



# Broadband Strategic Plan

## PREPARED FOR El Paso County Colorado

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December 31, 2018





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FIBER AND BROADBAND

January 2, 2019

Jeff Eckhart  
Chief Information Officer  
El Paso County Colorado  
325 S. Cascade Avenue  
Colorado Springs, CO 80903

Subject: Final Broadband Strategic Plan Submittal

Dear Mr. Eckhart:

The **HR Green, Inc.** (HR Green) project team is pleased to provide El Paso County with the attached Broadband Strategic Plan.

Through nearly nine months of dedicated effort, our team has interviewed, surveyed, interacted with and collected input from a wide range of constituents in the County. Leaders in County government and economic development, public safety, school districts and hospitals provided essential input into the needs of the public sector. In depth surveys were collected from more than 540 residents of the County to ensure the voice of your constituents were captured. Meetings were held with the private sector to determine if, and how, partnerships could be created to solve common challenges.

The inputs received through meetings and surveys have identified a number of key areas in which improved broadband can drive economic development, improve the livability of underserved geographies in the county, and create meaningful improvements for the county and its residents and businesses.

The importance of broadband to the future of El Paso County was well documented. While the entire County was within scope of this study, a heavy emphasis was placed on low density, smaller cities, and unincorporated geographies. With just a few notable outliers, the dense urban core of Colorado Springs is generally considered well served by incumbent broadband. However, through the course of this initiative, we identified that half of the residents in the unincorporated areas have little access to high-speed internet service that qualifies as broadband level service. These rural residents are on the wrong side of the so-called "Digital Divide" and risk not having access to educational, health and economic, benefits which are tied to broadband access in the 21st Century economy.

The study identified a number of incumbents whose investment in broadband infrastructure is focused on incorporated urban centers. Service to underserved portions of the county will require the advancement of relationships with willing partners, some of which are currently in the formative stages thanks to the County's efforts. In short, modest levels of support from the County to create partnerships with the private sector, may create real and measurable progress. Over time, and with the county's leadership and involvement, we believe the county can be transformed into one in which tomorrow's "Gig-Economy" will be a reality for all residents and businesses.



Jeff Eckhart

Broadband Strategic Plan Submittal

January 2, 2019

## FIBER AND BROADBAND

The dividends from these investments are many and are documented throughout the study. For example, broadband services can create enhancements in information technology, health care, government services, employment opportunities, and educational growth. Other benefits will likely include increases in property values, job creation in the unincorporated areas and cost reductions for its residents and small businesses. In short, the study found the benefits of a continuing a leadership role for the county will likely exceed any program costs in ways that can be quantifiable.

In as much as the county has created a robust transportation network in cooperation with the private sector for the past century, now creating a high speed, and in particular, Gigabit-speed Broadband infrastructure can pave the way for accelerating economic growth, assisting private sector businesses, increasing public safety and enhancing security for the County's residents.

The attached strategic plan provides five key recommendations to enable the county to meets its goals to create a county well-served by advanced communication services:

- Create Public-Private Partnerships as a Means to Extend Broadband
- Identify Targeted Improvement Zones & Develop Project Strategies
- Develop and Formalize Supportive Public Policy
- Align Projects to Mutual Needs
- Identify A Champion and Provide Resources to Implement

We strongly believe that the County must engage with both the public and private sectors proactively to create lasting change. Opportunities are present and will required ongoing commitment to drive the process. Thus, as part of this plan, we believe the County should identify resources, including an internal "champion," to drive implementation of the plan. We believe it is critical that this structure must be present to achieve the County's goals by creating the conditions necessary for the private sector to build world-class infrastructure and broadband services here in El Paso County.

We would like to specifically recognize Jeff Eckhart for his leadership and support as well as the two firms who partnered with HR Green to provide expertise and input into the creation of this strategic plan. Blakely + Associates was integral to the creation and execution of the public outreach for this study. CTC Technology & Energy associates were integral to the study of wireless connectivity, federal funding and to the evaluation of public safety applications for improved communication services.

Thank you for allowing us to be part of the initial solution. We eagerly look forward to seeing the county's progress!

Sincerely,

A blue ink signature of David S. Zelenok.

David S. Zelenok, PE  
Local Governmental Services Manager

A blue ink signature of Edward K. Barrett.

Edward K. Barrett  
Practice Leader, Fiber & Broadband Services

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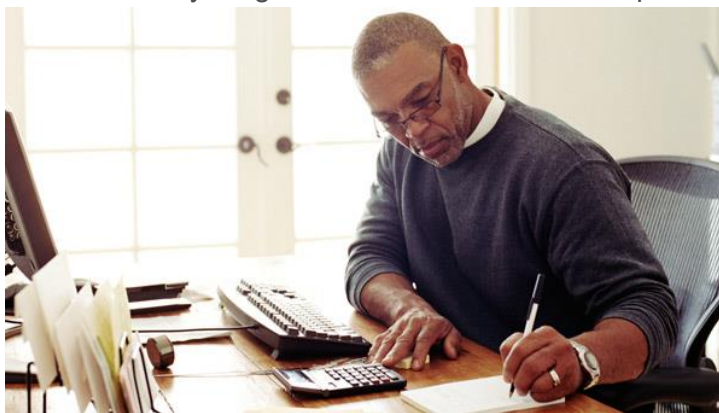
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■ **SECTION 1: EXECUTIVE SUMMARY**

## **Section 1: Executive Summary**

El Paso County contracted HR Green and its partners in the Spring of 2018 to provide a comprehensive broadband assessment and provide a strategic plan to address underserved residents in the County. (“Study”). The HR Green team has spent nine months exploring the current broadband conditions in the County. Residential and Business surveys were conducted, and meetings held with private providers in the County to “ground truth” the current and planned broadband conditions. Meetings were held with Potentially Affected Interest groups (PAIs) to understand how broadband availability affects schools, libraries, public safety agencies, medical systems and economic development efforts. Interviews were conducted with governmental department heads to understand current and future needs of government.



This study provides an overview of the current conditions and, more importantly, attempts to provide a series of recommendations and strategies through which the County can create positive forward movement for its constituents. It recommends a number of alternatives through which the creation and expansion of public-private partnerships (P3) alternatives can create meaningful change. Importantly, the plan suggests specific, actionable next steps through which to accomplish those goals.

## **KEY FINDINGS**

### **FINDING #1: Broadband Availability and Satisfaction in El Paso County is highly bifurcated**

While the County has more than 10 internet service providers, the underlying technologies used to deliver services creates a highly divided level of service and resident satisfaction. The Federal Communications Commission’s defines Advanced Telecommunication Services of 25 Megabits per second (Mb/s) download and 3 Mb/s upload speed. In general, fiber optics and cable-based internet are available in most urban and high population density areas that provide speeds at or above the federal definition of broadband.

Residents and businesses in more rural and lower population density areas are generally served by fixed wireless, cellular or through DSL technologies. As a whole, these technologies underperform the standard of service for broadband. This dichotomy has created a County in which higher speed services are clustered in municipalized geographies, leaving some rural residents underserved and unsatisfied with their current services.

■ **SECTION 1: EXECUTIVE SUMMARY**

**FINDING #2: Anchor Institutions are Generally Well-Served**

Meetings with representatives from anchor institutions paint a picture of a generally well-served sector. While there are some needs in public safety, most libraries, hospitals and schools currently have their needs well-met. Private fiber optic communication links are more available to these groups, which have leveraged existing state and federal funding programs to create high-speed (in many cases fiber optic-based) linkages to many locations inside the County.



**FINDING #3: The County Prefers to Address the Issue via Partnerships**

County Commissioners and El Paso County leadership have expressed a strong belief that the private sector and the free market should drive the solutions necessary to resolve broadband issues in underserved areas of the County. County leadership does not believe it is the role of government to be a direct service provider or compete with private sector providers in delivery of broadband services.

However, County leadership **is an** advocate for addressing underserved residents and inefficient market conditions through public-private partnerships and exploring opportunities for creating joint or shared broadband infrastructure. The low densities and difficult geographies inside parts of El Paso County have made private-sector deployment of advance infrastructure an economic challenge for many of the private carriers. Meetings with incumbent providers indicates an interest in creating partnerships with the county to extend and improve services in underserved areas.

The best opportunities for partnership exist where the County can help the private sector by sharing or defraying costs by providing joint-build and colocation opportunities to deploy last-mile solutions in areas where the County and private providers share a common interest in broadband infrastructure. Other opportunities exist to extend the County's fiber optic network for various purposes and allow excess capacity to be used by others, including other governmental agencies and the private sector.

Several of the recommendations of this study are based on the County's preference for private public partnerships to address broadband concerns, including the creation of focused Targeted Improvement Zones inside the County.

■ **SECTION 1: EXECUTIVE SUMMARY**

**FINDING #4: The County Needs Policies to Encourage the Creation of Broadband “Currency”**

In order to address underserved areas, the County should develop assets that align to this strategic plan and make them available through partnerships with the private sector. These assets are often referred to as “broadband currency” because they can be brought to the table and used to assist other governmental functions and leverage private sector participation. The County does not have current policies or a formal basis in which to identify, purchase, lease or share assets like fiber optic cable, conduits, building/tower sites, etc. In order to create the P3 partnerships identified as the preferred path forward, additional policies and practices must be created and institutionalized.

**KEY RECOMMENDATIONS**

This report suggests five recommendations that we believe will allow the County to achieve its strategic goals related to broadband availability in the County. These observations and recommendations are detailed further in subsequent sections of this report, but are summarized below:

**RECOMMENDATION #1: Create Public-Private Partnerships as a Means to Extend Broadband**

The County recognizes the importance of improving broadband access for underserved El Paso County residents. Real broadband service throughout the County will drive social and economic benefits for businesses, residents and the public sectors (a summary of the impact of broadband on rural development is provided later in this report).

The creation of effective Public-Private Partnerships will enable the County to target the use of scarce resources such as staff time, County budget to the areas in which the highest potential impact can occur.

A partnership model will enable the County to take on a non-ownership, facilitator role to shepherd the

deployment of assets in a way that enables the private sector to service areas of the County that would not be financially feasible without some sort of intervention. It is highly likely that these areas would not see meaningful improvements in broadband service without some sort of intervention, so the County, the private sector and residents and businesses receive advantage due to the County’s facilitative role. Combined, the results of a coordinated program could exceed individual initiatives, accelerating deployment of broadband infrastructure, reducing costs and increasing competition.





## ■ SECTION 1: EXECUTIVE SUMMARY

Based on the county's preference to address broadband service through partnership with the private sector, it is our recommendation that the county create a robust outreach and coordination program with private providers and public partners. Because telecommunications services are deployed relatively rapidly, it is important for the county to have existing strategic plans and existing relationships with the private sector.



We recommend that the county create a working group with these providers. This group would meet quarterly to discuss issues of interest to both the county and its partners. The group's membership would be made up of wired providers, wireless internet service providers (WISPs), cellular service providers and utilities such as Colorado Springs Utilities, Fountain Electric and other interested public sector partners.

By creating a forum for the open sharing of information, the County can engage the private sector as a real partner to help solve the broadband service issue that exists in many rural parts of the county.

## RECOMMENDATION #2: Identify Targeted Improvement Zones & Develop Project Strategies

There exists a number of areas inside the County in which a confluence of residential, business, County and anchor institution needs create opportunities to develop shared solutions. These Targeted Improvement Zones should be studied in further detail to determine the viability and form of solutions that involve the County, other public entities and the private sector. As part of this study, three areas were identified as Targeted Improvement Zones.

- **Ute Pass:** The County is partnering with the Colorado Department of Transportation and local governments to jointly fund and build fiber infrastructure from Interstate 25 to the western El Paso County boundary near Green Mountain Falls. This fiber is a significant asset and could help to address needs of residents and businesses in Green Mountain Falls, Manitou Springs and surrounding areas.
- **Black Forest to Calhan:** The Black Forest area is shown on state broadband maps to be well served. The survey of residents paints a much more bleak picture of broadband service in the area. With a relatively high population to serve, the route through the area to Calhan could create improvements for a large number of residents. The County has significant facility needs in Calhan and desire to improve connectivity at the Fairgrounds.
- **City of Fountain:** The City of Fountain is currently studying its options for community broadband. A potential community-owned broadband service would reach beyond the city limits and could serve in excess of 7,000 El Paso County unincorporated County residents who reside inside the electric service area of Fountain Municipal Utilities. The



■ **SECTION 1: EXECUTIVE SUMMARY**

County could assist in various ways with this effort, increasing access to County residents.

- **Woodmen Valley:** Late in the study, an organized group of citizens living south of the Air Force Academy highlighted their concern for improvements to the current DSL service in this enclave. Residents are reporting only a single service provider and download speeds that in some cases deliver less than 5 Mbps.

**RECOMMENDATION #3: Develop and Formalize Supportive Public Policy**

The County is currently reviewing its Community Development and Planning Comprehensive Plan. This creates a unique opportunity to develop and align a number of supportive policies that will enable the creation of broadband currency in the County. The most critical is the creation of a Dig-Once/Joint Build policy, which will help the County to develop assets and broadband currency. In addition, the County's pavement degradation and street cut policies should be updated to ensure full cost-recovery. Additional policies to govern the deployment of 5G/Small cell infrastructure also rank high on the list of recommended policy enhancements.

Communities around the country have created miles of assets at a deep discount to standalone deployment by cooperatively building excess conduit alongside public works improvements or even other private sector development. Planning Department leadership has expressed its support for a program that leverages the comprehensive planning process to create a unified plan to leverage broadband solutions.

**RECOMMENDATION #4: Align Projects to Mutual Needs**

The County should create a Broadband Master Plan that identifies key Targeted Improvement Zones and additional projects that can improve services for underserved populations. This Master Plan should identify paths in which the deployment of fiber and conduit can create a platform for future private-sector service enhancement.

During the course of this project, five projects were identified that meet the criteria outlined above:

- **Ute Pass:** Upon completion of the proposed US Hwy 24 West / Ute Pass CDOT partnership, the County will acquire broadband assets that can be used to address not only future County needs in western El Paso County, but the potential to create a public-private partnership to address the broadband needs of residents, businesses, and governments in Green Mountain Falls, Chipita Park, Cascade and surrounding areas.
- **Black Forest to Calhan:** The County has significant facilities in Calhan and desires to improve connectivity at the Fairgrounds. A middle-mile fiber connection to these facilities could be created with enough excess capacity to enable the private sector to use the new fiber route to enhance service into the Black Forest area and Calhan.
- **City of Fountain:** Should Fountain proceed with a broadband project, the County could facilitate this project, if it occurs, through the sharing of conduit assets that currently run from Fountain's municipal boundary to the internet carrier hotel location in Colorado Springs.

■ **SECTION 1: EXECUTIVE SUMMARY**

- **Woodman Valley:** Evaluate the needs and potential solutions to serve this enclave south of the Air Force Academy, including potential partnerships with private sector providers.
- **Southern Service Center:** There exists and opportunity to leverage communication infrastructure to serve County facilities in the southwest corner of the County. If the County determines that a project is feasible, partnerships with the private sector could create improvements in broadband service for this area.

**RECOMMENDATION #5: Identify Champion and Provide Resources to Implement**

There are numerous recommendations included in this summary, and at a higher level of detail, throughout the various sections of this strategic plan. One of the most crucial recommendations, is to create a structure of both resources and an internal organization structure to sustainably execute this plan.

The implementation champion(s) need not be a technology professional, but must be someone who has a strong grasp of the **value** to the county of implementing this study's recommendations. Importantly, due to the need for cooperation by multiple functions within the county's structure, these champions must not only have a passion for the initiative, but also have the authority and the political capital to influence across county departments in order to drive successful outcomes.

A successful model in Colorado is the creation of a Local Technology Planning Team (LTPT). Nearby, Teller County has had a highly effective LTPT which is supporting the implementation of their 2017 broadband master plan. Chaffee County is currently forming their own LTPT in the coming weeks following passage of SB-152 exemption. In this model, a county commissioner often plays a lead role, leveraging others inside county government, and including other state and local officials and the private sector.

El Paso County's Technology Planning Team (using whatever moniker chosen by the group) should include at least one senior staff member and one elected official who, together, could bring the combined strengths of both the administrative and intergovernmental perspectives necessary for sustained advancements. Staff members attending could often include Planning/Community Development, Public Works and IT to achieve the group's stated goals and objectives.

Finally, the county must provide financial resources over a multi-year period to support projects that are of critical importance. One such model that should be considered is the model currently in use by the Economic Development Department. While not deeply staffed, this department acts as a navigator to ensure that the important work required to manage business incentives, community initiatives and housing are coordinated and executed. The County may wish to consider hiring a broadband project manager or identifying a key consulting resource to fulfill that role in order to have the right talent to advance the complex relationships and roles required. A budget should be set to cover both the time and the necessary capital and operating expenses that may be incurred in pursuit of goals.

■ **SECTION 2: PUBLIC OUTREACH & INVOLVEMENT**

## **Section 2: Public Outreach & Involvement**

In order to better understand the needs of the community, the HR Green team solicited input from County residents, businesses and potentially affected interest (PAI) groups. Residents and businesses were invited to participate in surveys which collected data regarding the availability and satisfaction with wired and wireless communication options. PAI groups, which included fire departments, health care providers, schools, libraries and economic development officials, were invited to share their opinions through both targeted surveys and group-specific focus groups.

The residential and business survey ascertained the current state of communications services in the County, was intended to help the County better understand constituent demand for improved services. Separate surveys were issued to residents and businesses, and response rates differed significantly between the two groups.

### **RESIDENTIAL SURVEY FINDINGS**

For residential service, more than 800 surveys were received, and 677 of those surveys contained enough data to be considered “materially complete.” This results in a 99% confidence level that responses are accurate to within +/-5%. The full findings of the Residential Survey by questions are found in Appendix I of this document. However, there are a number of key findings that are discussed in more detail below, which helps to illustrate the challenging conditions today and indicate a need for more robust broadband services in the future in large sections of underserved areas of the County.

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.

### **The Rural Digital Divide is Real in El Paso County**

Federal statistics indicated a meaningful divide in access to broadband between urban and rural areas of the country. Nearly 43% of rural America does not have access to broadband services, where DSL and Wireless Internet are the predominant technologies available.

El Paso County is a region of significant diversity. Mountainous terrain in the west, a strong urban core in Colorado Springs and a more ranching/rural base in the east. In order to better understand the diversity of services in the County, this study’s methodology identified 10 areas which would receive specific focus to help the County better understand the diversity of broadband availability and adoption.

Those areas included:

- Manitou Springs
- Monument
- Fountain
- Black Forest Region
- Peyton
- Calhan
- Ellicott
- Truckton
- Turkey Creek Region
- Rural Ute Pass Region

## SECTION 2: PUBLIC OUTREACH & INVOLVEMENT

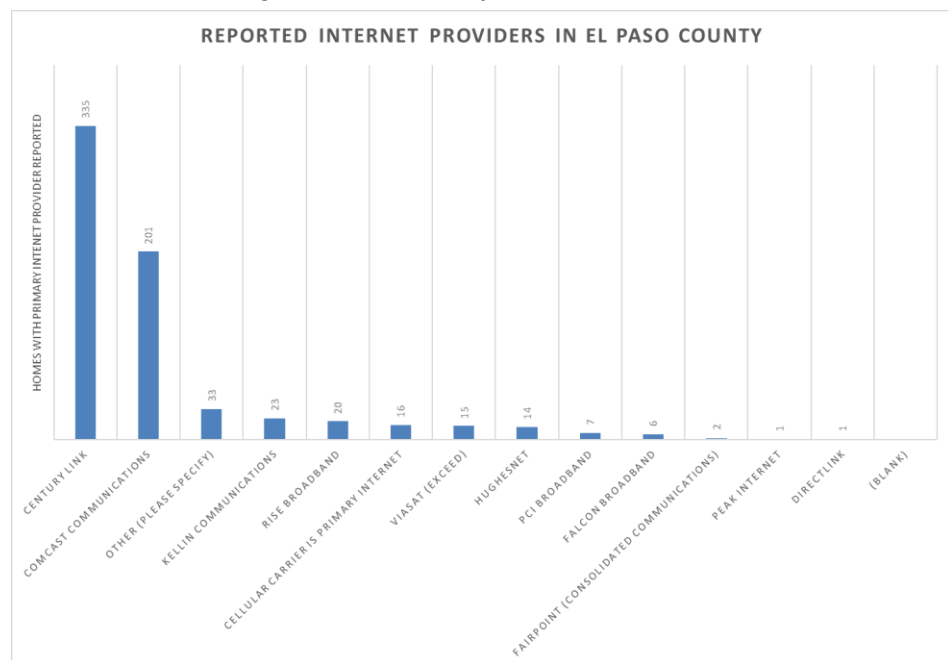
Ute Pass and Turkey Creek Region did not receive enough survey responses to validate further investigation on conditions in those areas. Because of the similarities of town size, and relatively small sample sizes, the towns of Ellicott and Calhan were combined, and Truckton was expanded to include Yoder in the analysis of satisfaction and speeds.

As a whole, the average speed of download reported in the County was 51.1Mbps. Average speeds in Colorado Springs, Manitou Springs, Monument and Fountain – communities generally served by the advanced technologies discussed above, were in excess of that average. Unfortunately, the situation is much worse in rural areas. Calhan/Ellicott reported an average speed of 5.6 Mbps; Yoder/Truckton 6.9 Mbps, Peyton 19.6 Mbps. The Black Forest region reported an average of 28.0 Mbps, but removing two users who report personal fiber connection speeds of 1Gbps, lowers this average to just 18.0 Mbps for the region.

In summary, El Paso County represents a microcosm of the larger picture of broadband availability in the United States. Well served urban and larger population centers have access to cable and fiber optic connectivity, while smaller/rural communities frequently leave residents with service that does not meet the federal standard.

Figure 2-1: El Paso County Internet Provider Counts

The vast majority of homes in El Paso County are served by two primary providers. CenturyLink is the internet carrier for 50% of the homes in the survey, while Comcast services 30% of the homes. The remaining share of the market is divided between a number of Wireless Internet Service Providers (WISPs) and local wireline carriers. These firms have between 2-5



percent shares of the market and include Kellin, Rise PCI, StratusIQ (formerly Falcon Broadband), Fairpoint and Peak Internet. Roughly two percent of homes have cellular-only internet services. Finally, the satellite providers capture roughly 4% of the market through ViaSat and HughesNet. **Specific details of provider availability, speeds and services by study area can be found in Section 3 of this report.**

## Technology is Creating Broadband “Haves” and “Have Nots” in El Paso County

El Paso County currently has at least nine terrestrial internet providers (not including satellite providers) who utilize a variety of technologies to provide internet services to homes and



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businesses. Throughout the County, the most striking difference in both service availability and satisfaction is tied to the underlying technology platforms.

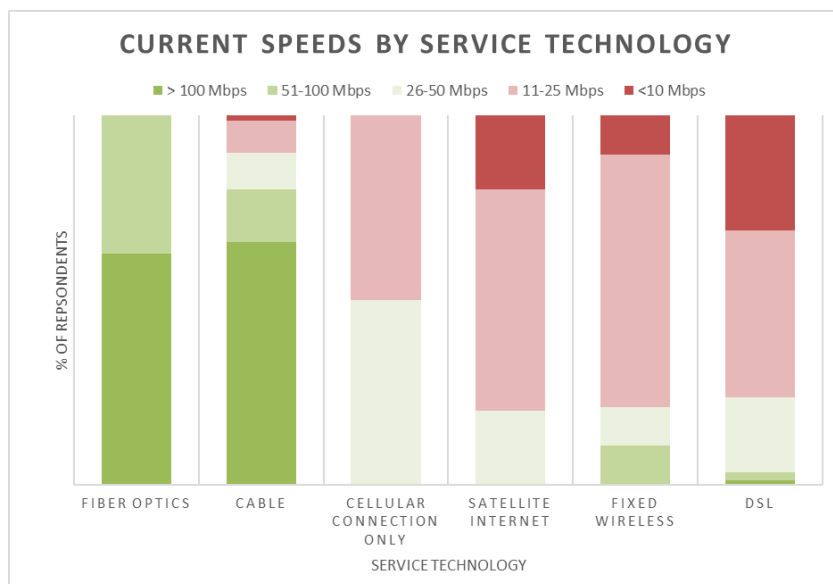
In urban areas where fiber optic and coaxial cable deployments have been made, speeds meet and exceed the broadband standard. Homes and businesses served by fixed wireless, DSL and satellite providers did not meet the federal definition. Further, beyond the issue of speed, overall satisfaction with services was markedly different when evaluating those on advanced platforms vs. those who were on lower capacity technologies.

The deployed network technology plays a significant role in the speeds respondents receive from their provider. Across the County, less than 4 percent of residents reported receiving broadband via fiber optic cable, which has the technical capability to deliver 1,000 Mbps (more commonly called “gigabit” broadband). Nearly 30% of County residents have access to Comcast’s coaxial network, which delivers via a DOCSIS 3.1 architecture where available. Even in areas where DOCSIS 3.0 is used, both technical platforms deliver in excess of the federal standard.

The picture outside of incorporated areas is less positive. Nearly 46% of County residents rely on Digital Subscriber Line (DSL) to deliver broadband to their homes, and the average reported download speed of 11.6 Mbps falls dramatically short of the federal broadband standard. Residents relying on fixed wireless and satellite technologies also consistently report speeds that did not meet the federal standard for broadband.

The graph to the right provides a summary of self-reported speed tests based on the underlying technologies.

Figure 2-2: Download Speeds by Type of Service



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### Providers are not Meeting Resident Expectations

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, El Paso County 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 (5.5 Rating) to residents and the low level of satisfaction with this component (2.6 Rating). This indicates a significant gap between expectation and reality for El Paso County residents.

Looking at the targeted study areas, the chart at right shows the overall satisfaction by location. As was the case with internet speeds, the locations in which fiber and cable internet is available has satisfaction levels that equate to the “somewhat satisfied” level of the survey choices. Residents of the more rural areas of the County, however, expressed significant overall **dissatisfaction** with the options available to them.

Figure 2-3: Reported Residential Importance vs. Satisfaction

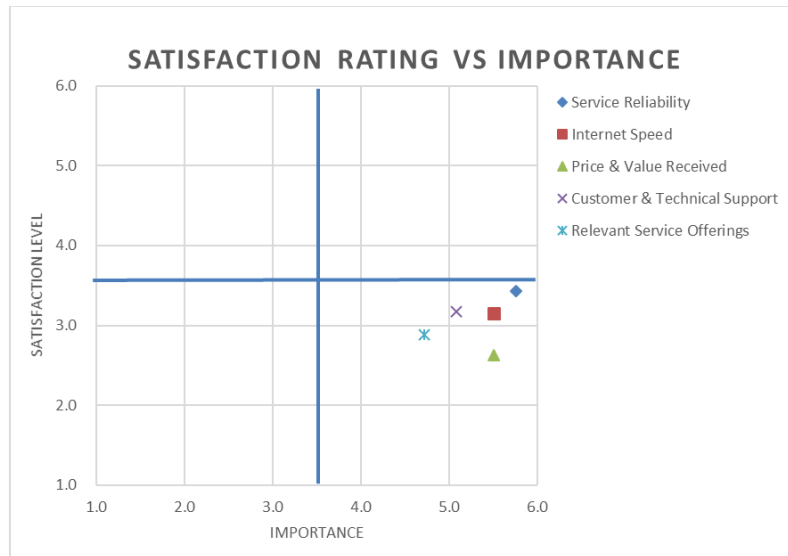
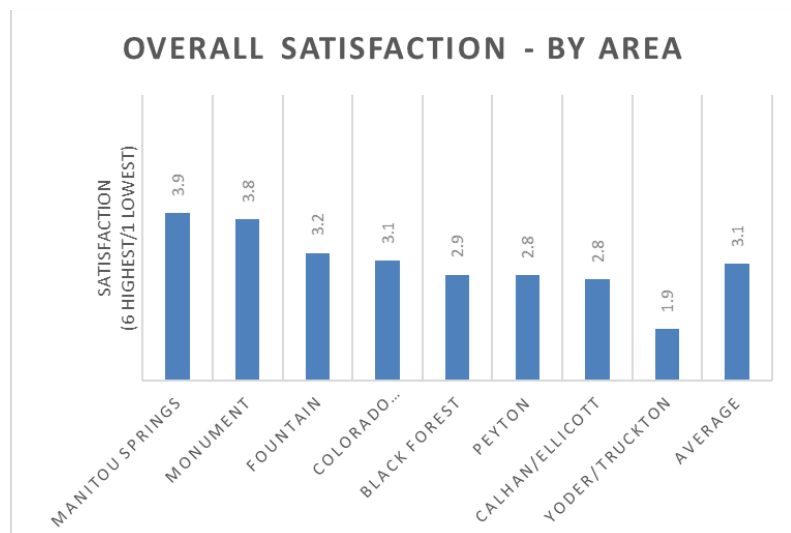


Figure 2-4: Overall Satisfaction by Study Area



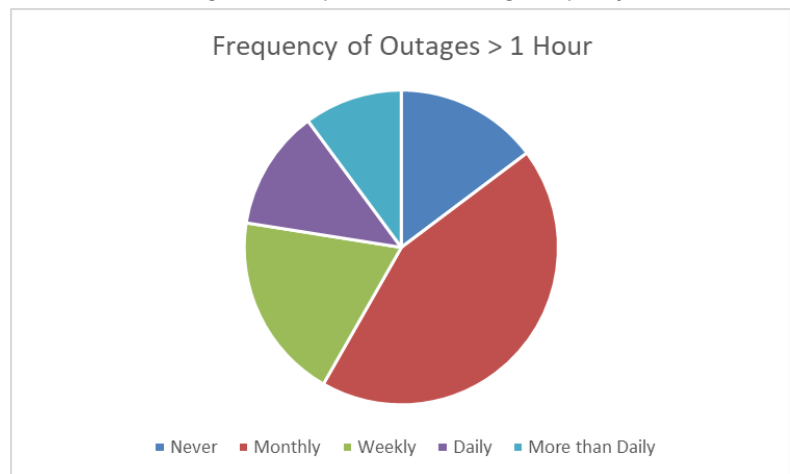
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### Outages are Too Common

Survey respondents indicated a high occurrence of internet outages through their current provider when compared to national averages. Twenty-two (22) percent of respondents indicated that they have an hour-long outage at least once a week. Nearly forty-two (42) percent of respondents indicated they have an hour-long outage at least monthly.

Most internet service providers (ISPs) attempt to attain a 99.999% (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 2-5: Reported Service Outage Frequency



**“Our internet connection is extremely unreliable. Service drops multiple times a day and their technicians can’t resolve the situation” – Black Forest resident.**

### State Maps Overstate Broadband Availability for most of Rural El Paso County

The Federal Communication Commission and the State of Colorado maintain broadband maps. The data in these maps is largely generated by self-reported data on the FCC’s Form 477. This data is provided to the FCC and state agencies twice per year and is intended to provide a representative picture of the availability of broadband speeds to consumers and businesses.

Recently, this mapping process has come under heavy public criticism for a variety of reasons. Perhaps the most common criticism is that national broadband maps count an entire census block served if one address within the block has service at that level. This means that if a single business has paid for a connection to a fiber optic, 1 Gbps connection, then that entire census block is considered served by 1Gbps service, even if the carrier is unwilling to connect others to that technology.

Colorado is to be commended for taking its Form 477 data and further zooming in to survey-based quarter-quarter sections of land when calculating served areas. However, our conversations with the state’s mapping agency also indicated that this methodology works very well in some areas of the state, but in others there is a much lower degree of certainty in the state data.

In order to validate the state mapping data, the survey asked residents to take a speed test on their service and to report upload and download speeds. This result was then overlaid against the state of Colorado map. A result of this analysis was shared with County Commissioners and is shown in the figure on the next page.

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Reviewing this map shows, for instance, that the state map considers the Black Forest area of El Paso County generally well-served with Broadband Services that meet the federal definition of 25/3 speeds. A closer look at reported speeds shows that many residents are unable to access these services and report speeds that are significantly slower than the broadband standard.

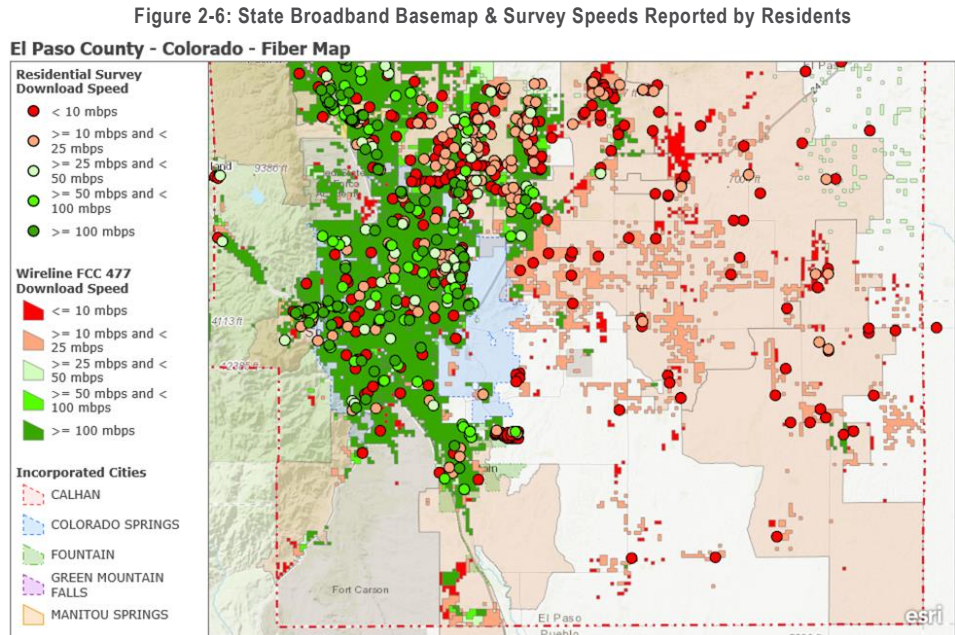
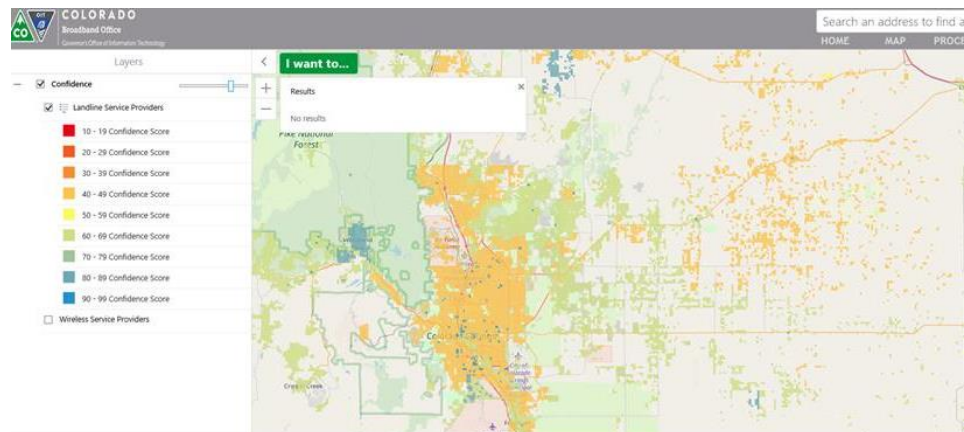


Figure 2-7: State of Colorado Broadband Confidence Level

The State of Colorado also provides a map that indicates its “confidence level” in FCC reported data. As can be seen in the map at right, much of Colorado Springs and the County as a whole, reflect a confidence level that is below 50%.



## BUSINESS SURVEY FINDINGS

Business responses were muted and there were not enough responses to create a statistically relevant analysis. With only 20 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 10 employees, mainly located in rural communities outside the bounds of Colorado Springs. These business owners 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.



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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 2.7 on the same 1-6 scale used for residential respondents.

One respondent was particularly passionate about this issue, and while one story should not drive strategy, his responses seemed to capture the feeling of many business

**“I daily have to tell clients I’m sorry, I can’t open that file... this puts me at a massive disadvantage.” – Black Forest resident.**

owners reporting their experience in rural regions of the County. Business owner Rick Christian, of the Alive Literary Agency, lives in the Black Forest Region. He reports that his agency needs internet to perform its work due to large data file size transfers and that he frequently has to drive into town to complete work, leaving himself and clients frustrated. A review of speeds, satisfaction scores and verbatim comments indicates a small business community that is generally dissatisfied with internet availability. Moreover, 15% of the respondents said that lack of internet availability has caused them to consider relocating or moving their business out of El Paso County.

### OUTREACH TO POTENTIALLY AFFECTED INTEREST GROUPS

Coordination with stakeholders and Potentially Affected Interest (PAI) groups is significant for several reasons. Primarily, it is important to know if these organizations follow the national pattern (that the surveys showed El Paso County was consistent with) of well served urban and larger population centers and not as well served rural areas. Also, it is important to understand how this connectivity (or lack thereof) affects their missions, their goals and their work.

For stakeholders and PAI groups, the FCC definition of broadband is only loosely applicable. If connectivity plays a significant role in delivery of their products or services, there are key factors of whether their broadband is adequate. For example, the level of speed and capacity can be critical for some stakeholders. For those who transmit large files or require a large capacity for coordination, 25 Mbps might be problematically inadequate. An unfortunate example of this was the fire coordination teams not having enough broadband capacity for their coordination tools in the fires in California in August 2018 (as reported in the New York Times August 22, 2018).

For many organizations, reliability is often one of the more critical measures of whether their broadband meets their needs. The disruption of frequent or long outages can be very damaging for some stakeholders. Examples of these are schools, medical facilities, emergency responders, businesses that rely on the internet, etc.

An important factor in reliability can be redundancy. To ensure the best redundancy possible, many stakeholders either look for a provider that offers more than one path to provide service or turn to multiple providers. For many businesses, schools, emergency management, government agencies, medical facilities, etc., having secondary connectivity in case the primary goes down can be critical. If there are areas that don’t have a good primary broadband option, having a redundant path can be very difficult. Some stakeholders in El Paso County pointed out

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that even having more than one provider doesn't guarantee redundancy. In the more rural areas, those providers might share the fiber path.

And, perhaps the most obvious or most visible question is if the broadband is affordable (whether it is good, reliable and/or redundant). If stakeholders are paying too much for connectivity and/or could save with another option (provided it is good and reliable), that is always an important consideration.

Lastly, it is important to know the stakeholders' and PAI groups' interest in exploring their possible involvement in any broadband assets the County might consider deploying. There can be reasons that some stakeholders might not be able to participate (or might have to delay participating) in broadband assets the County could explore providing. In some situations, or industries, it is common to have multiple year contracts with providers. Those contracts can delay or prohibit participation. Others have such good service at such good rates that they are up front that they don't see a reason to explore other options.

On the other side, we also find many who have a reason or multiple reasons why they want to participate in exploring the possibility of utilizing municipally deployed assets. Sometimes that is because the available providers have decided not to provide good connectivity to their specific area. Other times it is simply a matter of dollars – they are paying too much or don't feel that they can afford the prices of better service. Often, it is a question of reliability and/or the cost of redundancy.

Sometimes there are reasons that the stakeholders in an area see the need to explore municipally owned broadband infrastructure that surprise us. For example, a County in Western Minnesota decided to explore (and then to deploy) fiber, with the main reason being that there were a large number of senior citizens in their County and they wanted to find a way to help that large stakeholder group to stay in their homes (and, thus, in the County). So, they found ways to finance and monetize a fiber project and broadband related services for that stakeholder group. Of course, there were a lot of others who benefited from that, too.

## OUR PROCESS IN EL PASO COUNTY

So, to learn from the stakeholders and Potentially Affected Interest groups in El Paso County, we focused on the below categories as some of the key organizations and people to talk with about their broadband needs.

- County, city and town government leaders
- School Districts
- Library Districts
- Fire Departments/Districts and EMS
- Chamber of Commerce/business leaders
- Economic Development
- Military leaders
- Utilities
- State of Colorado leaders appropriate to these possibilities
- Medical facilities

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Our process was to develop and send a questionnaire to the members of these important stakeholder and PAI groups to ask questions about their current service, costs and reasons they might want El Paso County to help with broadband options. Next, we scheduled meetings with representatives within these categories to provide the opportunity to go deeper into these questions.

The questionnaire consisted of the following questions:

1. How well served is your organization with your current broadband services? Please explain why?
2. How would you rate your service for reliability and problem resolution? How frequently do users experience outages on your current platform? What has been the impact of those outages?
3. Do you own your own network or do you lease services from an internet service provider to connect and carry your internet traffic?
4. Who is your current internet provider? What is your actual level of service in megabits or gigabits per second? What is your monthly cost of service for internet access?
5. How long is your current contract? When is the expiration date of services under your current agreement? Are you locked into a collective purchasing or joint purchasing relationship (if so please describe the nature of the relationship)?
6. If El Paso County were to enlist the private sector and provide some sort of assistance to help improve internet services to your organization, would you be interested in participating?
7. What are the current trends in technology that are affecting your industry? Looking forward, in five years, what types of broadband service do you expect you will need to effectively meet your mission?

## OBSERVATIONS AND RESULTS

### Observation 1: Location Matters

Responses from the Potentially Affected Interest groups generally followed the survey findings in the residential survey. In general, anchor institutions located in more municipal geographies fairly consistently reported multiple provider options, adequate coverage and reasonable pricing. Several groups – those in education, military and medicine – reported high satisfaction with incumbent services, or have leveraged other funding sources to develop owned networks to service their needs.

Conversely, institutions located in rural areas of El Paso County reported difficulty in access to effective broadband. Of particular note, the cost of fiber optic speeds is prohibitive (where it is available) and redundancy are often not feasible. The Pikes Peak Library District, for instance, services both municipal and rural library locations, leaving just a single provider who can service all of its locations. While the district feels basic broadband needs are currently met, price (current pricing and even more if they want to increase speed and capacity) and redundancy are significant concerns.

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Economic development officials reported significant concerns with economic development challenges caused by this dichotomy. Section 6 of this report discusses the impact of inadequate broadband on economic development in rural communities. El Paso County seems to follow the national trends, with significant impacts to job creation, both through large scale business attraction and with creation of small and entrepreneurial businesses.

**“We run into problems in the more rural parts of the County. If you can’t provide the services businesses require in today’s world and in a non-cost prohibitive way it will be nearly impossible to attract most businesses to your community.” - Tammy Fields, Chief Economic Development Officer, Colorado Springs Chamber of Commerce**

**Observation 2: Emergency Management Is Affected**

Emergency management, fire districts, emergency medical services, etc. are critical components of our society. Because of the nature of their operations, they typically use a mix of connectivity options ranging from fiber to buildings (if available), radios, pagers, cellular in field operations and Wi-Fi if that is available.

From our discussions with these groups in El Paso County, we found some good models that were working well and some needs. For example, within Colorado Springs, all of the fire stations are connected by fiber, creating a highly effective connected infrastructure. Pikes Peak Regional Communications Network and the City of Colorado Springs and El Paso Counties have a cooperative radio communication arrangement that is working well.

In the more rural parts of the County, there are connectivity issues in certain areas that should be part of a County response. Multiple organizations reported “dead spots” in the County. Dead spots could mean emergency communication calls are dropped (for example, when emergency personnel are communicating via wireless) and/or when tools that they use won’t perform because those rely on internet.

Several organizations have towers in the County, with varying levels of fiber optic service to those facilities. It may be beneficial to have a comprehensive tower inventory (including provider towers, if possible) to help develop a clearer picture of needs.

A more robust explanation of public safety results can be found in Section 5 of this plan.

**Observation 3: Service and Necessary Redundancy are extremely expensive**

While, not every meeting and survey participant shared their costs, those who did often reported prices above the national averages. Stakeholders discussed different services that they paid for ranging from primary connection, Wide Area Networks, and secondary redundant connection.

The ranges that people paid for these services were from \$1,500/mo. for 1Gb of service (no other services) to over \$10K per month for multiple Gbps connections in primary and secondary sources. For more than 1 Gb, the higher side of that range was not uncommon. Services to

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anchor institutions with speeds under 300 Mbps appears to be more in line with national averages.

As a point of comparison, across the US, the average 2015 price paid for gigabit service by more than 10,000 schools enrolled in federal E-Rate funding program was roughly \$3,000 per month. The 2016 projected median price was \$2,650 per month, and it was projected to drop further over time<sup>1</sup>. The disparity between rural and urban school districts is particularly pronounced. Colorado Springs District 11 pays \$1.13 per Mbps over two 5 Gbps links, while rural Peyton District 23 pays \$4.17 per Mbps on a 100 Mbps link<sup>2</sup>.

The cost of telecommunication services is a meaningful component of many agency budgets. In fact, as part of the study, a review of El Paso County communication charges was conducted. For the first quarter of 2019, the County spent \$145,755.01 on voice and data communication services, which means an annual run rate of nearly \$600,000. While much of this spending is required for specific circuits, a meaningful portion of this is spent on broadband data services. Across the County, it is likely that anchor institution spending is well north of \$1 million per year.

Because government can wait longer for returns-on-investment, the county may desire to evaluate the creation of owned/lit fiber to replace the data services currently purchased from the private sector. This is particularly true for Targeted Improvement Zones in which there is secondary benefit to extending residential and business services through partnerships.

### **Observation 4: There is interest in Public-Public Partnerships**

Almost all of the stakeholders and Potentially Affected Interest groups expressed interest in working cooperatively with the County to improve broadband availability in El Paso County. (The only exception was specific military uses that don't have a lot of flexibility to work outside of their system.)

The main questions that they asked were about reliability, costs and the level of involvement the County would require. In many cases, anchor institutions shared their willingness to participate may be bound by long-term contracts, but that there would be a strong interest in exploring alternatives in the future.

Responses indicate that there is a wide recognition of the need for better broadband in the County and a generally strong interest in exploring County partnerships. Given the breadth of the groups that expressed this interest, there are strong opportunities for the County to create partnerships with anchor institutions to improve service availability, price and redundancy.

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<sup>1</sup> Source [www.compareandconnectk12.org](http://www.compareandconnectk12.org)

<sup>2</sup> Source [www.compareandconnectk12.org](http://www.compareandconnectk12.org)



■ **SECTION 3: WIRED MARKET ASSESSMENT**

## **Section 3: Wired Market Assessment**

At present, residents and businesses in El Paso County can obtain internet access services from a variety of ISPs (internet service providers) and WISPs (wireless internet service providers) via DSL (over copper), cable, fixed wireless, and satellite. Our review of available service providers indicates that there are eight providers operating networks within the County's five district boundaries.

- Two primary internet incumbents (Comcast and CenturyLink)
- Six Internet Service Providers (Peak Internet, TDS, PCI Broadband, StratusIQ (formerly Falcon Broadband), Viaero Wireless and Windstream)

This section describes consumer internet offerings available to residents and businesses from seven established ISPs and WISPs. Its goal is to draw a representative picture of the internet market in El Paso County and include one or more providers that serve their customers via copper (DSL), cable, fixed-wireless, and satellite. Given the relative remoteness (in comparison to Colorado Springs) and relatively low population density of El Paso County rural areas, great care has been taken to characterize the availability of internet access in El Paso County by provider and transport media, and to limit inclusion in this list to providers for which a meaningful degree of availability and customer penetration can be verified. A list of selected areas (Zip Codes) in four of the five districts was analyzed based on feedback from El Paso County staff.

<b>District</b>	<b>Area (Zip Code)</b>
1	Monument (80132)
2	Black Forest (80908), Calhan (80808), Peyton (80831)
3	Manitou Springs (80829), Rural Zip 80921
4	Ellicott (80808), Fountain (80817), Truckton (80864), Turkey Creek Canon (80926)
5	n/a

The on-line ads of a number of ISPs attempt to claim that their services are available ubiquitously across an entire region of the country while further analysis often leads to the conclusion that their actual penetration in a given area is too low to be of significance to the larger study. Given El Paso County's relatively low population density outside the core downtown area and its location relative to other population centers it is important to keep a provider's primary access media in mind (copper, satellite, etc.) as some media are inherently better suited, performance wise or cost wise, to a given population distribution and its topography.

The following statistics describe internet availability by transport medium (DSL, cable, etc.) in El Paso County with data drawn from two dedicated websites <sup>4,6</sup> which are consistent in every regard excepting one small variance, residential cable availability, which is noted on the following page.

■ **SECTION 3: WIRED MARKET ASSESSMENT**

**INTERNET PROVIDERS IN DISTRICT 1 – MONUMENT (80132) (EL PASO COUNTY, CO)**

“There are 7 home internet options and 14 business internet companies with available service in Monument 80132. 99.1% of customers can get fixed-line service. The number of providers in this zip code is above average.

Internet service providers (ISPs) in 80132:

- 1 fiber provider
- 3 DSL providers
- 2 cable providers
- 1 fixed wireless provider
- 14 business providers
- Satellite TV & internet providers.”<sup>5</sup>

Internet service type	Availability: Percentage of residents with access to this service type
Fiber	1% <sup>4</sup> , 8.2% <sup>6</sup>
Cable	96% <sup>4</sup> , 93.1% <sup>6</sup>
DSL	100% <sup>4</sup> , 97.6% <sup>6</sup>
Fixed wireless	34.6% <sup>6</sup>
Satellite	100% <sup>6</sup>

The following table provides an overview of the most popular ISPs in Monument and their entry level service packages.<sup>1,2,3,4,5,6,7,8,9,10,11,12,13,14,15</sup> **Note: The rates in this table reflect the promotional pricing that ISPs typically offer for the first 12 – 24 months of service, customarily with a term commitment of similar duration.** Longer term, non-promotional rates are discussed further down.

Service Type	Provider	Monthly rates starting at Res/Business	Speeds starting at “up to” (down/up)	Availability	Consumer rating 5 = best
Fiber	CenturyLink	\$55.00/\$64.99	40M/20M (res) 40M/5M (bus)	7.7% <sup>5</sup>	2.5 <sup>4</sup>
DSL (copper)	CenturyLink	\$45.00/\$54.99	12M/1M (res) 20M/1M (bus)	89.9.0% <sup>5</sup>	2.5 <sup>4</sup>
Cable	Comcast	\$29.99/\$84.90	15M/5M (res) 25M/5M (bus)	96.2% <sup>5</sup>	3.5 <sup>4</sup>
Fixed Wireless	Kellin	\$69.99/NA	15M/4M	26.8% <sup>5</sup>	UA <sup>4</sup>
Satellite	HughesNet	\$49.99/NA	25M/3M	>100% <sup>5</sup>	UA <sup>4</sup>
	Viasat (Excede)	\$49.99/NA	12M/3M		UA <sup>4</sup>

■ **SECTION 3: WIRED MARKET ASSESSMENT**

**INTERNET PROVIDERS IN DISTRICT 2 – BLACK FOREST (80908) (EL PASO COUNTY, CO)**

“There are 9 home internet options and 11 business internet companies with available service in Colorado Springs 80908. 98.9% of customers can get fixed-line service. The number of providers in this zip code is above average.

Internet service providers (ISPs) in 80908:

- 3 fiber providers
- 1 DSL provider
- 1 cable providers
- 5 fixed wireless providers
- 11 business providers
- Satellite TV & internet providers.”<sup>5</sup>

Internet service type	Availability: Percentage of residents with access to this service type
Fiber	6% <sup>4</sup> , 14.3% <sup>6</sup>
Cable	39% <sup>4</sup> , 40% <sup>6</sup>
DSL	100% <sup>4</sup> , 93.2% <sup>6</sup>
Fixed wireless	50.3% <sup>6</sup>
Satellite	100% <sup>6</sup>

The following table provides an overview of the most popular ISPs in Black Forest and their entry level service packages.<sup>1,2,3,4,5,6,7,8,9,10,11,12,13,14,15</sup> **Note: The rates in this table reflect the promotional pricing that ISPs typically offer for the first 12 – 24 months of service, customarily with a term commitment of similar duration.** Longer term, non-promotional rates are discussed further down.

Service Type	Provider	Monthly rates starting at Res/Business	Speeds starting at “up to” (down/up)	Availability	Consumer rating 5 = best
Fiber	CenturyLink	\$45.00/\$64.99	20M/2M (res) 40M/2M (bus)	8.7% <sup>5</sup>	2.5 <sup>4</sup>
	PCI	\$29.95/\$299.95	15M/7.5M (res) 10M/10M (bus)	1.9% <sup>5</sup>	UA <sup>4</sup>
	StratusIQ	\$49.95/\$299.95	25M/20M (res) 10M/10M (bus)	1.1% <sup>5</sup>	UA <sup>4</sup>
DSL (copper)	CenturyLink	\$45.00/\$54.99	12M/1M (res) 20M/1M (bus)	92.0% <sup>5</sup>	2.5 <sup>4</sup>
Cable	Comcast	\$29.99/\$84.90	15M/5M (res) 25M/5M (bus)	36.0% <sup>5</sup>	3.5 <sup>4</sup>
Fixed Wireless	Rise	\$39.95/\$74.95	25M/4M	26.3% <sup>5</sup>	UA <sup>4</sup>
	PCI	\$39.95/\$99.95	20M/10M	19.8% <sup>5</sup>	UA <sup>4</sup>
	DirectLink	\$49.90/\$79.95	5M/1M	10.7% <sup>5</sup>	UA <sup>4</sup>
	Kellin	\$69.99/NA	15M/4M	??% <sup>5</sup>	UA <sup>4</sup>
	Peak	NA/\$70	20M/10M	NA	UA <sup>4</sup>
Satellite	HughesNet	\$49.99/NA	25M/3M	>100% <sup>5</sup>	UA <sup>4</sup>
	Viasat (Excede)	\$49.99/NA	12M/3M		UA <sup>4</sup>

■ **SECTION 3: WIRED MARKET ASSESSMENT**

**INTERNET PROVIDERS IN DISTRICT 2 – CALHAN (80808) (EL PASO COUNTY, CO)**

“There are 8 home internet options and 11 business internet companies with available service in Colorado Springs 80808. 84.2% of customers can get fixed-line service. The number of providers in this zip code is above average.

Internet service providers (ISPs) in 80808:

- 1 fiber providers
- 2 DSL providers
- 1 cable provider (<1%)
- 4 fixed wireless providers
- 11 business providers
- Satellite TV & internet providers.”<sup>5</sup>

Internet service type	Availability: Percentage of residents with access to this service type
Fiber	0% <sup>4</sup> , 1.9% <sup>6</sup>
Cable	0% <sup>4</sup> , 0% <sup>6</sup>
DSL	84% <sup>4</sup> , 85% <sup>6</sup>
Fixed wireless	55% <sup>6</sup>
Satellite	100% <sup>6</sup>

The following table provides an overview of the most popular ISPs in Calhan and their entry level service packages.<sup>1,2,3,4,5,6,7,8,9,10,11,12,13,14,15</sup> **Note: The rates in this table reflect the promotional pricing that ISPs typically offer for the first 12 – 24 months of service, customarily with a term commitment of similar duration.** Longer term, non-promotional rates are discussed further down.

Service Type	Provider	Monthly rates starting at Res/Business	Speeds starting at “up to” (down/up)	Availability	Consumer rating 5 = best
Fiber	CenturyLink	\$45.00/\$64.99	20M/2M (res) 40M/2M (bus)	2.1% <sup>5</sup>	2.5 <sup>4</sup>
DSL (copper)	CenturyLink	\$45.00/\$54.99	12M/1M (res) 20M/2M (bus)	73.8% <sup>5</sup>	2.5 <sup>4</sup>
	Fair Point (Consolidated Communications)	\$25/\$52.95	10M/1M (res) 10M/1M (bus)	13.5% <sup>5</sup>	UA <sup>4</sup>
Cable	Comcast	\$29.99/\$84.90	15M/5M (res) 25M/5M (bus)	<1% <sup>5</sup>	3.5 <sup>4</sup>
Fixed Wireless	Rise	\$39.95/\$74.95	25M/4M	35.1% <sup>5</sup>	UA <sup>4</sup>
	Kellin	\$69.99/NA	15M/4M	48.4% <sup>5</sup>	UA <sup>4</sup>
	DirectLink	\$49.90/\$79.95	5M/1M	3.2% <sup>5</sup>	UA <sup>4</sup>
Satellite	HughesNet	\$49.99/NA	25M/3M	>100% <sup>5</sup>	UA <sup>4</sup>
	Viasat (Excede)	\$49.99/NA	12M/3M		UA <sup>4</sup>

■ **SECTION 3: WIRED MARKET ASSESSMENT**

**INTERNET PROVIDERS IN DISTRICT 2 – PEYTON (80831) (EL PASO COUNTY, CO)**

“There are 13 home internet options and 18 business internet companies with available service in Peyton 80831. 96.5% of customers can get fixed-line service. The number of providers in this zip code is above average.

Internet service providers (ISPs) in 80831:

- 2 fiber providers
- 2 DSL providers
- 3 cable providers
- 6 fixed wireless providers
- 18 business providers
- Satellite TV & internet providers.”<sup>5</sup>

Internet service type	Availability: Percentage of residents with access to this service type
Fiber	12% <sup>4</sup> , 6% <sup>6</sup>
Cable	54% <sup>4</sup> , 41.6% <sup>6</sup>
DSL	95% <sup>4</sup> , 96.2% <sup>6</sup>
Fixed wireless	79.1% <sup>5</sup> , 45.4% <sup>6</sup>
Satellite	100% <sup>6</sup>

The following table provides an overview of the most popular ISPs in Peyton and their entry level service packages.<sup>1,2,3,4,5,6,7,8,9,10,11,12,13,14,15</sup> **Note: The rates in this table reflect the promotional pricing that ISPs typically offer for the first 12 – 24 months of service, customarily with a term commitment of similar duration.** Longer term, non-promotional rates are discussed further down.

Service Type	Provider	Monthly rates starting at Res/Business	Speeds starting at “up to” (down/up)	Availability	Consumer rating 5 = best
Fiber	CenturyLink	\$45.00/\$64.99	40M/20M (res) 40M/5M (bus)	2.2% <sup>5</sup>	2.5 <sup>4</sup>
	StratusIQ	\$49.95/\$299.95	25M/20M (res) 10M/10M (bus)	6.7% <sup>5</sup>	UA <sup>4</sup>
DSL (copper)	CenturyLink	\$45.00/\$54.99	12M/1M (res) 20M/1M (bus)	91.5% <sup>5</sup>	2.5 <sup>4</sup>
	Integra				2 <sup>4</sup>
Cable	Comcast	\$29.99/\$84.90	15M/5M (res) 25M/5M (bus)	53.8% <sup>5</sup>	3.5 <sup>4</sup>
	StratusIQ			29.4% <sup>5</sup>	UA <sup>4</sup>
Fixed Wireless	Rise	\$19.95/\$74.95	5M/1M (res) 25M/4M (bus)	79.1% <sup>5</sup>	UA <sup>4</sup>
	PCI	No Service	10M/4M	61.2% <sup>5</sup>	UA <sup>4</sup>
	Kellin	\$69.99/NA	15M/4M	45.7% <sup>5</sup>	UA <sup>4</sup>
	DirectLink	No Service	5M/1M	6.2% <sup>5</sup>	UA <sup>4</sup>
Satellite	HughesNet	\$49.99/NA	25M/3M	>100% <sup>5</sup>	UA <sup>4</sup>
	Viasat (Excede)	\$49.99/NA	12M/3M		UA <sup>4</sup>



■ **SECTION 3: WIRED MARKET ASSESSMENT**

**INTERNET PROVIDERS IN DISTRICT 3 – MANITOU SPRINGS (80829) (EL PASO COUNTY, CO)**

“There are 6 home internet options and 9 business internet companies with available service in Manitou Springs 80829. 95.6% of customers can get fixed-line service. The number of providers in this zip code is above average.

Internet service providers (ISPs) in 80829:

- 1 DSL provider
- 2 cable providers
- 3 fixed wireless providers
- 9 business providers
- Satellite TV & internet providers.”<sup>5</sup>

Internet service type	Availability: Percentage of residents with access to this service type
Fiber	0%
Cable	92% <sup>4</sup> , 91.5% <sup>6</sup>
DSL	100% <sup>4</sup> , 94.2% <sup>6</sup>
Fixed wireless	77% <sup>6</sup>
Satellite	100% <sup>6</sup>

The following table provides an overview of the most popular ISPs in Manitou Springs and their entry level service packages.<sup>1,2,3,4,5,6,7,8,9,10,11,12,13,14,15</sup> **Note: The rates in this table reflect the promotional pricing that ISPs typically offer for the first 12 – 24 months of service, customarily with a term commitment of similar duration.** Longer term, non-promotional rates are discussed further down.

Service Type	Provider	Monthly rates starting at Res/Business	Speeds starting at “up to” (down/up)	Availability	Consumer rating 5 = best
DSL (copper)	CenturyLink	\$45.00/\$54.99	12M/1M (res) 20M/1M (bus)	94.9% <sup>5</sup>	2.5 <sup>4</sup>
Cable	Comcast	\$29.99/\$84.90	15M/5M (res) 25M/5M (bus)	91.3% <sup>5</sup>	3.5 <sup>4</sup>
Fixed Wireless	Rise	\$19.95/\$74.95	5M/1M (res) 25M/4M (bus)	62.2% <sup>5</sup>	UA <sup>4</sup>
	PCI	\$39.95/\$99.95	20M/10M	50.3% <sup>5</sup>	UA <sup>4</sup>
	Kellin	\$69.99/NA	15M/4M	8.6% <sup>5</sup>	UA <sup>4</sup>
	Peak	NA/\$70	20M/10M	15% <sup>5</sup>	UA <sup>4</sup>
Satellite	HughesNet	\$49.99/NA	25M/3M	>100% <sup>5</sup>	UA <sup>4</sup>
	Viasat (Excede)	\$49.99/NA	12M/3M		UA <sup>4</sup>

■ **SECTION 3: WIRED MARKET ASSESSMENT**

**INTERNET PROVIDERS IN DISTRICT 3 – COLORADO SPRINGS (80921) (EL PASO COUNTY, CO)**

“There are 9 home internet options and 18 business internet companies with available service in Colorado Springs 80921. 98.7% of customers can get fixed-line service. The number of providers in this zip code is above average.

Internet service providers (ISPs) in 80921:

- 3 fiber providers
- 1 DSL provider
- 2 cable providers
- 3 fixed wireless providers
- 18 business providers
- Satellite TV & internet providers.”<sup>5</sup>

Internet service type	Availability: Percentage of residents with access to this service type
Fiber	15% <sup>4</sup> , 12.6% <sup>6</sup>
Cable	95% <sup>4</sup> , 96% <sup>6</sup>
DSL	100% <sup>4</sup> , 97.2% <sup>6</sup>
Fixed wireless	5% <sup>6</sup>
Satellite	100% <sup>6</sup>

The following table provides an overview of the most popular ISPs in Rural 80921 and their entry level service packages.<sup>1,2,3,4,5,6,7,8,9,10,11,12,13,14,15</sup> **Note: The rates in this table reflect the promotional pricing that ISPs typically offer for the first 12 – 24 months of service, customarily with a term commitment of similar duration.** Longer term, non-promotional rates are discussed further down.

Service Type	Provider	Monthly rates starting at Res/Business	Speeds starting at “up to” (down/up)	Availability	Consumer rating 5 = best
Fiber	CenturyLink	No Service	40M/20M (res) 40M/5M (bus)	9.8% <sup>5</sup>	2.5 <sup>4</sup>
	StratusIQ	No Service		7.2% <sup>5</sup>	UA <sup>4</sup>
DSL (copper)	CenturyLink	\$45.00/\$54.99	3M/1M (res) 20M/1M (bus)	97.6% <sup>5</sup>	2.5 <sup>4</sup>
Cable	Comcast	\$29.99/\$84.90	15M/5M (res) 25M/5M (bus)	95.8% <sup>5</sup>	3.5 <sup>4</sup>
Fixed Wireless	Rise	No Service	5M/1M (res) 25M/4M (bus)	6.1% <sup>5</sup>	UA <sup>4</sup>
Satellite	HughesNet	\$49.99/NA	25M/3M	>100% <sup>5</sup>	UA <sup>4</sup>
	Viasat (Excede)	\$49.99/NA	12M/3M		UA <sup>4</sup>

■ **SECTION 3: WIRED MARKET ASSESSMENT**

**INTERNET PROVIDERS IN DISTRICT 4 – ELLICOTT (80808) (EL PASO COUNTY, CO)**

“There are 8 home internet options and 11 business internet companies with available service in Calhan 80808. 84.2% of customers can get fixed-line service. The number of providers in this zip code is above average.

Internet service providers (ISPs) in 80808:

- 1 fiber provider
- 2 DSL provider
- 1 cable providers
- 4 fixed wireless providers
- 11 business providers
- Satellite TV & internet providers.”<sup>5</sup>

Internet service type	Availability: Percentage of residents with access to this service type
Fiber	0% <sup>4</sup> , 1.9% <sup>6</sup>
Cable	0% <sup>4</sup> , 0% <sup>6</sup>
DSL	84% <sup>4</sup> , 85% <sup>6</sup>
Fixed wireless	48.4% <sup>6</sup>
Satellite	100% <sup>6</sup>

The following table provides an overview of the most popular ISPs in Ellicott and their entry level service packages.<sup>1,2,3,4,5,6,7,8,9,10,11,12,13,14,15</sup> **Note: The rates in this table reflect the promotional pricing that ISPs typically offer for the first 12 – 24 months of service, customarily with a term commitment of similar duration.** Longer term, non-promotional rates are discussed further down.

Service Type	Provider	Monthly rates starting at Res/Business	Speeds starting at “up to” (down/up)	Availability	Consumer rating 5 = best
Fiber	CenturyLink	No Service	40M/20M (res) 40M/5M (bus)	2.1% <sup>5</sup>	2.5 <sup>4</sup>
DSL (copper)	CenturyLink	No Service	12M/1M (res) 20M/1M (bus)	73.8% <sup>5</sup>	2.5 <sup>4</sup>
	Fair Point (Consolidated Communications)	No Service	10M/1M (res) 10M/1M (bus)	13.5% <sup>5</sup>	2.5 <sup>4</sup>
Cable	Comcast	No Service	15M/5M (res) 25M/5M (bus)	<1% <sup>5</sup>	3.5 <sup>4</sup>
Fixed Wireless	Kellin	\$69.99/NA	15M/4M	48.4% <sup>5</sup>	UA <sup>4</sup>
	Rise	No Service	5M/1M (res) 25M/4M (bus)	35.1% <sup>5</sup>	UA <sup>4</sup>
Satellite	HughesNet	\$49.99/NA	25M/3M	>100% <sup>5</sup>	UA <sup>4</sup>
	Viasat (Excede)	\$49.99/NA	12M/3M		UA <sup>4</sup>

■ **SECTION 3: WIRED MARKET ASSESSMENT**

**INTERNET PROVIDERS IN DISTRICT 4 – FOUNTAIN (80817) (EL PASO COUNTY, CO)**

“There are 9 home internet options and 19 business internet companies with available service in Fountain 80817. 96.9% of customers can get fixed-line service. The number of providers in this zip code is above average.

