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Coachella Valley Broadband Network Deployment

Broadband Strategic Plan - FINAL

February 2026



CVAG

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EXECUTIVE SUMMARY

THE STRATEGIC IMPERATIVE: BROADBAND AS A UTILITY

In the modern landscape of the Coachella Valley, high-speed broadband has transitioned from a luxury to an essential utility, similar to water and electricity. It serves as a vital foundation for economic growth, educational equity, and healthcare access through telemedicine. This broadband study was initiated to clearly define which addresses are unserved and underserved in Coachella Valley and to provide information, tools and recommendations to reach those addresses with better broadband (and improve broadband and connectivity throughout the Valley).

There are factors in the Valley that make broadband coverage and planning complex:

- Homeowners Associations (HOAs) make their own broadband arrangements
- There are significant differences in income levels in various parts of the Valley. Also, population density and geography vary widely in this region
- Agriculture is an important industry in the Coachella Valley that is continually becoming more technologically advanced, needing increasingly better connectivity. Given the generally rural nature of agriculture, there could be mutually beneficial possibilities to meet business needs and reach unserved and underserved addresses
- Other utilities in the Coachella Valley will continue to evolve. Those changes typically include technological advancements. Of particular interest is the electric distribution system. Transitions in the electric network (regardless of who owns it) will likely require conduit and fiber for smart improvements

While the Valley benefits from significant existing broadband infrastructure from multiple Internet Service Providers (ISPs), CV Sync conduit and jurisdiction owned assets, this report identifies critical service gaps. This report also documents significant broadband resources that, if utilized, could have considerable impacts on the Valley's future.

If the gaps are left unaddressed there will likely be parts of the Valley that will be left behind in attracting new citizens and businesses, important services, quality of life and inability to retain its younger population. If the resources are not utilized to their potential to improve broadband and connectivity, a very real opportunity to help the Valley be a technology leader in the region and State (and potentially beyond) could be missed. The components are available unlike many parts of the State and Country, the question is whether they will be used to their potential.

One of the more significant events that has transpired during this broadband study is the BEAD grant process. As is shown in the Broadband Study GIS Map, there are many unserved and underserved addresses in the Coachella Valley. Although CPUC's final proposal for awards has not yet been approved by the NTIA as of May 2026, the awards provide for service for most (if not all) eligible addresses to have broadband coverage. Not all will have fiber, but the fact that there will be this level of broadband improvement is a significant step in the Coachella Valley. The Grants section contains more details.

This Strategic Plan outlines a coordinated framework where the **Coachella Valley Association of Governments (CVAG)** acts as a regional facilitator. This approach allows individual member jurisdictions and Tribal Authorities to maintain local control while leveraging regional assets to solve their specific connectivity challenges.

METHODOLOGY

The primary focus of this broadband study was to more clearly define the broadband needs in the Coachella Valley and develop strategies to address those needs. To do this, Details can be found in the chapters of this report, but to accomplish this goal the below steps were completed:

- Determining current circumstances in a Market Analysis and Needs Analysis
- A Gap Analysis to define broadband concerns. As part of this step, a Regional Broadband Map was developed to display the findings and Gaps. Also, it was determined the CV Sync data would be more useful if it was converted to GIS, which was completed
- Several documents were also needed to provide perspective regarding options to improve broadband gaps, including policy and governance models
- Options to improve broadband were developed, including high-level designs and costs, financial analysis, implementation plans, etc.

The project was initiated on September 25, 2023. There were two extensions, one in March 2025 to extend the project to December 31, 2025, and the other in December 2025 to extend it to February 28, 2026. The project was completed in February 2026.

KEY DISCOVERIES: THE DIGITAL LANDSCAPE

Through rigorous data collection, including GIS mapping, ISP reporting, and direct stakeholder engagement, several core findings have emerged regarding the current state of connectivity in the Valley:

- **Verified Service Gaps:** Independent speed tests and survey results have confirmed ISPs reported "unserved" (below 25/3 Mbps) and "underserved" (below 100/20 Mbps) addresses scattered throughout the region. These gaps are often found in lower-density or geographically remote areas where the high cost of construction makes traditional private investment unfeasible
- **A Need for Standardized Policy:** Currently, broadband policies and construction standards vary across the 11+ jurisdictions of the Coachella Valley. This fragmentation creates a "friction" for private ISPs who wish to expand; standardizing these rules across the Valley would create a predictable environment that attracts private capital and speeds up deployment
- **The Utility of Public Assets:** The region possesses a significant amount of "broadband currency" (existing assets that can be traded or utilized to lower the costs for service providers). The CV Sync project, in particular, has deployed extensive conduit and fiber that can serve as the backbone for local community expansions

COMMUNITY-LED STRATEGIC RECOMMENDATIONS

The path forward focuses on empowering individual communities to use regional resources to bridge their local digital divides. The report recommends the following narrative of action:

1. **Levering Regional "Broadband Currency"**
   Communities should look to regional assets as a means to entice private partners. The CV Sync infrastructure provides a ready-made path for internet traffic. By allowing ISPs to access excess conduit capacity (through jurisdictional approval and arrangements), local jurisdictions can significantly reduce the capital expenditure (CAPEX) required for a provider to enter a new neighborhood. Furthermore, many cities have planned **Capital Improvement Projects (CIPs)**; by coordinating with this plan, cities can ensure that conduit is laid during road or utility work ("Dig Once"), which can provide savings up to 90% cheaper than a standalone broadband build (see

the Financial Analysis section of this report for explanation of this statistic)

2. **Adoption of a "Broadband-Ready" Regulatory Environment**
   To become more attractive to investment, the report recommends that member agencies adopt a unified **Broadband-Ready Checklist**. This includes:
   - Standardizing policies to encourage private investment by lowering costs and speed to market for ISPs.
   - Adopting uniform design specifications for fiber-optic interconnects and cabinetry
   - Streamlining the permitting process so that regional builds can move forward without a patchwork of different local rules

3. **Flexible Governance Models**
   Because no two communities in the Valley are identical, jurisdictions should choose from several proven business models that do not require a valley-wide public entity:
   - **Publicly Owned, Privately Served:** A city may choose to own the "last-mile" fiber or conduit while leasing it to a private ISP to provide retail service
   - **Public-Private Partnerships (P3):** Jurisdictions can offer "in-kind" contributions (like access to CV Sync or city-owned conduits or poles) in exchange for an ISP's commitment to serve unserved low-income areas
   - **Open Access Models:** Some communities may prefer an "open access" approach where the city-owned infrastructure is available to multiple ISPs, fostering competition and lower prices for residents

   Refer to the Governance section of this report for a more detailed explanation of governance models.

MEMBER JURISDICTIONS NEXT STEPS

The 2026 calendar year presents a unique window of opportunity for Coachella Valley communities to secure funding and finalize partnerships.

- **Create Local Strategic/Implementation Plans:** Jurisdictions will need to create a coordinated, strategic plan in order to fully leverage the regional assets in the Valley to improve broadband and connectivity. Priority should be given to developing plans in the next 12 months to align to expected completion of the CV Sync program and state middle mile assets (Indio, Palm Desert, Palm Springs, Coachella, and other jurisdictions have plans or are preparing plans)
- **Jurisdiction Broadband Goals**: Encourage jurisdictions to develop broadband goals that include:
  - Regional collaboration
  - Updating the Regional Broadband GIS Map
  - Developing ideas to utilize CV Sync Fiber and Conduit (including reviewing and approving agreements)
- **Finalize Local Inventories:** CV Sync should complete labelling components to make the initial data as complete as possible. Additionally, field verification should be completed whenever CV Sync staff are in the field. As is recommended in the above jurisdiction goals, jurisdictions should update the Regional Broadband GIS Map with CIP information whenever plans are developed for their CIPS (July/August of each year)

- **Target 2026 Grant Cycles:** Communities should focus on specific deadlines for state and federal funding:
    - See the Grant section of this report for grant opportunities to monitor
    - **July 1, 2026:** Deadlines for the **Broadband Adoption Account** (for digital literacy) and the **Broadband Public Housing Account** (for low-income community networks)
    - **Rolling Deadlines:** The **Line Extension Pilot Program** remains open for group applications to connect individual properties to existing providers
- **Regional Collaboration via the Strategic Advisory Group (SAG):** Continued participation in the SAG will help future collaboration and ensure that communities are not competing against one another for the same grants, but are instead presenting a unified, data-backed regional front to the CPUC and federal agencies
- **ISP Collaboration:** Develop a consistent meeting with ISPs. The initial meeting should be as soon as available conduit information is completed. ISPs expressed interest in developing plans based on lowering their costs by deploying in existing conduit. In the initial meeting, it will be important to update the ISPs regarding available conduit and defining the approval and agreement process with jurisdictions before the ISPs can access conduit
- **Policy and Design Standards**: Encourage jurisdictions to evaluate and approve regional permitting and design standards. Along with conduit, policies are the most important factors to attract ISP investment
- **Middle Mile Broadband Initiative (MMBI)**: Monitor MMBI pricing release and construction schedule. When MMBI pricing is available, analysis should be done to see if there is a regional way to reduce use costs

CVAG NEXT STEPS

- **Regional Broadband Map**: Create the “portal” for stakeholders to view the Regional Broadband Map and update CIPs in the third quarter of each year
- **SAG**: Coordinate continued meetings of the SAG at the appropriate internal to continue to foster collaboration of CV Sync use, ISP interactions, MMBI and grants
- **ISPs**: Coordinate regular group meetings with ISPs and jurisdictions to continue developing relationships, regional collaboration and grant support
- **Policies**: Work with jurisdictions to continue the process of regional policies, including design standards
- **MMBI**: Continue discussions with MMBI to learn pricing to distribute to jurisdictions and ISPs and to evaluate the possibility of lowering costs through coordinating aggregation
- **Grants:** Maintain an updated list of grant resources for member jurisdictions

GRANT ADMINISTRATION

SUMMARY

In reaching the addresses that are unserved and underserved for broadband connectivity, costs are often the key issue. If the revenues and costs made financial sense, the unserved and underserved addresses would likely already have good service. The more remote an address is, the greater the cost to reach it. There is a distance at which it no longer makes financial sense for a private Internet Service Provider (ISP) to serve the address. The payback or return on investment takes longer than the ISPs business model.

There are three main ways this can be addressed:

- Utilizing different technologies: Fiber is the most expensive, but it is also the most reliable and has the greatest capacity and speed for future needs
- Longer return on investment time and public sponsorship: Public entities can often accept longer payback periods than private ISPs, and can also serve as the applicant, owner, and/or construction sponsor (including public–private partnership structures) when a purely private business case is not feasible.
- Grants: The primary role for grants at this time is to lower costs for deployment in more rural areas

This document explores broadband grant opportunities. These programs are specifically for broadband improvement. It is also important to know that there are multiple grant programs that are not specifically for broadband but can be used for connectivity. For example, grants related to traffic control signals, sustainability, resiliency, smart connectivity, etc. can have broadband and connectivity applicability.

The second section will provide options for how the tools in this study can be utilized to apply for grants. This study has documented and produced multiple tools that can be used for grant coordination and grant applications. Those will be outlined and an explanation of how they can be utilized.

It is important to note that these resources will become less effective over time if they are not updated. Each resource that will need to be updated and kept at a useful level contains comments about how and when to update them. The following is a list of the most relevant, ongoing broadband grants with upcoming deadlines to monitor in 2026:

Broadband Adoption Account

- July 1, 2026: next batch deadline for digital literacy and public access projects.

Broadband Public Housing Account

- July 1, 2026: next deadline for low-income community network grants.

Tribal Technical Assistance Program

- April 1, 2026: second quarterly batch deadline.
- July 1, 2026: third quarterly batch deadline.
- October 1, 2026: fourth quarterly batch deadline.

Rural and Urban Regional Broadband Consortia Grant

- February 20, 2026: application window for the 2026 cycle closed.
- Later in 2026: dedicated window for new Tribal Consortia opens following regional workshops.

Line Extension Pilot Program

- Rolling: applications accepted at any time subject to available funding.

Digital Divide Grant Program

- February 12, 2026: application window for Round 3 closed.

- May 2026: notices of award scheduled for adoption.

There will be more fiber and broadband grants through Federal and State agencies. Some could be for better broadband; others would be for other projects that have a connectivity component. CVAG can help member jurisdictions by maintaining a compendium of grant programs and providing them to CVAG members. Additionally, the resources developed during this project presented in the CVAG Broadband Strategic Plan can be used as resources to prepare for grant applications, including the Regional Broadband GIS Map.

CALIFORNIA BROADBAND GRANTS AND FUNDING PROGRAMS

This section summarizes program options based on publicly available program guidance and application materials. Because deadlines, forms, and eligibility rules can change, readers should confirm current requirements available in the California and Federal Funding Program webpages before drafting or submitting applications.

BROADBAND EQUITY, ACCESS, AND DEPLOYMENT (BEAD)

The Broadband Equity, Access, and Deployment (BEAD) Program was authorized under the Infrastructure Investment and Jobs Act of 2021 and is administered federally by the National Telecommunications and Information Administration (NTIA).[i] The BEAD Program was established as the central federal mechanism for broadband infrastructure investment, with a total national allocation of $42.45 billion to expand high-speed internet access nationwide.

California received an allocation of approximately $1.86 billion under BEAD.[ii] On December 18, 2025, the California Public Utilities Commission (CPUC) approved the state's BEAD Final Proposal by a unanimous 5–0 vote, and the proposal was submitted to NTIA on December 19, 2025.

In early December 2025, the CPUC released tentative BEAD subgrant award results identifying more than 339,000 eligible locations statewide, with over $1.5 billion proposed for last-mile deployment projects pending NTIA approval.[iii] Based on the preliminary results, approximately 44% of proposed locations would be served by fiber-optic infrastructure, 41% by satellite service, and 15% by fixed wireless technology, subject to NTIA approval of final awards.

Major tentative BEAD awardees identified in the preliminary results include Comcast, provisionally awarded nearly $400 million; AT&T, awarded over $331 million; Frontier, awarded approximately $248 million; Amazon's Project Kuiper, provisionally awarded approximately $100 million to serve more than 92,000 locations; and SpaceX's Starlink, provisionally awarded approximately $63 million to serve nearly 46,000 locations, pending NTIA confirmation.

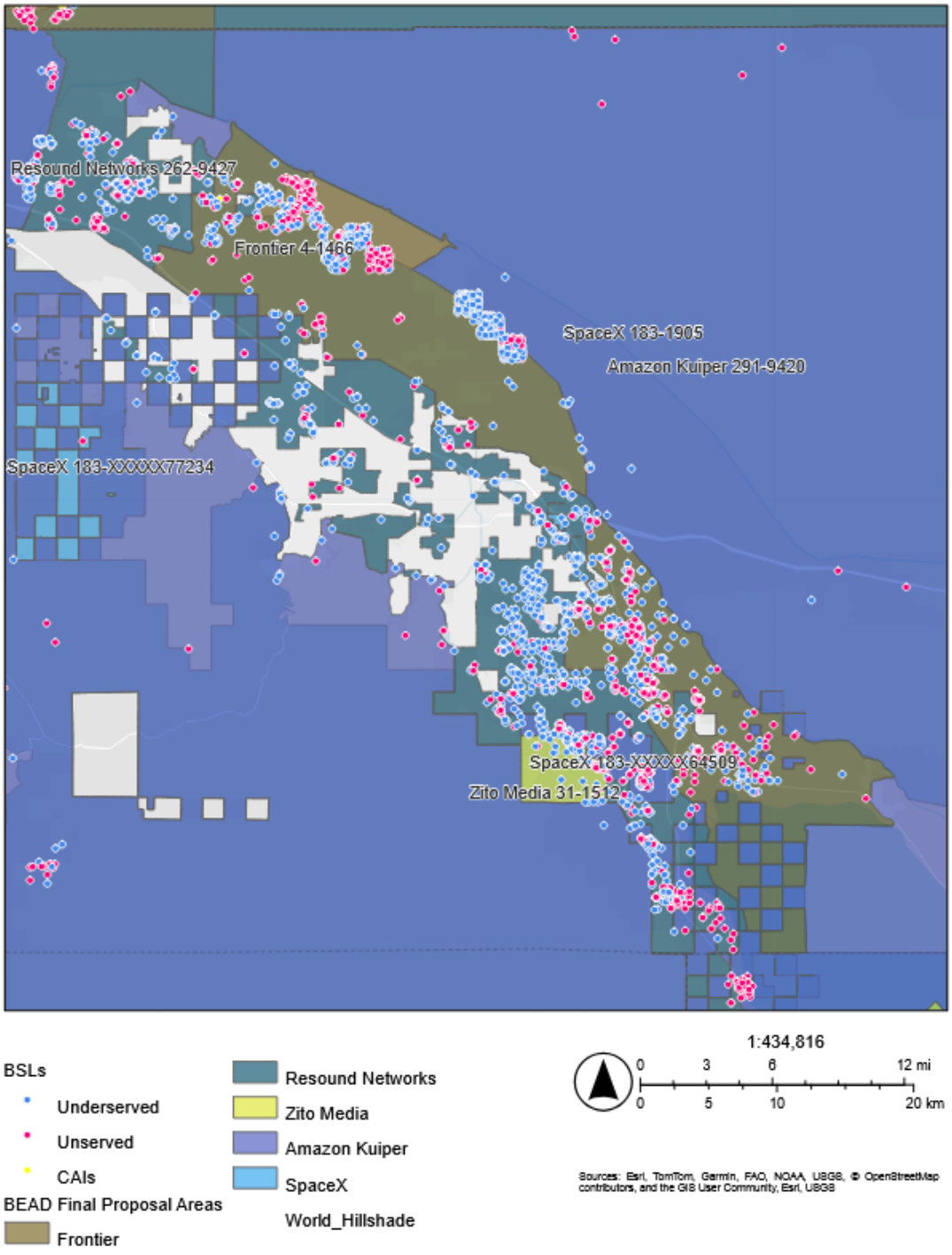
California's approved state plan (as submitted) proposes roughly $1.576B in subgrant awards to cover 200,545 BEAD-eligible locations via terrestrial projects, plus another 138,019 eligible locations via LEO satellite that are intended to reach 100% of the state's BEAD-eligible locations once finalized.

According to CPUC's preliminary award website (https://experience.arcgis.com/experience/8c43d72db37349089dc9d49b5f77896d#zoom_to_selection=true) there were four subgrantee awards (ISPs whose BEAD applications were selected:

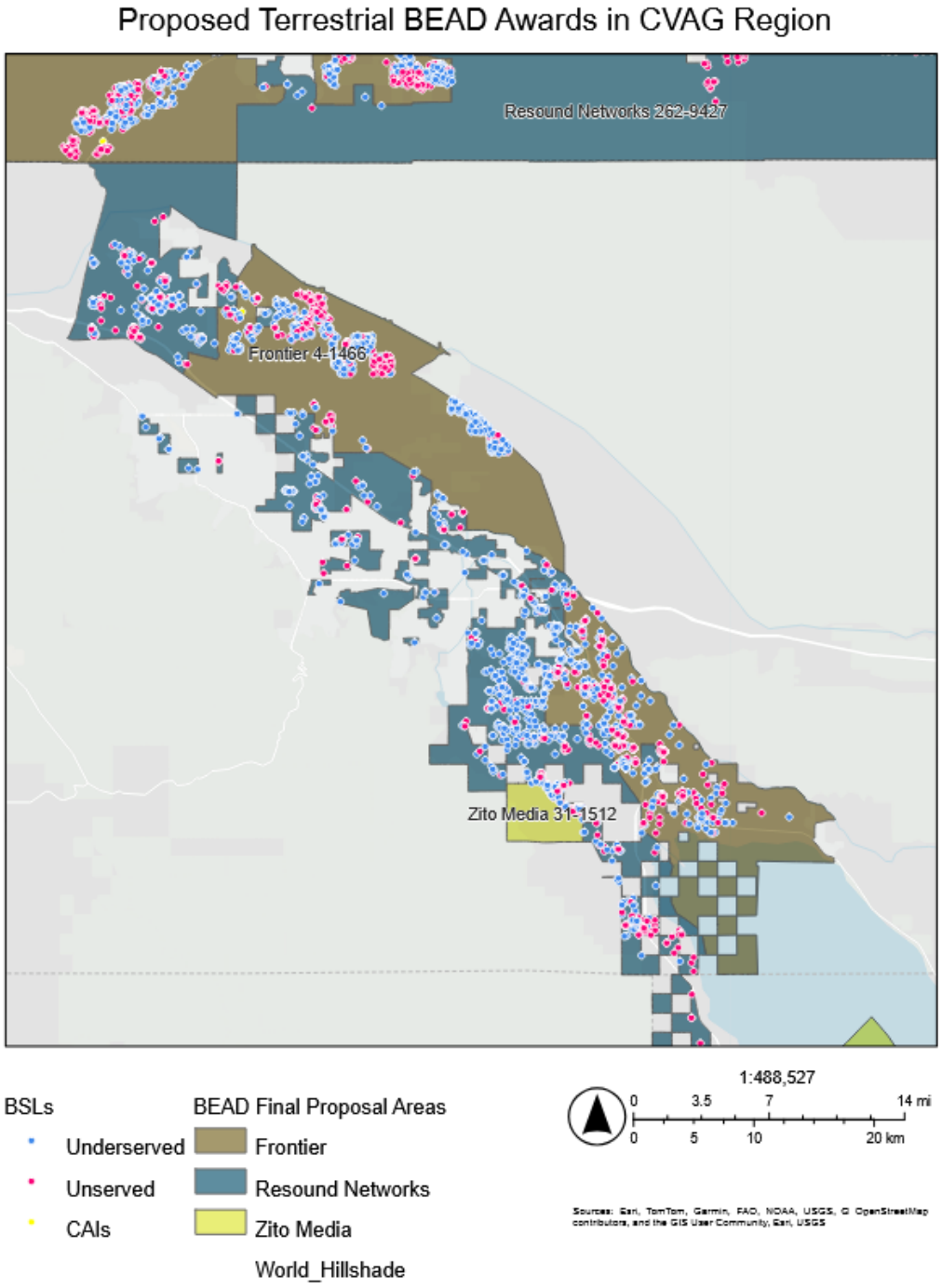
- Resound Networks
- Frontier Networks
- Amazon Kuiper
- Zito Media

Although it is difficult to define specific numbers of eligible addresses that will be served in these awards, Riverside County in its 2023 Broadband Master Plan identified 67,244 addresses that did not have internet subscriptions. The CPUC's BEAD final proposal to NTIA is meant to provide coverage for all eligible addresses. As of May 2026, CPUC's final proposal has not been approved by NTIA.

Proposed BEAD Awards in Riverside County



Excluding the Satellite-technology awards, the awards map includes many locations awarded to Frontier (4-1466), Resound Networks (262-9427), and Zito Media (31-1512):[iv]



LAST MILE FEDERAL FUNDING ACCOUNT (FFA)

In July 2021, Senate Bill 156[v] established the Last Mile Federal Funding Account (FFA) as the state's principal last-mile broadband grant mechanism.[vi] The CPUC has approved approximately $1.23 billion across 122 FFA broadband projects spanning all 58 California counties and affect more than 2 million Californians statewide.[vii]

In the CVAG area, two grants were awarded:

County	Amount	Grantee	Project Name	Award Document & Date
Riverside	$8,944,468	City of Indio	City of Indio Last Mile Infrastructure Project	T17833, 20240822
Riverside	$2,008,124	Frontier	Riverside 1	T17833, 20240822

Figure 1 - BEAD Grant Recipients

The following map illustrates these awards in the CVAG region:



Figure 2: FFA Awards in the CVAG Area

During this broadband study, there was an award for a Future Funding Account project in the Coachella Valley. This was awarded to Indio for the City to build fiber as part of their connectivity plan that includes CV Sync conduit.

CALIFORNIA ADVANCED SERVICES FUND (CASF)

The California Advanced Services Fund (CASF) is a long-standing broadband funding initiative administered by the CPUC to promote broadband deployment and adoption in unserved and underserved areas.[viii] The CASF Broadband Adoption Account provides grants to support publicly accessible broadband access, after-school connectivity, and digital inclusion initiatives.[ix]

CASF Broadband Adoption Account

The CPUC's Adoption Account Guidelines set rules for CASF Broadband Adoption Account grants that increase publicly available or after-school broadband access and deliver digital inclusion services such as digital literacy training and public education in communities with low broadband adoption, and they prohibit using Adoption Account funds to subsidize household broadband service. Eligible projects must fit one of three categories, digital literacy, broadband access, or call center projects focused on broadband adoption, and CPUC may fund up to 85 percent of eligible project costs. Applications are accepted on a rolling basis with the next upcoming batch deadline ending on July 1, 2026.[x]

The revised set of rules for these grants was updated in late 2025 to streamline the application process and align the program with newer state and federal digital equity goals.[xi] For California Tribes, the CPUC is currently coordinating regional workshops to gather feedback before opening a dedicated application window for Tribal consortia later in the year. Tribes and their representatives can coordinate with the Office of the Tribal Advisor at TribalAdvisor@cpuc.ca.gov for more information on these upcoming opportunities.

Infrastructure Account

The California Advanced Services Fund (CASF) Infrastructure Account provides capital grants to offset the cost of middle-mile and last-mile broadband infrastructure in unserved and underserved areas of California. Program eligibility thresholds, minimum performance standards, and related compliance requirements are established in statute and implemented through CPUC decisions and formal application guidance.[xii] The most recent published application deadline for the Infrastructure Account was October 31, 2025. As of now, the CPUC has not yet announced the next round timeline.

CASF Broadband Public Housing Account

The CASF Broadband Public Housing Account finances up to 100% of the costs to install broadband networks in qualifying low-income communities, with the next 2026 application deadline due July 1.[xiii] Advanced registration is available for CASF Broadband Public Housing Account Grant Application Instructions for Infrastructure Projects and CASF Broadband Public Housing Account Grant Application Instructions for Internet Extension Projects.

Broadband Loan Loss Reserve Fund

The Broadband Loan Loss Reserve Fund is administered by the California Department of Community Services and Development previously provided loans and loan guarantees of up to $50 million to support local governments in financing public broadband networks.

The Broadband Loan Loss Reserve Fund is administered by the CPUC and previously provided credit enhancements to support local governments in financing public broadband networks. While the fund was established with a total allocation of $750 million, the Commission recently authorized at least $50 million to be awarded to applications following the initial 2024 cycle.

California Emerging Technology Fund

The California Emerging Technology Fund supports public information campaigns and digital literacy initiatives, with an operations budget exceeding $3.5 million for the 2025–26 fiscal year.

Rural and Urban Regional Broadband Consortia Grant

The Rural and Urban Regional Broadband Consortia Grant Account accepted applications for the 2026 grant cycle through February 20, 2026, for projects scheduled to begin in July 2026.[xiv]

Applications will open for tribes later in the year.[xv] For more details, email the Office of the Tribal Advisor (TribalAdvisor@cpuc.ca.gov).

Line Extension Pilot Program

The CASF Line Extension Program (created by AB 1665 as a pilot within the CASF Broadband Infrastructure Grant Account) allows an individual household, property owner, or group (including via a representative) to apply for an infrastructure grant intended to offset the costs of connecting a household or property to an existing or proposed facility-based broadband provider. CPUC describes the program as accepting applications on a rolling basis.

Tribal Technical Assistance Program.

The Tribal Technical Assistance Grant Program provides technical assistance funding for California Tribes and Tribal Consortia pursuing improved voice and broadband communications (e.g., planning and pre-application work products such as market/feasibility studies, business plans, and grant writing). Applications may be submitted at any time, but CPUC processes them in quarterly batches with the next relevant deadlines being April 1, 2026 and July 1, 2026.

Digital Divide Grant Program

The CPUC accepted applications for Round 3 of the 2025–26 Digital Divide Grant Program from December 12, 2025 through February 12, 2026.[xvi] Staff review and scoring is scheduled to be completed by March 12, 2026, with notices of award to be adopted in May 2026. This round will award three grants totaling $200,000 to public schools and nonprofit community-based organizations to address localized broadband access gaps and provide devices to students.

California Teleconnect Fund

The California Teleconnect Fund provides a 50% discount on advanced communications services for eligible schools, libraries, hospitals, and nonprofit organizations, with an adopted budget of $108.583 million for Fiscal Year 2024–25.[xvii]

FEDERAL BROADBAND PROGRAMS

FCC, UNIVERSAL SERVICE FUND (USF), AND USAC PROGRAMS

The Federal Communications Commission administers broadband affordability and anchor-institution connectivity programs through the Universal Service Fund (USF), with program operations delegated to the Universal Service Administrative Company (USAC).

Rural Digital Opportunity Fund

Projects funded under legacy FCC deployment programs remain under active construction. Rural Digital Opportunity Fund Phase I awarded approximately $9.2 billion, and participating providers remain subject to multi-year deployment and reporting milestones monitored by the FCC.[xviii] Connect America Fund Phase II recipients are in the deployment verification stage in 2026 and are required to file annual progress reports and complete infrastructure buildouts to 100% of supported locations as a condition of support.

Lifeline & Affordable Connectivity Program

The Affordable Connectivity Program (ACP) formally ended on June 1, 2024, eliminating the $30 monthly broadband subsidy previously available to low-income households.[xix] As of 2026, the Lifeline program is the sole remaining federal consumer broadband affordability mechanism, providing a monthly discount of up to $9.25 for eligible households or up to $34.25 for households on Tribal lands.

E-Rate

The FCC's E-Rate program continues to provide schools and libraries with discounts ranging from 20% to 90% for eligible broadband and telecommunications services.[xx] For the 2026–2030 funding cycle, Category 2 budget amounts were increased by 20.7% to reflect inflation and higher technology costs. The FY2026 filing window opened January 21, 2026, will close con April 1, 2026, and requires FCC Form 470 submission by March 4 2026.

FCC Form 470 have to be submitted by March 4, 2026, to satisfy the minimum 28-day posting requirement within the window.

Healthcare Connect Fund

The Healthcare Connect Fund, administered by USAC, provides a 65% subsidy for eligible broadband services and network infrastructure for health care providers, including network construction where applicable.[xxi] The FY2026 filing window opened from December 1, 2025, and runs through April 1, 2026.

USDA BROADBAND PROGRAMS

ReConnect

The U.S. Department of Agriculture (USDA) ReConnect Program provides grants, loans, and loan-grant combinations for broadband deployment in rural areas that do not meet the FCC broadband definition.[xxii] Congress approved approximately $96 million for ReConnect funding in Fiscal Year 2026, while legislative proposals introduced in late 2025 seek to restructure the program to provide up to $650 million annually through 2030, prioritizing areas where 90% of households lack broadband access.

Under the USDA Rural Utilities Service portfolio, eligibility requirements vary by program. The Telecommunications Infrastructure Loan Program supports broadband construction and expansion in rural communities with populations of 5,000 or fewer. The Rural Broadband Access Loan Program finances broadband facilities in eligible rural areas where at least 15% of households lack broadband service. Community Connect Grants are targeted to very low-income rural communities with populations under 20,000 and are designed to fund last-mile infrastructure where broadband service is not otherwise available.

In addition to ReConnect, the USDA Rural Utilities Service administers multiple broadband financing mechanisms, including the Telecommunications Infrastructure Loan Program, the Rural Broadband Access Loan Program, Community Connect Grants for very low-income rural communities, and Distance Learning and Telemedicine grants supporting broadband connectivity for education and healthcare providers.[xxiii] Community Connect Grant recipients are required to provide free broadband service to at least one community center for a minimum of two years.

Economic Development Administration (EDA)

The U.S. Economic Development Administration administers Economic Development Assistance grants under which broadband infrastructure is an eligible expense when it can be directly tied to job creation and regional economic development outcomes.[xxiv]

Housing and Urban Development (HUD)

The U.S. Department of Housing and Urban Development administers the Community Development Block Grant (CDBG) program, under which broadband infrastructure is an eligible expense when projects address qualifying community development needs in entitlement and non-entitlement jurisdictions, although broadband use of CDBG funds has historically been limited.[xxv]

APPLYING FOR GRANTS

CVAG and most jurisdictions are likely familiar with grant application processes. Rather than discuss those, this section defines tools this broadband study has developed to help in the grant process.

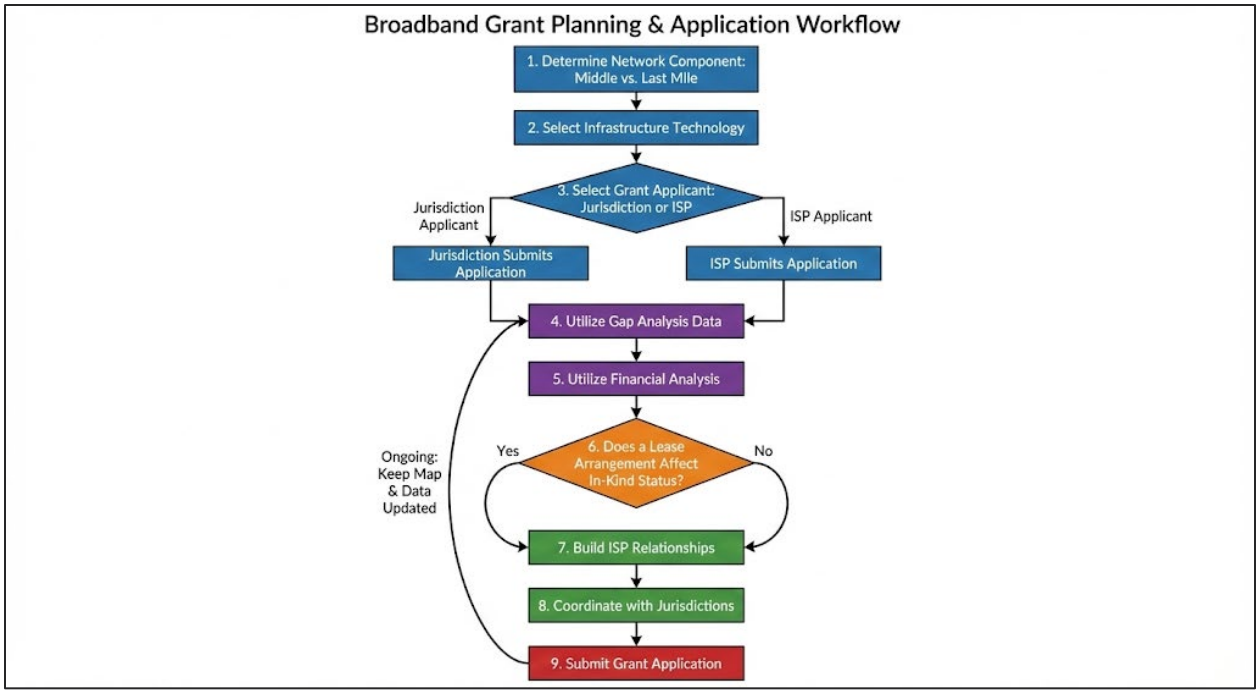


Figure 3: Grant application workflow (high-level).

CHOOSE THE INFRASTRUCTURE AND BUSINESS MODEL

The first detail to clarify is if the need is for middle mile (an analogy being the highway) or last mile (from the middle mile to the address). Services are, typically, provided by the last mile part of the network, not the middle mile.

Next, the decision will have to be made as to what infrastructure to use (aerial or buried fiber, fixed wireless, cable, copper, digital subscriber line (DSL), satellite, radio frequency (RF) links, Citizens Broadband Radio Service (CBRS), etc.). In many jurisdictions, utilities rely on RF links for operational connectivity. Most internet services are provided via fiber, fixed wireless, cable, copper, DSL, or satellite.

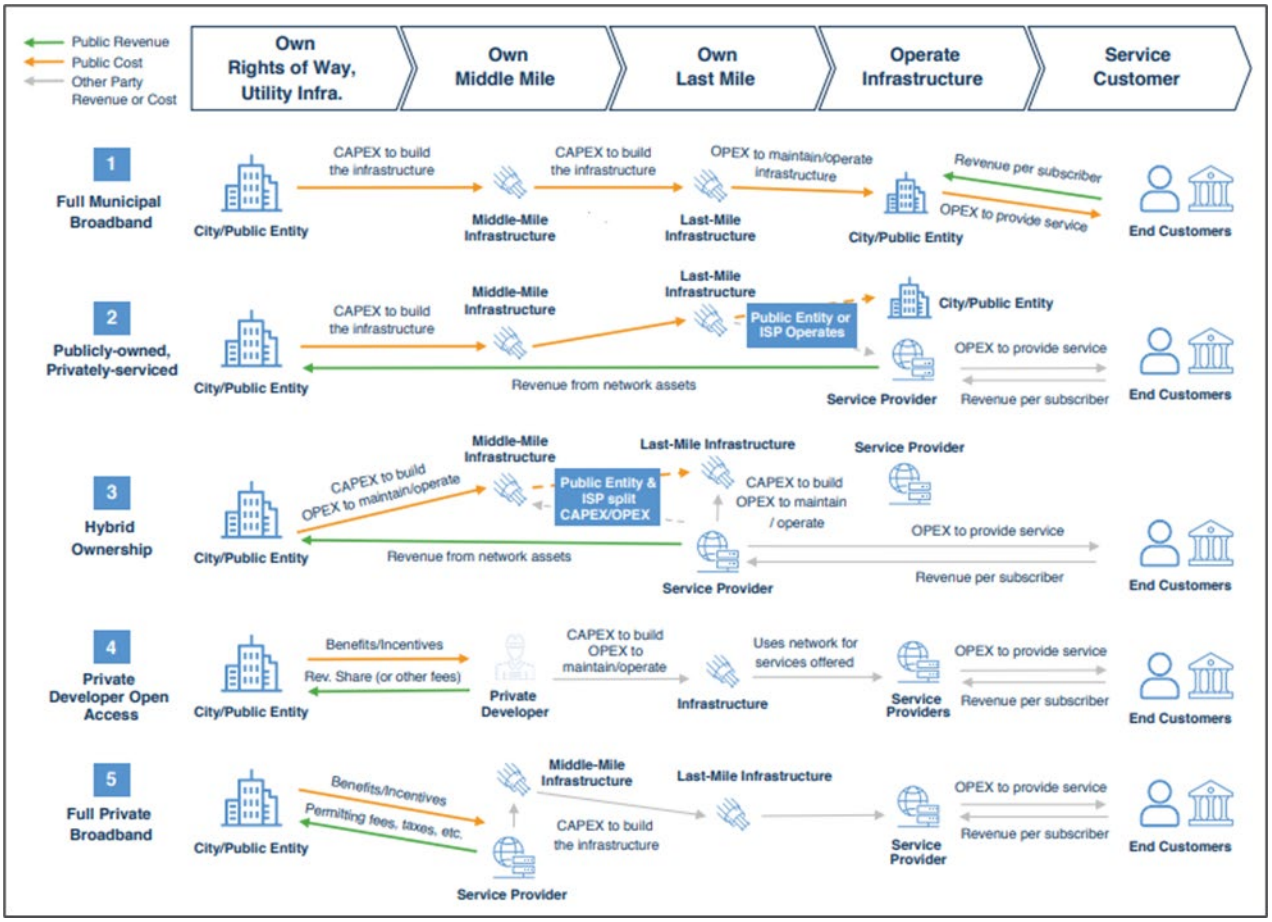


Figure 4 - Network Components and Business Models

Next, the decision will have to be made as to what infrastructure to use (aerial or buried fiber, fixed wireless, cable, copper, DSL, satellite, RF, CBRS, etc.). In most jurisdictions, the utilities are connected by an RF (Radio Frequency) system. Most internet services are provided by fiber, fixed wireless, cable, copper, DSL or satellite).

The most reliable and highest speed and capacity is fiber. It is also usually the most expensive. It could be beneficial for jurisdictions to think in terms of whenever they are upgrading any of their connectivity technologies, is there a possibility of upgrading technologies and could there be grants available. These types of steps can help develop a network to reach unserved and underserved addresses while achieving the upgrade the jurisdiction pursued.

When the component of the network is defined and the technology that will be utilized, the jurisdiction must select the business model. Basically, the question is will the jurisdiction own all or part of the component or will they rely on an ISP.

The outcome of that decision defines who will submit the application for the grant.

UTILIZE THE DATA IN THE GAP ANALYSIS

As part of the broadband study, a Gap Analysis was conducted. Several steps were taken to derive the inputs and results of the Gap Analysis. A survey was completed, stakeholder meetings were conducted, jurisdiction CIP information was included, CV Sync data was converted to GIS, the State Middle Mile Broadband Initiative (MMBI) was included, etc. CVAG has a map that shows the details of this phase of the project.