Internet service providers (ISPs) in 80817:

- 2 fiber providers
- 2 DSL providers
- 2 cable providers
- 3 fixed wireless providers
- 19 business providers
- Satellite TV & internet providers.”<sup>5</sup>

Internet service type	Availability: Percentage of residents with access to this service type
Fiber	1% <sup>4</sup> , 9.1% <sup>6</sup>
Cable	90% <sup>4</sup> , 87.1% <sup>6</sup>
DSL	100% <sup>4</sup> , 93.8% <sup>6</sup>
Fixed wireless	78% <sup>6</sup>
Satellite	100% <sup>6</sup>

The following table provides an overview of the most popular ISPs in Fountain and their entry level service packages.<sup>1,2,3,4,5,6,7,8,9,10,11,12,13,14,15</sup> **Note: The rates in this table reflect the promotional pricing that ISPs typically offer for the first 12 – 24 months of service, customarily with a term commitment of similar duration.** Longer term, non-promotional rates are discussed further down.

Service Type	Provider	Monthly rates starting at Res/Business	Speeds starting at “up to” (down/up)	Availability	Consumer rating 5 = best
Fiber	PCI	\$29.95/\$299.95	15M/7.5M (res) 10M/10 (bus)	8.6% <sup>5</sup>	UA <sup>4</sup>
	CenturyLink	Not Available	20M/2M (res) 40M/2M (bus)	8.7% <sup>5</sup>	2.5 <sup>4</sup>
DSL (copper)	CenturyLink	\$45.00/\$54.99	20M/1M (res) 20M/1M (bus)	93.0% <sup>5</sup>	2.5 <sup>4</sup>
Cable	Comcast	\$29.99/\$84.90	15M/5M (res) 25M/5M (bus)	89.8% <sup>5</sup>	3.5 <sup>4</sup>
Fixed Wireless	Rise	\$19.95/\$74.95	5M/1M (res) 25M/4M (bus)	77.2% <sup>5</sup>	UA <sup>4</sup>
	Kellin	\$69.99/NA	15M/4M	50.4% <sup>5</sup>	UA <sup>4</sup>
	PCI	\$39.95/\$99.95	10M/4M	45.8% <sup>5</sup>	UA <sup>4</sup>
Satellite	HughesNet	\$49.99/NA	25M/3M	>100% <sup>5</sup>	UA <sup>4</sup>
	Viasat (Excede)	\$49.99/NA	12M/3M		UA <sup>4</sup>

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**INTERNET PROVIDERS IN DISTRICT 4 – TRUCKTON (80864) (EL PASO COUNTY, CO)**

“There are 4 home internet options and 6 business internet companies with available service in Yoder 80864. 91.5% of customers can get fixed-line service. The number of providers in this zip code is above average.

Internet service providers (ISPs) in 80864:

- 1 fiber provider
- 2 DSL providers
- 1 fixed wireless provider
- 6 business providers
- Satellite TV & internet providers.”<sup>5</sup>

Internet service type	Availability: Percentage of residents with access to this service type
Fiber	0% <sup>4</sup> , 4% <sup>6</sup>
Cable	0% <sup>4</sup> , 0% <sup>6</sup>
DSL	88% <sup>4</sup> , 97.3% <sup>6</sup>
Fixed wireless	15.15% <sup>6</sup>
Satellite	100% <sup>6</sup>

The following table provides an overview of the most popular ISPs in Truckton and their entry level service packages.<sup>1,2,3,4,5,6,7,8,9,10,11,12,13,14,15</sup> **Note: The rates in this table reflect the promotional pricing that ISPs typically offer for the first 12 – 24 months of service, customarily with a term commitment of similar duration.** Longer term, non-promotional rates are discussed further down.

Service Type	Provider	Monthly rates starting at Res/Business	Speeds starting at “up to” (down/up)	Availability	Consumer rating 5 = best
Fiber	CenturyLink	No Service	20M/2M (res) 40M/2M (bus)	8.7% <sup>5</sup>	2.5 <sup>4</sup>
	SECOM	\$54.95	30M/15M	2% <sup>5</sup>	UA <sup>4</sup>
DSL (copper)	CenturyLink	\$45.00/\$54.99	10M/1M (res) 10M/1M (bus)	92.0% <sup>5</sup>	2.5 <sup>4</sup>
Cable	Comcast	No Service	15M/5M (res) 25M/5M (bus)	36.0% <sup>5</sup>	3.5 <sup>4</sup>
Fixed Wireless	SECOM	No Service	15M/8M	.1% <sup>5</sup>	UA <sup>4</sup>
Satellite	HughesNet	\$49.99/NA	25M/3M	>100% <sup>5</sup>	UA <sup>4</sup>
	Viasat (Excede)	\$49.99/NA	12M/3M		UA <sup>4</sup>



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**INTERNET PROVIDERS IN DISTRICT 4 – TURKEY CREEK CANON (80926) (EL PASO COUNTY, CO)**

“There are 3 home internet options and 6 business internet companies with available service in Colorado Springs 80926. 77.9% of customers can get fixed-line service. The number of providers in this zip code is above average.

Internet service providers (ISPs) in 80926:

- 1 DSL provider
- 2 fixed wireless providers
- 6 business providers
- Satellite TV & internet providers.”<sup>5</sup>

Internet service type	Availability: Percentage of residents with access to this service type
Fiber	NA
Cable	8% <sup>4</sup> , 3.2% <sup>6</sup>
DSL	95% <sup>4</sup> , 71.4% <sup>6</sup>
Fixed wireless	100% <sup>6</sup>
Satellite	100% <sup>6</sup>

The following table provides an overview of the most popular ISPs in Turkey Creek Canon and their entry level service packages.<sup>1,2,3,4,5,6,7,8,9,10,11,12,13,14,15</sup> **Note: The rates in this table reflect the promotional pricing that ISPs typically offer for the first 12 – 24 months of service, customarily with a term commitment of similar duration.** Longer term, non-promotional rates are discussed further down.

Service Type	Provider	Monthly rates starting at Res/Business	Speeds starting at “up to” (down/up)	Availability	Consumer rating 5 = best
Fiber	CenturyLink	Not Available	20M/2M (res) 40M/2M (bus)	0% <sup>5</sup>	2.5 <sup>4</sup>
DSL (copper)	CenturyLink	\$45.00/\$54.99	5M/1M (res) 10M/1M (bus)	67.5% <sup>5</sup>	2.5 <sup>4</sup>
Cable	Comcast	No Service	15M/5M (res) 25M/5M (bus)	0% <sup>5</sup>	3.5 <sup>4</sup>
Fixed Wireless	Kellin	\$69.99/NA	15M/4M	94.8% <sup>5</sup>	UA <sup>4</sup>
Satellite	HughesNet	\$49.99/NA	25M/3M	>100% <sup>5</sup>	UA <sup>4</sup>
	Viasat (Excede)	\$49.99/NA	12M/3M		UA <sup>4</sup>

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In interpreting and providing a proper context for viewing the data in the above table, which should be used as a guideline for understanding the present state of internet services in El Paso County, rather than an absolute measure, a few notes are in order.

- In regards to speeds, all ISPs advertise a maximum achievable or “up to” data speed which is what a consumer can expect to experience only under the best of all circumstances. The actual speeds enjoyed by customers on average are typically lower than the advertised “up to” speeds and can be highly variable across a given 24-hour period. This is because all internet service providers, regardless of transport medium, employ in their designs some degree of concentration and sharing of network resources. In a survey of informational and provider websites, no service provider publishes a guaranteed minimum throughput speed.
- The incumbent provider of basic telephony services and DSL (internet access over copper) is CenturyLink (CTL). DSL is a competitive product whose realized speeds can vary significantly due to a number of factors, from as low as 1Mbps/.25Mbps to 12M/3M, but engineering guidelines typically dictate that the distance to the customer from the central office or DSLAM (Digital Subscriber Line Access Module) will not exceed 5,000 ft. of data-conditioned cable to qualify for DSL at all. Yet sources <sup>2,4</sup> indicate that DSL is available to 95% of the residential market and 100% of business customers in El Paso County.
- At the opposite end of the availability spectrum is satellite service. Because of their extra-terrestrial access scheme, satellite service providers theoretically can, and in practice often do, boast of availability approaching 100%.

Here is a representative statement from HughesNet’s website describing the availability of their internet services. *“Because HughesNet® provides Internet service to customers through the use of satellite technology, virtually every residential home and business in the continental U.S. can get HughesNet service. Service can be installed in any building with a clear view of the southern sky, making it a great option for people who live in rural areas”.*

This is of particular applicability to El Paso County given the middling penetration of twisted-pair copper and coaxial cable facilities.

It is our professional opinion (confirmed by a review of survey responses) that satellite providers offer a very unsatisfying, and low-speed option as a provider of broadband services. Further lessening the attractiveness of satellite providers are frequent and aggressive overall data caps, which limit the overall consumption (similar to cellular plans that cap data use on their networks).

#### **NON-PROMOTIONAL, MONTHLY RECURRING CHARGES AND HOW SERVICE PROVIDERS DIFFER IN ADVERTISING AND FURNISHING THE RANGE OF SERVICE PLANS:**

An analysis of the extended term service plans and various tiers available from the mix of ISPs providing internet services in El Paso County (and other cities) reveals that the key differentiating factors between plans and their prices is sometimes a business decision, but is more often tied to the underlying transport technology (i.e. DSL, fixed wireless, satellite). To

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compare and contrast these various service plans, the major ISPs in El Paso County will each now be discussed in detail.

#### **HughesNet.** HughesNet / Hughes

Communications are wholly owned by Echostar, headquartered in Germantown, Maryland. The ISP provides internet access via satellite. The key aspect that differentiates it and other satellite operators from terrestrial purveyors is not speed but data caps - how much data is allowed per month in a given plan. As you increase in service tiers, you pay more for more data. The downstream/upstream data rates for all residential and business plans is 25M/3M, starting at \$49.95 for residential service plus \$14.95 monthly for rental of a dish and modem and 10Gig of “anytime” data. Business plans start at \$69.95/month plus \$19.95 monthly for equipment rental plus a \$99 a one-time setup fee for 10Gig of “anytime” data. 25Gig of anytime data is available to business customers for \$99.99 a month plus equipment rental and set up fees.

Figure 3-1: Hughes Net Residential - Internet



#### **Excede / Viasat Internet**

**(Viasat).** In 2017, Excede was rebranded Viasat Internet headquartered in Carlsbad, CA, is another satellite-based service provider. Like Hughes, all

residential and business service plans advertise the same data rates of 12M/3M while data caps increase with more expensive plans starting at 12Gig residential and 30Gig for business plans. Business plans, which come with a static IP address, start at \$200/month for 30Gig of anytime data, and incur a \$600 one-time installation fee. There are no installation fees for residential service. Note however, for home-based businesses, even if the subscriber has a dish to receive residential services, a second dish is required to access business services. As data caps are met or exceeded, the customer is not charged for data overages but the speeds they experience are lowered.

Figure 3-2: Viasat Residential - Internet

Liberty 12	Liberty 18	Liberty 30
<b>\$69.99</b> a month for 24 months. <b>12GB of Priority Data</b> ⓘ <ul style="list-style-type: none"> <li>Download Speeds up to 25Mbps</li> <li>Upload speeds of 3Mbps</li> <li>Liberty Pass</li> </ul>	<b>\$99.99</b> a month for 24 months. <b>18GB of Priority Data</b> ⓘ <ul style="list-style-type: none"> <li>Download Speeds up to 25Mbps</li> <li>Upload speeds of 3Mbps</li> <li>3 Year Price Lock Guarantee</li> </ul>	<b>\$149.99</b> a month for 24 months. <b>30GB of Priority Data</b> ⓘ <ul style="list-style-type: none"> <li>Download Speeds up to 25Mbps</li> <li>Upload speeds of 3Mbps</li> <li>Free Standard Installation</li> </ul>
<a href="#">Call Now</a>	<a href="#">Call Now</a>	<a href="#">Call Now</a>

**CARLSBAD, Calif., June 26, 2018** - Today, global communications company [Viasat Inc.](#) (NASDAQ: VSAT), launched America’s fastest satellite internet service for businesses, nationwide. The service offers a variety of unlimited and metered data plans with download speed options ranging from 35 Megabits per second (Mbps) across most of the U.S. up to 100 Mbps in select areas.

Viasat has a 3-month promotional internet pricing with the next generation satellite service. Also, a bundle and save promotion is available when adding Voice and/or DirectTV with the Viasat internet service.

Figure 3-3: ViaSat Residential – Internet  
**Order Viasat Home Satellite Internet**

#### Select Package

UNLIMITED BRONZE 12	UNLIMITED SILVER 25	UNLIMITED GOLD 50	UNLIMITED PLATINUM 100
<b>12 Mbps</b> <small>DOWNLOAD SPEED</small>	<b>25 Mbps</b> <small>DOWNLOAD SPEED</small>	<b>50 Mbps</b> <small>DOWNLOAD SPEED</small>	<b>100 Mbps</b> <small>DOWNLOAD SPEED</small>
Unlimited Data	Unlimited Data	Unlimited Data	Unlimited Data
 Video Streaming at Small Screen Quality Typically 360p	 Video Streaming at DVD Quality Typically 480p	 Video Streaming at HD Quality Typically 720p	 Video Streaming at Full HD Quality Typically 1080p
INCLUDES Built-In Wi-Fi	INCLUDES Built-In Wi-Fi	INCLUDES Built-In Wi-Fi	INCLUDES Built-In Wi-Fi
<b>\$50/mo</b> <small>\$70/mo after 3 months</small>	<b>\$70/mo</b> <small>\$100/mo after 3 months</small>	<b>\$100/mo</b> <small>\$150/mo after 3 months</small>	<b>\$150/mo</b> <small>\$200/mo after 3 months</small>

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**CenturyLink (CTL).** CenturyLink is a Monroe, LA based company founded in 1930. CTL is one

Figure 3-4: Residential - Bundles



of the nation's leading incumbent local exchange carrier (ILEC) providers of Internet, phone, TV data centers / colocation and home security

Figure 3-5: Residential - Internet



services. CTL employs over 50,000 employees and provides service in 37 states, including covering 91.8% of Colorado's population. CTL has deployed gigabit fiber service in 17 states, including Denver, Colorado. CenturyLink does provide a qualifying bundle packages, which consists of discounted pricing for double and triple bundle of core services purchased together. In addition, no service contracts, and Price for Life pricing guarantee allow for a savings over time options.

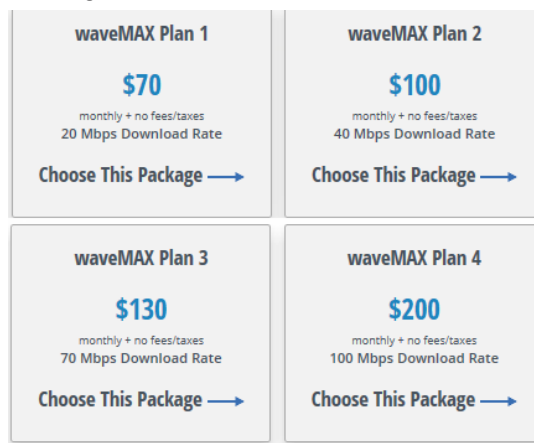
**StratusIQ (formerly Falcon Broadband).** StratusIQ specializes in Fiber-To-The-Premise (FTTP) and Hybrid-Fiber-Coax (HFC) communication services. The fiber backbone in Colorado Springs, reaches from Monument to Ft. Carson to StratusIQ. In residential areas, their technology deployments deliver Internet, phone & TV core services. StratusIQ currently has FTTH deployments in Woodmen Hills, The Gables, Courtyards, Banning Lewis Ranch, Flying Horse, Eastbrook, Davis Ranch and Cathedral Pines developments. StratusIQ has been locally owned and operated since its inception in 2003. StratusIQ's promotional pricing consists of 18-month contract with a \$5/month standard price discount. StratusIQ does provide bundled value package, which consists of discounted pricing for any two or three core services purchased together.

**Peak Internet (Peak).** Peak specializes in providing ultra-fast, ultra-reliable High-Speed Broadband Internet to Residential, Small Business, Enterprise and Government clients. Peak Internet builds, maintains and controls 100% of their network, with absolutely zero reliance on "the telephone company" or any other third party providers. Peak uses multiple technologies such as microwave, fiber and DSL to deliver Internet, phone & TV services.



Woodland Park, CO – June 27, 2018 – Peak Internet is proud to announce faster broadband speeds immediately available in the Woodland Park, CO market. Starting today fiberMAX 400 and fiberMAX 800 will be offered to homes and businesses with speeds of 400Mbps and 800Mbps respectively. Priced at just \$49.95 and \$99.95 per month when combined with an Advanced Networking Router rental.

Figure 3-6: Peak Internet Residential - Internet





### SECTION 3: WIRED MARKET ASSESSMENT

**PCI Broadband (PCI).** PCI is a Colorado based company formed in 1996 providing service throughout parts of the front range. PCI provides Internet Services (business), VoIP, Colocation or Business PBX. PCI has a 230-mile fiber network in Colorado Springs. The northern boundary is Interquest Parkway and runs south through Fountain. The eastern boundary is Markshuffel Rd through the western boundary of Gardens of the Gods. Business packages start at \$99.95/mo.

Figure 3-7: PCI Broadband Residential - Internet

Plan One	Plan Two	Plan Three	Plan Four
<b>200 Mbps Download</b> <b>100 Mbps Upload</b>	<b>100 Mbps Download *</b> <b>100 Mbps Upload</b>	<b>50 Mbps Download</b> <b>50 Mbps Upload</b>	<b>25 Mbps Download</b> <b>25 Mbps Upload</b>
Best for or serious users. • Video Conference • Lots of users • Major uploading	Best for standard usage or busy home. • Download multiple HD Movies • VPN • Upload videos	Best for small usage or home. • Download multiple HD Movies • VPN • Upload videos	Best for multiple users. • Stream Movies • Online gaming • Download music
<b>\$99.95/mo</b>	<b>\$59.95 (Sale Normally \$79.95)/mo</b>	<b>\$49.95/mo</b>	<b>\$39.95/mo</b>

\* only available in certain areas

**Comcast Cable / Xfinity (Comcast).** Comcast is a Philadelphia, PA based company formed in 1963. Comcast is one of the nation's leading providers of communications, entertainment and cable products and services. Comcast employs over 100,000 employees and owns 600,000 miles of fiber optic and HFC cable spanning 29 regional networks in 39 states. Comcast specializes in Hybrid-Fiber-Coax (HFC) communication technology to deliver Internet, phone, TV and home security services. Comcast does provide bundled value package, which consists of discounted pricing for double and triple play core services purchased together.

Figure 3-8: Comcast Residential - Triple Play

INTERNET TV VOICE	INTERNET TV VOICE	INTERNET TV HOME
X1 Starter Triple Play <b>\$89.99/mo</b> with 1-Year Agreement	X1 Starter Triple Play <b>\$109.99/mo</b> with 1-Year Agreement	X1 Preferred Secure Triple Play <b>\$139.99/mo</b> with 1-Year Agreement VISA \$100 Visa® Prepaid Card
Check Availability	Check Availability	Check Availability
Up To 150 Mbps Downloads 140+ VIEW CHANNELS	Up To 250 Mbps Downloads 140+ VIEW CHANNELS	Up To 400 Mbps Downloads 230+ VIEW CHANNELS

**Southeast Communications (SECOM).** SECOM is the broadband internet and telecommunications subsidiary of Southeast Colorado Power Association (SECPA), an electric power cooperative formed in 1937. SECOM has been providing competitive and innovative data transport solutions, based on high-speed fiber optic lines and equipment, since 1998. SECOM owns and maintain more than 1,300 miles of fiber throughout Southeastern Colorado. In 2008, SECOM purchased Rural-Com and Plains Online, two local internet service providers, expanding platforms to include residential wireless broadband. SECOM provides broadband internet, WAN and phone services to homes, schools, libraries, government entities, telecoms, and other businesses.

Figure 3-9: SECOM Residential - Internet

<b>30M Forte</b> <ul style="list-style-type: none"> <li>• 30 Mbps Download</li> <li>• 15 Mbps Upload</li> </ul> <b>\$54.<sup>95</sup> monthly</b>	<b>130M Forte</b> <ul style="list-style-type: none"> <li>• 130 Mbps Download</li> <li>• 75 Mbps Upload</li> </ul> <b>\$119.<sup>95</sup> monthly</b>
<b>80M Forte</b> <ul style="list-style-type: none"> <li>• 80 Mbps Download</li> <li>• 40 Mbps Upload</li> </ul> <b>\$79.<sup>95</sup> monthly</b>	<b>200M Forte</b> <ul style="list-style-type: none"> <li>• 200 Mbps Download</li> <li>• 200 Mbps Upload</li> </ul> <b>\$149.<sup>95</sup> monthly</b>

#### INTERNET

- Speeds up to 200 Mbps
- Carrier-grade technology for excellent reliability
- Fiber packages start at \$54.95/month
- Add phone service for \$25.00/month



### SECTION 3: WIRED MARKET ASSESSMENT

#### Kellin Communications (Kellin).

Kellin specializes in wireless high speed internet industry, opening its doors in 1999. Kellin has deployed products such as; DSL, ISDN, Fiber optics, and Fixed Wireless to deliver Internet & phone services.

**Rise Broadband (Rise).** Rise, headquartered in Englewood, Colorado, is the nation's largest fixed wireless broadband service provider, delivering high-speed Internet and digital voice services to nearly 200,000 residential and commercial customers across 16 states. Rise's parent company, JAB Wireless, Inc., was incorporated in 2005 and previously operated as Skybeam, Digis, T6, Prairie iNet and Rhino

Communications. All names were re-branded under the Rise name in 2015. Rise provides pricing discounts based on contract term length including installation discounts.

**FairPoint Communications / Consolidated Communications (Consolidated).** In 2017, FairPoint was purchased by Consolidated Communications headquartered in Mattoon, Illinois, Consolidated delivers a wide range of communications solutions, including:

data, voice, video, managed services, cloud computing and wireless backhaul to consumers, businesses and wireless companies and carriers an across 24-state service area. Its fiber network spans 36,000 route miles, making Consolidated the ninth largest fiber provider in the country. However, in the sampled ZIP code area, Consolidated did not provide service. Consolidated does provide bundled value package, which consists of discounted pricing for any two or three core services purchased together.

Figure 3-10: Kellin Communication Residential - Internet



Figure 3-11: Rise Broadband Residential - Internet

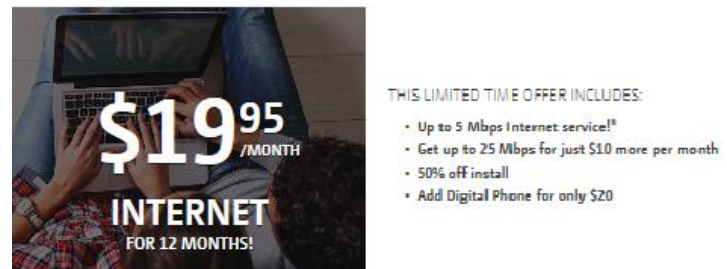
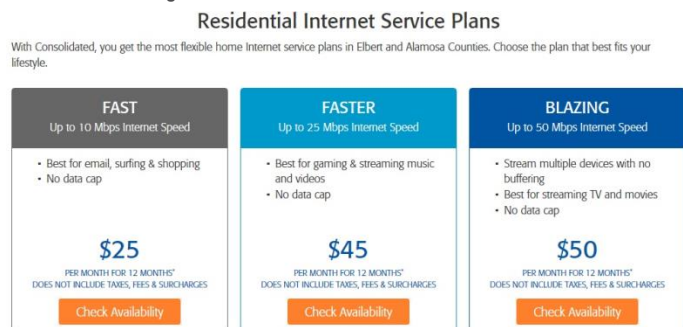


Figure 3-12: FairPoint Residential - Internet



### INTERNET SERVICE IS AVAILABLE, BUT HIGH SPEED BROADBAND LAGS OVERALL

As there are two satellite service providers in El Paso County, all with comparable service offerings, one could theoretically argue that due to the presence of these providers that excluding cost, everyone in El Paso County should be able to have internet access.

But observations and independent analysis<sup>1</sup> tell a different story. Availability cannot be equated with commitment. In the selected ZIP codes reviewed in El Paso County, the number of actual internet service subscribers falls far short of the number of potential customers with coverage available via one or more technologies, i.e. satellite only (>100%), fixed-wireless (>26%), cable

■ **SECTION 3: WIRED MARKET ASSESSMENT**

(>90%) or DSL (>67%). The reasons for this shortfall of internet access subscribers versus service availability are an area worthy of further investigation.

The website [www.broadbandsearch.net](http://www.broadbandsearch.net) summarizes their assessment of the situation as follows.

**Rating – Sloth Speeds**

District	Area (Zip Code)	Score
4	Truckton (80864)	14

***“Sloth Speeds.** There would be a gif of an adorable sloth loading in right now, but the internet here isn’t fast enough to load it. Unfortunately, has received one of our lowest Broadband Scores at 14. This score is calculated based upon average availability, internet speeds, prices, and user reviews.*

**Rating - Underachiever**

District	Area (Zip Code)	Score
1	Monument (80132)	30
2	Calhan (80808), Peyton (80831)	25, 32
3	Manitou Springs (80829)	33
4	Ellicott (80808), Fountain (80817)	25, 30

***“Underachiever.** Things are looking rough for **X**, CO. for broadband service. An underdog score of **X** was calculated based upon poor coverage, slow download and upload speeds, restrictive package pricing, and less than favorable user testimonials”.*

**Rating - Middle of the Road.**

District	Area (Zip Code)	Score
2	Black Forest (80908)	56
3	Rural Zip 80921	56
4	Turkey Creek Canon (80926)	56

***“Middle of the Road.** Getting internet in Colorado Springs, CO is a mixed bag. With a score of 56 you probably are not going to be streaming 4k video, but at least you can stream high definition. A Middle of the Road score places you in an area with average speeds, access, pricing, and feedback.”*

**VOICE AND VIDEO SERVICES**

The primary focus of HR Green’s competitive analysis was competing private broadband services. However, a complete analysis of the competitive marketplace is not complete without also understanding pricing for Voice and Video Services. Most providers seek to create value-added bundles of services, for instance a bundle of Voice, Video and Data (broadband) is frequently referred to as a “Triple Play” bundle.

A review of pricing, below, shows services provide by the primary carriers for standalone voice and video services. Bundling discounts become more complex than can be adequately reflected but are considered in the financial models created for El Paso County’s consideration.

■ **SECTION 3: WIRED MARKET ASSESSMENT**

Voice Provider		Residential Starting Monthly Phone Rates	Business Starting Monthly Phone Rates
CenturyLink		\$21	\$60
Comcast		\$20	\$29.95
Video Provider	Basic Package	MidTier Package	TopTier Package
CenturyLink*	\$29.99	\$39.99	\$44.99
Comcast*	\$39.99	\$49.99	\$59.99
Dish*	\$49.99	\$59.99	\$69.99/\$79.99
DirecTV*	\$40.00	\$75.00	\$115.00

\* Introductory Rates offered with contract.

**PRIVATE PROVIDER INTERVIEWS**

HR Green facilitated discussions with key incumbent providers and backhaul carriers to determine the current availability and planned expansion of high-speed networks within the study area. The goal of the discussions included:

- Validating the provider data captured
- Understanding each provider's expansion plans
- Identifying partnerships to advance the broadband agenda

**Findings:**

**CenturyLink (CTL).** Respondent – Abel Chavez / State & Local Government Affairs Director

1. Deployed Broadband Services?
  - a. There has been *explosive demand for internet as video services driving demand growth.*
  - b. *CenturyLink evaluates broadband deployment cost based on density, distance and terrain to justify 3-5-year ROI, while utilizing sources like CAF II funds, or other Federal and State grant fund programs.*
  - c. *CenturyLink's cost estimate to provide broadband service to the unserved areas is \$1 Billion, whereas, CAF II estimate has been as high as \$66 Billion.*
  - d. *CenturyLink's broadband service design is to support speeds of 40 Mbps to 80 Mbps based on trending study needs done by CenturyLink.*
    - 1) *Legacy network design is fiber to the node (curb) and copper to the premise to cover the last 1,500 feet (approximately) of terrain distance using DSL technology.*
    - 2) *Greenfield network design is fiber-to-the-home (FTTH) using GPON technology.*
  - e. *Fiber initiatives include fiber to business investments supporting Gigabit service, and fiberhood opportunity initiatives. The fiberhood initiative follows a tranche (zone) design approach and a precommitment service sign-up (pre-registration) to launch construction.*
  - f. *CenturyLink is current exploring the financial feasibility of deploying a fixed wireless broadband solution in the eastern parts of El Paso County to help with reaching more customer locations at a slightly lower capital outlay.*
2. Validated Services and Speeds Assessment in Study Area? Yes

■ **SECTION 3: WIRED MARKET ASSESSMENT**

3. Promotional / Standard Pricing? *Promotional - \$45.00 (res) / \$54.99 (bus)*
4. Planned expansion plans in the study are?
  - a. *In Colorado, CenturyLink is in year 4 of 6 using CAF 2 program (\$159 Million) to serve 50,000 of the 80,000 unserved customer locations in the state. As of end of year 3, CenturyLink has served the minimum 20,000 customer locations (20,224) required of the CAF II fund.*
  - b. *Through the first four years (2015 to 2018) of the six year CAF 2 program, CenturyLink has invested \$599,407 in construction of broadband facilities to serve 270 eligible customer locations as determined by the Federal Communication Commission (FCC). These rural locations were within six wire centers in El Paso County where there is no existing cable or fixed wireless broadband service available.*
  - c. *In the remaining two years (2019 and 2020), CenturyLink plans to invest an additional \$1,142,394 in construction to serve an additional 438 customer locations as determined by the FCC. These rural locations are within three wire centers in El Paso County (Monument, Rush and El Paso) where there is no existing cable or fixed wireless broadband service available, primarily in the northern and eastern parts of El Paso County.*
  - d. *CenturyLink has served 793 CAF II targeted service locations (Black Forest – 672, Calhan – 1, Fountain – 104, Monument – 11, Peyton – 5) that are within the El Paso County key study area.*
  - e. *CenturyLink design enables a HALO effect, which allows for additional service locations to be added along the route that are not a part of the CAF II targeted locations.*
  - f. *These investments do not include the ongoing CenturyLink costs of operating, maintaining and upgrading broadband facilities in these areas during the lifetime of the expanded network.*
5. Based on these plans, what are expected up to speeds? *40 Mbps to 80 Mbps in the overlapping CAF II area*
6. Willing to provide us with shapefile or.KMZ maps of your current network or proposed network expansions? *Colorado CAF 2 Broadband Fund Update*
7. If El Paso County were to enlist the private sector and provide some sort of assistance, would you be interested in participating?
  - a. *CenturyLink welcomes the opportunity to leverage our planned CAF 2 broadband investments in El Paso County by partnering and working collaboratively to address the broadband needs in unserved areas.*
  - b. *El Paso County can play an instrumental role in expanding the reach and coverage of CenturyLink CAF 2 investments in El Paso County by providing additional capital in areas adjacent to the company's expanded broadband footprint where federal funding was not offered or the construction costs are too high to achieve an adequate rate of return on investments.*
  - c. *CenturyLink is interested in public-private partnerships (P3) opportunities based on demand and customer willingness to purchase the service. CenturyLink, like any other business, must ensure on-going OPEX can be supported.*
  - d. *CenturyLink would respond to an El Paso County P3 RFP that answers the following needs:*

■ **SECTION 3: WIRED MARKET ASSESSMENT**

- 1) *What is the Broadband Speed, Service Coverage Area and Monthly Price expectations?*
- 2) *60-90-day response window*
- e. *CenturyLink P3 preference is to partner with state, County, city/town government entities.*
- f. *CenturyLink is less likely to partner in middle-mile projects based on already having fiber to their central offices including diverse fiber paths.*
- g. *CenturyLink is more likely to partner in last-mile projects, from central office to home, as that is biggest financial hurdle.*

**Comcast Cable / Xfinity (Comcast).** Respondent – Rob Timmons / Strategic Government Account Executive and Nicolas Jimenez / Director of Government & Regulatory Affairs  
Mr. Timmons expressed an openness to provide data and explore partnerships during the initial conference call. After providing the captured data and questionnaire, HR Green was unable to get a response from the Comcast staff despite repeated follow-ups. Below is the partial data captured from the initial discussion?

1. *Deployed Broadband Services? Hybrid Fiber Coaxial (HFC) deployment model, but can provide fiber to the business as backbone network is all fiber.*
2. *Validated Services and Speeds Assessment in Study Area?*
3. *Promotional / Standard Pricing? Can provide pricing, based on already having a state contract in place.*
4. *Planned expansion plans in the study are? Comcast Business Model, they will build it based on demand. Comcast wants to understand what areas are important to the County. However, remote area, ex. getting to water meter, is more difficult. But, if it is a neighborhood, they want to be proactive and have a team focused on proactive builds.*
5. *Based on these plans, what are expected up to speeds?*
6. *Willing to provide us with shapefile or.KMZ maps of your current network or proposed network expansions? Yes, willing to provide current KMZ fiber/coaxial backbone, based on already having a state contract in place.*
7. *If El Paso County were to enlist the private sector and provide some sort of assistance, would you be interested in participating?*

**StratusIQ (formerly Falcon Broadband) (StratusIQ).** Respondent – Ben Kley / President  
Mr. Kley promised to give us a written response in much more detail during the initial conference call. After providing the captured data and questionnaire, HR Green was unable to get a response with additional data from the StratusIQ staff. Below is the partial data captured from the initial discussion?

1. *Deployed Broadband Services? We provide fiber to the home in our network. All of our fiber plant is underground in conduit.*
2. *Validated Services and Speeds Assessment in Study Area?*
3. *Promotional / Standard Pricing? Can provide pricing, based on already having a state contract in place.*
4. *Planned expansion plans in the study are? Comcast Business Model, they will build it based on demand. Comcast wants to understand what areas are important to the County. However, remote area, ex. getting to meter, is more difficult. But, if it is a neighborhood, they want to be proactive and have a team focused on proactive builds.*
5. *Based on these plans, what are expected up to speeds?*



■ **SECTION 3: WIRED MARKET ASSESSMENT**

6. Willing to provide us with shapefile or.KMZ maps of your current network or proposed network expansions? *StratusIQ's has a fiber network that connects them throughout El Paso County. They are providing a FTTH residential service on the east side of Colorado Springs.*

Figure 3-13: Fiber Network - StratusIQ

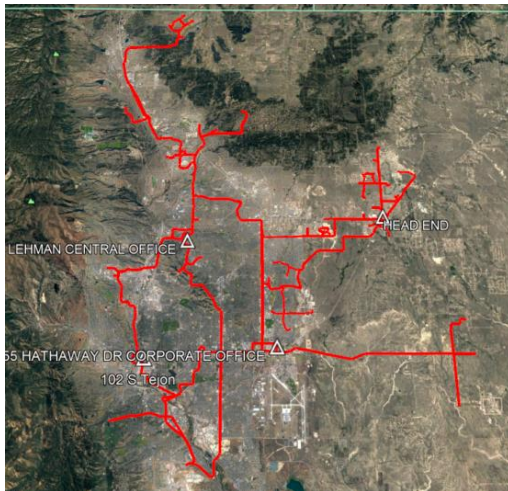
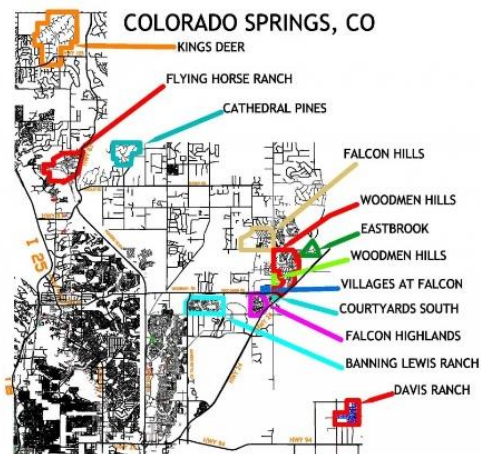


Figure 3-14: Service Area - Fiber-to-the-home (FTTH) - StratusIQ



7. If El Paso County were to enlist the private sector and provide some sort of assistance, would you be interested in participating? *We would be very interested. What is most needed is backhaul from our plant to the various small communities and subdivisions in eastern El Paso County.*

**Kellin Communications (Kellin).** Respondent – Kelly Kellin / Owner

Mr. Kellin expressed an openness to provide data and explore partnerships during the initial conference call. After providing the captured data and questionnaire, HR Green was unable to get a response from the Kellin staff. Below is the partial data captured from the initial discussion?

1. Deployed Broadband Services? *Fixed-Wireless service, but interested in fiber to the home opportunities.*
2. Validated Services and Speeds Assessment in Study Area? *Yes*
3. Promotional / Standard Pricing? *Promotional - \$69.99*
4. Planned expansion plans in the study area? *Continue to deploy towers and WISP services*
5. Based on these plans, what are expected up to speeds? *15Mbps – 40Mbps*
6. Willing to provide us with shapefile or.KMZ maps of your current network or proposed network expansions?
7. If El Paso County were to enlist the private sector and provide some sort of assistance, would you be interested in participating? *Yes, interested in participating. Also, would like permit costs and construction processes are lowered and improved / enforced, respectively.*

■ **SECTION 3: WIRED MARKET ASSESSMENT**

**PCI Broadband (PCI).** Respondent – Dave Wainwright / [djwain@pcisys.net](mailto:djwain@pcisys.net)

Mr. Wainwright spoke on the phone with HR Green for about a half hour. After providing the captured data and questionnaire, HR Green received the below response from the PCI staff.

1. Deployed Broadband Services? *We use unlicensed frequencies so we are at the mercy of the FCC's rules.*
2. Validated Services and Speeds Assessment in Study Area? *Yes*
3. Promotional / Standard Pricing? *Fixed Wireless - \$39.95, \$49.95, \$59.95 10, 15, 25*
4. Planned expansion plans in the study area? *We like to expand to where we can get customers. We have been working with neighborhoods lately that contact us directly.*
5. Based on these plans, what are expected up to speeds? *At least 100Mb and possibly more.*
6. Willing to provide us with shapefile or.KMZ maps of your current network or proposed network expansions? *Sure*
7. If El Paso County were to enlist the private sector and provide some sort of assistance, would you be interested in participating? *We would be willing to work with the County. The biggest issue the County could address is tower zoning. The County could adopt a small cells plan where as long as the homeowner agrees we can setup a tower for commercial use in a residentially zoned neighborhood equivalent to a personal use tower.*

**Peak Internet (Peak).** Respondent – Jayson Baker / CEO

Mr. Baker responded to an initial information request.

After providing the captured data and questionnaire, HR Green was unable to get an additional response from the Peak staff.

**Rise Broadband (Rise).** Respondent – Jeff Kohler / CDO

1. Deployed Broadband Services? *Fixed wireless services primarily on licensed backhaul and unlicensed last mile spectrum in 5 GHz and 3.65 GHz.*
2. Validated Services and Speeds Assessment in Study Area? *Yes*
3. Promotional / Standard Pricing? *\$19.95 / \$74.95*
4. Planned expansion plans in the study area? *Most likely continue to upgrade existing tower to both support existing speeds, and depending on demand upgrades to support 50 Mbps speeds.*
5. Based on these plans, what are expected up to speeds? *80808 and 80831 will be up to 50-meg other zips will be less than 20meg*
6. Willing to provide us with shapefile or.KMZ maps of your current network or proposed network expansions? *Need NDA but could share network map if it wasn't going to be seen in public*
7. If El Paso County were to enlist the private sector and provide some sort of assistance, would you be interested in participating? *To be very effective, access to high points/water towers/blds/poles, middle mile, and marketing support would be very enticing.*

**Southeast Communications (SECOM).** Respondent – Jon Saunders / CEO

Mr. Saunders expressed an openness to provide data and explore partnerships after an initial discussion at the 2018 MountainConnect conference. After providing the captured data and questionnaire, HR Green was unable to get a response from the SECOM staff.

■ **SECTION 3: WIRED MARKET ASSESSMENT**

**REFERENCES**

1. [www.broadbandsearch.net](http://www.broadbandsearch.net)
2. [www.broadbandnow.com](http://www.broadbandnow.com)
3. [www.internetprovidersbyzip.com](http://www.internetprovidersbyzip.com)
4. [www.highspeedinternet.com](http://www.highspeedinternet.com)
5. [www.decisiondata.org](http://www.decisiondata.org)
6. [www.inmyarea.com](http://www.inmyarea.com)
7. <http://www.satelliteinternet.com/plans-pricing>
8. <http://www.peakinter.net/pricing.php>
9. <https://business.comcast.com>
10. <https://www.xfinity.com>
11. <https://www.centurylinkquote.com/availability>
12. <https://shop.centurylink.com/small-business/>
13. <https://www.directv.com>
14. <http://www.kellin.net>
15. <https://www.consolidated.com>
16. <http://secom.net>
17. <https://www.risebroadband.com>
18. <http://www.pcibroadband.net>
19. <http://mydl.com>
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21. <https://www.elpasoco.com>
22. <http://www.secom.net>

■ **SECTION 4: WIRELESS MARKET ASSESSMENT**

## **Section 4: Wireless Market Assessment**

### **Overview of Existing Wireless Service Providers**

This section assesses the current offerings and plans of commercial wireless service providers serving residents and businesses in El Paso County. The wireless broadband marketplace in the United States includes:

- Mobile network operators (MNOs) such as AT&T Wireless, Sprint, T-Mobile, and Verizon Wireless;
- Mobile virtual network operators (MVNOs) such as Cricket and BoostMobile;
- Tower companies such as Crown Castle and American Tower; and
- Independent neutral host operators, which often are fiber companies involved in cellular backhaul.

The MNOs have collectively invested billions of dollars each year in infrastructure, mostly in urban and suburban markets, not more rural markets such as sections of El Paso County outside of Colorado Springs. The MNOs have mainly invested to expand infrastructure for LTE-4G. We are now seeing further upgrades in denser markets to include the Cloud-Radio Access Network (C-RAN) architecture that is expected to be needed to support future 5G deployment. MNOs are also deploying small cells to enhance capacity in more heavily used areas.

In addition, AT&T, the carrier selected by the federal government to deploy FirstNet, a public safety national broadband network, is obligated to expand its network to provide public safety grade performance across the country. AT&T's competitors, particularly Verizon, are following suit to retain and gain public safety users.

Another major development in the industry is the potential \$26 billion merger of Sprint and T-Mobile. Not only would this partnership produce a larger coverage footprint from a merged company, but it would also impact the economics of the industry. The two carriers submitted a formal application to the U.S. Federal Communications Commission on June 18, 2018 beginning the regulatory review process, including a U.S. Justice Department review of potential antitrust violations.

In the past, MNOs competed with tower companies by building their own infrastructure. Over recent years, that has changed. The MNOs have sold most of their towers to national tower companies and are now more likely to use those towers as tenants. AT&T and Crown Castle recently signed an agreement aimed at reducing the rental costs and easing some of the contractual limitations.<sup>1</sup> AT&T can now upgrade towers, modify their capabilities, expand their network, and add small cells as needed in cooperation with tower owner Crown Castle. These changes support the expansion of FirstNet and a range of commercial network upgrades.

When MNOs construct new towers, they typically do so to fill coverage gaps with a single structure. If they need to construct several towers in a given region, they will generally turn to tower companies. For their part, the tower companies typically do not build unless they have one or more MNOs as an anchor tenant.

#### ■ SECTION 4: WIRELESS MARKET ASSESSMENT

Wireless carriers are currently undergoing a process of “network densification.” This involves deploying additional, smaller antenna sites to enhance wireless capacity within an existing service area or to reach new service areas. Called “small cells” because of their lower power and thus reduced service areas (and often reduced physical footprint), these sites use 4G LTE technology and are being placed in high-density areas such as busy intersections, shopping centers, and downtown neighborhoods.

In Summit County, Colorado (and other rural Colorado counties including Eagle County), carriers are deploying numerous new “small cell” sites in the towns where additional capacity is needed, especially during the winter and summer tourist seasons. In Vail, for example, Crown Castle deployed 23 new cellular sites as part of a distributed antenna system (DAS) network enhancement; most of the sites are connected to fiber for backhaul. These sites are cost-effective to deploy and well-suited to communicating around obstacles such as buildings. To enable this deployment, the town changed ordinances to allow for taller poles, and to grant use of municipal buildings and conduit.

Colorado Springs already has small cell deployment occurring rapidly, especially in denser areas like Cheyenne Mountain Resort.<sup>2</sup> Crown Castle, has placed small cells, backhaul, and tower networks to improve connection bandwidth and reliability for carriers and allow for future network upgrades and applications.

In new markets, some carriers are also considering a strategy of deploying several small cell sites instead of a single macro site to meet coverage needs. Taken together, these deployments require a significant amount of fiber infrastructure, even creating fiber shortages.<sup>3</sup>

MVNOs are companies that resell commercial wireless services from AT&T, Verizon, Sprint, or T-Mobile at reduced prices. MVNOs purchase service in bulk from one or more carriers, carry little overhead, minimally advertise, and usually sell only services, not devices. The tradeoff is that performance of MVNOs may suffer during times of high network demand, depending on the specifics of the agreement between the MNO and the MVNO. Many MVNOs offer no contract for services as opposed to the one- or two-year contracts required by the major carriers. There are several MVNOs operating in El Paso County. These may be a viable choice for many residents, with the caveat that performance might be reduced at times.

Neutral host operators provide shared infrastructure for more than one carrier, typically in contained venues or environments such as stadiums, airports, military bases, and universities. Neutral host operators—including Boingo Wireless, ExteNet Systems, and Mobilitie—deploy and operate distributed antenna systems (DAS) and small cell and Wi-Fi networks to provide mobile internet access to these venues. Sharing infrastructure enables carriers to extend their network without incurring the cost of equipment and buildings. This practice also benefits communities because it requires less infrastructure.

## Broadband Survey Results – Wireless Services

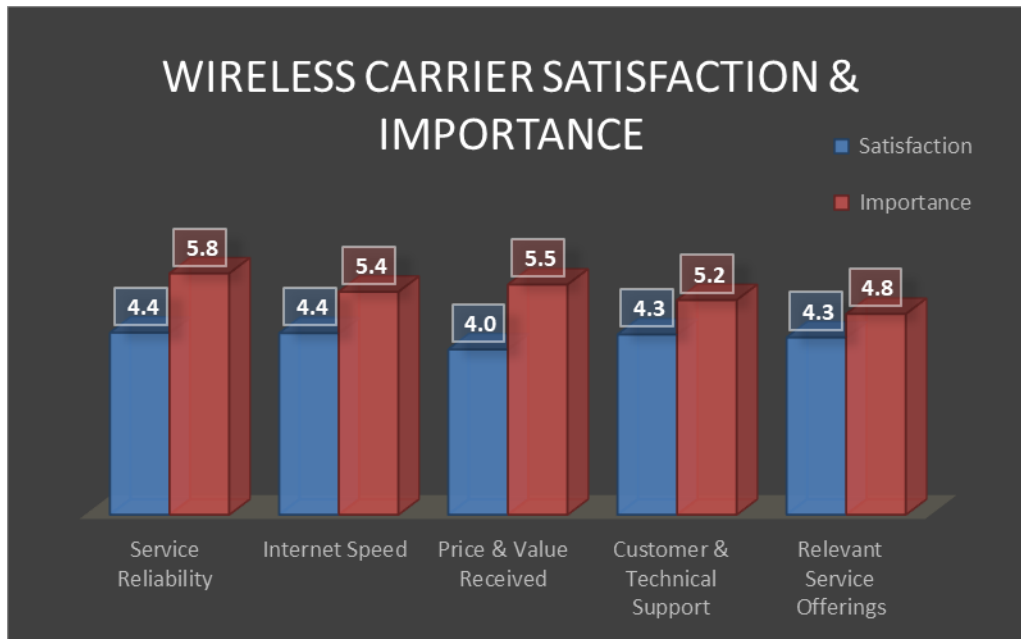
The results of the broadband survey, though not statistically valid, provided some insights into the satisfaction level and usage. Figure 4-1 on the following page indicates that respondents found each of the categories surveyed important, with service reliability being extremely important. It also indicates that the satisfaction level is fairly high across all wireless categories, much more so than for wired internet services. People tend to have higher expectations of



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wired services, which are often used for doing work at home and watching movies and other entertainment. As a result, when a wired service does not perform, it is much more disruptive than, for example, a dropped phone call or a slow search on a smartphone.

Figure 4-1: Survey Results - Wireless Carrier Satisfaction & Importance



Respondents shared areas of performance gaps throughout the County including in urban areas (primarily Colorado Springs); rural areas including Peyton, Elbert, Yoder, Calhan, Rush, and other localities; and in Black Forest. The rural areas are not well served by the carriers and in many cases, if they are well served, it is with older technologies such as 2G and 3G. We touch on the specific performance of each carrier in most of the rural areas noted to have problems. Poor performance in Colorado Springs is most likely due to capacity issues and may have only been an issue at certain points in time.

As noted elsewhere in this report, the carriers are building out across the country in a competitive race for LTE customers, to prepare for new technologies and spectrum, and to begin installing infrastructure as a result of a federal contract for public safety. El Paso County should benefit in the next several years from a surge in infrastructure investments and expanded services from each carrier.

### Wireless Broadband Price Comparison

Wireless is not a true substitute for wireline for most consumers both because of technical limitations and limitations imposed by the business models and pricing structures of the mobile broadband industry, as explained in a recent white paper by CTC.<sup>4</sup>

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Despite the claims of wireless carriers’ marketing campaigns for “unlimited” service, consumers of “unlimited” plans are not guaranteed truly unlimited mobile broadband in the United States. While all four major wireless carriers now tout unlimited data plans, all of these plans allow the carriers to throttle customers to sub-broadband speeds after they exceed certain usage thresholds. (In some cases, the carriers choose not to throttle, but the terms of the data package allow for this if the carrier chooses.)<sup>5</sup>

Even the most generous “unlimited” mobile data plan includes the caveat that the carrier can throttle users and deprioritize their hotspot traffic after they have consumed 32 GB of data in a month.<sup>6</sup> To put that number in context, a 2016 study found that the average U.S. household uses 190 GB of data each month.<sup>7</sup>

Table 4-1 summarizes the “unlimited” plans of the major wireless carriers.

Table 4-1: Summary of Unlimited Non-Business Wireless Plans

Plan name	Technology	Cost per month* (1 user / 4 users)	Throttling threshold	Hotspot allowance	Video quality limits
Verizon Go Unlimited <sup>8</sup>	4G LTE, but may be throttled at any time	\$75/\$160	0 GB	Unlimited, but speed limited to 600 Kbps	480p on phones, 720p on tablets
Verizon Beyond Unlimited <sup>9</sup>	4G LTE	\$85/\$200	22 GB	15 GB, then throttled to 600 Kbps	720p on phones, 1080p on tablets
AT&T Unlimited Choice Enhanced <sup>10</sup>	4GLTE <sup>†</sup>	\$65/\$160	22 GB	Not allowed	480p
AT&T Unlimited Plus Enhanced <sup>11</sup>	4G LTE	\$80/\$190	22 GB	15 GB, then throttled to 128 Kbps	1080p
T-Mobile One <sup>12</sup>	4G LTE	\$70/\$160	50 GB	Unlimited at 3G	480p
T-Mobile ONE Plus <sup>13</sup> - also get unlimited in-flight Wi-Fi on GoGo enabled flights	4G LTE	\$80/\$200	50 GB	10 GB, then throttled to 3G	720p
Sprint Unlimited Freedom <sup>14</sup>	4G LTE, Extended 4G LTE, Extended Non-LTE, Roaming	\$60/\$100	23 GB	10 GB, then throttled to 2G	1080p

\*Customers who do not opt-in to paperless billing and/or auto pay are charged an additional fee each month

Pricing is driven by numerous factors – regulations, topographical and geographic characteristics, labor, energy, infrastructure, and the cost of doing business. Another factor is unpredictable changes in demand. Demand does not always grow linearly, but can include

#### ■ SECTION 4: WIRELESS MARKET ASSESSMENT

sudden bursts of traffic following the introduction of new consumer technologies and online services.<sup>15</sup> Therefore, it is difficult for carriers to predict how prices will need to change.

### The Nationwide Public Safety Broadband Network in Colorado and El Paso County

One public safety initiative in progress may help alleviate the County's broadband issues as well as enhance El Paso County's public safety broadband capabilities. The National Public Safety Broadband



Network (NPSBN) is planned to be a nationwide, interoperable, IP-based, high-speed mobile communications network that will give first responders priority access. AT&T was awarded a federal contract to build this network, which included 10Mhz of prime 700Mhz spectrum (called Band 14). All 50 states, five territories and the District of Columbia have opted in, accepting AT&T's plan for deployment and operation of FirstNet<sup>16</sup> in each state. However, local agencies retain autonomy, and may choose which provider to use. We understand that the El Paso County Sheriff's Office (and potentially other El Paso County agencies) recently signed up for AT&T's FirstNet service.

In its public safety offering, AT&T plans to use not only the spectrum provided by the award but also existing spectrum already used by its network. Other carriers will also expand with their entire spectrum as they compete with AT&T. This means commercial users, too, will benefit from these deployments. Although FirstNet will not be completed until 2020 or later, carriers are in the process of building out their networks and commercial users will also have access to those improved networks.

In addition to needing new towers, the enhanced networks will need new small cell equipment installed throughout metro areas, providing higher data capacity over short ranges. Among other things, these small cells will help public safety networks become a platform for "internet of things" (IoT) applications such as traffic signal controls, firefighter health monitors, police body cameras, and camera-equipped drones and robots.

Of interest to the County, FirstNet is mandated to prioritize the need for communications in rural areas. This means that LTE infrastructure buildout for FirstNet in Colorado must consider El Paso County's rural areas. This contrasts with what commercial cellular carriers have done in the past, that is, prioritize the population centers. Therefore, FirstNet (and its competitors' networks), may offer El Paso County public safety agencies, residents, and visitors better mobile broadband performance throughout the County.

### Challenges of Providing Broadband in Rural Areas and in Mountainous Regions

As shown by both crowdsourced and drive-tested carrier performance data, Colorado Springs is well-served by wireless carriers. El Paso County residents along or close to the I-25 corridor are accustomed to reliable cellular coverage and data speeds. However, much of El Paso County is rural and includes mountainous as well as flat regions.

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The business case for wireless broadband provision usually does not change much carrier to carrier and largely depends on the density of residents in a given area. The result is that many of the same rural areas do not receive adequate coverage, because of the slimmer profit margins available there, while urban areas experience better coverage. An exception to this is FirstNet which mandates that AT&T cover rural areas and, as noted, other carriers are following suit to compete.

The challenges of rural broadband are the same whether the delivery technology is fiber or wireless:

- Large initial capital deployment
- Lack of existing usable infrastructure
- Extended payback with few potential customers (relative to more densely populated markets) for revenue generation

Towers create more value for their owners when they attract multiple carriers to collocate equipment—especially given that almost all towers must have adequate (and expensive-to-construct) fiber backhaul. But even then, the cost of constructing a tower may outweigh its potential for revenue generation.

The cost to deploy a cell tower ranges from about \$150,000 to \$350,000<sup>17</sup>, depending on factors including structure type, height, power (including backup capabilities), and environmental conditions. The need to locate backhaul and power at a site can significantly increase the required deployment investment—even doubling the cost, depending on the difficulty in reaching that site with either fiber or wireless infrastructure. For example, as a rough estimate, constructing a tower structure and connecting it to power and fiber backhaul might cost \$475,000 to \$575,000 in hard-to-access mountainous regions (up to \$275,000 for tower construction<sup>18</sup> and \$200,000 to \$300,000 for microwave or fiber backhaul and power<sup>19</sup>).

Cellular antennas mounted on towers require lines-of-sight with one another to facilitate call handoffs as a mobile device travels from one tower's coverage area to the next. This becomes difficult in mountainous regions, further complicating carriers' site selection; towers may also need to be higher, and the equipment may need to operate at a higher power.

Due in part to these expenses and the MNOs' efforts to increase their profits, the MNOs shifted their business models nationwide. As noted previously, rather than increasing their geographic coverage areas, they are seeking to improve capacity in the areas they already serve. The carriers' coverage maps before and after recent deployments tell the story: boundary edges do not change much, but the capacities and speeds in those areas improve sharply.

Improvements in well-served areas offer little to people in more rural areas who are desperate for some level of reliable coverage but instead are witnessing a widening digital divide.

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## Wireless Does Not Replace Wireline

Most businesses and residents will find that mobile wireless broadband has technological limitations relative to wireline. These include:

1. *Lower speeds.* At their peaks, LTE typically provides only about one-tenth the speed available from FTTP and cable modems. In coming years, LTE Advanced may be capable of offering Gbps speeds with optimum spectrum and a dense buildout of antennas—but even this will be shared with the users in a particular geographic area and can be surpassed by more advanced versions of wireline technologies (with Gbps speeds already provided by some FTTP providers today).
2. *More asymmetrical capacity, with uploads limited in speed.* As a result, it is more difficult to share large files (e.g., video, data backup) over a wireless service, because these will take longer to transfer; it is also less feasible to use video conferencing or any other two-way real-time application that requires high bandwidth.
3. *Stricter bandwidth caps.* Most service providers limit usage more strictly than wireline services. Though wireless service providers may be able to increase these caps as their technologies improve, it is not clear whether the providers will keep ahead of demand. Meantime, it's possible that watching a single movie could consume an entire monthly data allotment. From a residential customer's perspective, a mobile wireless data cap may still be sufficient for a light user of the internet. And, for certain users, higher connection speed may be considered a more desirable feature than unlimited data.

But there is one market segment for which mobile service is a significant threat to wireline revenue: low-income and other price-sensitive consumers. People who depend on mobile as a lifeline service—and who cannot afford to buy two products—will stick with mobile alone. Indeed, this trend may pertain to more than just low-income individuals. According to a 2018 survey by the Pew Research Center, 20 percent of U.S. adults—up from 12 percent in 2016—said they do not have broadband at home, but do own smartphones.<sup>20</sup>

The wireless industry could change its pricing structures and become even more competitive with wireline services for many consumers. We are seeing wireless carriers reduce data caps and appear to be positioned to become an adequate substitute product for wireline for a growing number of subscribers.

## Municipal Wireless Broadband

Municipalities in rural mountain counties of Colorado and across the United States have successfully pursued the creation and administration of their own wireless networks. There are many technical, operational, and financial factors to weigh; governments must exercise caution. Generally, the local government plans and constructs the network, leveraging public-private partnerships with local utility companies, smaller providers, and other stakeholders to access funding, infrastructure, and other resources. Many federal and state programs have partially or even fully funded network implementation with loans and/or grants.



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These two case studies describe successful municipal wireless networks:

- **Sandy, OR<sup>21</sup>:** The town of Sandy, OR faced such an extreme broadband coverage desert that many constituents did not even receive DSL connection. SandyNet provides fiber to the home services where feasible and wireless high-speed connectivity for rural areas surrounding the town. Costs for their rural wireless offering is \$39.95 per month for 5 Mbps and \$49.95 for 10 Mbps.
- **Garrett County, MD:** Although only 10 percent of its constituents received inadequate internet speeds, Garrett County faced mounting pressure to improve its broadband connectivity given its mountain tourism economy. Garrett County became one of the pioneer municipal network implementations, partnering with local providers to access fiber backbone connections and construct a network using 5 GHz spectrum and TV white space<sup>22</sup> (TVWS) for more remote residences. This dual solution, designed by CTC, proved highly successful, and Garrett County was able to offer unlimited data service while only paying for \$750,000 of the network's construction. The local government then engaged Declaration Networks Group) for network administration duties.

El Paso County may want to consider investigating a similar solution for areas where wired and wireless operators do not offer an acceptable solution. CTC can assist with a feasibility analysis upon request.

## Wireless Broadband Performance

### COMPARISON SUMMARY

Current mobile speeds are adequate for many users and will continue to improve. (5G service may be even faster, but a 5G standard has not yet been finalized, the deployment timetable is unclear, and the technology is extremely unlikely to be deployed in rural areas in any case.)

Our analysis of wireless carrier performance is based on publicly available data. This data is based on samples of signal strength detected through drive testing by an analyst firm and automatically reported by consumer mobile devices through a crowdsourcing app. If the County requires a more robust investigation, we suggest that it conduct further testing to fully assess the geographic scale and severity of any deficiencies in wireless carrier performance. Such testing would include an assessment of specific areas in a controlled environment using drive-and/or walk-test equipment specially configured for collecting performance data from individual carriers. CTC Technology & Energy (CTC) is currently conducting such tests for the State of Delaware's Division of Communications using equipment to evaluate both AT&T's and Verizon's performance in areas where there are perceived gaps.

The current performance of the four major carriers is similar based on the publicly available data. All show good to excellent performance within the population centers and along I-25 with performance diminishing as you head west into the mountains or east into flatter terrain. All four major carriers have plans to expand, enhancing both coverage and capacity not only within El Paso County, but across the country. Carriers keep their plans confidential for competitive reasons. But AT&T's requirement to deploy the NPSBN, other carriers' efforts at keeping up

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with AT&T, and all carrier's efforts to increase capacity means the carriers will be enhancing their networks. It appears that much of this enhancement, especially noted by T-Mobile, includes the zip codes under study where County constituents are underserved or unserved.

## ANALYSIS METHODOLOGIES

This section describes the methodologies used to collect wireless broadband performance data and presents an analysis of that data. As in the previous section (Section 3), we analyzed performance not only for entire County but also for a set of zip codes listed in Table 4-2. These zip codes are areas known to be underserved or unserved.

Table 4-2: Selected Underserved County Zip Codes for Testing

District	Area (Zip Code)
1	Monument (80132)
2	Black Forest (80908), Calhan (80808), Peyton (80831)
3	Manitou Springs (80829), Rural Zip 80921
4	Ellicott (80808), Fountain (80817), Truckton (80864), Turkey Creek Canyon (80926)
5	n/a

Our wireless broadband performance analysis for the County and these zip codes is based on multiple datasets, each of which are available online:

- Maps published by the carriers
- FCC datasets
- Data generated by crowdsourced collection (OpenSignal)
- Data generated by independent drive-testing (RootMetrics)
- Conversations with the carriers

## CARRIER MAPS ADVERTISING COVERAGE

Online carrier maps, captured in August 2018, illustrate the coverage that each network provider advertises in El Paso County. At this level, the carriers advertise (almost) ubiquitous coverage across the County. However, coverage results vary depending on the parameters used and therefore, carriers can generate coverage maps to show whatever they want. The parameters used to generate the carriers' advertised maps are not disclosed by the companies, but these maps likely depict areas that receive some signal level but potentially not the level that meets user needs. These maps are essentially marketing tools to persuade customers to join their network. Realize, however, that network providers, when they want to get a new tower approved, often must illustrate need and generate maps to show a *lack* of coverage. Realize also, that coverage shown is typically outdoor, not in-building, coverage and that good coverage does not always mean good performance or a fast data connection. So an experience at a particular point where good coverage is advertised may not be satisfactory.

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Of the four major carriers, T-Mobile provides the most useful online coverage tool. If you zoom in on the T-Mobile maps, you can see more distinction between levels of coverage as well as specifics when you click anywhere on the map (See Figure III-3). The hexagons designate where there is “verified coverage”, what T-Mobile denotes as “...data connections from actual customers ... connecting to the network with that technology, providing an added layer of confidence...” meaning this is essentially crowdsourced information reflecting real-world experiences as opposed to theoretical analysis.

These maps are provided in Appendix II for reference, but they are not particularly useful for depicting consumers’ real experiences or network performance. int.

#### FCC BROADBAND MAPS

Available federal government data is also of little practical use. The following map is available on the FCC’s website<sup>23</sup> and can only zoom into the level shown, basically at the state level.

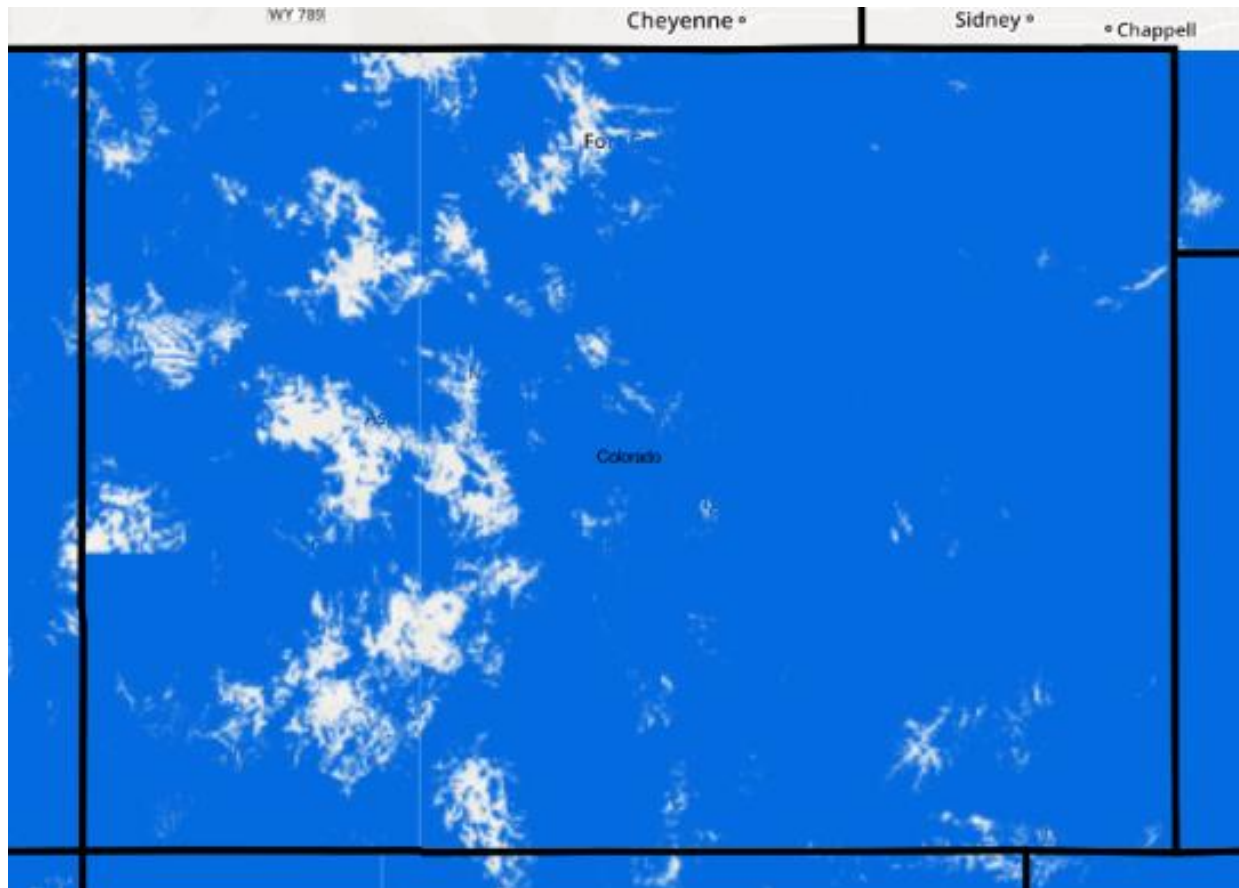
There are two maps available – one based on filings from carriers on an FCC form called “Form 477” and one based on findings by Mosaik, a performance testing company.