This map and the data could be important in applying for a grant in several ways:

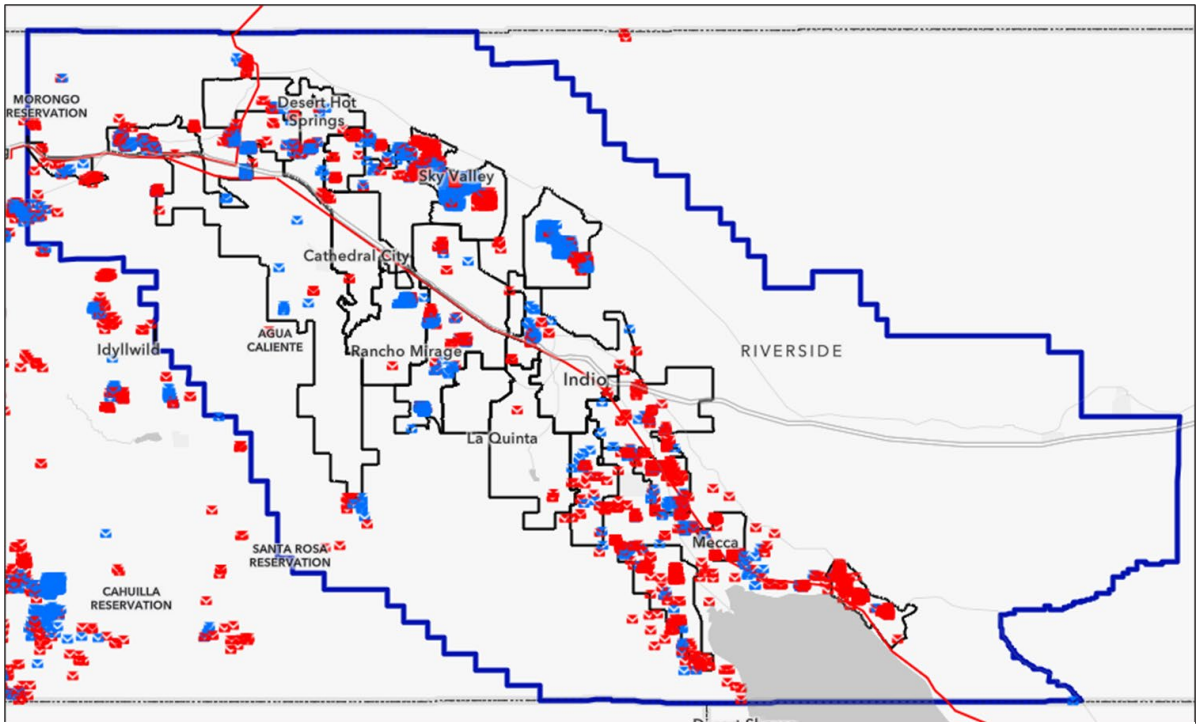


Figure 5 - CVAG Gap Analysis Map

- Unserved and underserved addresses: The Federal and State eligibility maps change frequently, so it is necessary to verify data. However, the data in the CVAG map was derived from the eligibility maps, speed test data and survey information. Unless a grant was given to reach these addresses, there is data to use in grant applications
- The map shows where there is conduit from CV Sync and potential CIP projects. This can be used to determine costs. Showing lower costs could help with a grant application's competitiveness
- Middle mile is also displayed, particularly the MMBI route is shown. This could be another significant cost factor. New network has to get to middle mile. There could be other middle mile in the Coachella Valley, but the Regional Broadband GIS Map shows the prominent MMBI middle mile if there is not another middle mile route

Checking the map and the data for each grant opportunity could provide valuable data and possibly save time.

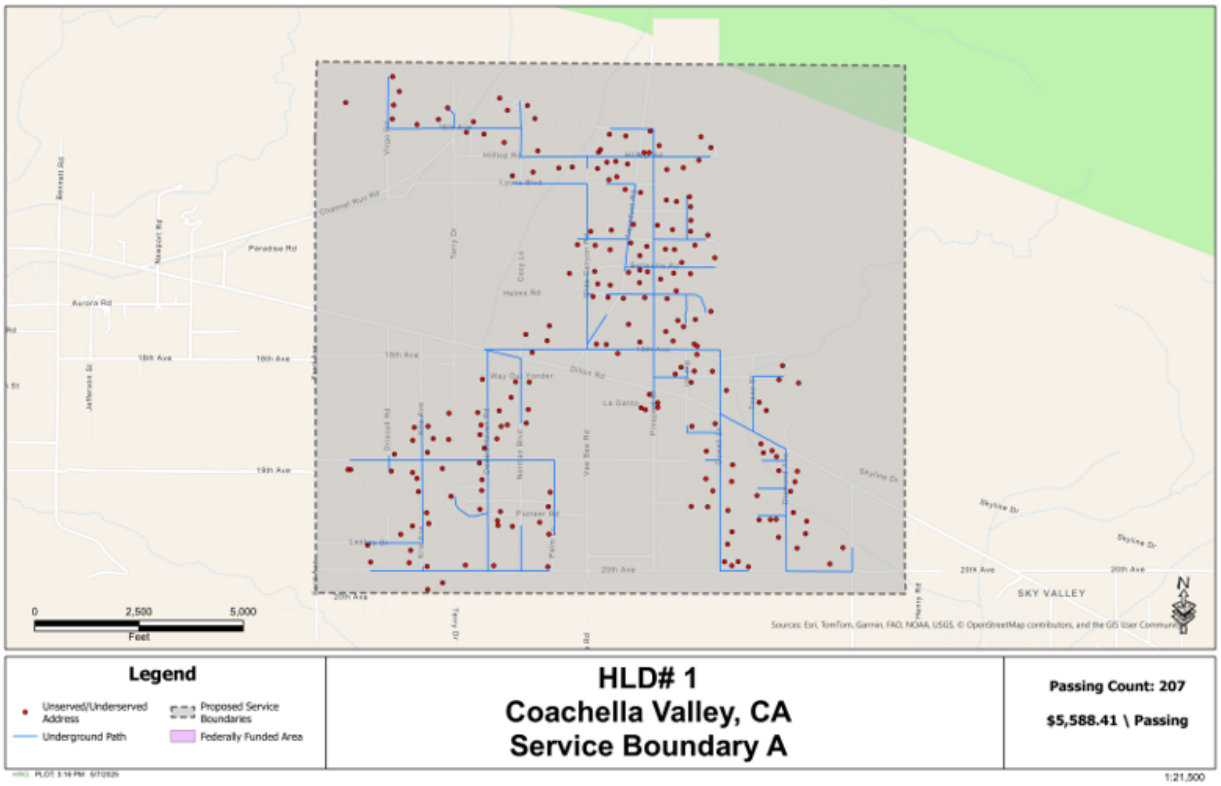
UTILIZE THE INFORMATION IN THE FINANCIAL ANALYSIS

As part of this study, there is also a financial analysis of specific network options. If a jurisdiction is considering applying for a grant, these numbers could be useful in developing the cost section of the grant application. Because costs fluctuate frequently and can change dramatically, it is important to get new numbers for a grant application, but the financial analysis can provide maps of addresses and cost numbers to work from.

The financial analysis includes specific areas with total costs and costs per each address. These numbers are Capital Expense (CapEx) numbers. The report also includes guideline numbers if a jurisdiction desires to pursue a grant to build and operate a network. The operations expense costs (OpEx) are only needed for the entity that plan on providing continued operations of the network.

If a jurisdiction selects the business model in which an ISP pursues the grant to build and operate the network, the ISP would likely do their own analysis and provide their numbers. In that instance, it could be helpful to them to show the maps and numbers in the CVAG map to see if they would be helpful to save the ISP time or provide a comparison.

The following map is one section in the Coachella Valley with the counts and costs associated with that specific area. For further clarification of these numbers, please refer to the Financial Analysis deliverable.



Engineering	95,251
Materials	210,038
Construction - AER	-
Construction - UG	851,513
Total Cost	$ 1,156,801.60

Passings	207
Cost Per Passing	$ 5,588.41

Figure 4 - Area # 1 Service Boundary A
Map and Summary Costs

Figure 6 - Financial Analysis Of One Area In the Coachella Valley

CHECK FOR IN KIND CONTRIBUTIONS

One important specific grant related component of the CVAG Regional Broadband GIS Map is the available conduit (from CV Sync and/or jurisdictions). As mentioned previously, being able to use existing conduit can lower costs dramatically, likely improving the competitiveness of the application.

It is also possible that the conduit could be considered and "in kind" contribution, which might lower the amount of match required for the grant. Particularly for jurisdictions considering building their own network, the value of the conduit can often be applied to any matching funds requirement.

In working with an ISP, it will be important to see if that could still be the case. If the jurisdiction is leasing the conduit to the ISP, the question will be whether the CapEx cost could be applied to the match requirement or if it would not apply because the use of the conduit is still being paid for (even though the lease is an OpEx expense).

ISP RELATIONSHIPS

Several steps were taken in the CVAG Broadband Deployment Study to build relationships with ISPs. An initial outreach was performed to all ISPs who could be identified as either being in the Coachella Valley or might have interest in building in the area.

A Request For Expressions of Interest (RFEI) was conducted with five ISPs responding. Follow up conversations were conducted with each of the five. Also, there were additional conversations with ISPs who did not respond formally, but who expressed an interest after the RFEI was conducted.

The contact information and information from ISPs is in the Partner RFP deliverable and in the Market Assessment.

Continuing and deepening these relationships could be important for broadband improvements in the Coachella Valley. Two particular suggestions could have significant implications:

- When grants become available, sending out the grant announcements and information could be helpful to the ISPs (which could increase chances for grant dollars coming into the Coachella Valley). Typically, the ISPs will know about grants, but this can help ensure that
- Having regular meetings with the ISPs can help provide the platform to discuss ideas, broadband challenges that arise, plans the ISPs have, grant opportunities, other synergies, etc.

COORDINATION WITH JURISDICTIONS

Through the process of this broadband study, there has been a monthly meeting of the Strategic Advisory Group (SAG). The group consisted of mainly the Information Technology Directors of the jurisdictions. Public Works Directors, City Engineers, and Economic Development staff were also engaged during the study. Because there will be ongoing broadband steps to take (keeping the map updated, working with MMBI, etc.), it could be important to continue meetings of this group (or some other stakeholder group in the Coachella Valley.

This can be particularly important for grants. Being able to discuss grant opportunities and who will be interesting (either jurisdictions themselves or jurisdictions working with ISPs) can help with a coordinated approach to grant opportunities.

Particularly when ISPs seek support letters, having one group to talk with for those letters would be efficient and it could help show coordinated support (which could increase the competitiveness of the grant application).

Also, it is highly important for the Regional Broadband GIS Map to stay updated. For it to be utilized for grant information (as well as other important needs), if it is not updated, it will become less useful. The SAG or some other stakeholder group that meets regularly and works together to keep the data in the map updated will be necessary.

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California Grants Portal. (2025, December 18). 2025-26 Digital Divide Grant Program - Round 3. California State Library. https://www.grants.ca.gov/grants/2025-26-digital-divide-grant-program-round-3/

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Universal Service Administrative Company. E-Rate. https://www.usac.org/e-rate/

Universal Service Administrative Company. Healthcare Connect Fund program. https://www.usac.org/rural-health-care/healthcare-connect-fund-program/

U.S. Department of Agriculture. ReConnect loan and grant program. https://www.usda.gov/reconnect

U.S. Department of Agriculture. Rural Utilities Service. https://www.usda.gov/rus

U.S. Economic Development Administration. Home. https://www.eda.gov

U.S. Department of Housing and Urban Development. Community Development Block Grant (CDBG). https://www.hud.gov/program_offices/comm_planning/cdbg

DATA COLLECTION

SUMMARY

Data Collection involves several steps and disciplines to collect the information needed to understand broadband in the Coachella Valley. This data forms the basis for the Gap Analysis to define broadband challenges in the area. The information comes from different sources and was brought into maps and reports for analysis and deliverable information. Most of the information is analyzed in other deliverables, which is defined in each data section.

Analysis of the data will not be included in this report, the intention of this deliverable is to list the data sources and display results.

DATA SOURCES

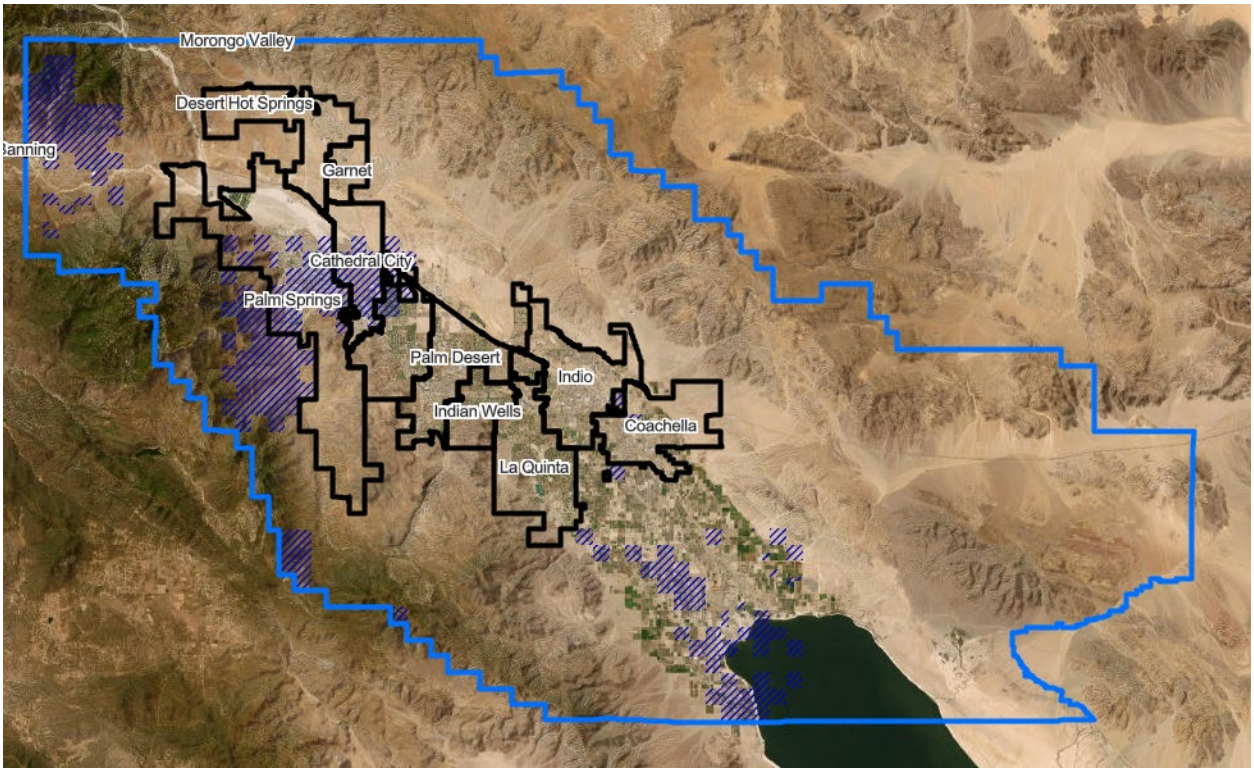
The data sources researched consisted of:

- Jurisdiction boundary and road data
- State of California Middle Mile Broadband Initiative data
- Federal and State of California broadband data (unserved, underserved and grants)
- Jurisdiction Capital Improvement projects
- Internet Service Provider (ISP) information
- Home Owners Association (HOA) information
- Survey and third-party internet speed test results
- Stakeholder Engagement responses

FINDINGS

JURISDICTION BOUNDARY AND ROAD DATA

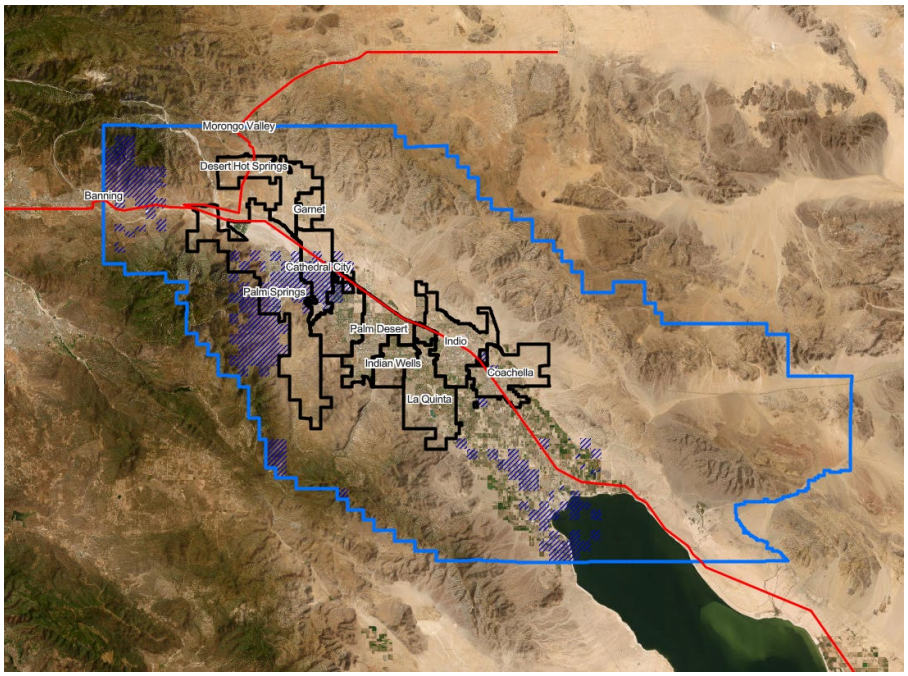
The data to display the jurisdiction boundaries and road data were found in typical GIS map data that is publicly available. The CVAG boundary that is shown in blue is from the CVAG Transportation Uniform Mitigation Fee Boundary.



This data is displayed in the interactive map that has been used throughout this project and will be provided for CVAG to use and update in the future.

STATE OF CALIFORNIA MIDDLE MILE BROADBAND INITIATIVE DATA

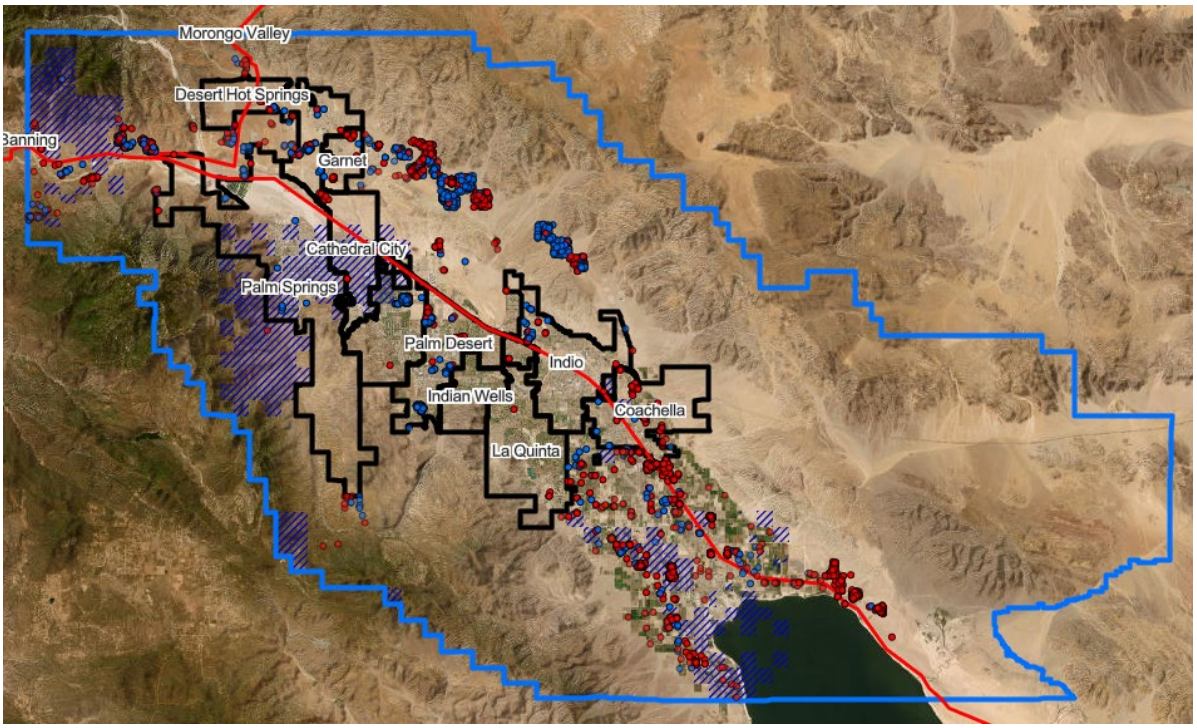
The State of California is currently designing and building/acquiring a middle mile project across the State. The part of the Middle Mile Broadband Initiative (MMBI) that traverses the Coachella Valley is shown in red in the map below (which is a layer of the project interactive map).



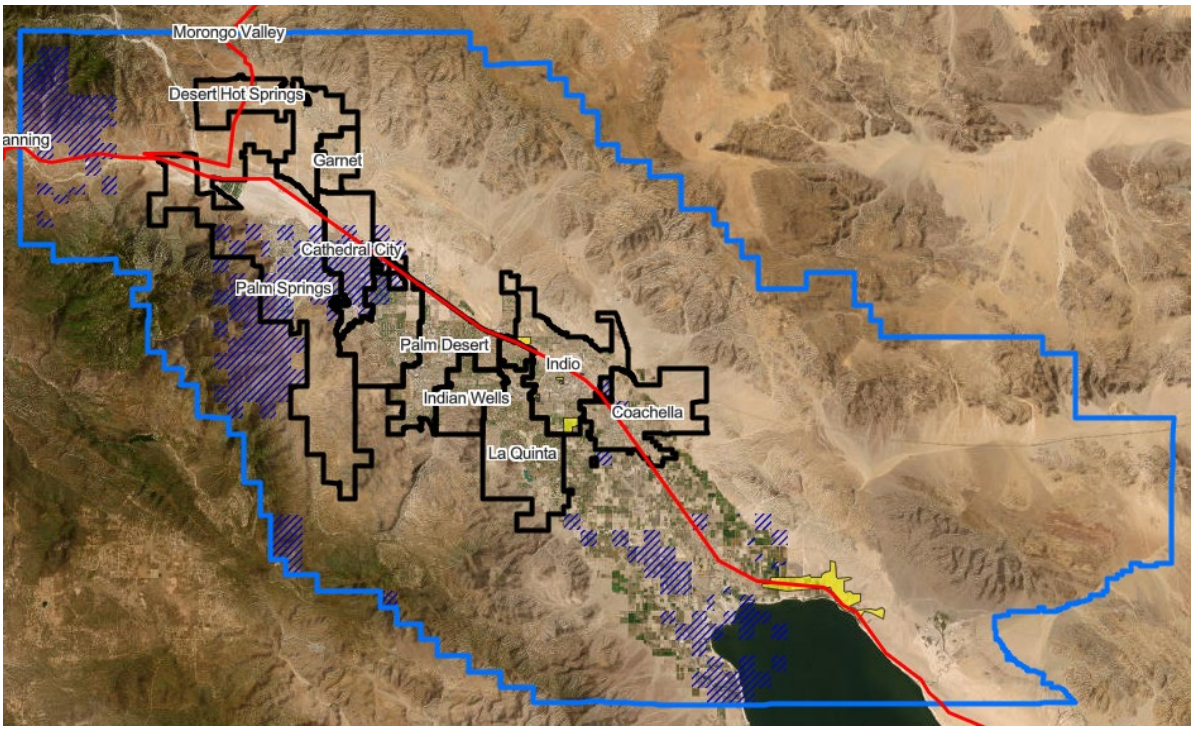
State employees directly involved in the MMBI have been actively involved in this project, attending meetings, providing updates and supplying information regarding the MMBI.

During the process of planning and building the MMBI, some sections of the project were coordinated with other projects, as opposed to building new fiber. Therefore, the State has materials that they have purchased that they will not need. The State was able to provide CVAG and the broadband study advisory group with lists of excess materials and pricing.

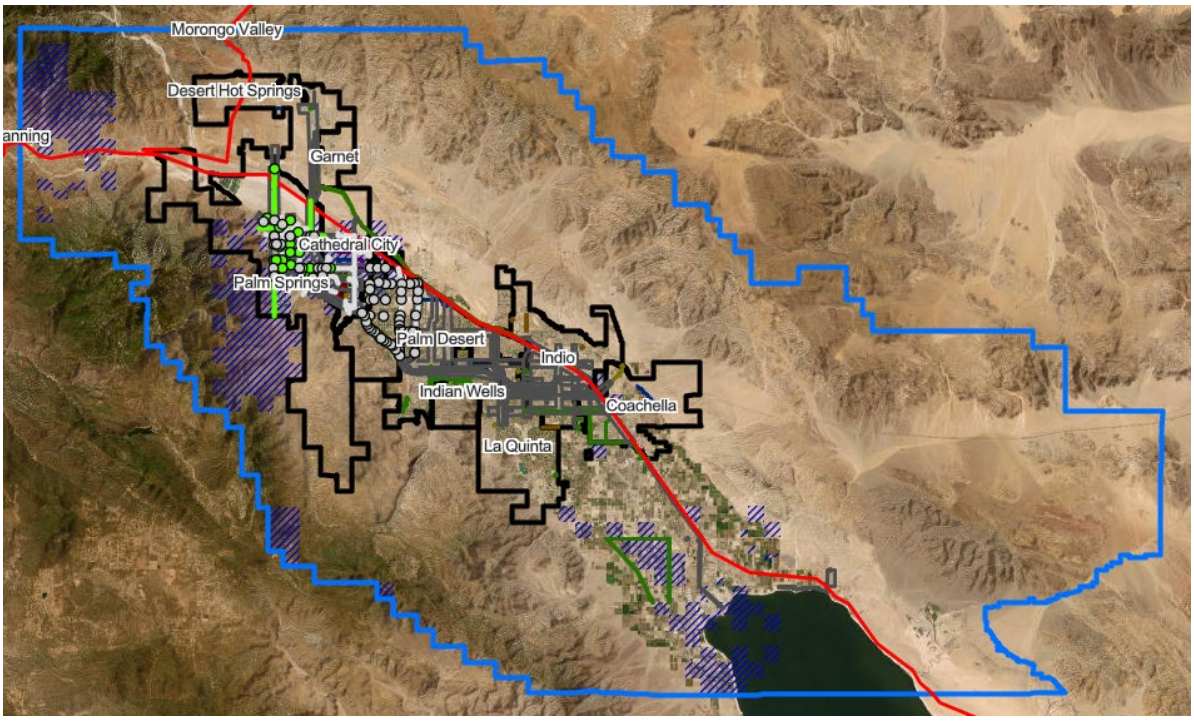
FEDERAL AND STATE OF CALIFORNIA BROADBAND DATA



STATE FEDERAL FUND ACCOUNT GRANT AWARD DATA



JURISDICTION CAPITAL IMPROVEMENT PROJECTS



INTERNET SERVICE PROVIDER (ISP) INFORMATION

In the initial Market Assessment, the following ISPs were identified as providing broadband services in the Coachella Valley:

- EarthLink
- Frontier
- HughesNet
- Pacific Lightwave
- Spectrum (Charter)
- Starlink
- T-Mobile 5G Home Internet
- Verizon 5G Home Internet
- Viasat

The Market Assessment section of this report provides more detail on the services these ISPs provide.

HR Green expanded outreach to other ISPs in the region and to others who expressed an interest in conducting an analysis regarding opportunities in the Coachella Valley. The following are ISPs engaged in discussions regarding broadband in the Coachella Valley:

- Always On
- American Tower
- Anza Electric Cooperative
- Astound Broadband
- AT&T
- CenturyLink/Lumen
- Charter (Spectrum)
- Cityside Fiber

- Consolidated Communications
- Crown Castle
- EarthLink/ One Ring Networks
- EntryPoint
- Frontier
- GeoLinks
- Hotwire Communications
- NetFortris (Sangoma)
- Onward
- Optimum
- Pacific Lightwave
- Race Communications
- SiFi Networks / FiberTel
- Southern California Telephone Company
- T-Mobile
- TPx Communications
- Underline
- Verizon
- Xfinity
- Zayo
- Zito Media

The data regarding their infrastructure and service offerings is self-reported through the Federal Communications Commission.

More information about ISP interactions can be found in the RFP Development and Partner Negotiations sections of this report.

HOME OWNERS ASSOCIATION (HOA) INFORMATION

Riverside County HOAs at a Glance

98% of Riverside County residents live in an HOA

Total county population: 2,361,026*

Number of HOAs: 2,416

Average number of homes in each HOA: 295

Aggregate number of homes in all HOAs (estimated): 713,000

Estimated number of county residents living in HOAs: 2,310,120

Average age of HOAs (estimated): 19 years

Average annual revenues generated by HOAs (estimated): $392,000

Aggregate annual revenue generated by HOAs (estimated): $947 million

CACM Membership Regions



Information provided by:

CACM California Association of Community Managers

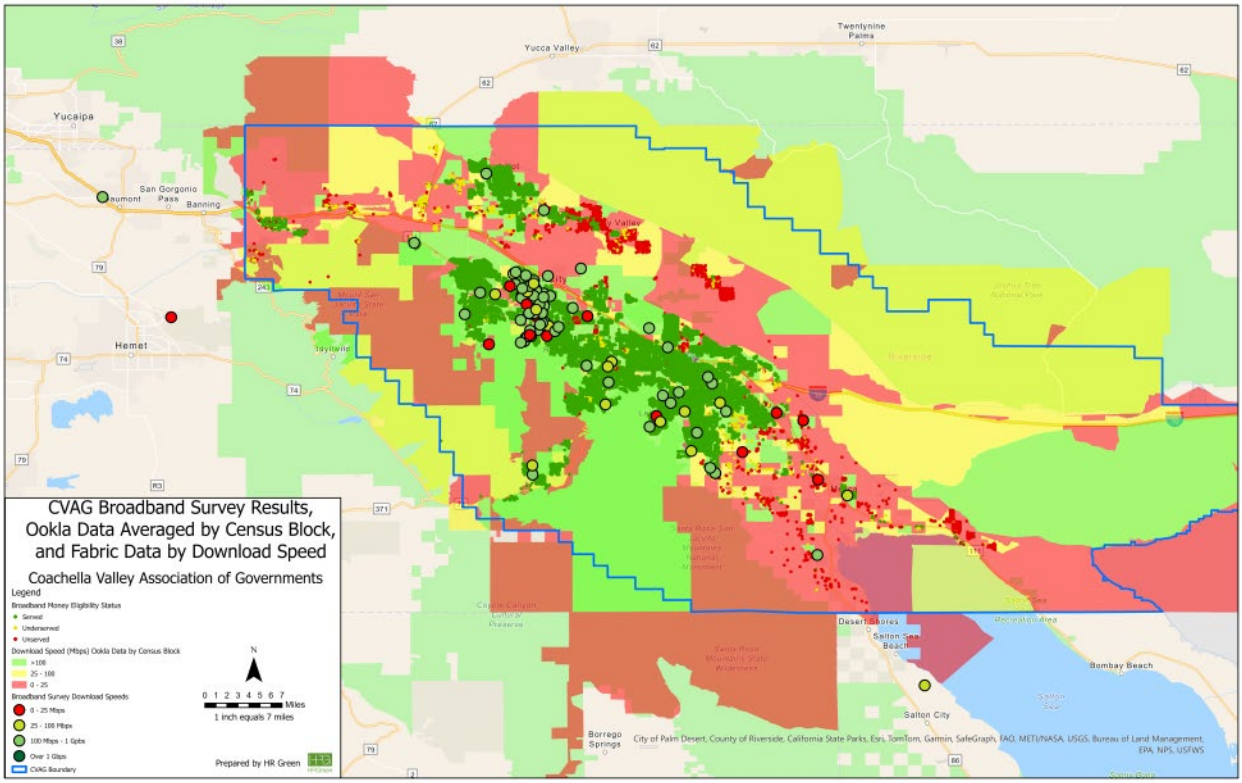
23461 South Pointe Dr., Ste. 200
Laguna Hills, CA 92653
(949) 916-2226 | www.cacm.org | info@cacm.org

*Total population from the U.S. Census Bureau's 2015 Population Estimates Program, based on the 2010 Census; estimated number of residents living in HOAs based on average of 2010-2014 Census reports of 3.24 persons per household (http://quickfacts.census.gov). All other data obtained from the 2016 California Community Association Statistics guide produced by Levy, Erlander & Company, CPAs (www.hoa-cpa.com).

A majority of residents in several jurisdictions in the Coachella Valley live in HOAs. There are factors that impact broadband within HOAs that are different than outside HOAs. Because the streets are private within HOAs, there are public policies regarding ROW that do not apply to the ROW streets. HOAs also often make arrangements with an ISP that only applies within their boundaries.

Because of those differences, the information in this report could be applicable to HOAs but will need to be translated to private streets and relationships with the specific ISP selected for the HOA. The HOAs could find benefits in engaging in the broadband improvement process in potential cost savings (from being part of a larger scale), negotiations with ISPs and in developing broadband standards for their roads.

SURVEY AND THIRD-PARTY INTERNET SPEED TEST RESULTS



Third party speed test data is collected by organizations that record and aggregate results when individuals take speed tests. This information helps validate or question ISP reported speeds and is another actual experience data point with survey results.

STAKEHOLDER ENGAGEMENT RESPONSES

Data collection included meetings with multiple stakeholders to understand their broadband plans, challenges and resources. A full list of stakeholders and their responses can be found in the Needs Assessment section of this report.

MARKET ASSESSMENT

SUMMARY

The significance of broadband coverage has evolved from a mere convenience to a necessity. Many employment opportunities and lifestyle elements, such as education, remote work, economic growth, telemedicine, and more, now rely heavily on robust internet connectivity. Analyzing the competitive landscape of broadband coverage, however, poses considerable challenges due to the ever-changing nature of market dynamics, pricing structures, product offerings, and disparities across different sectors.

The initial step in comprehending the broadband landscape within a community involves delving into industry-reported data. This journey begins with a comprehensive Market Assessment, which entails an in-depth analysis of data provided by broadband service providers regarding their coverage areas. The analysis commences with a comprehensive examination, cataloging, and detailed documentation of the service offerings from each primary provider in the communities comprising the Coachella Valley Association of Governments (CVAG).

As part of their licensing obligations, providers are mandated to report specific data related to their customer base. This data is typically accessible through the Federal Communications Commission (FCC) and other supplementary sources that offer further insights into the broadband ecosystem. Supplemental maps and relevant terminology depicting this information may be found in **Appendix A: Jurisdiction Broadband Service Conditions**.

It is important to acknowledge the inherent flaws within this data. These shortcomings include data exclusivity for reporting requirements. The public has access to the data within the Broadband Data Collection (BDC) reports, but only providers and some types of outside entities have full access to the back-end data necessary for an in-depth market analysis. In addition, reporting and display cycles can render the submitted information outdated before it becomes available for analysis. There are also limited consequences for inaccurate reporting and data entry errors, and some providers may have secondary motives to exaggerate their coverage, as it could affect their eligibility for grants. In addition, data is recorded at the census block level, potentially masking variations within that area when data is pulled to represent an entire block.

However, this data serves as the foundational dataset from which to initiate further analysis. It is also pivotal in securing federal and state grants. If inaccuracies persist, correcting them becomes imperative to ensure fair distribution of resources.

Given these data challenges, a high-level market assessment cannot be solely relied upon. Instead, it serves as a starting point for understanding coverage and identifying areas that necessitate validation against actual survey data. A word of caution is essential: conducting a market analysis without obtaining real-world feedback may lead to substantial inaccuracies. To cross-reference the Market Assessment results, HR Green will conduct a community-wide survey and stakeholder interviews, both of which are discussed in other chapters of this report. Such feedback illuminates not only the actual practices of providers, but also pricing structures, customer satisfaction levels, and identifies unmet demands or underserved segments of the market.

KEY FINDINGS

- 8 of the 9 internet providers in CVAG communities offer residential service.
- There are 9 residential internet options in CVAG service area from 8 residential internet providers.
- 8 of the 9 internet providers in CVAG communities offer business service.
- There are 9 business internet options in the CVAG service area from 8 business internet providers.
- Approximately 100% of households will have internet options from more than one provider.
- Those living in a zip code associated with CVAG have access to DSL, which covers an average of 90%. Cable is an internet option for an average of 89% within the CVAG service area. Similarly, fiber-optic internet is also an option for internet, offering service to an average of 82% of those living in a CVAG community listed zip code.

RESIDENTIAL AND BUSINESS SERVICE PROVIDERS OVERVIEW

The residents and businesses in the CVAG communities can obtain internet access services from a variety of internet service providers (ISPs) and wireless internet service providers (WISPs) via Digital Subscriber Line (DSL) (over copper), cable, fiber, DSL, satellite, fixed wireless, and mobile wireless. This assessment focused on 18 internet service options from a total of 9 providers that offer services to 5% or more of the residents and/or businesses within the city limits:

- 3 Wired Internet Service Providers (DSL/Cable/Fiber): EarthLink, Frontier, and Spectrum
- 2 Mobile Wireless Internet Service Providers: T-Mobile 5G Home Internet and Verizon 5G Home Internet
- 3 Satellite Internet Service Providers: HughesNet, Starlink, and Viasat
- 1 Fixed Wireless Internet Service Provider: Pacific Lightwave

The following statistics offer insights into Internet availability categorized by transport medium (DSL, cable, etc.) in CVAG's service area, drawing upon data from Broadband Money, a tool used for broadband grant applications and its associated research. Broadband Money draws its information from the FCC. The program references Broadband Serviceable Locations (BSLS), which refers to a "business or residential location in the United States at which mass-market fixed broadband internet access service is, or can be, installed" [xxvi]. For this analysis, BSLS has been simplified to "addresses," meaning locations with a known address within CVAG communities that do not include community anchor institutions or buildings with multiple offices. Each address is further broken into category type, which has been defined below. Note that these values are contingent on multiple variables and are meant to be used as a guide.

CVAG **177,054** Addresses/**264,913** Dwellings or Suites	**37** Addresses per centerline mile (avg) **71** Addresses per square mile (avg)

Residential **154,784** Addresses **189,853** Dwellings or Suites	**Business** **12,177** Addresses **25,496** Dwellings or Suites	**Agriculture** **44** Addresses **60** Dwellings or Suites
Community **457** Addresses **1,624** Dwellings or Suites	**Mixed Use** **9,470** Addresses **47,682** Dwellings or Suites	**Other** **122** Addresses **198** Dwellings or Suites

CITATIONS

Broadband Data Collection. “About the Fabric: What a Broadband Serviceable Location (BSL) Is and Is Not.” July 18, 2023. https://help.bdc.fcc.gov/hc/en-us/articles/16842264428059-About-the-Fabric-What-a-Broadband-Serviceable-Location-BSL-Is-and-Is-Not

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Costquest Associates, Inc. “FCC Broadband Serviceable Location Fabric Methods Manual,” June 27, 2023. https://us-fcc.app.box.com/v/Fabricmethodsmanuals/file/1248405048870?sb=/details

Additional data was drawn from the websites of each ISP, as well as some of the data was drawn from the following dedicated websites.

- All Connect (https://www.allconnect.com)
- Broadband Now (https://broadbandnow.com)
- Broadband Search (https://www.broadbandsearch.net)
- Business Internet (https://businessinternet.com)
- High Speed Internet (https://www.highspeedinternet.com)
- In My Area (https://www.inmyarea.com)

The following ISPs and WISPs are available for residents and businesses in CVAG’s service area:

- EarthLink
- Frontier
- HughesNet
- Pacific Lightwave
- Spectrum (Charter)
- Starlink
- T-Mobile 5G Home Internet
- Verizon 5G Home Internet
- Viasat

RESIDENTIAL INTERNET SERVICE PROVIDERS IN THE CVAG SERVICE AREA

This assessment focused on 9 residential internet options in CVAG communities from 8 residential internet providers. The table below lists the residential ISPs and WISPs in CVAG communities and identifies the type of service provided.