The FCC requires all facilities-based, fixed, and mobile broadband providers to complete Form 477 twice a year. Mobile providers must file maps of their coverage areas for each broadband technology as well as upload and download speeds. However, the FCC does not define the parameters for the maps nor the conditions under which the speed data is collected. Only that “the data associated with each polygon should indicate the minimum advertised upload and download speeds associated with that network technology in that frequency band, and the coverage area polygon should depict the boundaries where, according to providers, users should expect to receive those advertised speeds.”<sup>24</sup> Therefore, the coverage maps and speeds shared by the FCC are those *advertised* by the network providers, and thus the same as the maps on the respective carrier websites.

As a practical matter, the resulting maps are all but useless. Figure 4-2 shows the best LTE coverage map the FCC provides for Colorado. El Paso County lies to the southeast of the word “Colorado;” there appears to be a smudge of poor coverage in that area, perhaps in the mountains in western El Paso County. But the FCC maps don’t allow users to see more detail by zooming in. So whatever the white smudges may show, FCC maps are of little use in terms of understanding the true state of coverage at a level of detail that would be helpful to the County.

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Figure 4-2: FCC Nationwide LTE Coverage, Y/E 2016



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**CROWDSOURCED MAPS**

Wireless infrastructure analysis companies OpenSignal and Mosaik both gather data from individuals across the world to evaluate wireless network provider performance. OpenSignal shares its data online. Mosaik does not; its data is only available for purchase. Only OpenSignal data was assessed for this report.

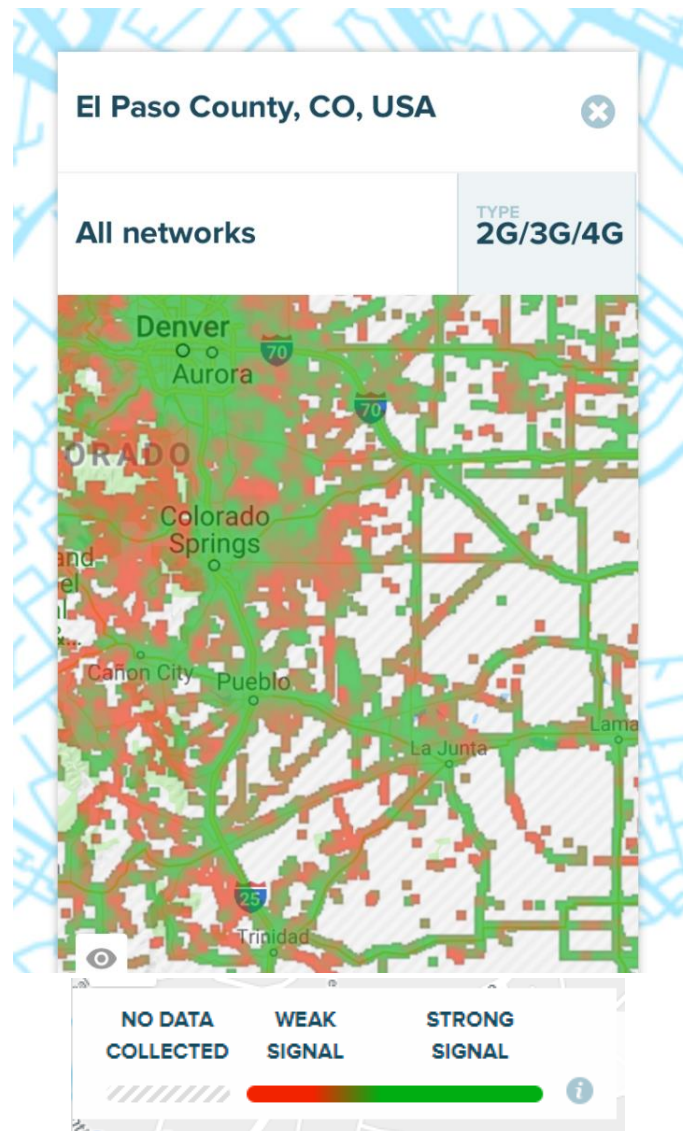
According to OpenSignal's website, testing is based on both user-initiated tests and background automated tests from a range of smartphone applications. While both types of tests can be useful, user-initiated measurements reflect conditions when users choose to run the tests, whereas background tests can be run at regular intervals throughout the day and capture a much broader range of network performance metrics.

By combining data from user-initiated and background tests, OpenSignal strives to reproduce the user experience. Most of their measurements are from indoor locations (since that is where most people spend their time) providing a larger indoor capture rate than other forms of data collection like drive-testing.

They collect raw data, then process and filter the data to remove outliers and calculate average metrics. As of September 2018, they calculate availability (when a user has network signal), download speed, upload speed, time on Wi-Fi, peak speed, and video experience. They are working on a new metric called “coverage experience” which is “the percentage of places where user’s devices have a network connection”.<sup>25</sup>

OpenSignal's maps convey a weak to strong signal, as well as areas where no data has been collected. The map shown in Figure 4-3 illustrates El Paso County's crowdsourced coverage for 2G, 3G, and 4G technologies for all four major carriers. (Users can also select technologies and carriers and zoom in to view coverage detail at the neighborhood level.) OpenSignal also gives awards for carrier performance, usually every six months (see Figure 4-4). Note that T-Mobile is the winner in the last six months. This is likely a consequence of T-Mobile's push for higher speeds and new deployments across the country, which has included deployments in El Paso County. Note that this comparison does not include a “coverage” award, so when determining the overall performance of a carrier, it is still important to assess where T-Mobile does not provide enough signal strength for a connection.

Figure 4-3: OpenSignal Crowdsourced Data All Wireless Networks













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These maps and reports provide consumers with a much better idea of network provider performance than do the carriers’ or the FCC’s coverage maps. OpenSignal’s independence from the carriers as well as its continuous updates more reliably demonstrate performance. Figure 4-3 shows where carriers have focused their deployments—along the major highways and in populous areas.

This is not surprising, but it is of concern for rural County residents. Note that there must be *some* signal level to execute one of these tests from an application on a Smartphone or other compatible wireless device. Therefore, the area of “no data collected” shows one of two things—no one with a signal ran a test while they were in that area or there is no signal in that area over which a test can be run. So these areas of “no data collected” may be an indicator of absent coverage or poor performance.

Figure 4-4: OpenSignal Wireless Carrier Awards July 2018

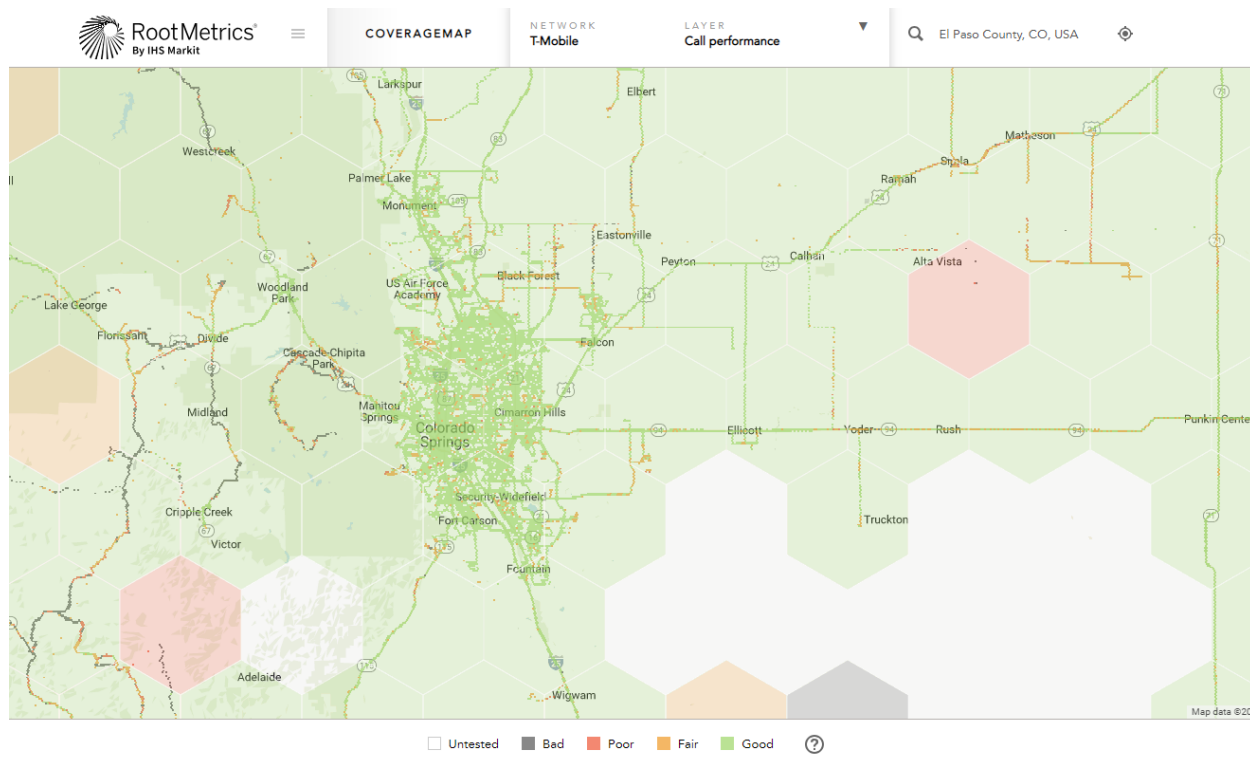
OpenSignal Awards	Download Speed: 4G	Download Speed: 3G	Download Speed: Overall	Upload Speed: 4G	Latency: 4G	Latency: 3G	Availability: 4G
AT&T							
Sprint							
T-Mobile							
Verizon							

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## DRIVE-TESTED MAPS

Drive-testing involves sending researchers into the field to drive primarily main thoroughfares. RootMetrics conducts these studies; it collects, analyzes, and reports on measurements every six months. The specific datasets available on their online maps include call performance, maximum speed, and best technology available for each of the four major network providers. The interface lacks the ability to show all networks simultaneously; Figure 4-5 illustrates the “call performance” countywide for T-Mobile.

Figure 4-5: Sample Countywide RootMetrics Drive-Tested Coverage Map



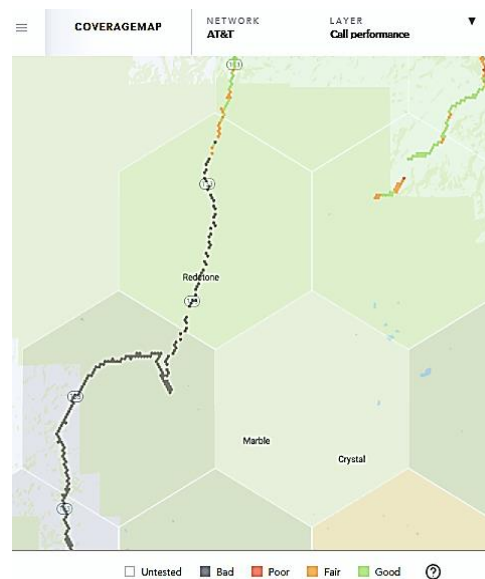
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There drive-tested datasets, however, overlook areas of inadequate coverage by compiling such areas with regions of *sufficient* coverage, declaring the entire area covered. In some cases, as seen at right in the zoomed in map of Redstone, CO, most of the area can be unserved, but one good data point allows the hexagon-shaped area to be green, denoting “good coverage.”

To evaluate coverage using these maps, it is important to understand this assumption as well as the fact that not all roads or all indoor locations are being tested.

The results of the call performance across each of the vendors is fairly consistent, with the urban Colorado Springs area and the I25 corridor well served and the mountains and rural plains showing poorer performance (note that areas of white are untested). AT&T offers faster speeds across the County, and T-Mobile offers the most advanced technology (LTE) in more areas. Again, this is only on the roads being tested at that particular time.

Figure 4-6: Coverage Map Inaccuracy in Redstone, CO from RootMetrics



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## Carrier Assessment: AT&T

The following table provides current price information for AT&T unlimited plans.

Table 4-3: AT&T Unlimited LTE Data Plan Options<sup>26</sup>

Plan name	Technology	Cost per month <sup>27</sup>		Throttling threshold	Hotspot allowance	Video quality limit
AT&T Unlimited &More	4GLTE	One device: \$70 Four devices: \$160		22 GB	Not allowed	480p
AT&T Unlimited &More Premium	4G LTE	One device: \$80 Four devices: \$190		22 GB	15 GB, then throttled to 128 Kbps	1080p

AT&T also offers four tiers of limited sharable data service:

- 1 GB download allowance for \$25 per month
- 5 GB download allowance for \$50 per month
- 10 GB download allowance for \$75 per month
- 20 GB download allowance for \$100 per month

Because the plans are sharable, each phone also incurs an access fee of \$20 per month, but the data charge is shared by all phones on the plan. These options also promise data rollover only from the previous month and no overage charges (speeds thereafter are limited to 128 Kbps). There may also be equipment charges with or without a contract, and activation fees.<sup>28</sup>

AT&T offers special pricing for public safety primary users (first responders) and extended primary users (those who may become “elevated” to first responders during an incident or planned event such as utility, school, and government personnel) on FirstNet enabled devices. Contracts are through NPPGov<sup>29</sup> or with individual states; eligible entities can then purchase off the state contract.

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Table 4-4: AT&T FirstNet Unlimited Data Plan Options

Plan name	Technology	Cost per month	Throttling threshold	Features
AT&T FirstNet Mobile – Responder Data Only <sup>30</sup>	4GLTE <sup>†</sup>	\$40	22 GB	Unlimited data, mobile hotspot and tethering
AT&T FirstNet Mobile – Responder Standard <sup>31</sup>	4GLTE <sup>†</sup>	\$50	22 GB	Unlimited talk, text, and data
AT&T FirstNet Mobile – Responder Enhanced <sup>32</sup>	4GLTE <sup>†</sup>	\$60	22 GB	Unlimited talk, text, and data, mobile hotspot and tethering

AT&T and FirstNet also offer limited plans as well, which the County should only pursue with prior knowledge of and confidence in its monthly data usage. Many FirstNet-capable devices, such as Sonim Technologies' XP8 and XP5s, will be either free or heavily subsidized; pricing is higher if the service is for a subsidized device.

Table 4-5: Monthly AT&T FirstNet Limited Plan Options

Type of Device	2 GB	5 GB	50 GB	100 GB	500 GB	1 TB
Any Cellular Device	\$28.50 \$48.50	\$41 \$61	\$227 \$247	\$412 \$432	\$1917.00 \$1937.00	\$3682.00 \$3702.00
Add a Line - Smartphone	\$19 \$39	\$19 \$39	\$19 \$39	\$19 \$39	\$19 \$39	\$19 \$39
Add a Line Other Cellular Device	\$19 \$31	\$19 \$31	\$19 \$31	\$19 \$31	\$19 \$31	\$19 \$31
Data-only	\$21.50 \$31.50	\$34 \$44	\$220 \$230	\$405 \$415	\$1910 \$1920	\$3675.00 \$3685.00
Add a Line Data-only	\$12 \$22	\$12 \$22	\$12 \$22	\$12 \$22	\$19 \$39	\$19 \$39

\* Top line shows unsubsidized devices and bottom shows subsidized

**CURRENT PERFORMANCE**

Based on our analysis of public information, AT&T offers consistent coverage/call performance in the urban areas of El Paso County and along I-25, with weaker performance throughout the rural areas. As is the case with most major providers, Colorado Springs and its surrounding suburbs tend to have better coverage, while the more rural areas either exhibit poorer performance overall or are untested.



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Figure 4-7: AT&T Open Signal Coverage Map for El Paso County

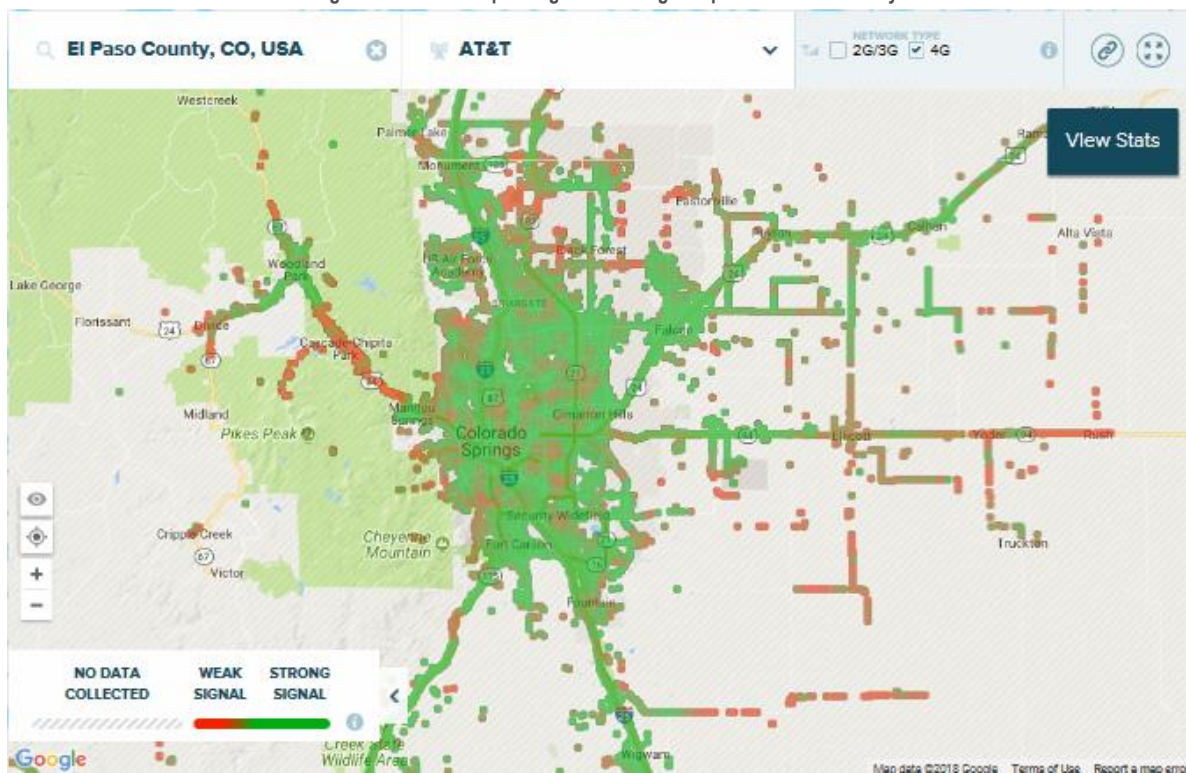
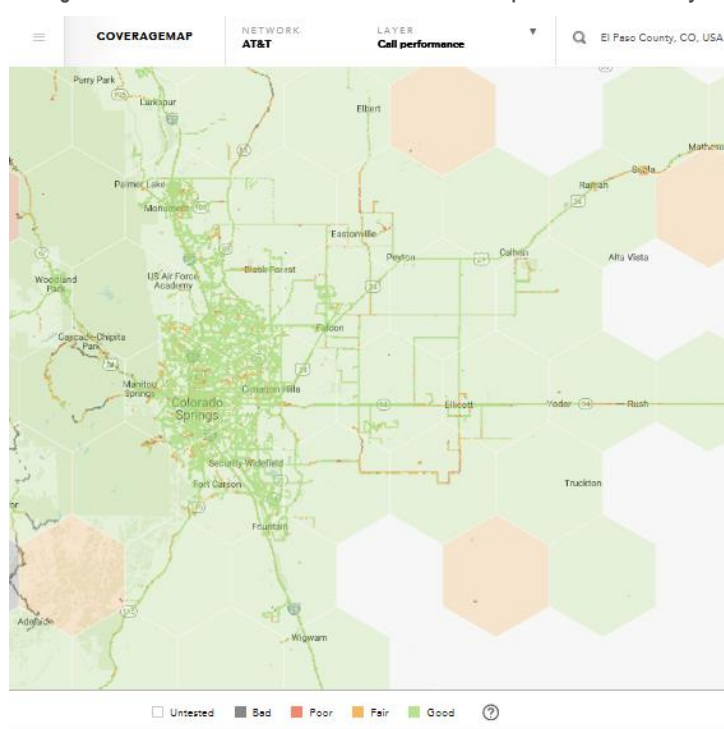


Figure 4-8: AT&T RootMetrics Call Performance Map for El Paso County



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The following list highlights areas in El Paso County inadequately served by AT&T in the zip codes of interest, as depicted in the OpenSignal and RootMetrics maps found in the Appendix:

Table 4-6: AT&T Coverage Gaps in Requested Zip Codes

Zip Code	Areas with Coverage Vulnerabilities
80132	SE Monument; E Rt. 105; Rt. 105 between Palmer Lake and Monument
80908	Black Forest Regional Park area
80808	S Calhan, S Ellicott
80831	N and E Eastonville (Elbert Rd.)
80829	Ruxton Creek SW of Manitou Springs; Cheyenne Mountain Zoo area
80921	Fox Run Regional Park
80817	N, NW, and W of Wigwam; Old Pueblo Rd.; Hanover Rd.
80864	Yoder; Rt. 94 East of Yoder to Rush,
80926	Rt. 115 around Deadman Canyon; Barrett Rd.
Other	Manitou Park Recreational Area; Cascade Chipita Park; Rush

#### PLANNED NETWORK ENHANCEMENTS

In December of 2017, the State of Colorado opted into the NPSBN, governed by a contract between FirstNet and AT&T. With the FirstNet contract comes the responsibility of providing a wireless carrier network for first responder access. Carriers primarily serve more populous areas for financial success. However, emergencies can happen in any location, and public safety personnel must be able to communicate wherever they are, including rural areas. With the exception of Colorado Springs, most of El Paso County can be considered rural. AT&T has committed to building new wireless facilities at an additional 35 sites within the state.<sup>33</sup> According to the Colorado Broadband Office, one site is located in the Cascade area in El Paso County and a few others are in neighboring Teller and Elbert counties.

These enhancements may help with performance in the southwestern part of zip code 80921 and Cascade-Chipita Park. The Teller site, planned for somewhere near Divide, may provide additional coverage in the mountains west and north of Manitou Springs. The Elbert County sites would potentially extend into the 80132, 80908, 80808, and/or 80831 zip codes.

According to AT&T during a call with CTC on September 17, 2018, their contract with FirstNet to build out the NPSBN within El Paso County precludes sharing any details on the planned network enhancements, either for business as usual or for FirstNet. This includes any small cell sites as well, which would improve capacity in areas where there are many users. It is likely that AT&T is deploying small cell sites in population centers such Colorado Springs and along I-25.

■ **SECTION 4: WIRELESS MARKET ASSESSMENT**

## Carrier Analysis: T-Mobile

The following table provides current price information for T-Mobile unlimited plans.

Table 4-7: T-Mobile Pricing for Unlimited Plans

Plan name	Technology	Cost per month* (1 user / 4 users)	Throttling threshold	Hotspot allowance	Video quality limits
T-Mobile One <sup>34</sup>	4G LTE	\$70/\$160	50 GB	Unlimited at 3G	480p
T-Mobile ONE Plus <sup>35</sup> - also get unlimited in-flight Wi-Fi on GoGo enabled flights	4G LTE	\$80/\$200	50 GB	10 GB, then throttled to 3G	720p

T-Mobile offers month-to-month wireless data options for mobile hot spots or tablet devices. Pricing is based on the total amount of data needed per month; plans with 6 GB of data or more allow the customer to carry over unused data into subsequent months (up to 22 GB). The 2 GB plan costs \$20 per month; increased data limits are available at incremental costs in a total of six packages, up to \$85 per month for up to 22 GB of data. Depending on current promotions, the \$35 activation fee is sometimes waived.<sup>36</sup>

### CURRENT PERFORMANCE

Based on our analysis of public information, T-Mobile offers consistent coverage/call performance in the urban areas and along I-25, with weaker performance throughout the rural areas, as expected. As with most major providers, T-Mobile tends to provide better coverage in Colorado Springs and its surrounding suburbs, while the more rural areas either exhibit poorer performance overall or are untested. Much of the southeastern part of the County was not tested by RootMetrics for T-Mobile.

SECTION 4: WIRELESS MARKET ASSESSMENT

Figure 4-9: T-Mobile OpenSignal Coverage Map for El Paso Co.

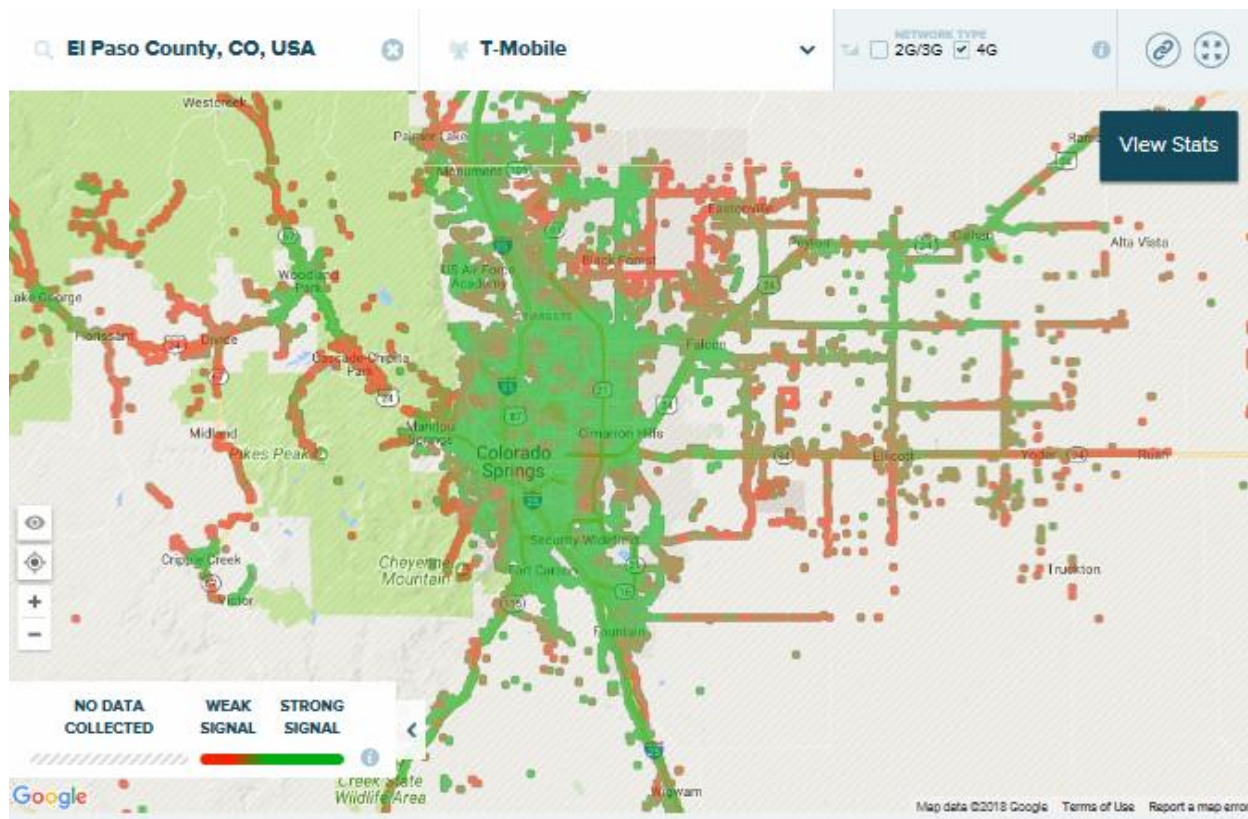
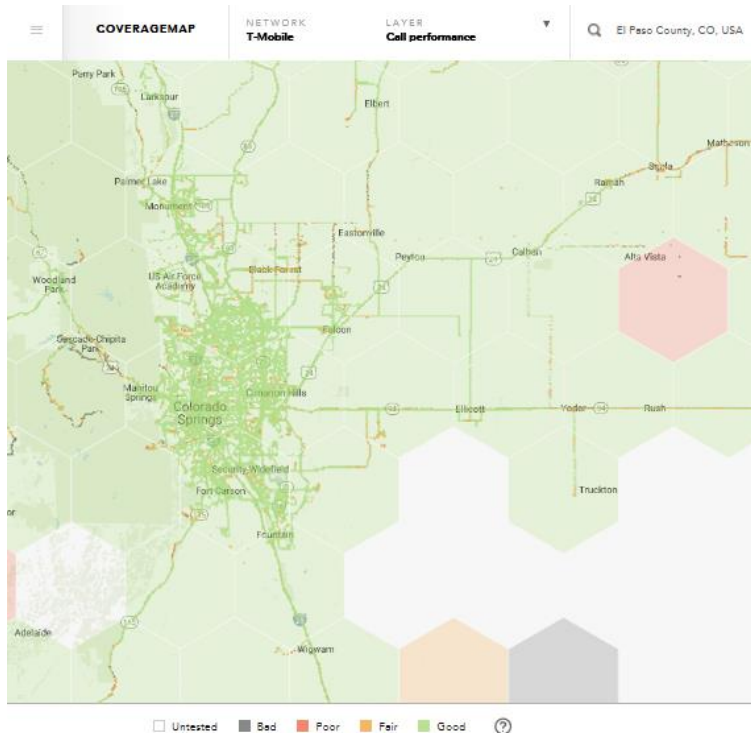


Figure 4-10: T-Mobile RootMetrics Coverage Map for El Paso Co.





■ **SECTION 4: WIRELESS MARKET ASSESSMENT**

The following list highlights areas in El Paso County inadequately served by T-Mobile in the zip codes of interest, as depicted in the OpenSignal and RootMetrics maps found in the Appendix:

Table 4-8: T-Mobile Coverage Gaps in Requested Zip Codes

Zip Code	Areas with Coverage Vulnerabilities
80132	None
80908	Shoup Rd./Black Forest Regional Park; Meridian Rd.; Burgess Rd.; Vollmer Rd.; Herring Rd.
80808	Simla; Harrisville Rd.
80831	N and W of Eastonville (Elbert Rd.), N Falcon
80829	Ruxton Creek SW of Manitou Springs; Cheyenne Mountain Zoo area
80921	Rampart Range Rd.; Fox Run Regional Park
80817	Indian Village Heights (W Wigwam)
80864	Yoder; S. Calhan Hwy.
80926	Deadman's Canyon
Other	Schiever AFB area, Cascade Chipita Park; N Palmer Lake; Squirrel Creek Rd.

**PLANNED NETWORK ENHANCEMENTS**

T-Mobile has extensive plans for expansion over the coming years. The company recently acquired spectrum in the 600MHz range, which they are deploying at macro, small cell, and in-building sites across the country. 600Mhz is the lowest range of frequencies used by carriers at this time; T-Mobile may therefore be able to extend their coverage further than other carriers. Several Android-based phones support this band today<sup>37</sup> and, according to T-Mobile, more will follow including Apple iPhones in September 2018.

In El Paso County, T-Mobile is planning to deploy numerous new macro and small cell sites in both the urban and rural areas of the County in the next year and beyond. They are also planning 600Mhz upgrades and preparing sites for 5G across the country. T-Mobile typically leases fiber for backhauling their sites either employing existing fiber or contracting another entity to build out additional fiber where needed. T-Mobile does lease some existing fiber for backhaul from the Colorado Department of Transportation (C-DOT) in Colorado.

T-Mobile is positioning itself to provide better coverage and capacity to urban and rural areas of El Paso County. In addition, a merger with Sprint could strengthen a combined network's performance.



■ SECTION 4: WIRELESS MARKET ASSESSMENT

## Carrier Analysis: Sprint

The following table provides current price information for Sprint unlimited plans.

Table 4-9: Sprint Pricing for Unlimited Plans

Plan name	Technology	Cost per month* (1 user / 4 users)	Throttling threshold	Hotspot allowance	Video quality limits
Sprint Unlimited Freedom <sup>38</sup>	4G LTE, Extended 4G LTE, Extended Non-LTE, Roaming	\$60/\$100	23 GB	10 GB, then throttled to 2G	1080p

Sprint offers 4G LTE wireless data in the County. The three data packages offered are \$15 per month for a 100 MB data allowance, \$50 per month for a 6 GB data allowance, and \$110 per month for a 30 GB data allowance. Sprint charges \$.05 for each MB over the limit. A two-year contract is required, as well as an activation fee of \$36 and equipment charges. There is an early termination fee of \$200.

### CURRENT PERFORMANCE

Based on our analysis of public information, Sprint offers consistent coverage/call performance in the urban areas and along I-25, with weaker performance throughout the rural areas, as expected. As is the case with most major providers, Sprint provides better coverage in Colorado Springs and its surrounding suburbs, while the more rural areas either exhibit poorer performance overall or are untested. Much of the southeastern part of the County, a large swath in the middle eastern section, and large areas of the southwest in the County were not tested by RootMetrics, and there is no crowdsourced data in these same areas for Sprint. Sprint's advertised coverage in these areas indicates that signal is present everywhere except in the western areas.

■ SECTION 4: WIRELESS MARKET ASSESSMENT

Figure 4-11: Sprint OpenSignal Coverage Map for El Paso Co.

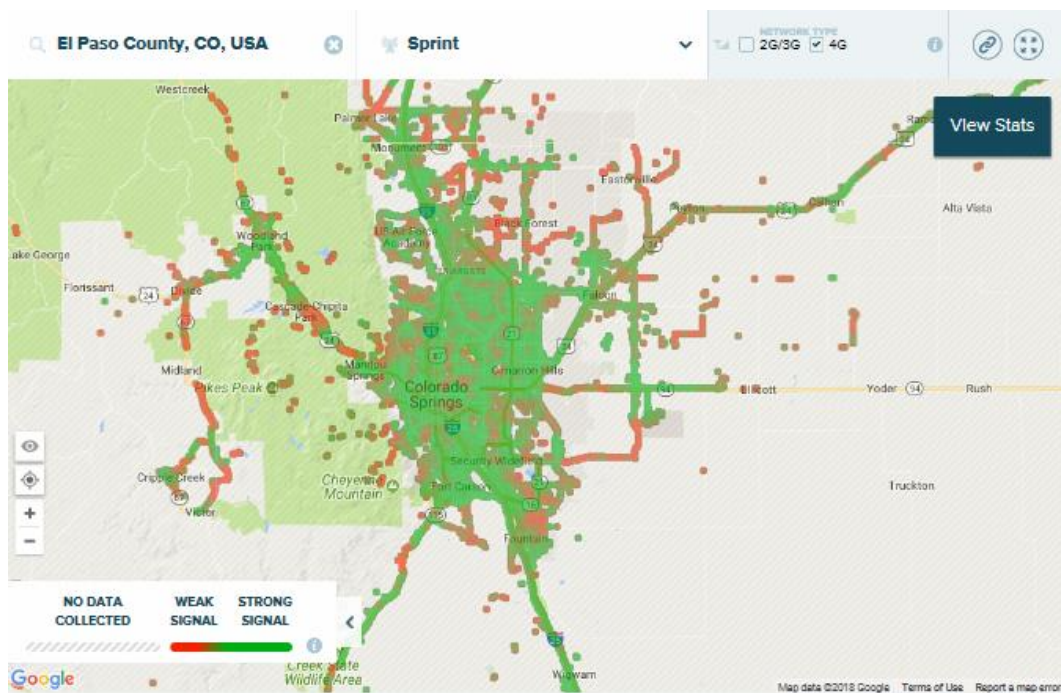
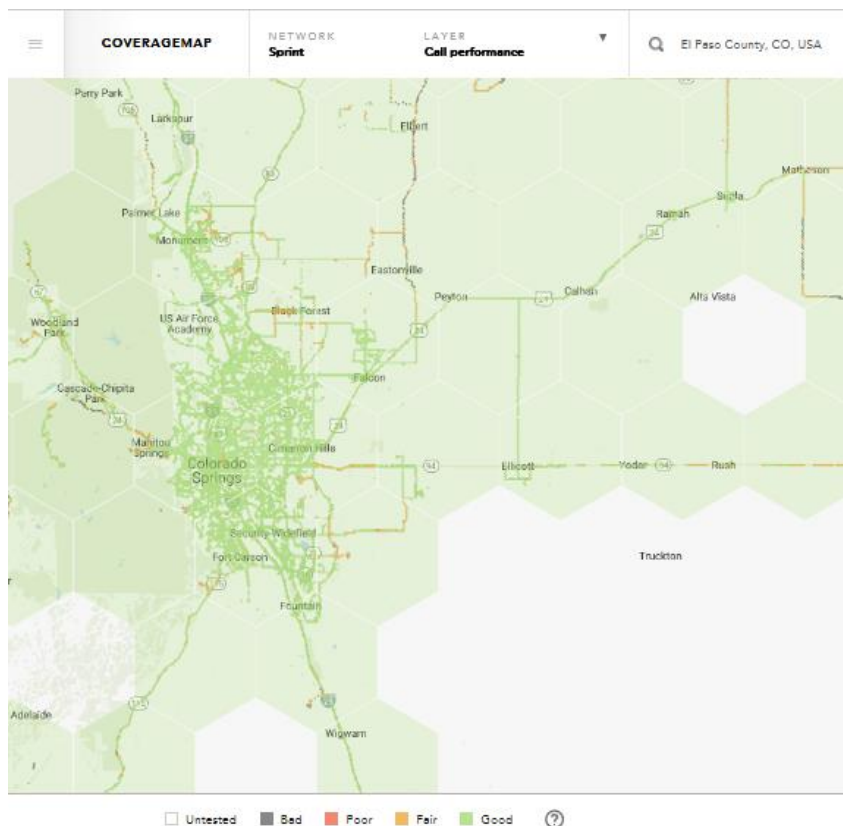


Figure 4-12: Sprint RootMetrics Coverage Map for El Paso Co.



■ **SECTION 4: WIRELESS MARKET ASSESSMENT**

The following list highlights areas in El Paso County inadequately served by Sprint in the zip codes of interest, as depicted in the OpenSignal and RootMetrics maps found in the Appendix.

Table 4-10: Sprint Coverage Gaps in Requested Zip Codes

Zip Code	Areas with Coverage Vulnerabilities
80132	Between Rt. 83 and I-25; Palmer Lake
80908	Black Forest Regional Park
80808	Much of the area does not have any data
80831	Eastonville (Elbert Rd.)
80829	Manitou Springs; Rt. 94 E of Cimarron Hills
80921	Fox Run Regional Park
80817	Pikes Peak International Raceway; NE Fountain
80864	none (insufficient data)
80926	Pet Rest Memorial Park area
Other	Pikes Peak Hwy/Toll Rd.; Rush; N Palmer Lake; Schiever AFB area; Squirrel Creek Rd.

**PLANNED ENHANCEMENTS**

Sprint is also planning to deploy more macro towers and small cells throughout the country. This is to boost their customer base, prepare for 5G, and retain/obtain public safety clientele with their PriorityConnect services. To provide terrestrial coverage out of range of a cell site, they plan to use OneWeb as a solution. OneWeb, partially funded by SoftBank, which also owns Sprint, is a satellite company planning to deploy as many as 1280 low earth orbit satellites capable of providing broadband communications. Sprint would deploy devices that would communicate with the satellite system and then use a point to multi-point network design to reach end devices.

This is similar to Wi-Fi, using satellite communication as backhaul. Sprint claims it will be able to provide full coverage with this solution and provide speeds comparable to terrestrial networks. Satellite services available today are slower than wired and even cellular Internet access speeds—5 to 15 Mbps for satellite, compared to about 50 Mbps for 4G LTE.

■ SECTION 4: WIRELESS MARKET ASSESSMENT

## Carrier Analysis: Verizon

The following table provides current price information for Verizon unlimited plans.

Table 4-11: Verizon Unlimited Data Plan Options

Plan name	Technology	Cost per month*	Throttling threshold	Hotspot allowance	Video quality limits
Verizon Go Unlimited <sup>39</sup>	4G LTE, but may be throttled at any time	One device: \$75 Four devices: \$160	0 GB	Unlimited, but speed limited to 600 Kbps	480p on phones, 720p on tablets
Verizon Beyond Unlimited <sup>40</sup>	4G LTE	One device: \$85 Four devices: \$200	22 GB	15 GB, then throttled to 600 Kbps	720p on phones, 1080p on tablets
Verizon Above Unlimited <sup>41</sup>	4G LTE	One device: \$95 Four devices: \$240	75 GB	20 GB, then throttled to 600 Kbps	720p on phones, 1080p on tablets

Verizon offers two 4G LTE data packages with multiple choices for data allowances and pricing, depending on the equipment chosen and if that equipment is fixed (such as a connected home device). The data-only mobile plan offers monthly prices that range from \$20 for a 2 GB data allowance to \$710 for a 100 GB data allowance. A connected device can be added for \$5 per month.<sup>42</sup>

Verizon's LTE Internet (Installed)<sup>43</sup> plan is a data-only 4G LTE service used on a fixed home device with Wi-Fi connectivity and wired Ethernet for up to four devices. Available download speeds are 5 Mbps to 12 Mbps and upload speeds are 2 Mbps to 5 Mbps. Monthly prices range from \$60 for a 10 GB data allowance to \$150 for a 40 GB data allowance. Overages are charged at \$10 per additional GB. A two-year contract is required, with a \$350 early termination fee. Verizon offers a \$10 monthly deduction for every month completed in the contract.

### CURRENT PERFORMANCE

Verizon dominates the market, with roughly 3.6 million more subscribers than AT&T, 77 million more than T-Mobile, and 99.7 million more than Sprint, according to Q2 2018 metrics from Strategy Analytics. The higher number of data points on the Verizon OpenSignal maps than the other carriers reflects this. Therefore, most likely, there are more Verizon users in El Paso County.

Verizon's performance is similar to that of the other carriers – better in the urban areas and along I-25 and poorer in the mountains and out east. Much of the southeastern part of the County, a large swath in the middle eastern section, and large areas of the southwest in the County were not tested by RootMetrics, but there is some crowdsourced data in these same areas for Verizon. This indicates that there is Verizon signal, but since most of the data points are red, it is "weak."



SECTION 4: WIRELESS MARKET ASSESSMENT

Figure 4-13: Verizon OpenSignal Coverage Map for El Paso Co.

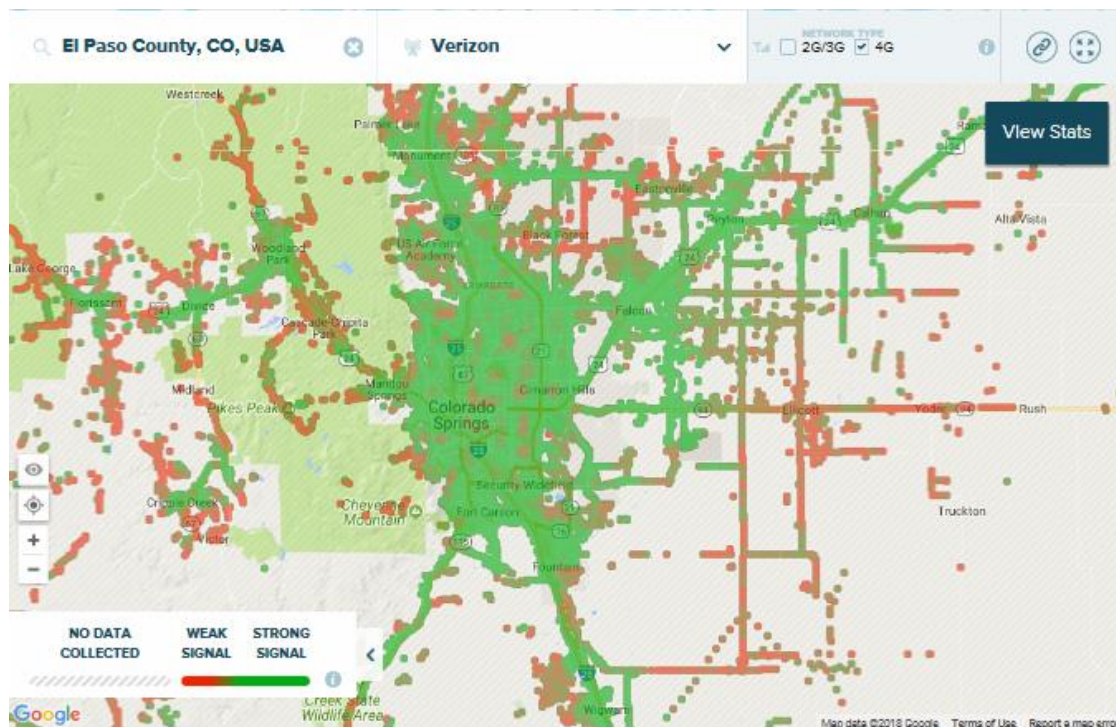
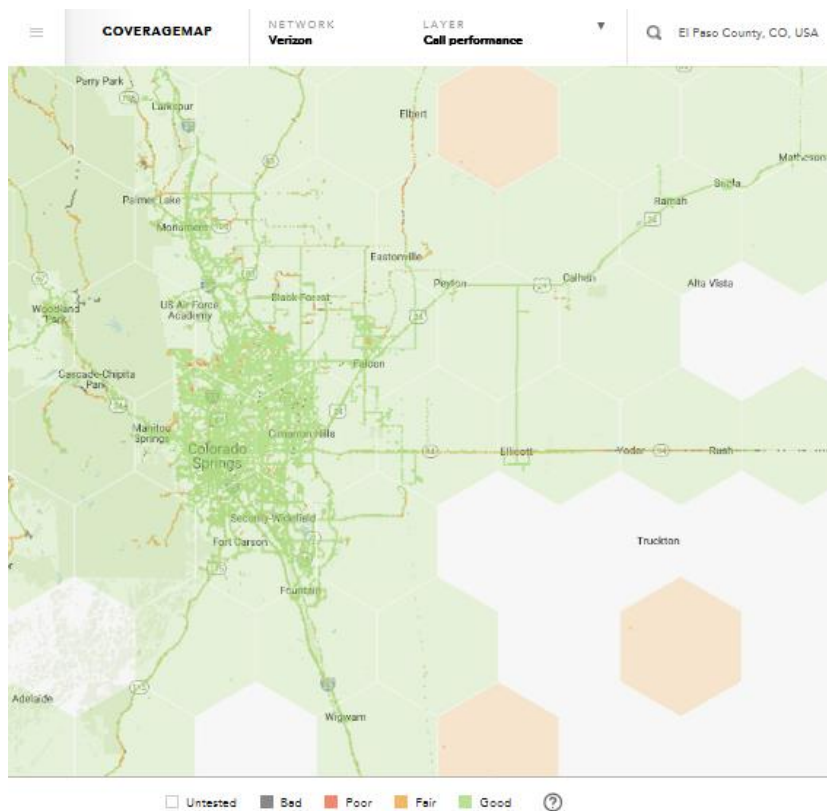


Figure 4-14: Verizon RootMetrics Coverage Map for El Paso Co.





■ **SECTION 4: WIRELESS MARKET ASSESSMENT**

The following list highlights areas in El Paso County inadequately served by Verizon in the zip codes of interest, as depicted in the OpenSignal and RootMetrics maps found the Appendix.

Table 4-12: Verizon Coverage Gaps in Requested Zip Codes

Zip Code	Areas with Coverage Vulnerabilities
80132	NE Woodmoor
80908	Black Forest Regional Park; Burgess Rd.; Vollmer Rd.; Herring Rd.
80808	Ellicott; Alta Vista
80831	N and E Eastonville (Elbert Rd.)
80829	Cave of the Winds Mountain Park
80921	Fox Run Regional Park
80817	N, NW, and W of Wigwam; Old Pueblo Rd.; Hanover Rd.
80864	roughly the whole zip code
80926	S of Deadman Canyon
Other	Rush; Pikes Peak Hwy/Toll Rd.; N Palmer Lake

The datasets used for this analysis provided the most data for Verizon (over other carriers), likely because its popularity in the region. This provides a better view of areas lacking coverage. Verizon covers similar areas to AT&T, but with a few nuances. While Verizon covers the popular tourist areas better in the western mountains, like Pikes Peak and its surrounding parks, it neglects the more rural eastern regions of the County, like Rush, Yoder, and zip code 80864.

**PLANNED ENHANCEMENTS**

Verizon, as with the other carriers, is currently enhancing its network across the country with both macro and small cell sites. Verizon is also very interested in maintaining its market share (currently greater than that of AT&T) of public safety users. Verizon is therefore deploying to remain competitive.

Verizon, although contacted for specific information about El Paso County, did not respond as of September 18, 2018.

■ **SECTION 4: WIRELESS MARKET ASSESSMENT**

## **Mobile Virtual Network Operators**

Mobile virtual network operators, or MVNOs, are companies that resell commercial wireless services from AT&T, Verizon, Sprint, or T-Mobile at a reduced price. To offer services at a lower cost than a MNO, MVNOs purchase service in bulk from one or more carriers, carry less overhead, minimally advertise, and usually sell only services and not devices. Many MVNOs offer no contract for services as opposed to the one- or two-year contracts required by the major carriers.

But you get what you pay for: an MVNO's service area may be smaller than the carrier's service area and service with an MVNO may be given a lower priority than service directly obtained from the parent network, and this could mean degraded service during times of network congestion. A major carrier will generally offer a higher performing network and better customer service.

The list of MVNOs, the networks on which they offer service, and pricing change constantly. One source for updated lists is [whistleOut](#)<sup>44</sup>.

## **Tower Companies and Their Plans**

Most tower companies build based on the carriers' (and governments for public safety radio systems) need for deployments; that is, it is usually not a "build it and they will come approach". Companies such as Crown Castle (over 40,000 towers), American Tower (approx. 40,000), SBA Communications (15,000), and United States Cellular Co. (4000) choose to invest in a tower when they know there are interested tenants. Tower companies also simplify co-location for carriers (and governments) being the "middleman" and providing not only the physical structures but also colocation management services. This brings down costs and allows the carriers to focus on their core business.

For the most part, tower companies stand to benefit from the increased investment in wireless networks due to many factors. For example, if the Sprint/T-Mobile merger does not happen, Sprint will need to continue to build out their own network to compete with the other three and, as mentioned, the FirstNet contract is driving AT&T to add infrastructure across the country. Crown Castle has agreements with both of these carriers to support their expansion; the recent contract with AT&T is aimed at reducing the rental cost of towers and some of the surrounding contractual limitations<sup>45</sup> which will facilitate faster deployments. (Of note, however, if the Sprint/T-Mobile merger does happen, their management has said that T-Mobile's network will stand as the foundation and ultimately there will be a reduction of 25,000 towers, mostly Crown Castle's.) Verizon and AT&T also have an agreement with Tillman to build towers, enabling lower costs from collocating.

Some of these companies, such as Crown Castle, also deploy small cells, again benefitting from the carriers' investments to densify the networks and increase capacity. Verizon and AT&T are building many of their own small cells using their own fiber infrastructure as backhaul. Small cells are at the forefront of the wireless world as the FCC, states, and local governments weigh the need to quickly build infrastructure to progress and the need for established processes and standards to ensure best practices are followed.

■ SECTION 4: WIRELESS MARKET ASSESSMENT

## What Can El Paso County Government Do to Help?

El Paso County should establish and maintain good relationships with each of the wireless carriers' staff: the sales people; the technical personnel responsible for planning and deploying within the County; and any public safety representatives. This may provide lines of communication for the County to receive updates and to report issues.

In our experience, the carriers are typically very willing to accept information about performance and want to work with jurisdictions to alleviate problems. This was the case with a carrier in Summit County, Colorado who is now working with the County to close known coverage gaps. This creates a win-win: The County gets better service and the carrier may gain customers.

The County also should continue to pay attention to FirstNet working closely with the State Point of Contact and the Colorado Broadband Office, not only for public safety's sake, but for all consumers who will benefit from the required improvements in network coverage and service. AT&T has the contract to build the federal public safety network, but the other carriers are following suit, building out to compete in the public safety arena and provide better service to the general public.

- 
- <sup>1</sup> Mike Dano, "AT&T Inks Streamlined Tower Small Cell Deal with Crown Castle", Fierce Wireless, April 11, 2018, <https://www.fiercewireless.com/wireless/at-t-inks-streamlined-tower-small-cell-deal-crown-castle> (accessed July 2018)
  - <sup>2</sup> Wayne Heilman, "Colorado Springs Colo. Increases Small Cell Tech in Anticipation of 5G", GovTech, May 23, 2018, <http://www.govtech.com/network/Colorado-Springs-Colo-Increases-Small-Cell-Tech-in-Anticipation-of-5G.html> (accessed July 2018)
  - <sup>3</sup> Gina Narcisi, "Verizon Inks \$1.05B Fiber Deal With Corning To Build Out Fiber Footprint, Speed 5G Deployment Plans," CRN, April 18, 2017, <http://www.crn.com/news/networking/300084601/verizon-inks-1-05b-fiber-deal-with-corning-to-build-out-fiber-footprint-speed-5g-deployment-plans.htm> (accessed September 2017).
  - <sup>4</sup> CTC Technology & Energy, "Mobile Broadband Service Is Not an Adequate Substitute for Wireline" October, 2017, [www.ctcnet.us/wp-content/uploads/2017/10/CTC-Mobile-Broadband-White-Paper-final-20171004.pdf](http://www.ctcnet.us/wp-content/uploads/2017/10/CTC-Mobile-Broadband-White-Paper-final-20171004.pdf) (accessed August 2018)
  - <sup>5</sup> We note that in the future, usage limits and throttling might follow a similar trend to mobile voice "minutes," eventually offering truly unlimited options. However, there is no definitive evidence in the industry today to support this.
  - <sup>6</sup> "T-Mobile One," T-Mobile, <https://support.t-mobile.com/docs/DOC-31900> (accessed September 2017).
  - <sup>7</sup> John Engebretson, "iGR: Average Monthly Broadband Usage is 190 Gigabytes Monthly Per Household," *Telecompetitor*, September 26, 2016, <http://www.telecompetitor.com/igr-average-monthly-broadband-usage-is-190-gigabytes-monthly-per-household/> (accessed September 2017).
  - <sup>8</sup> "Unlimited for All," Verizon Wireless, <https://www.verizonwireless.com/plans/verizon-plan/> (accessed May 2018).
  - <sup>9</sup> "Unlimited for All," Verizon Wireless, <https://www.verizonwireless.com/plans/verizon-plan/> (accessed May 2018).
  - <sup>10</sup> "Unlimited data is better than ever," AT&T, <https://www.att.com/plans/unlimited-data-plans.html> (accessed May 2018).
  - <sup>11</sup> "Unlimited data is better than ever," AT&T, <https://www.att.com/plans/unlimited-data-plans.html> (accessed May 2018).
  - <sup>12</sup> "With our plan, you just get more," T-Mobile, <https://www.t-mobile.com/cell-phone-plans> (accessed May 2018).

■ SECTION 4: WIRELESS MARKET ASSESSMENT

- 13 With our plan, you just get more,” T-Mobile, <https://www.t-mobile.com/cell-phone-plans> (accessed May 2018).
- 14 “Switch to Sprint and get the BEST price for Unlimited,” Sprint, <https://www.sprint.com/en/shop/plans/unlimited-cell-phone-plan.html?INTNAV=TopNav:Shop:UnlimitedPlans> (accessed May 2018).
- 15 “Mobile network cost study”, September 4, 2013, pwc, [https://asut.ch/asut/media/id/94/type/document/st\\_pwc\\_mobile\\_network\\_cost\\_20130904.pdf](https://asut.ch/asut/media/id/94/type/document/st_pwc_mobile_network_cost_20130904.pdf)
- 16 The moniker “FirstNet” is used to describe both the federal organization and the NPSBN.
- 17 This is a CTC estimate based on our experience designing fiber-to-the-premises projects.
- 18 [http://www.americantower.com/Assets/uploads/files/PDFs/investor-relations/Americantower\\_investorrelations\\_towers-101\\_2Q14.pdf](http://www.americantower.com/Assets/uploads/files/PDFs/investor-relations/Americantower_investorrelations_towers-101_2Q14.pdf)
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- 20 “Internet/Broadband Fact Sheet.” Pew Research Center, <http://www.pewinternet.org/fact-sheet/internet-broadband/> (accessed April 2018).
- 21 <https://ilsr.org/wp-content/uploads/2015/11/sandynet-2015.pdf> (accessed July 2018)
- 22 TVWS is unlicensed spectrum vacated by television operators.
- 23 <https://www.fcc.gov/reports-research/maps/nationwide-lte-coverage-ye-2016/>
- 24 <https://www.fcc.gov/document/data-specification-form-477-data-collection>
- 25 For more details about the metrics OpenSignal collects. <https://opensignal.com/blog/2018/04/05/understanding-mobile-network-experience-what-do-opensignals-metrics-mean/> (accessed September 2018)
- 26 “Unlimited Data Plans,” AT&T, <https://www.att.com/plans/unlimited-data-plans.html> (accessed July 2018)
- 27 These costs include a \$10 discount for autopay and paperless billing setup that only applies after the first two billing periods.
- 28 “AT&T Mobile Share Flex Plans,” AT&T, <https://www.att.com/plans/wireless/mobile-share-flex.html> (accessed July 2018)
- 29 “FirstNet Simplifies Service Contracts with NPPGov”, AT&T, [http://about.att.com/story/firstnet\\_nppgov\\_service\\_contracts.html](http://about.att.com/story/firstnet_nppgov_service_contracts.html) (accessed July 2018)
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- 31 Ibid.
- 32 Ibid.
- 33 Theo Douglas, “After Considering Its Own Network, Colorado Joins FirstNet”, December 19, 2017 <http://www.govtech.com/public-safety/After-Considering-Its-Own-Network-Colorado-Joins-FirstNet.html>
- 34 “With our plan, you just get more,” T-Mobile, <https://www.t-mobile.com/cell-phone-plans> (accessed May 2018).
- 35 With our plan, you just get more,” T-Mobile, <https://www.t-mobile.com/cell-phone-plans> (accessed May 2018).
- 36 <http://www.t-mobile.com/cell-phone-plans/mobile-internet.html>, accessed February 2018.
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- 38 “Switch to Sprint and get the BEST price for Unlimited,” Sprint, <https://www.sprint.com/en/shop/plans/unlimited-cell-phone-plan.html?INTNAV=TopNav:Shop:UnlimitedPlans> (accessed May 2018).
- 39 “Unlimited for All,” Verizon Wireless, <https://www.verizonwireless.com/plans/verizon-plan/> (accessed May 2018).
- 40 Ibid.
- 41 Ibid.
- 42 <https://www.verizonwireless.com/plans/data-only-plan/>, accessed February 2018.
- 43 <https://www.verizonwireless.com/home-services/lte-internet-installed/>, accessed February 2018.
- 44 [www.whistleout.com/](http://www.whistleout.com/)
- 45 [http://about.att.com/story/att\\_crown\\_castle\\_expand\\_strategic\\_relationship.html](http://about.att.com/story/att_crown_castle_expand_strategic_relationship.html)

■ **SECTION 5: PUBLIC AGENCY NEEDS**

## **Section 5: Public Safety & County Department Needs**

### **Public Safety Needs in El Paso County**

HR Green's sub consultant, CTC Technology & Energy, engaged with El Paso County public safety stakeholders to collect information on current public safety communications capabilities and determine areas of potential future broadband needs. Over the course of this task, we met with the following County representatives:

- David Rose – Chief Public Information Officer for El Paso County, Member of the El Paso-Teller County 911 Authority
- Carl Simpson- Chief Executive Officer for the El Paso-Teller County 911 Authority
- Matthew Towell – Security and Information Technology Manager at El Paso-Teller County 911
- James Reid – Executive Director of Public Services at El Paso County – oversees Transportation, Fleet Management, Office of Emergency Management
- Jeff Eckhart – Executive Director of Information Technology

Additionally, we reviewed material available on-line regarding public safety networks in the County and other relevant networks.

Our stakeholder discussions and material review provided a picture of the County's existing public safety wired and wireless networks, issues, and applications; and helped to understand potential areas of improvement to optimize communications relative to the County's broadband needs.

### **Summary Recommendations**

The following summarizes our recommendations based on our interviews and research.

- **Assess the feasibility of a County-owned high-speed fiber network.** County public safety has worked hard to provide quality connections among its facilities. These networks vary, however, and include primarily leased to connect PSAPs, LMR sites, and fire stations. Public safety should consider working with other County entities to assess the feasibility of a County-owned fiber network that would provide these connections as well as serving other government facilities throughout the County (or region). More municipalities are undertaking such studies breeding more competition and potentially better pricing. Doing so would give the County greater control over the costs, usage, and performance.
- **Continue to enhance LMR interoperability.** The County's primary public safety land mobile radio (LMR) Pikes Peak Regional Communications Network (PPRCN) is integrated into the State of Colorado 800 MHz P25 Digital Trunked Radio System



## ■ SECTION 5: PUBLIC AGENCY NEEDS

(DTRS). It is also linked to other LMR networks via an APCO P25 Inter-RF Subsystem Interface (ISSI). In addition, El Paso and Teller County work together on the El Paso-Teller County 911 Authority to address public safety governance in the region. The County should continue to look for ways to provide seamless interoperability to first responders within and outside of the County such as connectivity via wireless in rural and mountainous regions.

- **Continue to push wireless carriers to enhance performance.** As illustrated in Section 4 of this report, commercial carrier coverage is not ubiquitous across the County. The County should insist that commercial carriers provide adequate coverage for their public safety services as more agencies rely on broadband for daily, planned, and unplanned events. It can support this effort by providing known coverage gap information to the carriers. County agencies can also reach out to the carriers and mobile data equipment vendors to test services prior to making a carrier choice. The State of Colorado, through the State and Local Implementation Grant 2.0 federal grant, may also be planning to conduct performance analysis in the state – the County should stay apprised of their plans and request testing in areas of known poor coverage such as those areas captured in this report.
- **Keep apprised of public safety broadband services and applications.** As AT&T's FirstNet evolves and as other carriers compete, more public safety broadband services and applications will become available. County public safety agencies should monitor progress and determine which best fit the needs and requirements of first responders. The public safety internet of things, or the "Internet of Life Saving Things", will see applications such as situational awareness, EMS data transfer, shot spotter, air quality/smoke detection and monitoring, smart home data processing, and numerous other "smart apps" become more and more commonplace. The County should stay apprised of developments in these areas and assess the need for implementation within its agencies and department.

## Public Safety Agencies and Relevant Public Service Departments in El Paso County

There are eight independently operated 9-1-1 centers/public safety answering points (PSAPs) and one backup PSAP supported by the El Paso-Teller County 911 Authority. The Authority also provides mobile data equipment to law enforcement, fire, and other entities. The sole funding source for 9-1-1 is the emergency telephone charge (ETC) which was recently increased to support the County's transition to Next Generation 9-1-1 (NG911).

The El Paso County Sheriff's Office and local city/town police departments provide law enforcement throughout the County. In addition, the El Paso County Sheriff's Office runs both the Criminal Justice Center and the Metro Detention Facility. There are 59 fire stations and Emergency Medical Service (EMS) response is supported by American Medical Response, a private firm contracted and overseen by the Emergency Service Authority. Utilities and other public service entities, which often become first responders during certain disasters and other events, primarily include Colorado Springs Utilities, Mountain View Electric Association, and water departments.

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## **Public Safety Wireless Networks in El Paso County**

### **EXISTING NETWORKS**

Public safety wireless communications networks and agencies that use the networks within the County include the following:

- Pikes Peak Regional Communications Network (PPRCN)/State of Colorado 800 MHz P25 Digital Trunked Radio System (DTRS)
  - All 32 fire districts
  - City of Colorado Springs
  - Law enforcement agencies in Calhan, Monument, Fountain, Green Mountain Falls, Palmer Lake, and Manitou Springs
  - Colorado Springs Utilities
  - El Paso County Sheriff's Office
  - El Paso County Emergency Management
  - Public works
- Fort Carson UHF P25 system
- Air Force Academy 300MHz P25 system
- Several fire department conventional networks<sup>1</sup>
- Major cellular carrier networks that support public safety
  - AT&T/FirstNet
  - Verizon Wireless
  - T-Mobile
  - Sprint

PPRCN, a land mobile radio (LMR) network, is the primary wireless public safety voice communications network used by the County and other local agencies. PPRCN became part of the Consolidated Communications Network of Colorado (CCNC) in July 2009 when its zone controller was upgraded and integrated into the statewide DTRS. PPRCN was recently upgraded to simulcast operations and added two sites (one on US Forest Service land and one near the airport) to enhance system performance. Backhaul connectivity is via both leased microwave and fiber connections. The network is sustained by user fees of \$230/year/device to pay for operations and upgrades.

Federal systems within the County include Fort Carson's UHF and the Air Force Academy's 300 MHz P25 systems.

The four major cellular carriers (AT&T, Sprint, T-Mobile, and Verizon) provide public safety targeted solutions on their commercial networks. AT&T is responsible for building out and providing services over the Nationwide Public Safety Broadband Network (NPSBN) under their current contract with FirstNet.

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The NPSBN is a next-generation public safety network conceived after the terrorist attacks of Sept. 11, 2001 exposed serious communications problems. For years, public safety stakeholders and others have been deeply involved in trying to solve communications problems with a fully interoperable, robust network. In response, Congress created a federal organization called FirstNet in 2012 and tasked it with creating the NPSBN. AT&T won the contract to build the network.

All 50 states and the District of Columbia “opted in” or accepted AT&T’s plan for deployment and operation.<sup>2</sup> However, adoption of FirstNet is not required of any agency or individual. Other major carriers also offer services with similar capabilities, giving state and local public safety agencies a choice. It is now up to public safety agencies to decide whether the value of FirstNet is worth the transition. We understand that the El Paso County Sheriff’s Office is currently subscribing to FirstNet services. AT&T was not at liberty to provide any additional information regarding subscribing agencies within the County.

County employees (non-public safety), including public works, can select which carrier works best for them. Selection is highly dependent on where they require coverage and live.

## GAPS AND RECOMMENDATIONS

El Paso County public safety is well-served by the LMR systems in use today for voice operations. The PPRCN has recently been upgraded to simulcast and is P25-compliant. Simulcast networks offer several advantages, primarily overlapping coverage without the complexity of a handoff facilitating trunking efficiency, more redundancy, and simpler operation. Of note, simulcast sites must be properly synchronized to minimize distortion. Having a P25-compliant system enables agencies to select equipment from multiple vendors—more choices and price competition, frequency efficiency, and the ability to interoperate with neighboring (P25) systems.

El Paso County representatives noted that users, including the Sheriff’s Office, have experienced coverage gaps in the PPRCN including in the southeast in the Hanover area as well as capacity issues during events such as wildfires. The upgrade to simulcast and P25 may help with alleviate some of these issues.

Otherwise, a coverage and capacity study in specific areas may be necessary to determine if the problem warrants a new site(s) or additional channel(s).

Public safety is using commercial carrier LTE systems more today than in the past, especially with the advent of FirstNet. However, it is not recommended by either public safety—or the wireless carrier industry—to replace LMR systems with LTE services at this point in time. LMR is designed for narrowband, critical voice while LTE is designed for data and video and current performance may not be sufficient.



## ■ SECTION 5: PUBLIC AGENCY NEEDS

LMR systems are specifically designed to cover 95+ percent of their service area whereas LTE systems have been built to serve populous areas (where carriers can make the most revenue). For more details on commercial carrier coverage within El Paso County, see Section 3 of this document. The information in this section illustrates that commercial coverage is currently inadequate for public safety to rely on. LTE should be used to supplement LMR for applications such as computer aided dispatch, field reporting, situational awareness, body cameras, and others.

As an example, the County noted that during the Waldo Canyon Fire in 2012, AT&T was supporting the County with firefighting operations at Holmes middle School. Even though the school was located on a mesa, a high point, AT&T needed to supplement service with a cell-on-wheels.

The County, in fact, should insist that commercial carriers provide adequate coverage for their public safety services. It can support this effort by providing coverage gap information to the carriers. County agencies can also reach out to the carriers and mobile data equipment vendors to test equipment and services prior to making a decision. Numerous agencies across the country, including Onondaga County, New York and Sussex County, Delaware, have run tests for 30+ days to assess carrier network capabilities and associated resource management tools.

## Public Safety Wired Networks in El Paso County

### EXISTING NETWORKS

9-1-1 Centers/PSAPs depending on secure, robust, public safety grade wired connections to communicate among centers within the County, including the 911 Center in Fort Carson, and with several LMR towers. County PSAPs use Computer Aided Dispatch (CAD) systems to dispatch appropriate personnel using CAD-to-CAD operations if necessary. Personnel must also have access public safety databases and networks (e.g., state and federal database searches) relying on secure, fast connections.

The County currently contracts wide area connections from CenturyLink at 50-300Mbps speeds for approximately \$10K per month. In addition, the County uses Peak Internet to provide redundancy in some spots for approximately \$7K per month. The County notes that they have explored putting in their own network for these links but found that it was cost-prohibitive at the time.

El Paso County is currently in the process of migrated to Next Generation 911 (NG911) being in the process of or having installed NG911-compliant equipment in County PSAPs. NG911, as defined by the National Telecommunications and Information Administration, “will enhance emergency number services by creating a faster, more resilient system that allows digital information (e.g., voice, photos, videos, text messages) to flow seamlessly from the public, through the



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911 network and eventually, directly to first responders. It will also enable 911 call centers to transfer 911 calls to other call centers, and help them deal with call overload, disasters, and day-to-day transfer of 911 calls to other jurisdictions.” To enable these services, NG911 requires updated hardware, software, data, and operational policies and procedures as well as a private, secure network interfaces among PSAPs (an Emergency Services IP Network or ESINet).

Per County representatives, the County is waiting for CenturyLink to offer core services and revise tariffs to be able to provide ESINet to the County before it can fully migrate to NG911. The County will most likely implement a regional ESINet with Teller County and potentially other localities.

County fire station connectivity for alerting and other communications varies greatly, with some connections being more reliable and faster than others (such as in Cripple Creek where there is currently fiber access from CenturyLink).

LMR system backhaul is through both wireless (microwave connections) and fiber (fiber-to-the-tower). Fiber connections provide faster speeds but cost more and take longer to deploy.

## GAPS AND RECOMMENDATIONS

Notwithstanding some fire station links, the current wired connections for the County are, for the most part, robust and provide good service. To immediately improve connectivity, the County should continue to pursue alternatives for fire stations that do not have a reliable connection (or any connection at all). Interviewees noted that this may be via wireline or wireless means using PPRCN or by commercial cellular service. (However, as noted above, commercial cellular service should not be relied upon to provide public safety grade service until proven.)

The County may want to consider a County-owned or leased fiber network to connect public safety facilities, potentially in concert with other government facility connections throughout the County or region. This could be a fully fiber network or a hybrid fiber/wireless network using spectrum available to public safety.

The County would not necessarily have to manage or operate the network unless it desires to do so. A managed services firm could provide that service. Public safety would be able to design the network as needed, considering security, redundancy, and capacity. Such a system could provide robust connectivity to all fire stations and enable ESINet between the PSAPs.

Of note, however, an operational and cost feasibility analysis is highly recommended before pursuing any of these options. Fiber deployments are expensive, especially long runs that would be required to reach the remote eastern facilities and deployments in mountainous areas.

## Public Safety Applications

### CURRENT APPLICATIONS

According to those interviewed, County and other local agencies currently use one or more of the following public safety applications:



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- Computer aided dispatch including priority dispatch and CAD-to-CAD interfaces facilitating call hand-off when needed
- Records management – the local RMS is owned by Colorado Springs and the County recently gained access to it
- Automatic vehicle location (AVL)
- Video/body cameras – each agency is responsible for their own equipment, video storage, and access. Fountain and Monument police currently use Axon cameras; Colorado Springs police and El Paso County deputies use Utility, a camera that looks like a cellphone. The County is interested in technology that links the captured video with CAD incident markers.
- Visual aids such as building diagrams pushed to a field unit, LIDAR imaging, and pictometry
- Everbridge – a mass notification system recently implemented by the County to push information out to its constituents
- P25 Inter-RF Subsystem Interface (ISSI) between El Paso County and the City of Pueblo
  - ISSI allows two P25 networks to work seamlessly together connecting radio systems from different owners into a single, interoperable network
- Zonar – fleet management

Each agency also maintains its own GIS database and tools that are shared with other agencies upon request. Agencies jointly acquire and share aerial photography.

There is good regional cooperation among County agencies, 9-1-1 groups and utilities as well as a cost sharing model for public safety-related data and tools.

**FUTURE APPLICATIONS**

El Paso County is interested in augmenting their public safety communications by integrating RapidSOS into their processes. RapidSOS enables Internet of Things (IoT) information to be transmitted from a location during an emergency sending important data such as temperature, status of the locks, whether anyone is in the building, and other information to the PSAP where it is parsed and sent to first responders. As more and more homes and commercial buildings become “smart”, this technology will greatly enhance public safety’s ability to react faster and more precisely.

The County was interested in many of the latest firefighting technologies such as sensors, actuators, and situational awareness tools. But, as with other agencies across the country, funding is often an issue for both capital and ongoing expenses. The County also expressed an

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interest in hazmat monitoring tools and Wi-Fi on public safety campuses that users automatically switch to while at that location.

**GAPS/RECOMMENDATIONS**

Technology is moving faster than ever in public safety. FirstNet has cracked the market for public safety application developers wide open. This is good news for public safety, but agencies are cautioned to look, and thoroughly investigate, before leaping. Use of an application should be based on the specific needs of an agency and what works best for their personnel.

We recommend that the County maintain an awareness of both FirstNet and other commercial carrier service and application offerings. FirstNet has established an application clearinghouse of sorts and currently classifies vetted applications as “certified” or “listed” in the FirstNet App Catalog; those certified having undergone a more rigorous testing process.<sup>3</sup>

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## **County Department Communication Services**

### **OVERVIEW**

HR Green staff engaged with El Paso County Public Works stakeholders to collect information on current public safety communications capabilities and determine areas of potential future broadband needs. Over the course of this task, we met with the following County representatives:

- James Reid – Executive Director of Public Services at El Paso County – he has overseen Transportation, Fleet Management, Office of Emergency Management. As our study progressed, Mr. Reid accepted a new opportunity and we interviewed his interim replacement, Mr. Scot Cuthbertson
- Scot Cuthbertson – Interim Director of Public Services
- Jennifer Irvine -- County Engineer
- Craig Dossey – Executive Director of Planning and Community Development
- Mark Gebhart – Deputy Director of Planning and Community Development
- Jeff Eckhart – Executive Director of Information Technology

Additionally, we reviewed material available on-line regarding public works in the County and verified much of the information provided via other relevant sources.

Our stakeholder discussions and material review provided an understanding of the County's existing public works networks, use of technology and applications; and helped to understand potential areas of improvement to optimize operations relative to the County's telecommunications and broadband needs.

### **EXISTING CONDITIONS**

The Public Works department is responsible for, among other functions much of the County's fleet, transportation (highway maintenance), engineering as well as coordinating key emergency management and hazardous material incident responses. Approximately 2000 individual pieces of equipment, including roughly 1000 pieces of rolling stock are in the agency's fleet. Of these, a typical snowstorm incident involves 43 heavy trucks with mounted snowplows and 23 road graders covering approximately 1100 miles of paved highways and 1100 miles of unpaved, or gravel highways. Much of the fleet is equipped with on-board telematics allowing for improved efficiency and routing.

Satellite maintenance yards are dispersed around the County and include facilities in Black Forest, Monument, Ellicott, Peyton and Truckton with the two largest facilities west of Marksheffel Road (Akers) and in Calhan.

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Although not every yard has internet connectivity, the on-board telematics are capable of storing the data generated then dumping the information into the County's management system when within range of a facility allowing a broadband connection. Since no commercial cellular service is available throughout much of the remote parts of the County, crews may be out of contact for significant periods of time, possibly increasing risk to them and the travelling public.

## Summary Recommendations

The following summarizes our recommendations based on our interviews and research.

- **Extend broadband to every County Public Works facility allowing Wi-Fi, communications and telematics capabilities to every vehicle while within a County yard.** This technology could be extended to remote facilities and key "nodes" throughout the County via a number of point-to-point microwave "hops."
- **Extend telecommunications to key "nodes" throughout rural El Paso County.** Often, state DOT's will dual-purpose these nodes to employ remote Variable or Dynamic Message Signs with a "Wi-Fi hotspot" capable of offering limited telematics and mobile data terminal functions.
- **Consider Public Works rural telecommunications plan.** Although designing such a network is beyond the scope of this study, the benefits to enhancing the agency's management capabilities, combined with improved safety of both the road crews and the travelling public could justify developing such a detailed plan.

Such a plan should be conducted in coordination with key agencies including Public Safety and OEM. Key elements of this plan would include laying out locations for sensing and safety purposes including:

- Road closure gates
- Messaging signs,
- Flood/high water alarms
- Debris flows
- Air quality/smoke
- Road conditions (snow, ice, temperature, winds,)
- Traffic speed and volumes

This data could be relayed back to a central location for real time analysis and action. Initially such a plan could focus on developing point-to-point microwave connections, with a future phase involving fiber optic connections. The details for such a plan should consider the agency's interest in using this data for resource management and assessing road conditions throughout rural El Paso County.

- **Assess the feasibility of a County-owned high-speed fiber network.** As noted above, El Paso County has worked hard to provide quality connections among its facilities. These networks vary, however, and include primarily leased to connect PSAPs, LMR sites, and fire stations. Public safety should consider working with Public Works and other agencies to assess the value of a County-owned or shared fiber network

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that would provide these connections as well as serving other government facilities throughout the County (or region). Doing so could give the County greater control over the costs, usage, and performance.

- **Continue to upgrade and interconnect traffic signals with fiber optics.** The County owns and operates approximately 56 signalized intersections. While many of the County's signalized intersections are in areas distant from any other nearby signals and would not benefit from "synchronization" or coordination efforts, others are along major corridors which are developing and could significantly enhance both safety and reduce travel times.

As part of an unrelated analysis, HR Green's staff conducted a traffic signal study along nearby Academy Boulevard and determined, for example, run times along the entire corridor would be reduced from more than 1 hour to approximately 20 minutes; a net reduction of about 65% in travel times. This data was derived by comparing "unsynchronized" signals between I-25 south of Colorado Springs to I-25 North of Colorado Springs with a fully coordinated and interconnected system. Again, while not every signal in El Paso County would benefit from a fiber optic interconnection, developing such a long-term plan would yield significant benefits in safety and congestion to the travelling public. Benefits would likely include:

- Quantifiable improvements to traffic safety (reduced accidents)
- Reduced traffic congestion (reduced travel time)
- Likelihood of funding assistance from CDOT/PPACG and other sources
- Moreover, any excess fiber optic capacity developed for traffic signal interconnections could benefit the County, other governmental/public safety agencies and the private sector

Given these opportunities for multiple partnerships and funding, additional detailed planning should be considered to conceptualize a real-time traffic management center. While the benefits of traffic signal timing plan alone (noted above) would be significant, the ability to remotely adjust the County's traffic signals would pay significant dividends by improving safety and reducing congestion, the ability to remotely adjust and manage the county's signals would pay dividends by improving safety and reducing congestion.



Again, with a well-planned fiber optic network, a centralized traffic operations control would capitalize on the benefits that remote sensing, telecommunications and fiber optic interconnections would bring.

We understand the City of Colorado Springs, for example, has placed great emphasis on such an initiative with more than 90% of its signals now connected with fiber optics,



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traffic and highway sensors and are capable of centralized, remote control, allowing it to dynamically adjust its traffic flows city-wide based on time of day, special events and weather/public safety events. Peterson AFB has a similar system in which base security forces can deliberately bring traffic throughout the installation to stop by imposing “all-red” indications on its signals. Developing such scenarios could also benefit the County during periods, for example, of heavy flooding, preventing traffic from entering, for example a dangerously high creek, or to better manage, for example, traffic from major events such as at the Fairgrounds.

- **Dedicate funding to expand the County’s fiber optic network.** Including a modest amount of funding in the County’s annual budget, perhaps \$200,000-\$300,000 would allow an excellent fiber optic network development program. Such a funding level would be used, for example to co-locate perhaps 10-20 miles of new fiber optic cables annually.

With 2,200 miles of highways, this amount would be less than 1% annually of the overall transportation budget, and would be done in partnership with private sector providers. Again, such an initiative would be an excellent first step in a highly valuable, and integrated program to develop improved telecommunications throughout the County.

Details about such programs as “dig once,” “piggybacking” and “co-locating” are found in section nine of this report, and would create value by leveraging the County’s limited resources. By comparison, one city in the Denver Technology Center area spent about \$600,000 over 4 years and developed - in conjunction with private sector partners - a system with a value estimated now at \$10 million - \$20 million, yielding a leveraging or cost/benefit ratio for public dollars of more than 20:1. We believe a similar, relatively modest investment would bring potentially tens of millions of dollars in benefits to El Paso County and its residents.

- **Continue to pursue dedicated easements and pole attachment fee waivers on Public Rights-of-Way with Mountain View Electric.** As the County develops its highway network from two-lane gravel roads to major arterials, Mountain View Electric Association (MVEA) has been placing its new utility poles in dedicated easements on adjacent private property. This scheme has had the net effect of greatly increasing the County’s cost to widen its major corridors and greatly limits its ability to attach fiber optic cables on its infrastructure. Moreover, should the county wish to widen, for example, a two-lane gravel road to a 4/5 lane section, it must acquire a new dedicated easement on private property to “make whole” MVEA. The County’s Public Works staff has been doing an excellent job working with its Planning and Community Development Department to address the situation, but are limited in their ability to pursue improvements in the public interest. While a detailed legal assessment of this issue is beyond the scope of this report, the County staff should be commended for its efforts to address the situation and strongly recommend these efforts continue.
- **Encourage Pole Attachment Arrangements for fiber optic cables on Electric Utility Poles.** Perhaps more importantly, consideration should be given to requiring no-cost pole attachments for fiber optic cables owned by the County, but placed on Mountain View aerial electric transmission and distribution infrastructure. While similar in concept to requiring a parallel underground public conduit during a private operators’

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installation, this concept could play significant dividends in allowing no-cost pole attachments, critical for expanding the County's fiber optic network at a low-cost. This concept would require negotiation with Mountain View Electric, but we believe would save millions of dollars in the long-term future for pole attachment fees, should the County desire to build a fiber optic network based on aerial utility poles. A possible related approach could be to require no-cost pole attachments for fiber optic cables on new infrastructure in exchange for other consideration during the initial exaction deliberations with the county's electric utilities.

- **Require “fiber-friendly” exactions in new developments.** When El Paso County receives applications for new developments, officials often request, for example, dedication of rights-of-way for transportation and stormwater facilities. Many organizations now require exactions for telecommunications facilities as well. Although these exactions vary considerably and would require both a public input process and changes to the County's Planning and Public Works regulations, the ultimate goal should be to obtain conduit/fiber optic facilities into new developments for future use by County and others in the public interest.

We recommend placing a minimum of a 2” conduit in a dedicated easement with “pull boxes” located roughly every block to enable future fiber optic cables to be installed. The added cost for such infrastructure is usually about \$2 per linear foot for the conduit, and about \$300 per pull box. This “upcharge” for these empty conduits and boxes would likely increase the cost of development by less than 1%, but will create fiber-ready neighborhoods.

One recent, national study showed the increase in home value resulting from the extension of fiber optic infrastructure to be a minimum of three percent. In other words, a \$350,000 home could increase in sales price and value by nearly \$10,000. From a County tax assessor viewpoint, this increase would be reflected in assessed valuation, which in turn could be easily recouped via the County's mill levy in perhaps 1-2 years, with potentially millions in net revenue gains to County generated for years. As an alternative to placing the full cost on a developer, the County may pay the additional expense separately as well; or partner with the developer on the additional cost of the infrastructure. Again, the goal is for the County to own the infrastructure upon dedication, develop a shared open access network and use it to ultimately improve service to new residents.

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<sup>1</sup> See wiki listings for the El Paso County Fire Departments here:  
<https://www.radioreference.com/apps/db/?ctid=261>

<sup>2</sup> El Paso County and its towns and cities may want to consider planning for new radio towers and small cell radio equipment installations for the NPSBN and other carriers' competing networks.  
<http://www.ctcnet.us/blog/how-localities-can-prepare-for-and-capitalize-on-the-coming-wave-of-public-safety-network-construction/>

<sup>3</sup> It should be noted, however, that to access the App Catalog, an agency must subscribe to the FirstNet network.

■ **SECTION 6: THE ECONOMIC IMPACT OF RURAL BROADBAND**

## **Section 6: The Economic Impact of Rural Broadband**

### **The Rural Broadband Reality**

The availability of high speed broadband services has become a major issue impacting education, economic development, health care and nearly every aspect of people's lives. The President's Council of Economic Advisors issued a 2016 report titled "The Digital Divide and Economic Benefits of Broadband Access." This study, and other whitepapers on the topic, have extolled the positive socioeconomic benefits of broadband services:

- **Accessible, affordable and reliable high speed broadband is a key economic development tool to attract and retain businesses.**
- **Telehealth and electronic exchange of medical information is predicated on the ability to share information quickly across broadband platforms.**
- **Education technology and distance learning are increasingly dependent on the availability of broadband services, particularly in rural communities where online learning may be a primary method of tapping into development opportunities for residents.**

The availability and adoption of high-speed broadband are key challenges for rural America. The Federal Communication Commission (FCC) has set a threshold of 25 megabits per second (Mbps) download speed and 3 Mbps upload speed (commonly referred to as 25/3 Mbps) as the definition of broadband in the United States. The [FCC's 2016 Broadband Progress Report](#)<sup>1</sup> showed that while 90 percent of all homes have access to broadband in the country, the picture is much worse for rural America. In non-metro areas, 39 percent of the population is unable to access true broadband services.

Here in El Paso County, the FCC's 2016 [data](#)<sup>2</sup> show that 95 percent of homes in urban areas have access to broadband from a wired carrier (excluding wireless and satellite services), but 46 percent of those in rural areas lack access from at least one wired carrier.

Across America, there are clear relationships between use of broadband and achievement of income, although some studies do question the causality of this relationship. In their 2016 study, the Council of Economic Advisors looked at the impact of Broadband on economic outcomes. According to their data, 95 percent of the homes in the highest income quintile were using broadband, while just 49 percent of those in the lowest quintile were using these services.

Whitepapers and studies from are increasingly showing that Broadband infrastructure is a crucial element of the economic growth and viability of rural communities. There are a number of drivers for this and several reasons why broadband availability and adoption appear to be important outcomes for communities considering investments to improve access in their geographies.

## ■ SECTION 6: THE ECONOMIC IMPACT OF RURAL BROADBAND

### CHALLENGES FACING RURAL AMERICA

Rural America is facing a number of significant challenges. The urbanization of the country is creating a number of key issues for rural communities who desire to compete and grow in an ever-more-technically demanding economy. The identification of these issues is crucial to understand how broadband affects and interacts with these issues.

- **The Loss of Manufacturing Jobs:** Community Economic Development activities have traditionally focused on attracting manufacturing and other high-labor industries into rural environments. Manufacturing jobs represent highly compensated positions and are attractive as economic engines. A 2015 USDA [report](#)<sup>3</sup> showed that 14 percent of non-farm payroll in rural counties vs. 7 percent in urban counties, and a surprising 21 percent of earnings vs. 11 percent, respectively. However, rural America's reliance on manufacturing as economic drivers faces significant global headwinds. The same USDA report notes a significant decline in overall US manufacturing activity. "Between 2001 and 2015, a period that included two recessions (in 2001 and 2007-09), manufacturing employment fell close to 30 percent."

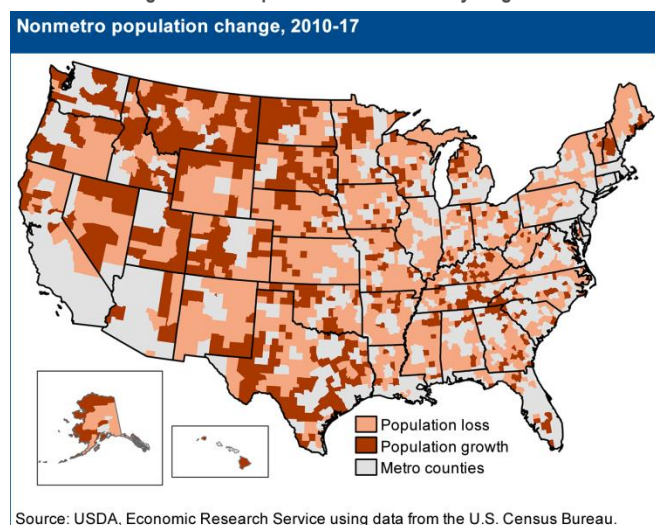
A 2016 article in the [Atlantic](#)<sup>4</sup> on the topic quoted Don Albrecht the director of the Western Rural Development Center at Utah State University Extension. "In a lot of the industries [rural areas] have traditionally been dependent on, technical developments have replaced a lot of the jobs," previously present in the rural West.

- **The Greying of Rural America:** Most rural areas are also facing meaningful demographic changes that affect the long-term viability of their local economies. Across the country, just 19 percent of the US population live in rural areas, but 25 percent of the nation's seniors live in those areas. Population outflows are particularly noticeable in younger generations, who frequently "leave the farm" or their hometown in search of more robust job and social outlets than are available in their hometowns.

These population losses cause governments to lose tax base, and subsequently cut spending. As budget cuts hurt schools and public assets, the cutbacks drive more people to cities, lowering property values and creating a downward spiral.

While El Paso County has seen growth in the county, much of that growth is related to inflows of residents into Colorado Springs and surrounding suburban bedroom communities.

Figure 6-1: Population Gains/Loss by Region



## SECTION 6: THE ECONOMIC IMPACT OF RURAL BROADBAND

- Transition to Gigabit Economy:** Related to the changes in manufacturing job loss are significant changes in the way jobs are being created globally. “Knowledge Workers” or “Creative Class” workers occupy professions that allow them to perform their work from any location, either as employees or corporations or as independent contractors. These workers are frequently entrepreneurial and will start businesses that require like-minded, technically-proficient coworkers. A study by Michigan State University’s Crystal Wilson indicated that these workers and their resultant firms tend to locate in communities with Quality of Place (live, work and play), active/dynamic living with significant amenities (particularly outdoor amenities), diverse lifestyle choices and business and entrepreneurial opportunities.

Unfortunately, much of rural America has not chosen to focus its limited resources on programs that attract these workers, including the adoption of broadband that is necessary. Here in El Paso County, a commissioner shared the story of a highly-compensated Microsoft employee located in the Black Forest area who has expressed his desire to stay and live in the County but who may be forced to move because of the lack of good broadband necessary to perform his work.

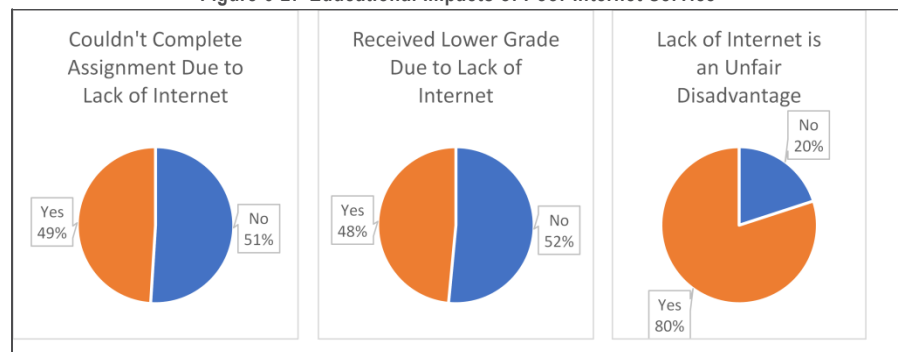
- Access to Education:** A skilled workforce is one of the key drivers of economic expansion. Significant shifts are occurring across America as both childhood and lifetime learning opportunities are facilitated through broadband connectivity.

Across the country, K-12 school districts are moving to a form of education commonly referred to as “One-to-One.” This refers to significant changes in instructional methodologies to leverage technology (computers and/or tablets) as to create learner-centric education paradigms. This learner-centric model often features a device to each student, who then utilizes it both in class and for homework assignments. Studies indicate that 70% of teachers assign homework requiring access to the internet, and with nearly 45% of low income homes having not access, children are not able to complete even basic homework required in their classrooms in their homes.

A study by the Family Online Safety Institute in 2015 found that nearly half of students have been unable to complete an assignment due to lack of internet access, and nearly the same percentage indicating they’ve received a lower grade due to lack of internet (see table below).

In many communities, lower income children who lack affordable high-speed internet means children must either forego completing homework or must seek out alternatives to home access by looking for public Wi-Fi in libraries or even fast food locations.

Figure 6-2: Educational Impacts of Poor Internet Service





## ■ SECTION 6: THE ECONOMIC IMPACT OF RURAL BROADBAND

For adult or lifetime learners, access to distance learning and educational opportunities requires high-speed connectivity. Distance learning presents a key opportunity for rural residents who may lack the ability to travel the long-distances to and from a physical campus, but who want to develop knowledge-based skills necessary to achieve higher-paying, sustainable incomes.

- **Access to Medicine:** The availability of expert medical care can be a challenge for many living in rural communities. Health Care providers are experiencing challenges recruiting and retaining qualified medical care staff in remote locations. This occurs at the same moment when the graying of rural communities is creating ever-higher demand for services as remaining populations “age in place.”



In many communities, including those here in El Paso County, the lack of ready access to healthcare creates additional complications as those with barriers to commute to providers experience more complications and less effective care for chronic conditions.

### CAN BROADBAND CHANGE THE EQUATION?

Briand Whitacre, a well-published Oklahoma State University Assistant Professor in the Department of Agricultural Economics focuses on technology impacts in rural areas. He has published a number of studies evaluating the linkages between broadband and improved economic outcomes, and summarizes these impacts succinctly: “My own research reveals that broadband adoption can help improve the economy in these rural areas (including increasing income, lowering unemployment rates and creating jobs).” *“Broadband’s Contribution to Economic Growth in Rural Areas: Moving toward a Causal Relationship,” ScienceDirect, 6/8/16).*

Here in Colorado, researchers at the University of Colorado conducted a study of the social impact of Broadband that occurred in Red Cliff, Colorado. The arrival of fixed broadband service in 2017 provided a unique opportunity study the impact of changes in the community. Fully 100% indicated that they though broadband would have a moderately or extremely positive effect on the community. Nearly two-thirds of residents indicated they wanted to work from home more and 75% said they would access telemedicine services, both areas of challenge that have been discussed earlier in this section.

Regarding medical care, several studies have been completed that indicate that broadband has made information more convenient and more accessible. A study by Finkelstein, Speedie and Potthoff (2006) showed that broadband-enabled virtual visits with trained medical staff improved patient outcomes at a lower cost and lower risk of complications than conventional care in person. A 2010 General Accounting Office study found that telemedicine is particularly valuable for rural patients who lack access to medical care, as telemedicine allows access to care from specialists who are located elsewhere in more urban settings. In one of the few empirical studies of potential economic benefits of telemedicine Whitacre, Hartman, Boggs and Schott

■ **SECTION 6: THE ECONOMIC IMPACT OF RURAL BROADBAND**

(2009) found that five rural communities in Oklahoma saved a total of \$3.5MM in healthcare costs for tele radiology and tele psychiatry alone.

A growing body of research is beginning to emerge that shows that there are meaningful impacts when broadband is both accessible and adopted by rural communities... and significant negative impacts when there is a lack of access to high-speed broadband connectivity. These impacts touch nearly every aspect of the community, from economic development to education and health care.

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- 1 <https://www.fcc.gov/reports-research/reports/broadband-progress-reports/2016-broadband-progress-report>
  - 2 [https://broadbandmap.fcc.gov/#/area-summary?version=jun2017&type=county&geoid=08041&tech=acfosw&speed=25\\_3&vlat=38.82536242457962&vlon=-104.56204850000006&vzoom=8.871980592222439](https://broadbandmap.fcc.gov/#/area-summary?version=jun2017&type=county&geoid=08041&tech=acfosw&speed=25_3&vlat=38.82536242457962&vlon=-104.56204850000006&vzoom=8.871980592222439)
  - 3 <https://www.usda.gov/media/blog/2017/09/12/manufacturing-relatively-more-important-rural-economy-urban-economy>
  - 4 <https://www.theatlantic.com/business/archive/2016/06/the-graying-of-rural-america/485159/>

■ **SECTION 7: FEDERAL AND STATE FUNDING OPTIONS**

## **Section 7: Federal and State Funding Options**

### **Introduction**

This guide offers an overview of federal and state funding options that could provide financial support to El Paso County, Colorado, in its efforts to construct and operate a middle-mile and/or fiber-to-the-premises (FTTP) network. It includes both essential application details and strategic guidance based on our working with other public sector clients.

The first part of this guide includes details on a range of federal programs:

- The Department of Housing and Urban Development's Community Development Block Grants could apply to an urban broadband project, especially in Colorado Springs.
- E-rate and Healthcare Connect funds could help local schools, libraries, and healthcare entities pay the County for advanced telecommunications services delivered over the County's fiber network, but the County would need to win a competitive bidding process to be awarded these funds.
- The County's project could be a good candidate for a Community Connect Grant, U.S. Economic Development Administration Grant, or Rural Utilities Service loan.
- The Department of Homeland Security and Department of Commerce recently announced broadband grants to support public safety personnel and disaster relief. Since the County's project would aid first responders, such grants might apply to this project.

By segmenting projects across its rural and urban divides, the County could potentially qualify for grants or loans that would be unavailable for a project that spans the entire County. In addition to the programs identified above, additional smaller opportunities may emerge in any given year—examples of the ever-changing landscape of broadband funding and financing.

The application processes for each of these federal programs can be tedious and demanding, so El Paso County should start as early as possible on its applications for any funding sources that it decides to pursue.

After the federal options, this guide outlines the two major state grant opportunity sources: Colorado Department of Local Affairs (DOLA) and Colorado Department of Regulatory Agencies (DORA). DOLA can provide competitive grants for planning and middle mile construction and DORA can offer last mile construction. These sections provide details on those grant programs and specific information regarding the application processes.

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## **Community Connect Broadband Grants**

### **INTRODUCTION**

This section provides a brief overview of and guide to the Community Connect Broadband grant program administered through the Rural Utilities Service (RUS) under the authority of the United States Department of Agriculture (USDA). Community Connect is a modestly sized grant program for local and tribal governments that targets broadband deployment to unserved (defined as speeds less than 10 Mbps download and 1 Mbps upload), low-income rural communities with fewer than 20,000 residents. Grantees must ultimately offer service at the broadband grant speed (defined as 25 Mbps download plus 3 Mbps upload) to *all* households and community institutions in the Proposed Funded Service Area (PFSA), with free service for at least two years to a community center.

The application process is rigorous and competitive (i.e., only about 10 percent of applicants receive an award) and once awarded, program requirements can be demanding (e.g., requiring last-mile service be available for all households in the service area). The program has been funded consistently since it was introduced in 2002 and represents an important opportunity for qualifying communities.

### **PROJECTS AND ENTITIES LIKELY TO BE FUNDED**

#### Entities Awarded:

Eligible applicants include incorporated organizations, Indian tribes or tribal organizations, state or local units of government, or cooperatives, private corporations, and limited-liability companies organized on a for-profit or not-for-profit basis. Individuals or partnerships are not eligible. Any public or private applicant must have the legal capacity and authority to own and operate the proposed broadband facilities, to enter into contracts, and to otherwise comply with applicable federal statutes and regulations. Thus, awards cannot be granted to a local government entity that does not want to own or operate the broadband service.

#### Eligible Projects:

The Community Connect program targets communities where broadband service is not available<sup>1</sup> and where low population densities and poverty make deployment costs high, and build-out of infrastructure unlikely. Funding is limited to contiguous areas with populations less than 20,000 and without Broadband Transmission Service (defined as 10 Mbps download and 1 Mbps upload speeds). Service areas need not be in the same state, so long as the areas are contiguous.

Once awarded, projects must offer last-mile service at the broadband grant speeds (25 Mbps download and 3 Mbps upload) to *all* businesses, residents, and community facilities in the PFSA, with free service provided to all critical facilities,<sup>2</sup> and at least one community center (with weekend hours and two to 10 public computer access points) for at least two years from the grant award. Grants can be used to offset the cost of providing such service and to lease spectrum, towers, and buildings as part of the project design.<sup>3</sup> The lesser of 10 percent of the grant or \$150,000 can be used to construct, acquire, or expand an existing community center.<sup>4</sup> In summary, Community Connect awards must:

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- Offer last-mile service of at least 25 Mbps download and 3 Mbps upload to an entire PFSA<sup>5</sup> that did not previously have service;
- Benefit rural areas (with fewer than 20,000 residents *and* not adjacent to cities with more than 50,000 residents); and
- Provide complimentary service for at least two years to all critical facilities and a community center that meets the grant requirements.

To prepare the most competitive Community Connect grant application possible, we would recommend that an applicant acquire or create a utility chart of an area within its unserved footprint, then target the lowest-income portions of that area. Community Connect is a competitive program with approximately 10 percent of the roughly 150 applicants receiving funding.

The USDA maintains a comprehensive database of all successful Community Grant awards since the program's inception.<sup>6</sup> These awards are sorted by state and chronologically.

**DESCRIPTION OF THE FULL COMMUNITY CONNECT APPLICATION**

This section provides an overview of the application process and key application components. The USDA Application Guide includes sample forms, links, and additional guidance, with particularly important pages noted below.<sup>7</sup>

1. **Establish Contact with RUS.** Prior to initiating the application process, all applicants are encouraged to contact their RUS general field representative. Field representatives can provide updated information about deadlines and any new application requirements.
2. **Secure a DUNS Number.**<sup>8</sup> DUNS numbers are available free of charge and take one to two business days to secure by visiting the Dun & Bradstreet (D&B) website,<sup>9</sup> or by phone (866-705-5711 and/or 800-518-4726). The process is straightforward.
3. **Apply for or Update SAM Registration.** All applicants must have an active SAM registration (previously known as the “Central Contractor Registry,” CCR).<sup>10</sup> The SAM registration process takes three to 12 business days and must be updated annually. Potential grant applicants should register before initiating the application process.

Applicants who are registering in SAM to apply for a federal financial assistance opportunity on Grants.gov (like Community Connect), will have a much shorter registration path. Applicants should select this “grants only path” by indicating that they do *not* wish to bid on contracts, but are only seeking “to be eligible for grants and other federal assistance.” To receive a SAM for grant applications, applicants will need to validate their DUNS information, enter business information (including Tax Identification Number), create a Marketing Partner Identification Number (MPIN),<sup>11</sup> enter the CAGE code associated with the appropriate DUNS number, enter general information about the entity, provide relevant financial information (e.g., bank account and routing numbers), address executive compensation questions, and answer proceedings details.<sup>12</sup> After



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the SAM application is submitted, there will be a “congratulations” message, followed by external validation with the IRS and for CAGE Code assignment or validation. SAM.gov will send an email when registration is active.

4. **Review the Notice of Solicitation of Applications.** The NOSA provides details about the application process, opens the application window, and announces minimum and maximum qualifications. In 2018, the NOSA was published on March 15; however, publication date has varied year to year. Current minimum grant speeds are 25 Mbps download and 3 Mbps upload and FY 2018 grants may range from \$100,000 minimum to \$3 million maximum, though actual awards will vary with appropriations.
5. **Submit a Grant Application.** Grant applications may be filed electronically (<http://www.grants.gov>) or by mail (with electronic copies).<sup>13</sup> Per the requirements of the grant program, the following items must be labelled appropriately (Schedule A-K) and included in grant applications:
  - a. **Schedule A-2—SAM Confirmation.** This document is a copy of SAM registration confirmation, containing the applicant’s name, registration date, and CAGE code.
  - b. **Schedule A-1—Application for Federal Assistance (SF 424).**<sup>14</sup> Both a DUNS number and SAM registration number are needed to complete the SF 424.
  - c. **Schedule B—Executive Summary of the Project.** This is one of the most important parts of the application, where applicants provide a general project overview and convey the importance of the project to the RUS. The summary should demonstrate that adequate broadband is *not* available in the PFSA, using support from the National Broadband Map and from communication with local phone and video providers.<sup>15</sup> The summary should include a comprehensive list of participating critical community facilities with documentation of any facilities that have *declined* service, a detailed breakdown of projected costs, a brief description of the applying entity, and a general description of the proposed system. Applicants must provide evidence of their legal authority to enter into a grant agreement with RUS and to perform the proposed activities. Such evidence may include articles of incorporation, bylaws, board resolutions, excerpts from state statutes, or an attorney’s opinion of counsel.
  - d. **Schedule C—Criteria Scoring.** This section requires a convincing analysis that the project meets the main three criteria: necessity, community involvement, and management experience. To address the first, the applicant must use statistics and the demographics of the PFSA to show the economic need, educational challenges, health care shortcomings, and public safety issues that this system would rectify. The section must also include proof of support from the surrounding community, show the commitment of the applicant to providing broadband access, and more generally, reflect the involvement of stakeholders in the process. Finally, the last part closely mimics Schedule I, showing the management, technical, and

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administrative experience of the applicant and oversight personnel. A more descriptive summary of the determining criteria is in Section 4.5 of Schedule C. The USDA primarily uses this section to compare the various applications, after establishing qualification with other sections.

- e. **Schedule D—System Design.** The applicant must submit a system design, including: a narrative with specifics about the proposal, associated costs, maps, engineering design studies, technical specifications and system capabilities, relevant licenses and progress reports on their acquisition, and the number of households/individuals served. System design plans should include details about the existing network (if applicable) and projections for the coverage of the new network. The system design will include a detailed Network Diagram (Schedule D-1) that must identify critical facilities, the distance between network elements, bandwidth capacity between network elements, and the location of any leased facilities. This section must also include an Environmental Questionnaire (Schedule D-2) that indicates the applicability and anticipated compliance with a suite of environmental laws.<sup>16</sup> Since project construction is subject to local laws, an engineer that is registered in the state where the project will be constructed should complete the system design.
- f. **Schedule E—Service Area Demographics.** Applicants must provide a map of the PFSA using the RUS Mapping Tool.<sup>17</sup> This section of the application must also include demographic data, including the total population, the number of households and businesses that will be served by the project, and the sixteen-digit reference number. Such data are available through the U.S. Census Bureau (<http://www.census.gov/>) and can be supplemented with more current information.
- g. **Schedule F—Scope of Work.** The scope of work must delineate the specific activities and services to be performed under the proposal; identify who will carry out the activities and services; provide specific timeframes for completion; and outline a budget for all capital and administrative expenditures reflecting the line-item costs for all grant purposes, the matching contribution, and other sources of funds necessary to complete the project. The scope of work will include both the build-out schedule (Schedule F-1) and a detailed budget (Schedule F-2). The budget must be consistent with the amount requested in SF-424.
- h. **Schedule G—Community-Oriented Connectivity Plan.** The applicant must provide a detailed community-oriented connectivity plan. Such a plan should include:
  - 1) A list of all critical community facilities located in the PFSA, and documentation of consultation with these entities, including commitments to participate or not to participate in the proposed project.
  - 2) Services that will be available to residents/ businesses in the PFSA.

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- 3) Anticipated activities and hours of the community center and documentation of permission to use the community center.<sup>18</sup>
  - 4) Description of consultations with local telecommunication carriers, demonstrating that broadband service is not available and the carriers' roles in the implementation of the project.
  - 5) Documentation of intent for the creation and/or usage of a community center within the PFSA.
- i. **Schedule H—Financial Information and Sustainability.** Applicants must produce a narrative description of financial sustainability and cost reduction efforts as well as audited financial statements<sup>19</sup> (for the past two years) and comprehensive annual financial projections (for the next five years). This section of the application will be subject to scrutiny, so applicants should ensure that:
1. Equipment purchases in the budget are consistent with those in the design;
  2. The financial audit is consistent with historical financial data;
  3. Sufficient matching funds (15 percent, cash) are available for all submitted applications; and
  4. Detailed assumptions are provided for budget forecasts.

Additional guidance on these forms is available in the Application Guide (pp. 39-52).

- j. **Schedule I—Statement of Experience.** Applicants must “provide a written description of their capability and experience, if any, in operating broadband telecommunications systems.”<sup>20</sup> If a partnership with another entity is anticipated, the application must also include an agreement to this effect. This section should also include the qualifications of oversight and key personnel involved in the project.
- k. **Schedule J—Additional Funding.** Community Connect is subject to a modest (15 percent) cash match, available at the time of closing. Applicants submitting multiple applications must be able to satisfy the match requirement for *each* application. Funding availability can be demonstrated by submitting a recent bank statement in the applicant's name. The match cannot be satisfied with federal funding from another program. Where supplemental funding from other sources is required, the applicant must provide signed evidence that they have obtained funding agreements in adequate quantities to ensure completion of the project.
- l. **Schedule K—Federal Compliance.** Applicants must provide evidence that they have complied with other federal regulations. These requirements are enumerated in the 2017 Application Guide (pp. 53–63)<sup>21</sup>, but may be subject to changes in future years.

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Previous applications have required a Schedule A-3—USDA Rural Development State Director Notification Form, but did not require it in the 2018 application cycle. The Application Guide will announce any annual changes to the required documents.

### EVALUATION CRITERIA

Applications are scored on a three-part, 100-point scale (as detailed in 7 CFR §1739.17<sup>22</sup>): PFSA challenges (50 points), local participation (40 points), and management experience (10 points).

PFSA challenges (50 points) are assessed based on the following five factors:

1. Economic Characteristics (15 points) (e.g. median income, unemployment);
2. Educational Challenges (15 points) (consequences of inadequate access for educational institutions and lack of distance learning);
3. 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); and
4. Public Safety Issues (10 points) (include a listing of police, fire and rescue services who service the PFSA and their anticipated use of the proposed network as well).

Applicants should emphasize factors that demonstrate the unique need of the PFSA for the project, such as persistent poverty, out-migration, rurality, speed of existing broadband offerings, and presence of community members with disabilities.

Local participation is judged on the evidence of support by local residents, institutions, and critical community facilities, as well as their historic engagement in civic issues. Management experience is judged on the oversight team's resumes and past success operating broadband systems, if any.

### SUMMARY OF COMMUNITY CONNECT PROCESS, TIMELINE, AND DEADLINES

The Community Connect process generally opens in the spring, though in 2015 and 2017, the process opened in late winter. The following are key dates that should be built into a prospective service provider's annual planning. However, recognizing that the funding calendar may fluctuate, we advise applicants to stay apprised of opportunities through Grants.gov (<http://www.grants.gov>):

- **Winter:** Prior to the opening of the application window, or as soon as possible thereafter, applicants must secure a free Data Universal Number System (DUNS) number. DUNS numbers can be secured through the web form (<http://fedgov.dnb.com/webform>) or by calling Dun & Bradstreet (866-705-5711 and/or 800-518-4726).
- **Winter/Early Spring:** Prior to the opening of the application window, or as soon as possible thereafter, applicants must complete System of Award Management (SAM) registration or update their existing registration. To remain active, registrants must

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update their information annually. SAM registration is a prerequisite to the grant program and applications can take three to 12 days to process. The application is available online (<https://www.sam.gov>) but a DUNS number is required and should be obtained first.

- **Spring to Summer:** The window during which rural communities (“applicants”) can apply to RUS for funding is typically announced in spring, with a 45- to 60-day application window.<sup>23</sup> The exact dates differ from year to year and are announced on the Community Connect Grants website (<http://www.rd.usda.gov/programs-services/community-connect-grants>) and Grants.gov. The FY 2019 grant process is not yet open.

The Notice of Solicitation of Applications (NOSA) is issued *before* appropriations are assured and costs associated with the application process are incurred at the applicant’s risk. This gives RUS time to process applications within the current fiscal year, even though funding is not guaranteed without a continuing resolution or final appropriations act. Despite this apparent uncertainty, Community Connect has been consistently funded at roughly \$15 million annually since its inception in 2002. However, this administration’s emphasis on rural development has led to increased funding in the past two years. The proposed FY 2019 budget currently would fund the program with \$30 million.<sup>24</sup>

- **Before Beginning the Application Process:** USDA recommends contacting the USDA Loan Origination and Approval Division via email ([community.connect@wdc.usda.gov](mailto:community.connect@wdc.usda.gov)) or phone (202-720-0800) before attempting to fill out any forms or applications. Similarly, the General Field Representative that serves your area is eager to provide assistance.
- **During the Application Window:** USDA will hold a series of webinars before and during the application window, which will provide detailed information about the application process and an opportunity to ask questions of agency staff. An archived presentation explaining the latest changes to the grant program process is available online.<sup>25</sup> The first of these webinars for 2018 funding occurred on April 5, 2018. When the webinars for 2019 are announced, registration will be available on the Community Connect homepage (<http://www.rd.usda.gov/programs-services/community-connect-grants>).

Applicants are provided 45 to 60 days to complete the application process. All applicants are ranked and awards are given in rank order until funds are expended. If there are similarly ranked proposals, additional consideration will be given to those that provide faster speeds of service, are located in a tribal or trust area, fund areas of persistent poverty, or benefit persons with disabilities. Thus, there is no reason to complete the application well in advance of the close of the application window, and we advise taking time to review the application guide and consult with agency staff.

- **Fall:** The time at which awards are typically announced.



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- **180 Days after Issuance of the Award:** Construction must begin 180 days following issuance of the award. Exceptions to this rule can be made in the case of unmanageable delays as determined by the RUS.
- **Annually Thereafter:** If awarded, reports must be submitted annually that include an annual performance report and audit, beginning with the first year of funding. With limited exception, First Tier Sub-Awards of \$25,000 or more must be reported by the recipient to <http://www.fsrs.gov> no later than the end of the month following the month the obligation was made. Awards are typically given on a multiyear, non-renewable basis. Grant recipients must maintain an active SAM registration throughout the funding period.
- **At the Close of the Award Period:** Applicants must submit a final performance report, which may serve as the last annual report and must include an evaluation of the project.

**COMMON MISTAKES**

We urge applicants to contact the USDA and carefully review the Application Guide before submitting their application. Some common mistakes that may disqualify applications include:

- **Insufficient match funding.** Applicants must make a modest (15 percent) match with its availability documented at the time of closing. Where a single applicant applies for multiple awards, match funds must be available for *each* award.
- **Inadequate documentation or support from community leaders or organizations within the PFSA.** Applicants must demonstrate the need and desire for the proposed award. This demonstration should include letters from community leaders.
- **Inconsistent plan.** The PFSA in maps does not match the PFSA described.
- **The entire PFSA is not rural.** While the PFSA need not be in the same community, the PFSA must be contiguous and cannot include communities with more than 20,000 residents or be adjacent to cities with more than 50,000 residents.
- **Inadequate service offerings.** All households & businesses in the PFSA must be offered service at the Broadband Grant Speed (25 Mbps download and 3 Mbps upload). Where applicable, documentation should demonstrate that critical facilities have been offered and declined such service.
- **Inadequate details about existing and proposed networks.** Applications must provide design plans and maps for all proposed networks and a complete survey of existing resources, including documentation of outreach to existing providers.

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- **Lack of details on or ineligible community center.** Applications must include details about the location, ownership, hours, number of work-stations, and free public access of the applicable center. The key community facilities must be in the PFSA and in rural areas.
- **Inadequate assumptions, lack of specifics, or inconsistencies within the application.** Applications must include detailed maps and financial/budget information, specific enough to allow USDA to determine the project's technical. Submitted budgets must be consistent with the amount requested in the application for federal assistance (SF-424). Many times the applicant will outright fail to submit historical financials.

**KEY RESOURCES**

- The Community Connect Grant webpage is available at:  
<http://www.rd.usda.gov/programs-services/community-connect-grants>
- An informative fact sheet is available at:  
<https://www.rd.usda.gov/files/fact-sheet/RD-FactSheet-RUS-CommunityConnect.pdf>
- Community Connect Field Representatives are designated for each state. Contact information available at: <https://www.rd.usda.gov/browse-state>
- The program is governed by 7 CFR §1739 (<http://www.law.cornell.edu/cfr/text/7/part-1739/subpart-A>)
- The 2018 NOSA is available at: <https://www.gpo.gov/fdsys/pkg/FR-2018-03-15/pdf/2018-05200.pdf> (2019 funds have not yet been formally approved).
- Frequently Asked Questions:  
<http://www.rd.usda.gov/files/utp2014CommConnectFAQs.pdf>
- A detailed presentation about Community Connect (with references and links) is available at: [https://www.rd.usda.gov/files/CC\\_Presentation\\_2018.pdf](https://www.rd.usda.gov/files/CC_Presentation_2018.pdf)

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## **Rural Utilities Service Loans**

The US Department of Agriculture (USDA) Rural Utilities Service (RUS) also provides loans for broadband deployment. The broadband loan program recently underwent a federal rulemaking during the FY 2018 budget approval process, in which its priorities and availability shifted. Although these programs offer loans at competitive rates, they are notoriously paperwork- and labor-intensive during funding. Thus, it may be preferable to rely on public bonds or private loans.

### **INTRODUCTION TO VARIOUS LOAN OPTIONS AND PROGRAMS**

The Rural Broadband Access Loan and Loan Guarantee Program (Rural Broadband Loan Program) has historically been the RUS program with the greatest promise for broadband. The Broadband Loan Program is intended to ensure that rural consumers enjoy the same quality and range of broadband services that are available in urban and suburban communities. To date, 704 loans (a total value of \$8.6 billion) have been provided through the program since 2004. Available funds increased to \$27.0 million for FY 2017. Loans are prioritized based on the percent of unserved households in the proposed service area and range from \$100,000 (minimum) to \$25 million (maximum).<sup>26</sup> The pre-approval application process is not onerous and there is some flexibility in what loans can cover.

Another pilot program with \$600 million in funding just became available through the Consolidated Appropriations Act of 2018. Minimal documentation or foundation currently exists for the program yet, but the funds must go to 90 percent rural areas without access to minimum speeds of 10 Mbps download and 1 Mbps upload.<sup>27</sup> Applicants should check regularly for updates on timeline, requirements, qualifications, and the application.

Other loan options exist under the same oversight as the RUS Broadband Loans (e.g. telecommunications, electric), but these could require a more convoluted application, design, and approach to the reviewing committee. For instance, the Electric Loan and Loan Guarantee has served projects that incorporate broadband; however, the expiration of the 2014 Farm Bill means that Congress has not yet reauthorized or funded the program.

Potential borrowers should also consider either Treasury and Federal Financing Bank (FFB) or Hardship loans<sup>28</sup>, though the former offer much lower rates. Hardship loans may be used by retail providers that meet rate disparity thresholds and whose consumers either fall below average per capita and household income thresholds or have suffered a severe, unavoidable hardship. Interest rates are fixed at 5 percent for up to 20 years. Generally, Hardship loans should be a last resort as interest rates tend to be higher than other available options.

### **ENTITIES AND PROJECTS FUNDED**

Broadband loans are available for both nonprofits and for-profit organizations,<sup>29</sup> including corporations, limited-liability corporations, cooperatives, Indian tribes, and state or local governments. Individuals and partnerships are not eligible for broadband loans.

The Broadband Loan Program provides financing to support the construction, improvement, and acquisition of facilities required to provide broadband services, defined as service with at least a downstream transmission capacity of 25 Mbps and an upstream transmission capacity of 3

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Mbps. Broadband projects must be completed within three years from the date that loan funds become available, serving a completely rural area with at least 15 percent of the population designated as underserved. The rural area can also have no more than three competing broadband providers serving any part of the populace.

For the pilot program, the area must be 90 percent rural and have, at best, limited access (10 Mbps download, 1 Mbps upload) currently available to residents. The program's fundamental regulations disallow for more than four percent of all funding to be used for administrative purposes and three percent for technical oversight. These restrictions may vary year to year at the discretion of the Secretary of Agriculture. Given the more difficult qualifications and relative novelty of the program, it could be a highly successful, highly rewarding opportunity.

The loans and loan guarantees finance maintenance, upgrades, expansion, or replacement of electric distribution, transmission (bulk and sub-transmission), generation, and headquarters (office, service, and warehouse) facilities in rural areas. The other loan programs provide funding to support demand-side management, energy efficiency and conservation programs, and on-and off-grid renewable energy systems, all of which could be repurposed to support broadband.

## NATURE OF AWARD

The program provides direct cost-of-money loans, direct 4 percent loans, and private loan guarantees. Loan guarantees may cover up to 100 percent of construction costs to qualified borrowers. The other options described in the introduction (e.g. hardship loans) may offer different rates and financing options. The former electric loans currently offer refinancing options to previous recipients, while the pilot program has not yet established its options. The applicant should review and compare each loan, as different loans meet different financial situations.

## APPLICABLE DEADLINES

New regulations reverted the program back to a rolling review from two annual evaluation periods originally. Loan applications will be reviewed every 90 days on a first-come, first-served basis, but the lending process has historically been slow, relative to private sector sources. Applicants should expect to secure a loan 12 to 18 months following their initial application, and thus, must either submit a loan well before resources are needed or arrange for alternate resources in the near term (e.g., by borrowing from private lending institutions and repaying with the long-term RUS funds). All RUS loan applications use the RD Apply Portal.<sup>30</sup>

## RESTRICTIONS

The restrictions for the RUS Broadband Loan and RUS pilot program include:

- Loans are limited to eligible rural communities (i.e., an area with less than 20,000 inhabitants and not adjacent to an urbanized area with more than 50,000 inhabitants) with at least 15 percent of the households unserved and no part of the proposed funded service area serviced by three or more incumbent service providers;
- Borrowers must have the legal authority to provide, construct, operate, and maintain the proposed facilities or services;

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- The proposed service area may not overlap with a current RUS borrower's service area
- Broadband loan borrowers must have equity of at least 10 percent of the loan; and
- Broadband loans cannot be used to fund the purchase or lease of any vehicles not used primarily in construction or system improvements.

## KEY RESOURCES

- Application: <https://www.rd.usda.gov/programs-services/rd-apply>
- General background on Farm Bill Loan Programs:  
[https://www.rd.usda.gov/files/FB\\_AppGuide\\_Revised\\_032518\\_1.pdf](https://www.rd.usda.gov/files/FB_AppGuide_Revised_032518_1.pdf)
- Application guide (Broadband Loan Program):  
[http://www.rd.usda.gov/files/UTP\\_FarmBillBroadbandLoanApplicationGuide.pdf](http://www.rd.usda.gov/files/UTP_FarmBillBroadbandLoanApplicationGuide.pdf)
- Broadband Loan Program fact sheet: <http://www.rd.usda.gov/files/fact-sheet/RD-FactSheet-RUS-FarmBillBroadbandLoans.pdf>
- Application Frequently Asked Questions:  
[https://www.rd.usda.gov/files/RDApply\\_FAQs.pdf](https://www.rd.usda.gov/files/RDApply_FAQs.pdf)
- NOSA, Broadband Mapping Tool, and Broadband Loan Main Webpage:  
<https://www.rd.usda.gov/programs-services/rural-broadband-access-loan-and-loan-guarantee>
- Agency Contacts:
  - Ken Kuchno (202-690-4673); [Kenneth.kuchno@wdc.usda.gov](mailto:Kenneth.kuchno@wdc.usda.gov)
  - For an interactive map of General Field Representative contacts, visit:  
<http://www.rd.usda.gov/contact-us/telecom-gfr>

## Economic Development Assistance (EDA) Programs

### INTRODUCTION AND PURPOSE

The Department of Commerce's Economic Development Administration oversees the Economic Development Assistance (EDA) program, which has provided economic assistance to distressed communities for many years. Public broadband projects in economically distressed communities are eligible for funding under the Public Works and Economic Adjustment Assistance programs.

New to this fiscal year, the EDA also now coordinates with a \$587 million grant program<sup>31</sup> also under the oversight of the Department of Commerce. This opportunity attempts to remedy disaster-stricken areas of the economic burdens that such disasters impose. Disasters are defined per the President's declaration. If El Paso County were to qualify, this opportunity would provide a less competitive, but similar application process to the broader, non-disaster EDA grants.

As an initial matter, the Notice of Funds Available (NOFA) repeatedly emphasizes the importance of consulting with the appropriate regional EDA contacts. Regional staff is



■ **SECTION 7: FEDERAL AND STATE FUNDING OPTIONS**

available to review project proposals, assess proposed cost shares, and preview all application materials. Though optional, we believe that such consultation will ultimately be beneficial.<sup>32</sup>

EDA's materials on Public Works funding explicitly mentions broadband:

Public Works investments help facilitate the transition of communities from being distressed to becoming competitive in the worldwide economy by developing key public infrastructure, such as technology-based facilities that utilize distance learning networks, smart rooms, and smart buildings; multitenant manufacturing and other facilities; business and industrial parks with fiber optic cable; and telecommunications and development facilities....<sup>33</sup>

This language appears to have been added into the program description in 2009. Despite this, it does not appear that broadband funding has been a significant part of the funding portfolio. In fact, the online annual reports (2007–2017) include only eight references to relevant projects:<sup>34</sup>

1. In October 2017, the EDA awarded \$760,025 to the Telluride Foundation in Telluride, CO, to support business growth by providing broadband connectivity to the communities of Nula, Naturita, Redvale, Norwood, Ilium, Telluride, Mountain Village and Ophir.<sup>35</sup>
2. The EDA awarded \$144,000 to the Confederated Tribes of the Umatilla Indian Reservation, in Pendleton, OR, in 2017. The award will support the development of a broadband fiber optics network near Pendleton to be located on the Umatilla Reservation. This investment will improve the information systems technology infrastructure to facilitate the formation and expansion of regional business enterprise, which will increase business capacity and create new, higher paying job opportunities for the region's workforce.<sup>36</sup>
3. In 2014, the EDA awarded \$714,861 in Public Works funds to OneCommunity, Case Western Reserve University, Ideastream, and the City of Cleveland, OH, to support construction of three miles of an ultra-high-speed, 100 gigabit network through Cleveland's Health-Tech Corridor. This investment is part of a \$1,021,230 project that the grantees estimate will create 115 jobs and leverage \$35 million in private investment.<sup>37</sup>
4. In 2014, EDA awarded a grant in the amount of \$300,000 to the town of Estes Park, CO, "to conduct a regional economic diversification and industry cluster job retention and recovery strategy" after the town suffered heavy damage from a 2012 wildfire and 2013 flood, which significantly affected the crucial tourist industry. Part of the grant project was to find new ways to utilize Estes Park's existing fiber optic ring to improve broadband services to the town and region.<sup>38</sup>
5. EDA awarded \$1.2 million to the town of Vidalia, LA, in 2014 to build a Technology Center and extend fiber optics into the city, to promote entrepreneurship and business development. Additionally, the new fiber is intended to contribute to the operations of public safety systems and to aid in future disaster recovery efforts.<sup>39</sup>

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6. EDA awarded a grant in 2013 to the Vermont Digital Economy Project, a partnership between EDA and the Council on Rural Development, which “will help small rural communities affected by flood events to create new job opportunities, strengthen downtowns, and enhance municipal communications systems to support both businesses and emergency services. The project seeks to improve online access within twenty-five core communities and other targeted locations, strengthen online communications within the state, and enhance community and non-profit economic development functions.” Vermont received a total of six grants together worth \$6.5 million in 2013.<sup>40</sup>
7. During FY 2012, EDA awarded 10 grants in the State of Georgia totaling \$5.6 million.<sup>41</sup> These included six Public Works projects for critical infrastructure—road improvements and rail spurs, increased sewer capacity, and installation of fiber optic cable—that are helping communities across the state to support business expansion and the attraction of new industry. It is unclear what share of the states’ awards were directed to fiber.
8. In FY 2012, the Tulalip Tribes in Washington “coordinated to create Tulalip Broadband and Tulalip Data Services, which offer technology services to Tribal members and businesses looking to locate near tribal lands. All of these businesses have brought jobs and income both to tribal members and the surrounding community and serve as a strong example of how long-term, coordinated economic development planning can lead to increased prosperity.” Note that support for this effort was a modest \$48,000.<sup>42</sup>

While broadband funding to date through the EDA appears to be modest, both construction and technical assistance are clearly eligible. Moreover, applicants can apply existing federal funds toward the cost-share, which allows them to leverage available resources. Given this, we highly recommend contacting Regional EDA representatives to explore this opportunity. Regional agency contact information is available on the EDA website: [www.eda.gov/contact](http://www.eda.gov/contact)

A brief overview of the program follows:

*The Economic Development Administration provides Public Works and Economic Adjustment Assistance grants to states, counties, cities, institutions of higher education, or nonprofits to support a wide array of projects that benefit distressed communities. Broadband infrastructure is eligible for funding.*

Program Mission: Awards are intended to leverage existing regional assets and support the implementation of economic development strategies that lead to job creation and private investment in distressed communities.

**ELIGIBILITY QUALIFICATIONS**

Entities Funded: Eligible applicants for EDA assistance include state or local units of government, Indian tribes, institutions of higher education, or public or private non-profit organizations.

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Projects Funded: The NOFA highlights two separate EDA funding opportunities:

The Public Works program helps distressed communities build critical infrastructure, such as technology-based facilities that utilize distance learning networks, smart rooms, and smart buildings; multitenant manufacturing and other facilities; business and industrial parks with fiber optic cable; and telecommunications and development facilities.

The Economic Adjustment Assistance program supports construction and non-construction activities, which may include infrastructure, design and engineering, technical assistance, and economic recovery strategies.

Broadband infrastructure appears to be eligible under either program. Recent annual reports available on the EDA website indicate that Public Works funding has supported several broadband projects. EDA will only fund projects that align with at least one of their six investment priorities:

- Collaborative regional innovation
- Public-private partnerships
- National strategic priorities (including information technology infrastructure)
- Global competitiveness
- Environmentally sustainable development
- Serving economically distressed and underserved communities

Restrictions: Projects must be located in or primarily benefit a region that meets EDA's economic distress criteria:

1. Unemployment rate that is, for the most recent 24-month period for which data are available, at least one percentage point greater than the national average;
2. Per capita income that is, for the most recent period for which data are available, 80 percent or less of the national average; or
3. An area of "special need" as determined by EDA.

All data used to establish economic need must be complete and come from a federal or third-party source. The EDA will internally use data from the U.S. Census Bureau, the Bureau of Labor Statistics, and other federal sources to establish economic need as well. Economic Assistance Awards target only regions experiencing severe economic dislocations (e.g. major employer closure, natural disaster) that may occur suddenly or over time.

FY 2017 Resources: For FY2017, the federal government appropriated \$100 million for Public Works, \$35 million for Economic Adjustment Assistance (EAA) and \$30 million for the Assist American Coal Mine Communities (ACC) initiative.<sup>43</sup> This represents an increase in total funds available. For FY2016, the EDA awarded \$100 million for Public Works and \$35 million for Economic Adjustment Assistance (EAA).<sup>44</sup> No public updates have been made for FY 2018 yet, but since the EDA continues to review applications on a rolling basis, funding will continue until the next appropriation.

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Typical Grant Award: The average Public Works award is \$1.4 million, with investments ranging from \$200,000 to \$3 million. EDA has historically awarded 80 to 150 Public Works projects annually. The average EAA award is \$820,000, with investments ranging from \$100,000 to \$1.25 million. EDA has historically awarded funds for 70 to 140 EAA projects annually.

Cost-Share Requirement: Applicants must typically make a matching contribution of at least 50 percent of the total award. In cases of extreme economic distress (i.e., substantially lower per capita income or higher unemployment than the qualifying levels), this requirement may be reduced to only 20 percent. The cost-share can be provided through “in kind” contributions (which EDA will assess to ensure that they are accurately valued and available as needed). Other Federal financial assistance may be used to provide the match, if authorized by statute. A state or non-profit could also receive a 100 percent grant, only if the EDA’s Assistant Secretary determines that the entity cannot garner any more taxable income or borrow elsewhere.