Municipality or Tribe	EarthLink Coverage, Provider Type (Average)	Frontier Coverage, Provider Type (Average)	HughesNet Coverage, Provider Type (Average)	Spectrum Coverage, Provider Type (Average)	Starlink Coverage, Provider Type (Average)	T-Mobile 5G Home Internet Coverage, Provider Type (Average)	Verizon 5G Home Internet Coverage, Provider Type (Average)	Viasat Coverage, Provider Type (Average)
Cathedral City	92.4% DSL, Fiber	65.4% Fiber	100% Satellite	97.6% Cable	100% Satellite	20.7% Mobile Wireless	29.2% Mobile Wireless	100% Satellite
Coachella	92.4% DSL, Fiber	66.3% Fiber	100% Satellite	94.3% Cable	100% Satellite	8.4% Mobile Wireless	38.3% Mobile Wireless	100% Satellite
Desert Hot Springs	92.4% DSL, Fiber	53.3% Fiber	100% Satellite	87.9% Cable	100% Satellite	11.5% Mobile Wireless	25.6% Mobile Wireless	100% Satellite
Indian Wells	92.4% DSL, Fiber	50.8% Fiber	100% Satellite	98.7% Cable	100% Satellite	39.0% Mobile Wireless	57.5% Mobile Wireless	100% Satellite
Indio	92.4% DSL, Fiber	88.5% Fiber	100% Satellite	96.3% Cable	100% Satellite	12.0% Mobile Wireless	32.8% Mobile Wireless	100% Satellite
La Quinta	92.4% DSL, Fiber	100% Fiber	100% Satellite	97.9% Cable	100% Satellite	26.1% Mobile Wireless	41.0% Mobile Wireless	100% Satellite
Palm Desert	92.4% DSL, Fiber	56.5% Fiber	100% Satellite	96.1% Cable	100% Satellite	23.3% Mobile Wireless	35.4% Mobile Wireless	100% Satellite
Palm Springs	92.4% DSL, Fiber	65.4% Fiber	100% Satellite	96.1% Cable	100% Satellite	40.1% Mobile Wireless	78.4% Mobile Wireless	100% Satellite
Rancho Mirage	92.4% DSL, Fiber	89.6% Fiber	100% Satellite	97.6% Cable	100% Satellite	10.9% Mobile Wireless	38.1% Mobile Wireless	100% Satellite
Agua Caliente Band of Cahuilla Indians*	92.4% DSL, Fiber	75.5% Fiber	100% Satellite	96.1% Cable	100% Satellite	30.8% Mobile Wireless	42.9% Mobile Wireless	100% Satellite
Augustine Band of Cahuilla Indians*	92.4% DSL, Fiber	31.8% Fiber	100% Satellite	8.6% Cable	100% Satellite	NA	23.5% Mobile Wireless	100% Satellite
Cabazon Band of Mission Indians*	92.4% DSL, Fiber	54.6% Fiber	100% Satellite	52.0% Cable	100% Satellite	10.2% Mobile Wireless	29.5% Mobile Wireless	100% Satellite

Torres Martinez Desert Cahuilla Indians*	66.8% DSL, Fiber	56.9% Fiber	100% Satellite	52.0% Cable	100% Satellite	10.9% Mobile Wireless	22.8% Mobile Wireless	100% Satellite
Twenty-Nine Palms Band of Mission Indians*	92.4% DSL, Fiber	88.5% Fiber	100% Satellite	96.3% Cable	100% Satellite	12.0% Mobile Wireless	32.8% Mobile Wireless	100% Satellite

TABLE 1: RESIDENTIAL INTERNET OPTIONS
*Note that coverage and ISP availability for Tribes are based on zip code coverage, not specific locations owned by the Tribes.

BUSINESS INTERNET SERVICE PROVIDERS IN THE CVAG SERVICE AREA

This assessment focused on 9 business internet options in CVAG communities from 8 business internet providers. The table below lists the business ISPs and WISPs in CVAG communities and identifies the type of service provided.

Municipality or Tribe	Frontier Coverage, Provider Type (Average)	HughesNet Coverage, Provider Type (Average)	Spectrum Coverage, Provider Type (Average)	Starlink Coverage, Provider Type (Average)	T-Mobile 5G Home Internet Coverage, Provider Type (Average)	Verizon 5G Home Internet Coverage, Provider Type (Average)	Viasat Coverage, Provider Type (Average)
Cathedral City	64.9% Fiber	100% Satellite	NA	100% Satellite	22.0% Mobile Wireless	NA	100% Satellite
Coachella	65.8% Fiber	100% Satellite	6.5% Cable, Fiber	100% Satellite	8.8% Mobile Wireless	NA	100% Satellite
Desert Hot Springs	70.7% Fiber	100% Satellite	6.2% - 16.4% Cable, Fiber	100% Satellite	6.4% - 17.2% Mobile Wireless	NA	100% Satellite
Indian Wells	51.1% Fiber	100% Satellite	NA	100% Satellite	NA	NA	100% Satellite
Indio	77.1% - 89.9% Fiber	100% Satellite	Up to 6% Cable, Fiber	100% Satellite	9.7% - 15.2% Mobile Wireless	6.1% Mobile Wireless	100% Satellite
La Quinta	86.3% Fiber	100% Satellite	NA	100% Satellite	27.4% Mobile Wireless	NA	100% Satellite
Palm Desert*	7.6% - 91.4% Fiber	100% Satellite	Up to 6.3% Cable, Fiber	100% Satellite	22.7% - 30.8% Mobile Wireless	NA	100% Satellite
Palm Springs	32.4% - 59.3% Fiber	100% Satellite	5.2% - 6.5% Cable, Fiber	100% Satellite	39.3% - 50.4% Mobile Wireless	NA	100% Satellite
Rancho Mirage	NA	100% Satellite	NA	100% Satellite	11.4% Mobile Wireless	NA	100% Satellite

Agua Caliente Band of Cahuilla Indians**	32.4% - 94.3% Fiber	100% Satellite	5.2% - 6.5% Cable, Fiber	100% Satellite	22.0% - 50.4% Mobile Wireless	NA	100% Satellite
Augustine Band of Cahuilla Indians**	17.6% Fiber	100% Satellite	71% Cable	100% Satellite	NA	NA	100% Satellite
Cabazon Band of Mission Indians**	17.6% - 89.9% Fiber	100% Satellite	Up to 6.5% Cable	100% Satellite	8.8% - 15.2% Mobile Wireless	6.1% Mobile Wireless	100% Satellite
Torres Martinez Desert Cahuilla Indians**	17.6% - 89.9% Fiber	100% Satellite	Up to 6.5% Cable, Fiber	100% Satellite	8.8% - 15.2% Mobile Wireless	6.1% Mobile Wireless	100% Satellite
Twenty-Nine Palms Band of Mission Indians**	77.1% - 89.9% Fiber	100% Satellite	Up to 6% Cable, Fiber	100% Satellite	9.7% - 15.2% Mobile Wireless	6.1% Mobile Wireless	100% Satellite

TABLE 2: BUSINESS INTERNET OPTIONS

*Palm Desert also includes 15% coverage of Pacific Lightwave, a Fixed Wireless internet service provider based out of Palm Desert.
**Note that coverage and ISP availability for Tribes are based on zip code coverage, not specific locations owned by the Tribes.

Internet Service Providers in CVAG Communities

This assessment focused on internet options in the CVAG service area. This section provides an overview of residential ISPs in CVAG communities sorted alphabetically by the name of the service provider. It shows the type of service provided, maximum download speeds, and, if available, the maximum estimated monthly cost for each service provider.

EARTHLINK

EarthLink was incorporated in 1994 as a pioneering tech leader and its headquarters are based out of Atlanta, Georgia. It was acquired by Trive Capital in 2019 and provides fiber, DSL, satellite, and fixed wireless to its customers. They are the largest internet network in the US spanning across 48 states. They service 78% of US households and have a 15-year average length of time with their customers. [xxvii]

The table below shows the cost of EarthLink's plans available in the CVAG service area as of January 2024: [xxviii]

Type of Service	Business / Residential	Download Speed Up To (Mbps)	Upload Speed Up To (Mbps)	High Speed Data	Cost/Month
Fiber	Residential	300 Mbps	300 Mbps	NA	N/A
Fiber	Residential	500 Mbps	500 Mbps	NA	$73
Fiber	Residential	700 Mbps	700 Mbps	NA	$93
Fiber	Residential	1,000 Mbps	1,000 Mbps	NA	$103
Fiber	Residential	2,000 Mbps	2,000 Mbps	NA	$173
DSL	Residential	12 Mbps	NA	NA	$63
DSL	Residential	18 Mbps	NA	NA	$73

TABLE 3: EARTHLINK RESIDENTIAL AND BUSINESS INTERNET OPTIONS

FRONTIER

Frontier is among the nation's largest telecommunications companies and was incorporated in 1935. They operate in 25 states and provide internet, TV, and phone services. [xxix] Frontier does not lock its customers into annual commitment plans and provides unlimited monthly data.

The table below shows the cost of Frontier's plans available in the CVAG service area as of January 2024: [xxx]

Plan	Business or Residential	Download Speed Up To (Mbps)	Upload Speed Up To (Mbps)	Cost/Month*
Fiber	Residential	500	500	$45
Fiber	Residential	1,000	1,000	$60
Fiber	Residential	2,000	2,000	$100
Fiber	Residential	5,000	5,000	$155
Fiber	Business	500	500	$65
Fiber	Business	1,000	1,000	$90
Fiber	Business	2,000	2,000	$130

TABLE 4: FRONTIER RESIDENTIAL AND BUSINESS INTERNET OPTIONS

* Note prices reflect the applied savings when signed up for automatic payments and paperless billing

HUGHESNET

HughesNet (Hughes Network Systems, LLC) is headquartered in Germantown, Maryland. [xxxi] It is a wholly owned subsidiary of EchoStar (DirecTV) and serves the contiguous US, Puerto Rico, and Alaska. Over 25 years ago, HughesNet invented satellite internet. As a result, they are the world's largest satellite internet service provider today.

The key aspect that differentiates HughesNet 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 a subscriber advances in service tiers, they pay more for more data. However, they can exceed the data plan and they will not be cut off from service or be charged an additional fee, but they will experience reduced speeds. [xxxii]

The table below shows the cost of HughesNet's plans available in the CVAG service area as of January 2024. [xxxiii]

Plan	Business or Residential	Download Speed Up To (Mbps)	Cost/Month*
Satellite	Residential	50	$75
Satellite	Residential	100	$90
Satellite	Business	50	$85
Satellite	Business	100	$100

TABLE 5: HUGHESNET RESIDENTIAL AND BUSINESS INTERNET OPTIONS

* Note a $5 savings has been applied for signing up for automatic payments

SPECTRUM (CHARTER COMMUNICATIONS, INC.)

Spectrum was founded in 1993 and is headquartered in Stamford, Connecticut. They provide high-speed internet to residential and business customers across the US. What originally started as a cable company, Spectrum has expanded to offer broadband and mobile services, providing 200 Mbps as a starting speed in all their markets. They also own multiple local news channels, including a 24-hour news

network in L.A. [xxxiv]

The table below shows the cost of Spectrum's plans available in the CVAG service area as of March 2023 per direct communication with Spectrum:

Provider	Type of Service	Business / Residential	Download Speeds (Mbps)	Upload Speeds (Mbps)	Cost/Month
Spectrum	Cable	Residential	300	10	$50
Spectrum	Cable	Residential	500	20	$70
Spectrum	Cable	Residential	1,000	35	$90
Spectrum	Cable/Fiber	Business	10	10	(Varies)*
Spectrum	Cable/Fiber	Business	20	20	(Varies)*
Spectrum	Cable/Fiber	Business	50	50	(Varies)*
Spectrum	Cable/Fiber	Business	100	100	(Varies)*
Spectrum	Cable/Fiber	Business	200	200	(Varies)*
Spectrum	Cable/Fiber	Business	500	500	(Varies)*
Spectrum	Cable/Fiber	Business	1,000	1,000	(Varies)*
Spectrum	Fiber	Business	2,000	2,000	(Varies)*
Spectrum	Fiber	Business	5,000	5,000	(Varies)*
Spectrum	Fiber	Business	10,000	10,000	(Varies)*
Spectrum	Fiber	Business	20,000	20,000	(Varies)*
Spectrum	Fiber	Business	30,000	30,000	(Varies)*
Spectrum	Fiber	Business	40,000	40,000	(Varies)*
Spectrum	Fiber	Business	50,000	50,000	(Varies)*
Spectrum	Fiber	Business	60,000	60,000	(Varies)*
Spectrum	Fiber	Business	70,000	70,000	(Varies)*
Spectrum	Fiber	Business	80,000	80,000	(Varies)*
Spectrum	Fiber	Business	90,000	90,000	(Varies)*
Spectrum	Fiber	Business	100,000	100,000	(Varies)*

TABLE 6: SPECTRUM RESIDENTIAL AND BUSINESS INTERNET OPTIONS

* Monthly costs for business broadband services depend upon the cost of building out the broadband connection to the business location and the term of the agreement.

STARLINK

Starlink is a proposed and partially implemented Low Earth Orbit (LEO) constellation of over 12,000 satellites intended to provide internet service in underserved areas. [xxxv] Currently, there are over 4,800 working satellites across the entire surface of the earth. [xxxvi] Some say their sunlight reflections can now be seen at dusk with the naked eye.

This project is expensive and technically complex. It is estimated to cost $6.1 billion to launch, with an additional $10 billion price for the required base station. [xxxvii] For access to this service, a Starlink customer is asked to pay $599 for equipment for their home and $120/month for the residential internet service and anywhere from $140 - $500/month for one of three business internet service plans. [xxxviii] Based on current pricing, it will take 2.2 million residential customers paying $120/month for five years to recoup that initial investment of LEO and ground station infrastructure.

For rural and remote areas, the system is promising in helping resolve the Digital Divide. It is reported that Starlink will likely serve the "3 or 4 percent hardest-to-reach customers for telcos" and "people who simply have no connectivity right now, or the connectivity is really bad," Musk said. [xxxix] While satellites provide global coverage, each satellite covers a large area and bandwidth is split between all customers. In an interview in 2021, Musk specified that "although those Starlink satellites, about 550 kilometers up, combine to deliver some 30 terabits per second and should offer worldwide coverage except for polar areas by August, Musk warned that this doesn't necessarily leave much bandwidth for individual subscribers. Especially if they live too close together. It's really meant for sparsely populated regions". [xl]

T-MOBILE 5G HOME INTERNET

T-Mobile started as VoiceStream Wireless PCS in 1994 and renamed T-Mobile USA, Inc. in 2002. In 2013, T-Mobile USA and MetroPCS Communications, Inc. combined to form T-Mobile US, Inc, better known as T-Mobile. [xli] Additionally, in 2020, T-Mobile acquired Sprint Corporation. Headquartered in Delaware, T-Mobile offers mobile services as part of the contiguous US' largest and fastest 5G network. T-Mobile 5G Home internet offers mobile wireless services using a 5G Gateway device which converts 5G to Wi-Fi. This service is available to over 50 million households nationwide and does not require an annual contract and does not have data caps. [xlii]

The table below shows the cost of T-Mobile's internet plans available in the CVAG service area as of January 2024: [xliii], [xliv]

Plan	Business or Residential	Download Speed Average Up To (Mbps)	Upload Speed Average Up To (Mbps)	High Speed Data	Cost/Month
Mobile Wireless	Residential	59	23	(Varies*)	$55
Mobile Wireless	Business	176	23	100 GB	$50/Line
Mobile Wireless	Business	176	23	300 GB	$70/Line

TABLE 7: T-MOBILE 5G HOME INTERNET RESIDENTIAL AND BUSINESS INTERNET OPTIONS

VERIZON 5G HOME INTERNET

Verizon (Verizon Communications) was founded in 2000 and is headquartered in New York City, New York. As the first company to launch commercial 5G for fixed wireless and mobility, Verizon is a leader in providing technology and communication services, offering 5G, 4G LTE, and fiber. They cover 99% of the US population with 4G LTE and serve over 150 countries. Verizon has over 1 million miles of fiber worldwide and has over 8.8 million broadband connections. [xlv] Verizon now offer 5G Home Internet which utilizes mobile wireless to the home using the Verizon Internet Gateway router and Ultra-Wideband receiver.[xlvi]

The table below shows the cost of Verizon's internet plans available in the CVAG service area as of January 2024:[xlvii], [xlviii]

Plan	Business or Residential	Download Speed Up To (Mbps)	Upload Speed Up To (Mbps)	Cost/Month
Mobile Wireless	Residential	100	10	$60
Mobile Wireless	Residential	300	20	$80
Mobile Wireless*	Business	10	UA	$69/Plan
Mobile Wireless*	Business	25	UA	$99/Plan
Mobile Wireless*	Business	50	UA	$199/Plan

TABLE 8: VERIZON 5G HOME INTERNET RESIDENTIAL AND BUSINESS INTERNET OPTIONS

VIASAT (FORMERLY EXEDE)

Viasat Inc. was founded in 1986. It is based in Carlsbad, California, with additional operations across the United States and worldwide. ViaSat is a provider of high-speed satellite broadband services and secure networking systems covering military and commercial markets around the globe. [xlix] In 2017, Exede was rebranded Viasat Internet. [l]

The table below shows the cost of ViaSat's plans: [li]

Plan	Business or Residential	Download Speed Up To (Mbps)	High-Speed Data Availability (GB)	Price/Month
Satellite	Residential	25	60	$70
Satellite	Residential	50	100	$100
Satellite	Residential	75	150	$150
Satellite	Residential	100	300	$200
Satellite	Residential	150	500	$300
Satellite	Business	50	50	$70
Satellite	Business	150	300	$225
Satellite	Business	150	500	$325
Satellite	Business	150	Unlimited	$400

TABLE 9: VIASAT RESIDENTIAL AND BUSINESS INTERNET OPTIONS

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APPENDIX A: JURISDICTION BROADBAND SERVICE CONDITIONS

CVAG COMMUNITIES AND TRIBES

Table 1 below identifies zip code boundaries used in the research and analysis portion of the Market Assessment.

Note that this assessment focused on the following CVAG members

- City of Cathedral City
- City of Coachella
- City of Desert Hot Springs
- City of Indian Wells
- City of Indio
- City of La Quinta
- City of Palm Desert
- City of Palm Springs
- City of Rancho Mirage
- Agua Caliente Band of Cahuilla Indians
- Augustine Band of Cahuilla Indians
- Cabazon Band of Mission Indians (previously listed as Cabazon Band of Cahuilla Indians)
- Torres Martinez Desert Cahuilla Indians
- Twenty-Nine Palms Band of Mission Indians

Municipality or Tribe	Zip Code Agency Resides In
Cathedral City	92234
Coachella	92236
Desert Hot Springs	92240, 92241
Indian Wells	92210
Indio	92201, 92203
La Quinta	92253
Palm Desert	92211, 92260
Palm Springs	92262, 92264
Rancho Mirage	92270
Agua Caliente Band of Cahuilla Indians	92234, 92262, 92264, 92276
Augustine Band of Cahuilla Indians	92274
Cabazon Band of Mission Indians	92201, 92203, 92236, 92274
Torres Martinez Desert Cahuilla Indians	92239, 92254, 92274
Twenty-Nine Palms Band of Mission Indians	92201

TABLE 7: TABLE OF COMMUNITIES AND TRIBES WITHIN CVAG'S SERVICE AREA AND THEIR RESPECTIVE ZIP CODES

The maps below show what areas of CVAG communities and tribes are served, underserved, and unserved according to the FCC Fabric dataset. This information is displayed within Broadband Money, the program used during this market assessment. Note that underserved is defined as speeds of less than 100 Mbps for downloads and less than 20 Mbps for uploads. Unserved is defined as speeds of less than 25 Mbps for downloads and less than 3 Mbps for uploads.[lii]

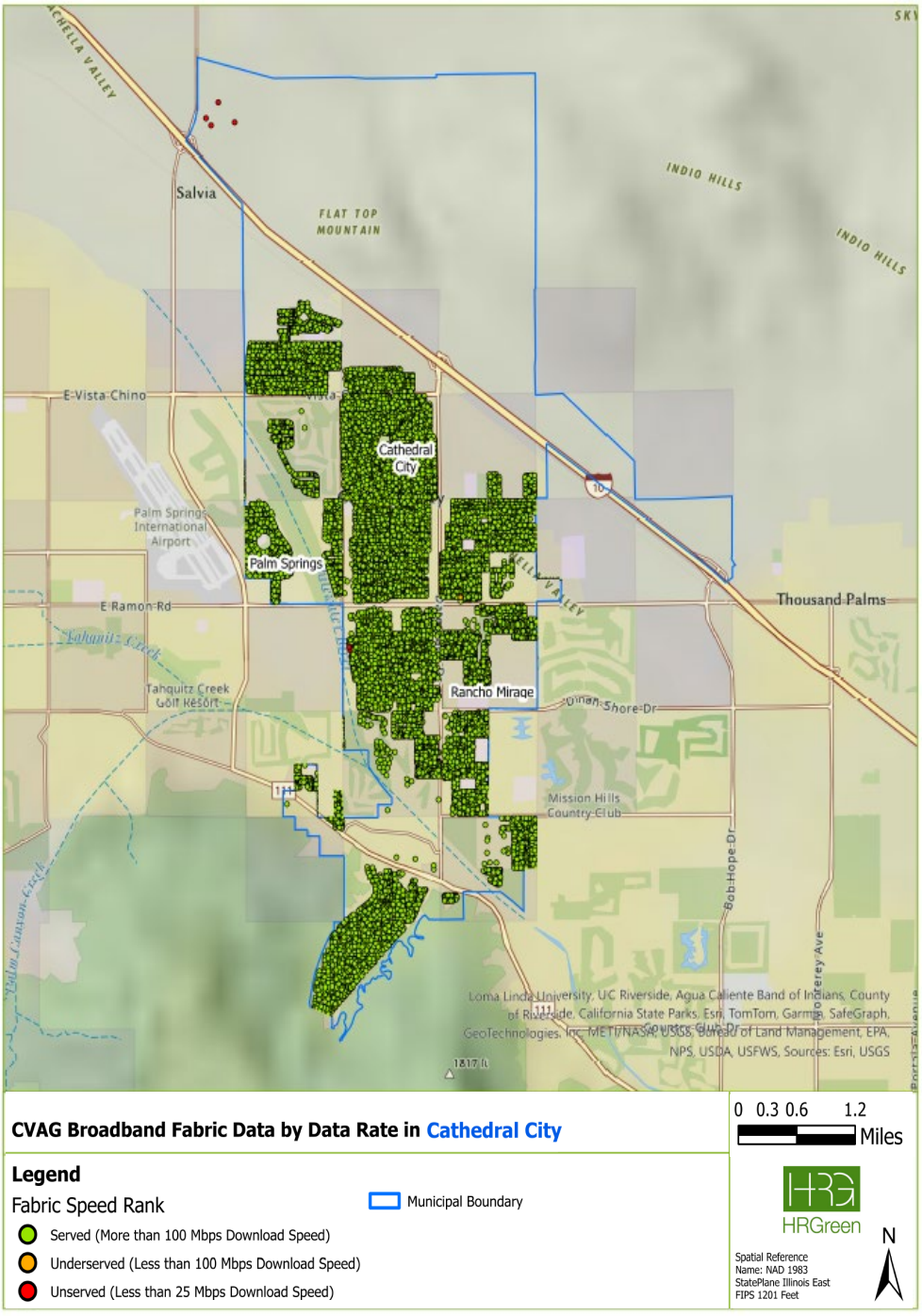


FIGURE 1: MAP OF CATHEDRAL CITY'S BROADBAND AVAILABILITY

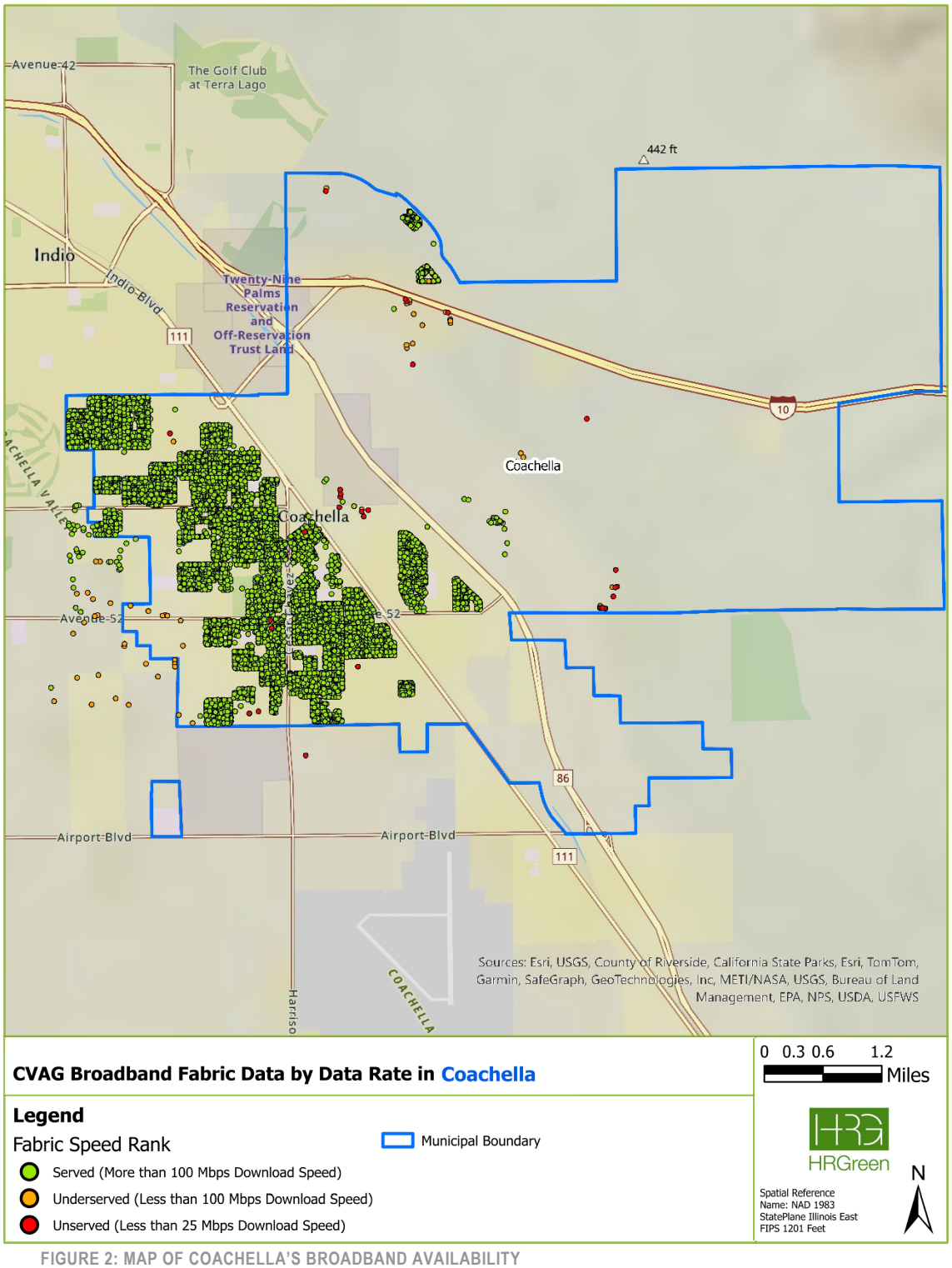


FIGURE 2: MAP OF COACHELLA'S BROADBAND AVAILABILITY

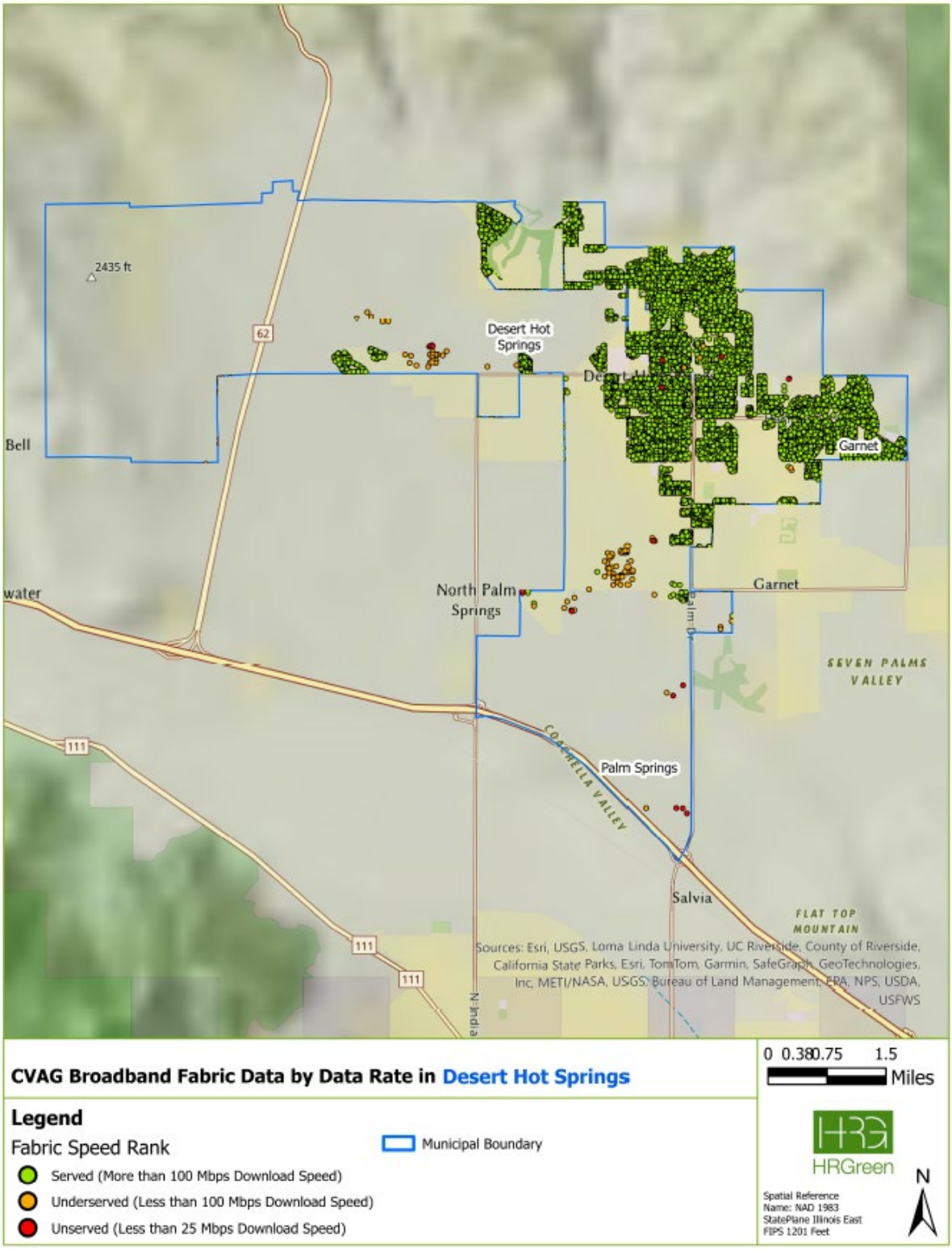
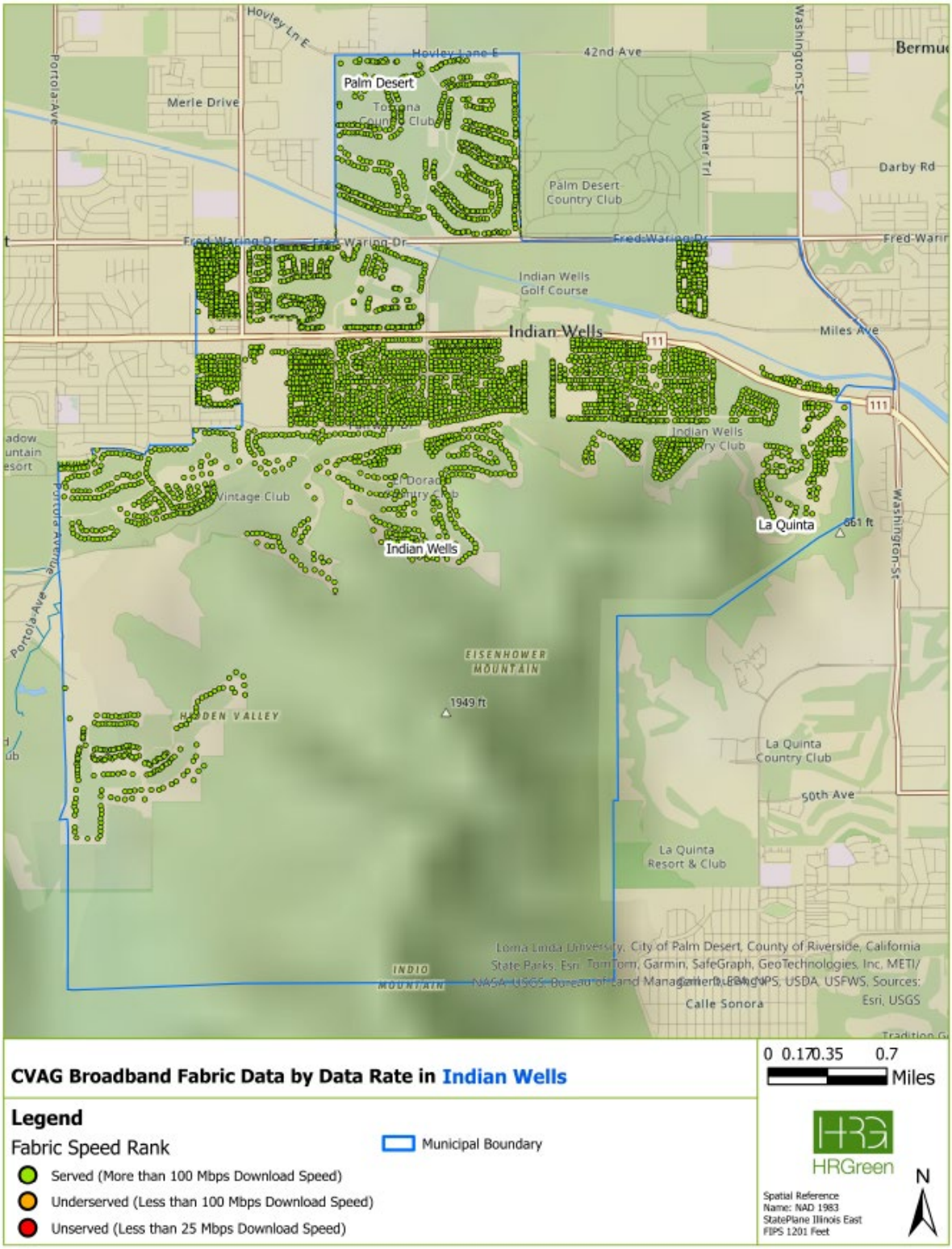


FIGURE 3: MAP OF DESERT HOT SPRINGS' BROADBAND AVAILABILITY


Palm Desert
Indian Wells
La Quinta
Hovley Lane E
42nd Ave
Merle Drive
Portola Ave
Washington St
Darby Rd
Warner Trl
Palm Desert Country Club
Fred Waring Dr
Indian Wells Golf Course
Miles Ave
111
Indian Wells Country Club
Vintage Club
El Dorado Country Club
661 ft
EISENHOWER MOUNTAIN
1949 ft
HIDDEN VALLEY
La Quinta Country Club
50th Ave
La Quinta Resort & Club
INDIO MOUNTAIN
Calle Sonora
Loma Linda University, City of Palm Desert, County of Riverside, California State Parks, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USDA, USFWS, Sources: Esri, USGS
CVAG Broadband Fabric Data by Data Rate in Indian Wells
Legend
Fabric Speed Rank
Served (More than 100 Mbps Download Speed)
Underserved (Less than 100 Mbps Download Speed)
Unserved (Less than 25 Mbps Download Speed)
Municipal Boundary
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Miles
HRGreen
N
Spatial Reference
Name: NAD 1983
StatePlane Illinois East
FIPS 1201 Feet