## APPLICATION AND TIMELINE

Applicable Deadlines: In recent years, EDA has shifted to rolling review and acceptance of applications until the next NOFA. The FY2018 NOFA was effective July 2, 2018.<sup>45</sup>

EDA encourages applicants to seek feedback on their project and application from state EDA representatives at least 30 days before the desired turn-in date. Final applications submitted via Grants.gov require approximately five days to be accepted and validated in the system and to provide time for any errors to be corrected.

The Application: In order to even receive consideration for an award, applicants must first obtain and retain an active System of Award Management account throughout the entirety of the application process and the award duration. Details about how to acquire this account are in sections 2.4.3 and 2.2 of this document.

The application for the grant itself is split into two parts, which can be submitted separately, barring any inconsistencies or incompleteness. The first part, a proposal, includes all documents found in the NOFA Section D.2.a., and allows for initial vetting of basic qualifications before the more extensive application. The second part, the application itself, includes all documents found in the NOFA Section D.2.b.<sup>46</sup> The applicant must submit part one and receive approval from the EDA before part two can be considered.

The applicant can submit the application itself to Grants.gov or receive a paper application upon request from their regional EDA representative. The applicant is responsible for all pre-award costs and should not expect to be reimbursed for such expenses.

Other Requirements:<sup>47</sup> All applications (for both construction and non-construction projects) must include an Application for Investment Assistance (Form ED-900), an Application for Federal Assistance (Form SF-424), Certification Regarding Lobbying (CD-511), Disclosure of Lobbying Activities (Form SF-LLL), documentation confirming cost-share funding, and comments from the state clearinghouse (“Intergovernmental Review of Federal Programs”). Applications for construction assistance must also include Budget Information-Construction Programs (Form SF-424C), Assurances-Construction Programs (Form SF-424D), maps of the project site, letters of commitment from beneficiaries of the proposed project, comments from the metropolitan area review, a preliminary engineering report, an environmental narrative that

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will enable EDA to comply with NEPA, copies of any correspondence with other agencies, and copies of any other environmental studies that have already been completed for the project site.

### APPLICATION SUBMISSION AND REVIEW

The applicant can submit both the proposal and application either via the internet on Grants.gov or mail. An online submission will receive confirmation within two days. The EDA will contact the applicant with any further steps or submissions necessary for review.

Once received, the proposal will undergo vetting from a committee for basic qualifications with a response within 30 days. The application, on the other hand, will receive a final determination from a different committee within 60 days. The approval of a proposal does not guarantee funding, but simply allows for the review of the subsequent application. Thus, there are still no guarantees that an approved proposal will receive any funding.

A committee judges applications based on a number of key factors, including feasibility, project design, the applicant's demonstration of commitment and experience, economic stimulus (e.g. job creation, investment drawn into region), and financial need. Each program will review applicants separately. At that point, the committees will then make suggestions to the Regional Director<sup>48</sup>, who ultimately awards the grants, depending on the available budget.

### KEY RESOURCES

- Notice of Funds Available (NOFA) and Application:  
<https://www.grants.gov/web/grants/view-opportunity.html?oppld=294771>
- Public Works Program one pager:  
<http://www.eda.gov/pdf/about/Public-Works-Program-1-Pager.pdf>
- Economic Adjustment Assistance one pager:  
<http://www.eda.gov/pdf/about/Economic-Adjustment-Assistance-Program-1-Pager.pdf>
- EDA Annual Reports: <http://www.eda.gov/annual-reports/>

EDA strongly encourages all applicants to consult with the EDA regional director prior to submitting application materials. A list of regional directors is available here:  
<http://www.eda.gov/contact/>

## E-Rate Discounts for Schools and Libraries

### INTRODUCTION

The following is a brief overview of the federal Schools and Libraries universal service support mechanism (known as “E-rate”) for service providers, administered through the Universal Service Administrative Company (USAC) under the authority of the Federal Communications Commission (FCC). The E-rate program provides discounts to schools and libraries (“Customers”) for telecommunications and Internet access. In the case of El Paso County, the county itself could become a service Provider and apply as such, and/or encourage its schools and libraries to apply as Customers, coordinating a broadband deployment project with them.



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**SUMMARY OF E-RATE PROCESS, TIMELINE, AND DEADLINES**

Generally, the E-rate process begins in the fall and closes in the spring. The USAC website provides a detailed overview,<sup>49</sup> including video guides documenting each step of the application process.<sup>50</sup> Both Providers and Customers should start the process by creating an E-rate Productivity Center (EPC, or the portal through which USAC will correspond) account.<sup>51</sup> The following are key dates that should be built into an applicant's annual planning:

- Winter to spring: Schools and libraries can apply to USAC for funding from winter to spring preceding the start of the funding year. USAC opens the application window in mid-winter and closes the window the following March or April. The exact dates differ each year and are announced on the USAC website. For FY2018, the application window opened on January 11 and closed on March 22, 2018.

Prior to the opening of the window, or as soon as possible after the window opens, municipal and state entities that seek to become E-rate "Providers" should obtain a SPIN ID and file Form 499-A to obtain a 499 Filer ID.<sup>52</sup> Customers should obtain a BEN ID online or by calling (888)-203-8100.

Schools and libraries can post their RFPs (Form 470) describing the services they require—and properly registered, prospective Providers can bid on those RFPs beginning in the fall prior to the new funding year. Customers must ensure that each RFP be posted and available for bid for at least 28 days, and can be posting up to a year in advance. Customers must fill out all forms completely and meet the necessary qualifications to be considered for funding. When the funding window opens in the spring, the timeline becomes compressed, because the 470 process must be completed before a funding request (Form 471) can be filed.

In our experience, the volume of RFPs tends to increase over the course of the multi-month window, with an enormous amount of posting/bidding activity during the final month in which the window is open. There will therefore be a flurry of bidding and contracting activity in the early spring of each year.

Once a Customer selects a Provider (i.e., the winner of the competitive bidding process), the Customer must file a Form 471—within the E-rate window—to request funding. A contract should be negotiated and executed by the Customer and the Provider before Form 471 is filed.<sup>53</sup> The Customer is responsible for filing Form 471, but the Provider should ensure it is filed in a timely and accurate manner.

- June 1: The Provider must file the Service Provider Annual Certification Form (Form 473) for each funding year before it may submit invoices to USAC.
- July 1 to June 30 is the E-rate funding year: Service that will be subsidized by E-rate during a funding year can begin no earlier than July 1 of each year and end no later than June 30 of the following year.

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- July 1: As soon as services begin, the Customer should file Form 486, Certification of Start of Services, with USAC. Accurate and timely filing of this form (in addition to the Provider's own invoice to USAC) is a necessary prerequisite for the Provider to be paid/reimbursed by USAC for applied discounts. USAC will acknowledge receipt of the Form 486.

**OVERVIEW OF FULL E-RATE PROCESS**

The full E-rate process entails 14 steps for the Provider, all of which must be followed to receive the subsidy funding for its services:

1. The Provider must apply for and receive a SPIN ID.<sup>54</sup>
2. The Provider must file Form 499-A to obtain a 499 Filer ID.<sup>55</sup>
3. The Provider should set up an E-rate Productivity Center (EPC) account via USAC.
4. The Provider must bid on RFPs (Form 470) posted by schools and libraries (Customers) that it seeks to serve.
5. Once the Customer selects the Provider, the two entities will enter into a contractual relationship.
6. The Customer, with the Provider's input, must submit Form 471 to USAC requesting funding for services and notifying USAC of the selection of the Provider.
7. USAC will send confirmation of the submission of Form 471 to both the Customer and the Provider ("Receipt Acknowledgement Letter" or RAL) while reviewing the request.
8. The Provider and the Customer must review the confirmation of filing of Form 471 for accuracy.
9. If errors are found in the Form 471 data, the Provider must report them to the Customer for correction before the 15-day period to report corrections/changes occurs.
10. USAC will send the Funding Commitment Decision Letter to both the Customer and the Provider.
11. The Provider can begin providing service to the Customer no earlier than July 1<sup>st</sup> of the funding year and funding will stop June 30<sup>th</sup> of the following year.
12. The Customer must file Form 486, Certification of Start of Services; USAC will send confirmation of filing to the Provider.
13. The Provider must file Form 473<sup>56</sup>, certifying compliance with program rules on June 1<sup>st</sup> of each funding year. Failure to file this form will result in rejection of invoices to USAC for payment of discounts.
14. The Provider can begin invoicing the Customer for services provided.

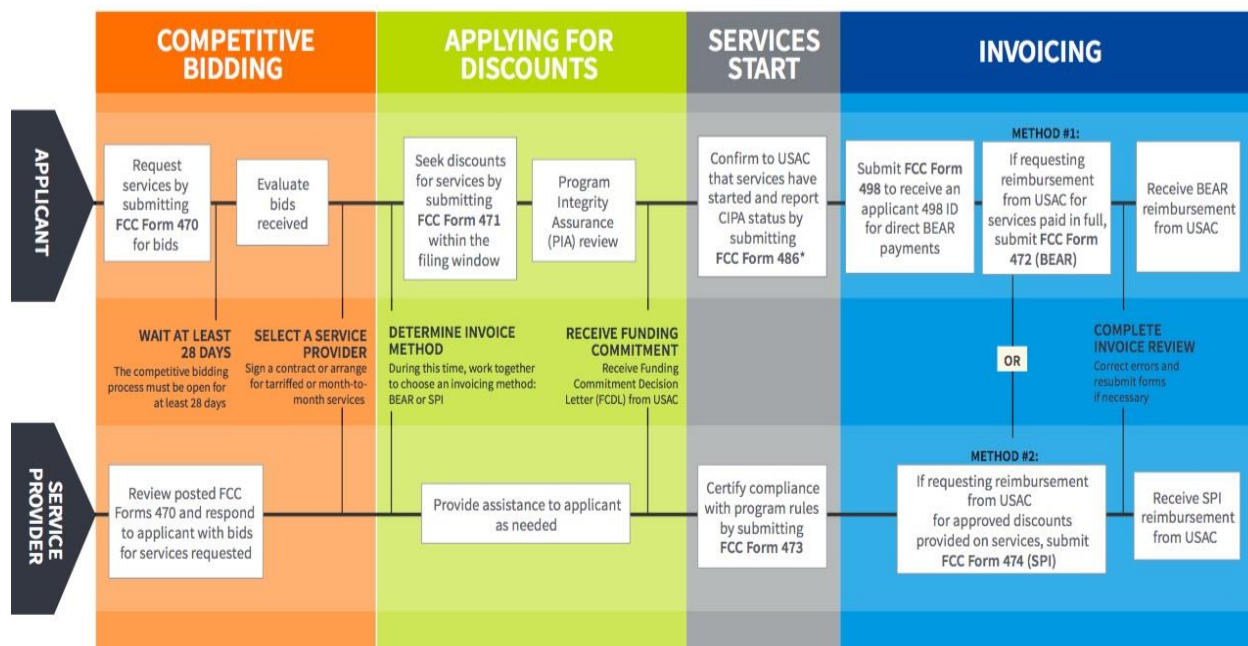
The application entails 11 steps for Customers as well, listed below:

1. The Customer must have/obtain a Billed Entity Number (BEN).<sup>57</sup>
2. The Customer should set up an E-rate Productivity Center (EPC) account via USAC.

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3. The Customer must file an FCC Form 470 (which may be accompanied by an RFP) via the EPC account and it must remain on there for at least 28 days prior to the close of the funding window.
4. The Customer should select a provider by constructing a bid evaluation.
5. The Customer, with the Provider's input, must submit FCC Form 471 to USAC notifying USAC of the selection of the Provider.
6. USAC will send confirmation of the submission of Form 471 to both the Customer and the Provider ("Receipt Acknowledgement Letter" or RAL) while reviewing the request.
7. The Provider and the Customer must review the confirmation of filing of Form 471 for accuracy.
8. If errors are found in the Form 471 data, the Provider must report them to the Customer for correction.
9. USAC will send the Funding Commitment Decision Letter (FCDL) to both the Customer and the Provider.
10. The Customer must file Form 486, Certification of Start of Services, upon the start of services; USAC will send confirmation of filing "FCC Form 486 Notification Letter" to both the Customer and Provider.
11. The Customer may file the FCC Form 472 "Billed Entity Applicant Reimbursement" (BEAR) Form if they have paid in full for the service, or the Provider may file FCC Form 474 (Service Provider Invoice Form) if they have provided discounted bills to the Customer.

Figure 7-1: E-Rate Process for Provider and Customers<sup>58</sup>



## OVERVIEW OF INVOICING

The Provider may invoice the Customer only after services have been provided (and a Form 473 certification has been filed as noted in Section **Error! Reference source not found.**). USAC offers two invoicing options for reimbursements: Form 472 or Form 474. The method of invoicing is at the discretion of the service Provider and the Customer; however, once

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chosen, the method of invoicing cannot be changed during the contract term. The Provider should establish the method of invoicing in the service contract with the Customer.

Using Form 472 (also known as the Billed Entity Applicant Reimbursement, or “BEAR” form), the Customer requests reimbursement from USAC for the subsidy amount after it has paid the Provider in full for its services. The use of this form of reimbursement requires the Provider to certify the payment. Providers will also certify via Form 473 that they are in compliance with rules regarding invoicing.

Using Form 474 (also known as the Service Provider Invoice), the Provider bills the Customer at the pre-determined discount rate approved by USAC and then bills USAC for the difference (i.e., the subsidy amount). Therefore, the Form 474 process requires Providers to send two bills—one to the Customer and one to USAC (filed online)—while the BEAR form puts the greater burden on the Customer.

Invoices to USAC must be timely—they can be posted no later than 120 days after the date of the Form 486 Notification Letter or 120 days after the last date the Customer receives service, whichever is later. These dates set outside parameters, but should never be at issue so long as invoicing is done consistently and reliably on a monthly basis.

Electronic filing of USAC invoices use Form 474. Online submissions can be made at:

<http://www.slforms.universalservice.org/form474/menu.aspx>.

The list of forms below<sup>59</sup> shows each deadline and process:

Figure 7-2: E-Rate Program Timetable and List of Deadlines

### E-rate Program Timetable and List of Deadlines

Form or Event	Deadline or Dates
Funding Year	July 1 through the following June 30 (non-recurring services can be delivered and installed through September 30)
FCC Form 470	Certified at least 28 days before the filing of the FCC Form 471, keeping in mind (1) the timeframe for compliance with all competitive bidding requirements and (2) the FCC Form 471 application filing window opening and closing dates
FCC Form 471 Window	Generally opens 5-6 months before the start of the funding year (exact dates for each funding year will be posted on the website)
FCC Form 471	Certified no later than 11:59 PM ET on the day of the close of the FCC Form 471 application filing window (exact date will be posted on the website)
FCC Form 486	Certified no later than 120 days after the date of the Funding Commitment Decision Letter or 120 days after the Service Start Date, whichever is later
FCC Form 498	Certified by the applicant and approved by USAC once for each of the billed entity's associated banking account(s) before an applicant can receive reimbursements via the BEAR method
FCC Form 472 (BEAR) FCC Form 474 (SPI)	Submitted no later than 120 days after the date of the FCC Form 486 Notification Letter or 120 days after the last date to receive service, whichever is later
Appeals	Submitted no later than 60 days after the date of USAC's decision letter

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**OVERVIEW OF PROVIDER RECORDKEEPING AND INTERNAL AUDIT RECOMMENDATIONS**

Providers are required to maintain extensive records for each of their E-rate Customers for at least 10 years following termination of services for each funding year. The files should include bids, contracts, records, correspondence, receipts, vouchers, delivery information, memoranda, and other data related to provision of services to each Customer for each funding year.

Since USAC performs audits of Customers that receive E-rate discounts, Providers should perform an internal audit of their E-rate Customer files to ensure compliance, ensuring that:

- No charges are submitted to USAC that violate the Customer contract and Form 471.
- Substituted services or products are noted prominently on invoices submitted to the Customer and USAC, well documented, and approved before their provision.
- Supporting documentation denotes that services provided were approved by the FCDL and provided to the Customer.
- If E-rate eligible services and/or installation or equipment costs are included as part of a larger contract or service/equipment billing, support for the allocation of E-rate eligible amounts and reconciliation of that total to the total amount billed should be documented.
- If E-rate eligible services or equipment are allocated to multiple sites, support for the allocation consistent with the amount and locations identified in Form 471 should be documented.
- Documentation of both E-rate funded services and proper FRN charges during the allowable contract period exists.
- A list of E-rate supported equipment provided to the customer, with detailed information for each item exists.

**KEY RESOURCES**

- Step-by-step Application and Acquisition Instructions for Providers:  
<https://www.usac.org/sl/service-providers/default.aspx>
- Overview of E-rate Purpose and Application Process:  
<https://www.usac.org/res/documents/sl/pdf/handouts/E-rate-Overview.pdf>
- FCC Description of E-rate:  
<https://www.fcc.gov/consumers/guides/universal-service-program-schools-and-libraries-e-rate>
- Frequently Asked Questions about E-rate:  
<https://www.usac.org/sl/about/faqs/default.aspx>
- E-rate Productivity Center (EPC) (most of the application): <https://portal.usac.org/suite/>



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## **Healthcare Connect Fund**

### **INTRODUCTION**

This section provides an overview of the federal Healthcare Connect Fund (HCF); however, in Colorado, these funds sometimes pass through the Colorado Telehealth Network (CTN). As the consortium leader for the state, the CTN releases an annual Request for Proposals (RFP) in which it solicits bids for data services on behalf of consortium members that are eligible for a subsidy through the HCF. El Paso County can decide whether to pursue funding as a member of the CTN or independently directly through the HCF. The program is administered through the Universal Service Administrative Company (USAC) under the Federal Communications Commission (FCC). Since USAC oversees this opportunity as well as E-rate, the two application processes have significant crossover, so references may be made back to Section 5 of this document.

The Healthcare Connect Fund provides a 65 percent subsidy for broadband service to eligible healthcare providers and facilities. While the focus is on serving rural facilities, teaching hospitals and urban/suburban facilities will be eligible if they are part of an in-state consortium that includes rural facilities. However, if the applicant is creating a new consortium for this program, they will need to undergo an extensive application process and provide documentation. To that end, any newly proposed consortium should begin the formation process as soon as possible.

HCF is intended to provide Health Care Providers (HCP) access to broadband services, particularly in rural areas, and to encourage the formation of state and regional broadband networks linking HCPs. While the program is intended to benefit rural providers, consortia of urban and rural providers may also participate, so long as the majority of the members of the consortia (at least 51 percent) are rural.<sup>60</sup> HCPs may include public or nonprofit entities including post-secondary schools offering health care instruction (e.g., teaching hospitals or medical schools); community health centers or health centers providing healthcare to migrants; a local health department or agency; a community mental health center; a not-for-profit hospital; a rural health clinic, or a dedicated emergency room of a rural for-profit hospital.

Specifically, HCF is allocated for three goals:

1. Increase broadband access to primarily rural HCPs.
2. Encourage the development of interconnected broadband health care networks.
3. Maximize the cost-effectiveness of federal Universal Service funds for healthcare.<sup>61</sup>

Significantly, the FCC order creating HCF states that the fund will, in addition to expanding broadband access for rural HCPs, “encourage the creation of state and regional broadband health care networks.”<sup>62</sup> HCF is intended to help expand healthcare providers’ access to the high-bandwidth connections they need for modern telemedicine by:

- Addressing the artificial limitations on Universal Service support broadband connections;
- Fostering the creation of consortia among rural and urban HCPs to share resources;

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- Increasing the participants' portion of financial responsibility, but reducing their overall costs by improving buying power in the creation of a more competitive marketplace;
- Supporting a broad range of broadband services from a diverse set of providers and encouraging HCPs to build their own broadband networks where cost-effective; and
- Including service upgrades that are required to support new health care applications.<sup>63</sup>

Unlike grants, the HCF offers a sustainable source of financial subsidy for rural HCPs, just as E-rate does for schools and libraries. Since funding is provided through the Universal Service Fund, it is not subject to annual appropriations, meaning that HCF provides an ongoing funding stream. The FCC has capped funding for all Rural Health Care (RHC) programs including HCF, at \$400 million per year on a first-come, first-served basis. RHC programs notably reached their cap in 2018, meaning that changes may be pending with the next application cycle and that grants cannot be awarded for the rest of the year.

## SUMMARY OF HEALTHCARE CONNECT PROCESS, TIMELINE, AND DEADLINES

The HCF funding cycle runs from July 1 through June 30 and dates for the FY 2018 application cycle are below.<sup>64</sup> It is important to note that these dates can vary annually; however, this timeline gives the applicant some sense of the application and expectations.<sup>65</sup>

- January. This is typically when applicants are first allowed to submit the FCC Form 461 ("Request for Services") and supporting documentation for the upcoming (July through June) funding year. Although applications are accepted on a rolling basis throughout the funding cycle, USAC encourages applicants to file during the initial funding request filing period (i.e., January through March). If a consortium is formed, additional information will be required to qualify for funding, including the submission of Form 460 ("Eligibility and Registration Form") and Letters of Agency (LOA), which provide governance power to the consortia and establish a network plan. Once Health Care Providers (HCP) and consortia ("applicants") submit their initial Form 461 to USAC, they must leave them posted and available for bid for at least 28 days.
- February to June. This is the period during which applicants may submit FCC Form 462 ("Funding Request Form") and supporting documentation within the initial funding request filing period for the upcoming funding year (i.e., requests submitted during this window will not receive funding until July 1). Applicants can submit Form 462 until the end of the funding cycle (i.e., until June 30, 2019); however, awards will be prorated to reflect the time remaining in the funding cycle. The FCC will continue to review funding requests until the program cap (\$400 million) is reached. Given the historical use of the program, this is unlikely to occur.
- Early May. This is the deadline for posting an FCC Form 461 ("Request for Services") to receive the full 12 months of funding. Support is prorated if either the FCC Form 461 or 462 is posted after this date. For example, if an applicant submits a request on January

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1 for services during the current funding year, it will only be eligible for 6 months of funding.

- Early July. This is the first day of the FY 2018 funding year. As noted above, funding requests may still be submitted after this date and will be reviewed on a rolling basis until funds are expended. As noted above, requests received after this date will be prorated.
- End of June. This is the last day of the allowed funding year and the deadline to submit the FCC Form 462 and supporting documentation for a current fiscal year.
- Variable. Service providers may submit FCC Form 463 (“Invoice and Request for Disbursement”) after the following conditions are met:
  - The applicant receives a funding commitment;
  - The service provider has installed the equipment or started services;
  - The applicant has received services and a bill from the service provider;
  - The applicant has submitted its 35 percent contribution to the service provider;
  - The service provider and applicant certify and sign the invoice (FCC Form 463).

Applicants are encouraged to start this process shortly after services have started.

- Six months after funding commitment. Service providers must submit FCC Form 463 Invoice and Request for Disbursement) to invoice USAC within six months after the last day of the funding commitment. For example, if a consortium receives a funding commitment for services that end on May 30, 2018, the applicant must submit its invoice by November 30, 2018. This deadline will be in the USAC funding commitment letter.

## OVERVIEW OF THE FULL HEALTHCARE CONNECT PROCESS

The process for securing funding through Health Care Connect includes determining eligibility of HCPs, submitting a request for services, participating in the competitive bidding process, selecting the most cost-effective bid, starting services, and invoicing for those services. This process is elaborated below:

1. If it does not already have one, the Provider should apply for and receive a Service Provider Identification Number (SPIN) ID using Form 498.<sup>66</sup> All service providers intending to submit bids will need to complete Form 498 before funding commitments can be made. Service providers must certify on Form 498 that they will provide all information and documents that the HCP needs to respond to FCC or USAC inquiries on a timely basis. Note that service providers who have already been assigned a SPIN ID to allow participation in another program need not complete Form 498.
2. The provider must file and initial Form 499-A to obtain a 499 Filer ID.<sup>67</sup>
3. To be eligible for support under HCF, an applicant must be classified as a Health Care Provider (HCP), confirm their eligibility with Form 460, and be one of the following:

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- Public or non-profit hospital,
  - Rural HCP,
  - Community health center,
  - Local health department or agency,
  - Post-secondary educational institution (teaching hospital, university, etc.), or
  - A consortium of the above types of institutions. (Non-rural providers may participate in this way, so long as a majority of the consortium members are rural.)
4. Once eligible, the HCP must put out a Request for Proposal (using FCC Form 461) to solicit bids.<sup>68</sup> Form 461 must be posted for 28 days before applicants may select a service provider to allow for a competitive bidding process. This is the “allowable contract selection date” (ACSD), noted on Form 461. The FCC recommends that service providers confer with the listed point of contact on Form 461 (line 13(a)) before submitting a bid for services to ensure that they understand the applicant’s needs.

The HCF allows applicants to seek subsidized services for expenses related to network design, engineering, operations, installation, and construction. Connections to, and equipment located at, eligible off-site data centers and administrative offices are also eligible for support. See the table below for a list of eligible services.

Table 7-1: Eligible Services

	Individual Applicants	Consortium Applicants
<b>Eligible Services</b>	Yes	Yes
<b>Reasonable and Customary Installation Charges</b> ( $\leq$ \$5,000 undiscounted cost)	Yes	Yes
<b>Lit Fiber Lease</b>	Yes	Yes
<b>Dark Fiber</b>		
■ Recurring charges (lease of fiber and/ or lighting equipment, recurring maintenance)	Yes	Yes
■ Upfront payments for IRUs leases, equipment	No	Yes
<b>Connections to Research &amp; Education Networks</b>	Yes	Yes
<b>HCP Connections Between Off-Site Data Centers &amp; Administrative Offices</b>	Yes	Yes
<b>Upfront Charges for Deployment of New or Upgraded Facilities</b>	No	Yes
<b>HCP-Constructed and Owned Facilities</b>	No	Yes
<b>Eligible Equipment</b>		
■ Equipment necessary to make broadband service functional	Yes	Yes
■ Equipment necessary to manage, control, or maintain broadband service or dedicated healthcare broadband network	No	Yes

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Form 461 also includes an extensive Network Plan<sup>69</sup> that must clearly outline the construction and performance expectations. This process in particular can take significant time, especially for a healthcare provider or consortium without technical experience. We suggest beginning this planning as soon as possible in consultation with engineers.

5. The HCP will select a service provider and develop a contract. Applicants purchasing services and/or network equipment from a Master Services Agreement (MSA) previously negotiated by federal, state, Tribal, or local government entities on behalf of applicant HCPs and others are exempt from the competitive bidding requirements, but only if such MSAs were awarded pursuant to applicable federal, state, or local competitive bidding requirements. Such MSAs may take the form of a multi-year agreement that contractually obligates the vendor to offer certain services to HCPs at specified pricing.

Colorado RFP Resources: The CTN will post RFPs for eligible healthcare providers in Colorado, usually in the winter. Current RFPs are available to see sites within the service area that are seeking eligible services for HCF subsidies.

6. After the bidding process is complete, the HCP will prepare a funding request for USAC using Form 462.<sup>70</sup> This form identifies the service(s), rates, service provider(s), and date(s) of service provider (vendor) selection. Both individual and consortium applicants must submit a separate Form 462 for each service provider, and that form should list the relevant information for all services or circuits for which the applicant is seeking support.
7. The service provider should review Form 462 and certify its accuracy before it is submitted to USAC by the HCP applicant by June 30th. USAC will not grant funding requests for previous years, only for current or upcoming funding years.
8. Within 21 calendar days of the receipt of a complete Form 462, USAC will notify the applicant in writing of any errors or ineligible network elements. The applicant will have 14 calendar days from the date of receipt to address these errors (without violating the June 30 deadline).
9. Upon completion of the review process, USAC will issue a funding commitment letter (“FCL”) that informs both the applicant and the service provider that they are eligible for support as specified in the letter. The letter will indicate whether a multi-year commitment has been issued. Service providers should validate the SPIN noted on the FCL to ensure that the support amount is being credited to the appropriate account.
10. The service provider should provide an invoice in arrears of services provided or for a consortium a bill with the credit applied for the services provided.
11. The applicant will create an invoice (using Form 463)<sup>71</sup> for the services it has received. Form 463 serves as the request for the disbursement of funding from the HCF for any services, equipment, and facilities set forth in an applicant’s funding commitment letter.



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12. If approved by the service provider, the applicant will pay and certify its 35 percent contribution to the service provider. Then, the applicant must return the invoice to the service provider.
13. The service provider, in turn, must certify the accuracy of the form and submit it to USAC for payment within six months of the end date of the funding commitment.<sup>72</sup> The invoice (FCC Form 463) can only be submitted after:
  - The applicant receives a funding commitment;
  - The service provider has at least started services from the contract, if applicable;
  - The applicant has received services (and a bill) from the service provider;
  - The applicant has remitted 35 percent of the amount due to the service provider;
  - The service provider and applicant certify and sign the FCC Form 463.

## KEY RESOURCES

- Healthcare Connect Fund Program Website:  
<http://www.usac.org/rhc/healthcare-connect/default.aspx>
- Frequently Asked Questions: Healthcare Connect Fund:  
<http://www.usac.org/res/documents/rhc/pdf/fcc/FCC-HCF-FAQs.pdf>
- RHC Program Website: <http://www.fcc.gov/encyclopedia/rural-health-care>
- Rural Health Care Order (Dec. 12, 2012):  
[http://www.usac.org/res/documents/rhc/pdf/fcc/13.02.25\\_Linked\\_Order.pdf](http://www.usac.org/res/documents/rhc/pdf/fcc/13.02.25_Linked_Order.pdf)
- Sample forms and templates (RFPs, LOAs, and third-party authorization):  
<http://www.usac.org/rhc/healthcare-connect/tools/sample-documents.aspx>
- Colorado Telehealth Network website:  
<http://www.usac.org/rhc/healthcare-connect/tools/sample-documents.aspx>

## Community Development Block Grant Programs

The Community Development Block Grant (CDBG) program is a flexible program that provides communities with resources to address a wide range of unique community development needs. Launched in 1974, the CDBG program is one of the longest continuously run programs in the Department of Housing and Urban Development (HUD). The CDBG program provides annual grants on a nationwide formula basis, primarily driven by census data, to more than 1,200 units of local government and states.

Since El Paso County, CO, includes Colorado Springs, it likely has access to CDBG entitlement funds for urban projects and could partner with other local municipalities to apply for state funds for non-entitlement communities. In Colorado, the Department of Local Affairs administers the CDBG program for non-entitlement municipalities and counties.<sup>73</sup>

## BACKGROUND ON HUD SUPPORT

To date, HUD resources have not been used to support broadband deployment; however, we believe that this could be a tremendous untapped opportunity. Agency staff confirm that

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HUD CDBG grant recipients have flexibility to determine the best use of agency funds and that installing broadband infrastructure can be consistent with the program's guidelines and mission in meeting a "National Objective." Generally, the grants are intended for low- to middle-income communities with pressing infrastructure needs.

Notably, in February 2015, former Secretary of HUD Julián Castro declared that broadband access "is important because the world requires a connection to the internet."<sup>74</sup> This declaration accompanied an announcement about HUD's interest in launching a new program with private-sector telecommunication companies to improve access in 20 major metropolitan areas. The previous HUD Secretary, Shaun Donovan, likewise acknowledged the critical role of broadband, publicly noting that "broadband is essential to building the economy of the 21<sup>st</sup> century," and announcing a collaboration with "Connect2Compete" (C2C), a national digital literacy coalition. Secretary Donovan described a HUD initiative to bring broadband to federally assisted housing.<sup>75,76</sup> An original proposed budget for FY 2018 attempted to completely defund the CDBG program but a bipartisan effort by local governments quelled the current administration's attempts.<sup>77</sup> Such an effort showed the impact that such a program has made communities across the country.

As elaborated below, broadband could be funded through CDBG entitlement capacity to the cities (i.e., "entitlement grants") and non-entitlement state funding, or indirectly through Section 108 loans (which would be financed through CDBG allocations or from income associated with the project). The primary objective of the authorizing legislation for CDBG (i.e., Title I of the Housing and Community Development Act of 1974) is the development of viable urban communities. CDBG grants and related loans are available for infrastructure, housing, and economic development; a fiber broadband plan would thus seem to fit squarely into the program mission.<sup>78</sup>

## AWARD OPTIONS

Three related HUD CDBG programs hold significant promise for broadband deployment:

### 1. CDBG Entitlement Grants

The CDBG entitlement program applies a formula to allocate annual grants to larger cities and urban counties (i.e., with populations greater than 50,000) to improve housing, infrastructure, and economic development, particularly for low- and moderate-income persons. Information about CDBG eligibility is available on the HUD website.<sup>79</sup> The average award in FY 2016 was \$1.79 million, with a range from \$67,000 to \$151.5 million. The number of annual grantees has steadily increased since the program's inception.<sup>80</sup>

### 2. State CDBG

In 1981, Congress expanded HUD authority to give states the flexibility to allocate CDBG funds to non-entitlement areas. Also known as the Small Cities CDBG program, states may use these funds to support smaller units of general local government that implement community-development activities based on a state's designated funding priorities. The average state CDBG grant was \$18 million in FY 2016.

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### 3. Section 108 Loans

CDBG entitlement communities can leverage their grants by using them as security for Section 108 loan guarantees to support economic development, housing rehabilitation, public facilities, and large-scale physical development projects. Non-entitlement communities are also eligible to participate using state CDBG funds (providing the state agrees to pledge its current and future CDBG funds as security for the loan). As elaborated below loans are awarded over a 20-year term and can represent as much as five times the area's annual CDBG allocation. In this way, Section 108 loan guarantees allow local governments to transform a small portion of their CDBG funds into federally guaranteed loans large enough to pursue large-scale physical and economic revitalization projects.

## ENTITIES FUNDED

CDBG allocations support 1,200 communities and 7,250 local governments each year. The program is intended to benefit local governments ("grantees" or "recipients"). As noted above, the "Entitlement Program" benefits large metropolitan areas—cities with more than 50,000 residents, designated principal cities of metropolitan statistical areas, or urban counties with more than 200,000 people. The "States and Small Cities Program" distributes HUD funds to states, which in turn can reallocate resources to small cities or non-entitled communities (also referred to as units of general local government). Recipients under either program can pass allocations to sub-recipients to help implement and administer the program. Sub-recipients are generally nonprofit organizations that help implement the awarded activity (e.g., administering a home rehabilitation loan program or managing a job training program).

Section 108 loan guarantees can be used by states, metropolitan cities, urban counties (i.e., CDBG entitlement recipients), and non-entitlement communities that are selected by the state. HUD has recently proposed changing the Section 108 program to allow for user fees, which would offset the cost of loan guarantees and allow the agency to make Section 108 loan guarantee commitments without appropriated subsidies.<sup>81</sup>

## NATURE OF AWARD

CDBG awards through both the Entitlement Program and States and Small Cities Program are provided as grants. Allocations have been fairly stable over time. The awards are intended to supplement other resources as either seed or capstone money. In fact, HUD reports that each dollar of CDBG allocations has been leveraged to support an additional \$4 in state, federal, foundation, or private support.<sup>82</sup> CDBG allocations can also be used to provide the non-federal share of grants (i.e., matching funds or cost shares) for other federal programs.<sup>83</sup>

Section 108 loans allow recipients to finance up to five times their CDBG allocation. The principal security for the loan guarantee is a pledge by the applicant or the state (in the case of a non-entitlement public entity) of its current and future CDBG funds. Such loans are financed through underwritten public offerings, which can be provided through an interim lending facility established by HUD.

Interest rates on interim borrowing are priced at the three-month London Interbank Offered Rate (LIBOR) plus 20 basis points (0.2 percent). Permanent financing is pegged to yields on U.S. Treasury obligations of similar maturity to the principal amount. A small additional basis

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point spread, depending on maturity, will be added to the Treasury yield to determine the actual rate. Each annual principal amount will have a separate interest rate associated with it. Loans can be repaid over a period of up to 20 years, with payment based upon the fixed interest rate determined in the public offering for that specific year, resulting in the borrower paying the weighted average interest rate corresponding to the project principal amortization schedule.

To date, there has been no default under Section 108 resulting in a repayment by HUD. In the event of such a default, HUD would continue to make payments on the loan in accordance with its terms. The source of payments by HUD pursuant to its guarantee would almost always be pledged CDBG funds (which are assumed to be stable in perpetuity). However, HUD does have borrowing authority with the U.S. Treasury if the pledged funds are insufficient.

### PROGRAM RESOURCES

Congress has appropriated \$144 billion in CDBG program funds in the first 40 years after its inception in 1974. Loans are financed for up to 20 years, thereby assuming a stable contribution from annual CDBG awards and continued support for the program.

Each dollar of HUD funding typically leverages an additional \$4 in state, federal, and foundation support. CDBG entitlement allocations are determined based on a statutory formula that considers several objective measures of community need, including poverty, population, housing overcrowding, age of housing, and growth lag. Seventy percent of program funds are allocated to metropolitan cities and urban counties (i.e., with populations greater than 200,000). Additional funds are allocated directly to states to reallocate to non-entitlement local jurisdictions.

Significantly more resources are available for Section 108 loan guarantees. Recipients may apply for up to five times the latest approved CDBG allocation, minus any outstanding Section 108 commitments and/or principal balances of Section 108 loans for which the state (or entity) has pledged its CDBG funds as security.

### APPLICABLE DEADLINES

In Colorado, the application deadline generally occurs in February of the fiscal year for non-entitlement funding. Application details and instructions can be found on the [Colorado Department of Local Affairs website](#).

Recipients must comply with both annual and five-year reporting and planning requirements. These include both periodic strategic plans and more frequent spending plans, which identify programs and projects that will be supported with CDBG awards.

At the federal level, the program accepts application materials at any time, but has certain buffer deadlines. A Consolidated Plan (Con Plan) is due 45 days before the year construction begins and a Consolidated Annual Performance Evaluation Report (CAPER) is due 90 days after that year ends for each year thereafter until project completion. The recipient must also make the CAPER public for at least 15 days. More information about the application can be found here: [https://www.hudexchange.info/resources/documents/BasicallyCDBG\\_Slides.pdf](https://www.hudexchange.info/resources/documents/BasicallyCDBG_Slides.pdf)

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**PROJECTS FUNDED**

Entitlement communities have flexibility in developing their own programs and funding priorities, insofar as they consult with local residents before making final decisions. CDBG funds have been used for property acquisition; rehabilitating existing residential and nonresidential properties; providing public facilities and improvements, such as water and sewer, streets, and neighborhood centers; supporting public services; clearance; homeownership assistance; and assistance to for-profit businesses for economic development activities.

Although CDBG funds have historically been used to support infrastructure projects (e.g., flood control, wastewater treatment), to date, no awards have been used for broadband. Table 7-2 delineates CDBG spending by activity since 2001. HUD maintains a collection of detailed project profiles, which provide a sense of the range and scale of supported activities.<sup>84</sup>

Table 7-2: CDBG Spending by Activity (FY 2001 – FY 2013)<sup>85</sup>

Activity	Percentage of Allocations
Acquisition	5.7%
Housing	24.1%
Administrative & Planning	14.9%
Repayment of Section 108 Loans	3.1%
Public Services	11.4%
Economic Development	8.6%
Public Improvements	31.7%

**ELIGIBLE ACTIVITIES**

CDBG offers grantees a high level of flexibility in choosing program activities. With limited restrictions, grantees are free to select activities that best meet the needs of their communities, in accordance with the national objectives and other requirements of the CDBG Program. Each entitlement grantee proffers a Consolidated Plan (five-year strategic planning document) and an Action Plan (one-year implementation plan) defining proposed projects for HUD review and approval.

All CDBG activities must in some way benefit low- and moderate-income persons (typically demonstrated with a job-creation strategy and plan), aid in the prevention or elimination of slums and blight, or address an urgent need that poses a serious and immediate threat to the health or welfare of the community that occurred within the last 18 months and for which no other funds are available.<sup>86</sup>

CDBG funds may be used for the acquisition, construction, reconstruction, rehabilitation, or installation of public improvements or public facilities. Public improvements are defined to include—but are not limited to—improvements to streets, sidewalks, water and sewer lines, and parks. Public facilities include—but are not limited to—neighborhood or community facilities and facilities for persons with special needs (e.g., homeless shelters, group homes, and halfway houses).



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CDBG funds may also be used for activities related to economic development (e.g., microenterprise assistance, commercial rehabilitation, and special economic development activities) and payment of the non-federal share of grants required for CDBG-eligible activities.

### RESTRICTIONS

While recipients have tremendous flexibility to determine the appropriate use of CDBG grants (or Section 108 loans), these funds are subject to some restrictions. First, at least 70 percent of the funds expended over a period specified by the grantee, not less than three years, must be used for activities that benefit low- and moderate-income persons. In addition, funds cannot be used:

- To construct buildings for the general conduct of government;
- To finance general government expenses or political activities (though a building assisted with CDBG funds can be used for political meetings, candidate fora, or voter registration, if it is available to all community organizations on an equal basis);
- To purchase equipment;
- To purchase personal property (e.g., furnishings or motor vehicles); or
- To finance operating and maintenance expenses.

### KEY RESOURCES

- Authorizing legislation (Title 1 of the Housing and Community Development Act of 1974, Public Law 93-383, as amended; [42 U.S.C. 5301](#) et seq.) and regulations governing the Section 108 loan guarantee program ([24 CFR 570](#), Subpart M, Loan Guarantees).
- Fact sheet:  
<https://www.hudexchange.info/resources/documents/About-the-CDBG-Program.pdf>
- CDBG general background:  
<http://portal.hud.gov/hudportal/HUD?src=/hudprograms/entitlement>
- CDBG overview:  
<https://www.hudexchange.info/resources/documents/Basically-CDBG-Chapter-1-Overview.pdf>
- Economic development toolkit:  
<https://www.hudexchange.info/resource/2376/cdbg-economic-development-toolkit/>
- Section 108 guide and toolkit:  
<https://www.hudexchange.info/section-108/guides>

To apply for Colorado state CDBG funds, the Department of Local Affairs recommends contacting your appropriate regional manager. A list of regional offices is available online <https://www.colorado.gov/pacific/dola/regional-contacts>.

## Department of Homeland Security Public Safety Programs

On May 21, 2018, the Department of Homeland Security (DHS) announced eight funding opportunities addressing public safety preparedness, some of which pertain to El Paso County's explained needs. The \$1.6 billion budget merits an investigation as to the programs'

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potential as funding sources. Although this section summarizes each pertinent grant, the County should follow DHS announcements for more details regarding application guidelines and timelines.

### INTRODUCTION AND PERTINENCE

Although DHS perennially awards these Preparedness Grants, the natural disasters of 2018 have reinvigorated support for the programs. Broadly, the programs attempt to fulfill the National Preparedness Goal, set to improve prevention, protection, mitigation, response, and recovery to natural and violent disasters on U.S. territory.<sup>87</sup> To that end, DHS strongly supports any improvements, like broadband (including FirstNet), to threat detection, response, and resolution speeds. Of DHS's main focuses, the 2017 National Preparedness Report<sup>88</sup> primarily highlights cybersecurity and supply chain integrity, both of which are addressed in broadband projects.

### ENTITIES FUNDED

As stated in each program description (Section 8.4), the awards can go to state, local, and private entities, including non-profits and public transportation agencies. Although each grant program targets a different type of recipient (and thereby may initially disqualify the County from numerous opportunities), cooperation with qualifying entities would enable a County application. The nature of the relationship, the work undertaken, and the agreement therein fall to the discretion of the applicant.

Applicants at both the state and local level must comply with all federally mandated public safety protocols. For instance, all applying states and their respective security agencies must currently operate under (or plan to implement) the National Incident Management System (NIMS) and retain Emergency Management Assistance Compact (EMAC) membership.

### PROJECTS FUNDED

DHS keeps the grants and projects flexible to the needs of the applicant insofar as they create improvements directly benefiting domestic security needs. Planning of implementation of such projects must begin following the award, and funding will conclude three years later. All grant programs address public safety and preparedness in some way, so coordination with law enforcement and first responder personnel is essential to merit consideration. Similarly, demonstrating a reputation and history of need for such preparedness in the proposed area would benefit an application as well, given the criteria evaluated in DHS's review process.

### GRANT OPTIONS

Under DHS and FEMA regulation, these grant programs primarily target urban environments at high risk of terrorist activity. El Paso County's jurisdiction covers both Colorado Springs and the U.S. Air Force Academy, making it a potential target. With the advent of FirstNet and other commercial public safety broadband offerings that provide public safety priority and preemption, many broadband expansion projects have requested public safety funds, typically highlighting their improvements to emergency capabilities and response time in their applications. Integrating this project with current emergency networks or expanding emergency networks would place the project under the scope of these grants. Thus, the following relevant programs could apply:

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- The Emergency Management Performance Grant (EMPG) offers a total of \$350 million in funds to address emergency management shortcomings and sustainability for regional, local, tribal, and state entities. In improving the speed and capabilities of emergency management with increased broadband speeds, the project directly addresses the intention of the grant.
- The Homeland Security Grant Program (HSGP) includes three programs with a total of \$1 billion in funds.<sup>89</sup> Although only states are allowed to apply to these grant opportunities, municipalities can make a case to their respective State Homeland Security Division to apply. In the case that the state did receive such funding, it could then aid in the implementation of such projects at its own discretion. HSGP is composed of three grant programs: State Homeland Security Program (SHSP); Urban Area Security Initiative (UASI); and Operation Stonegarden (OPSG).
- The Nonprofit Security Grant Program (NSGP) has \$60 million in funds given in maximum grants of \$150,000 to high-risk non-profits for their cyber- and physical security needs.
- The Transit Security Grant Program (TSGP) and Intercity Bus Security Grant Program (IBSGP) oversee \$88 million and \$2 million respectively in grant funding for the administration and management of regional transportation to improve their security prevention and response systems against acts of terrorism. Mountain Metro Transit of Colorado Springs would qualify for this program, but coordination with its administration would be critical.

Although the grants all address different public safety preparedness needs, the project qualifications, application processes, and post-award requirements are similar for all of them. Thus, it would be relatively easy to couple multiple funding opportunities.

## NATURE OF AWARD

Awarded grants may vary in size and focus; however, they must primarily address prevention, response, and recovery from disasters that could detrimentally affect communities. Federal regulations allow projects to use awards for planning, organization, equipment, training, exercises, personnel, necessary domestic travel, overtime pay caused by disasters, construction/renovation, maintenance, management, and identification.

Awardees must submit regular progress reports, described in the notice of award, to ensure the correct and legal use of the allocated funds. This includes potential audits and submission of Federal Financial Reporting Forms (FFR), as well as other documents. DHS, as part of ongoing regular emergency response testing, may also assess the improvements to systems for verification.

## APPLICATION PROCESS

In order to apply, applicants must first obtain a DUNS number and retain an active SAM profile, as previously outlined in Sections 2.2 and 2.4. Following this step, the actual application

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processes are through the non-disaster portal of Grants.gov<sup>90</sup> that explains all the necessary steps and documents and allows applicants to authorize, sign, and track the application and its documents. To address more specific questions about the application, contact the agency at 1-800-518-4726 or [support@grants.gov](mailto:support@grants.gov). Application submission deadline for all the grants was June 20, 2018 and it is anticipated to be in the same general timeframe next year.

Applications and proposed projects are assessed on three key factors: completeness of proposal, qualification (including financial feasibility), and projected improvements (based on both the project and the risk in the area). Following this process, applicants will also undergo mandatory Federal Awardee Performance and Integrity Information System (FAPIIS) clearance to determine the validity of their proposals, plans, and management. If applicants pass, they can be awarded—and must respond to any correspondence regarding such notification within 90 days.

## KEY RESOURCES

- Announcement of Awards from DHS:  
<https://www.dhs.gov/news/2018/05/21/dhs-announces-funding-opportunity-fiscal-year-fy-2018-preparedness-grants-0>
- HGSP Grants.gov posting: <https://www.grants.gov/web/grants/search-grants.html> (see the “Related Documents” tab for information, including the Notice of Funding Opportunity [NOFO])
- FEMA non-disaster Grants.gov portal for application submission:  
<https://portal.fema.gov/famsVuWeb/home>
- Contact FEMA directly at [ndgrants@fema.dhs.gov](mailto:ndgrants@fema.dhs.gov) with questions

## State Grant Opportunities

### COLORADO DEPARTMENT OF LOCAL AFFAIRS (DOLA)

DOLA set aside \$20 million from its Energy and Mineral Impact fund to assist with the study/planning and deployment of broadband in the state. DOLA funding provides funding for the study of broadband and for the execution of middle-mile broadband projects in rural Colorado. The original \$20 million in dedicated funding has been committed, but regional, county and local projects are still able to tap into this funding stream with grant applications that are considered alongside the traditional projects covered by DOLA.

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Figure 7-3: DOLA Broadband Program Grants and Eligibility

**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](http://dola.colorado.gov/regmanagers)

 **COLORADO**  
Department of Local Affairs

Colorado's election of a new governor may have political implications, but it is our opinion that the incoming governor will continue to support rural broadband as a legislative and funding priority. Well-considered rural broadband projects have generally been looked upon favorably in this grant process, particularly those that focus on county- or regional-level solutions to the broadband problems facing rural communities.

It is important to note that the priority has been on rural broadband. Therefore, DOLA has worked with eligible entities (particularly regional, such as counties) to coordinate regional, rural needs. This can include bringing rural entities together and/or maintaining a rural focus (as opposed to more populated, urban areas).

The first category is for Broadband Planning. These grants can be used for feasibility with some component of regional coordination. This type of funding was used by Buena Vista to complete their study, and there are subsequent grant opportunities available under DOLA programs.



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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:

- Funds are only available to entities that have opted out of SB152
- These Tier II grants can be up to \$1 Million
- Last mile connectivity is not an eligible service under this program
- The funds can be used to connect anchor institutions, but not end resident or business customers
- Applicants for these funds would be required to provide 50% matching funds for these connections (although there could be a reduction to 25% match in some financial need circumstances). While this is the general requirement, grant applications which provide more than the minimum local match have tended to receive more favorable treatment.
- 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 process starts for the next cycle the next month after the previous cycle
- An advisory committee scores all projects
- That scoring goes to the Executive Director of DOLA who makes the final decisions on what is funded and if there is full or partial funding
- There is a 10-week process from application to scoring to decisions
- The grants can reimburse expenses that have already been incurred

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These Energy/Mineral Impact Assistance Fund Grants (EIAF) applications will be evaluated by the criteria in the chart below.

Figure 7-4: EIAF Grant Application Evaluation Criteria

Of particular note is the last category, Energy/Mineral Impact. The first section in that category has a pre-score between one and ten and references that it is determined using metrics. This mainly considers energy production and is an already known score. El Paso County is currently rated a four.

HR Green met with local DOLA representatives to better understand the agency's interest in projects in the region. The Energy/Mineral Impact score was a topic of specific discussion, and it is viewed as a somewhat neutral rating. There are regions with a higher number and others with lower. Therefore, there are steps that can be taken

to realistically deal with this number. One option is to offset that number in the other categories (making sure that other categories have higher scores to, hopefully, offset that score compared to other regions). Also, it can be important to take into account what other regions are applying in any given cycle to try to apply in the cycle that gives you the most likely opportunity to be funded.

DOLA has divided Colorado into Regions, with each one having a Regional Manager. That person is in place to help their regions receive funding for eligible projects. El Paso County's Regional Manager is Clay Brown and he can be reached at (303) 273-1787 or [clay.brown@state.co.us](mailto:clay.brown@state.co.us). Working with him is a critical part in successfully completing the grant process and navigating the issues previously discussed.

With the governor's office change, there will also most likely be a new Executive Director of DOLA. That should not change most of what DOLA does and how DOLA operates. But, there could be process changes or changes in philosophy of how grants decisions are made. Also,

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

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given that the Executive Director makes final decisions on funding, it will be important to know the new Director and to develop a relationship with her/him.

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>

**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 Board 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% of new infrastructure costs.

In 2016, the Broadband Deployment Board awarded \$2.1 million for eight projects. In 2017, they awarded \$8.8 million to eight projects.

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>.

With DOLA grants for planning and middle mile, these last mile grants can be important to building out the full network, if that is the path that the County decides to take. Given that DORA grants are targeted to a partnership, there are several important considerations that need to be evaluated before pursuing these grants.

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<sup>1</sup> Applicants should check all available sources to confirm that service is not available. These include but are not limited to service provider websites, the NTIA and FCC National Broadband Map (<http://broadbandmap.gov/> and/or <https://www.fcc.gov/reports-research/maps/>), and the grant awardee database.

<sup>2</sup> Critical community facilities include public schools, public libraries, public medical clinics, public hospitals, community colleges, public universities, law enforcement, and fire and ambulance stations.

<sup>3</sup> Leasing costs can only be covered for three years.

<sup>4</sup> Note that additional funds can be used to provide the computer access points and their connection to the network. Applicants may use their own resources to cover costs exceeding this limit. The program historically required provision of at least 10 computer access points in a public community center; however, now requires only two such access points—with a *maximum* of 10 computers.

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- <sup>5</sup> The minimum requirements increased from FY 2017 to FY 2018 and may change again before FY 2019. The NOSA will announce any changes. The requirements provided reflect the most recent numbers from the FY 2018 cycle.  
(<http://www.rd.usda.gov/programs-services/community-connect-grants> under the Forms & Resources tab).
- <sup>7</sup> To access a synopsis and pertinent attachments in [www.grants.gov](http://www.grants.gov), click on “Search Grants” from the lower navigation menu. Input CFDA number 10.863 and locate the “Community Connect” hyperlink, which may fall under the “closed” or “archived” designation at this time. More documents may become available when the application officially opens.
- <sup>8</sup> Q&A on DUNS numbers is available at: [http://www.rd.usda.gov/files/UTP\\_duns\\_qa.pdf](http://www.rd.usda.gov/files/UTP_duns_qa.pdf).
- <sup>9</sup> See section 4.2 for website.
- <sup>10</sup> SAM registration is available online at: <https://www.sam.gov> or by phone (877-332-8277 and/or 866-606-8220). For help registering in SAM, contact the supporting Federal Service Desk (FSD) (<https://www.fsd.gov/>). SAM account application status can be checked with your DUNS number online ([https://www.sam.gov/sam/helpPage/SAM\\_Reg\\_Status\\_Help\\_Page.html](https://www.sam.gov/sam/helpPage/SAM_Reg_Status_Help_Page.html)).
- <sup>11</sup> This number is important and will serve as a password in the actual Grants.gov applications.
- <sup>12</sup> Additional details about the SAM registration process can be found online:  
[https://www.sam.gov/sam/transcript/Quick\\_Guide\\_for\\_Grants\\_Registrations.pdf](https://www.sam.gov/sam/transcript/Quick_Guide_for_Grants_Registrations.pdf).
- <sup>13</sup> Completed hard copy applications should be mailed to:  
Deputy Assistant Administrator  
Loan Origination and Approval Division - Rural Utilities Service  
STOP 1597, Room 2844-S 1400 Independence Ave.  
SW Washington, D.C. 20250-1597
- <sup>14</sup> SF 424 is available online ([https://apply07.grants.gov/apply/forms/readonly/SF424\\_2\\_1-V2.1.pdf](https://apply07.grants.gov/apply/forms/readonly/SF424_2_1-V2.1.pdf)).
- <sup>15</sup> Lack of service can be illustrated with a brief table documenting outreach to area service providers (as laid out in the Application Guide on p. 21).
- <sup>16</sup> The applicant must check the Application Guide (once released) and contact any relevant agencies with due diligence to show consideration for environmental effects and parameters. The applicant should explicitly state descriptions of correspondence and deliberate changes in the consideration of the environmental effects.
- <sup>17</sup> Both the mapping tool (<http://broadbandsearch.sc.egov.usda.gov/>) and a detailed User Guide (<http://broadbandsearch.sc.egov.usda.gov/MappingToolUserGuide.pdf>) are available online.
- <sup>18</sup> Note that the public must have post-working hours and weekend access to the community center, which should be explicitly stated in the application.
- <sup>19</sup> Unaudited financial statements will only be accepted if audited financial statements do not exist, and the financial statements include income statements, balance sheets, and statements of cash flows.
- <sup>20</sup> CC Presentation 2018, USDA, [https://www.rd.usda.gov/files/CC\\_Presentation\\_2018.pdf](https://www.rd.usda.gov/files/CC_Presentation_2018.pdf)
- <sup>21</sup> The 2017 Community Connect Application Guide is available at:  
[https://www.rd.usda.gov/files/2017\\_CC\\_App\\_Guide-Final.pdf](https://www.rd.usda.gov/files/2017_CC_App_Guide-Final.pdf). (accessed June 2018)
- <sup>22</sup> “7 CFR 1739, Subpart A- Community Connect Grant Program,” *Legal Information Institute*,  
<https://www.law.cornell.edu/cfr/text/7/1739.3> (accessed June 2018)
- <sup>23</sup> Note that this schedule may vary. In fact, for 2015, the Notice of Service Availability (NOSA) was published December 17, 2014 with applications due February 17, 2015.
- <sup>24</sup> FY 2018 Budget Summary, USDA, <https://www.obpa.usda.gov/budsum/fy19budsum.pdf> (accessed June 2018)
- <sup>25</sup> Information is available at: [https://www.rd.usda.gov/files/CC\\_Presentation\\_2018.pdf](https://www.rd.usda.gov/files/CC_Presentation_2018.pdf) (accessed June 2018)
- <sup>26</sup> Lennard Kruger, “Broadband Loan and Grant Programs in the USDA’s Rural Utilities Service,” Congressional Research Service, August 1, 2017, <https://fas.org/sqp/crs/misc/RL33816.pdf> (accessed June 2018).
- <sup>27</sup> For further information, see <https://www.fcc.gov/news-events/blog/2018/04/11/experienced-advice-new-broadband-program> (accessed June 2018)
- <sup>28</sup> For further information, see <http://www.rd.usda.gov/programs-services/services/rural-utilities-loan-interest-rates>

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- 29 While loans are available to corporations, an entity that provides telecommunications or broadband service to at least 20 percent of the households in the United States is limited to a loan amount of no more than 15 percent of the available funds for the given fiscal year.
- 30 See: <https://www.rd.usda.gov/programs-services/rd-apply> (accessed June 2018)
- 31 See <https://www.grants.gov/view-opportunity.html?oppld=302953> (accessed June 2018)
- 32 EDA regional contacts available online at: <https://www.eda.gov/contact/>
- 33 EDA, Public Works Program Pager, <https://www.eda.gov/pdf/about/Public-Works-Program-1-Pager.pdf> (accessed June 2018)
- 34 EDA annual reports available online at: <https://www.eda.gov/annual-reports/>
- 35 “Telluride Foundation Receives \$760,025 Grant for Regional Broadband Expansion,” *Telluride Foundation*, October 17, 2017, <https://telluridefoundation.org/telluride-foundation-receives-760025-grant-for-regional-broadband-expansion-foundation-one-of-35-projects-nation-wide-to-receive-economic-development-administration-funding/> (accessed December 2017)
- 36 “Latest EDA Grants,” *EDA*, <https://www.eda.gov/grants/> (accessed June 2018).
- 37 “EDA \$700K Grant to City of Cleveland/OneCommunity Lays Groundwork for First Commercially Available 100 Gigabit Fiber Network,” *EDA*, November 21, 2014, <https://www.eda.gov/archives/2016/news/press-releases/2014/11/21/one-community.htm> (accessed June 2018)
- 38 CO FY2014 Annual Report, *EDA*, <https://www.eda.gov/annual-reports/fy2014/states/co.htm> (accessed June 2018)
- 39 LA FY2014 Annual Report, *EDA*, <https://www.eda.gov/annual-reports/fy2014/states/la.htm> (accessed June 2018)
- 40 EDA, FY2013 Annual Report, at 83, <https://www.eda.gov/files/annual-reports/fy2013/EDA-FY2013-Annual-Report-full.pdf> (accessed June 2018)
- 41 EDA, FY2012 Annual Report, at 28, [https://www.eda.gov/files/annual-reports/fy2012/EDA\\_FY\\_2012\\_Annual\\_Report\\_full.pdf](https://www.eda.gov/files/annual-reports/fy2012/EDA_FY_2012_Annual_Report_full.pdf). (accessed June 2018)
- 42 *Id.* at 70.
- 43 EDA, “2017 Assistance to Coal Communities,” <https://www.eda.gov/coal/2017/> (accessed June 2018)
- 44 “Economic Development Administration: FY2016 Appropriations,” *EveryCRSReport.com*, July 29, 2016, <https://www.everycrsreport.com/reports/R44112.html> (accessed June 2018)
- 45 The 2018 NOFA can be found under the Related Documents tab of <https://www.grants.gov/web/grants/search-grants.html?keywords=FY%202018%20Economic%20Development%20Assistance%20Program>. (accessed August 2018)
- 46 *Id.*, see 21-25.
- 47 A list of all required application materials is provided at pp. 17-28 of the FY2018 FFO.
- 48 Denver Regional Office Director: Angela Belden Martinez, 1244 Speer Boulevard Suite 431, Denver, CO 80204; (303) 844-4715 Main Office; (303) 844-3968 Fax
- 49 See, USAC, Schools and Libraries (E-Rate), “Applicant Process” (<http://www.usac.org/sl/applicants/default.aspx>) (with separate links describing each of the requisite forms).
- 50 See USAC, Schools and Libraries (E-Rate), “Online Learning Library” (<http://www.usac.org/sl/about/outreach/online-learning.aspx>) (providing dozens of short videos for each step of the application process).
- 51 New applicants can obtain a new account by contacting the Client Service Bureau (CSB) at (888) 203-8100.
- 52 Form 499 allows Providers to report revenues received from telecommunications services to the FCC. However, any Provider that is a municipal or state government providing services to government-owned buildings should consult with its lawyer while filling out the form. Generally, services provided by a municipal or state-based provider to its own buildings meet a *de minimis* threshold to be exempt from annual or quarterly Form 499-A/Q filings. The Provider should review the form and a possible claim of exemption with its lawyer. Regardless of the qualification for the exemption, the Provider must still file the form claiming the exemption. USAC will follow up with instructions on further filing requirements.



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- 53 In the recent E-rate Modernization Order (FCC 14-99 at Para. 203-204), the requirement to negotiate and execute a contract prior to submitting FCC Form 471 was removed effective for the 2015 funding year (beginning July 1, 2015). The FCC has directed “USAC to consider the existence of a written offer from the service provider containing all material terms and conditions and a written acceptance of that offer as evidence of the existence of a legally binding agreement.”
- 54 The SPIN ID is not required to search and bid on posted RFPs; however, according to the program rules, the SPIN must be in place in order to qualify for funding. To apply for a SPIN ID, the service Provider will be required to obtain an FCC Registration Number (FRN). Form 498 gives instructions on how to do this; the process is simple.
- 55 It is important that an initial Form 499-A is filed as soon as a SPIN ID is assigned. The purpose of the initial filing is to secure a 499 Filer ID, which USAC and the FCC will require when processing Form 471. The Provider will then be required to file Quarterly or Annual 499 filings reporting income from services provided.
- 56 <https://www.usac.org/about/tools/e-file.aspx/>. (accessed June 2018)
- 57 The billed entity number (BEN or BEIN) is a unique number assigned by USAC to schools and libraries that pay service providers for their services. This number can be set up when contacting USAC to create an EPC account. See: “Entity Numbers,” Universal Services Administrative Company, <http://www.usac.org/sl/applicants/beforeyoubegin/entity-number.aspx>, accessed February 2018.
- 58 “Application Process Flowchart,” *Universal Service Administrative Company*, [http://www.usac.org/\\_res/documents/sl/pdf/handouts/application-process-flow-chart.pdf](http://www.usac.org/_res/documents/sl/pdf/handouts/application-process-flow-chart.pdf) (accessed December 2017).
- 59 “Schools and Libraries E-rate Program Overview,” USAC, [https://www.usac.org/\\_res/documents/sl/pdf/handouts/E-rate-Overview.pdf](https://www.usac.org/_res/documents/sl/pdf/handouts/E-rate-Overview.pdf) (accessed June 2018)
- 60 Applicants can determine if an HCP is located in a rural area by using the Rural Health Care (RHC) Program’s Eligible Rural Areas Search Tool.
- 61 Oliver, L., Jan. 10, 2013, “The FCC’s Healthcare Connect Fund,” (accessed June 2018) [http://www.usac.org/\\_res/documents/rhc/training/2013/healthcare-connect-fund-webcast.pdf](http://www.usac.org/_res/documents/rhc/training/2013/healthcare-connect-fund-webcast.pdf)
- 62 In the Matter of Rural Healthcare Support Mechanism, Dec. 12, 2012, Report and Order, WCDocket No. 02-60, at 3 [https://apps.fcc.gov/edocs\\_public/attachmatch/FCC-12-150A1.pdf](https://apps.fcc.gov/edocs_public/attachmatch/FCC-12-150A1.pdf) (accessed June 2018)
- 63 See FCC, USAC, Dec. 12, 2013, Press Release: “FCC Creates Healthcare Connect Fund to Expand Access to Robust Broadband Healthcare Networks, Improve Care and Lower Costs for Patients Nationwide.” (accessed June 2018) <http://www.fcc.gov/document/new-healthcare-connect-fund-expands-access-broadband-healthcare>
- 64 FY 2018 (through 6/30/2019) timeline available at: (accessed June 2018) [http://usac.org/\\_res/documents/rhc/pdf/handouts/RHC-Timeline-FY2016-FY2017-FY2018.pdf](http://usac.org/_res/documents/rhc/pdf/handouts/RHC-Timeline-FY2016-FY2017-FY2018.pdf)
- 65 We recommend that prospective service providers sign up for e-mail updates about the program and upcoming deadlines at: <http://www.usac.org/about/tools/publications/subscription-center.aspx>
- 66 See sections 6.2 and 6.3 of this document for further instructions. Note that Form 498 can be found on the USAC website: <http://www.usac.org/rhc/healthcare-connect/tools/forms/default.aspx> (listed under Service Provider Forms) and revisions can be submitted to <http://www.usac.org/sp/about/498/default.aspx>. Any questions about Form 498 can be directed to USAC ([CustomerSupport@usac.org](mailto:CustomerSupport@usac.org) or 888-641-8722).
- 67 It is important that an initial Form 499-A is filed. The purpose of the initial filing is to secure a 499 Filer ID, which USAC may require when processing the Invoice (Form 463).
- 68 Form and instructions available online: <https://www.usac.org/rhc/healthcare-connect/tools/forms/default.aspx>
- 69 See <https://www.usac.org/rhc/healthcare-connect/consortia/step04/network-plan.aspx> (accessed June 2018)
- 70 Form and instructions available at [https://apps.fcc.gov/edocs\\_public/attachmatch/DOC-331756A1.pdf](https://apps.fcc.gov/edocs_public/attachmatch/DOC-331756A1.pdf) and <https://www.usac.org/rhc/healthcare-connect/tools/forms/default.aspx>.
- 71 Form and instructions available online: [http://www.usac.org/\\_res/documents/RHC/training/2014/HCF-Program-Form-463-Webinar-SP.pdf](http://www.usac.org/_res/documents/RHC/training/2014/HCF-Program-Form-463-Webinar-SP.pdf).