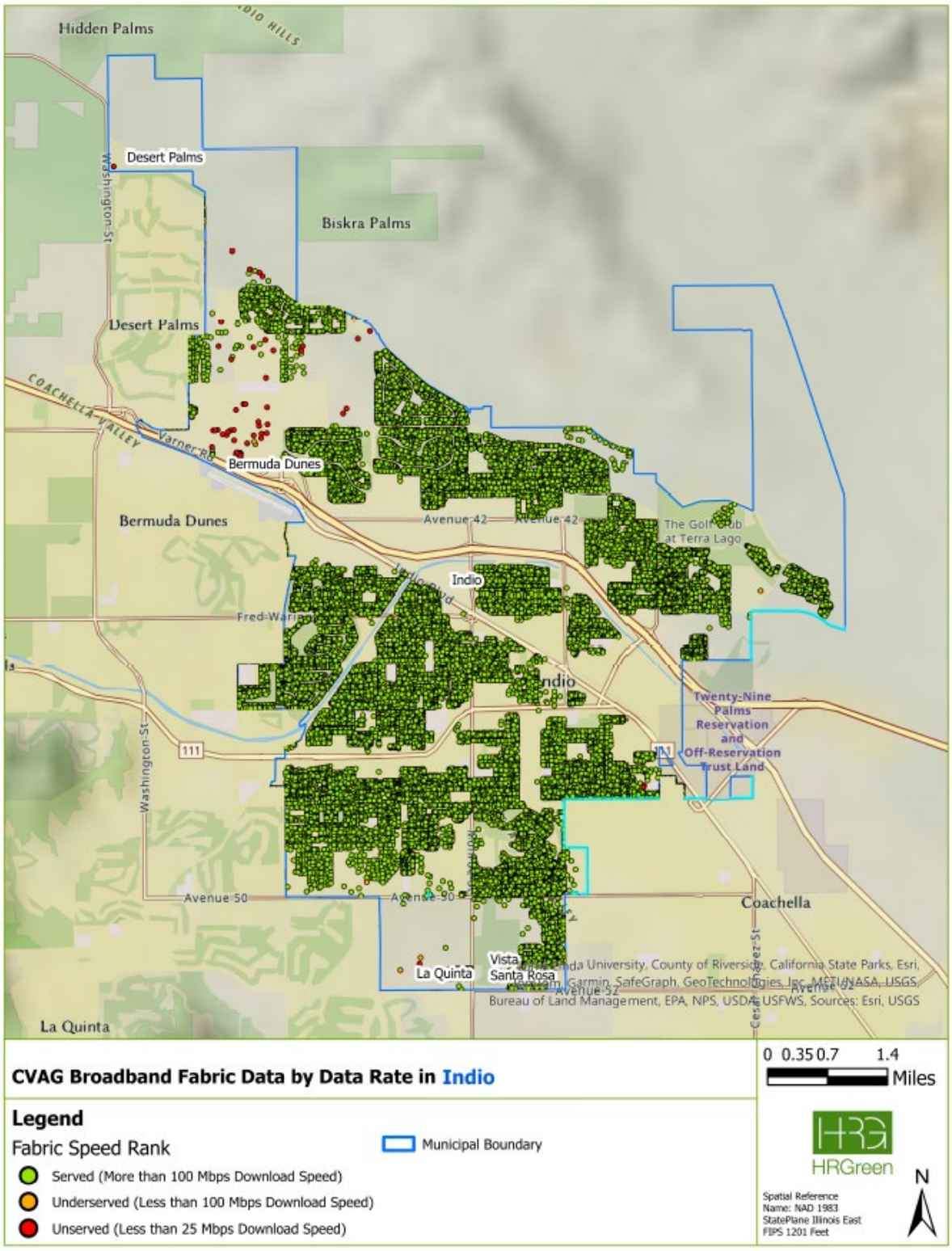


FIGURE 5: MAP OF INDIO'S BROADBAND AVAILABILITY

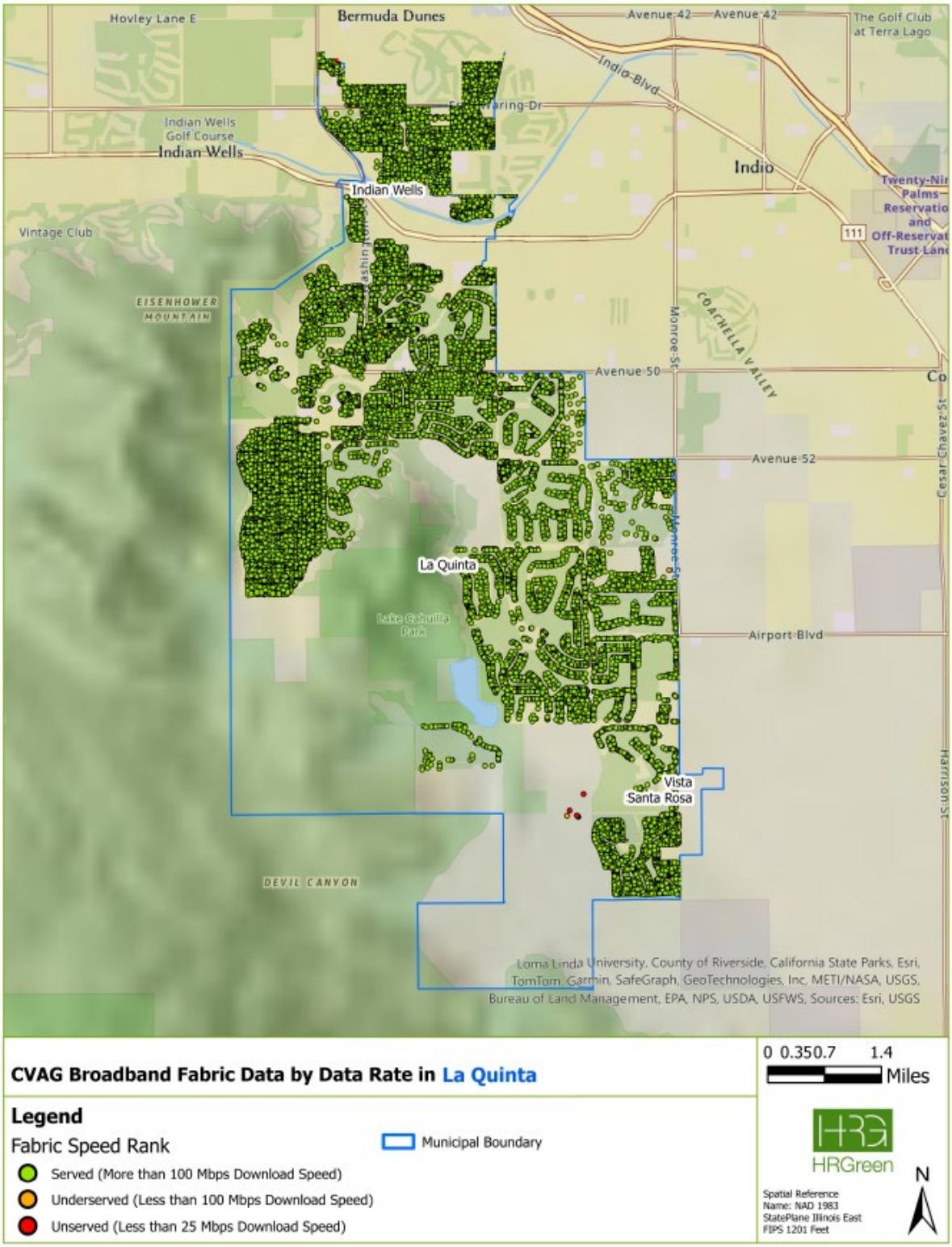


FIGURE 6: MAP OF LA QUINTA'S BROADBAND AVAILABILITY

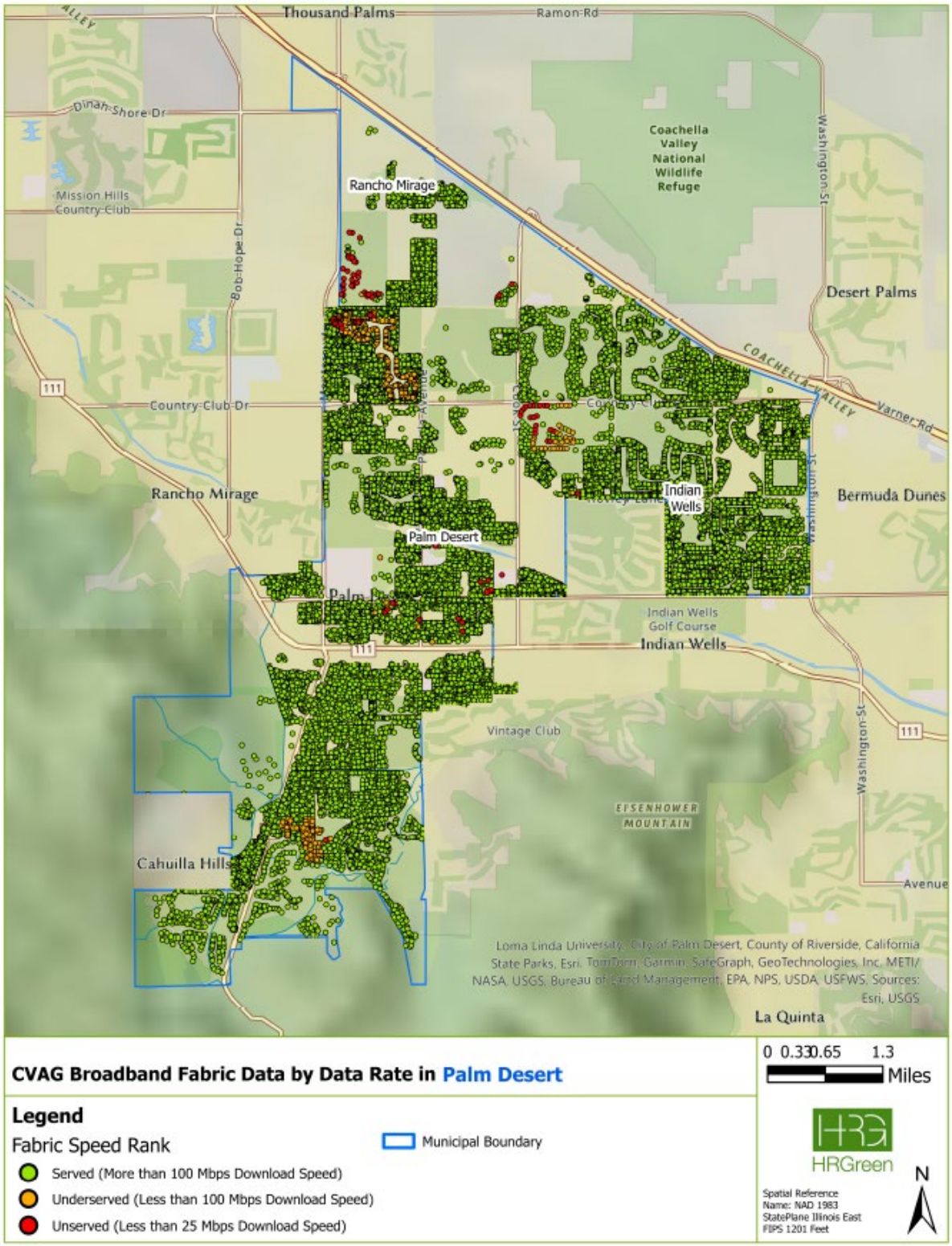


FIGURE 7: MAP OF PALM DESERT'S BROADBAND AVAILABILITY

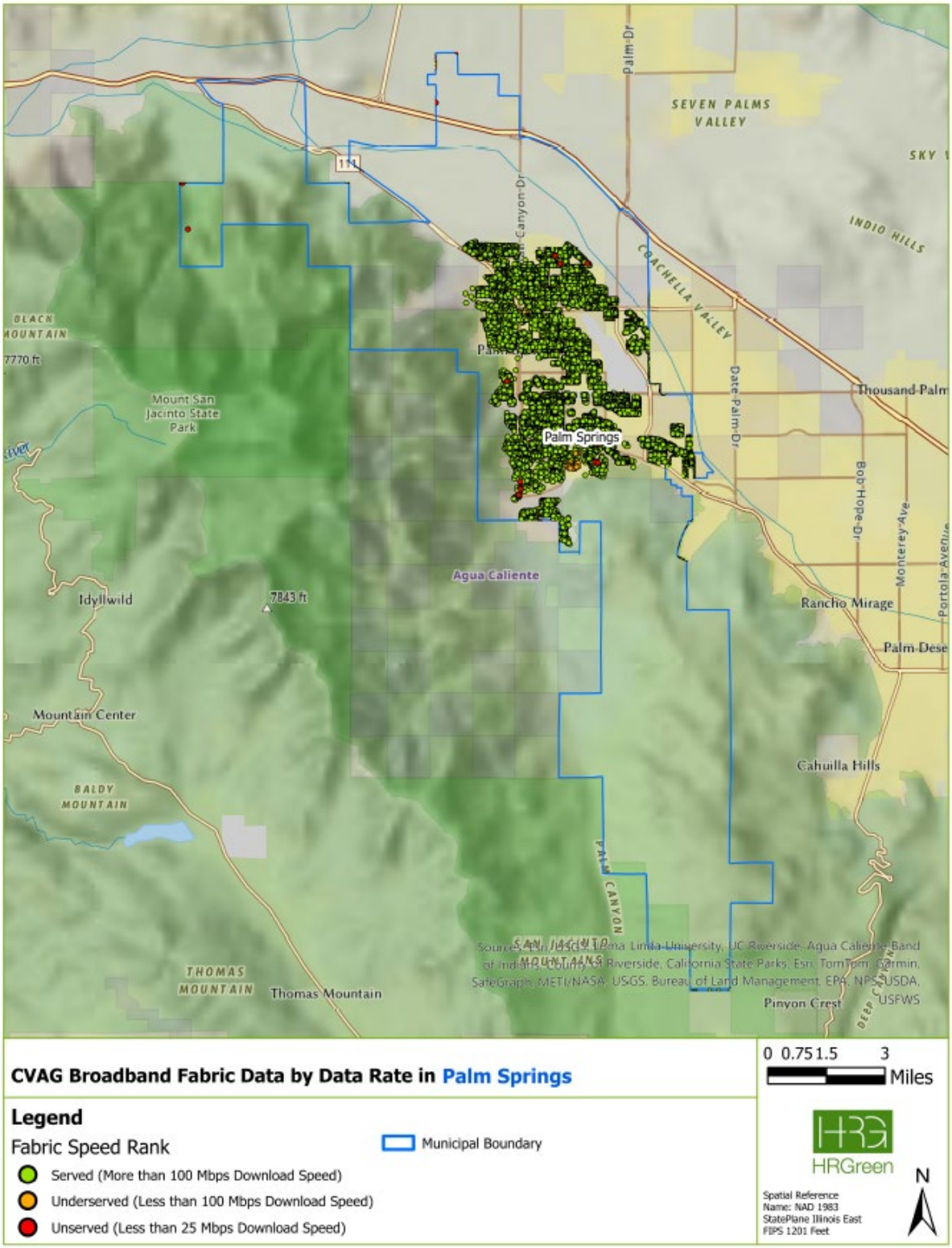


FIGURE 8: MAP OF PALM SPRINGS' BROADBAND AVAILABILITY

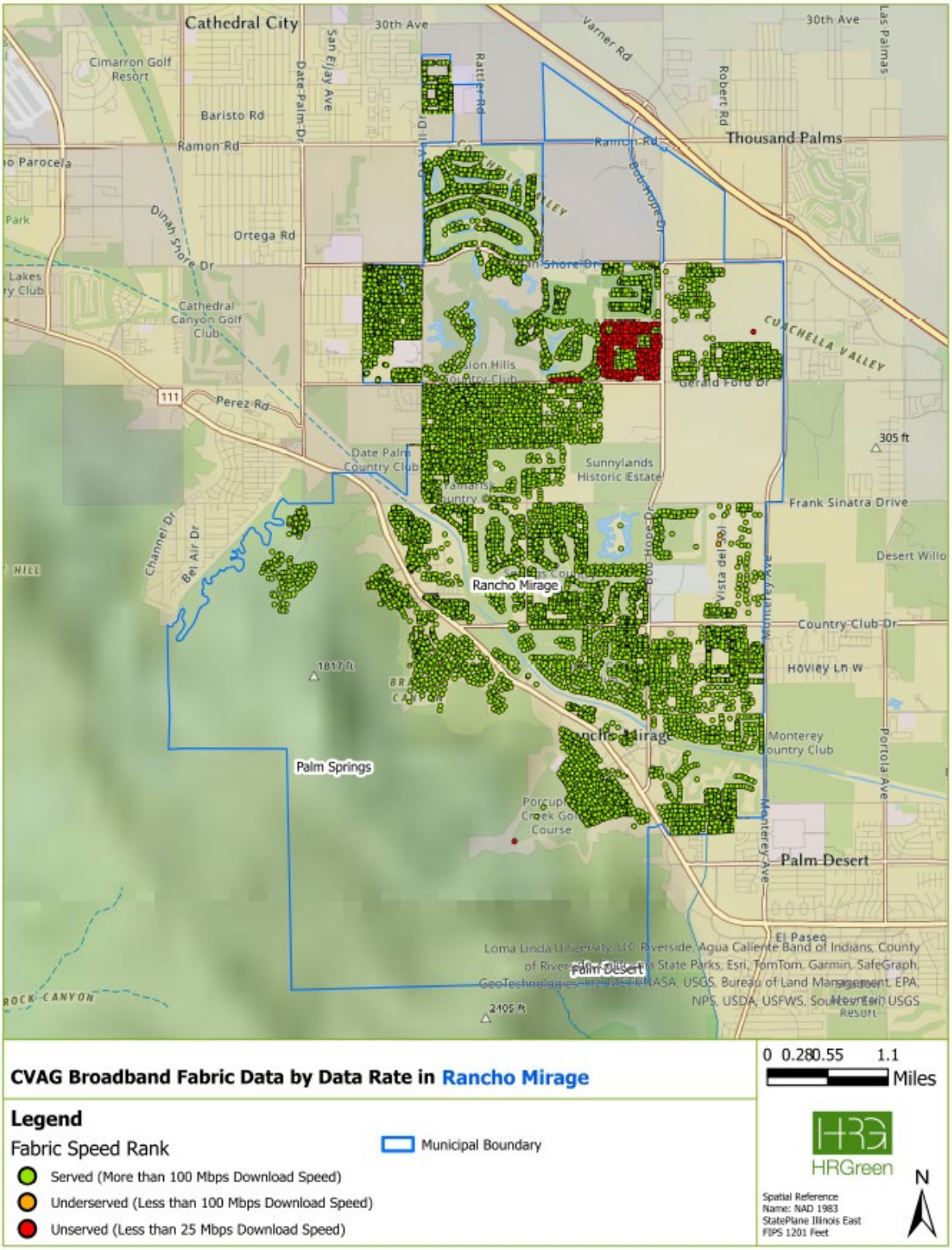


FIGURE 9: MAP OF RANCHO MIRAGE'S BROADBAND AVAILABILITY

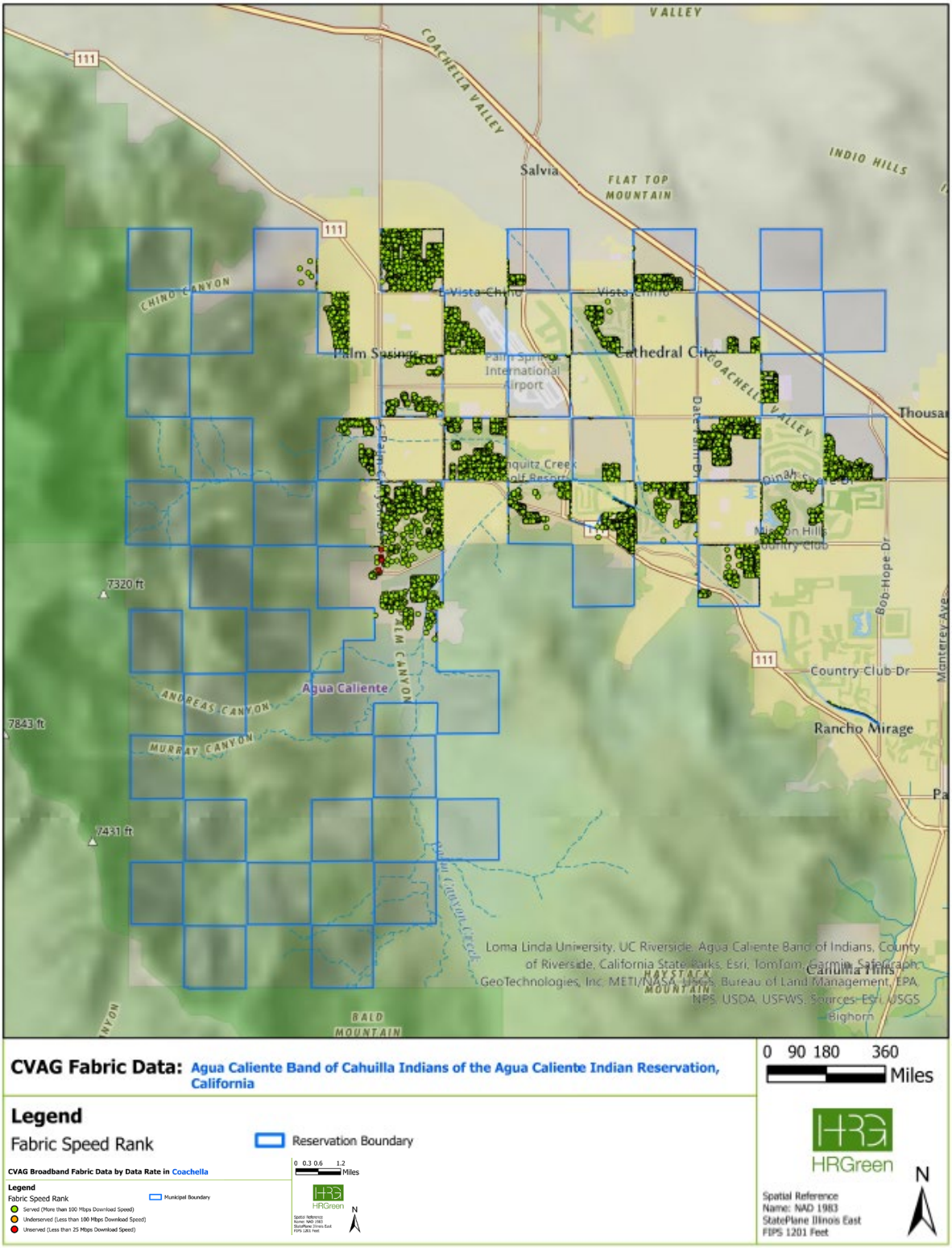


FIGURE 10: MAP OF AGUA CALIENTE BAND OF CAHUILLA INDIANS' BROADBAND AVAILABILITY

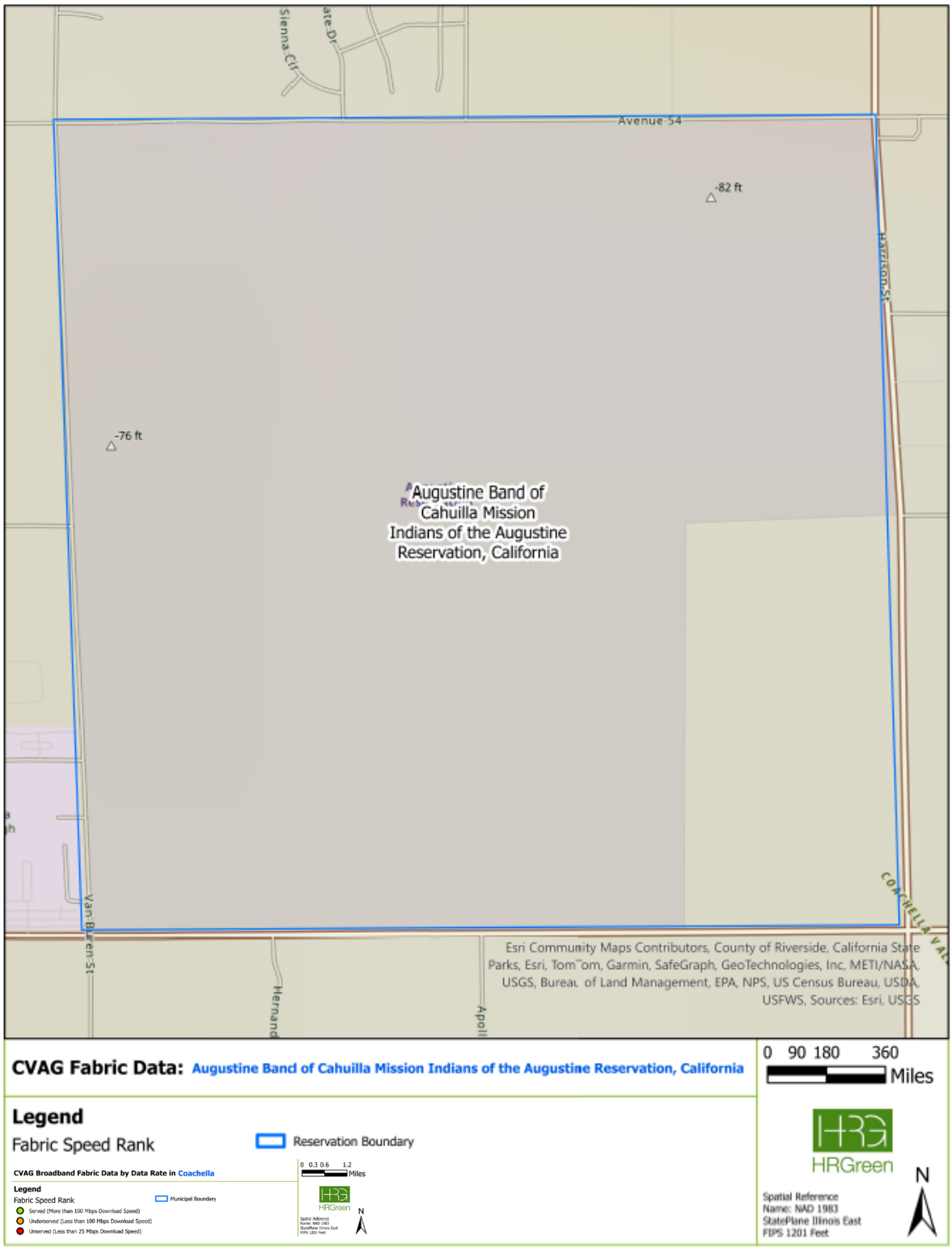


FIGURE 11: MAP OF AUGUSTINE BAND OF CAHUILLA INDIANS' BROADBAND AVAILABILITY

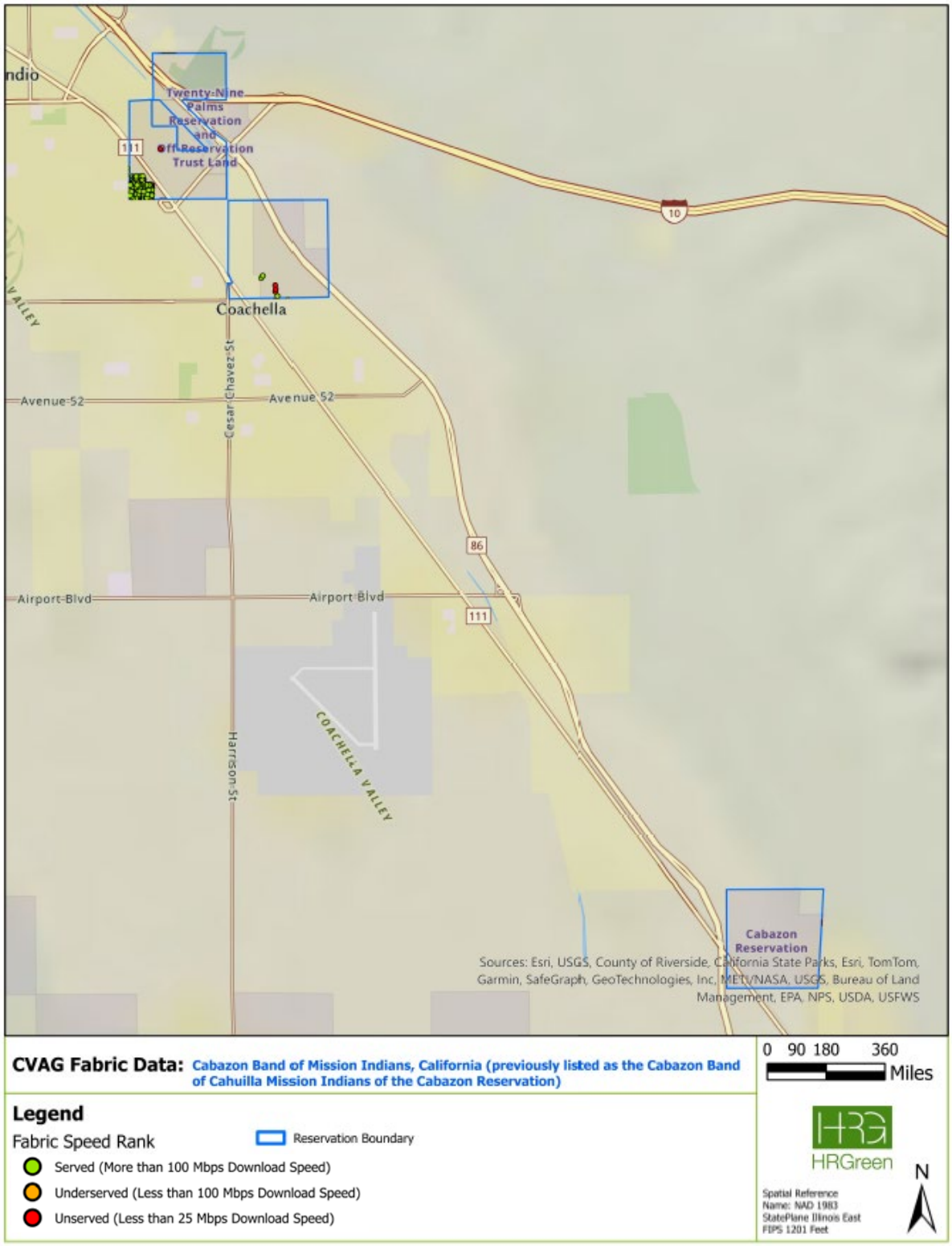


FIGURE 12: MAP OF CABAZON BAND OF MISSION INDIANS' BROADBAND AVAILABILITY

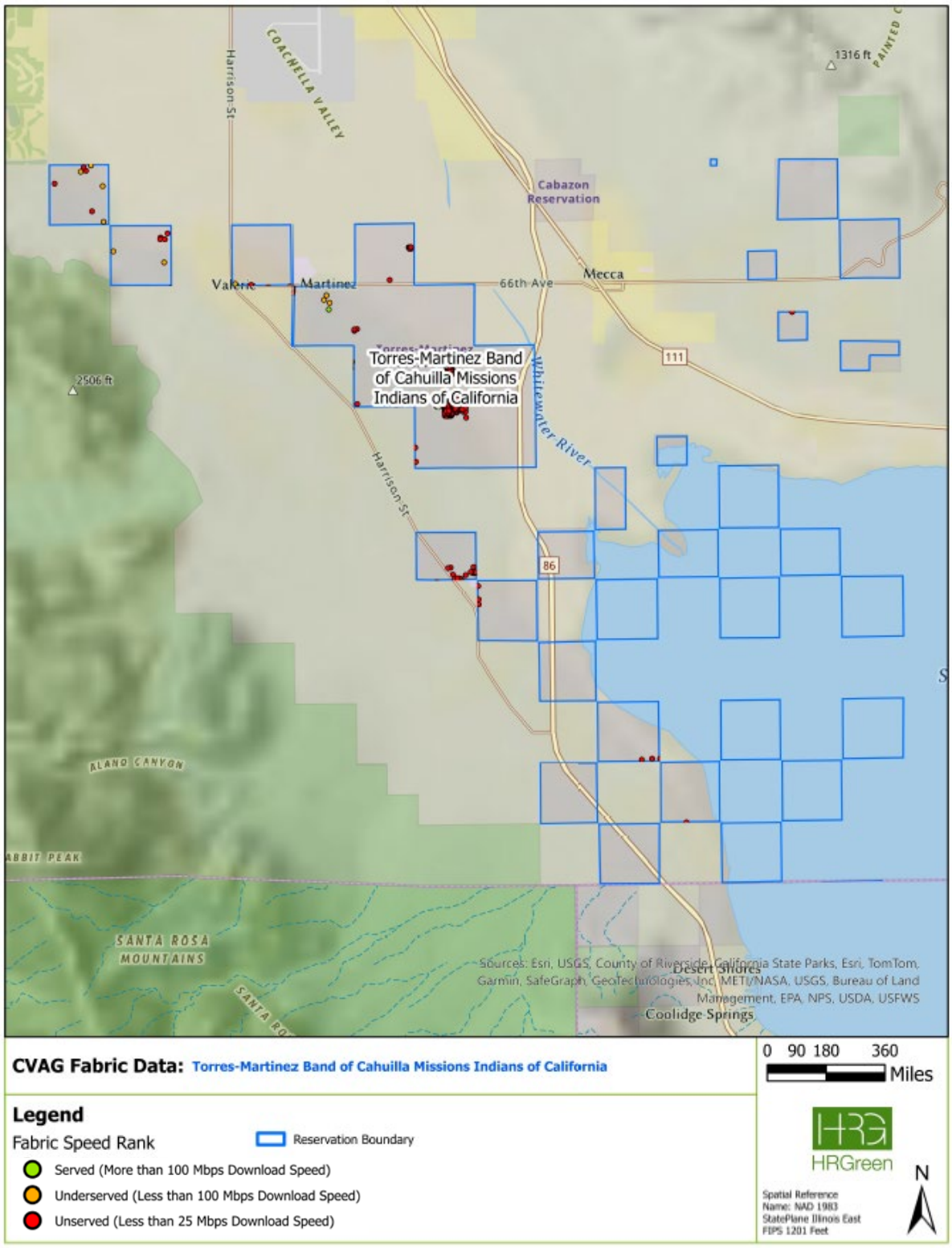


FIGURE 13: MAP OF TORRES-MARTINEZ BAND OF CAHUILLA INDIANS' BROADBAND AVAILABILITY

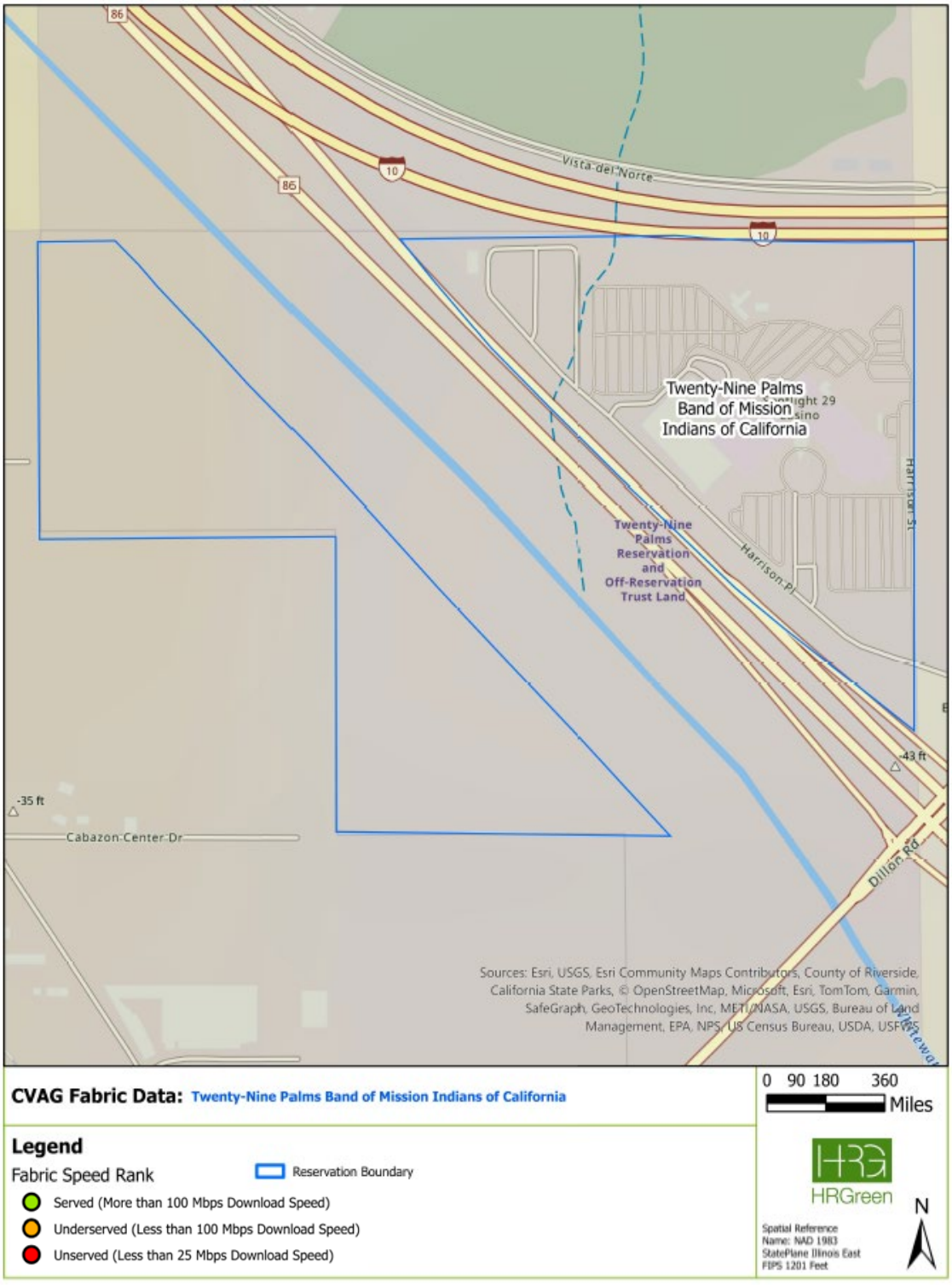


FIGURE 14: MAP OF TWENTY-NINE PALMS BAND OF MISSION INDIANS' BROADBAND AVAILABILITY

[1] US Department of Commerce National Telecommunications and Information Administration. "Internet for All: Frequently Asked Questions and Answers Draft Version 2.0." September 2022. https://broadbandusa.ntia.doc.gov/sites/default/files/2022-09/BEAD-Frequently-Asked-Questions-%28FAQs%29_Version-2.0.pdf

NEEDS ASSESSMENT

SUMMARY

The Needs Assessment collects data that represents actual broadband experience from citizens and organizations in the Coachella Valley. Two methods were used to get this information: stakeholder meetings and a survey. These data sources provide an independent verification of the grant eligibility maps and other insights from customers and broadband users.

The previous deliverable in this broadband study was a Market Assessment. The data in that deliverable was taken from the 477 reports the Internet Service Providers (ISPs) submitted to the Federal Communications Commission (please see the Glossary of Terms in Appendix A for more information about 477 reporting and the FCC). This Needs Assessment is a user experience check on the provider reported data.

Because the ISP reported data is the basis for grant eligibility maps, it is important to have a way to either confirm or challenge their results. The information in the Needs Assessment (particularly survey responses) serves that important role. The Needs Assessment also provides insights that can only be gained from discussions with municipal leaders and other stakeholder agencies in stakeholder meetings.

In the stakeholder meetings and survey we have found the information ISPs reported regarding who is considered unserved (having less than 25 Mbps download and 3 upload speeds), underserved (between 25/3 and 100/20) and served (over 100/20) is mostly accurate (please see the Glossary of Terms in Appendix A for more information regarding Mbps or Megabits per Second). The State of California opened a process to challenge BEAD grant eligibility maps from July 8, 2024 to August 6, 2024. The Needs Assessment did not find substantial possible inaccuracies in the eligibility maps that would lead to performing a challenge.

The Needs Assessment did confirm that there are broadband needs in the Coachella Valley. Although the majority of citizens, businesses and public agencies within the CVAG boundaries appear to have adequate broadband, there are those who do not have access to broadband infrastructure, cannot afford the internet available or have language or skill barriers to being able use the broadband that is accessible.

Below are the key findings from the stakeholder meetings and then the key findings from the survey. Details and other findings from each of those two tasks are in the following sections.

KEY FINDINGS

Below is a summary of key findings that were shared during the **stakeholder engagement** process. Please refer to the Stakeholder Report for the full list of key findings.

- Concerns regarding broadband services in CVAG jurisdictions included availability, bandwidth, capacity, connectivity, cost, latency, reliability, resiliency, redundancy, and speed.
- Organizations ranged from feeling as though they were consistently experiencing internet outages to feeling as though they were very well served by their current broadband services. The majority of agencies felt they were receiving ok to reasonable service.
- Frontier and Spectrum are the two consistent internet service providers brought up in discussions, with one frequently serving as a backup to the other provider in case of an outage. Pacific Lightwave was mentioned, but predominantly in the context of business usage. Verizon was also mentioned, but their infrastructure has been sold to Frontier.
- Almost all respondents agreed that there are not enough alternatives in the Coachella Valley in terms of broadband service providers. With additional providers, redundancy and subsidized or

reduced costs for low-income groups could be available, along with better speeds and competitive pricing.

- SCAG estimated that over 1 million people in the region (Los Angeles and the following Counties: Orange, Imperial, Riverside, Ventura, and San Bernardino) are impacted by the digital divide.
- SCAG suggested the national estimate where 30% of the population in the U.S. lacks digital literacy is due to challenges which include language barriers, lacking learning opportunities due to age, and poor funding in schools. Suggestions for eliminating the digital divide included teaching digital literacy.
- Agencies are looking to build resiliency in their broadband network to prevent service loss during severe and extreme weather events, such as hurricanes and tropical storms
- Multiple municipalities are looking to provide public Wi-Fi in their downtown areas during events that will require laying down fiber strands.
- The vast majority of organizations are moving to cloud-based services by either utilizing the cloud more or transitioning entirely to the cloud for daily business operations.
- Caltrans' middle mile project and CVAG's CV Sync Project can help reduce the last-mile gaps, creating last mile collaboration possibilities.
- All but one organization interviewed would be interested in participating or learning additional information about CVAG if they were to explore solutions to help improve internet services. The one outlier organization was not comfortable committing to the project on behalf of their IT staff.

Below is a summary of key findings that were presented during the **survey analysis**.

- Most responders are somewhat satisfied to very satisfied with their home service's speed/data rate, reliability, customer service, and overall satisfaction.
- Almost half of the responders are somewhat dissatisfied to very dissatisfied with their home service price.
- Nearly three-fourths of responders report home outages of 1 hour or less per month.
- Almost half of the responders think their current providers are mostly meeting or meeting very well their service needs for education, economic development, health care, quality of life, and remote work.
- Nearly all of the responders consider the internet to be an essential public infrastructure like electricity, water, and transportation.
- One of the concerns shared by responders is the perceived lack of competition.
- Over three-fourths of responders feel strongly that CVAG needs to help facilitate better broadband.
- Almost half of the responders said that they would participate in an organized effort led by their City.

KEY RECOMMENDATIONS

Based on the findings from the stakeholder engagement and the residential and business survey, HR Green makes the following recommendations.

- Based on the survey results, it does not appear a BEAD grant eligibility challenge is warranted. In reviewing the results with CVAG, the survey results align with the eligibility maps. This was confirmed in the Advisory Group meeting, with Riverside County reaching the same conclusion.
- Continue in the next steps of the project:
  - Perform a Gap Analysis based on the Market Assessment and the Needs Assessment.
  - Develop high-level designs and high-level costing for options to fill the defined gaps.
  - Conduct as complete an inventory of fiber assets and future broadband project opportunities

as possible (CVAG member agencies CIPs and plans, private providers, CV Sync, middle mile, etc. – current assets and future plans).
    - Ask for agency CIP and future development plans.
    - Discuss specific collaboration opportunities with Tribal agencies.
    - Meet with providers to discuss their plans.
    - Align CV Sync and State middle mile projects with collaboration possibilities.
- Align CVAG opportunities to improve broadband issues the Needs Assessment has brought to light with member agency possibilities. This could be done through the Advisory Group. Some of the goals in this alignment effort are to build momentum for broadband improvement, maximize resources, avoid duplication of efforts and coordinate opportunities for collaboration.

CVAG has a unique opportunity to coordinate broadband efforts in the Coachella Valley. This Needs Assessment clarifies broadband issues to provide a baseline to develop options to make broadband improvements. Those next steps will be developed in the subsequent steps of the project.

SURVEY PROMOTION METHODOLOGY

CVAG SURVEY PROMOTION METHODOLOGY

There are many factors that influence the number of results that will be received in a survey. Survey promotion is one factor that can have a significant impact. In this project, the leadership team decided to work through the Advisory Group to ask them to work in their agencies to promote the survey through the means available in their organization.

Some agencies had previously conducted surveys, so CVAG was able to import their results. In those areas, people were not encouraged to take the survey for this project.