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- <sup>72</sup> Guidance for Service Providers who are reviewing Form 463 is available online: <http://www.usac.org/res/documents/RHC/training/2014/HCF-Program-Form-463-Webinar-SP.pdf>. USAC can address any remaining questions about the invoicing process ([RHC-assist@usac.org](mailto:RHC-assist@usac.org) or 800-453-1546)
- <sup>73</sup> “Community Development Block Grants,” *Department of Local Affairs; CO*, <https://www.colorado.gov/pacific/dola/community-development-block-grant-cdbg> (accessed June 2018).
- <sup>74</sup> Freddie Allen, “HUD Chief Seeks Broadband Access for the Poor,” *Pittsburgh Courier*, Feb. 16, 2015, <http://newpittsburghcourieronline.com/2015/02/16/hud-chief-seeks-broadband-access-for-the-poor/> (accessed June 2018)
- <sup>75</sup> “HUD Secretary Donovan on the Importance of Broadband to Housing,” *The American Genius*, March 14, 2010, <https://theamericangenius.com/politics-and-news/hud-secretary-donovan-on-the-importance-of-broadband-to-housing/> (accessed June 2018)
- <sup>76</sup> Connect2Compete has since been rebranded as “EveryoneOn” (see <http://everyoneon.org/>).
- <sup>77</sup> “Support Local Development and Infrastructure Projects,” *NACo*, <http://www.naco.org/resources/support-local-development-and-infrastructure-projects-community-development-block-grant-1> (accessed June 2018)
- <sup>78</sup> To date, CDBG funds have *not* been used to finance broadband; however, such projects are clearly consistent with program regulations. The current administration has also suggested that CDBG should cover broadband.
- <sup>79</sup> “CDBG Entitlement Program Eligibility Requirements,” *HUD Exchange*, <https://www.hudexchange.info/programs/cdbg-entitlement/cdbg-entitlement-program-eligibility-requirements/> (accessed June 2018)
- <sup>80</sup> “Basically CDBG,” *HUD Exchange*, [https://www.hudexchange.info/resources/documents/BasicallyCDBG\\_Slides.pdf](https://www.hudexchange.info/resources/documents/BasicallyCDBG_Slides.pdf) (accessed June 2018)
- <sup>81</sup> HUD, Feb. 5, 2015, 80 Fed. Reg. 6470, “Section 108 Loan Guarantee Program: Payment of Fees To Cover Credit Subsidy Costs” ([http://www.gpo.gov/fdsys/pkg/FR-2015-02-05/pdf/2015\\_02262.pdf](http://www.gpo.gov/fdsys/pkg/FR-2015-02-05/pdf/2015_02262.pdf)).
- <sup>82</sup> HUD, “About the Community Development Block Grant Program” (<https://www.hudexchange.info/resources/documents/About-the-CDBG-Program.pdf>).
- <sup>83</sup> 24 CFR § 570.201(g).
- <sup>84</sup> HUD, CDBG Project Profiles, <https://www.hudexchange.info/community-development/cdbg-ta-products/project-profiles/> (accessed June 2018).
- <sup>85</sup> “About the Community Development Block Grant Program,” HUD, <https://www.hudexchange.info/resources/documents/About-the-CDBG-Program.pdf> (accessed December 2017)
- Note that the vast majority of these funds (approximately 95 percent) have been invested in activities that primarily benefit low- and moderate-income persons.
- <sup>86</sup> *Id.*
- <sup>87</sup> “National Preparedness Goal,” *FEMA*, <https://www.fema.gov/national-preparedness-goal> (accessed June 2018)
- <sup>88</sup> “National Preparedness Reports,” *FEMA*, <https://www.fema.gov/media-library/assets/documents/134253> (accessed June 2018)
- <sup>89</sup> Operation Stonegarden (\$85 million) and the Urban Areas Security Initiative or UASI (\$520 million) would not apply in El Paso County, thereby reducing the amount available to projects like this one. Similarly, regulations require that 25 percent of SHSP funding focuses directly on law enforcement terrorism prevention activity (LEPTA).
- <sup>90</sup> See <https://portal.fema.gov/famsVuWeb/home> (accessed June 2018)

■ **SECTION 8: REGIONAL COOPERATION OPPORTUNITIES**

## **Section 8: Regional Cooperation Opportunities**

El Paso County is not the only public entity currently seeking solutions to the problems identified in this study. Throughout the county, there are other entities who are either aware of, or actively studying solutions to, the issue of broadband availability. Each of these represent potential partners, who bring the potential for cooperative work and shared solutions.

### **CITY OF MANITOU SPRINGS, CO**

Local leaders in Manitou Springs have made investments in the creation of broadband currency, such as collocated conduit, inside the City's Urban Renewal Association boundaries. The recent reconstruction of Manitou Avenue presented an opportunity for the city to place conduit during construction, creating a future conduit for broadband deployment at a significantly reduced price.

At this time, the City is also part of a multi-agency Intergovernmental Agreement (IGA) between El Paso County, Manitou Springs and Colorado Springs Utility. This IGA will govern the creation of fiber from approximately I-25 up Highway 24 through Ute Pass to Woodland Park. The deployment of fiber optic cable creates a meaningful backhaul opportunity for future community-owned networks, or public-private partnerships.



Manitou Springs hired HR Green to engage potential private partners to evaluate interest in deployment of high-speed broadband in their community. A report on the outcome of this study was presented to the City Council on October 8, 2018. At this time, Manitou Springs is evaluating options for improved broadband service to its residents, including P3 solutions and/or a publicly-owned and publicly-operated system. Local leaders have expressed a strong degree of interest in creating partnerships with other entities to increase broadband inside Manitou Springs.

### **CITY OF FOUNTAIN, CO**

In 2017, the City of Fountain engaged HR Green to develop a community Vision for broadband services. This study was presented to City Council in May, 2018 and contained five key findings that provided the Council with further insight into conditions and potential opportunities for the city to improve services:

- The Council Desires to Improve Broadband Service
- Own and Operate Model Potential
- Regional Opportunities Are Present
- Backhaul is Available, Affordable and Redundant
- Current Utilities Fiber Optic Infrastructure Will Require Augmentation

## ■ SECTION 8: REGIONAL COOPERATION OPPORTUNITIES

As a result of the Vision process, the Council approved language which was placed on the November election ballot to opt out of Senate Bill 152. This measure passed with 72 percent approval in November, 2018, which cleared the way for the city to more deeply study alternatives to improve broadband alternatives. It is the intention of Fountain to move forward with marketing and economic feasibility studies in 2019 to evaluate alternatives to bring better and more ubiquitous broadband to the area in and around the City of Fountain.

Of particular interest for El Paso County, Fountain Municipal Utilities electric service area extends outside the city limits of Fountain itself to include areas of Security and Widefield. Discussion with Fountain thus far has indicated an interest in leveraging the reach of its electric utility to improve conditions to homes inside the Electric Service Area. This means that a project by the City of Fountain could also serve almost 6,500 homes that generally fall into unincorporated El Paso County and are underserved today.



Initial discussions with the City of Fountain and El Paso County indicate a potential opportunity to leverage county-owned conduit as an inexpensive backhaul path to reach the carrier hotel in Colorado Springs. The County should continue to evaluate opportunities to partner with Fountain to improve services.

### **ANCHOR INSTITUTIONS**

As discussed earlier in this report, the county's schools, libraries and other anchor institutions are open to opportunities to partner with the County to enhance their broadband services. These anchor institutions currently receive services through private providers, but are frequently served by only a single carrier, and generally pay higher prices than the national average.



■ **SECTION 9: PUBLIC POLICY RECOMMENDATIONS**

## **Section 9: Public Policy Recommendations**

El Paso County is in a unique position to leverage public policy to dramatically alter the broadband landscape for government, business and residents. During the course of this study, multiple meetings were held with Craig Dossey, Executive Director of Planning and Community Development, Mark Gebhart, Deputy Director of Planning and Community Development, and Jeff Eckhart, Chief Information Officer for the County. Additional input was solicited from Scot Cuthbertson, Interim Director of Public Services and Jennifer Irvine, the County Engineer as much of the implementation work of these policies falls to these groups.

The Planning and Community Development Department is currently performing an update on the El Paso County Comprehensive Plan. There is a strong desire to coordinate these efforts to ensure that revisions to the Comprehensive Plan also strongly support the broadband goals of the county. It is imperative that these strategies be aligned and mutually supporting.

Because of the work underway, the review of public policy was abbreviated with a goal of resuming engagement in a future phase of the project as the Comprehensive Plan begins to take shape. The detail below covers several of the broad topics discussed as important for the county as it moves forward and are intended to provide a framework for further policy work in 2019.

### **COST RECOVERY POLICIES**

Communities are frequently asked to leverage staff, equipment and time in order to support contractors who are implementing projects for private projects. In most cases, support for these “cost causers” is provided without recovering the full costs being incurred by the community. El Paso County has an existing policy in place to address revenue recovery, but the cost calculations associated with this policy have not been recently updated.

HR Green engaged with planning and public works officials to address current costs by studying actual cost incurred in the processing of various activities, but was unable to discover actual cost data from the county. Discussions on the topic with the Public Works Department indicate a desire to update these cost tables to ensure full recovery. We recommend the following actions be taken by the county:

- **Review / update the County’s street cut and pavement degradation fee program every five years**
- **Eliminate subsidies for street cutter and permit requestors. In order to gain full cost recovery from all permit fees, perform a “Cost of Service Study” to ensure no public subsidization of street cutting by the private sector.**

### **DIG ONCE/COLOCATION POLICIES**

Communities who seek to develop advanced communications infrastructure have a unique opportunity to deploy assets at a fraction of the cost of overbuilding individually. By developing a colocation policy and standards, the community can require builders with open trenches and boring projects to deploy conduit and/or fiber on behalf of the community. When cities build and repair roads, construct new developments, build commercial zones or business parks or when utilities are placing services underground there is opportunity to place conduits for the eventual



## ■ SECTION 9: PUBLIC POLICY RECOMMENDATIONS

placement of fiber. The creation of a formal colocation package would create policies and supporting processes to implement these programs, in order to create long-term value for El Paso County.

In fact, the County is currently negotiating an Intergovernmental Agreement (IGA) with the Colorado Department of Transportation. This agreement, as envisioned, would leverage the economic power of colocation to provide installed fiber from just west of Interstate 25 in Colorado Springs to the western boundary of Woodland Park. The County's intent is to provide access to a portion of these fibers to partners in Manitou Springs and Colorado Springs Utilities to further provide cost sharing of the deployment cost. Early estimates indicate that the cost of deploying these fiber assets can be accomplished for as little as 10-15% of the cost of running fiber as a standalone entity.



Once completed, these fiber assets could be leveraged with private providers as a way to achieve inexpensive backhaul, and to facilitate the deployment of high-speed broadband service to underserved residents in the Ute Pass Targeted Improvement Zone.

More detailed information on Dig Once Policies, including draft policy and ordinance language, is included within Appendix I of this report.

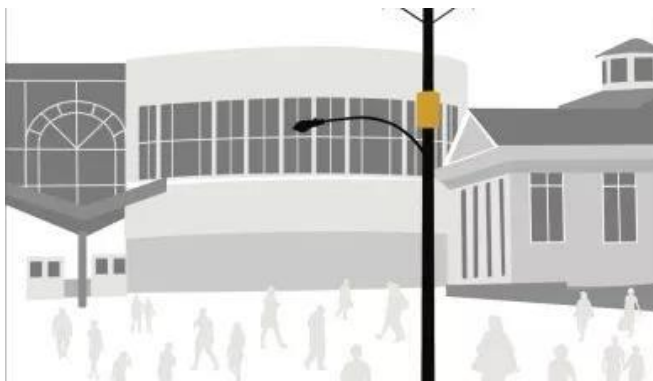
## COMMERCIAL MOBILE RADIO SYSTEM (CMRS)/SMALL CELL/5G FACILITIES

The Planning and Community Development Department is currently proposing changes to the county's process for managing small cell and CMRS deployments. This work comes on the heels of a September 2018 rule change published by the Federal Communication Commission that significantly changes the way in which counties and cities must deal with requests for future CMRS, small cell, and 5G towers and facilities.

The impact of a new FCC Small Cell Order published on September 26, 2018 will:

- Shorten the time local governments must process applications for small cells; failing to approve a request for a new tower may mean automatic approval

Figure 9-1: With Permission of the National League of Cities, 2018



## ■ SECTION 9: PUBLIC POLICY RECOMMENDATIONS

- Limit permit and recurring fees for small cell deployments
- Prohibit counties from assessing fees that include anything other than a “reasonable approximation” of “reasonable costs”
- Limit aesthetic review and requirements of facilities, such as small cells and distributed antenna systems (“DAS”) proposed for installation to public rights-of-way

Figure 9-2: Macro and Small Cell cellular deployment examples



We are aware of one instance, for example in which a 10 block area in Houston, TX, now has about 20 active applications for small cell antennae and some local governments are being deliberately flooded with hundreds of CMRS/small cell antenna requests. Failing to approve these in a timely manner (required by the newly-mandated FCC ‘Shot clock’) will grant the requestors automatic approval of their requests.

Figure 9-3: Active Small Cell Applications in Houston



Still, we believe that with the rapid proliferation of small cells in the coming months and years, the need is even more critical now to encourage local governments to work proactively with the carriers by identifying solutions and common sites which can be easily accommodated in terms of fiber optic backhaul and power. The impact of this new regulation, which may be challenged remains unclear as of this writing, but we recommend the county be proactive in revising its telecommunications policies assuming the new FCC rules will take effect in the Spring.

We recommend consideration of a multi-tiered action plan engaging both the Public Works Department and the Planning and Community Development Department which would include:

- Update the county’s various complete technical manuals to include Public Works and Planning/Community Development to include current costs of service and updates for new regulations.
- Establish or update and publish aesthetic standards for attachments and new small cell locations. These new requirements should include concealment requirements in new developments. Inclusion of these standards will help El Paso County protect its important aesthetic qualities as cellular telephone infrastructure increasingly places more devices into neighborhoods and business zoned areas.
- Update the county’s permit management systems to ensure new underground utilities are delivered in electronic format to blend into the County’s GIS system, at no charge to the county. In essence, every attribute of every utility installed in public rights-of-way should be mapped in 3D in the county’s GIS database, again at no expense to the county.

## ■ SECTION 9: PUBLIC POLICY RECOMMENDATIONS

### NEW RESIDENTIAL DEVELOPMENT COLOCATION

Related to the colocation policy above is the creation of a policy to govern the creation of fiber and broadband ready new residential and commercial development. Governmental entities around the United States are increasingly viewing broadband as the “fourth utility” and creating policies to require the deployment of conduit in the same way water, electric and transportation are required in new development areas.

The costs to the private sector of such developments are generally substantially reduced when developers deploy these assets during the infrastructure phase of their projects. We strongly recommend that the County consider creation of public policy to support these goals through inclusion of colocation requirements in new development areas.

### PERMITTING POLICIES & PRACTICES

Explicit policies, with clear and easy to follow procedures, can save carriers and/or the County time and money.

Permitting can be the most time-consuming process for the fiber builder. Construction usually involves multiple permits, documentation standards, and time variances that are difficult for both parties to manage. Smoothing out these processes with clarity, being realistic in requirements and allowance for unforeseen issues may be very helpful in making this process more efficient and attractive. We recommend considering a more detailed assessment of the county’s current permitting process by opening a dialogue with the county’s permittees to explore the need for such enhancements.

The County should be clear about expectations for detailed engineering drawings that show what was built and where – known as “as-builts.” Today many government agencies require these attributes to be captured electronically in an Environmental Systems Research Institute (ESRI) format to integrate into their GIS systems – often at no cost to the agency.

The rationale for requiring these improvements is simple – since the permittees are occupying public right-of-way at no cost, there is a mutual benefit for the county to possess in its GIS system 3-D information about the type, size and precise location (often to within 1-foot, horizontally, vertically) of the utilities occupying its rights-of-way.

Subsequently, having good documentation facilitates many of these issues and reducing future utility locating and inspection costs and reducing the likelihood of future conflicts and related unplanned outages due to intended utility cuts. Likewise, information delivered at no cost to the county should include be detailed to include conduit sizes/types as well as both strands and buffer tubes within each fiber optic cable.

The County should create rules and approval process that govern the placement and management of any hut, cabinet or pedestal, whether underground, above ground or on

Figure 9-4: Co-Located Conduit on I-25 on Monument Hill



■ **SECTION 9: PUBLIC POLICY RECOMMENDATIONS**

poles should be part of the County’s zoning regulations. As noted above, this is particularly critical for Commercial Mobile Radio System (CMRS) – including future “5G” cellular and “small cell deployments”. Included with this information, similar to the record keeping requirements noted above should include detailed information on conduit sizes/types as well as both strands and buffer tubes within each fiber optic cable.



■ **SECTION 10: STRATEGIC RECOMMENDATIONS**

## **Section 10: Strategic Recommendations**

This report suggests five recommendations that we believe will allow the County to achieve its strategic goals related to broadband availability in the County. These observations and recommendations are detailed further in subsequent sections of this report, but are summarized below:

### **RECOMMENDATION #1: Create Public-Private Partnerships as a Means to Extend Broadband**

The County recognizes the importance of addressing the digital divide that exists in El Paso County today. Real broadband service throughout the county will drive social and economic benefits for businesses, residents and the public sectors (a summary of the impact of broadband on rural development is provided later in this report).

The creation of effective Public-Private Partnerships will enable the county to target the use of scarce resources such as staff time, county budget to the areas in which the highest potential impact can occur.

A partnership model will enable the county to take on a non-ownership, facilitator role to shepherd the deployment of assets in a way that enables the private sector to service areas of the county that would not be financially feasible without some sort of intervention. It is highly likely that these areas would not see meaningful improvements in broadband service without some sort of intervention, so the county, the private sector and residents and businesses receive advantage due to the county's facilitative role. Combined, the results of a coordinated program could exceed individual initiatives, accelerating deployment of broadband infrastructure, reducing costs and increasing competition.

### **RECOMMENDATION #2: Identify Targeted Improvement Zones & Develop Project Strategies**

There exists a number of areas inside the County in which a confluence of residential, business, county and anchor institution needs create opportunities to develop shared solutions. These Targeted Improvement Zones should be studied in further detail to determine the viability and form of solutions that involve the county, other public entities and the private sector. As part of this study, three areas were identified as Targeted Improvement Zones.

- **Ute Pass:** HR Green is currently representing the County in negotiations with the Colorado Department of Transportation to develop an Intergovernmental Agreement (IGA) for county fiber up Ute Pass from Colorado Springs to Woodland Park to service various county facility needs in the area. This fiber is a significant asset and could help to address needs of residents and businesses in Green Mountain Falls, Manitou Springs and surrounding areas.
- **Black Forest to Calhan:** The Black Forest area is dramatically underserved, according to survey respondents. With a relatively high population to serve, the route through the area to Calhan could create improvements for a large number of residents. The County has significant facility needs in Calhan and desire to improve connectivity at the Fairgrounds.
- **City of Fountain:** The City of Fountain is currently studying its options for community broadband. A potential community-owned broadband service would reach beyond the



■ **SECTION 10: STRATEGIC RECOMMENDATIONS**

city limits and could serve in excess of 7,000 El Paso County unincorporated county residents who reside inside the electric service area of Fountain Municipal Utilities. The County could assist in various ways with this effort, increasing access to county residents.

- **Woodmen Valley:** Late in the study, an organized group of citizens living south of the Air Force Academy highlighted their concern for improvements to the current DSL service in this enclave. Residents are reporting only a single service provider and download speeds that in some cases deliver less than 5 Mbps.

**RECOMMENDATION #3: Develop and Formalize Supportive Public Policy**

The County is currently reviewing its Community Development and Planning Comprehensive Plan. This creates a unique opportunity to develop and align a number of supportive policies that will enable the creation of broadband currency in the county. The most critical is the creation of a Dig-Once/Joint Build policy, which will help the county to develop assets and broadband currency. In addition, the County's pavement degradation and street cut policies should be updated to ensure full cost-recovery. Additional policies to govern the deployment of 5G/Small cell infrastructure also rank high on the list of recommended policy enhancements. Communities around the country have created miles of assets at a deep discount to standalone deployment by cooperatively building excess conduit alongside public works improvements or even other private sector development. Planning Department leadership has expressed its support for a program that leverage the comprehensive planning process to create a unified plan to leverage broadband solutions.

**RECOMMENDATION #4: Align Projects to Mutual Needs**

The County should create a Communication Master Plan that identifies key Targeted Improvement Zones and additional projects that can improve services for underserved populations. This Master Plan should identify paths in which the deployment of fiber and conduit can create a platform for future private-sector service enhancement.

During the course of this project, five projects were identified that meet the criteria outlined above:

- **Ute Pass:** Upon completion of the proposed US Hwy 24 West / Ute Pass CDOT partnership, the county will acquire broadband assets that can be used to address not only future county needs in western El Paso County, but the potential to create a public-private partnership to address the broadband needs of residents, businesses, and governments in Green Mountain Falls, Manitou Springs and surrounding areas. Manitou Springs, for examples, is currently studying both P3 and municipally-owned broadband service in its town. Woodland Park and Green Mountain Falls have expressed interest in a joint solution.
- **Black Forest to Calhan:** The County has significant facilities in Calhan and desires to improve connectivity at the Fairgrounds. A middle-mile fiber connection to these facilities could be created with enough excess capacity to enable the private sector to use the new fiber route to enhance service into the Black Forest area and Calhan.

■ **SECTION 10: STRATEGIC RECOMMENDATIONS**

- **City of Fountain:** Should Fountain proceed with a broadband project, the County could facilitate this project, if it occurs, through the sharing of conduit assets that currently run from the city boundary to the internet carrier hotel location in Colorado Springs.
- **Woodman Valley:** Evaluate the needs and potential solutions to serve this enclave south of the Air Force Academy.
- **Southern Service Center:** There exists an opportunity to leverage communication infrastructure to serve county facilities in the southwest corner of the county. If the county determines that a project is feasible, partnerships with the private sector could create improvements in broadband service for this area.

**RECOMMENDATION #5: Proactively Partner with Public and Private Sectors**

Based on the county's preference to address broadband service through partnership with the private sector, it is our recommendation that the county create a robust outreach and coordination program with private providers and public partners. Because telecommunications services are deployed relatively rapidly, it is important for the county to have existing strategic plans and existing relationships with the private sector.

We recommend that the county create a working group with these providers. This group would meet quarterly to discuss issues of interest to both the county and its partners. The group's membership would be made up of wired providers, wireless internet service providers (WISPs), cellular service providers and utilities such as Colorado Springs Utilities, Fountain Electric and other interested public sector partners.

By creating a forum for the open sharing of information, the County can engage the private sector as a real partner to help solve the broadband service issue that exists in many rural parts of the county.

**RECOMMENDATION #6: Identify Champion and Provide Resources to Implement**

There are numerous recommendations included in this summary, and at a higher level of detail, throughout the various sections of this strategic plan. One of the most crucial recommendations, is to create a structure of both resources and an internal organization structure to sustainably execute this plan.

The implementation champion(s) need not be a technology professional, but must be someone who has a strong grasp of the **value** to the county of implementing this study's recommendations. Importantly, due to the need for cooperation by multiple functions within the county's structure, these champions must not only have a passion for the initiative, but also have the authority and the political capital to influence across county departments in order to drive successful outcomes.

A successful model in Colorado is the creation of a Local Technology Planning Team (LTPT). Nearby, Teller County has had a highly effective LTPT which is supporting the implementation of their 2017 broadband master plan. Chaffee County is currently forming their own LTPT in the coming weeks following passage of SB-152 exemption. In this model, a county commissioner often plays a lead role, leveraging others inside county government, and including other state and local officials and the private sector.

■ **SECTION 10: STRATEGIC RECOMMENDATIONS**

El Paso County's Technology Planning Team (using whatever moniker chosen by the group) should include at least one senior staff member and one elected official who, together, could bring the combined strengths of both the administrative and intergovernmental perspectives necessary for sustained advancements. Staff members attending could often include Planning/Community Development, Public Works and IT to achieve the group's stated goals and objectives.

Finally, the county must provide financial resources over a multi-year period to support projects that are of critical importance. One such model that should be considered is the model currently in use by the Economic Development Department. While not deeply staffed, this department acts as a navigator to ensure that the important work required to manage business incentives, community initiatives and housing are coordinated and executed. The County may wish to consider hiring a broadband project manager or identifying a key consulting resource to fulfill that role in order to have the right talent to advance the complex relationships and roles required. A budget should be set to cover both the time and the necessary capital and operating expenses that may be incurred in pursuit of goals.

■ **APPENDIX I: PUBLIC POLICY WHITEPAPER**

## **Appendix I: Public Policy Whitepaper**

The Fiber to the Home Council publishes best practice articles and is a recognized thought leader in the creation and execution of policies that advance the deployment of fiber optic in cities, counties and communities across the United States. The White Paper below was published by the FTTH council in early 2018 and summarizes best policy practices to enable the creation of broadband currency.

### **DIG SMART: Best Practices for Cities and States Adopting Dig Once Policies**



#### EXECUTIVE SUMMARY

Advanced fiber networks and high speed broadband are increasingly important to a community's quality of life and a healthy local economy. An essential step to deploying broadband is installing conduit and fiber, often in underground trenches where other similar infrastructure is also located. This installation process requires excavators to dig in the public rights-of-way, frequently in areas that are already paved or developed. Excavation is both disruptive to the community and expensive for the service provider.

Cities and states can reduce excavation costs, minimize disruption in public rights of way, and encourage broadband deployment through "Dig Once." Dig Once encompasses several approaches to installing conduit in conjunction with other compatible construction projects.

This paper focuses on the most impactful form of this policy: governments installing conduit whenever there is underground construction in the public right of way -- whether that construction is for installing new utility equipment, repairs, or road work. The government then has the opportunity to lease that conduit to broadband providers that are interested in deploying fiber networks to the community. This approach benefits the community by facilitating broadband entry and by giving the government an ongoing revenue source. In fact, as we will show, these revenues can more than make up for the initial capital expense. While some governments may be hesitant to pay for conduit themselves because of its short-term budget impact, they can recoup that investment over time while also creating significant benefits from the community.

To distinguish it from other types of "Dig Once" policies, we call this approach "Dig Smart". This paper lays out the benefits of Dig Smart, how to implement Dig Smart, and the practical implications of Dig Smart.

#### DIG SMART POLICIES BENEFIT LOCAL COMMUNITIES

Dig Smart benefits local governments and residents by promoting the deployment of advanced fiber networks and broadband competition. Dig Smart policies mandate the installation of conduit throughout public rights-of-way, lowering costs for providing broadband service and making a community more attractive for broadband providers hoping to break into a new market or expand their existing operations. The resulting competition leads to more choices and

■ **APPENDIX I: PUBLIC POLICY WHITEPAPER**

lower prices for consumers. In addition, Dig Smart policies decrease the frequency of inconvenient and possibly dangerous construction along roadways, protect the reliability of broadband networks, and incentivize providers to lay fiber underground, hiding unsightly equipment and beautifying the community.

### **Dig Smart Promotes Competition in Broadband, Which Benefits Consumers**

Lack of competition is a serious problem in the broadband market. The Federal Communications Commission found that nearly 75% of homes have at most one choice in a provider of fixed Internet access at download speeds of 25 Mbps (the current definition for “broadband” and the minimum the FCC says is necessary to access the most advanced online applications).<sup>1</sup>

Without competition, consumers often are charged higher broadband Internet access prices. The Center for Public Integrity conducted an international comparative study on broadband competition, looking at the differences between comparable U.S. and French cities.<sup>2</sup> The French cities, on average, had seven choices in broadband service providers, whereas the U.S. cities averaged out to two choices.<sup>3</sup> In the U.S. cities, prices for broadband were up to three and a half times higher than in the French cities.<sup>4</sup>

One of the primary reasons competition is lacking in the broadband marketplace is that the barriers to entry are so high. The upfront costs of deploying broadband service are enormous – particularly for the most advanced fixed residential broadband service, fiber-to-the-premises. The most expensive part of deploying advanced fiber networks is the physical installation of conduit to hold the fiber, due to the costs of excavation.<sup>5</sup> Indeed, the Federal Highway Administration estimates that it is ten times more expensive to install fiber where the provider has to excavate and repair an existing road than it would be to install fiber in conjunction with other roadwork.<sup>6</sup>

Dig Smart policies specifically address the costs of excavation in installing new conduit. San Francisco estimates that implementation of its Dig Smart law will lead to cost savings in excavation ranging from 25%-33%.<sup>7</sup> By minimizing the costs associated with conduit installation with a Dig Smart policy, more broadband providers will be able to compete in the marketplace and deploy broadband services. This will promote greater competition, which will foster lower prices, prompt incumbents to engage in more consumer-friendly behavior and lead to more choices for a community’s residents.

### **Dig Smart Reduces Disruptive Repeated Excavation**

Installing equipment underground is disruptive, especially in areas that are already paved or developed or have underground infrastructure present. Excavators must first work through the jurisdiction’s “locates” system to notify existing underground infrastructure owners and then those owners must mark the location of their facilities. Then the excavator must dig trenches where the conduit can be installed, which typically involves jackhammering through pavement. The excavators must surround the trenches with barricades, warning devices, and covers because the trenches are usually where people will encounter them. With each additional excavation, communities face risks to public safety, traffic disruption, risk of property damage service outages, and wasted government resources.



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**Traffic Disruption and Road Deterioration.** Putting conduit underground alleviates crowding in urban public space, but the issues associated with excavation are exacerbated in these urban areas. Excavation along roadways will often halt or impede traffic, sometimes for lengthy periods of time,<sup>8</sup> and create traffic congestion that increases vehicular accidents and wastes commuters' time. In addition, without Dig Smart, construction initiated by a broadband provider is often re-excavation, meaning that many roads have been excavated previously to install underground infrastructure. Like an article of clothing that is patched and patched again, repeated excavation damages the integrity of the road and shortens its lifespan.<sup>9</sup>

**Public Safety and Service Outages.** Excavating where utilities already exist comes with other risks. Although state authorities require various locates processes before excavators may begin digging,<sup>10</sup> there is always the chance that the excavator may inadvertently damage existing equipment underground, sometimes because the underground equipment operator failed to accurately mark its facilities.<sup>11</sup> Fiber is often installed alongside established utility infrastructure (e.g., gas or electric). Any damage to those pipes or cables could cause a serious disruption of services and harm to surrounding property. The math is simple: the more often excavations occur around existing utilities, particularly for distribution of natural gas, the more likely that gas lines or other utilities are struck resulting in significant risks to life and property.

**Wasted Governmental Resources.** Underground conduit installation requires time and resources from both the excavator and the government. Because excavations involve public safety and environmental concerns, there are a number of legal and regulatory hurdles to approving a dig.<sup>12</sup> Excavation usually requires permits from the state or local permitting authority.<sup>13</sup> Indeed, if the excavation extends through a wide area, the excavator may need to seek permits in multiple jurisdictions. Further, governments will sometimes undertake (or require the excavator to undertake) environmental reviews for excavations, depending on how extensive the excavations may be.<sup>14</sup> Governments must spend time and resources that could be conserved by only having to do the permitting and reviewing once.<sup>15</sup>

### **Dig Smart Incentivizes Installing Fiber Underground**

With Dig Smart in place, broadband providers can more easily and cost-effectively install fiber underground. Thus, the policy encourages broadband providers to choose to place their fiber underground rather than along utility poles. Undergrounding fiber has some significant advantages, including better service reliability and more attractive neighborhoods.

**Service Reliability.** Underground fiber improves the reliability of broadband services.<sup>16</sup> Unlike fiber attached to exposed poles, underground fiber is protected from ice, falling trees, high winds, natural disasters, lightning, sabotage, and other types of destruction, as well as decaying pole infrastructure.<sup>17</sup> This leads to fewer outages. Fiber on poles also requires more maintenance, such as trimming trees to prevent them from interfering with the lines, as well as other repairs from normal wear and tear of open-air exposure.<sup>18</sup> Placing lines underground therefore reduces the costs of providing service and facilitates competition.

**Aesthetics.** Communities generally prefer to have fiber underground for aesthetic reasons as well because it eliminates unsightly utility poles and hanging lines that obscure the landscape.<sup>19</sup>

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## HOW TO IMPLEMENT DIG SMART

Dig Smart mandates government installation of conduit whenever excavation occurs in the public right-of-way and where government-owned conduit does not already exist, whether a private entity is excavating or the government is digging for a public works project. Dig Smart includes requirements that developers of new subdivisions install conduit or other appropriate or necessary communications infrastructure to each residence in the subdivision and in public or homeowner's association rights-of-way in the subdivision. With mandatory conduit installation, the Dig Smart approach is for the government to pay for the extra incremental costs of laying down the conduit, with the government retaining ownership of the installed conduit.

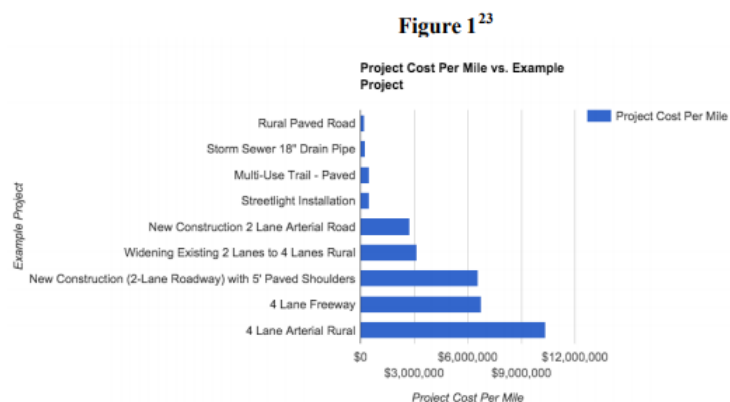
Dig Smart also minimizes legal controversies; unlike with respect to a private service provider installing underground infrastructure on private property, the applicable government entity already possesses authority to control construction in the public rights-of-way. Governments also possess broad latitude to condition the grant of construction permits in the public rights-of-way.<sup>20</sup> Even in states where municipal broadband is restricted,<sup>21</sup> Dig Smart is an appropriate and lawful approach; municipalities would not be running afoul of such restrictions on providing service, as the conduit itself is not a service but only a facility.

With Dig Smart, conduit is installed as excavation occurs, gradually increasing coverage of the conduit network around the community with each new construction project. Dig Smart makes the community ready for deployment of advanced broadband services and eliminates additional excavation necessary to make those services a reality. In addition, service providers do not have to shoulder the added burden of seeking trenching partners or paying for the costs of conduit installation, and thus the opportunity to lease government conduit will encourage them to build a fiber network in the community. By maintaining ownership of the conduit, the government generates revenue by leasing those valuable assets out to broadband providers interested in providing fiber service to the community. Dig Smart works for the community and works for the government.

For governments desiring to reap the community benefits of adopting Dig Smart, model legislation is included in Appendix A.

### How Dig Smart Works for Governments in Practice Governments

Governments can use Dig Smart as a source of potential revenue, once the municipality or other governmental authority has installed enough conduit to interest broadband providers in leasing. With a private excavation project, the government typically would pay the costs for materials (the conduit itself), installing the conduit in the excavated trench, and any design variations in a private excavation project required to facilitate conduit installation. For public works projects, the government can install conduit in conjunction with existing construction much less

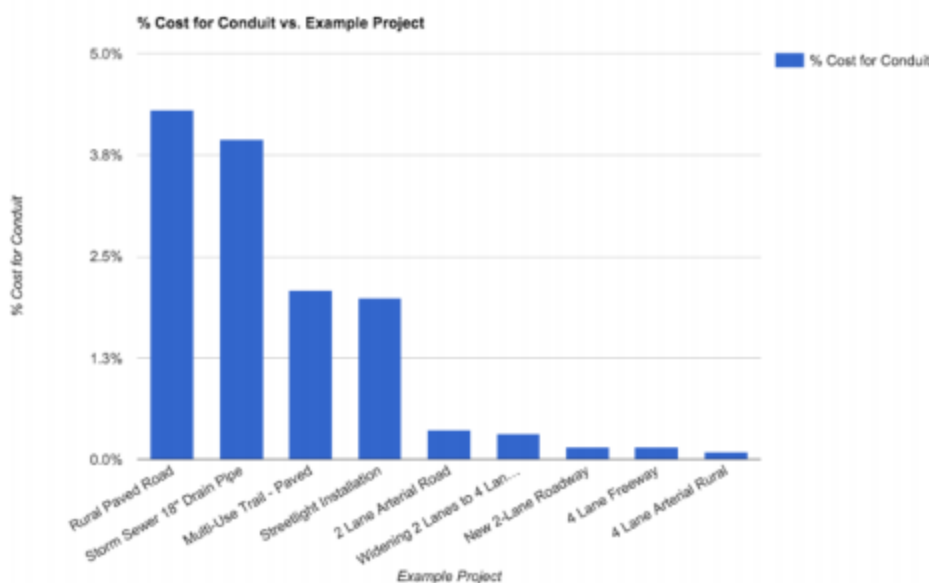


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expensively than would be possible in a separate excavation and installation project. The costs of conduit, including materials and installation, are slight relative to the expenses for digging up and repairing the ground.<sup>22</sup> Sample road and underground construction costs from various cities generally run from \$200,000 per mile for something like a sewer replacement to \$10 million per mile for larger road system construction.

In contrast, the average cost of the conduit itself is around \$10,000 per mile (or around \$1.90 per foot), making it 0.1% to 4.3% of the total cost of any given excavation project.<sup>24</sup>

**Figure 2<sup>25</sup>**



Dig Smart does require the government to pay certain upfront construction costs on top of the actual cost of the conduit itself. Installation will often require additional fees for design changes in trenching—the trenching required for sewer lines, for example, may not be the kind typically used for conduit and accommodating those changes will incur design costs. Other additional costs may include extra labor fees for installation. However, the cost of installation should be considered an investment. Governments can usually install conduit at a discounted rate per linear mile as compared with private utilities.<sup>26</sup> Moreover, after installation, the government will own the conduit and, because it is in the public right-of-way, the government will not owe any licensing fees to any landowner on which the conduit is located. The government would then lease the conduit to a broadband provider and recover the modest costs of installation.

The following example shows how quickly the government would be able to recover its investment. Assume the cost of the conduit itself and extra conduit installation fees (independent of the main excavation costs) is \$25,000 per mile (or \$4.73 per foot).<sup>27</sup> Private service providers typically lease installed conduit for between \$0.65 and \$0.80 per linear foot of conduit per year. With a lease rate of \$0.65 per linear foot of conduit annually, a local agency would more than recover its upfront installation costs after 8 years of leasing (8 x \$0.65 = \$5.20).

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The 8-year period here is a minimal estimate, too, especially if the government manages to secure multiple lessees. Where the government installs conduit with multiple duct banks to accommodate multiple providers, it can recover costs more quickly with adequate demand. The additional revenue could be used for a number of purposes, including covering internal costs for managing the public rights-of-way. Below is an example on calculating a return on investment (“ROI”), assuming a lease to just one broadband service provider. Fiber Installation Cost (per mile) \$25,000 Fiber Lease Rate (per mile per year) \$3,432 (or \$0.65 per foot) 10-Year Income \$34,320 Return-On-Investment (ROI) Example 37%

Fiber Installation Cost (per mile)	\$25,000
Fiber Lease Rate (per mile per year)	\$3,432 (or \$0.65 per foot)
10-Year Income	\$34,320
Return-On-Investment (ROI) Example	37%

To protect its investment in the conduit and discourage re-excavation, a government can also require that new broadband providers use existing conduit to the maximum extent feasible. Of course, the government is unlikely to obtain lessees immediately upon implementing Dig Smart legislation. Broadband providers would want to lease conduit after the community has a critical mass of conduit network already in place, and the actual recovery time of installation costs will depend on when broadband providers lease the government’s assets. Accordingly, governments interested in Dig Smart should enact legislation as soon as possible, because the benefits of Dig Smart begin to accrue as more excavation projects are undertaken. Once Dig Smart is in place, a government can begin building up enough conduit to begin leasing it to generate revenue in excess of costs.

## OTHER WAYS TO ENCOURAGE DIG SMART

States too should be interested in bringing more broadband options to their citizens. States, of course, can implement Dig Smart policies and install conduit when excavating rights-of-way under state jurisdiction. Although states do not control access to local rights-of-way, states can encourage Dig Smart policies at the municipal level in at least two ways.

First, states may adopt resolutions or other legislative policies that encourage municipal enactment of Dig Smart laws.<sup>28</sup> This allows states to signal support for Dig Smart at no cost to the state.

Second, states may consider creating a monetary incentive for municipalities to adopt Dig Smart laws. States could condition grant of certain funds for local governments based on the local government implementing a Dig Smart policy. For instance, state road construction funding could be conditioned on the locality installing conduit that will increase the opportunities in the local community for better advanced communications services.

## OTHER “FLAVORS” OF DIG ONCE

Dig Smart is the gold standard of Dig Once. There are other types of Dig Once that are unlikely to be as effective as Dig Smart but nonetheless encourage broadband deployment while

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reducing the burdens of additional excavations. These other types of Dig Once are described here and compared to the advantages of Dig Smart. The primary other “flavors” of Dig Once policies and laws are: (1) coordination, (2) voluntary joint trenching, and (3) mandatory joint trenching.

**(1) Coordination.**<sup>29</sup> Coordination requirements help inform interested excavators, such as broadband providers, when underground or road construction is going to happen so that they can be prepared to install equipment in conjunction with scheduled excavations. Coordination is facilitated by governments establishing a “coordination database” and requiring underground facilities owners to update the coordination database with information on upcoming scheduled excavation. Interested excavators may then use this database for coordinating underground facilities installation with existing planned construction.

A coordination policy requires governments to expend resources on organizing and posting information from different entities. While a coordination policy would help some enterprising service providers in identifying excavation areas where they could potentially coordinate installation of their equipment, the marginal benefits of this are low, and it in no way guarantees that conduit will actually be installed. Coordination databases rely on the existence of other interested entities to effectuate infrastructure deployment. Where no service provider is already building in the market and therefore monitoring the database, opportunities to install conduit when there is planned excavation in the public rights-of-way may be missed. Moreover, this policy by itself does not allow the government to control for quality or for competition maximizing conduit that has room to accommodate more than one fiber cable. Finally, with coordination, any installed conduit will be the property of the private entity, rather than the government. The government, therefore, has little direct opportunity to earn a return from implementing a coordination policy.

**(2) Voluntary Joint Trenching.** Voluntary joint trenching requires entities that have received approval to excavate in public rights-of-way to formulate construction plans, and schedule construction, with other service providers that are interested in installing or maintaining equipment in public rights-of-way.<sup>30</sup>

Voluntary joint trenching (in contrast with mandatory joint trenching, discussed below) is termed “voluntary” because the policy relies on other excavators volunteering to jointly trench for the Dig Once benefits to be realized. (The initial excavator is required, however, to formulate construction plans with and schedule construction with other service providers that want to jointly trench.) The disadvantage of this approach to Dig Once is that if no broadband provider comes forward within the allotted time after the lead excavator notifies of an excavation, then no conduit would be installed. Interested service providers could miss the window for joint trenching and end up having to re-excavate. Indeed, a provider that does not yet exist by definition cannot take advantage of this opportunity. Voluntary joint trenching has many of the same drawbacks as a coordination policy. Ultimately, this policy would encourage more efficient excavations (and additional deployment of broadband network infrastructure) but not guarantee it. Although governments should not depend on voluntary joint trenching as a reliable means of achieving Dig Once objectives, if companies wish to jointly trench, governments should not prevent them from negotiating a private solution to excavation and conduit installation. Industry-driven initiatives in joint trenching can work in tandem with Dig Smart laws to minimize excavation and maximize installation of conduit.



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**(3) Mandatory Joint Trenching.** Mandatory joint trenching requires all potential excavators to install their infrastructure in the same trench at the same time. All parties then split the costs of the excavation.<sup>31</sup> A mandatory joint trenching law would require that all excavators determine a “lead.” That lead excavator would then approach the city to receive a “joint trench” permit on behalf of all the service providers installing underground infrastructure in the excavation. Mandatory joint trenching makes installation of conduit more certain than with voluntary joint trenching, as broadband providers must install conduit where it does not already exist as part of the joint trenching. Some municipalities with this type of joint trenching also have an enforcement clause that prevents re-excavation within a certain amount of time.<sup>32</sup> But these restrictions on re-excavation (often called moratoria) can delay broadband deployment and discourage competition if an interested broadband service provider misses the window. If broadband providers miss the period for joint excavation, they could be barred from re-excavating for years. This delay would work against the goals of Dig Once, which include deploying more broadband for consumers. In addition, other types of non-broadband excavators could be shut out from installing important equipment for their services. Ultimately, these unintended consequences could hurt various service providers and local residents.

**CONCLUSION**

High-speed broadband Internet access brings greater prosperity and convenience to communities. Local and state government policy therefore should facilitate more competition in the broadband market. Dig Smart is a win-win policy for states and municipalities, as residents benefit from broadband competition (bringing faster service at lower prices) and less excavation disruptions. Unlike some other government initiatives, Dig Smart has the potential for government to recoup funds spent on public works through leasing of conduit. Dig Smart is the best way for communities to accelerate deployment of the fastest, most advanced broadband and should be seriously considered by any city or state that wants to bring better services to its residents.

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**APPENDIX A: MODEL LEGISLATION**

This appendix includes model legislation for (1) municipalities or states to implement Dig Smart policies and (2) states to facilitate Dig Smart policies at the municipal level. The model legislation here also includes definitions and sensible exceptions for Dig Smart requirements (e.g., in cases of emergency repair).

These provisions may be adapted for municipal or state use. In place of “city” or “state” the model legislation uses Government Entity. These provisions are models to serve as a starting point for cities and states interested in obtaining the benefits of Dig Smart; the provisions may be altered as appropriate or necessary to conform to specific community preferences and existing laws.

***Definitions***

Section XX.XX (Define Based on Local Needs)

As used in this chapter creating “Dig Smart” requirements, the following definitions apply:

- (a) “Communications Infrastructure” means conduit installed in public rights of way that can accommodate at least two separate fiber optic cables.
- (b) “Developer” means any person or private entity that proposes to subdivide, divides or causes to be divided real property into a subdivision.
- (c) “Emergency” means an Unexpected Occurrence requiring prompt action to prevent or mitigate loss of, or damage to, life, health, property, or essential public services.
- (d) “Excavate” or “Excavation” means any work or action in which earth, rock, pavement, or other material in the ground or underwater in a public right-of-way is moved, removed, or otherwise displaced by means of tools, equipment, or explosives in any of the following ways: grading, trenching, digging, ditching, drilling, tunneling, scraping, cable or pipe plowing and driving, or any other means.
- (e) “Excavator” means any person, private entity, or Government Entity that engages in Excavation or has applied for a permit from Government Entity to Excavate.
- (f) “Operator” means any person, private entity, or Government Entity that owns, operates, or maintains Underground Facilities.
- (g) “Public Works Project” means any Excavation project undertaken by Government Entity.
- (h) “Underground Facilities” means underground or submerged conductor, pipe, structure, conduit, or equipment used or installed for use in providing electric or communications service or in carrying, providing, or gathering gas, oil or oil products, sewage, 14 wastewater, storm drainage, or water or other liquids. All Underground Facilities shall be considered to extend up to the connection to the customer’s facilities.

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- (i) “Unexpected Occurrence” is an unexpected event, including without limitation fires, floods, earthquakes, or other soil or geologic movements, riots, accidents, and damage to Underground Facilities requiring repair.

***Exceptions to Dig Smart Requirements***

Section XX.XX

- (a) Emergency. Operators, Excavators, and Developers are not required to comply with “Dig Smart” requirements in cases of Excavation because of an Emergency.
- (b) De Minimis Excavation. Notwithstanding anything else set forth in this chapter, “Dig Smart” requirements involving Excavation only apply when the contiguous length of the proposed Excavation will be at least 900 linear feet in the public right-of way.

***Mandatory Installation of Conduit***

Section XX.XX

- (a) Installation of Conduit in Public Rights-of-Way in Public Works Projects. Whenever an agency or department of the Government Entity undertakes a Public Works Project involving the planning, construction, reconstruction, or repaving of a public right-of-way, such project shall include, to the maximum extent practicable and feasible, installation of underground Communications Infrastructure by the Government Entity.
- (b) Installation of Conduit in Public Rights-of-Way in Other Excavations.
  - (1) To the maximum extent practicable and feasible, the Government Entity shall condition all Excavation permits on the installation of underground Communications Infrastructure on behalf of the Government Entity.
  - (2) The Government Entity shall provide at the Government Entity’s cost the necessary materials (but not any equipment used for installation) for the permittee to install underground Communications Infrastructure in the public right-of-way.
  - (3) The Government Entity shall bear all reasonable and documented design and construction costs associated solely with inclusion of the Government Entity’s Communications Infrastructure in the Excavation.
  - (4) Title to the installed Communications Infrastructure provided by the Government Entity shall vest in the Government Entity upon installation without any further action of the Excavator or the Government Entity.

***State Facilitation of Local Dig Smart***

Section XX.X

To the extent practicable, the Department of XX shall encourage and assist local units of government to adopt and implement “Dig Smart” policies for construction or other improvements

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to county state-aid highways, municipal state-aid roads, and any other rights-of-way under the local unit of government's jurisdiction. "Dig Smart" refers to policies that require the government entity to install conduit in conjunction with excavation along public rights-of-way.

- 1 Federal Communications Commission, Fact Sheet: FCC Chairman: More Competition Needed in a High-Speed Broadband Market 1 (2014), [https://apps.fcc.gov/edocs\\_public/attachmatch/DOC-329160A1.pdf](https://apps.fcc.gov/edocs_public/attachmatch/DOC-329160A1.pdf).
- 2 Allan Holmes and Chris Zubak-Skees, *U.S. Internet Users Pay More and Have Fewer Choices than Europeans*, Center for Public Integrity (Apr. 1, 2015), <http://www.publicintegrity.org/2015/04/01/16998/us-internet-users-pay-more-and-have-fewer-choices-europeans>.
- 3 *Id.*
- 4 *Id.*
- 5 Jon Brodtkin, *One Big Reason We Lack Internet Competition: Starting an ISP is Really Hard*, ARS Technica (Apr. 6, 2014), <http://arstechnica.com/business/2014/04/one-big-reason-we-lack-internet-competition-starting-an-isp-is-really-hard/>. The FCC found that installation costs were the largest cost element to deploying broadband via fiber. U.S. Dept. of Transp., Fed. Highway Admin., Office of Policy and Governmental Affairs, Executive Order: Accelerating Broadband Infrastructure Development 16 (2012), <http://www.fhwa.dot.gov/policy/otps/workplan.pdf>. The percentage cost of conduit as compared to the excavation project itself is only 0.1% to 4.3%. Gigabit Communities: Technical Strategies for Facilitating Public or Private Broadband Construction in Your Community, <http://www.ctcnet.us/wp-content/uploads/2014/01/GigabitCommunities.pdf>
- 6 Eshoo, Walden Introduce "Dig Once" Broadband Deployment Bill, Eshoo.House.Gov (Oct. 22, 2015), <https://eshoo.house.gov/issues/economy/eshoo-walden-introduce-Dig-Oncebroadband-deployment-bill/>.
- 7 See U.S. Gov't Accountability Off., GAO-12-168R, Broadband Conduit Deployment 5 (2012), <http://www.gao.gov/assets/600/591928.pdf>; San Francisco, Cal., Ordinance 220-14 (Oct. 6, 2014) (codified in various provisions of the S.F. Public Works Code), <http://www.sfbos.org/ftp/uploadedfiles/bdsupvrs/ordinances14/o0220-14.pdf>. In addition, the Utah Department of Transportation estimated cost savings of 15.5% per mile when conduit and fiber are installed at the time a road is being constructed versus installing the conduit and fiber at a later time. U.S. Gov't Accountability Off., GAO-12-168R, Broadband Conduit Deployment 5 (2012), <http://www.gao.gov/assets/600/591928.pdf>. It is worth noting that the cost savings here are largely due to no longer having to re-excavate; laying conduit is enough to reap the benefits of the cost savings, as stringing the fiber generally does not require re-excavation. *Id.*
- 8 *Id.*
- 9 U.S. Gov't Accountability Off., GAO-12-168R, Broadband Conduit Deployment 5 (2012), <http://www.gao.gov/assets/600/591928.pdf>.
- 10 See, e.g., Cal. Gov't Code § 4216.2(a)(1); Ga. Code Ann. § 25-9-6(a); 220 Ill. Comp. Stat. 50/4; Kan. Stat. Ann. § 66-1804(a); Mo. Rev. Stat. § 319.026; Or. Admin. R. § 952-001-0050; Tex. Util. Code Ann. § 251.151(a).
- 11 CommScope, Broadband Applications and Construction Manual 8.2 (2014) [http://www.commscope.com/Docs/Fiber\\_Optics\\_Const\\_Manual\\_CO-107147.pdf](http://www.commscope.com/Docs/Fiber_Optics_Const_Manual_CO-107147.pdf) ("high consideration" is given to locates marks when determining excavation damages).
- 12 U.S. Gov't Accountability Off., GAO-12-168R, Broadband Conduit Deployment (2012), <http://www.gao.gov/assets/600/591928.pdf>.
- 13 See, e.g., Mass. Gen. Laws ch. 81, § 21 ("No state highway shall be dug up ... without written permit of the department ..."); 605 Ill. Comp. Stat. 5/9-113 ("No ... equipment of any public utility company, municipal corporation or other public or private corporation, association, or person shall be located ... under or along any highway, or upon any township or district road, without first obtaining written consent of the appropriate highway authority...").

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- <sup>14</sup> California Environmental Quality Act, Cal. Pub. Res. Code § 21000 et seq. This statute, and others like it, requires an in-depth environmental impact report for all activities for which private entities receive a government-issued permit.
- <sup>15</sup> U.S. Gov't Accountability Off., GAO-12-168R, Broadband Conduit Deployment 6 (2012), <http://www.gao.gov/assets/600/591928.pdf>.
- <sup>16</sup> *Id.* at 5.
- <sup>17</sup> Cf. Edison Electric Institute, Out of Sight, Out of Mind 2012: An Updated Study on the Undergrounding of Overhead Power Lines (2012), <http://www.eei.org/issuesandpolicy/electricreliability/undergrounding/documents/undergroundreport.pdf>
- <sup>18</sup> *Id.* at 25.
- <sup>19</sup> Edison Electric Institute, Out of Sight, Out of Mind 2012: An Updated Study on the Undergrounding of Overhead Power Lines 5 (2012), <http://www.eei.org/issuesandpolicy/electricreliability/undergrounding/documents/undergroundreport.pdf>
- <sup>20</sup> See Jason Koebler, *The 21 Laws States Use to Crush Broadband Competition*, Motherboard (Jan. 14, 2015), <http://motherboard.vice.com/read/the-21-laws-states-use-to-crushbroadband-competition>.
- <sup>21</sup> Dig Once ideas—including Dig Smart—tend to be politically popular, supported by Democrats and Republicans. The federal Dig Once House bill, sponsored by Rep. Eshoo (D-Calif.) and Rep. Walden (R-Or.), received praise from both sides of the aisle, along with endorsements from FCC Commissioners Rosenworcel (a Democrat) and Pai (a Republican). See Moriah, Mensah, “Dig Once” Could Lead to Smarter Broadband, R Street (Jan. 14, 2016), <http://www.rstreet.org/2016/01/14/dig-once-could-lead-to-smarter-broadband/>. See also Amir Nasr, *Widely Supported ‘Dig Once’ Bill Faces Procedural Hurdles*, Morning Consult (Nov. 18, 2015), <http://morningconsult.com/2015/11/widely-supported-dig-oncebill-faces-procedural-hurdles/>; Alisha Green, *Bipartisan “Dig Once” Legislation Provides Hope for Broadband Expansion*, Government Technology (Nov. 2, 2015), <http://www.govtech.com/network/Bipartisan-Dig-Once-Legislation-Provides-Hope-forBroadband-Expansion.html> (“At least one issue on Capitol Hill brings together Republicans, Democrats, the tech industry, and the White House: legislation to expand high-speed Internet access nationwide, especially for rural, tribal, and other remote areas.”).
- <sup>22</sup> U.S. Dept. of Transp., Fed. Highway Admin., Office of Policy and Governmental Affairs, Executive Order: Accelerating Broadband Infrastructure Development 16 (2012), <http://www.fhwa.dot.gov/policy/otps/workplan.pdf> (“[T]he largest cost element for deploying broadband via fiber optic cable is the cost of placement, such as burying the fiber in the ground, rather than the cost of the fiber itself.”).
- <sup>23</sup> Data from discussions with BHC Rhodes, civil engineering firm: <http://ibhc.com/>
- <sup>24</sup> *Gigabit Community: Technical Strategies for Facilitating Public or Private Broadband Construction in Your Community*, <http://www.ctcnet.us/blog/gigabit-communities-how-localgovernments-can-facilitate-private-investment-in-new-gigabit-networks/>.
- <sup>25</sup> Data from discussions with BHC Rhodes, civil engineering firm: <http://ibhc.com/>
- <sup>26</sup> Data from discussions with BHC Rhodes, civil engineering firm: <http://ibhc.com/>
- <sup>27</sup> This is not meant to be an exact number on how much installation of conduit would cost, but rather, an approximation, with an illustration on how such a policy could be profitable over time.
- <sup>28</sup> See Minn. Stat. § 237.90; Fla. Stat. § 364.0135.
- <sup>29</sup> See, e.g., Santa Monica, Cal., Mun. Code, § 7.06.300(b); Minn. Stat. § 161.462.
- <sup>30</sup> See, e.g., 30-092 Vt. Code R. § 8091; Ocala, Florida, Mun. Code, § 58.136.
- <sup>31</sup> See, e.g., Los Angeles Department of Public Works, Joint Trench Utility Permit Guidelines (2015), <http://dpw.lacounty.gov/general/forms/download/2175.pdf>.
- <sup>32</sup> See Houston, Texas, Mun. Code, § 40-145.