CVAG MAILINGS METHODOLOGY

Project leadership felt it was important to attempt to verify speeds in areas that showed as served on the grant eligibility maps, but were in close proximity to areas with many unserved addresses. To do that, the following methodology was used to determine what addresses should be specifically asked to take the survey through a specific postcard mailing.

With the Coachella Valley being home to over 370,000 individuals, the HR Green team had to be selective on which homes would receive a survey flier to help promote survey success without depleting the project's funds. To determine which homes made the list, Step 1 was to focus on the number of unincorporated addresses in the CVAG study area. These areas would most likely be the furthest away from city centers and would be excellent candidates representing less adequate broadband service due to their physical home location. From initial research, this totaled 3,600 addresses in the unincorporated areas within CVAG.

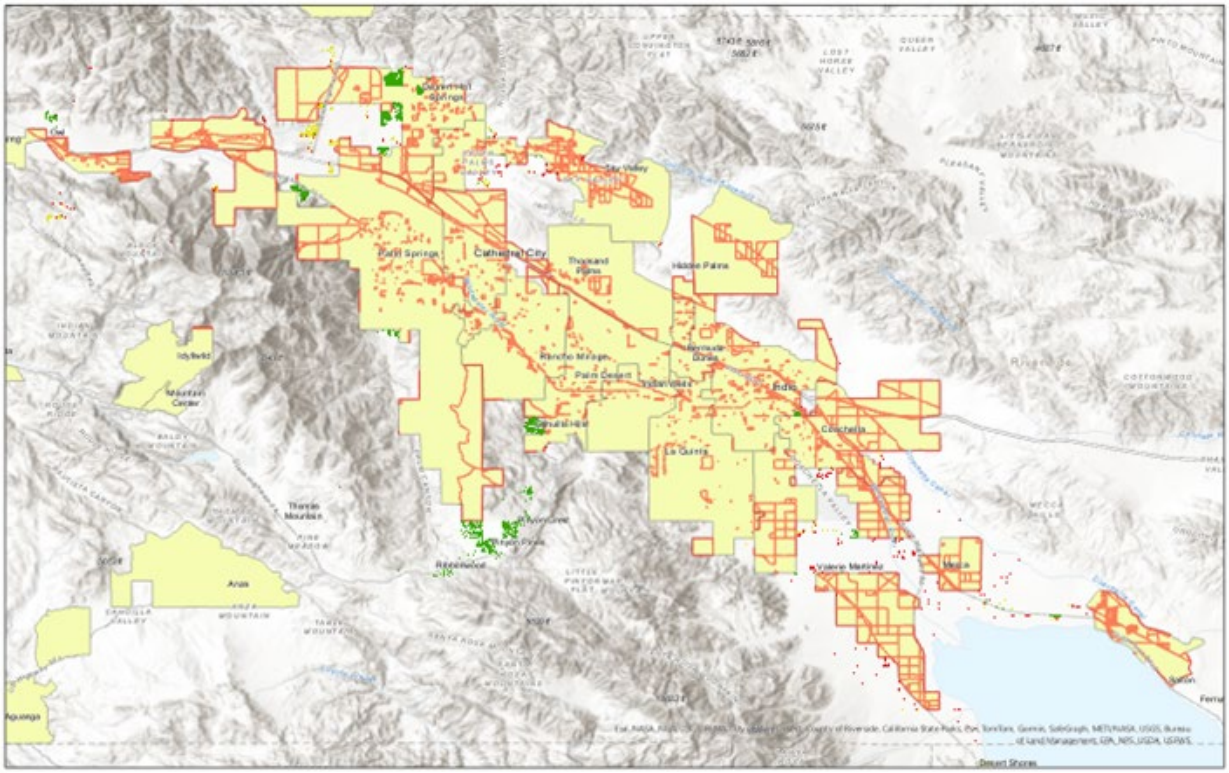


FIGURE 1 - UNINCORPORATED ADDRESSES WITHIN CVAG

Next, HR Green analyzed the number of incorporated addresses in census blocks with a median download speed of less than 25 Mbps. Doing so ensured capturing all of the Federal Communications Commission (FCC's) unserved locations for areas which have less than a 25 Mbps download speed. This resulted in **13,368 addresses**.

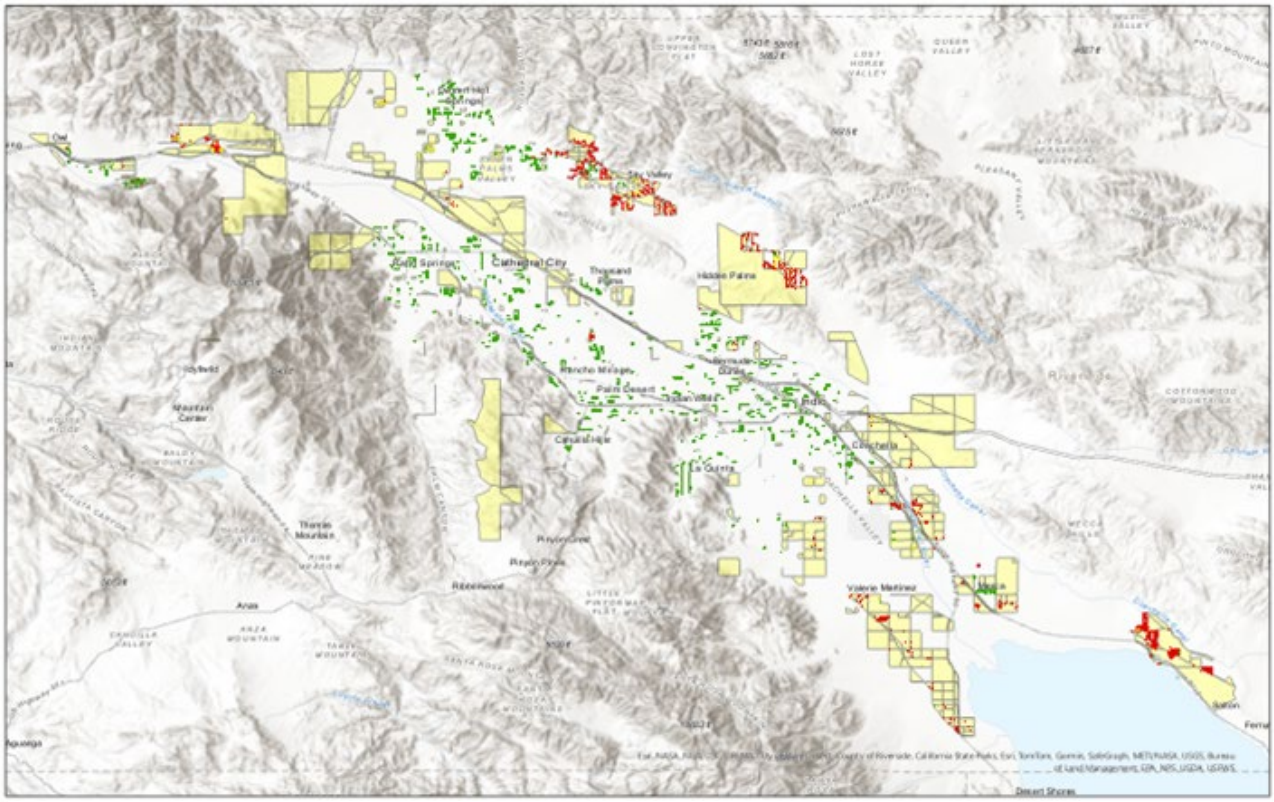


FIGURE 2 - ADDRESSES WITHIN CVAG WITH LESS THAN 25 MBPS DOWNLOAD SPEED.

From there, the team calculated how many addresses in the CVAG project area are listed as the FCC's Unserved and Underserved locations for Step 3. These locations are already counted as receiving poor broadband service. As such, the HR Green team subtracted all 2,464 addresses listed from the 13,368 addresses determined in Step 2 for a total of **10,904 addresses**. For Step 4, HR Green analyzed which addresses the Ready Performance Rank marks as Served, as the team has confidence that those are correctly marked as served by FCC Fabric data. All identified 7,690 addresses were subtracted from the 10,904 addresses listed in Step 3, providing a total of **2,944 addresses**.

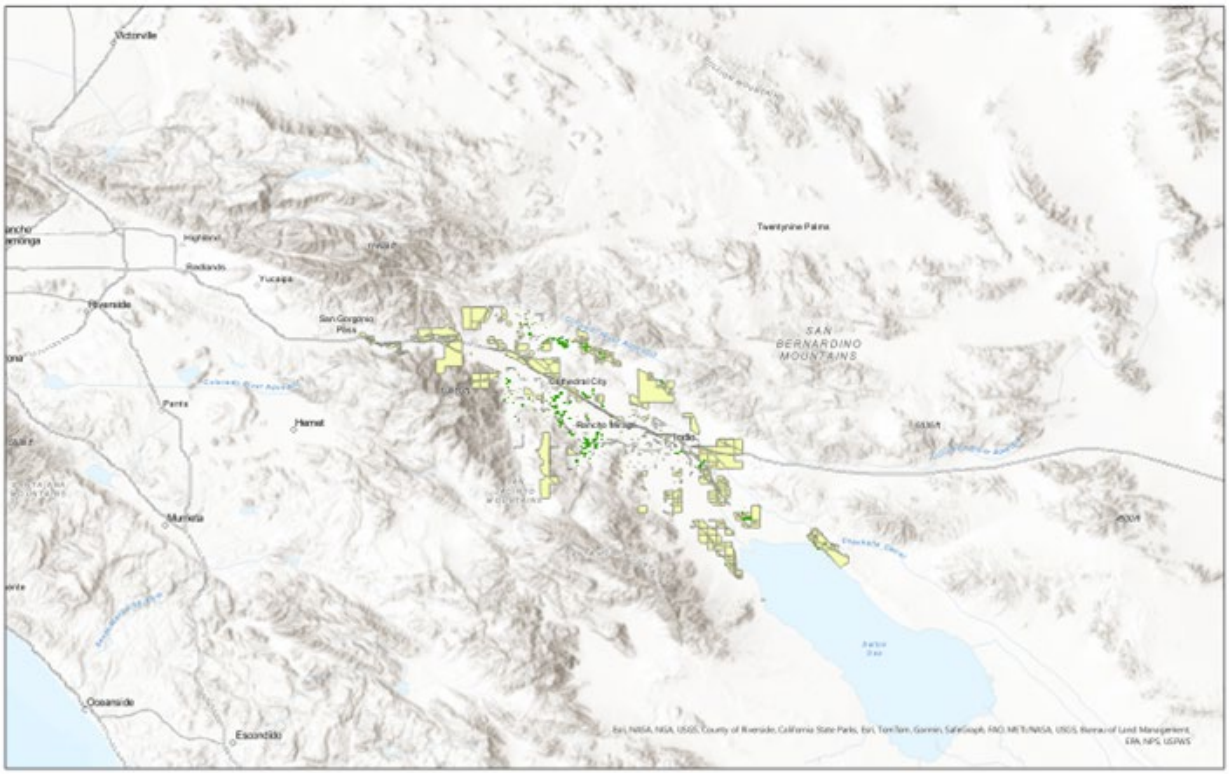


FIGURE 3 - FINALIZED MAILING ADDRESSES LOCATED WITHIN CVAG

Step 5 entailed HR Green adding together the values from Steps 1 (**3,600 addresses)** and Step 4 (**2,944 addresses)** to determine a total of **6,544 Mailings**. These identified addresses would be tied to those locations where the actual download and upload speed tests would most likely differ from the FCC Fabric Data, providing valid data to challenge the FCC's dataset.

CVAG CITIZEN AND BUSINESS SURVEY RESULTS

INTRODUCTION TO THE SURVEY

States utilize the FCC data to determine eligibility for their grant programs. If the data is correct, then the system is fine. However, the FCC data is widely known to have problems as the data is self-reported from the providers and is not knowingly checked before it is entered into the FCC system. Due to these known flaws, a community survey gathering speed test data (actual speed tests recorded from the CVAG area) is used to help determine if the FCC data is acceptable.

Since the available data on broadband speeds and coverage is known to be poorly representative of the reality of broadband in many locations, this survey of residents and business owners helps decision makers better understand community needs. The large-scale public survey asked questions to determine the community's internet services, usage patterns, current market conditions and deficiencies, and desire for improved service in the community. Identifying questions were also asked about household composition and demographic information. Some of the questions asked are what is important to them personally, what do they value about communications services, and what is important to the community; and, most importantly, how strongly they feel CVAG needs to help facilitate better broadband.

The survey garnered 103 responses, 101 of which were residential and 2 were businesses responses. For the full list of survey questions, please see **Section Appendix B: CVAG Residential and Business Survey Questions**.

Although duplicate surveys took place in the CVAG area, no respondent in this survey indicated taking this survey for another community, providing new data not already captured. These findings help to illustrate today's residential conditions and indicate a need for more robust broadband services in some areas of the CVAG area. Identification of needs in the survey results will facilitate the development of network model alternatives that may be helpful to mitigate some of the most significant gaps between the community's capabilities and needs. The questions relating to the community's broadband vision will facilitate an understanding of what role CVAG could take in facilitating broadband service.

The survey includes additional text fields for respondents to write any other comments they desire to share. Those comments are included in Section Appendix C.

SURVEY FINDINGS

URBAN AREAS ARE FAIRLY WELL-SERVED, WHILE RURAL AREAS ARE LIKELY TO BE UNSERVED OR UNDERSERVED

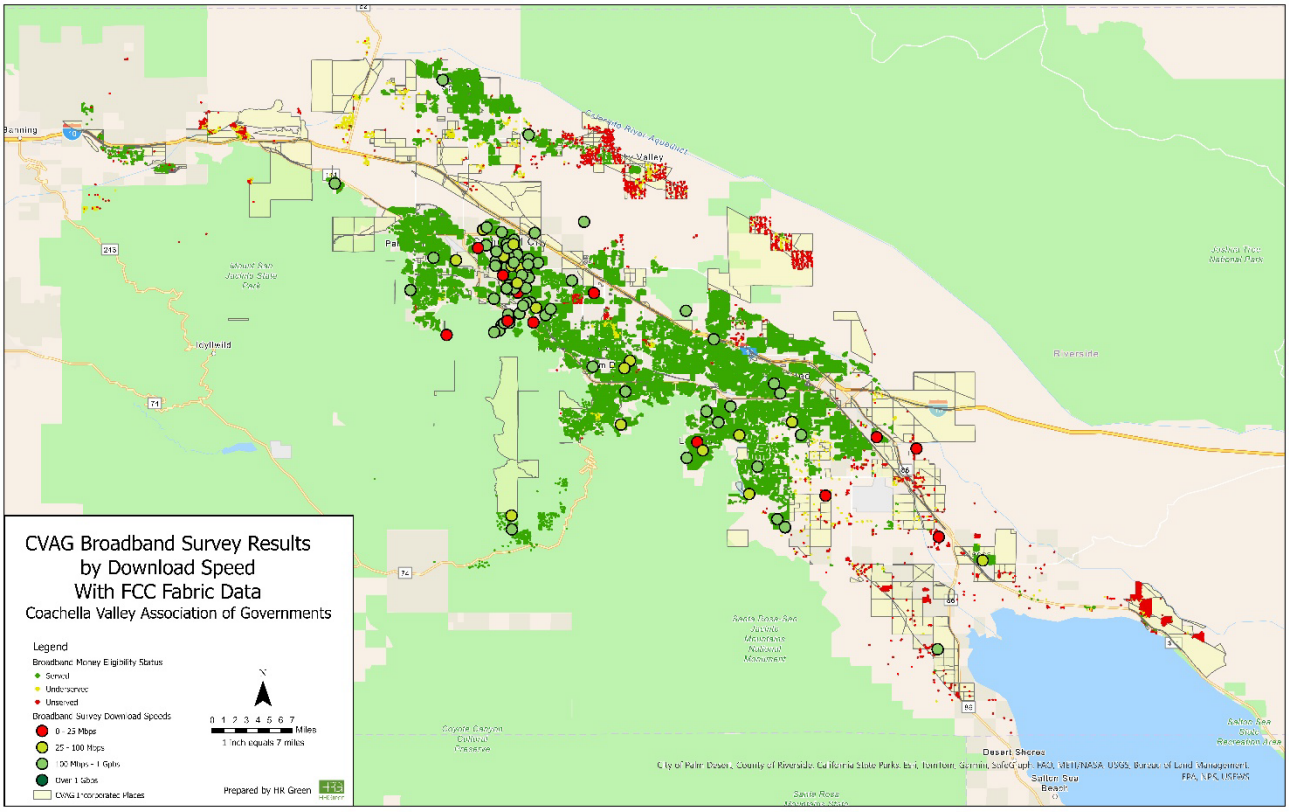


FIGURE 4 - SURVEY RESULTS BY DATA RATE

Figure 4 shows the distribution of survey results by download speed within the CVAG area. Please note that all of the survey results are analyzed in charting survey results, while the map data may have geocoding outliers due to technical or user errors. When measured against the federal definition of Broadband, the residents of the CVAG communities report gaps in several areas. The survey respondents were asked to take a speed test through an online tool and report their actual speeds. While this method is reliant on variables such as the quality of in-home networking equipment, the results are generally accurate to show actual speed of service received, if not precise, to the Mbps level.

Although the survey results look at the entire CVAG study area, Figure 5 (below) helps demonstrate the breakdown of how many respondents were from each city. Note the 9% of respondents located on the edge of the CVAG boundary in surrounding communities identified based on their provided location and included in these results due to their proximity of the surveyed area.

Two of the 101 residential responses indicated that they do not subscribe to Internet Service, providing insight that available speeds are too slow for their needs. For the remaining 99 respondents, they were asked who their providers were for Internet.

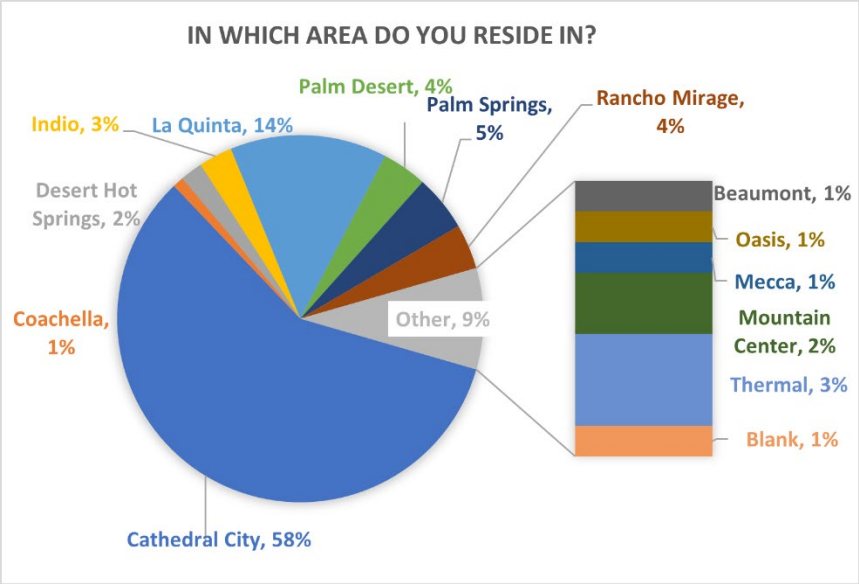


FIGURE 5 -WHERE DO CITY RESPONDENTS LIVE?

Due to the large study area comprising multiple communities, there were numerous companies providing internet service, with some providing service to select locations. Overall for home services, Spectrum is the primary Internet service providers for CVAG, accounting for sixty-nine percent (69%) of all service subscriptions. The next largest providers, Frontier and T-Mobile 5G Home Internet, serve only nineteen percent (19%) and four percent (4%) of the survey respondents, respectively. Note that any service provider accounting for less than one percent (1%) of subscriptions was excluded from the graph.

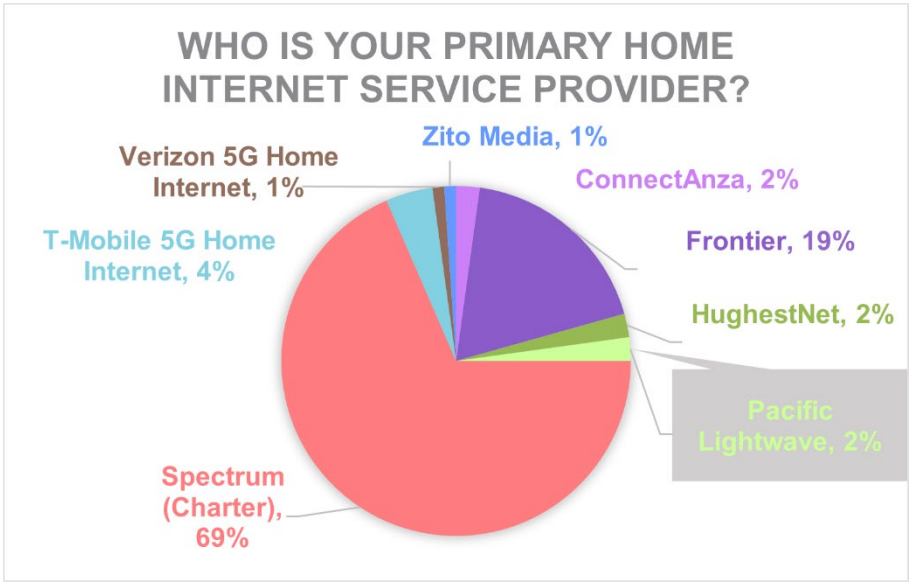


FIGURE 6 - INTERNET SERVICE PROVIDERS OF SURVEY RESPONDENTS (HOMES)

The following map illustrates the distribution of respondents' providers.

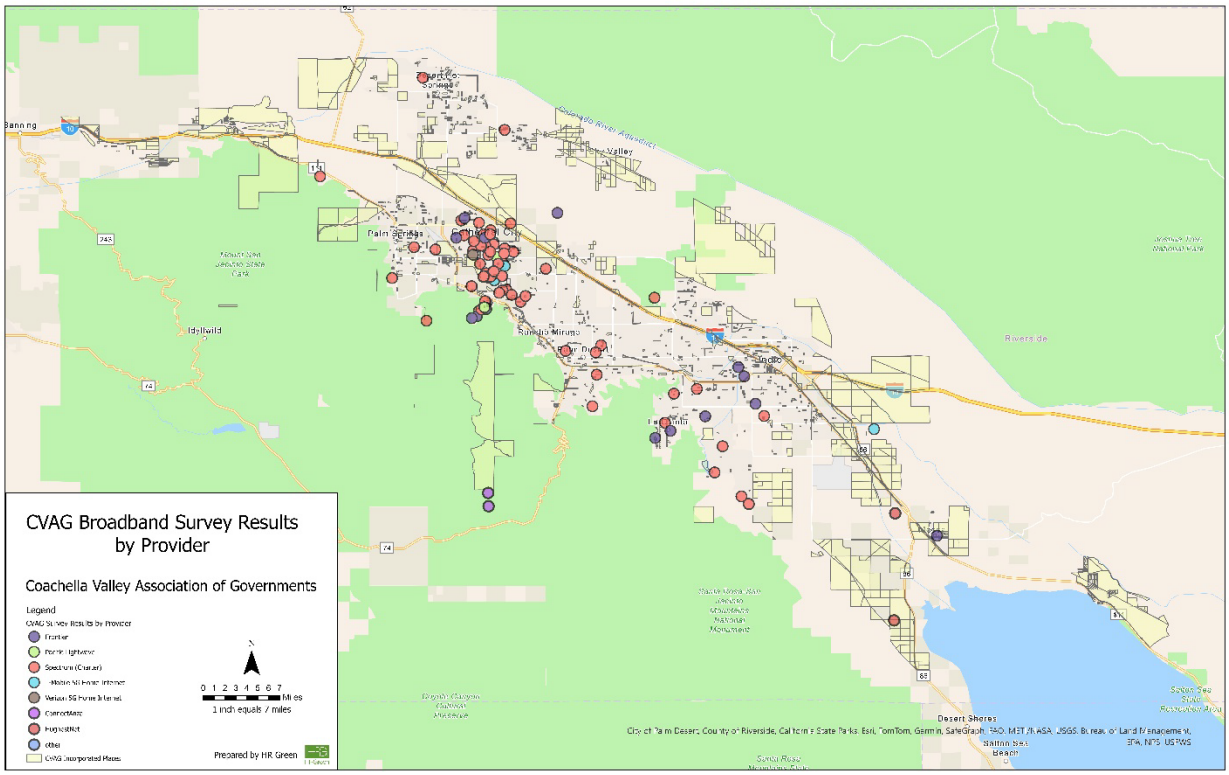


FIGURE 7 - INTERNET SERVICE BY PROVIDER

When asked about residential download speeds, seventy-one percent (71%) of respondents who provided data received speeds of 101 megabits per second (Mbps) or greater. For upload speeds, eighty-one percent (81%) of respondents had speeds of 21 Mbps or more. Under the FCC's definition of underserved populations, nineteen percent (19%) of respondents in CVAG experience speeds of 100/25 Mbps or less (i.e. underserved), as seen with the applicable data bars highlighted in orange in Figure 8 and Figure 9.

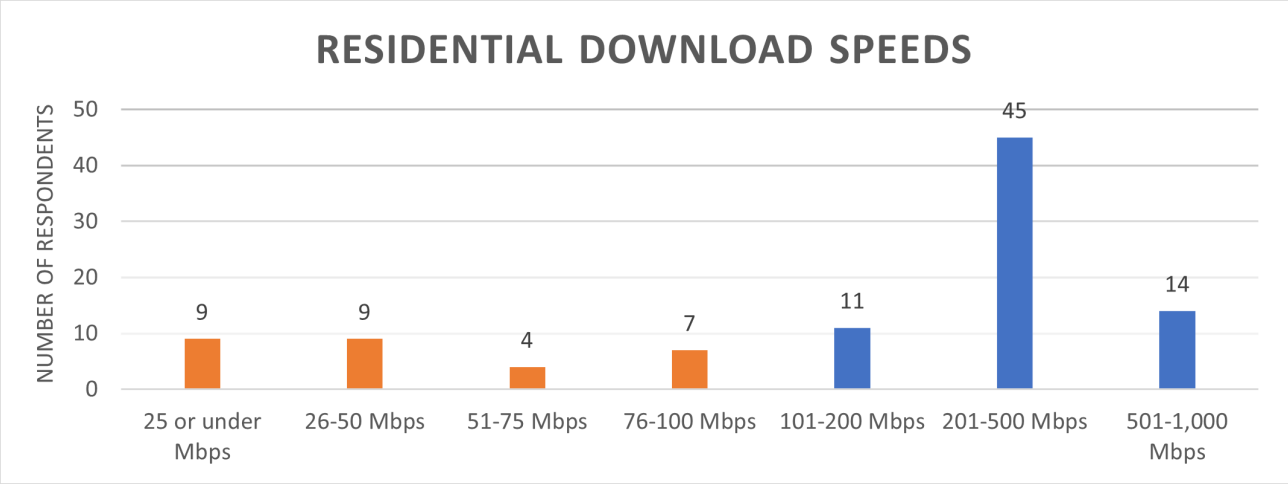


FIGURE 8 - RESIDENTIAL DOWNLOAD SPEEDS

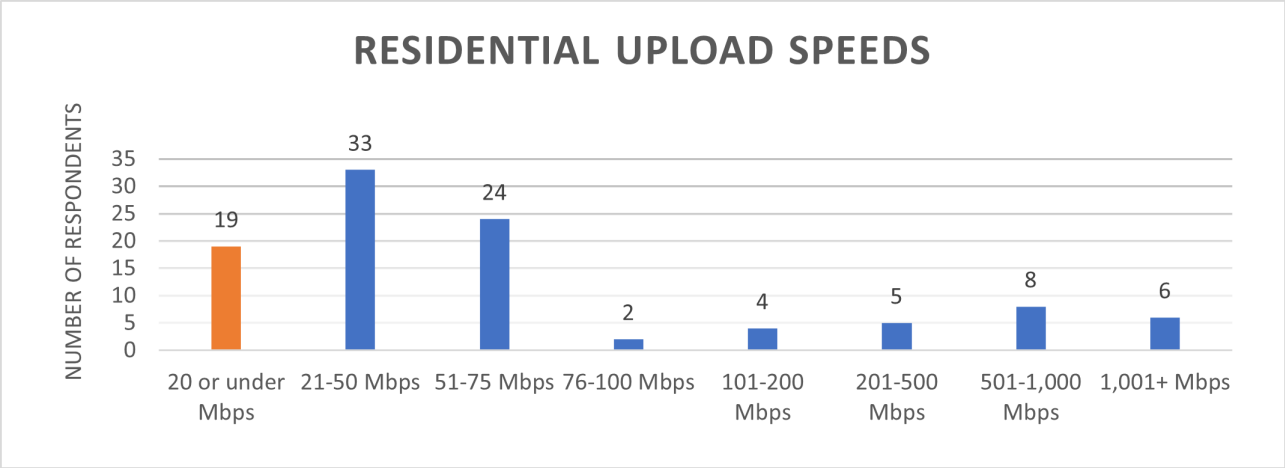


FIGURE 9 - RESIDENTIAL UPLOAD SPEEDS

Another survey question asked how many users typically actively use the internet at their home. The overwhelming majority of respondents at seventy-one percent (71%) noted that there are one to two active users at home. The next largest group came in at twenty-five percent (25%) for three to five users, with one percent (1%) reporting six to ten users.

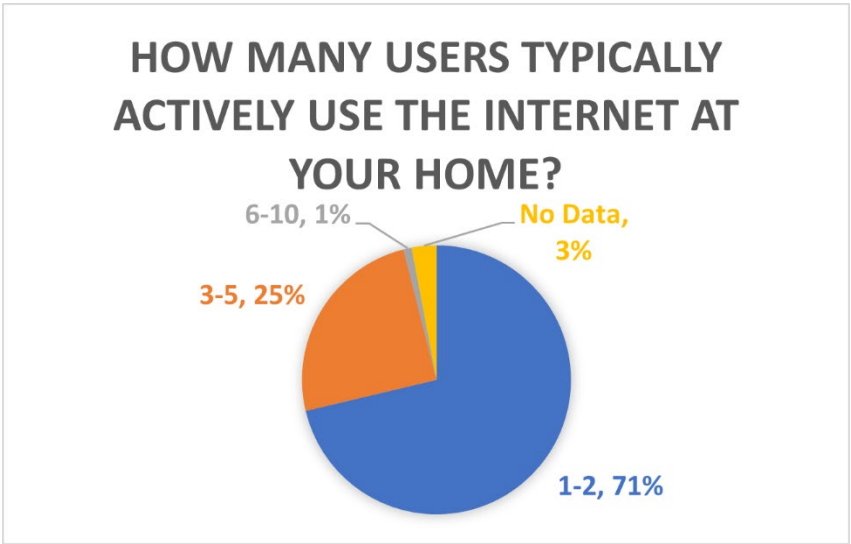


FIGURE 10 - NUMBER OF USERS AT HOME

Survey respondents were also asked about the likelihood of recommending their home service provider to a friend or colleague. Thirty-seven percent (37%) of respondents were likely or very likely to recommend the service, while thirty percent (30%) of respondents were unlikely or very unlikely to recommend it. This close divide suggests that overall, providers have good enough service for individuals. Of those who would not recommend their service, individuals mentioned issues with service reliability and capacity, the lack of competition from other providers, and high prices.

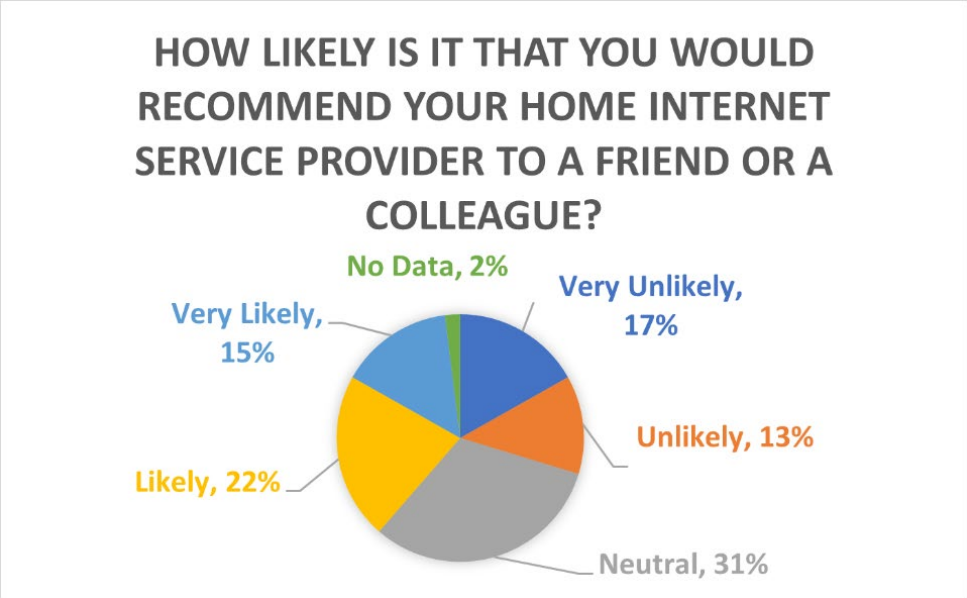


FIGURE 11 - LIKELIHOOD TO RECOMMEND ISP

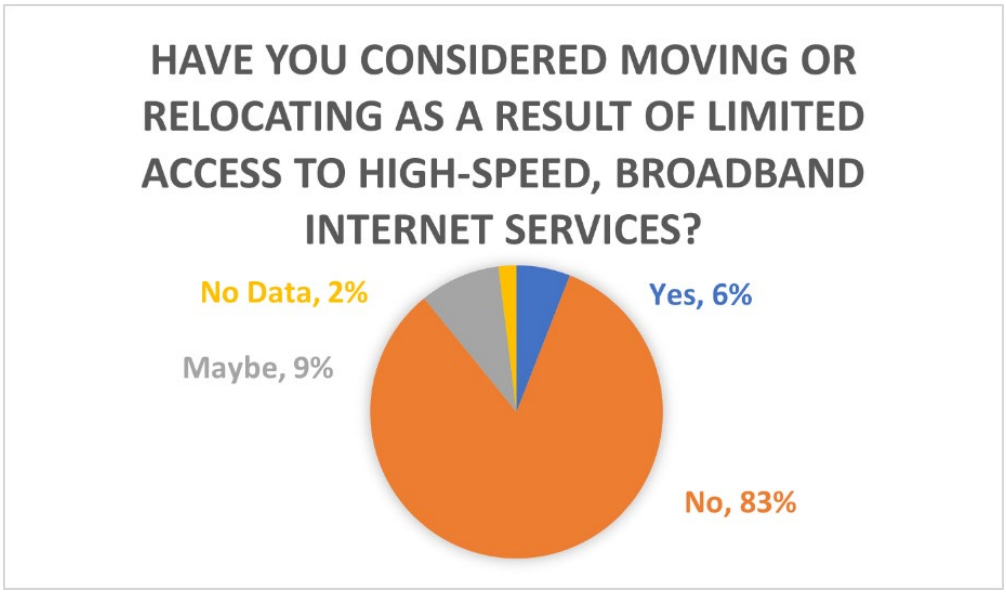


FIGURE 12 - CONSIDERED MOVING DUE TO INTERNET SERVICE

Another survey question relates to whether dissatisfaction with internet service can incentivize residents to move to a different area. The vast majority indicated no, but fifteen percent (15%) answered that they have or maybe have considered moving as a result of their internet service. One possible reason people may not consider moving is that when compared with results to the age demographics chart (see Figure) the majority of respondents may be retirees or close to retirement age. Usually, this age group is not one to commonly move and such may not want to move, regardless of their internet service quality.

USAGE

Aggregated by the number of mentions, the usage statistics for the CVAG's residents for home services include a variety of internet applications, the most common ones being email, shopping, news, streaming video, and web surfing. Those who work full or part time from home are approximately five percent (5%) of the responses, while telehealth and online education is approximately six percent (6%) of internet usage.

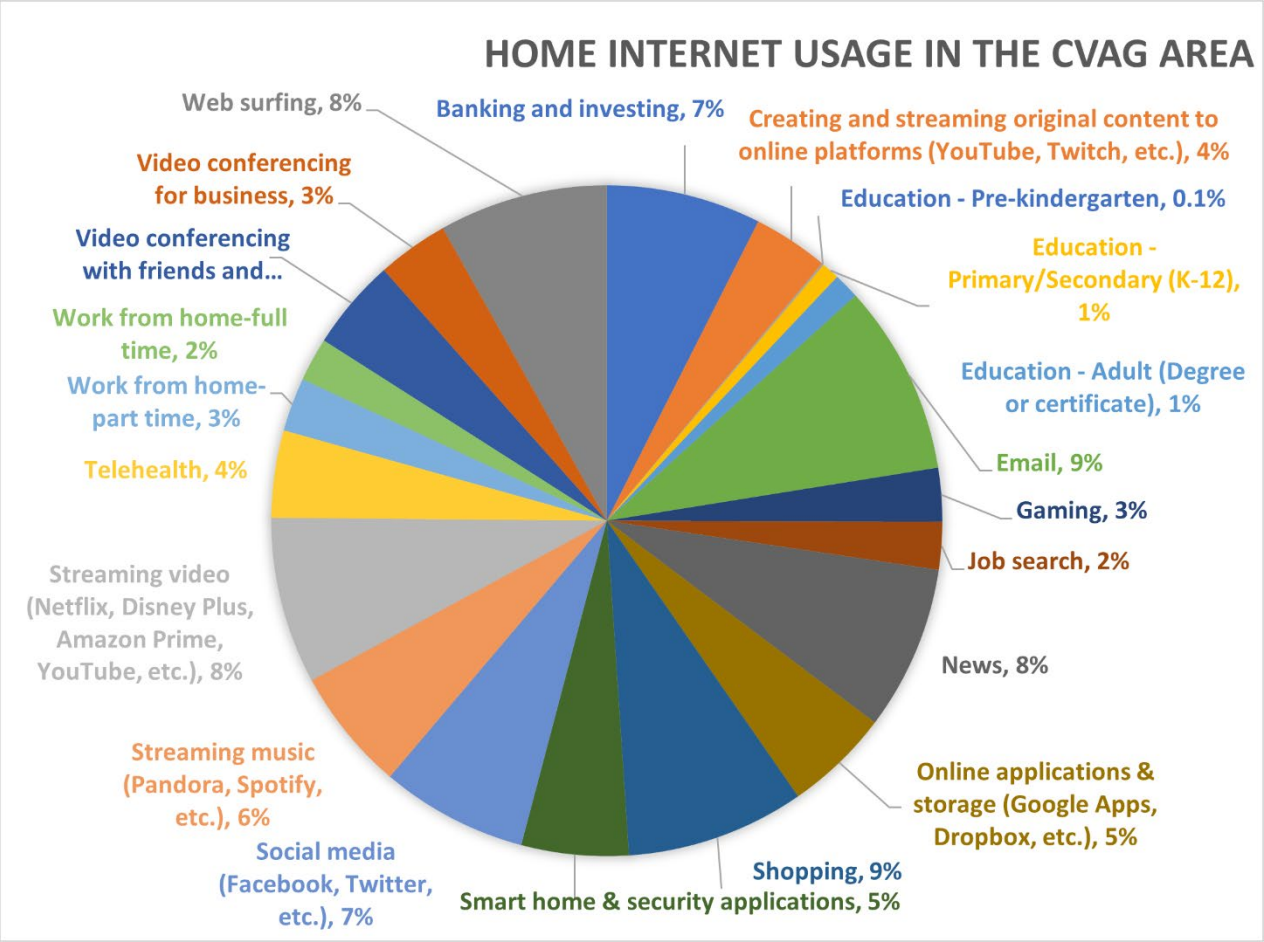


FIGURE 13 - USAGE OF HOME INTERNET APPLICATIONS

Figure 14 displays when respondents were asked if anyone in their home is currently working from home or running a business. This question reflects the remote work culture instigated by the pandemic, as seen with the results of almost half of respondents answering “yes”.