■ APPENDIX II: DETAILED CELLULAR COVERAGE MAPS

## Appendix II - Detailed Cellular Coverage Maps

Figure II-1: AT&T Published Coverage

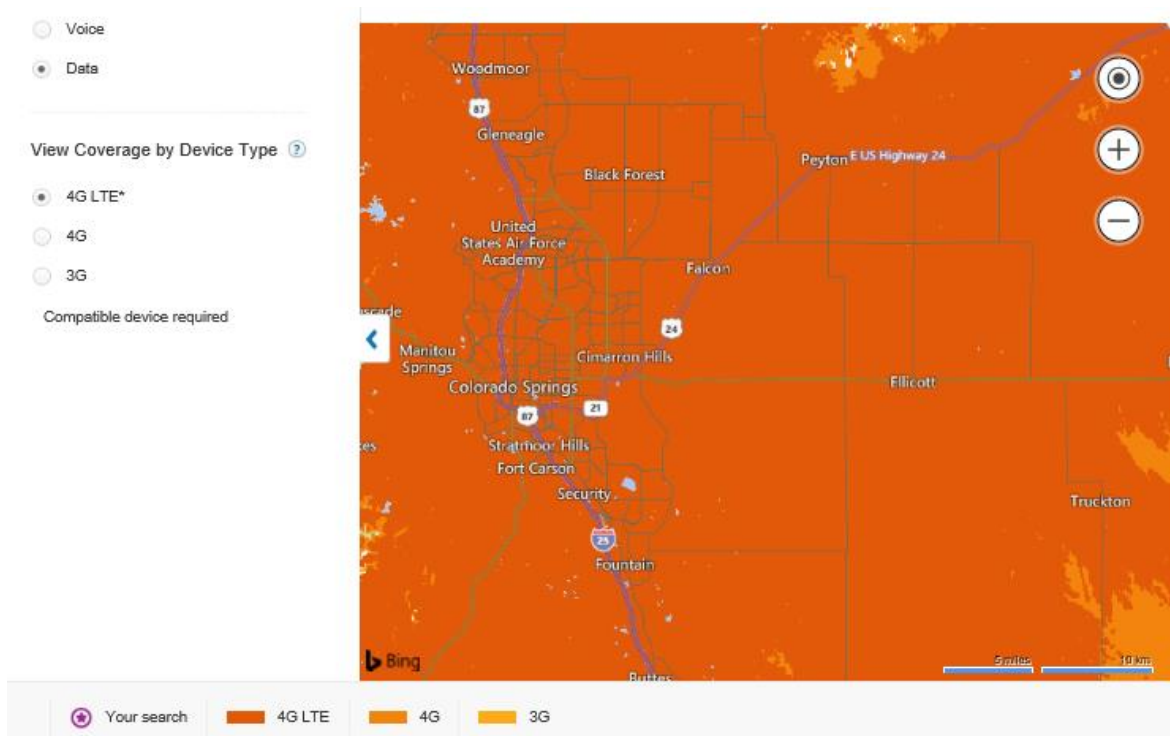
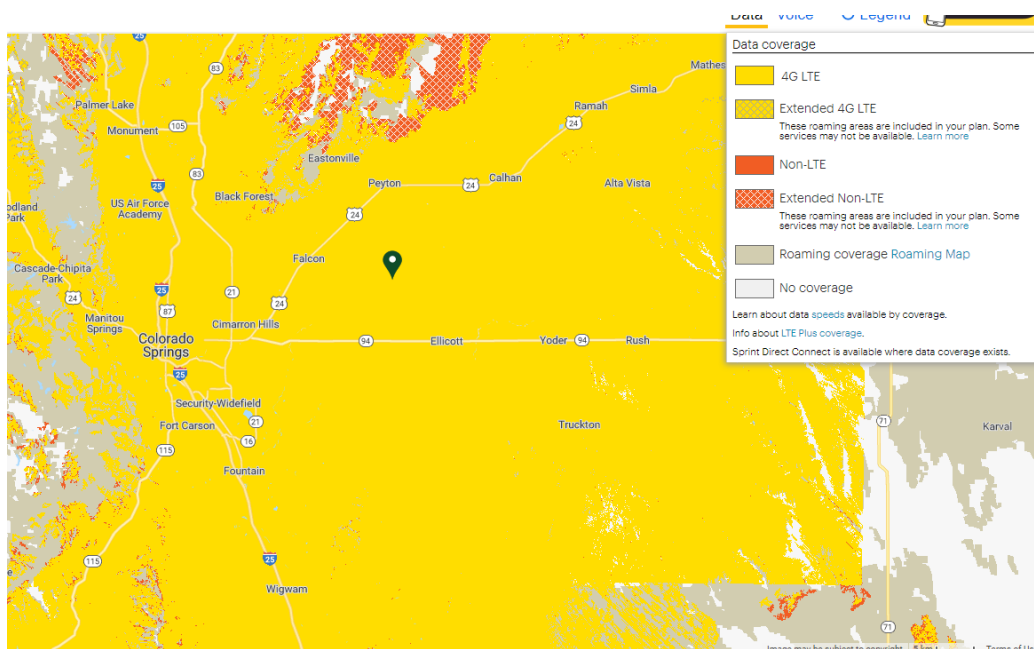


Figure II-2: Sprint Published Coverage



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Figure II-3: T-Mobile Published Coverage

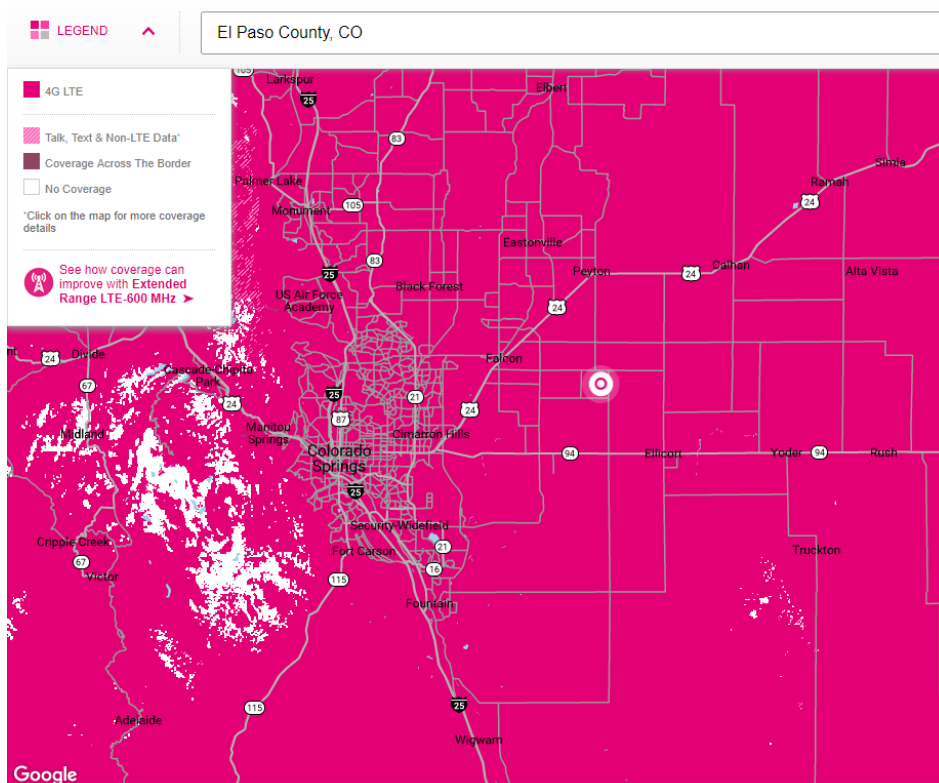
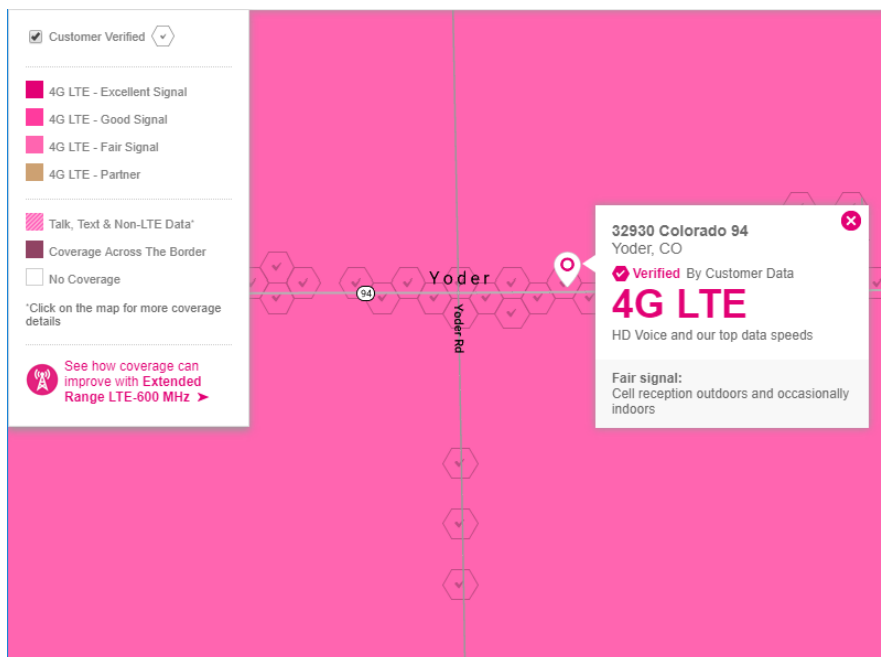
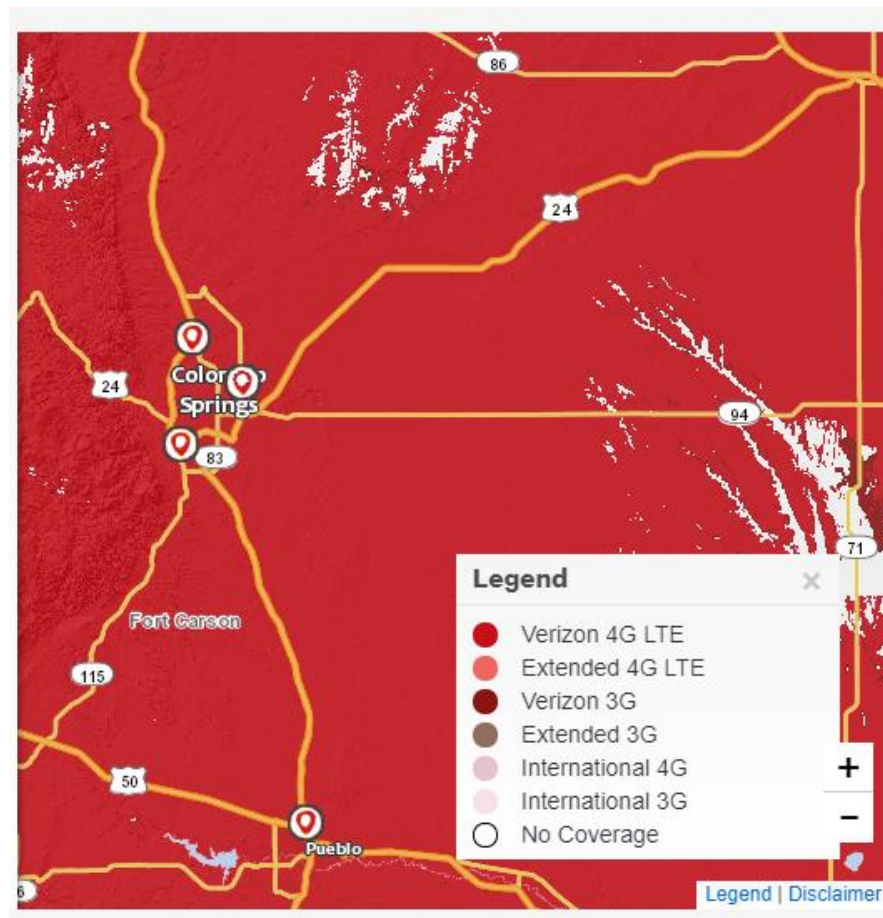


Figure II-4: T-Mobile Yoder Intersection Coverage Detail



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Figure II-5: Verizon Published Coverage



■ APPENDIX II: DETAILED CELLULAR COVERAGE MAPS

Figure II-7: Zip Code 80132 OpenSignal AT&T Coverage Map

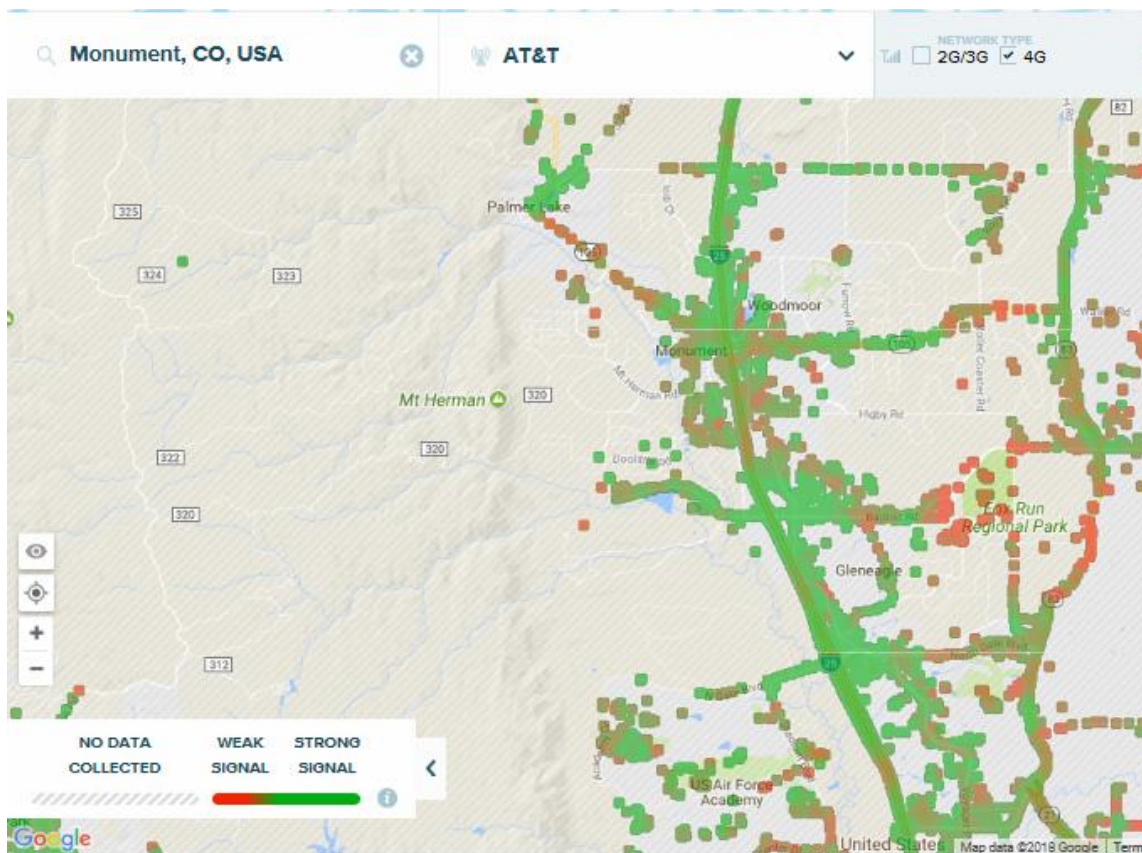
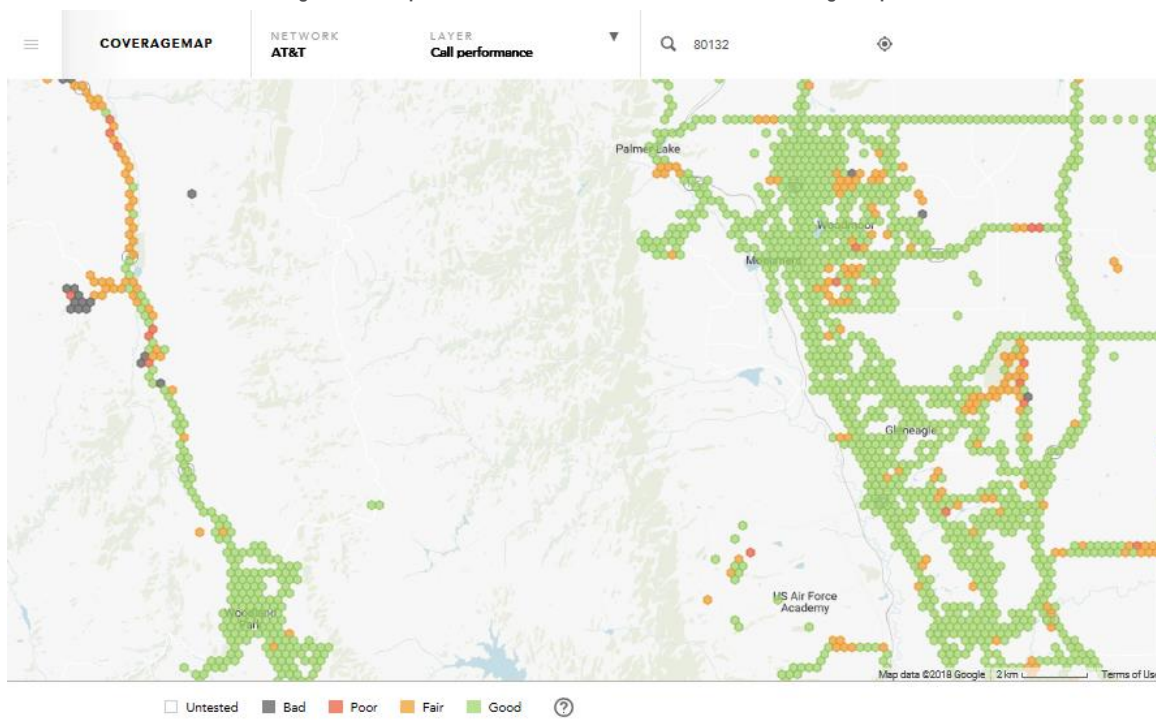


Figure II-6: Zip Code 80132 AT&T RootMetrics AT&T Coverage Map





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Figure II-8: Zip Code 80808 OpenSignal AT&T Coverage Map

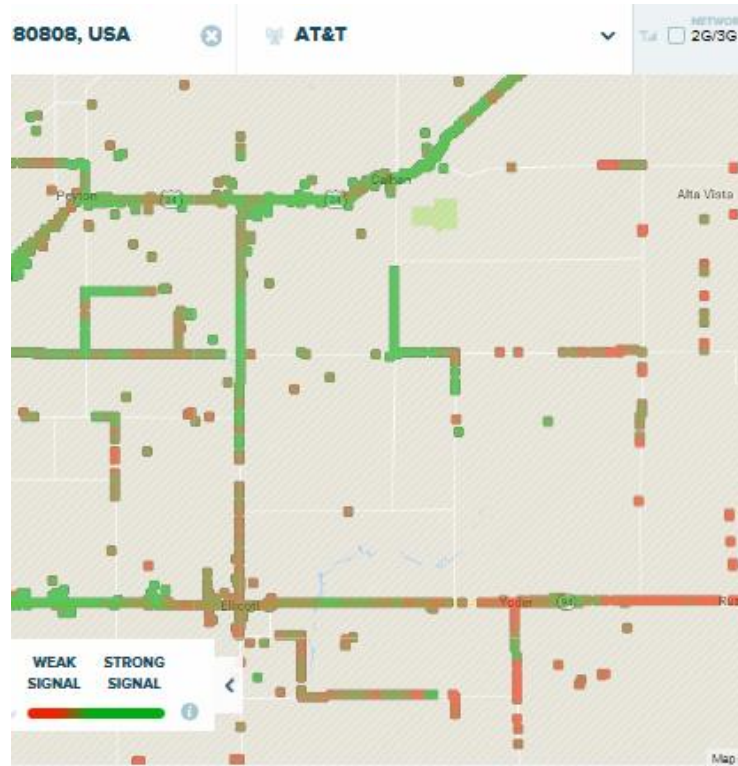
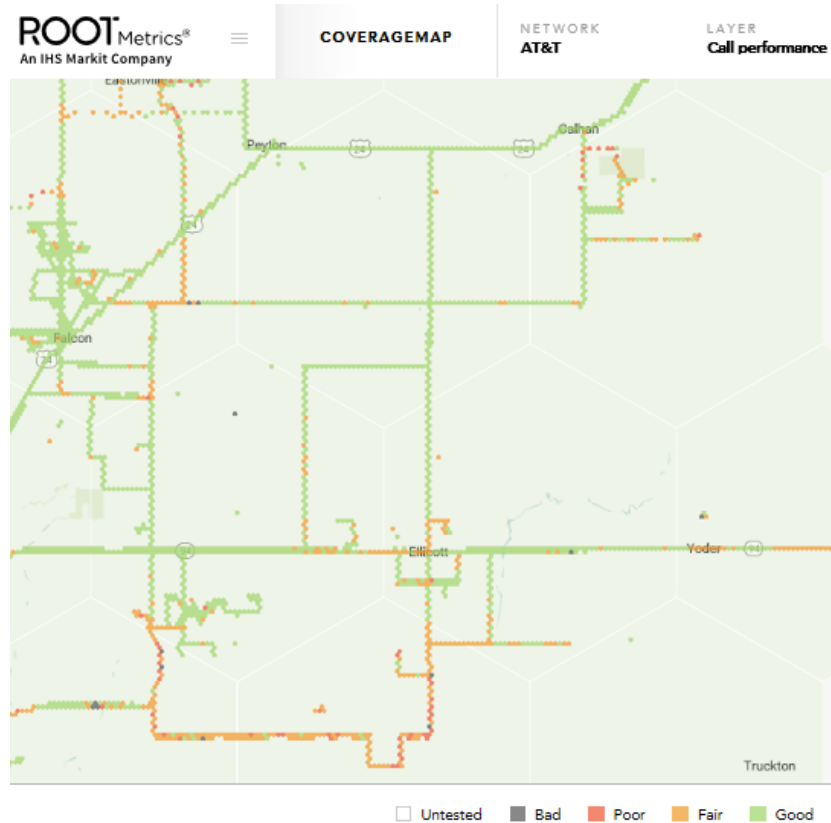


Figure II-9: Zip Code 80808 RootMetrics AT&T Coverage Map





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Figure II-10: Zip Code 80817 OpenSignal AT&T Coverage Map

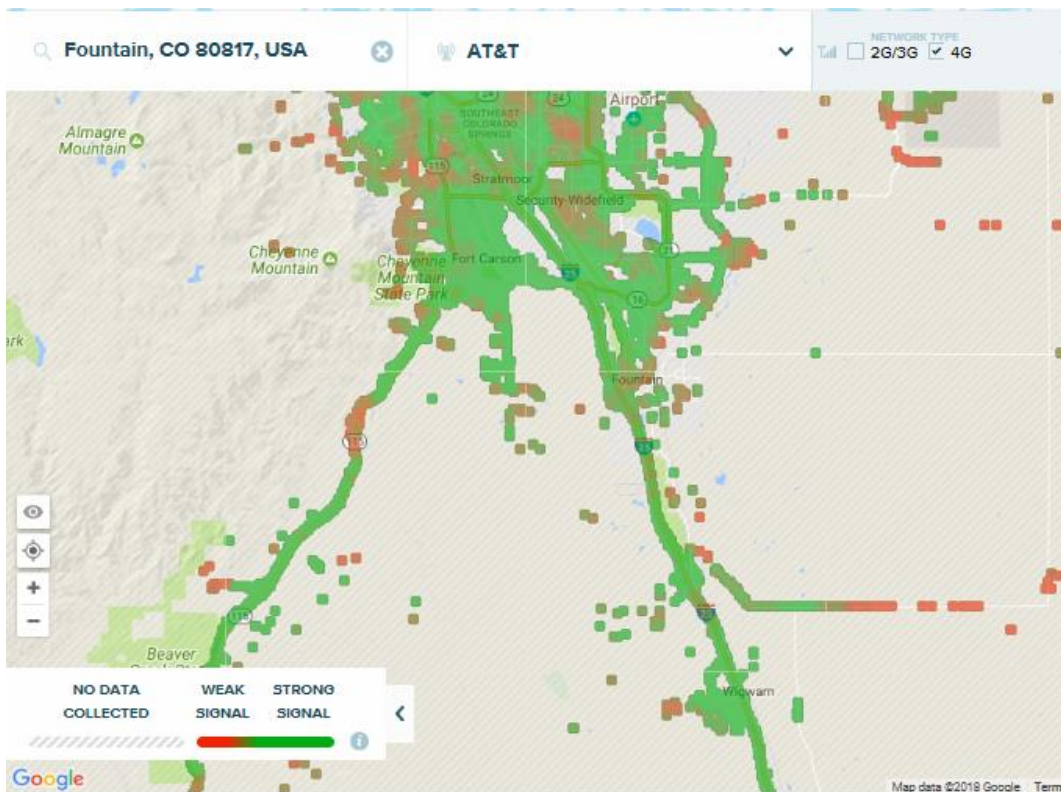
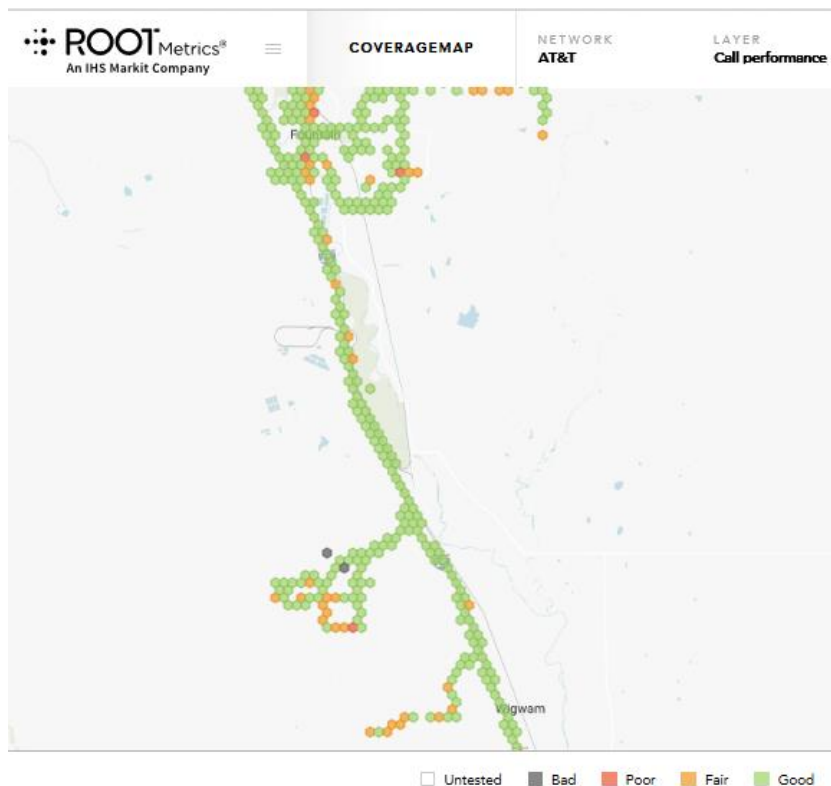


Figure II-11: Zip Code 80817 RootMetrics AT&T Coverage Map



■ APPENDIX II: DETAILED CELLULAR COVERAGE MAPS

Figure II-12: Zip Code 80829 OpenSignal AT&T Coverage Map

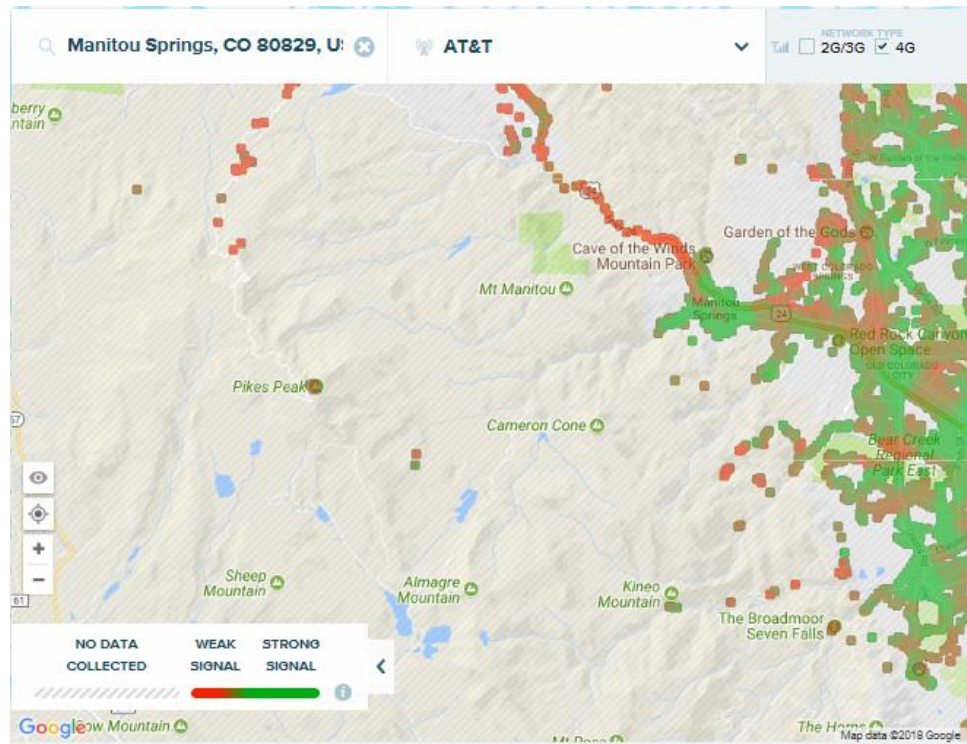
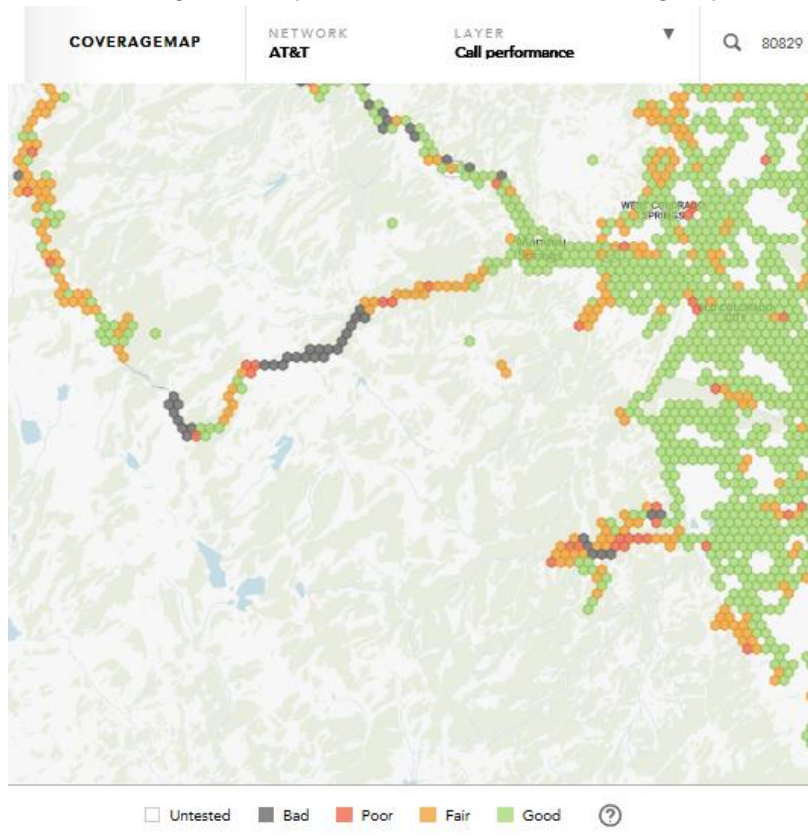


Figure II-13: Zip Code 80829 RootMetrics AT&T Coverage Map



■ APPENDIX II: DETAILED CELLULAR COVERAGE MAPS

Figure II-14: Zip Code 80831 OpenSignal AT&T Coverage Map

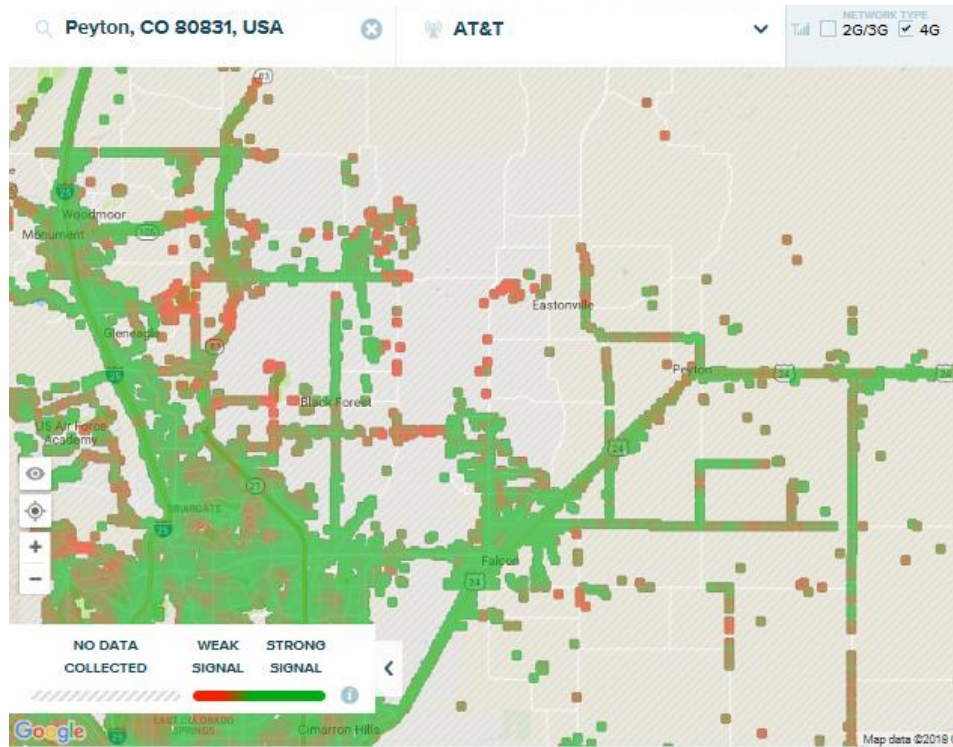
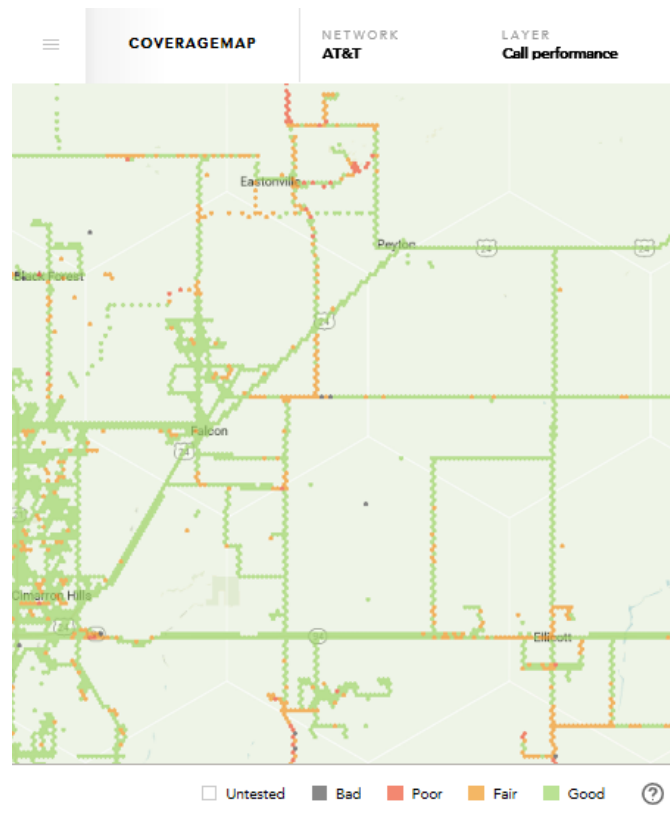


Figure II-15: Zip Code 80831 RootMetrics AT&T Coverage Map





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Figure II-16: Zip Code 80864 OpenSignal AT&T Coverage Map

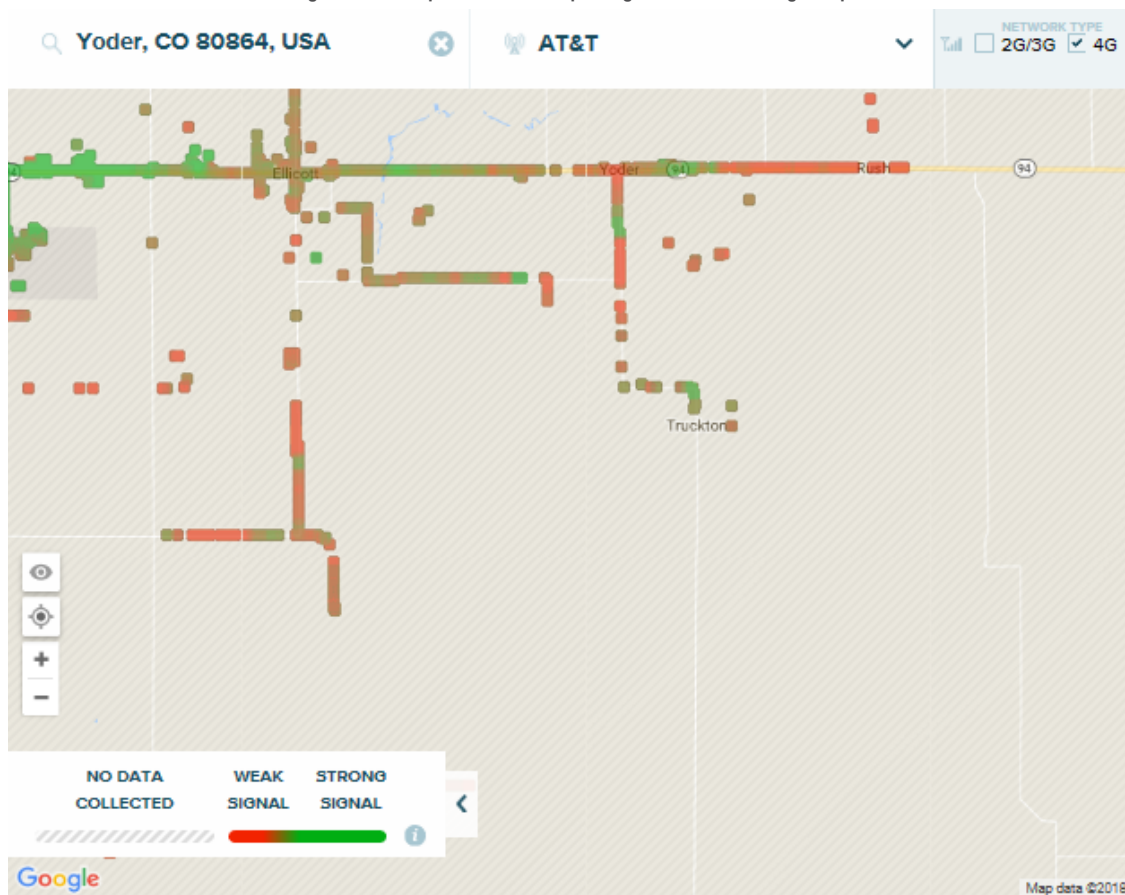
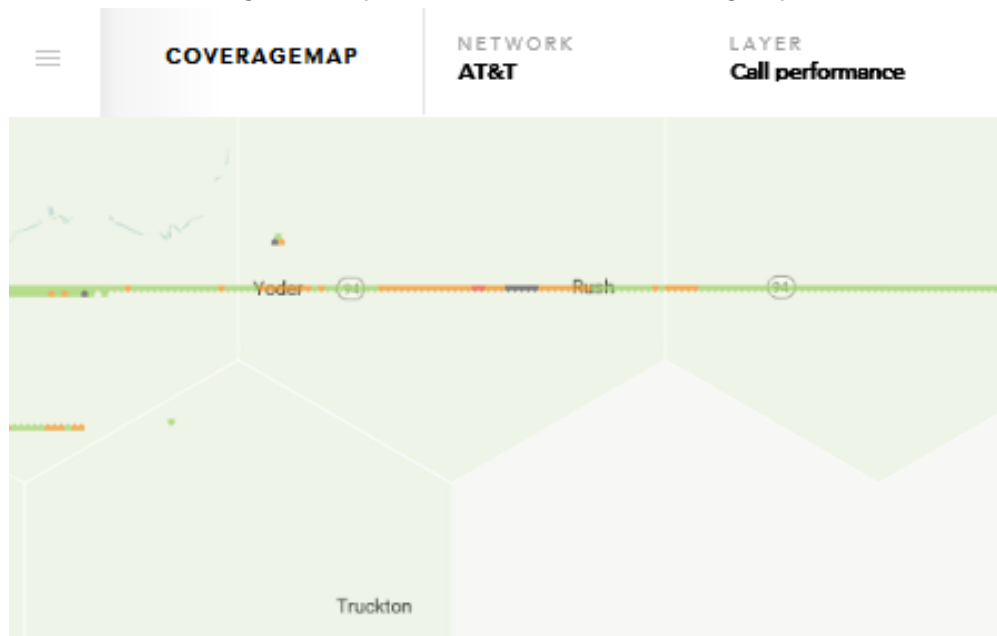


Figure II-17: Zip Code 80864 RootMetrics AT&T Coverage Map



■ APPENDIX II: DETAILED CELLULAR COVERAGE MAPS

Figure II-18: Zip Code 80908 OpenSignal AT&T Coverage Map

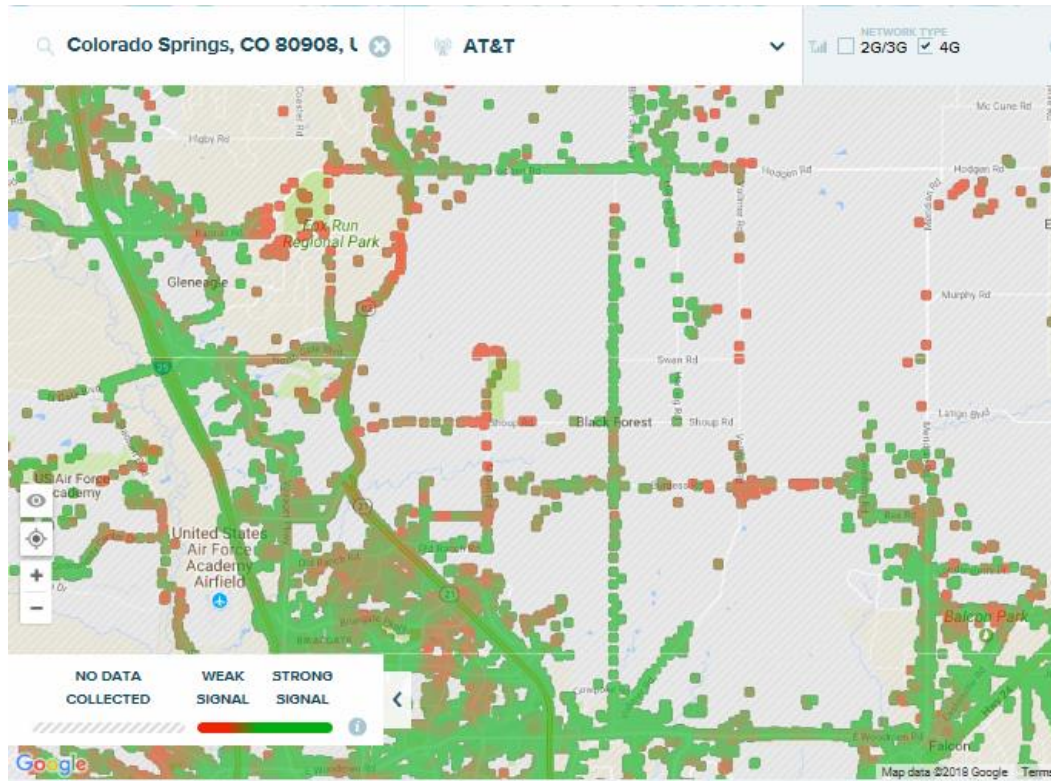
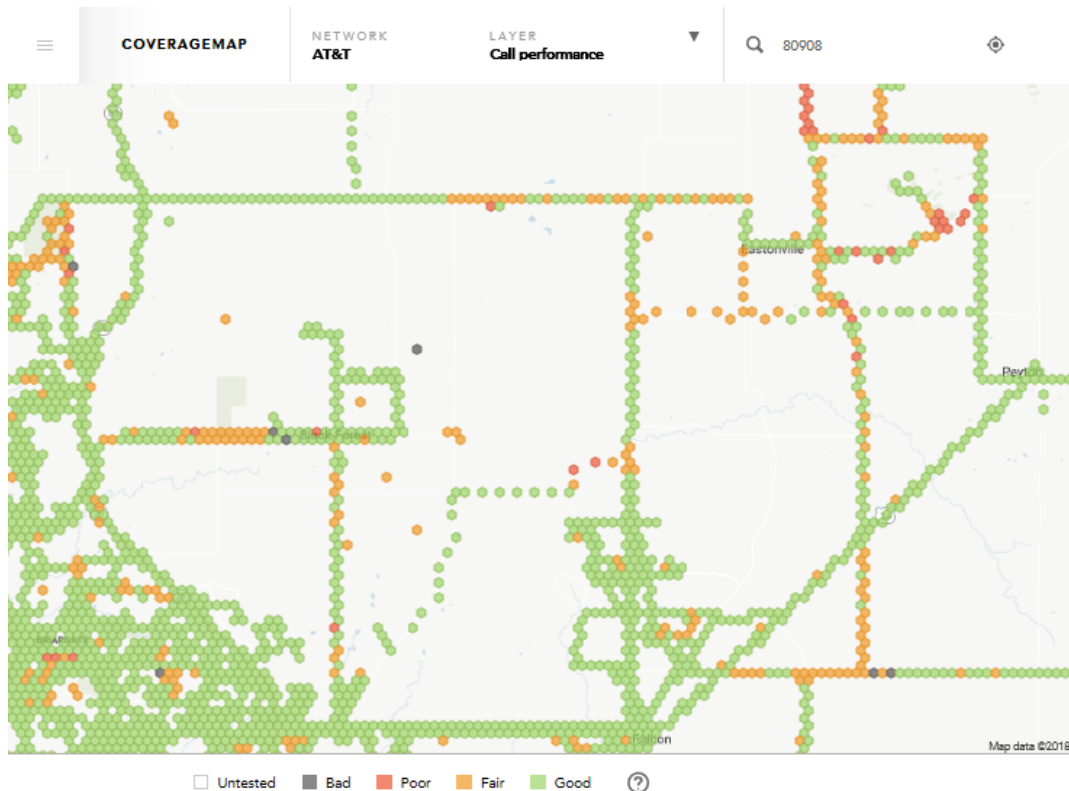


Figure II-19: Zip Code 80908 RootMetrics AT&T Coverage Map





■ APPENDIX II: DETAILED CELLULAR COVERAGE MAPS

Figure II-20: Zip Code 80926 OpenSignal AT&T Coverage Map

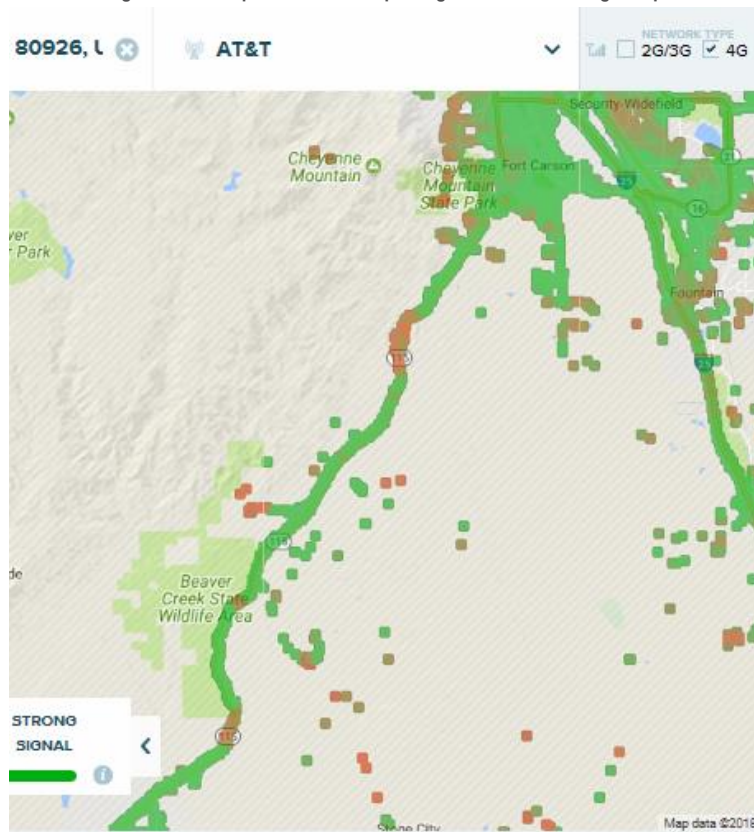
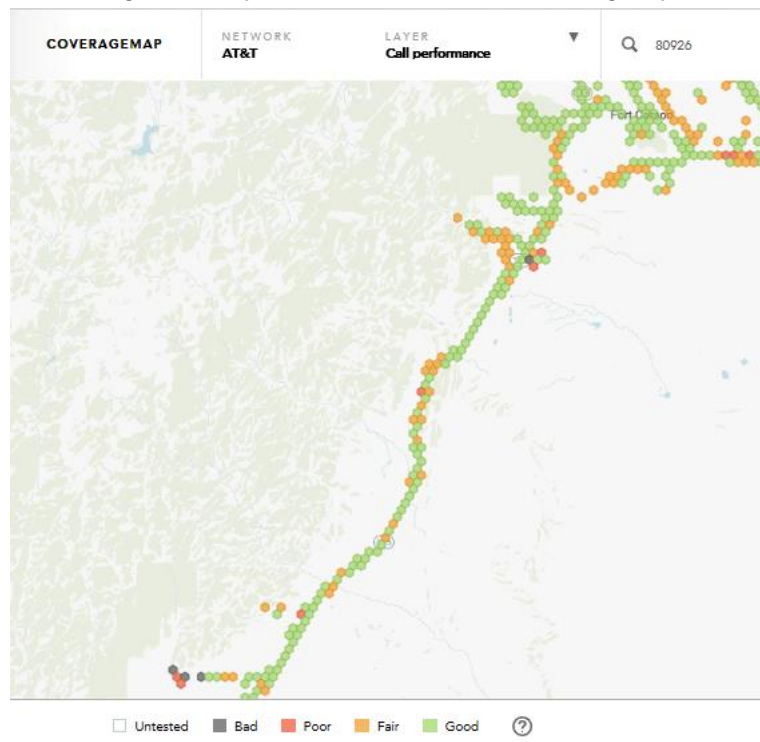


Figure II-21: Zip Code 80926 RootMetrics AT&T Coverage Map



■ APPENDIX II: DETAILED CELLULAR COVERAGE MAPS

Figure II-23: Zip Code 80132 OpenSignal Verizon Coverage Map

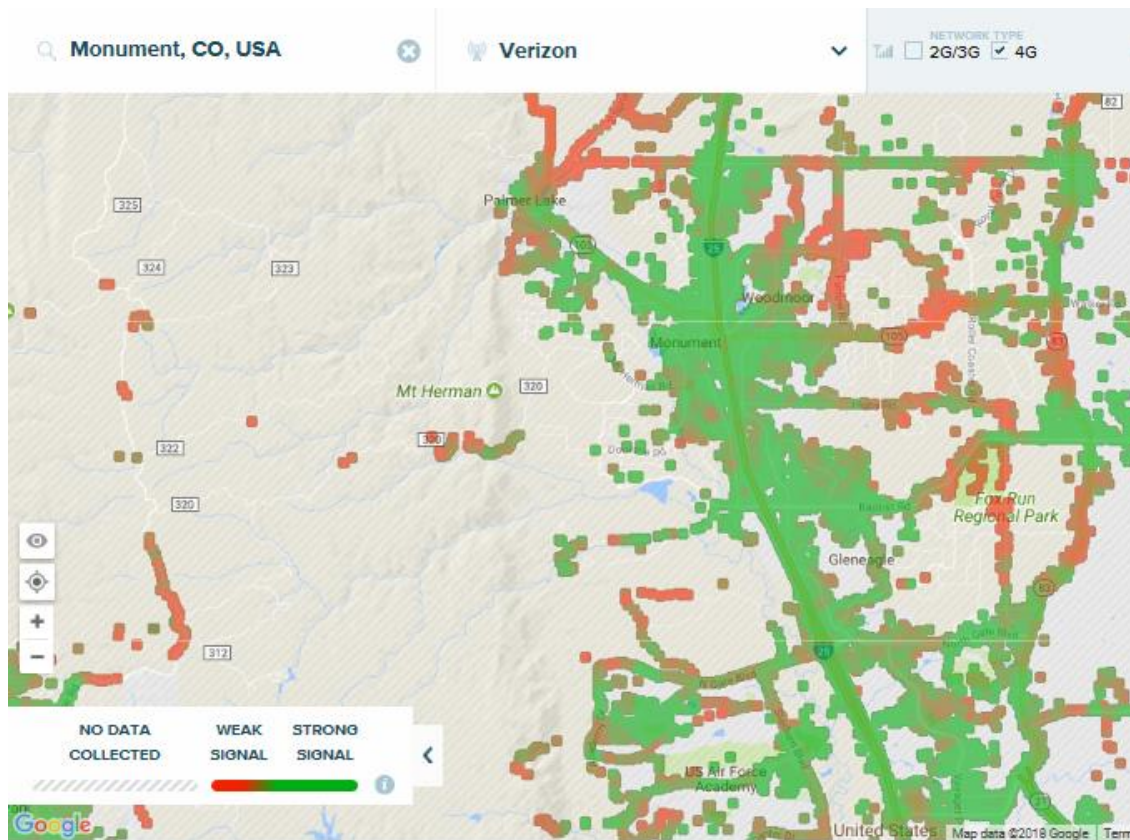
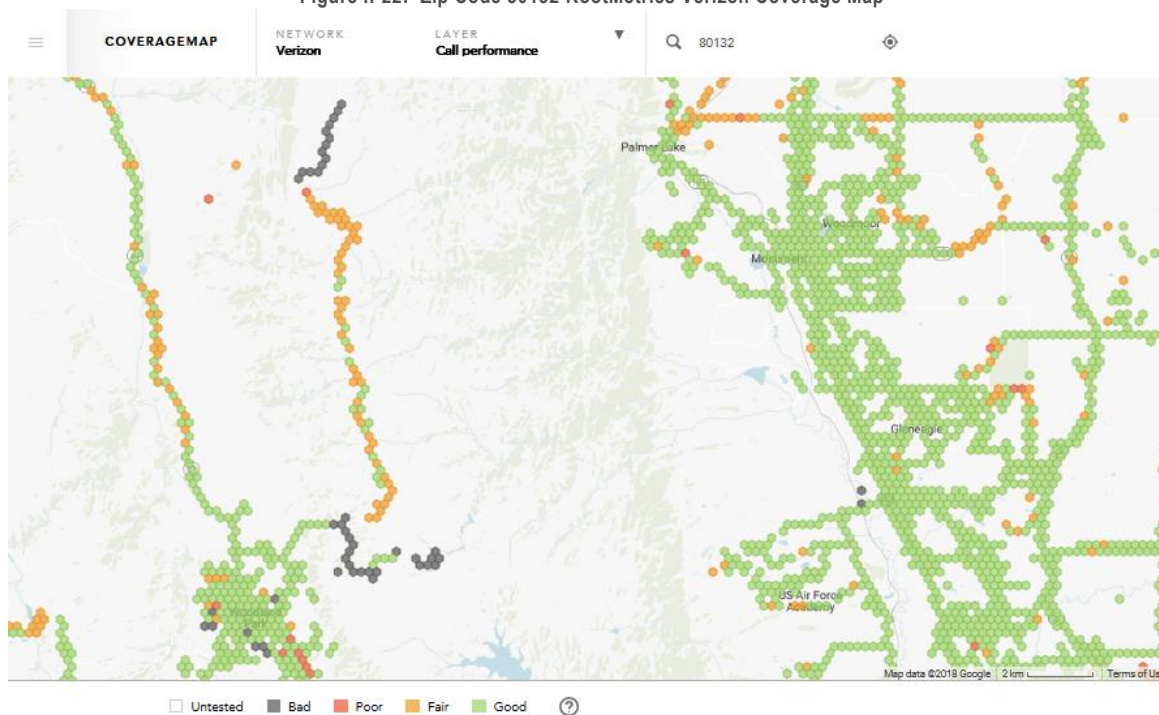


Figure II-22: Zip Code 80132 RootMetrics Verizon Coverage Map



■ APPENDIX II: DETAILED CELLULAR COVERAGE MAPS

Figure II-24: Zip Code 80808 OpenSignal Verizon Coverage Map

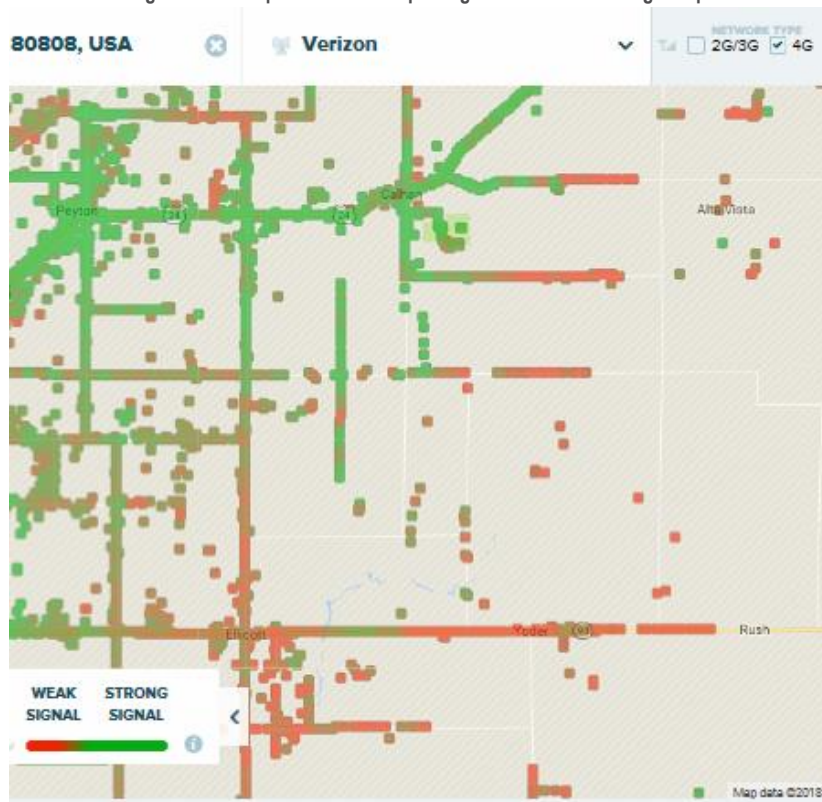
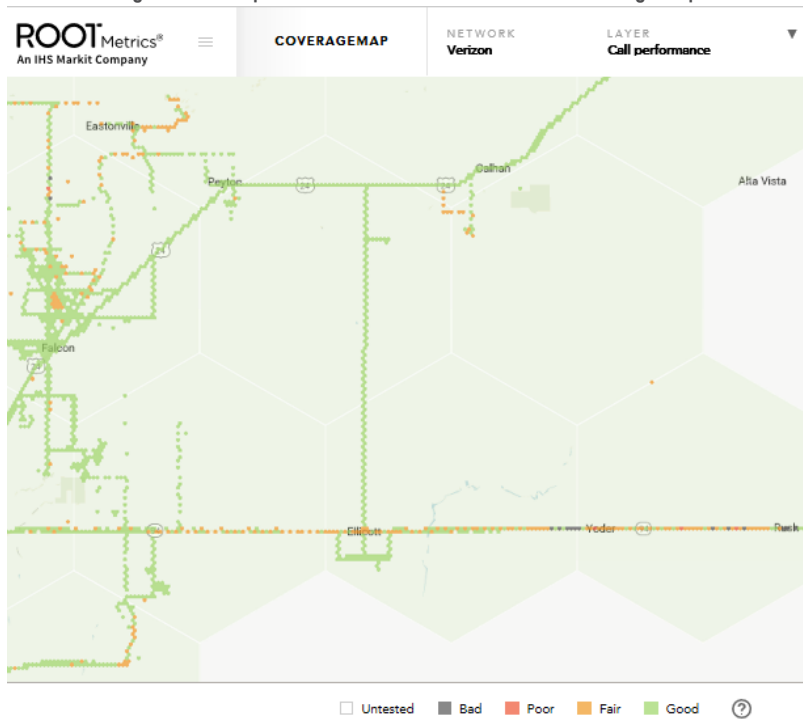


Figure II-25: Zip Code 80808 RootMetrics Verizon Coverage Map





■ APPENDIX II: DETAILED CELLULAR COVERAGE MAPS

Figure II-26: Zip Code 80817 OpenSignal Verizon Coverage Map

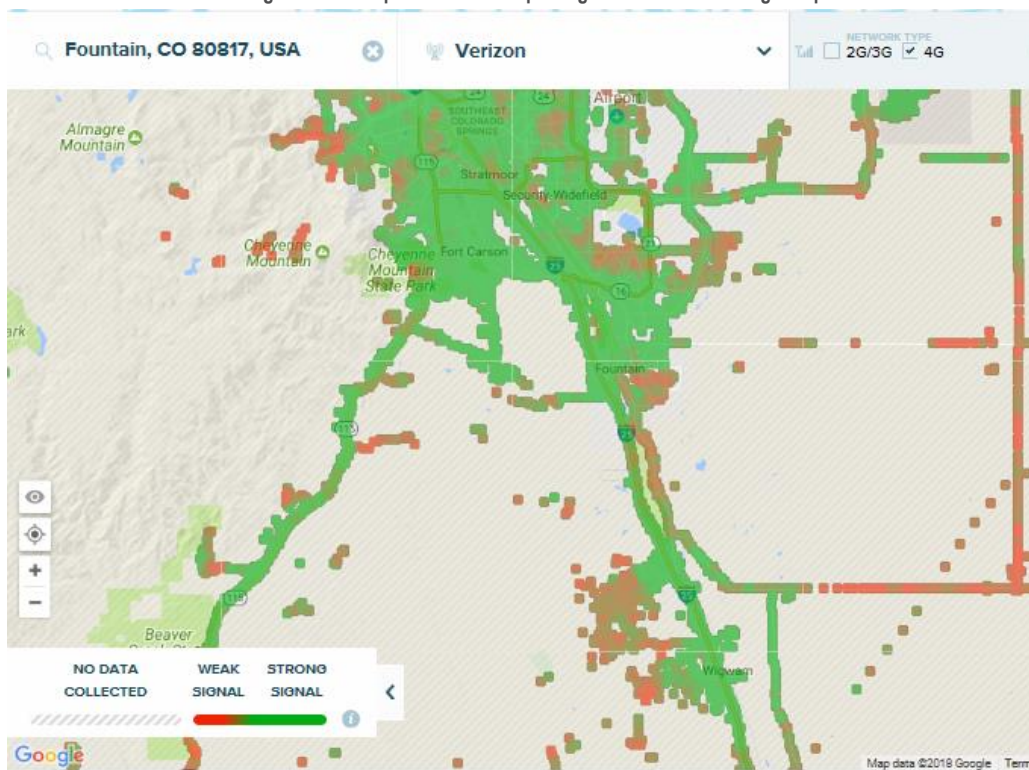


Figure II-27: Zip Code 80817 RootMetrics Verizon Coverage Map



■ APPENDIX II: DETAILED CELLULAR COVERAGE MAPS

Figure II-28: Zip Code 80829 OpenSignal Verizon Coverage Map

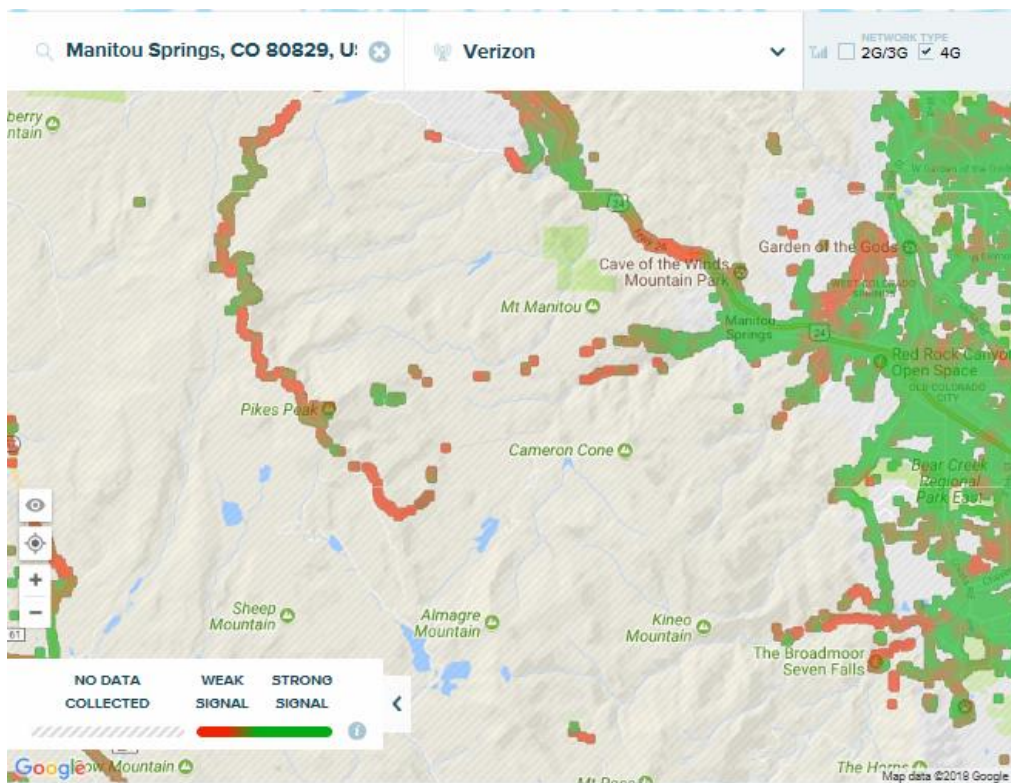
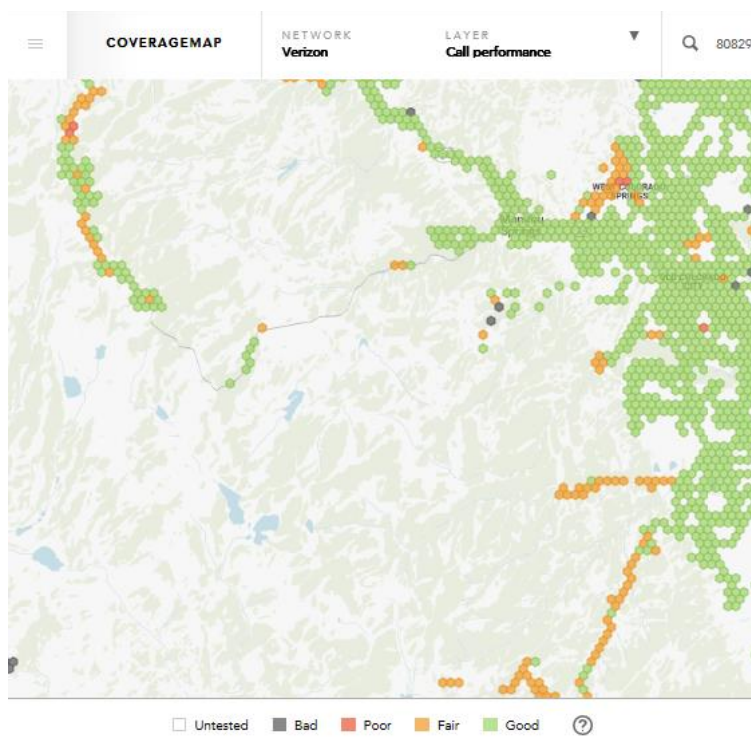


Figure II-29: Zip Code 80829 RootMetrics Verizon Coverage Map





■ APPENDIX II: DETAILED CELLULAR COVERAGE MAPS

Figure II-30: Zip Code 80831 OpenSignal Verizon Coverage Map

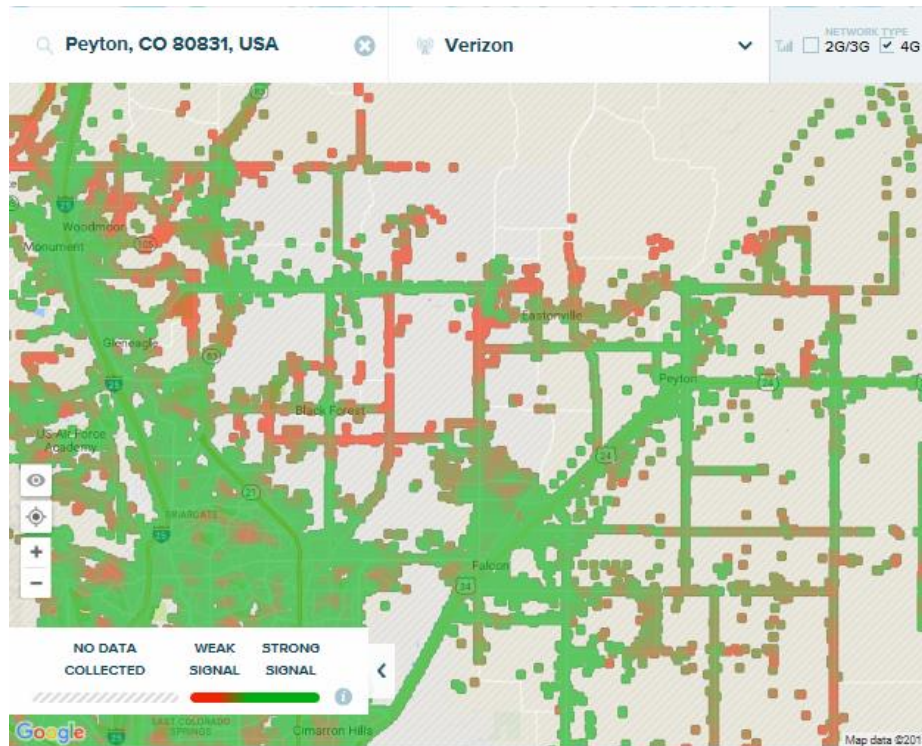
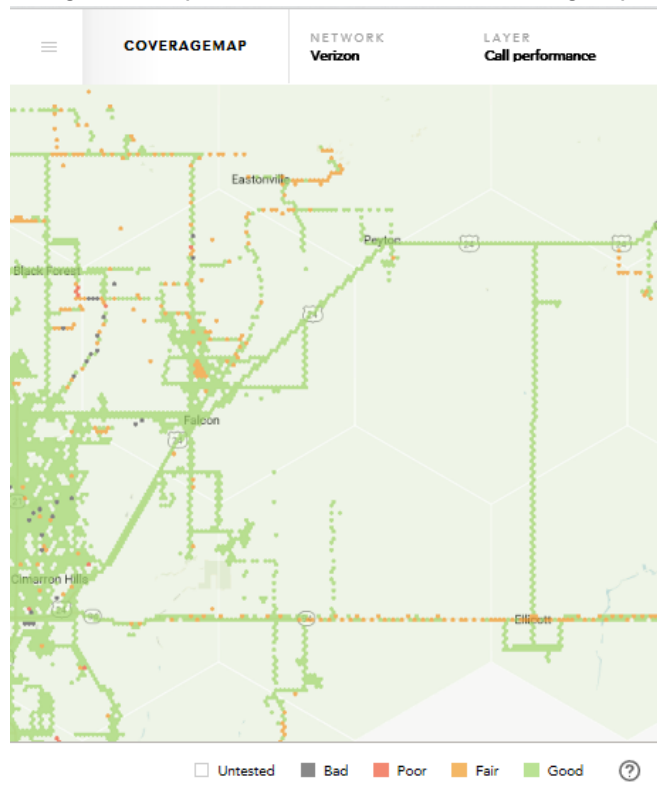