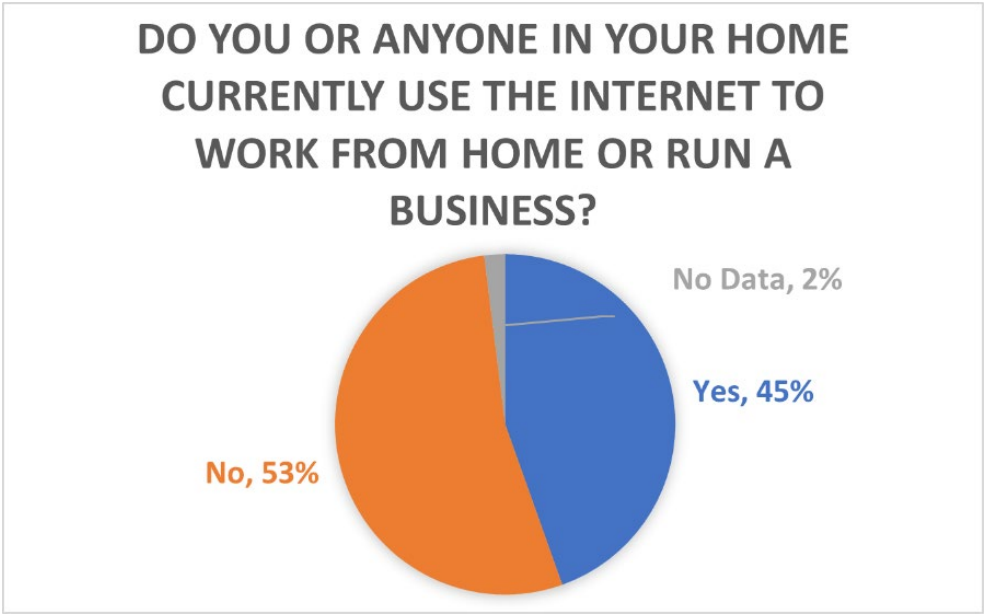


Figure 14- E-Work Home Internet Usage

When asked what types of devices respondents use on the internet, there is a fairly similar ratio of users using mobile phones, laptops/ desktops computer, tablets, and sensors/ smart devices/ internet of things-supported devices.

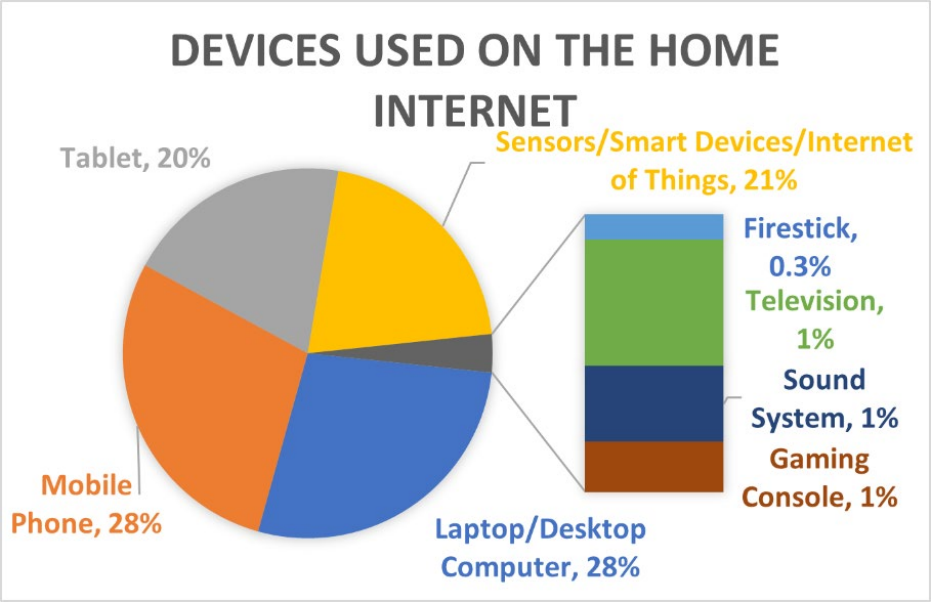


FIGURE 15 - DEVICE USAGE ON THE INTERNET

SERVICE INTERRUPTIONS ARE NOT MANAGEABLE IN CVAG COMMUNITIES

Less than half of survey respondents indicated that home service interruptions are relatively common. A notable eighteen percent (18%) of residential service subscribers have experienced an outage for an hour or less a week, with seven percent (7%) experiencing them more than one hour or less a day, and five (5%) experiencing an outage more frequently than 1 hour per day. Sixty-eight percent (68%) of residential service subscribers have outages for an hour or less a month.

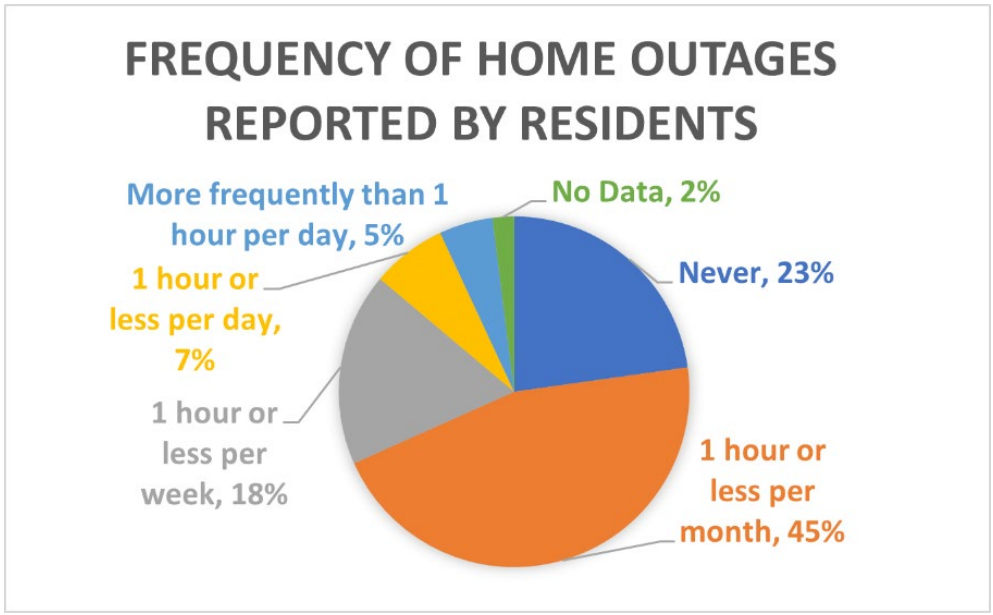


FIGURE 16 - FREQUENCY OF HOME OUTAGES

SATISFACTION VS IMPORTANCE OF SERVICE CATEGORIES

The colored bar graphs in Figure . shows level of satisfaction in each of the following service categories (overall satisfaction, speed/data rate, reliability, price, and customer service), with the lighter blue color indicating very satisfied in the category. The majority of respondents range from feeling “ok” to “highly dissatisfied” about these categories. Note that data reliability is not a major concern for the respondents as shown by the width of the “very satisfied” and “somewhat satisfied” data bars.

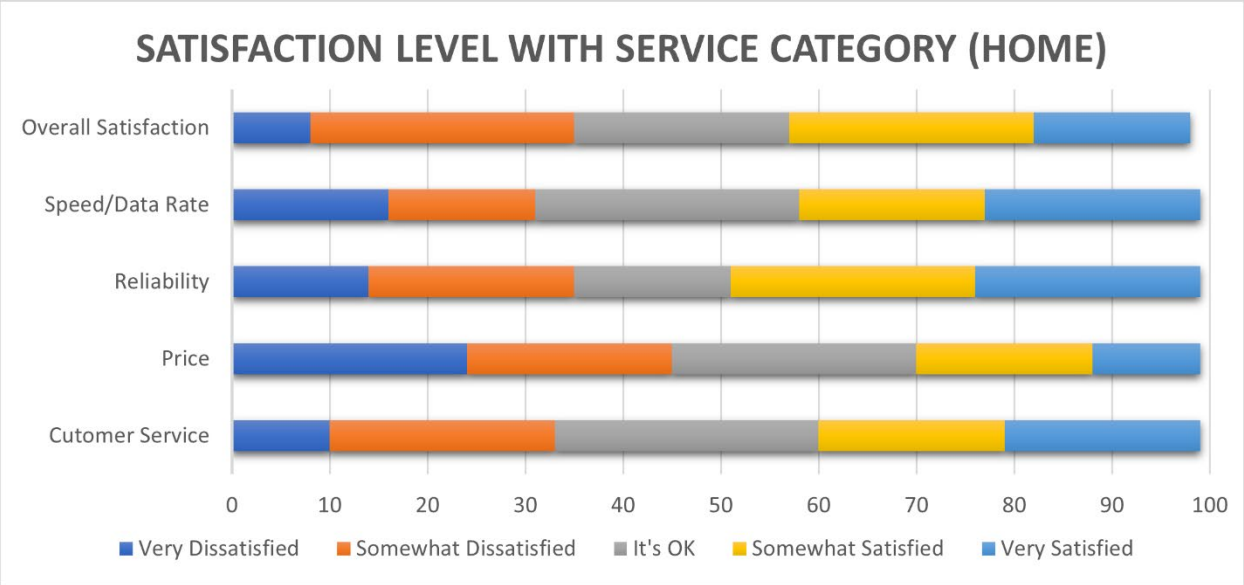


FIGURE 17 - SATISFACTION LEVEL (HOME)

Figure 18 shows how important the service category is to the individual respondents. Here, the lighter blue color shows a service category is very important to an individual respondent. The perceived importance for home service is in the following ranked order: reliability, price, customer service, and speed/data rate. These perceived importance rankings show that respondents have relatively reliable service, and the customer service of said service is in line

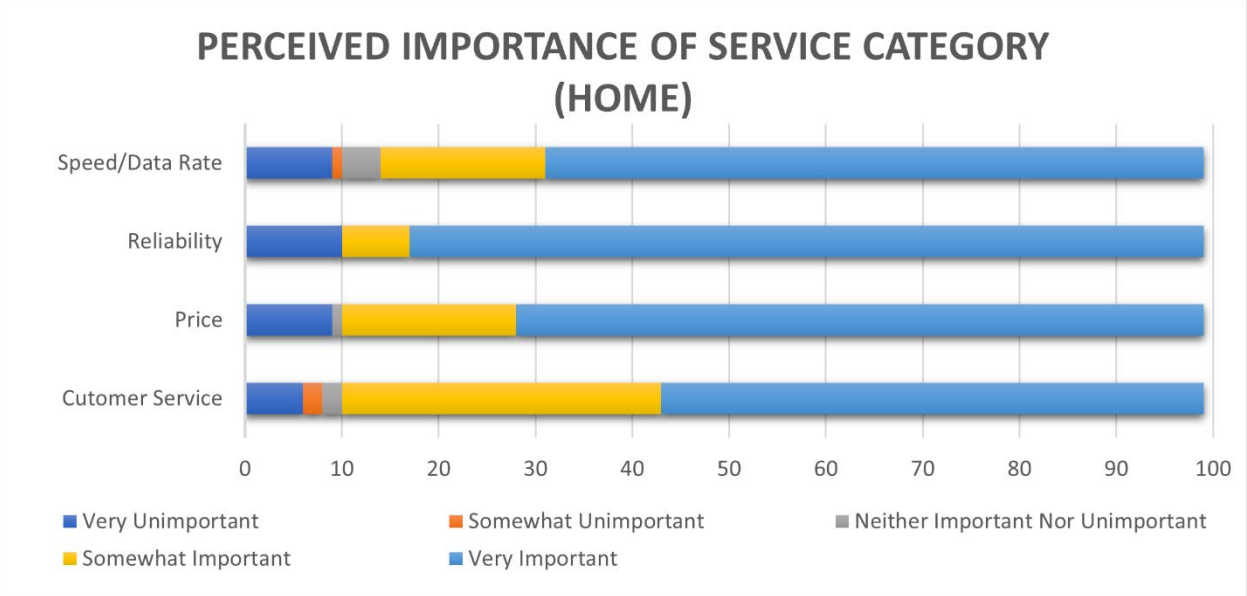


FIGURE 18 - IMPORTANCE LEVEL (HOME)

DEMOGRAPHICS OF RESPONDENTS

Figures 19 through 22 provide a visual representation of the respondents' demographics. The respondents are characterized by a lean toward male respondents and a wide and fairly consistent distribution of ages, with the exception being ages 65 through 74 who represent thirty-seven percent (37%) of respondents.

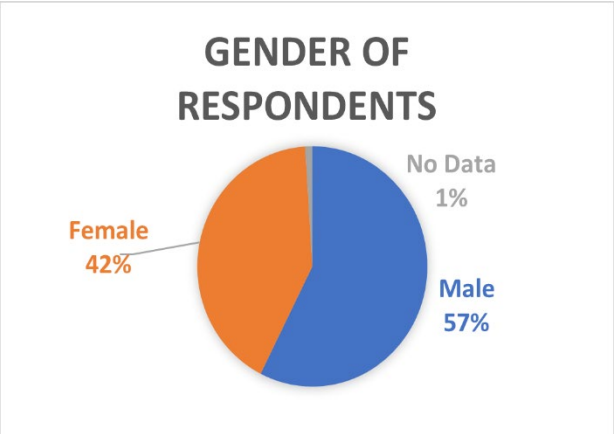


FIGURE 19 - GENDER OF RESPONDENTS

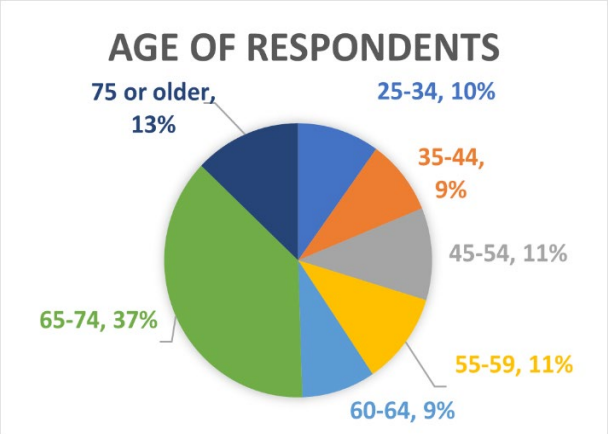


FIGURE 20 - AGE OF RESPONDENTS

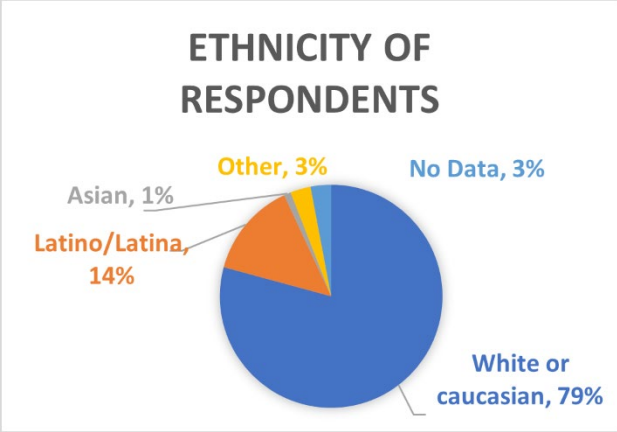


FIGURE 21 - ETHNICITY OF RESPONDENTS

The majority of respondents identified as white or Caucasian, with the next highest group belonging to Latino/Latina ethnicity for fourteen percent (14%) of the respondents.

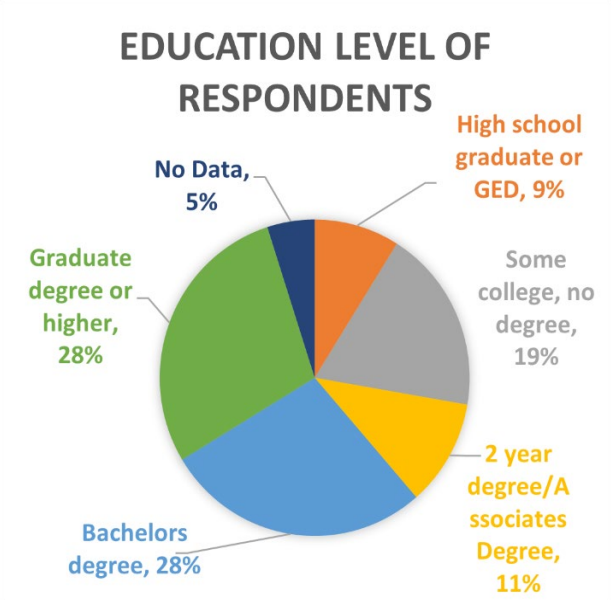


FIGURE 22 - EDUCATION LEVEL OF RESPONDENTS

The majority of the respondents have higher education.

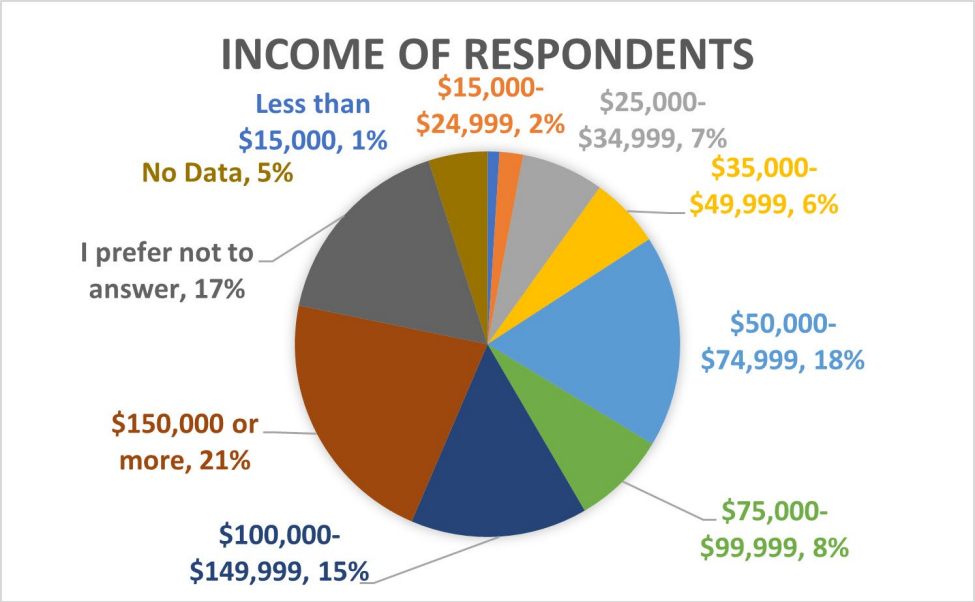


FIGURE 23 - INCOME LEVEL OF RESPONDENTS

The income reported was household income and not an individual's income. The income of the respondents is distributed relatively even across each income bracket from $50,000 and beyond. Typically, this distribution is intuitive as the higher educated are also typically more concerned with being connected and more likely to leverage current technologies.

LEVEL OF SUPPORT FOR COMMUNITY INVOLVEMENT TO FACILITATE BROADBAND SERVICE

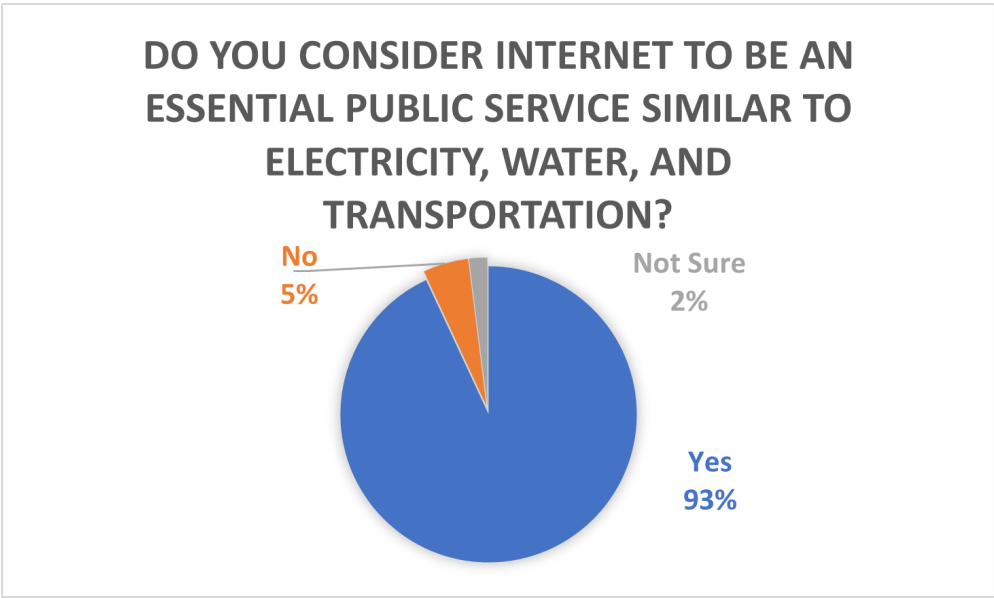


FIGURE 24- INTERNET AS AN ESSENTIAL INFRASTRUCTURE

Survey respondents were questioned to determine their support for public action to promote broadband service for their community. Ninety-three percent (93%) of respondents consider the internet to be an essential public infrastructure consider Internet as an essential utility like electricity, water, and transportation.

In relation to the priorities that have moved online during the pandemic, respondents were asked about the importance they place on broadband services supporting remote work, health care, and education in the community, as seen in Figure 25. These results indicate that respondents within the CVAG area strongly believe that those community attributes are very important or somewhat important.

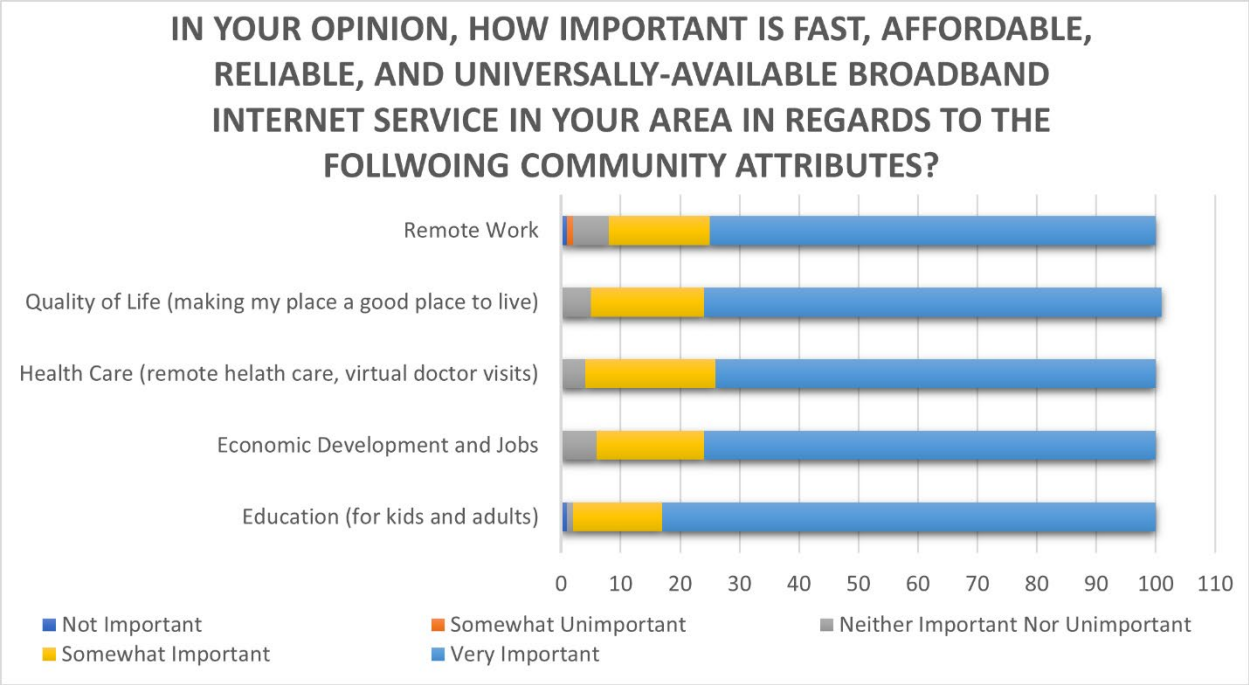


FIGURE 25 - ISP COMMUNITY ATTRIBUTES

When asked how well providers are meeting these needs, approximately twenty-nine percent (29%) of respondents indicated that they met the bare minimum or not at all.

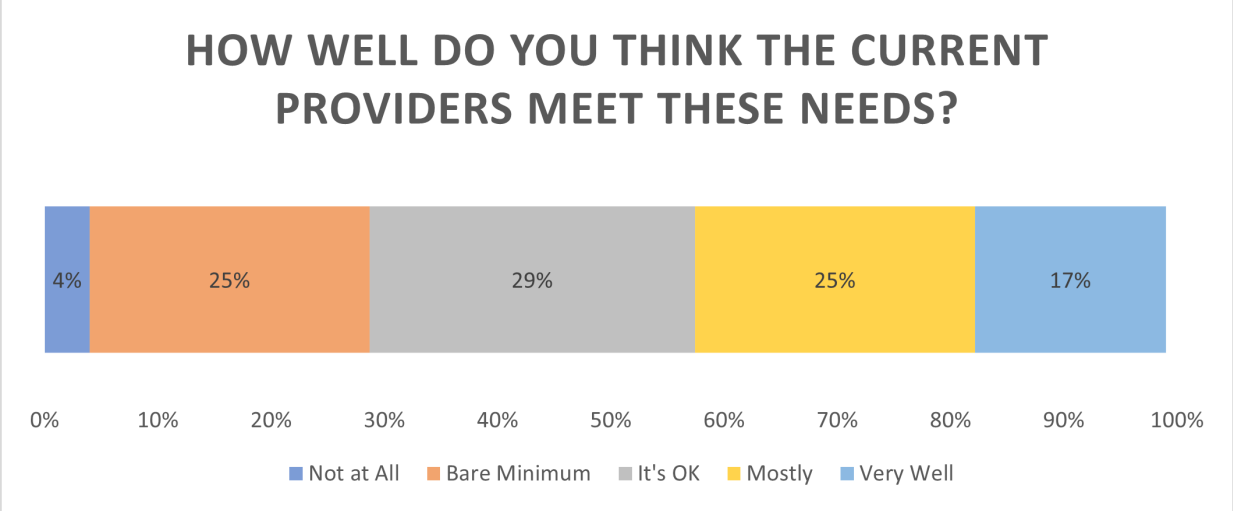


FIGURE 26- HOW CURRENT PROVIDERS ARE MEETING COMMUNITY NEEDS

In taking potential action to facilitate better broadband, seventy-nine percent (79%) of the respondents indicated that they felt CVAG should take action.

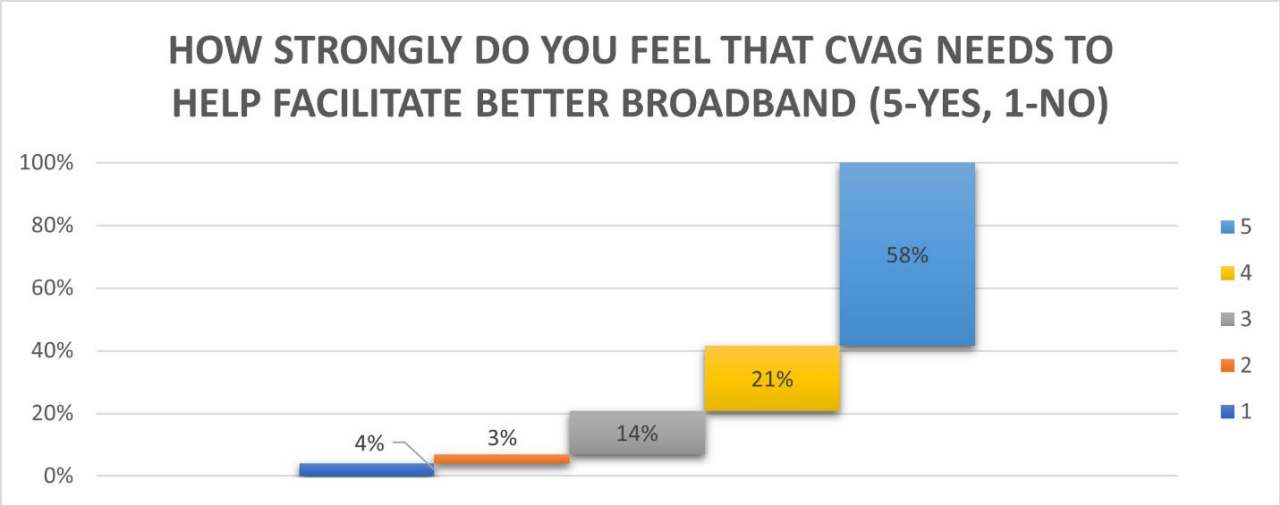


FIGURE 27 - HOW CURRENT PROVIDERS ARE MEETING COMMUNITY NEEDS

When asked if respondents would participate in an organized effort led by their city, subdivision, neighborhood, or HOA to improve high speed internet access, eighty-seven percent (87%) of individuals said they would either be willing or potentially willing to participate in this effort. One individual directly stated their participation would depend on the terms and conditions of the effort. Only twelve percent (12%) of respondents would not participate should CVAG/their city lead an effort.

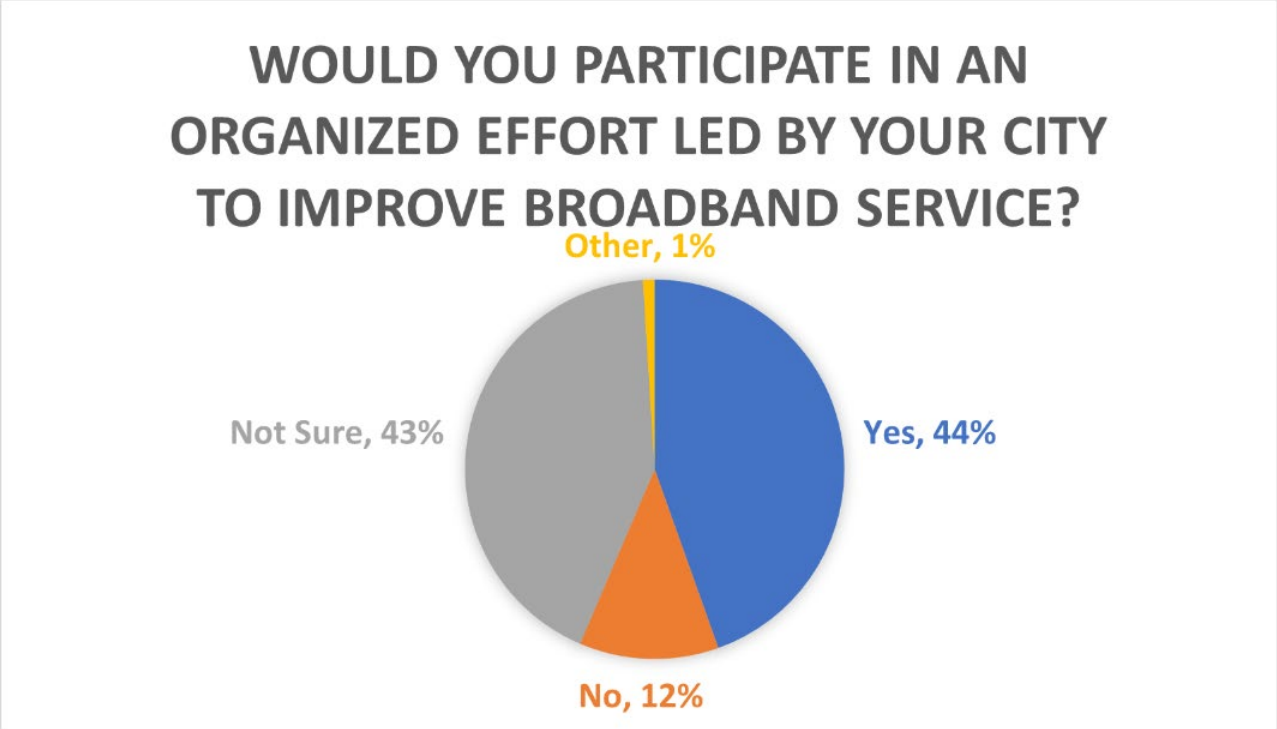


FIGURE 28 - RESPONDENTS WILLINGNESS FOR PARTICIPATION

Two other broadband surveys were completed while the CVAG broadband study was in process. The surveys are included here as additional information. See combined analysis at the end of this section.

PALM DESERT CITIZEN AND BUSINESS SURVEY RESULTS

INTRODUCTION TO THE SURVEY

Palm Desert needed feedback and input from its citizens and businesses regarding the current state of broadband service. This information is crucial for helping the City identify areas of greatest need, partner Internet Service Providers (ISPs) to work with for a given area, and funding opportunities to support any future initiatives. The City welcomed citizen and business participation as it looked at how the presence or lack of broadband (internet) services impact the community, and how facilitating broadband access can meet the City's goal of improving broadband services throughout the community.

Surveys of residents and business owners were used to help decision makers better understand community needs. In key economic areas, such as along El Paseo, the surveys incorporated questions around incorporating public Wi-Fi, EV charging stations, smart streetlights/poles, and other opportunities to make these business districts a point of destination and retain consumers in these areas for a longer period of time.

Resident and business surveys helped to determine the community's desire for broadband services; current market conditions and deficiencies, predicted take rate and optimum monthly cost users would be willing to pay for the service; stakeholder needs and what role the government should take in providing broadband services. One survey was developed that included two paths, one path focused on residential broadband services, and the other path focused on business broadband services. The survey would go down the appropriate path based on whether the responder selected resident or business.

The survey included a detailed list of questions to capture the data needed. The survey requested information about phone, television, and Internet services: which provider is used; at what costs; what they like and dislike today or would wish in the future; and even a bit about what they do with Internet services.

The residential survey also asked questions about the composition of their household, do they have children; do they work at home, solely or occasionally and the age of the respondent. Survey questions also included upload/download speed, general location of responding party, and their opinion on what role municipal government should take in providing these services. Additionally, the survey asked if business districts offered free public Wi-Fi, would that encourage you to stay and shop longer?

The survey was accessible via a link on the City's website. The link to the survey was also shared with residents and businesses via other sources including:

- Print version of the Palm Desert BrightSide
- Digital version of the Palm Desert BrightSide
- El Paseo Business Improvement District channels
- Palm Desert Area Chamber of Commerce (PDACC) eblasts
- PDACC business breakfast
- EngagePalmDesert.com
- Posts on the City's Facebook page
- Posts on the City's Twitter
- Desert Sands Unified School District student portal (in English and Spanish)
- Palm Desert affordable housing residents
- HOAs

It is important to note that the surveys included a link to a speed test website. Once on the speed test website, testing was conducted to determine actual upload/download speeds in a manner that could be verified and documented. To obtain the best possible speed test results, the person completing the survey was asked to complete it at their residence or business.

The survey took only a few minutes to complete. All responses were anonymous and confidential. Participation was limited to one person per household or business. As this was a survey to assess wired internet service, participants were encouraged to use a device that could be connected to a wired internet

connection (through Wi-Fi or Ethernet) to take the survey.

Both surveys were available from February to April 2023, and then again from July to August 2023. During this five-month time frame, the City received a total of 230 responses, with 209 responses to the Resident Survey and 20 responses to the Business Survey. The is a small sample size; therefore, it is difficult to apply to the overall population of Palm Desert. Three hundred eighty-three (383) survey responses would have been needed to achieve a base statistical significance level. Due to the low number of responses to the business survey, the rest of this section focuses on the responses to the resident survey.

Survey data was collected via GIS-enabled tools to enable a deep understanding of conditions neighborhood by neighborhood.

SURVEY FINDINGS

How do you use internet service at home?

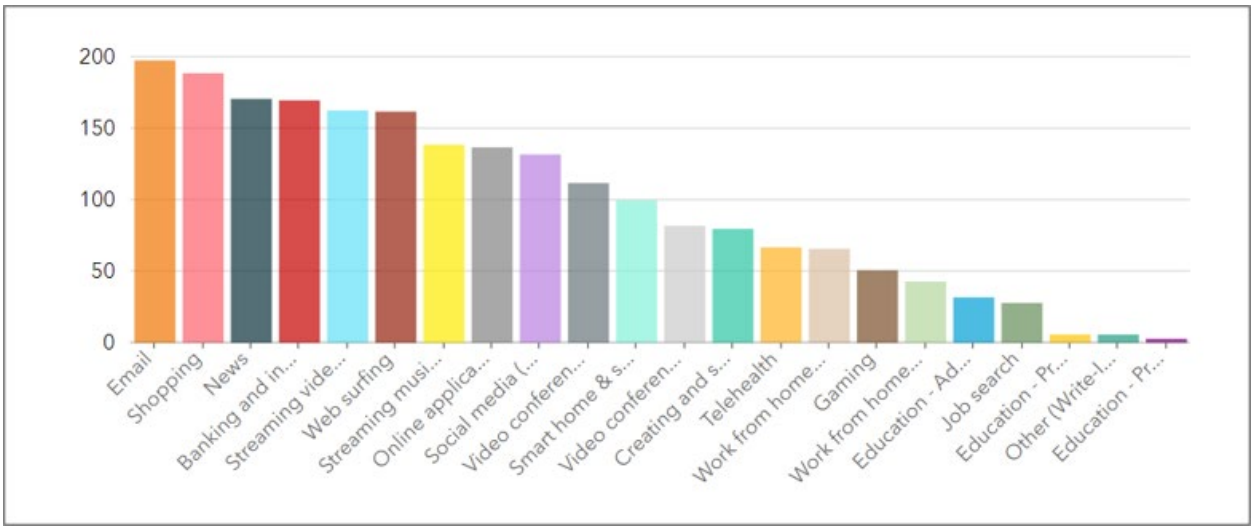


FIGURE 29 - HOW DO YOU USE INTERNET SERVICE AT HOME?

Please rate your level of satisfaction with the Reliability of your home internet service:

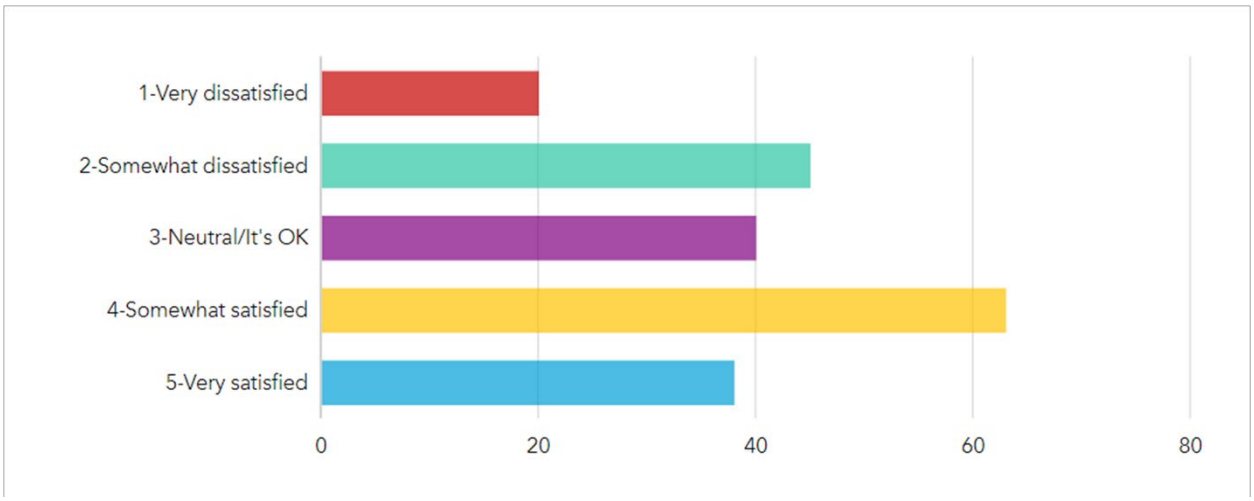


FIGURE 30 - PLEASE RATE YOUR LEVEL OF SATISFACTION WITH THE RELIABILITY OF YOUR HOME INTERNET SERVICE

Please rate your level of satisfaction with the Speed/Data Rate of your home internet service:

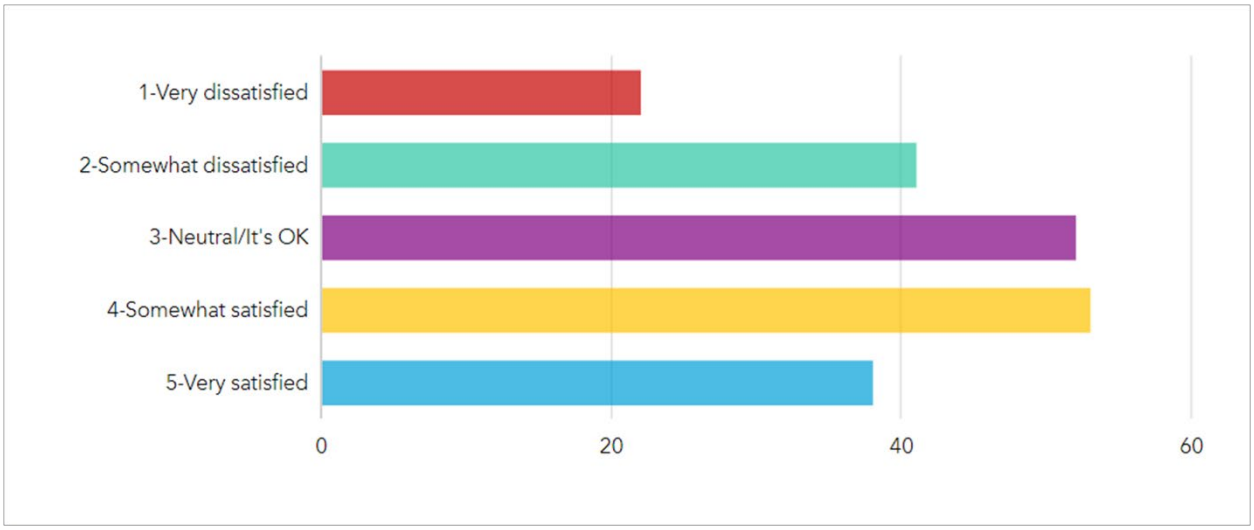


FIGURE 318 - PLEASE RATE YOUR LEVEL OF SATISFACTION WITH THE SPEED/DATA RATE OF YOUR HOME INTERNET SERVICE

Please rate your level of satisfaction with the Price of your home internet service:

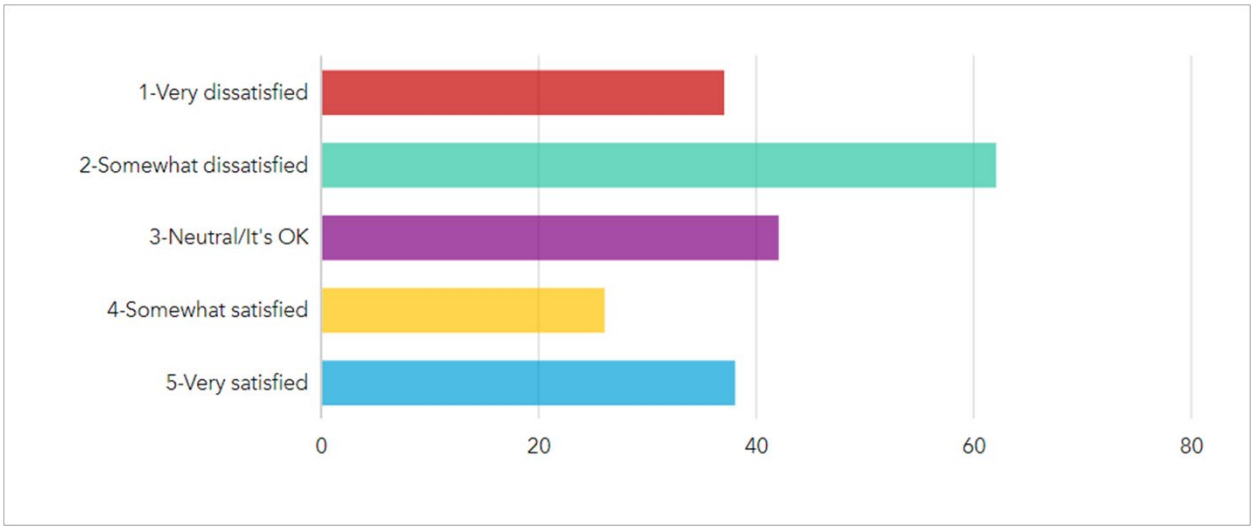


FIGURE 32 - PLEASE RATE YOUR LEVEL OF SATISFACTION WITH THE PRICE OF YOUR HOME INTERNET SERVICE

How often do you experience outages due to connection problems or slow/inoperable speeds?

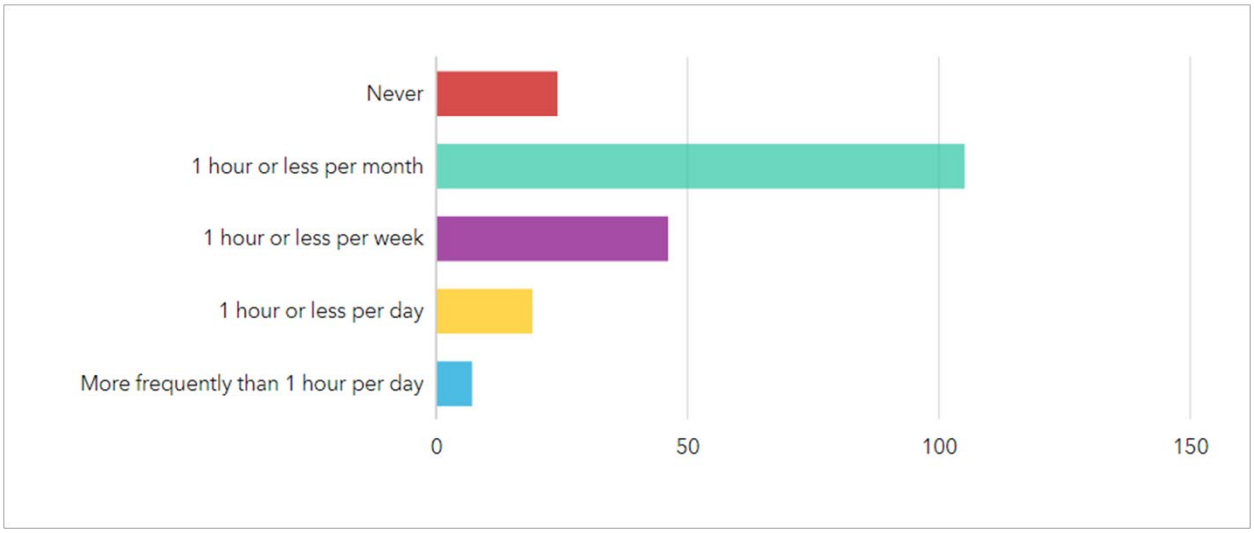


FIGURE 33 - HOW OFTEN DO YOU EXPERIENCE OUTAGES DUE TO CONNECTION PROBLEMS OR SLOW/INOPERABLE SPEEDS?

Do you consider the internet to be an essential public infrastructure like electricity, water, and transportation?

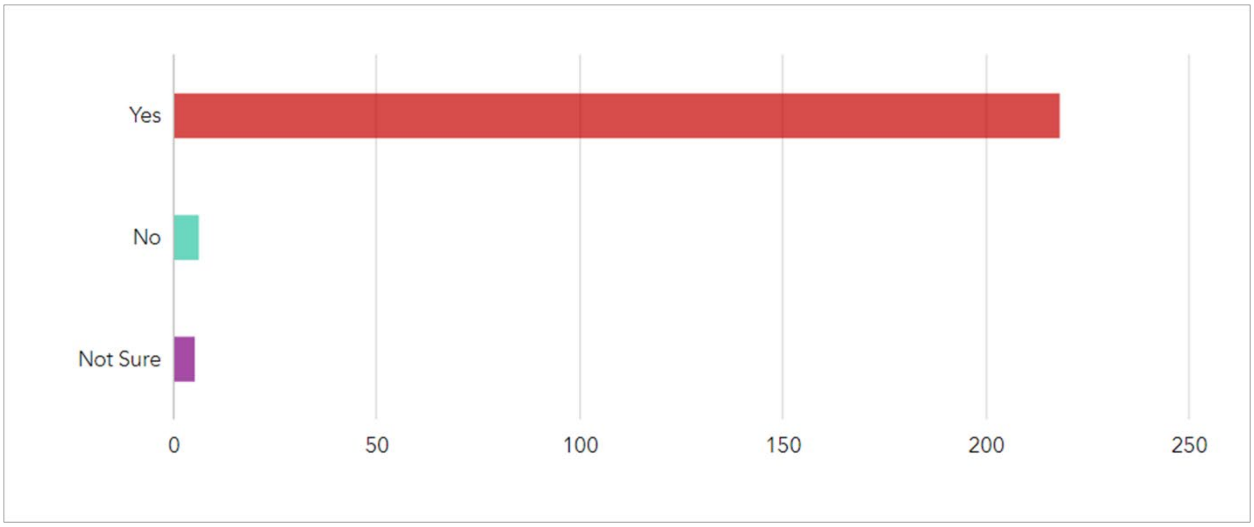


FIGURE 9 - DO YOU CONSIDER THE INTERNET TO BE AN ESSENTIAL PUBLIC INFRASTRUCTURE LIKE ELECTRICITY, WATER, AND TRANSPORTATION?

How well do you think the current providers in Palm Desert meet the needs of the community?

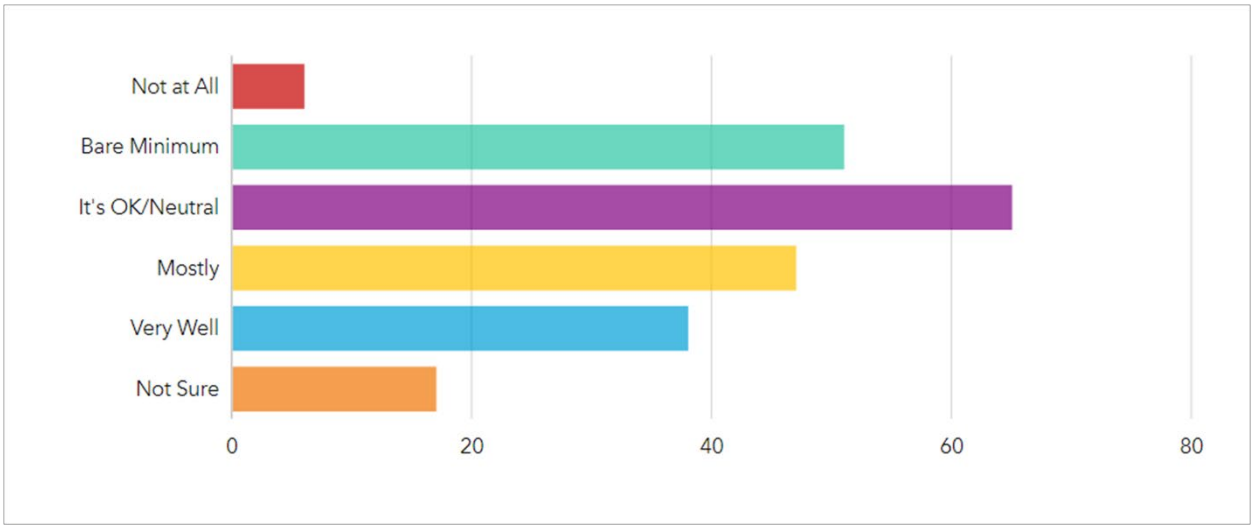


FIGURE 35 - HOW WELL DO YOU THINK THE CURRENT PROVIDERS IN PALM DESERT MEET THE NEEDS OF THE COMMUNITY?

Would you participate in an organized effort led by your subdivision / neighborhood / HOA to improve broadband service?

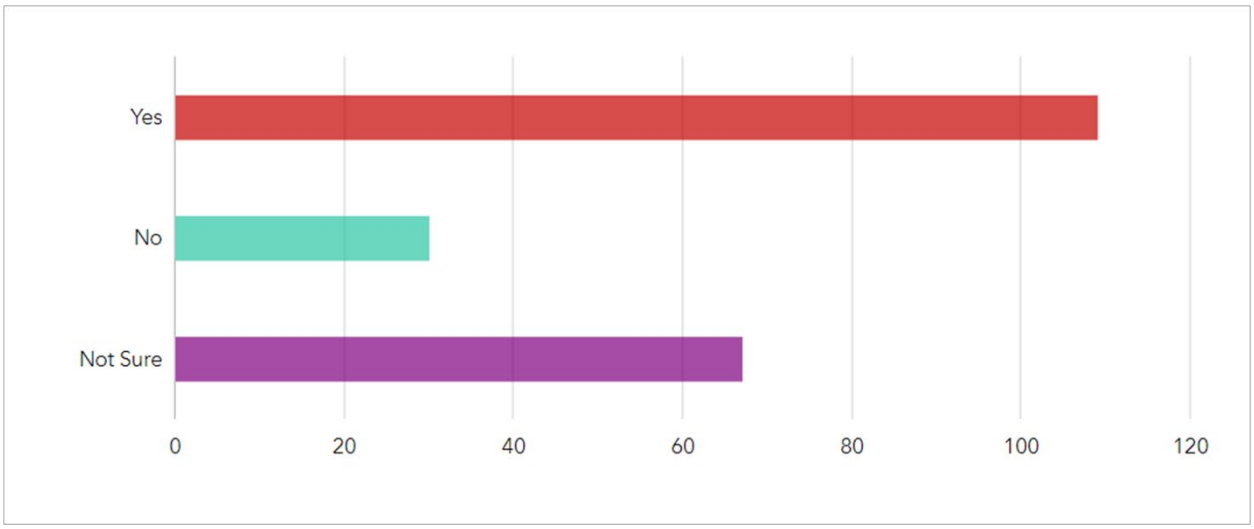


FIGURE 36 - WOULD YOU PARTICIPATE IN AN ORGANIZED EFFORT LED BY YOUR SUBDIVISION / NEIGHBORHOOD / HOA TO IMPROVE BROADBAND SERVICE?

How strongly do you feel that the City needs to help facilitate better broadband?

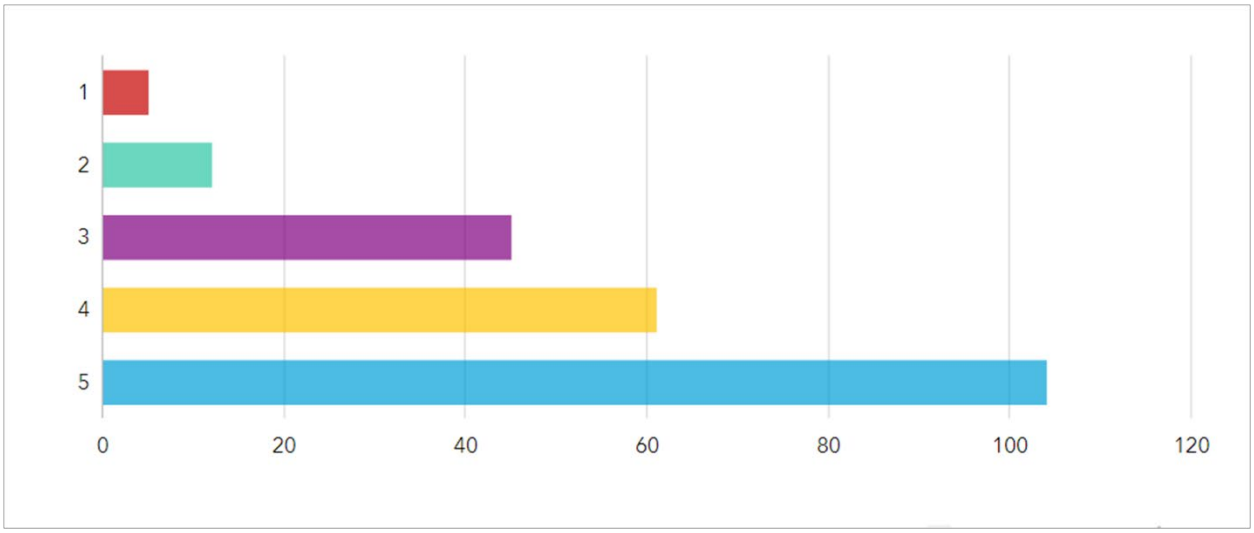


FIGURE 37 - HOW STRONGLY DO YOU FEEL THAT THE CITY NEEDS TO HELP FACILITATE BETTER BROADBAND?

Do you have any other comments, questions, or concerns about your current home internet service?

Responses
Pleased with internet service.
Internet has been fine since fiber optic service has been delivered at home.
Competition is needed.
Price per month is ridiculously high for the service.
Cannot work from home because internet is too slow.
Speed is ok but less contention and lower latency would be better.
TV and streaming freeze a few times per night.
Waiting for fiber optics to come to the neighborhood.
Internet is unstable, unreliable, and underperforming.
Cell service is awful and has been for years.

KEY FINDINGS

- Most responders are somewhat satisfied to very satisfied with the reliability of broadband services within the City.
- Most responders are somewhat satisfied to very satisfied with the speed and data rate of broadband services within the City.
- Most responders are somewhat dissatisfied to very dissatisfied with the price of broadband service within the City.
- One of the concerns shared by responders is the perceived lack of competition.
- Most responders consider the internet to be an essential public infrastructure like electricity, water, and transportation.
- Most responders said that they would participate in an organized effort led by their subdivision / neighborhood / HOA to improve broadband service within the City.
- Most responders feel strongly that the City needs to help facilitate better broadband.

PALM SPRINGS CITIZEN AND BUSINESS SURVEY RESULTS

INTRODUCTION TO THE SURVEY

States utilize the FCC data to determine eligibility for their grant programs. If the data is correct, then the system is fine. However, the FCC data is widely known to have problems as the data is self-reported from the providers and is not knowingly checked before it is entered into the FCC system. Due to these known flaws, a community survey gathering speed test data (actual speed tests recorded from the Palm Springs area) is used to help determine if the FCC data is acceptable.

Since the available data on broadband speeds and coverage is known to be poorly representative of the reality of broadband in many locations, this survey of residents and business owners helps decision makers better understand community needs. The large-scale statistically significant public survey asked questions to determine the community's internet services, usage patterns, current market conditions and deficiencies, and desire for improved service in the community. Some of the questions asked are what is important to them personally, what do they value about communications services, what is important to the community, and, most importantly, how strongly they feel Palm Springs needs to help facilitate better broadband.

The survey garnered 532 responses, of which 521 were residential and 11 were businesses responses.

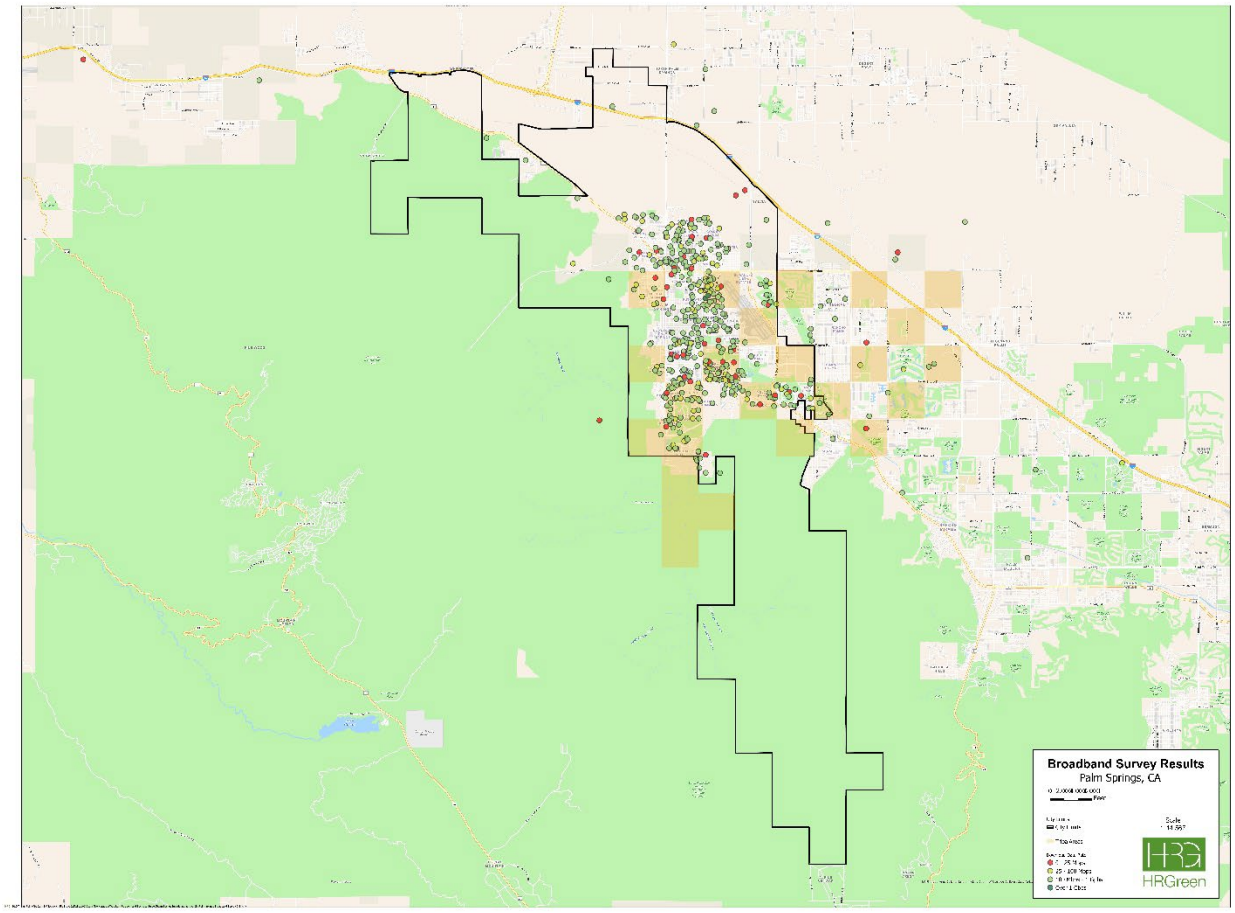


FIGURE 38 - SURVEY RESULTS BY DATA RATE

These findings help to illustrate today's conditions and indicate a need for more robust broadband services in some areas of the Palm Springs area. Identification of needs in the survey results will facilitate the development of network model alternatives that may be helpful to mitigate some of the most significant gaps between the community's capabilities and needs. The questions relating to the community's broadband vision will facilitate an understanding of what role Palm Springs could take in facilitating broadband service.

SURVEY FINDINGS

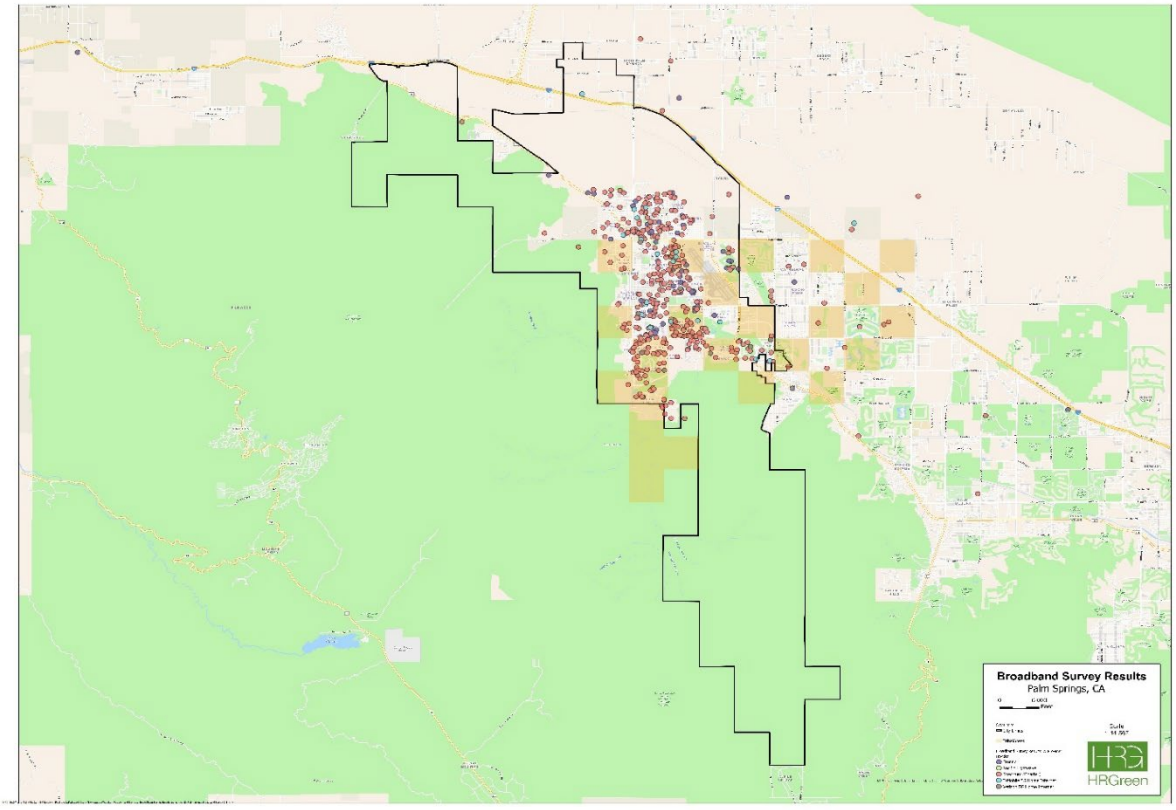


FIGURE 39 - SURVEY RESULTS BY PROVIDER

The study was performed with 521 residential respondents. An overwhelming majority of seventy-nine percent (79%) utilize Spectrum (Charter) as their primary ISP, with Frontier as the second most used ISP comprising fourteen percent (14%) of responses. Combined, this equates to the two providers covering ninety-three percent (93%) of our surveyed respondents. Note that any service provider accounting for less than one percent (1%) of subscriptions were excluded from the graph.

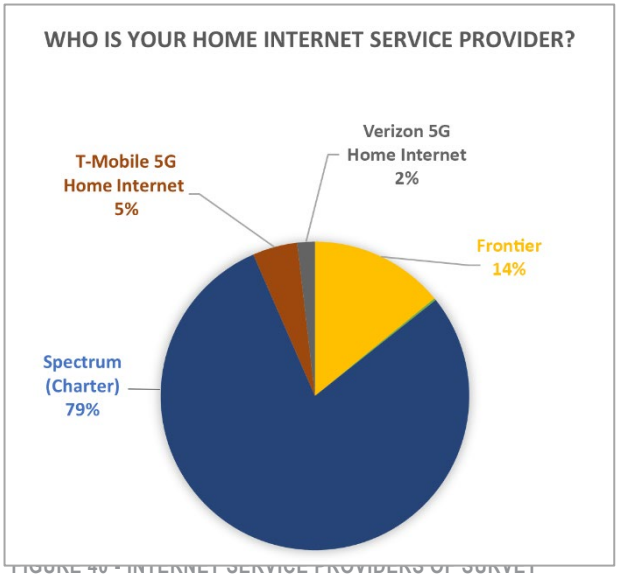


FIGURE 40 - INTERNET SERVICE PROVIDERS OF SURVEY

Our results for the survey of business providers yielded fewer results than we would have liked to be considered statistically significant. Of the responses recorded, ninety percent (90%) use Spectrum (Charter) as their ISP and the remaining ten percent (10%) have Verizon Home Internet.

Considering the low level of responses, this data could be an inaccurate representation of the Palm Springs area. However, the trend suggests a potential trend of Spectrum being the primary ISP for both residential and business service

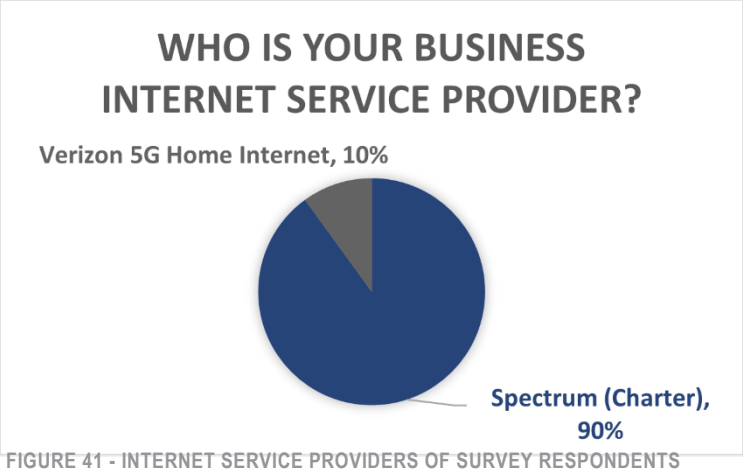


FIGURE 41 - INTERNET SERVICE PROVIDERS OF SURVEY RESPONDENTS (BUSINESS)

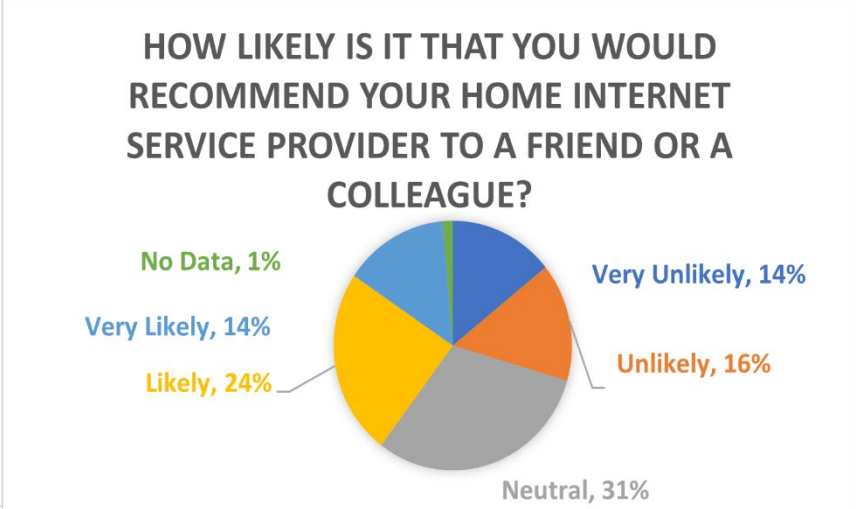


FIGURE 42 - LIKELIHOOD TO RECOMMEND HOME ISP

Note that any service provider accounting for less than one percent (1%) of subscriptions were excluded from the graph.

Survey respondents were also asked about the likelihood of recommending their home service provider to a friend or colleague. The majority of respondents indicated they were neutral at thirty-one percent (31%). Twenty-four percent (24%) responded they were likely to recommend their ISP and sixteen percent (16%) indicated they were unlikely to recommend their service provider. Very likely and very unlikely both scored similarly at fourteen percent (14%), indicating a strong likelihood or unlikelihood of recommendation.

With a similar caveat as the other business survey results, more data would have yielded a higher statistical significance. However, when asked the same question regarding business service provider, most respondents also indicated they were unlikely to recommend their ISP to a friend or colleague, with thirty-seven percent (37%) indicating unlikely or twenty-seven percent (27%) indicating very unlikely.

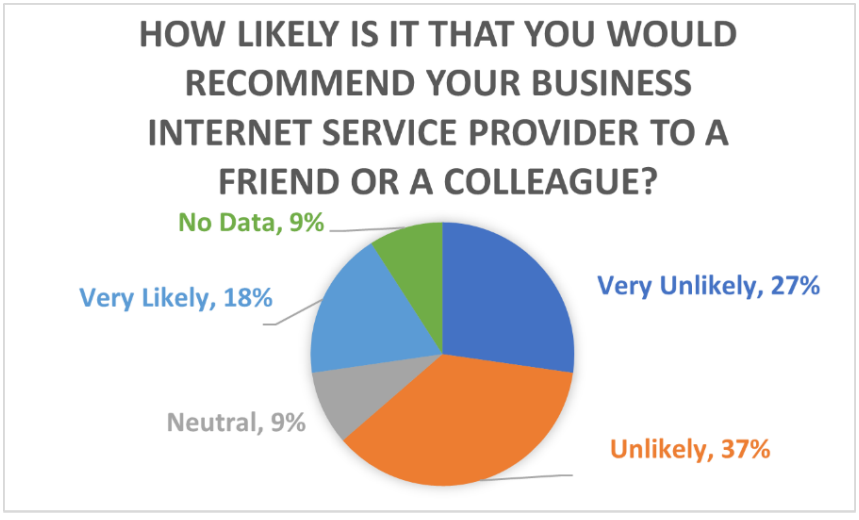


FIGURE 43 - LIKELIHOOD TO RECOMMEND BUSINESS ISP

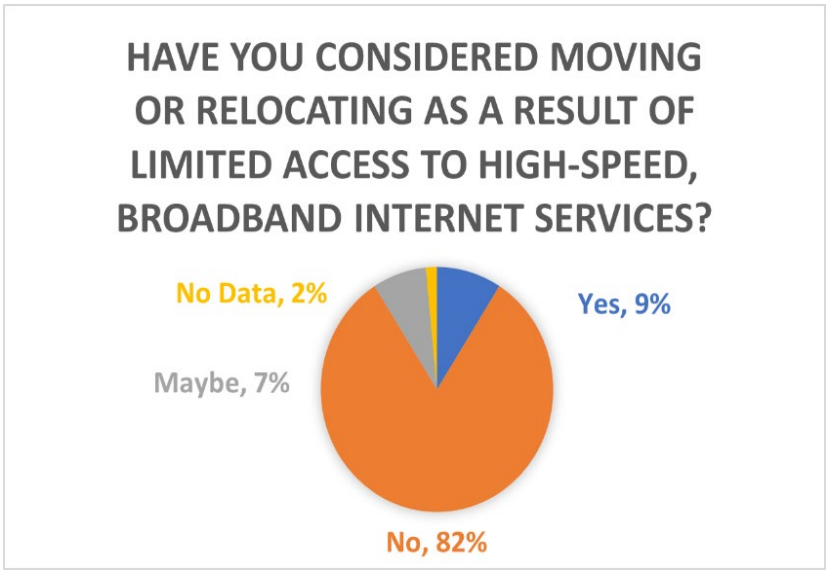


FIGURE 44 - LIKELIHOOD OF MOVING DUE TO INTERNET SERVICE QUALITY

Another survey question relates to whether dissatisfaction with internet service can incentivize residents to move to a different area. Of those surveyed, eighty-two percent (82%) responded that they would not consider moving as a result of high-speed, broadband internet access. In addition, seven percent (7%) indicated maybe and nine percent (9%) responded they have considered moving due to limited access to high-speed internet access

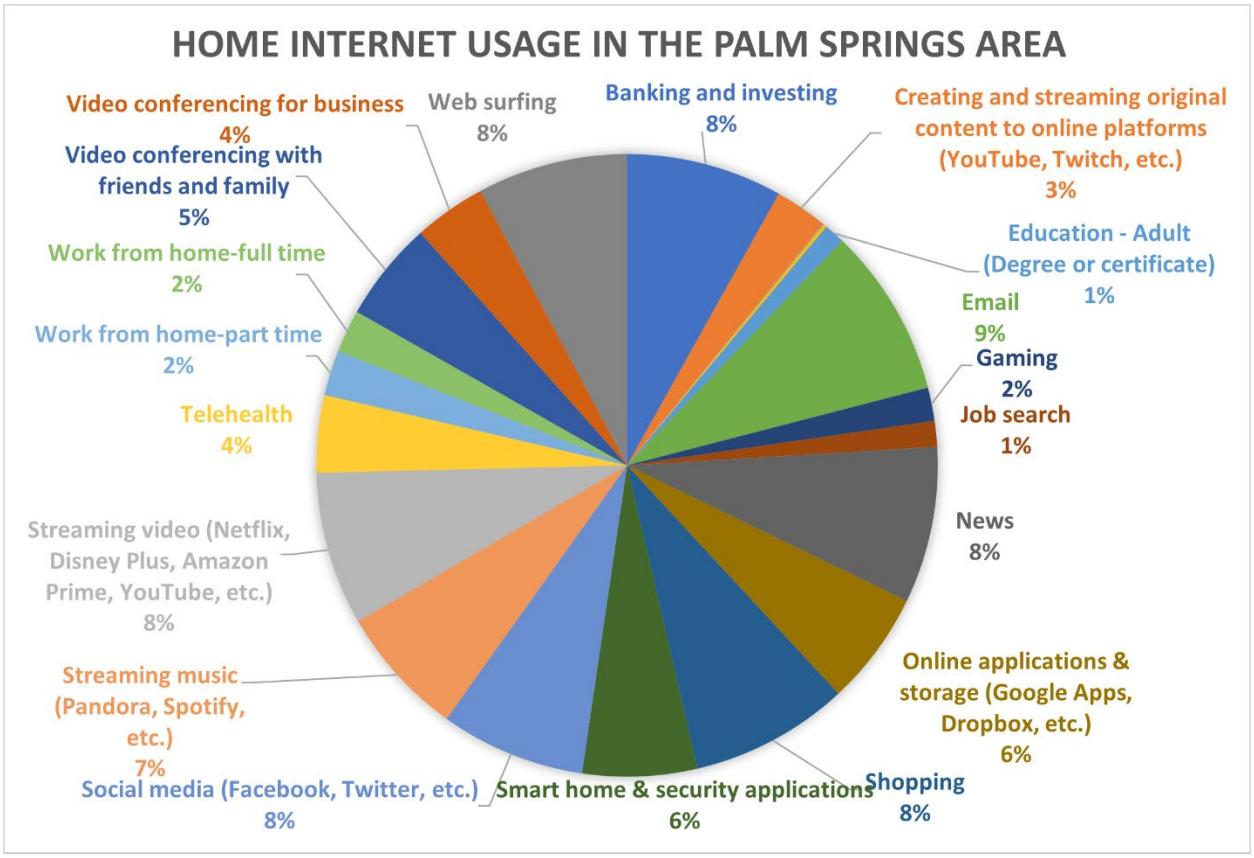


FIGURE 45 - USAGE OF HOME INTERNET APPLICATION

USAGE

Aggregated by the number of mentions, the usage statistics for the area's residents for home services include a variety of internet applications, the most common ones being email, banking, social media, news, shopping, web surfing and streaming video. Those who work full or part time from home are approximately four percent (4%) of the responses, while telehealth and online education is approximately five percent (5%) of internet usage.

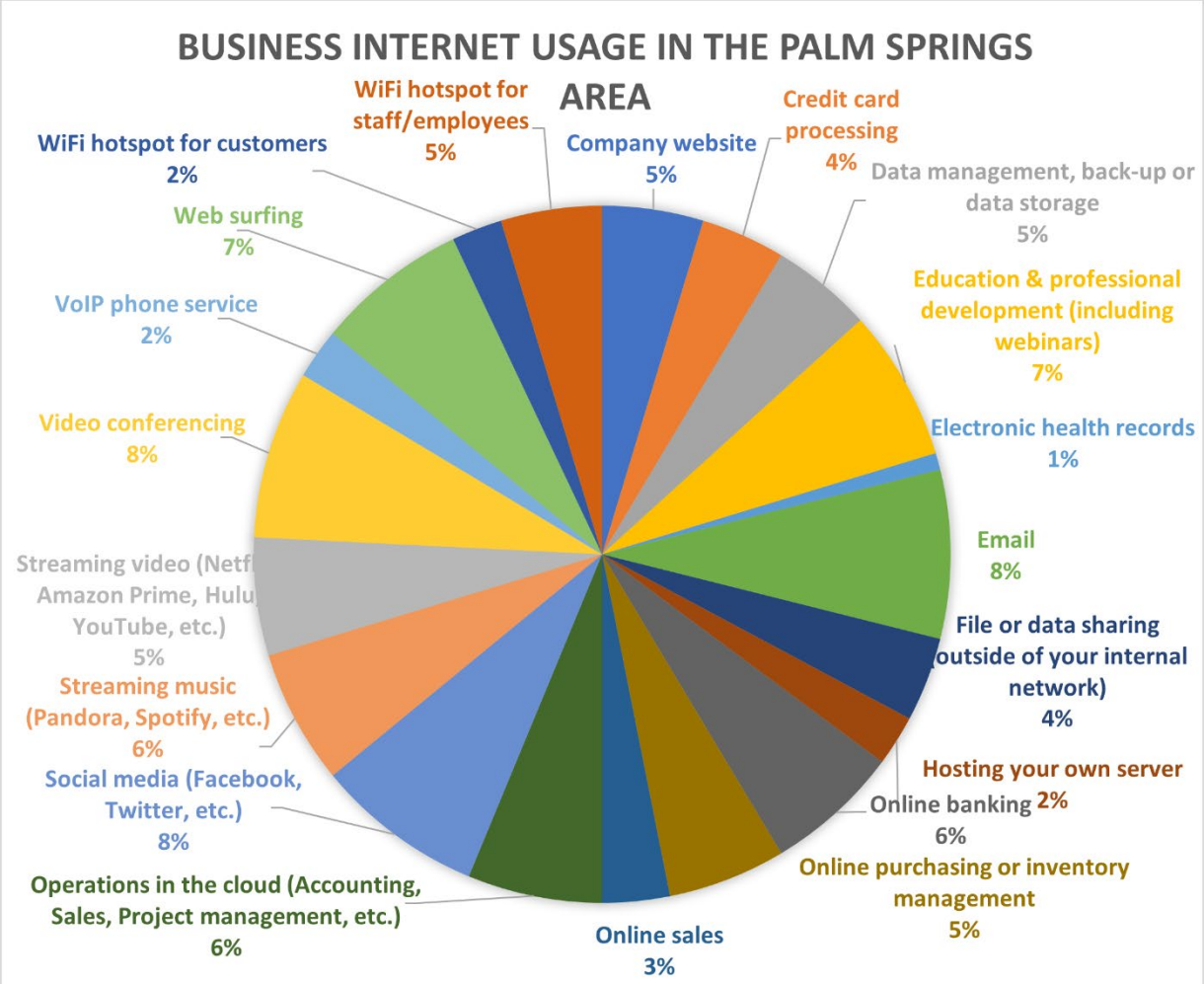


FIGURE 46 - USAGE OF BUSINESS INTERNET APPLICATIONS

Aggregated by the number of mentions, the usage statistics for the area's residents for business services include a variety of internet applications, the most common ones being email, social media, video conferencing, web surfing, and education and professional development. Wi-Fi hotspots for staff/employees and customers are approximately seven percent combined (7%) of the responses, while operations in the cloud is approximately six percent (6%) of internet usage. Note that any responses accounting for less than one percent (1%) of usages were excluded from both the Business and Residential graphs.