Figure II-31: Zip Code 80831 RootMetrics Verizon Coverage Map



■ APPENDIX II: DETAILED CELLULAR COVERAGE MAPS

Figure II-32: Zip Code 80864 OpenSignal Verizon Coverage Map

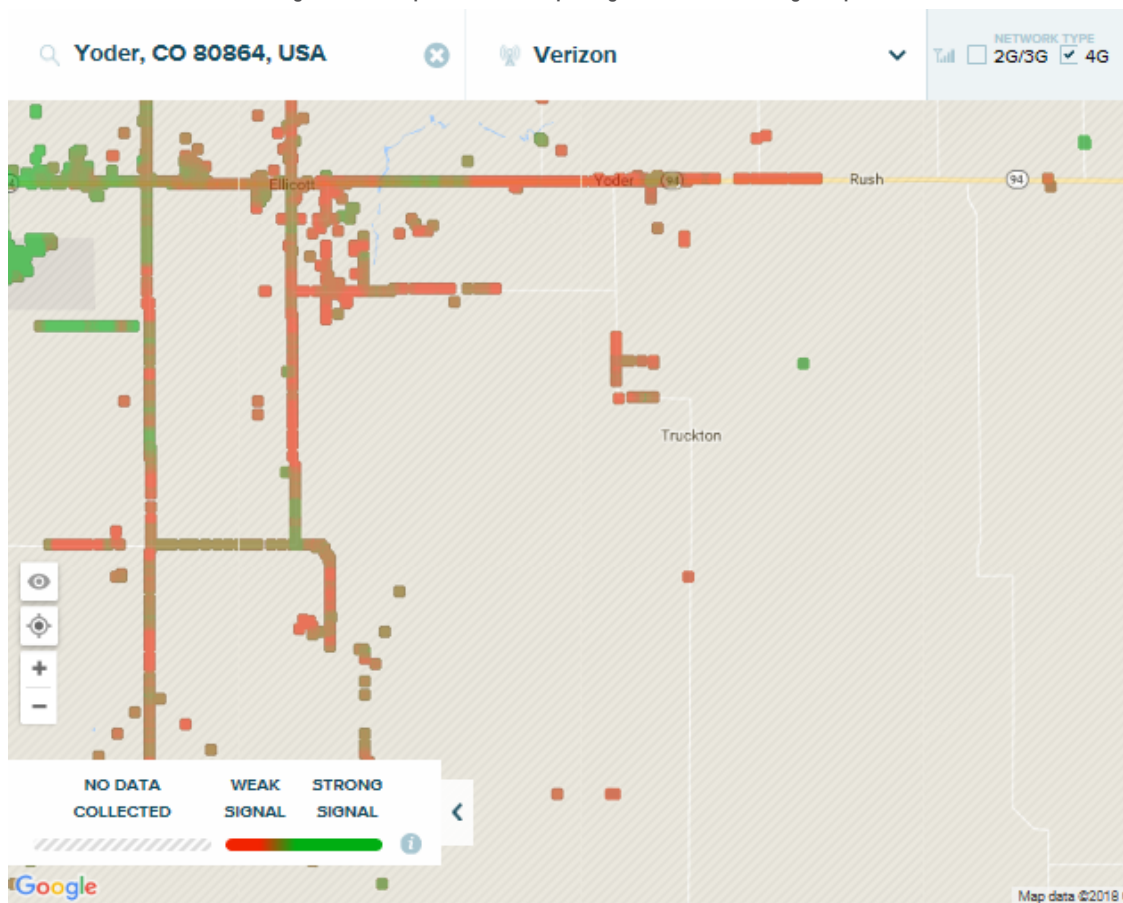
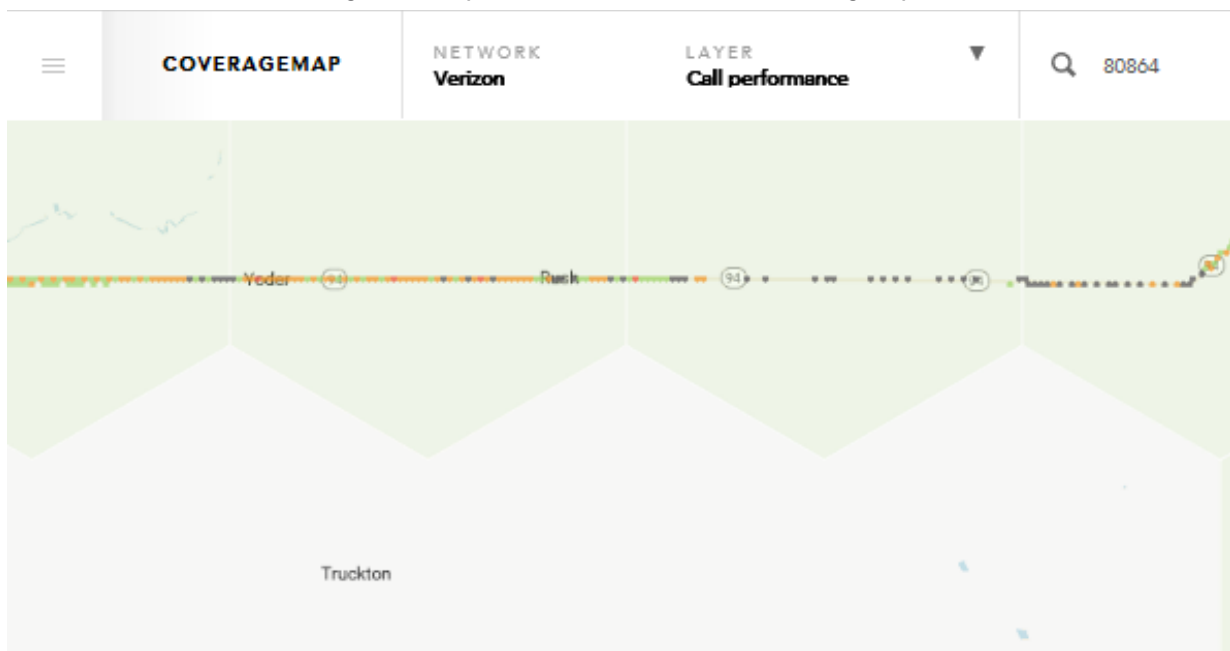


Figure II-33: Zip Code 80864 RootMetrics Verizon Coverage Map



■ APPENDIX II: DETAILED CELLULAR COVERAGE MAPS

Figure II-34: Zip Code 80908 OpenSignal Verizon Coverage Map

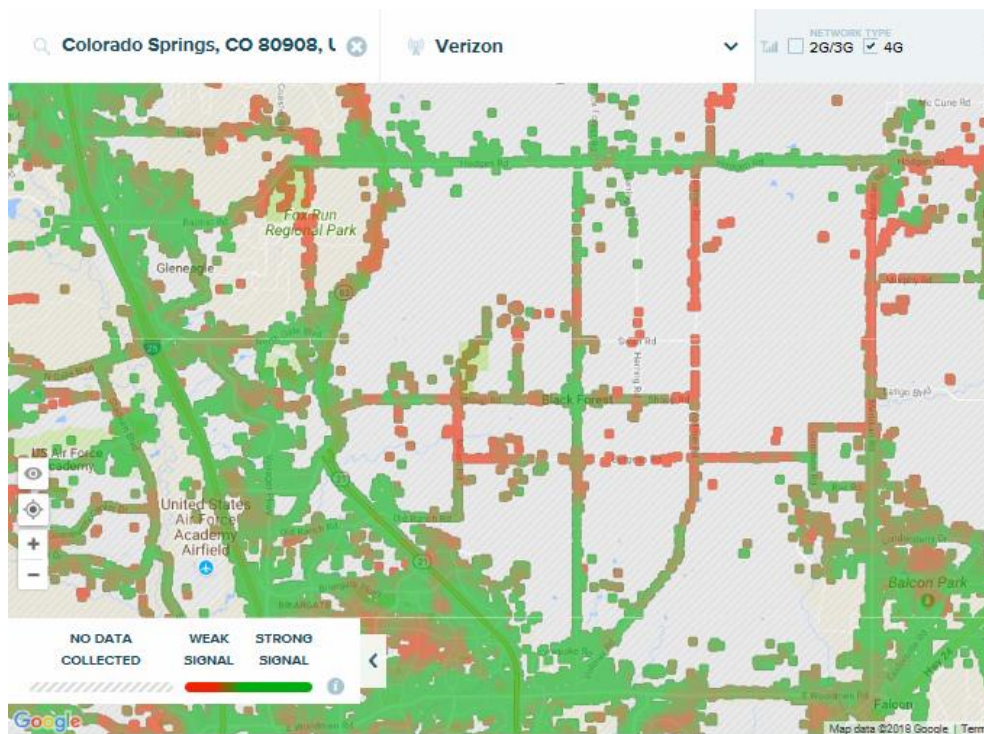
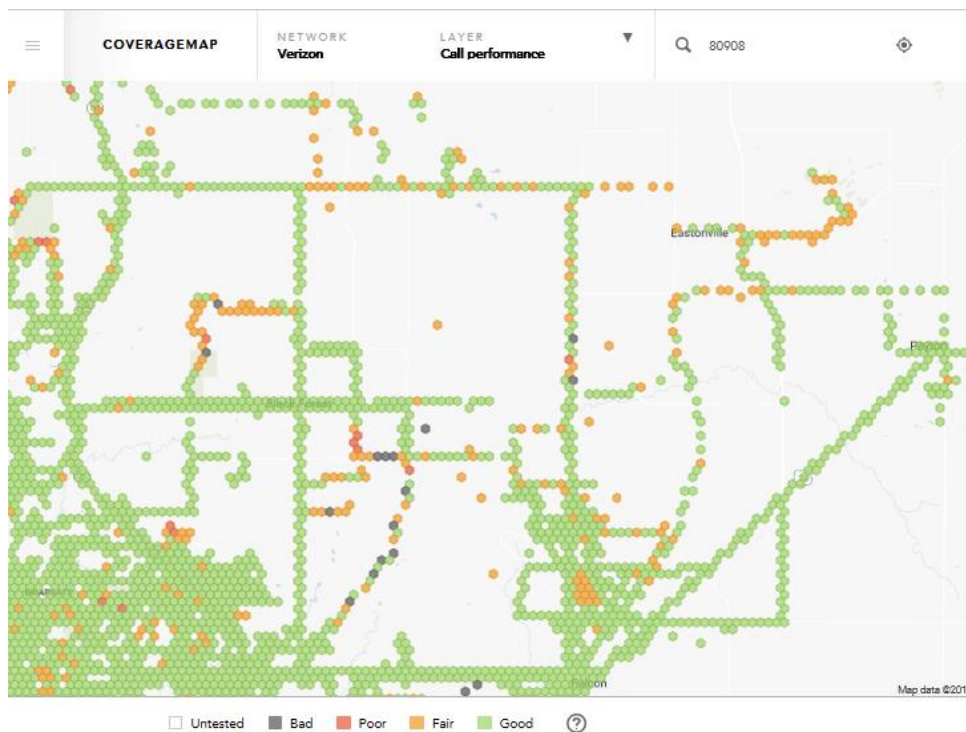


Figure II-35: Zip Code 80908 RootMetrics Verizon Coverage Map





■ APPENDIX II: DETAILED CELLULAR COVERAGE MAPS

Figure II-36: Zip Code 80926 OpenSignal Verizon Coverage Map

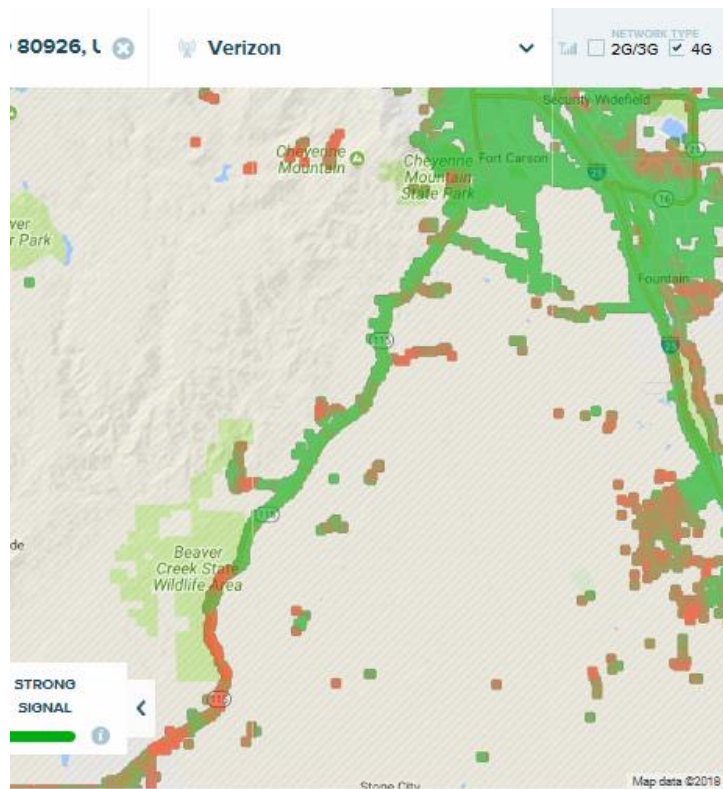
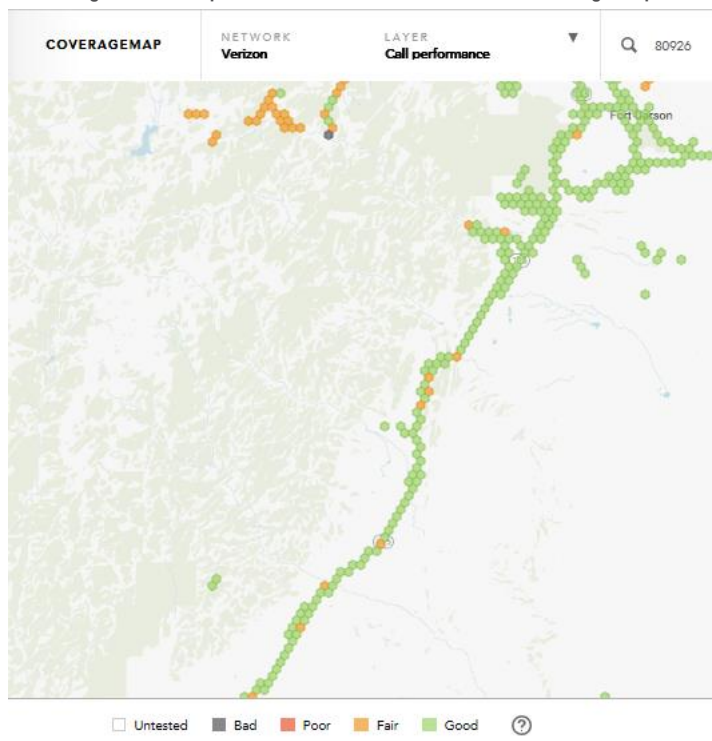


Figure II-37: Zip Code 80926 RootMetrics Verizon Coverage Map



■ APPENDIX II: DETAILED CELLULAR COVERAGE MAPS

Figure II-38: Zip Code 80132 OpenSignal T-Mobile Coverage Map

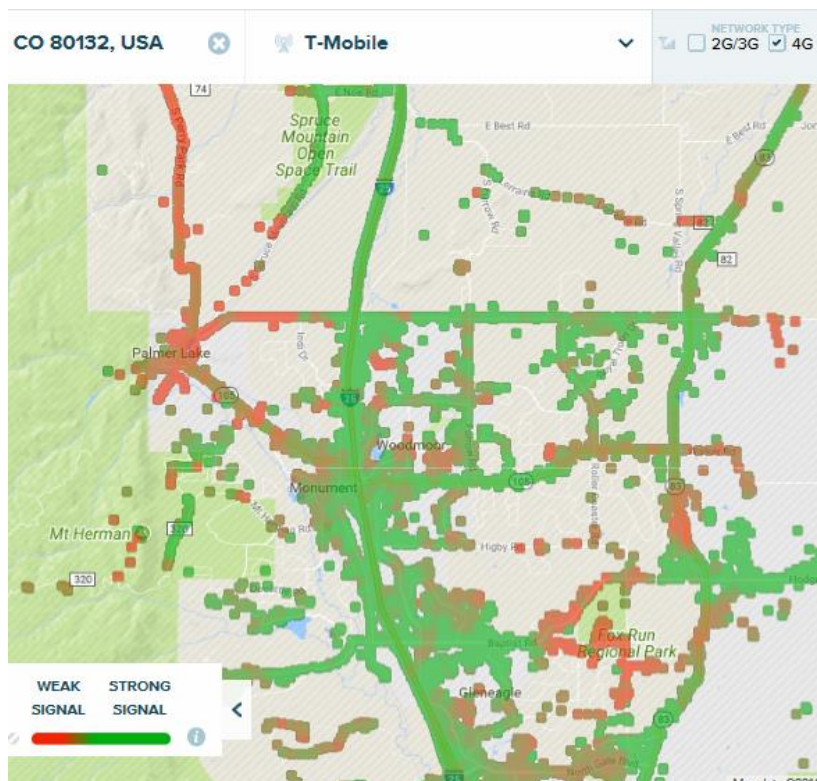
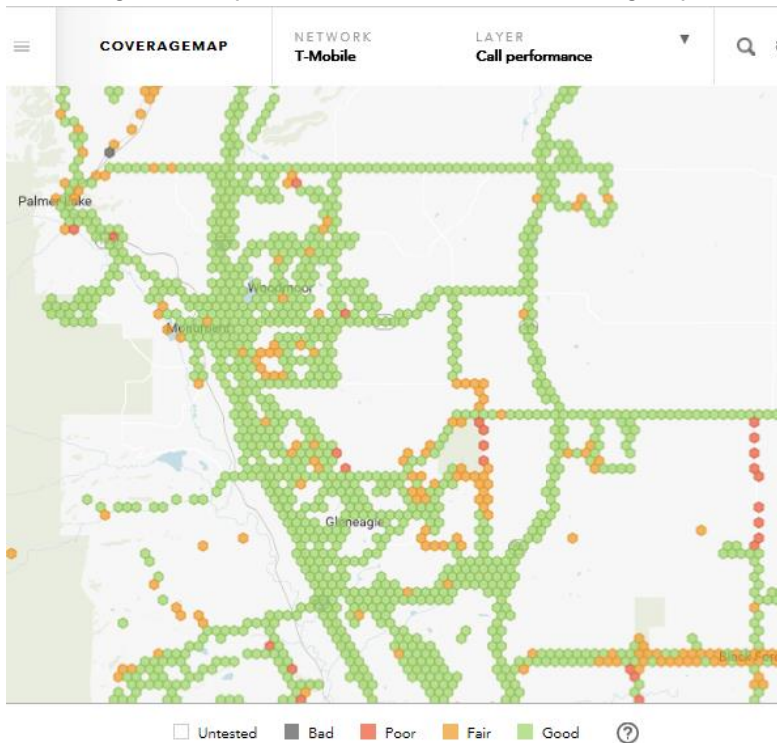


Figure II-39: Zip Code 80132 RootMetrics T-Mobile Coverage Map





■ APPENDIX II: DETAILED CELLULAR COVERAGE MAPS

Figure II-40: Zip Code 80808 T-Mobile OpenSignal Coverage Map

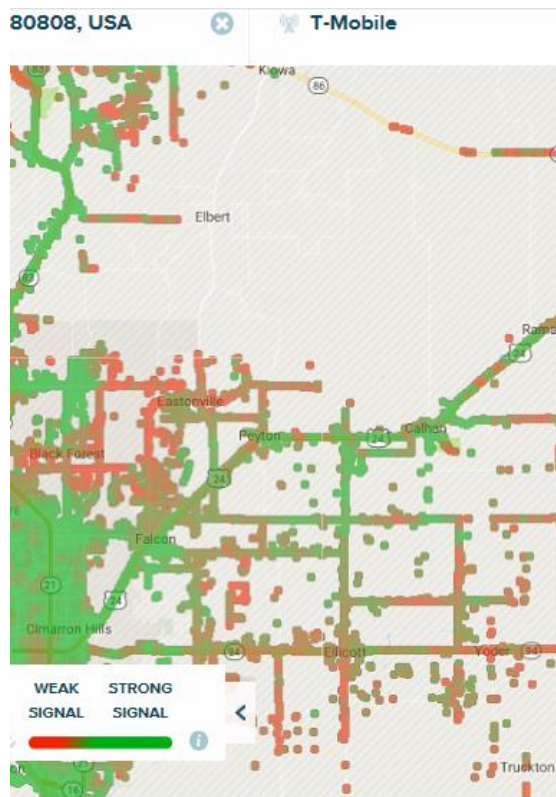


Figure II-41: Zip Code 80808 T-Mobile RootMetrics Coverage Map



■ APPENDIX II: DETAILED CELLULAR COVERAGE MAPS

Figure II-42: Zip Code 80817 T-Mobile OpenSignal Coverage Map

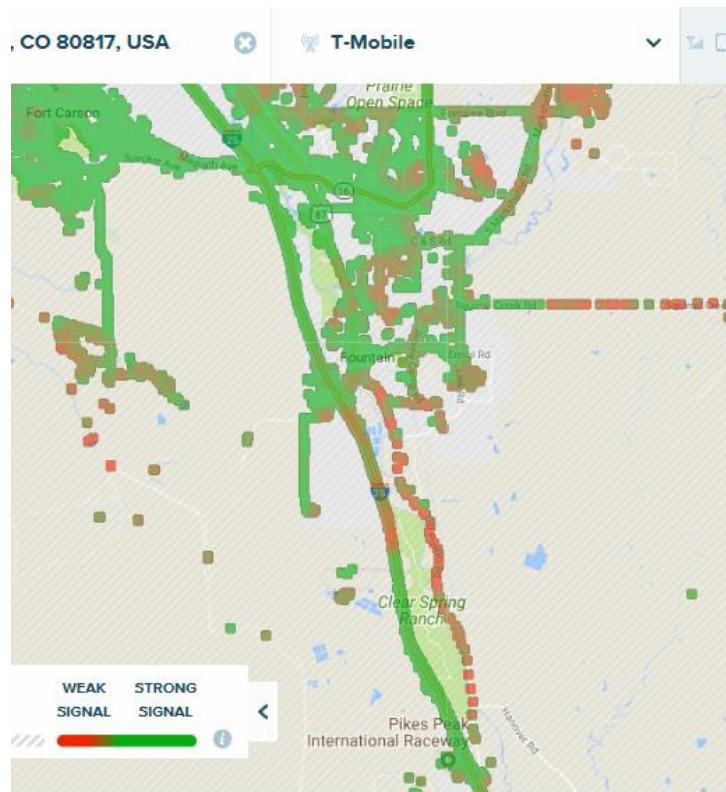
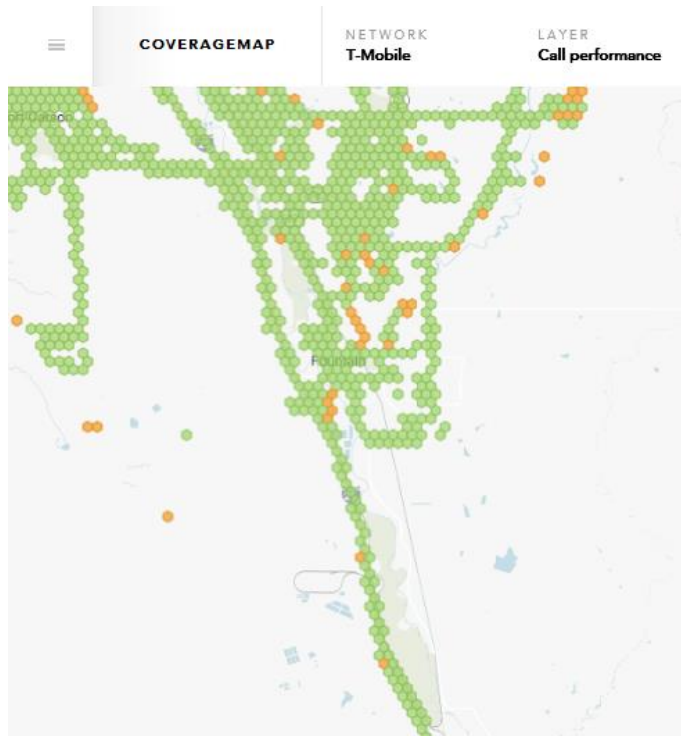


Figure II-43: Zip Code 80817 T-Mobile OpenSignal Coverage Map



■ APPENDIX II: DETAILED CELLULAR COVERAGE MAPS

Figure II-44: Zip Code 80829 T-Mobile OpenSignal Coverage Map

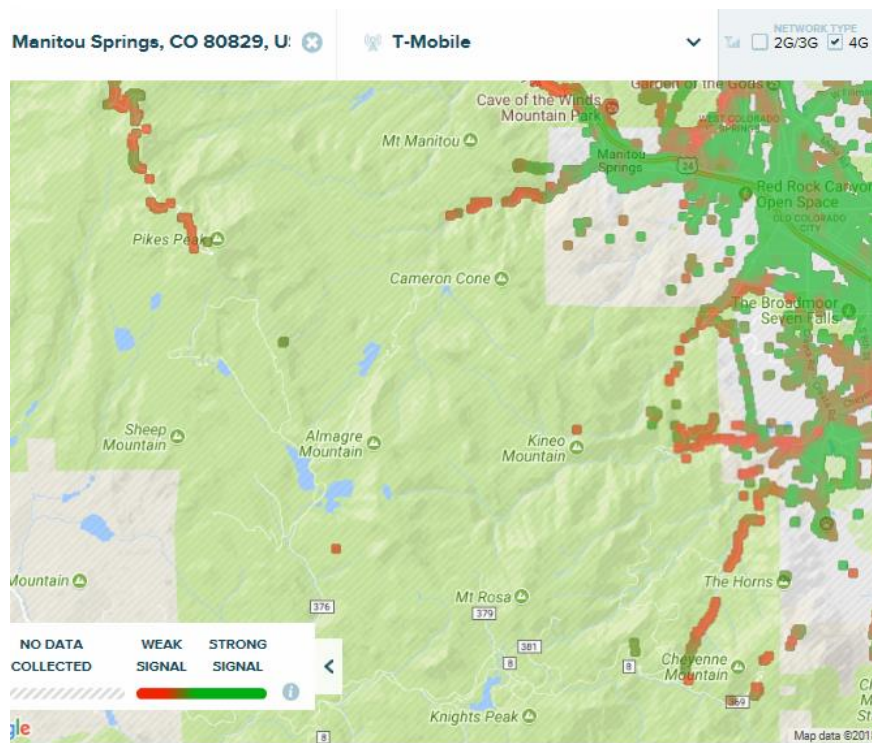
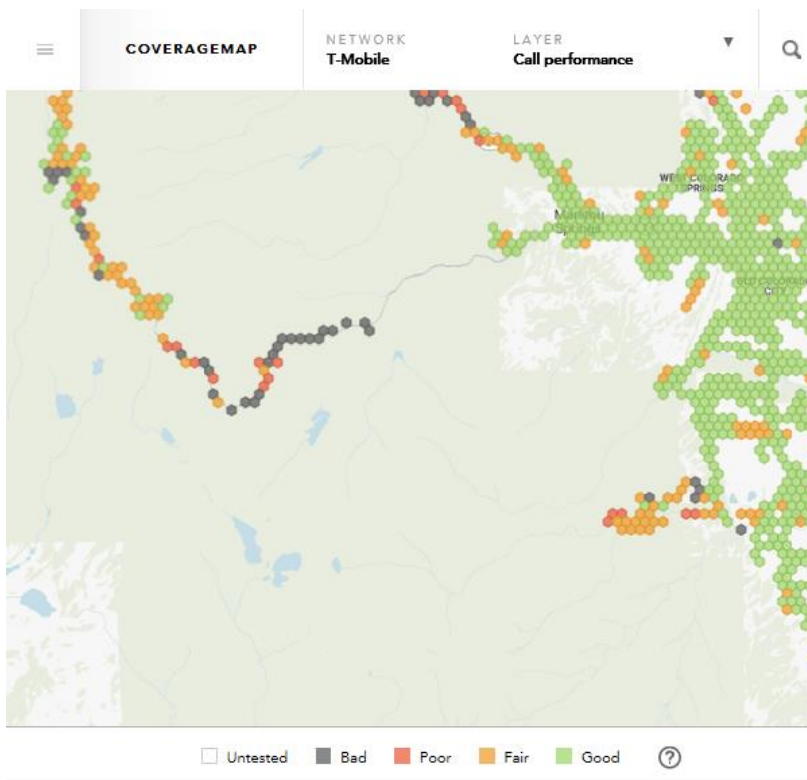


Figure II-45: Zip Code 80829 T-Mobile RootMetrics Coverage Map



■ APPENDIX II: DETAILED CELLULAR COVERAGE MAPS

Figure II-46: Zip Code 80831 T-Mobile OpenSignal Coverage Map

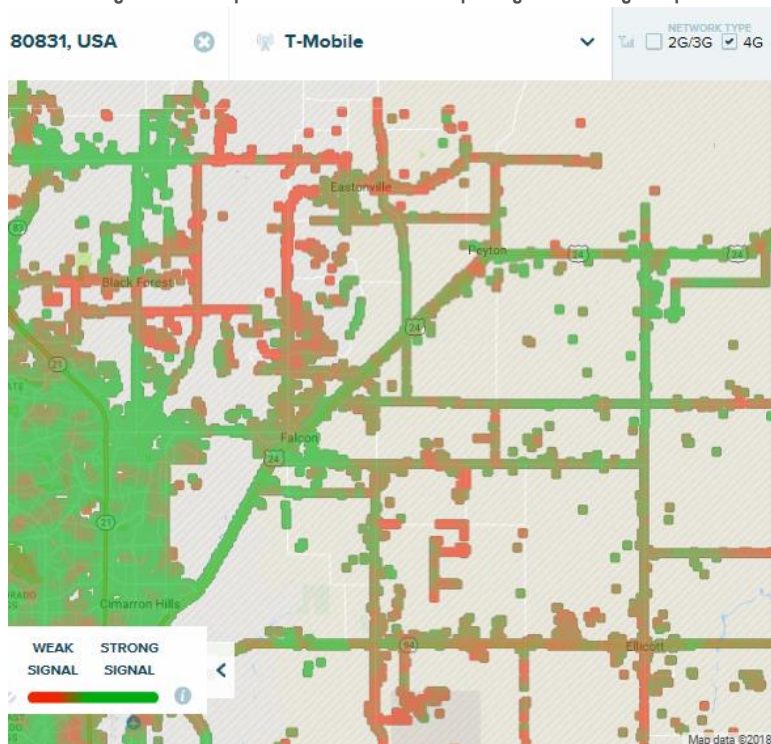
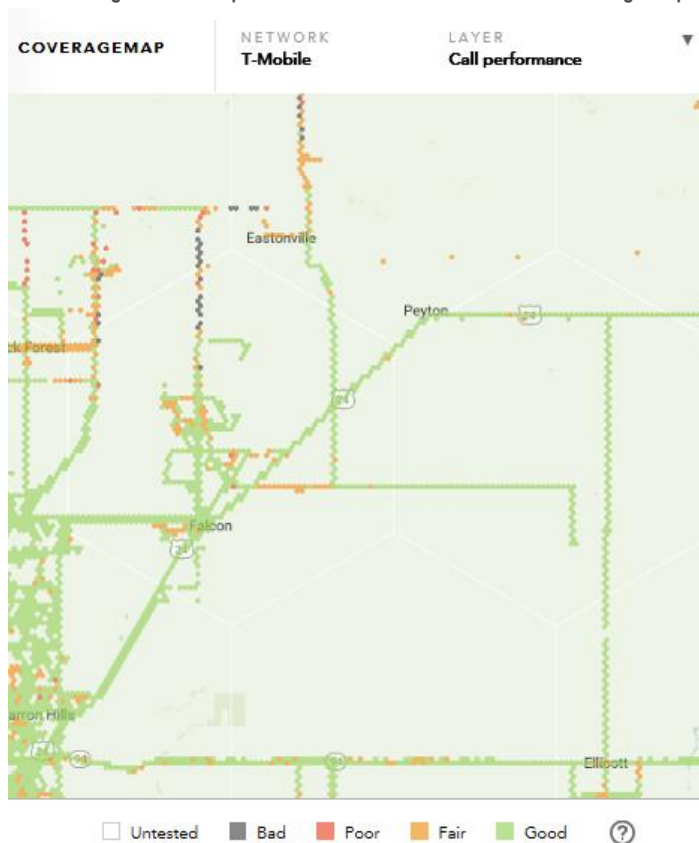


Figure II-47: Zip Code 80831 T-Mobile RootMetrics Coverage Map



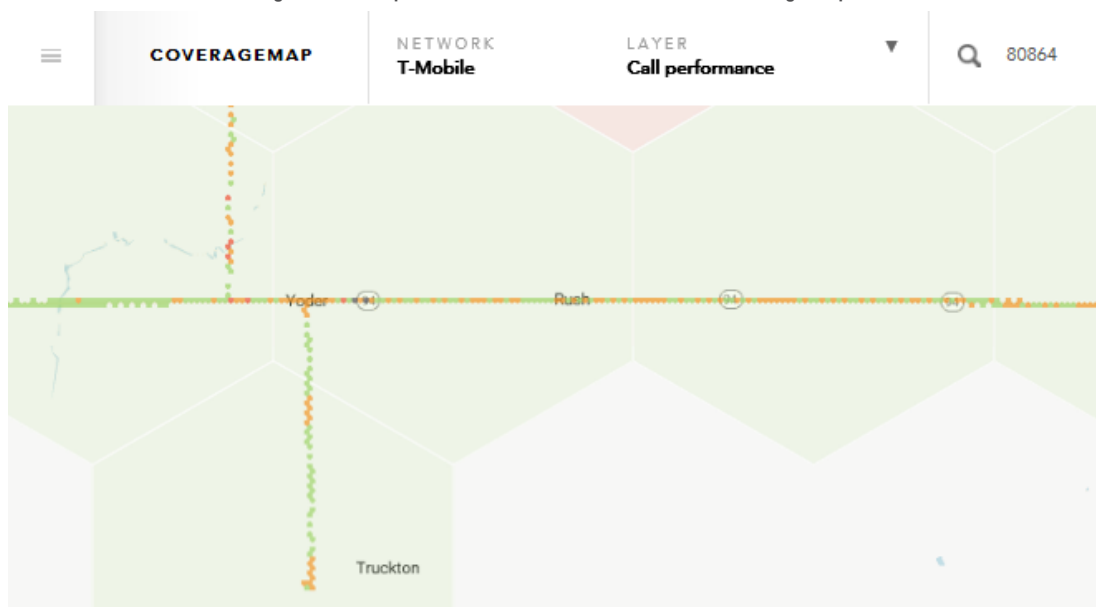


■ APPENDIX II: DETAILED CELLULAR COVERAGE MAPS

Figure II-48: Zip Code 80864 T-Mobile OpenSignal Coverage Map



Figure II-49: Zip Code 80864 T-Mobile RootMetrics Coverage Map





■ APPENDIX II: DETAILED CELLULAR COVERAGE MAPS

Figure II-50: Zip Code 80908 T-Mobile OpenSignal Coverage Map

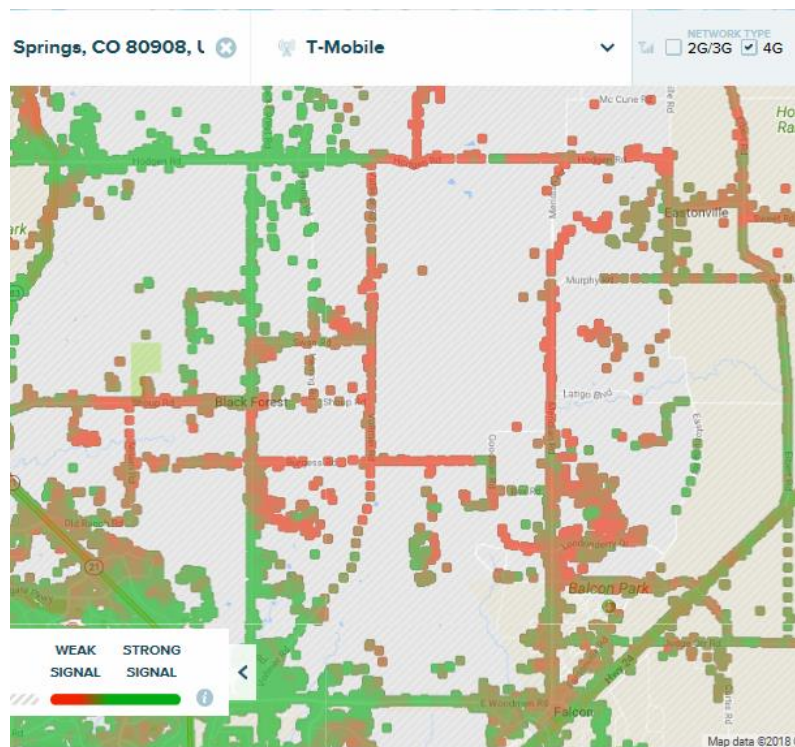


Figure II-51: Zip Code 80908 T-Mobile RootMetrics Coverage Map



■ APPENDIX II: DETAILED CELLULAR COVERAGE MAPS

Figure II-52: Zip Code 80926 T-Mobile OpenSignal Coverage Map

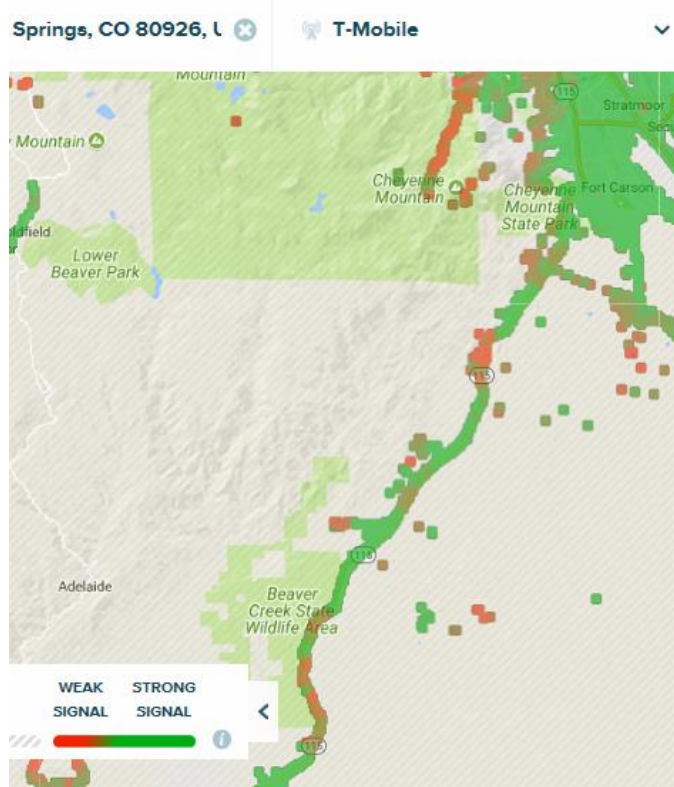
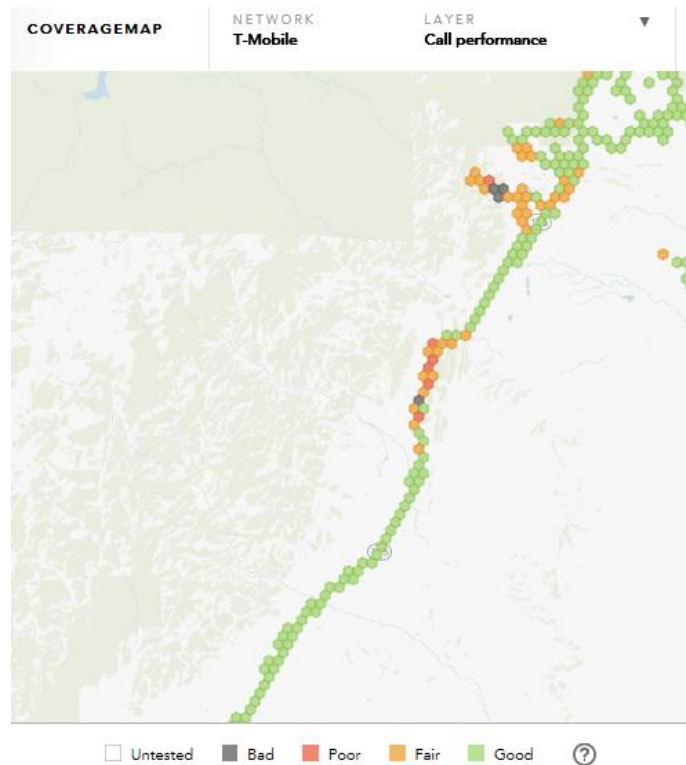


Figure II-53: Zip Code 80926 T-Mobile RootMetrics Coverage Map



■ APPENDIX II: DETAILED CELLULAR COVERAGE MAPS

Figure II-54: Zip Code 80132 Sprint OpenSignal Coverage Map

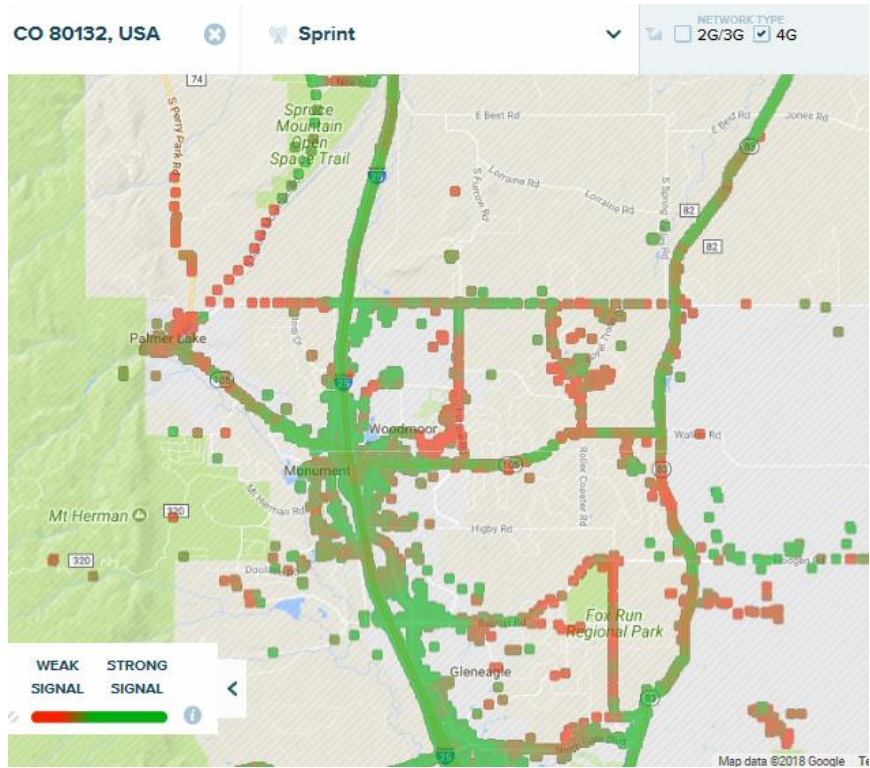
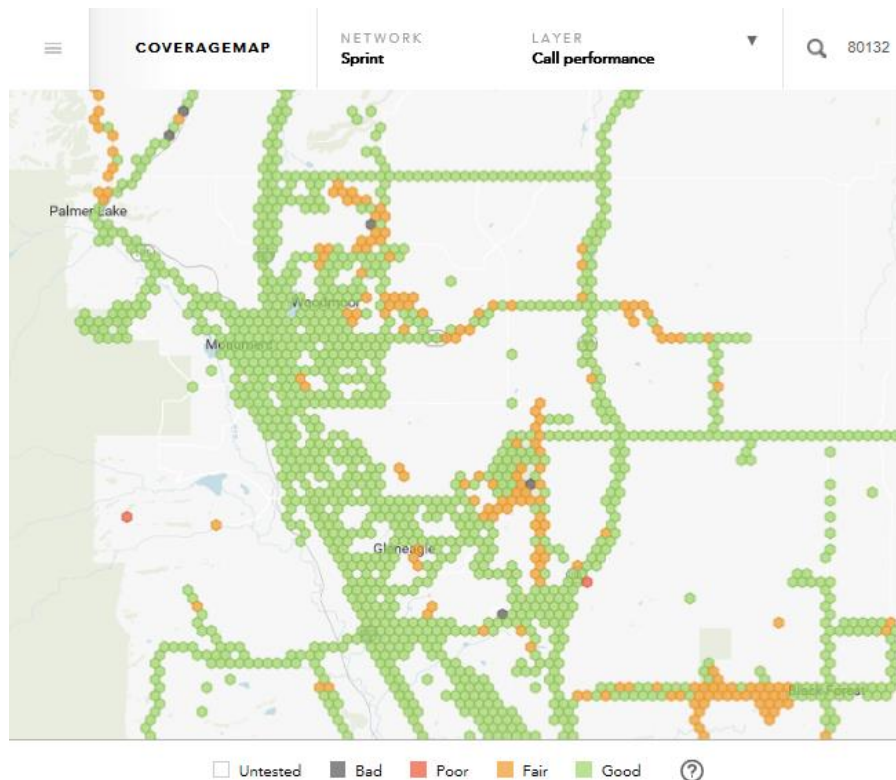


Figure II-55: Zip Code 80132 Sprint RootMetrics Coverage Map





■ APPENDIX II: DETAILED CELLULAR COVERAGE MAPS

Figure II-56: Zip Code 80808 Sprint OpenSignal Coverage Map

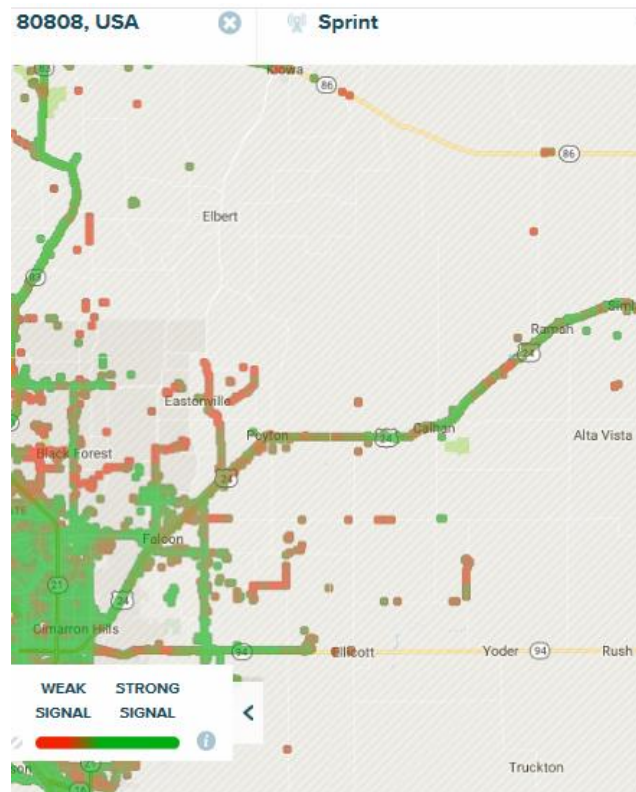
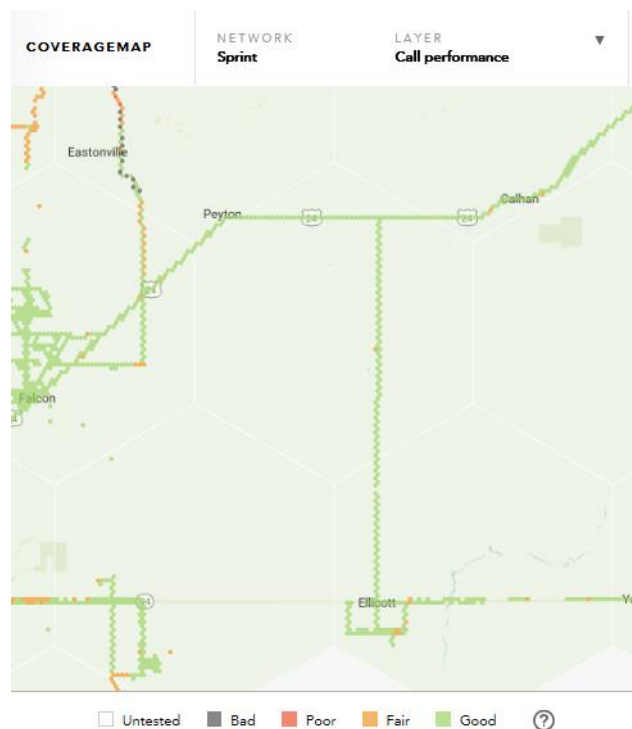


Figure II-57: Zip Code 80808 Sprint RootMetrics Coverage Map



■ APPENDIX II: DETAILED CELLULAR COVERAGE MAPS

Figure II-58: Zip Code 80817 Sprint OpenSignal Coverage Map

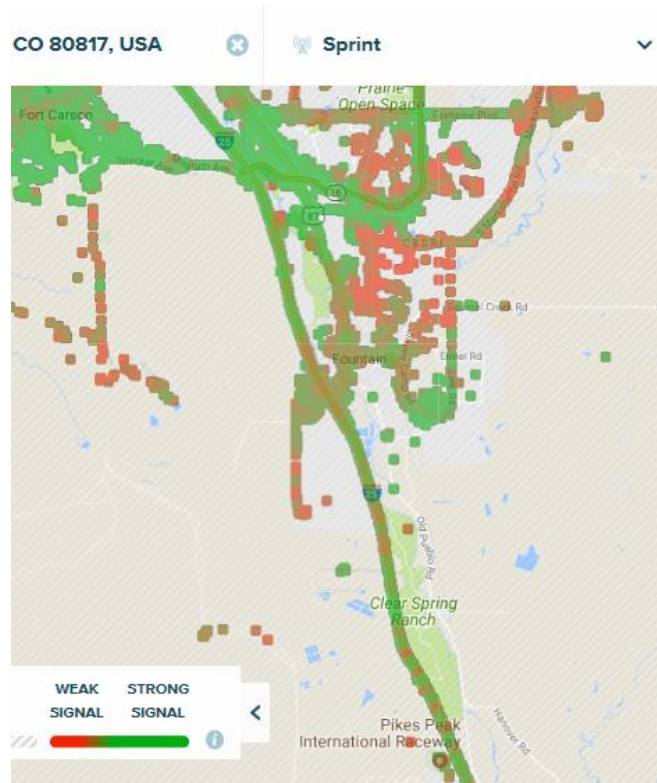


Figure II-59: Zip Code 80817 Sprint RootMetrics Coverage Map





■ APPENDIX II: DETAILED CELLULAR COVERAGE MAPS

Figure II-60: Zip Code 80829 Sprint OpenSignal Coverage Map

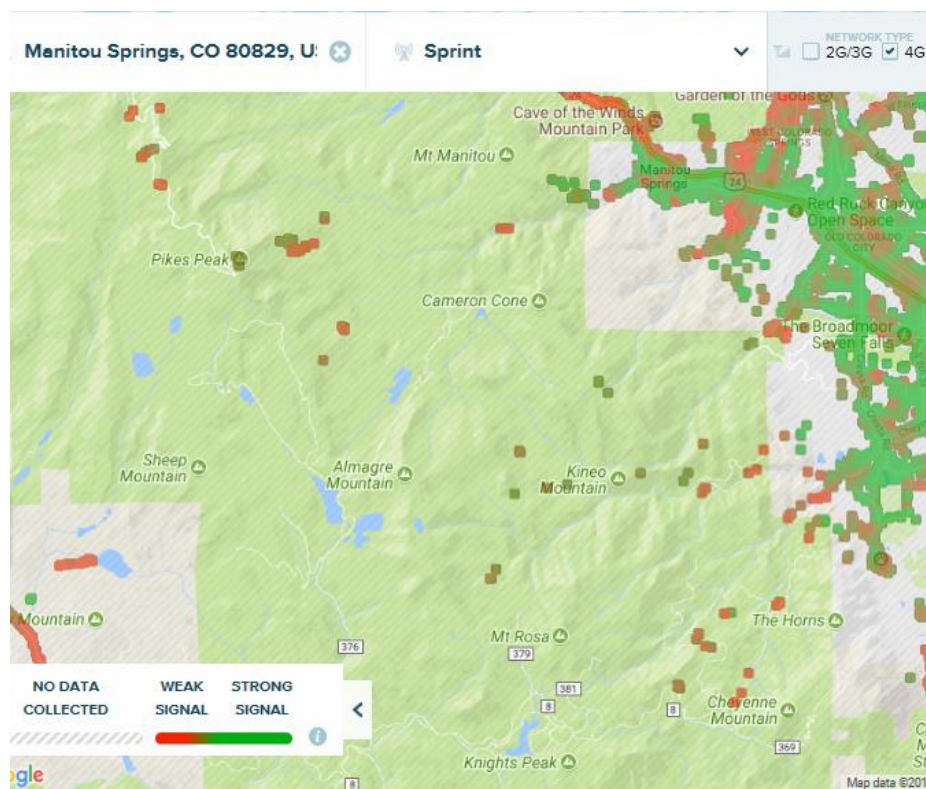
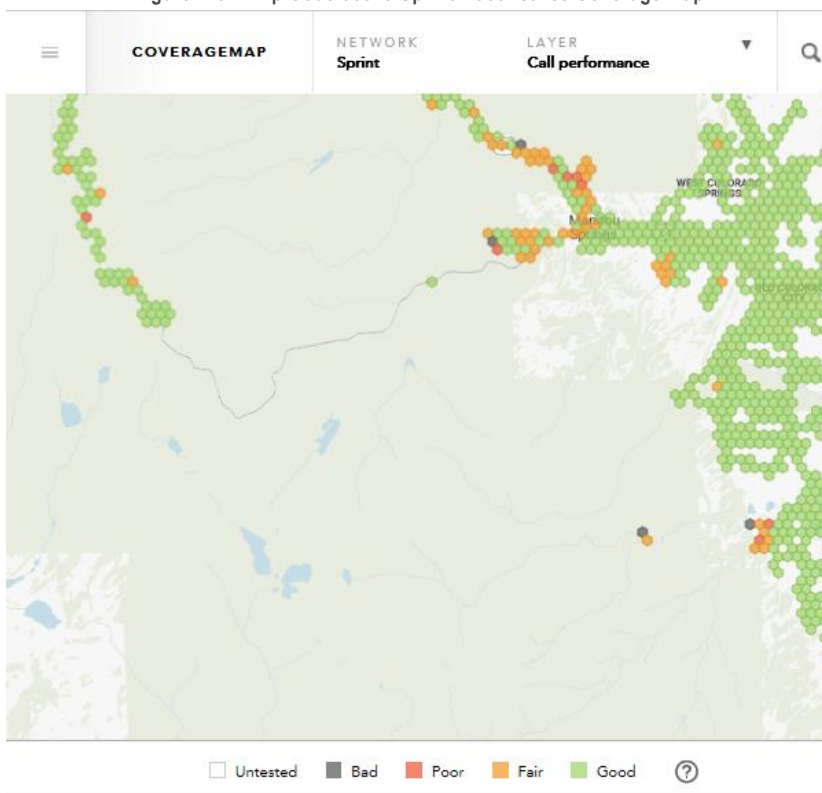


Figure II-61: Zip Code 80829 Sprint RootMetrics Coverage Map



■ APPENDIX II: DETAILED CELLULAR COVERAGE MAPS

Figure II-62: Zip Code 80831 Sprint OpenSignal Coverage Map

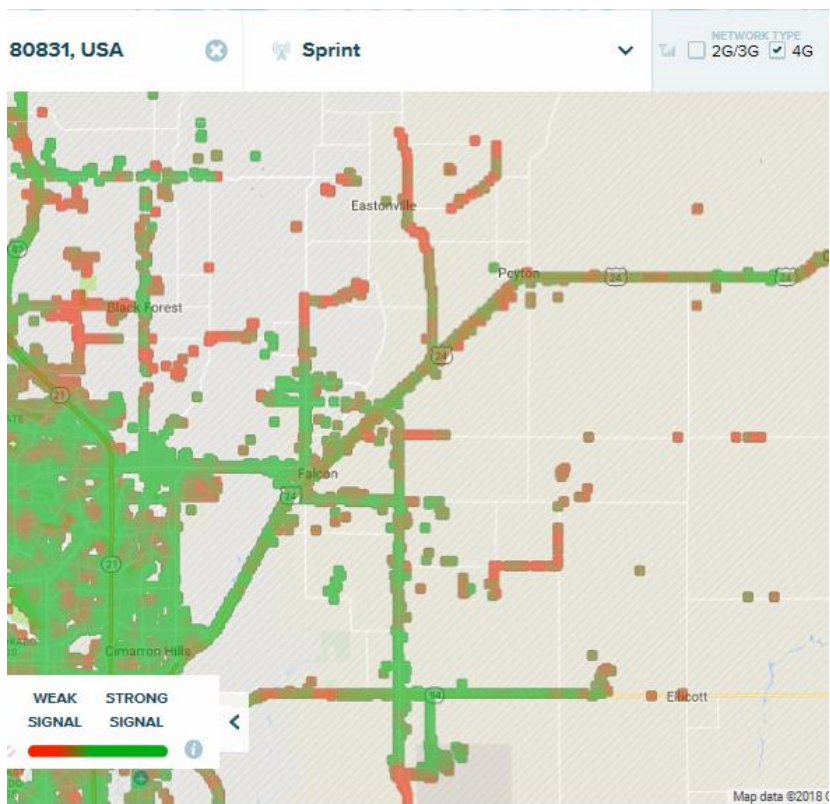
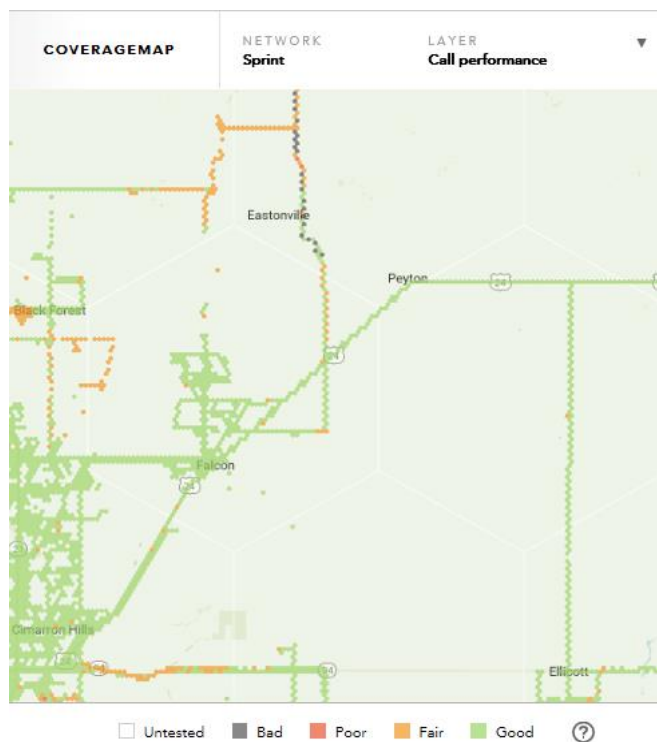


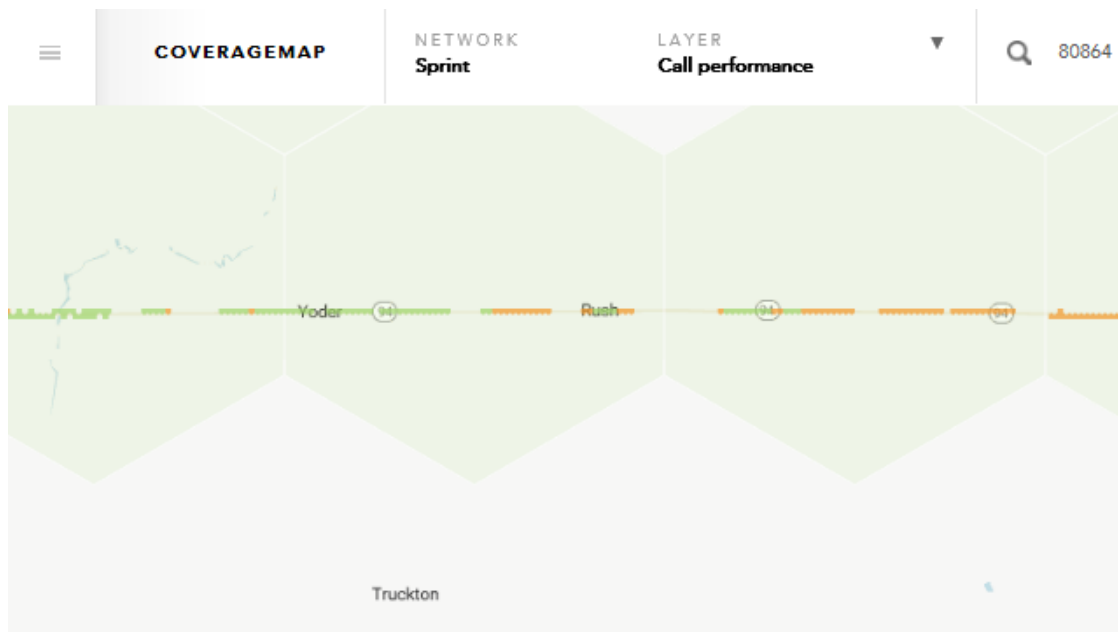
Figure II-63: Zip Code 80831 Sprint RootMetrics Coverage Map



■ **APPENDIX II: DETAILED CELLULAR COVERAGE MAPS**

**[Please note that OpenSignal does not have any current data for Zip Code 80864. It lists Viaero as the most popular carrier behind AT&T and Verizon there. However, Viaero’s lack of coverage for the totality of the county indicates that it is not a viable option.]**

Figure II-64: Zip Code 80864 Sprint RootMetrics Coverage Map



■ APPENDIX II: DETAILED CELLULAR COVERAGE MAPS

Figure II-65: Zip Code 80908 Sprint OpenSignal Coverage Map

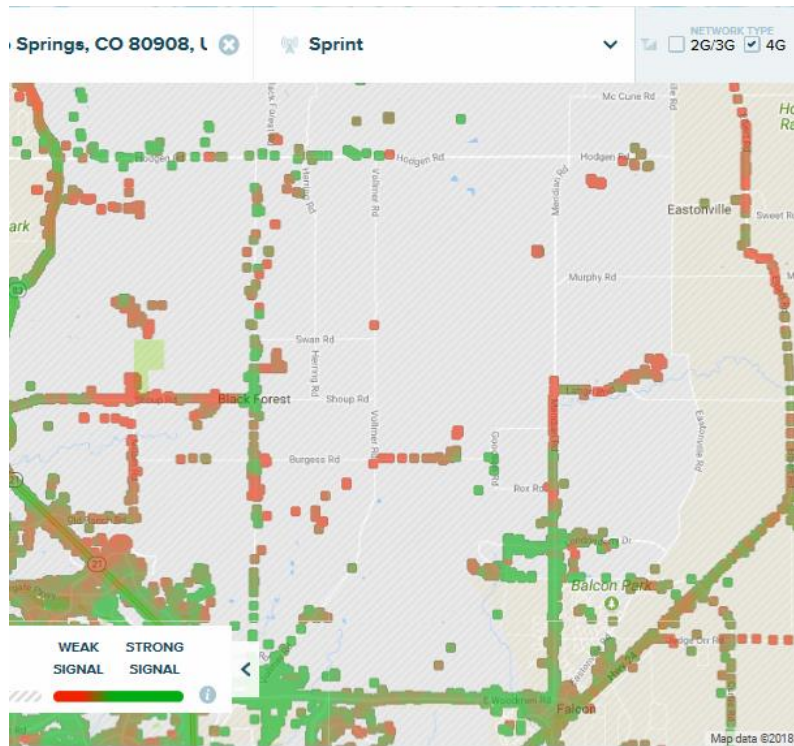
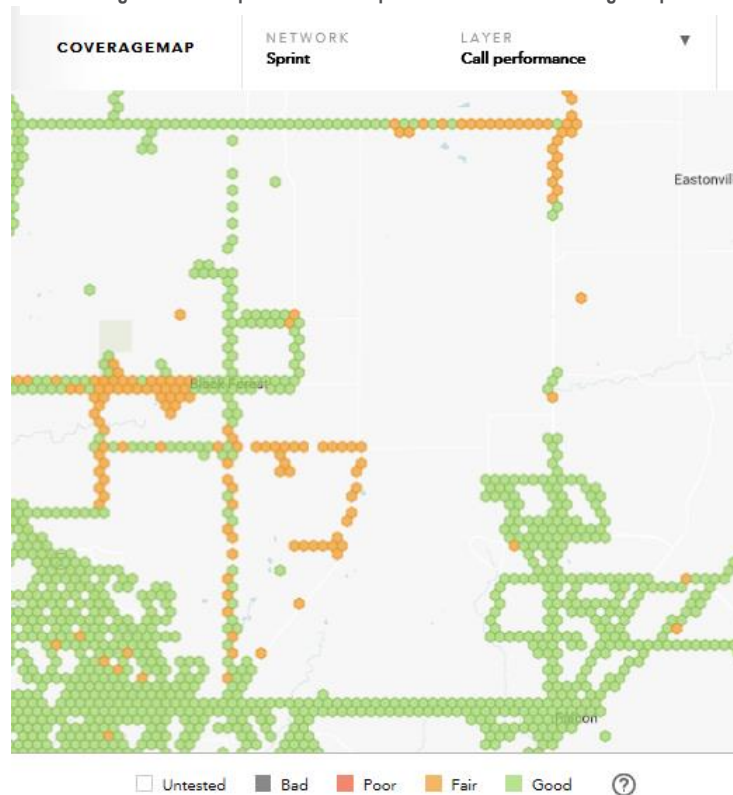


Figure II-66: Zip Code 80908 Sprint RootMetrics Coverage Map





■ APPENDIX II: DETAILED CELLULAR COVERAGE MAPS

Figure II-67: Zip Code 80926 Sprint OpenSignal Coverage Map

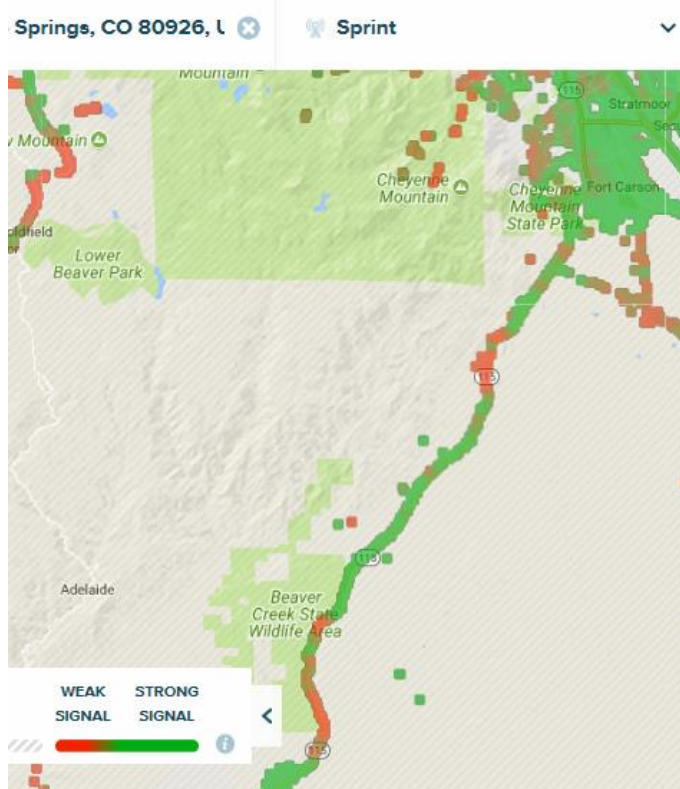
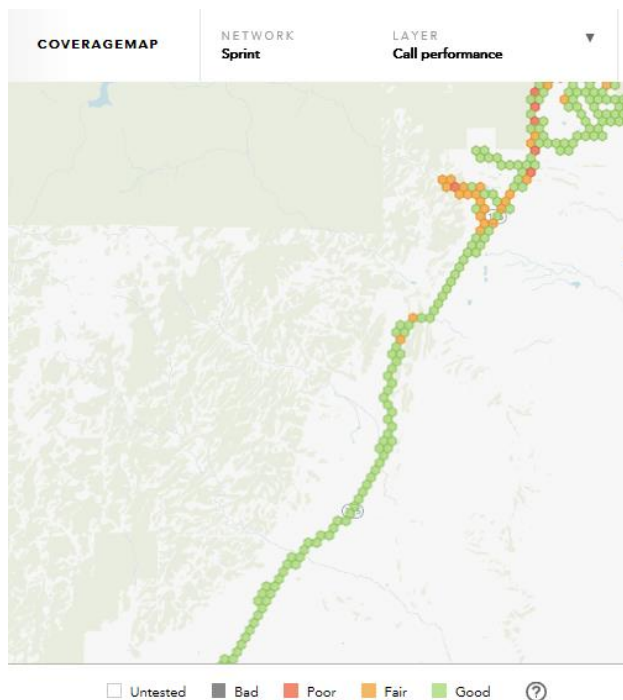



Figure II-68: Zip Code 80926 Sprint RootMetrics Coverage Map







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