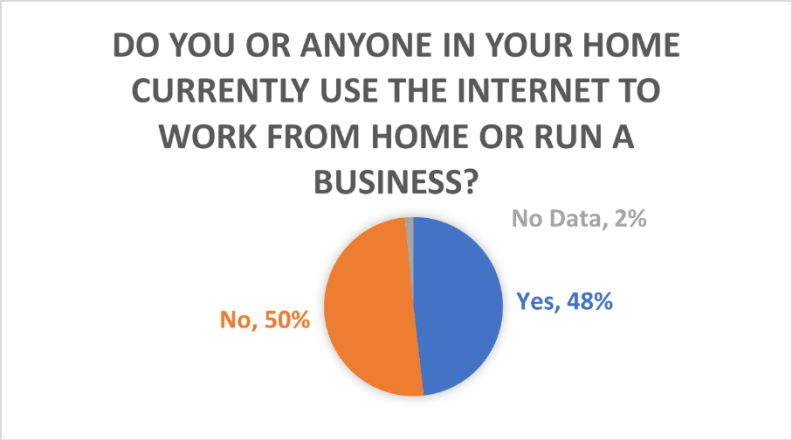


FIGURE 47 - WORK FROM HOME STATISTICS

In another question (Figure 47), respondents were asked if anyone in their home is currently working from home or running a business. This question is a reflection of the remote work culture instigated by the pandemic, as seen with the results of almost half of respondents answering “yes”.

SERVICE INTERRUPTIONS ARE MANAGEABLE IN PALM SPRINGS COMMUNITIES

Less than half of survey respondents indicated that home service interruptions are relatively common. Fourteen percent (14%) of residential service subscribers have experienced an outage for an hour or less a week, with three percent (3%) experiencing them more than one hour or less a day, and two (2%) experiencing an outage more frequently than 1 hour per day. Fifty-five percent (55%) of residential service subscribers have outages for an hour or less a month.

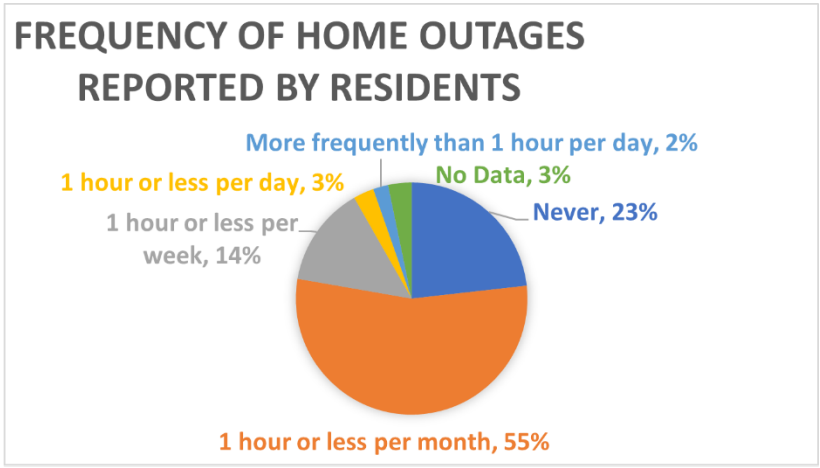


FIGURE 48 - FREQUENCY OF HOME OUTAGES

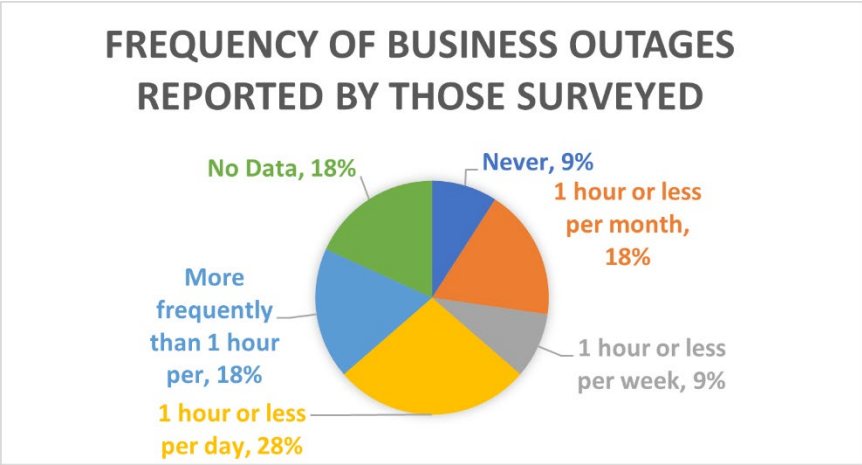


FIGURE 49 – FREQUENCY OF BUSINESS OUTTAGES

Surveyed respondents were much more evenly distributed regarding outages reported by businesses, but with the same disclaimer listed previously. With such a low volume of respondents, each category can carry an artificially inflated or deflated weight with minimal responses.

SATISFACTION VS. IMPORTANCE OF SERVICE CATEGORIES 2302329



FIGURE 50 - SATISFACTION LEVEL WITH SERVICE CATEGORY (HOME)

The colored bars in Figure 50 show the level of satisfaction in each of the following service categories: overall satisfaction, speed/data rate, reliability, price, and customer service, with the lighter blue color indicating very satisfied responses in the category. Most respondents are generally satisfied with level of service they currently receive, with the speed and reliability being generally positive, but the price being the largest point of dissatisfaction among those surveyed.

Figure 51 to the right shows the same breakdown as the residential service queries, but for businesses. The responses being minimal yield data that is somewhat difficult to apply to greater community sentiment, but of those surveyed, there is a general dissatisfaction with the current levels of service. However, Data Allowance appears to be the service with the highest overall satisfaction rating.

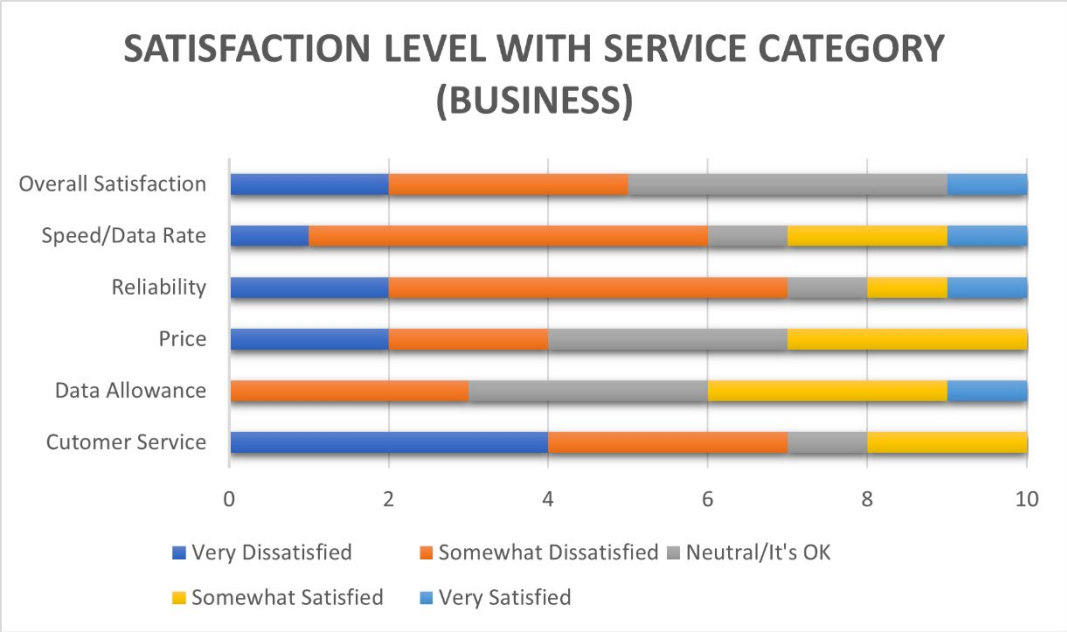


FIGURE 51 - SATISFACTION LEVEL WITH SERVICE CATEGORY (BUSINESS)

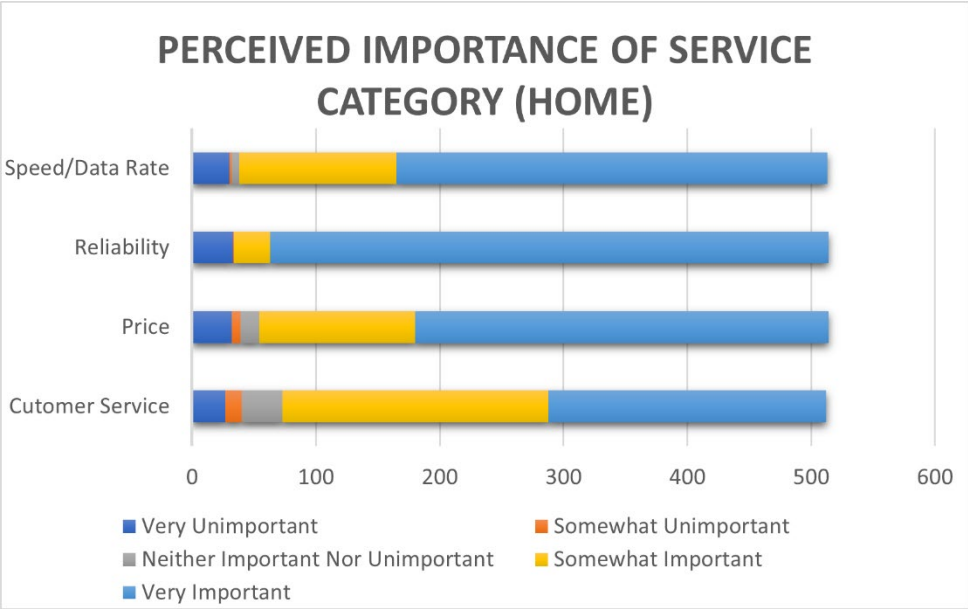


FIGURE 52 - IMPORTANCE PER SERVICE CATEGORY (HOME)

Figure 52 shows how important the service category is to the individual respondents. Here, the lighter blue color shows a service category is very important to an individual respondent. As might probably be expected, most categories are some level of important, with reliability being capturing the most responses for "very important."

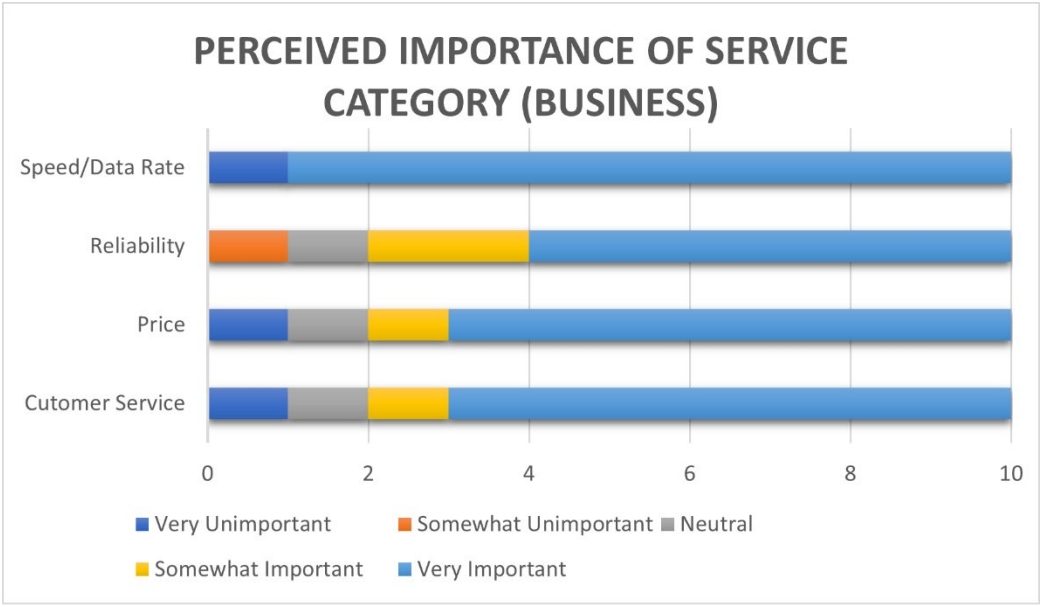


FIGURE 53 - IMPORTANCE PER SERVICE CATEGORY (BUSINESS)

For the perceived importance of service categories for businesses, respondents ranked the following from most important to least important: speed/data rate, customer service & price, and reliability These perceived importance rankings are relatively similar as they largely point to each criteria carrying a similar level of overall importance to them. The data is subject to the same limitations referenced earlier regarding the low level of respondents possibly yielding artificially inflated or deflated representations. However, based on the characteristics observed with the residential responses, it is not unreasonable to assume the businesses greatly value these service categories as well.

LEVEL OF SUPPORT FOR COMMUNITY INVOLVEMENT TO FACILITATE BROADBAND SERVICE

Survey respondents were questioned to determine whether they consider internet to be an essential public infrastructure and consider Internet as an essential utility like electricity, water, and transportation. Ninety-six percent (96%) of respondents responded yes, highlighting the significance of this utility to respondents.

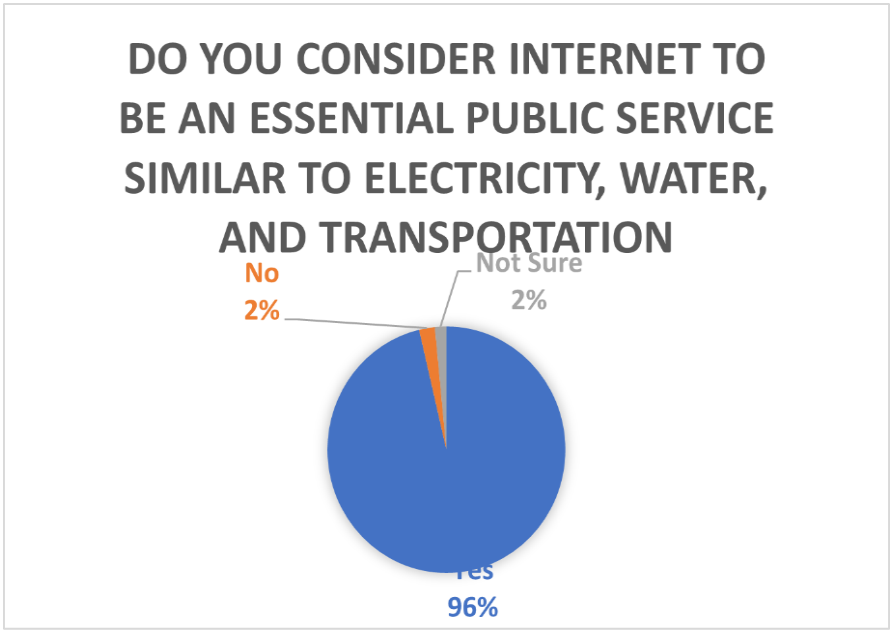


FIGURE 54 - INTERNET AS ESSENTIAL INFRASTRUCTURE

In response to the COVID-19 pandemic, many essential aspects of daily life have transitioned to virtual settings with a greater frequency. Respondents were asked about the importance they place on broadband services supporting remote work, health care, and education in the community, and provided the following results.

Perhaps unsurprisingly, the community overwhelmingly believes fast, affordable, reliable, and universally

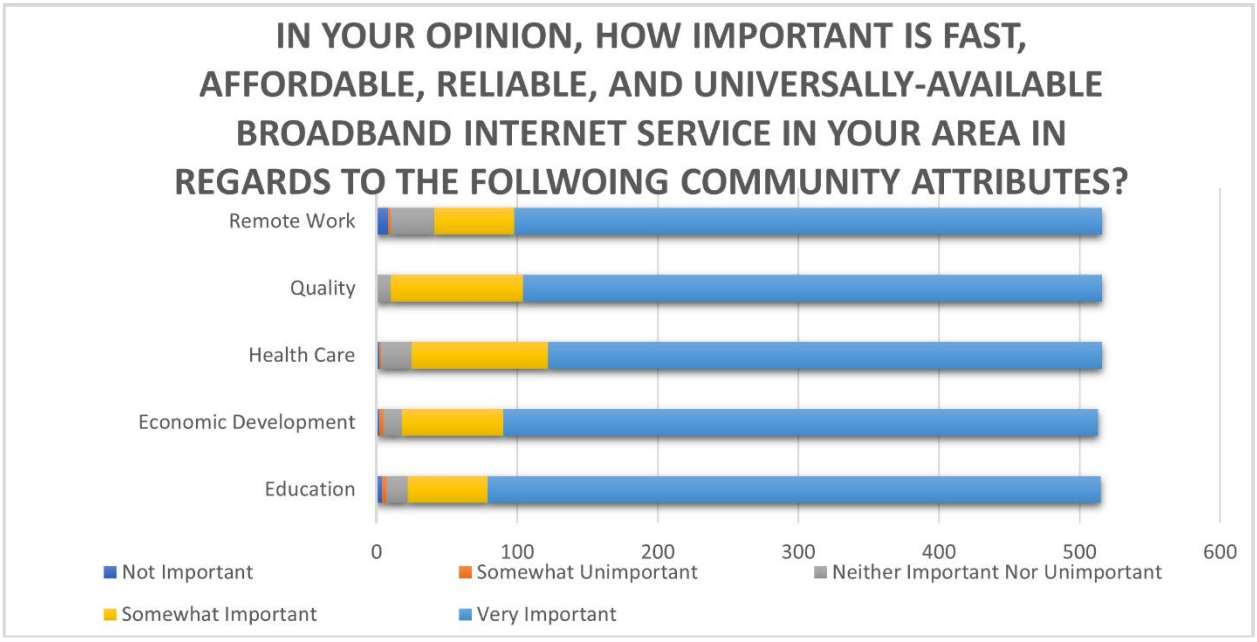


FIGURE 55 - ISP COMMUNITY ATTRIBUTES

available broadband internet is important. These results indicate that the community strongly believes that those community attributes are very important or somewhat important.

When asked how well providers are meeting these needs, only ten percent (10%) of respondents indicated they believe the current providers meet those needs “Very Well” and thirty percent (30%) responding “Mostly” leaving sixty percent (60%) of the community with the impression that the current providers at best meet the current needs “OK”.

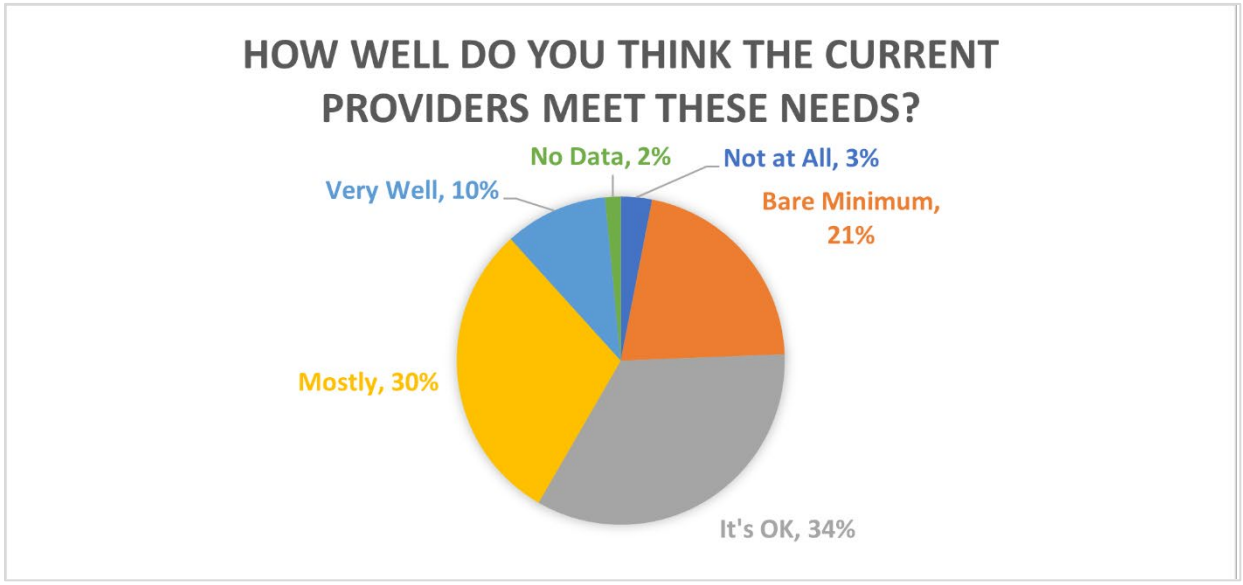


FIGURE 56 - RATE OF CURRENT PROVIDERS MEETING COMMUNITY NEEDS

In taking potential action to facilitate better broadband, eighty-three percent (83%) of the respondents indicated that they felt the City should act.

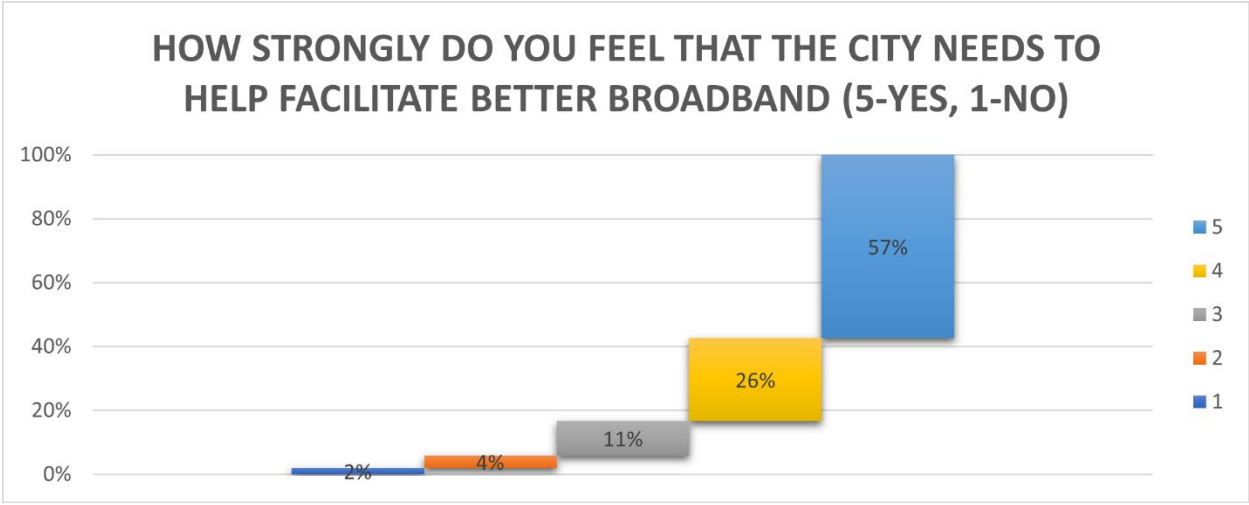


FIGURE 57 - DESIRE FOR THE CITY TO FACILITATE BROADBAND

CVAG, PALM SPRINGS, AND PALM DESERT SURVEY RESULTS COMBINED ANALYSIS

COMBINED CVAG, PALM SPRINGS, AND PALM DESERT SURVEY RESULTS

In an effort to better understand which locations within the CVAG project study area are eligible for broadband funding, the CVAG survey download speeds results were overlayed on the Broadband Money eligibility status for served, underserved, and unserved categories. Broadband Money is a tool used for broadband grant applications and its associated research, which draws its information from the FCC. This layer was then overlayed on the download speed data from Ookla, one of the two most commonly used tools on the market for measuring broadband speed and performance. Discrepancies within the dataset amongst the three layers provides an opportunity to Challenge the FCC Fabric data.

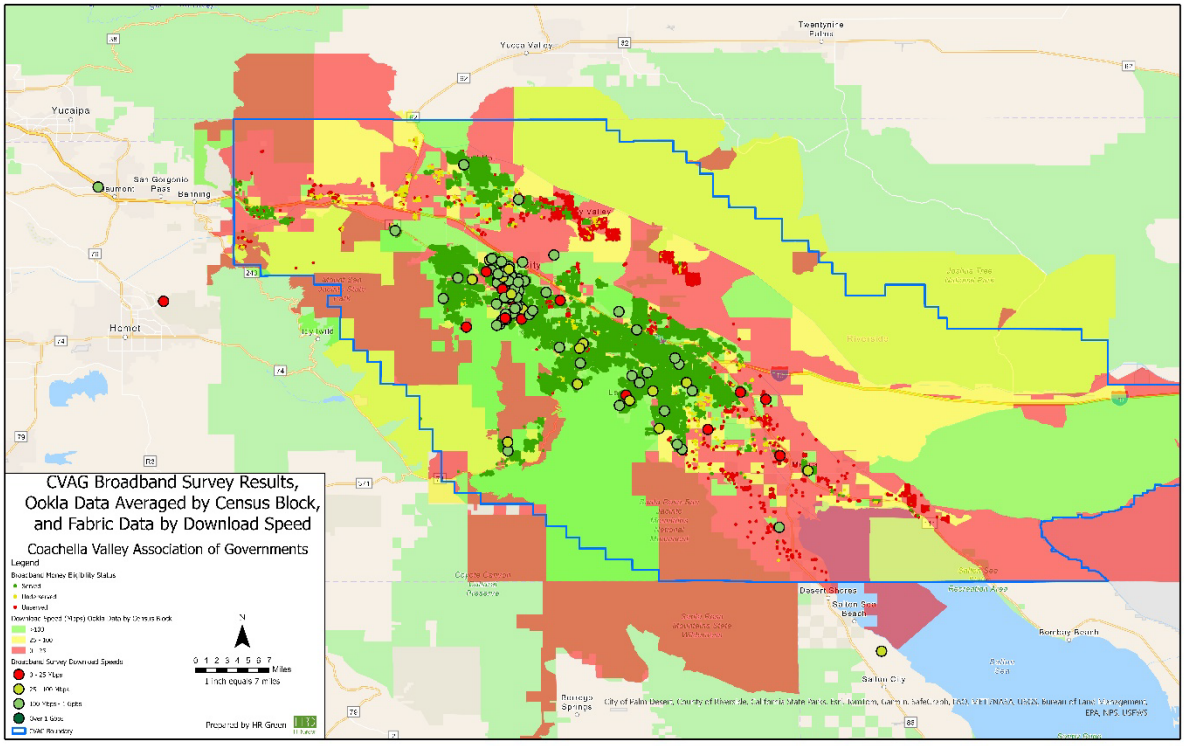


FIGURE 58 – CVAG BROADBAND SURVEY RESULTS OVERLAYED ON OOKLA AND FABRIC DATA

In addition, combining the Palm Springs and Palm Desert download speeds data with CVAG's data helps to enlarge the data pool to challenge the FCC Fabric data with updated data collected in the field, as seen in the maps below.

Overall, it appears that the FCC reported data matches the findings confirmed in the field from the Needs Assessment. It is important to note that although several locations challenge the 477 reported data provided by ISPs, the majority of the data matches. CVAG may wish to challenge these several locations to more accurately represent the study area per the FCC reporting.

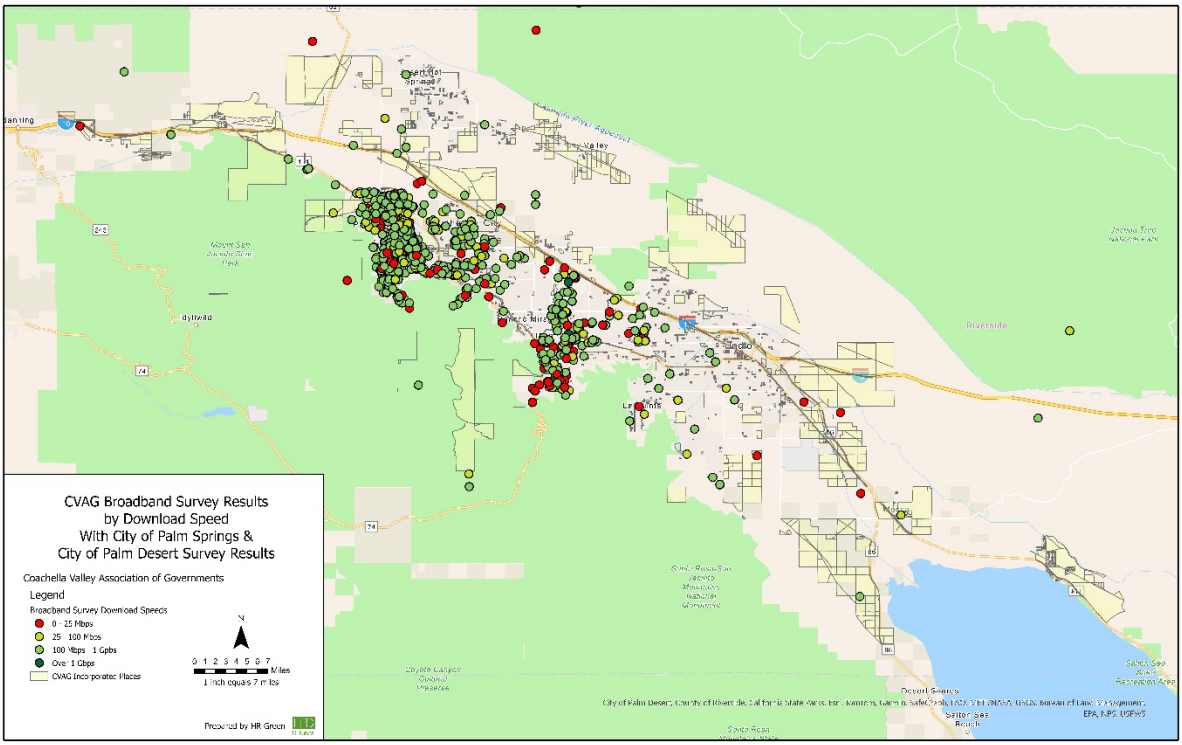


FIGURE 59 - COMBINED CVAG, PALM SPRINGS, AND PALM DESERT DOWNLOAD SPEEDS

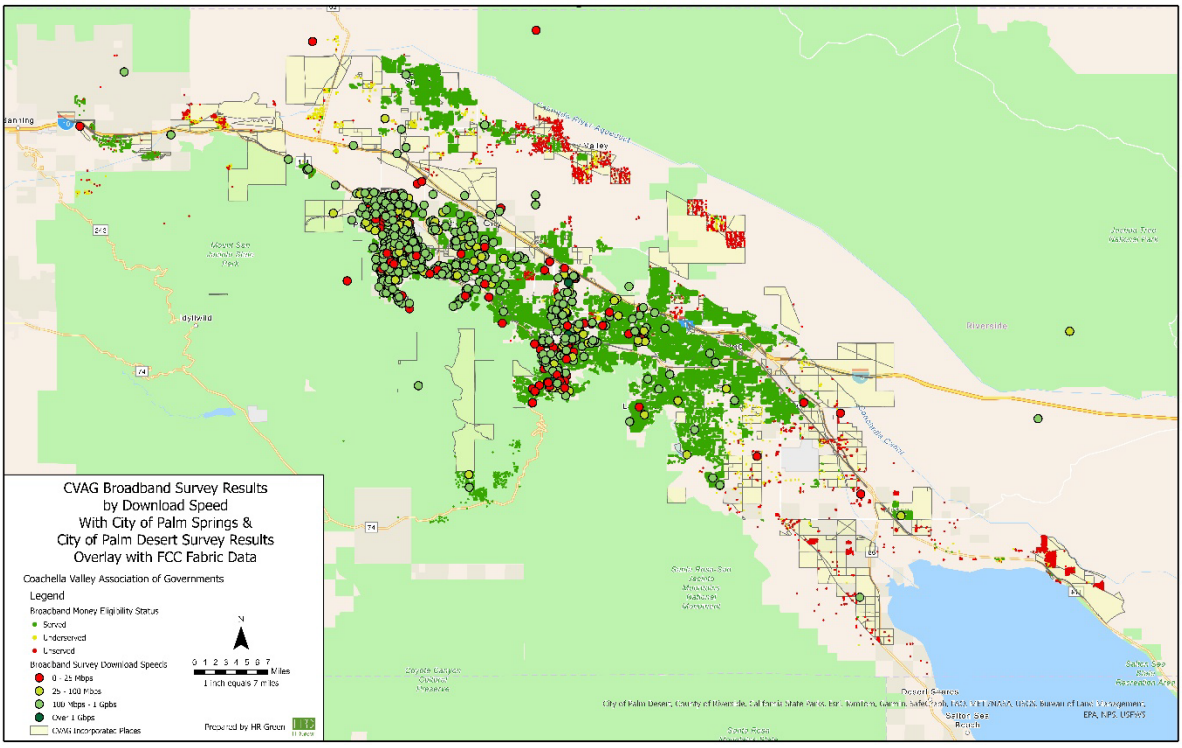


FIGURE 60 - COMBINED CVAG, PALM SPRINGS AND PALM DESERT DOWNLOAD SPEEDS OVERLAYED ON FCC DATA

The HR Green team combined the list of providers gathered from the CVAG, the Palm Springs, and the Palm Desert surveys for a visual representation of which provider is currently servicing which area. In addition, knowing which provider is in the area in this quick reference provides a foundational database for the CVAG team to know which provider should be approached for initial discussions regarding future partnership opportunities presented through a request for expressions of interest (RFEI) in the event of a public-private partnership.

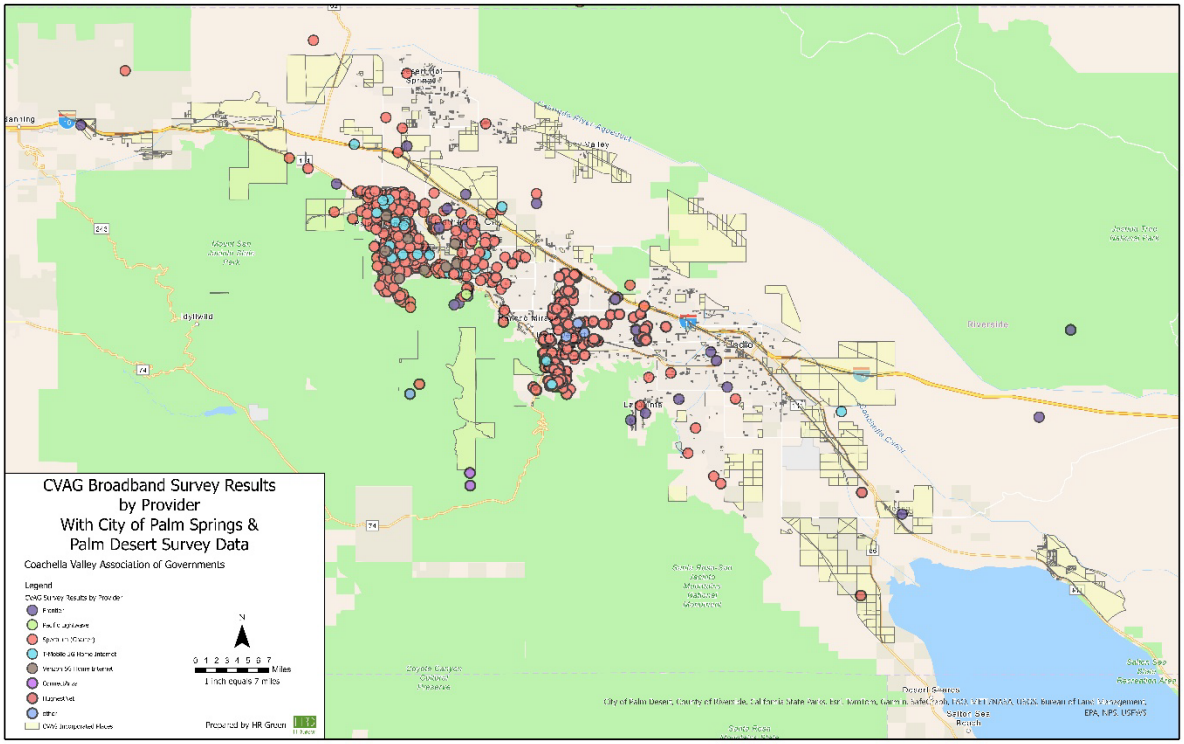


FIGURE 61 - COMBINED CVAG, PALM SPRINGS, AND PALM DESSERT PROVIDERS

STAKEHOLDER ENGAGEMENT REPORT

OVERVIEW

From February 2024 to May 2024, stakeholder engagement meetings took place with Coachella Valley Association of Governments (CVAG) staff, City and Tribal staff, anchor institutions, regional entities, and community partners/entities. The various goals of these meetings included identifying existing broadband needs, evaluating current broadband services, exploring future broadband expectations, and collaborating with regional entities.

The initial step in the process was to identify key stakeholders. Once completed, virtual stakeholder one-on-one and group meetings took place with policymakers, anchor institutions, and key influencers to drive visibility into goals of the service area's communities and to identify how best to position and future-proof CVAG to maximize economic development, including retaining current businesses and attracting new businesses to the Coachella Valley (CV). These meetings also explored the impacts of current and potential future broadband services on economic development for the agencies within CVAG.

Goals for these meetings include:

- Gathering input from staff not just on governmental operations, but also on needs for public-facing Wi-Fi, commercial broadband services, residential broadband services, and communications support for emerging technologies.

STAKEHOLDERS

Engagement meetings were held with the following stakeholders or stakeholder groups:

CVAG, CITY, AND TRIBAL STAFF

- City of Cathedral City
  - Chief Technology Officer
- City of Coachella
  - Information Technology (IT) Director
- City of Desert Hot Springs
  - IT Manager, Assistant City Manager/City Engineer, Public Works Director
- City of Indian Wells
  - Public Works Director, Public Works Manager, and Management Analyst
- City of Indio
  - Director of Information Technology
- City of La Quinta
  - Director (Business Unit & Housing Development), Senior Planner, Management Analyst
- City of Palm Desert
  - Director of Economic Development, Deputy Director of Economic Development, and Management Analyst II
- City of Palm Springs
  - Director of Information Technology and Public Works Director
- City of Rancho Mirage
  - Director of Information Services
  - Director of Information Services
- Agua Caliente Band of Cahuilla Indians
  - Chief Information Officer & Senior Director of Infrastructure & Operations
- Twenty-Nine Palms Band of Mission Indians
  - Tribal Chief Administrative Officer & Executive Director Development & Airport Operations
- CVAG
  - Transportation Engineer

ANCHOR INSTITUTIONS

- Cabots Pueblo Museum
- College of the Desert
- Desert Sands Unified School District
- Friends of the CV Link
- La Quinta Cove Neighborhood Association
- Riverside County Information Technology
- University of California, Riverside – Palm Desert Center

REGIONAL ENTITIES

- California Department of Technology (CDT)
- Caltrans – District 8
- Southern California Association of Governments (SCAG)

COMMUNITY PARTNERS & ENTITIES

- Desert Care Network
- Desert Valley Builders Association
- Greater Coachella Valley Chamber of Commerce
- Riverside University Health System – Public Health

CV BROADBAND LEADERS MEETING

On March 25th, 2024, CVAG hosted a Broadband Leaders meeting comprised of local and regional broadband leaders who were interested in learning about CVAG's and the regional entities' broadband efforts. During the meeting, CDT, Caltrans, and GoldenStateNet discussed the state's broadband initiatives and funding, shedding insight into current projects impacting the Coachella Valley. CVAG presented their Broadband Strategic Plan, going into detail about the initiatives and goals of improving broadband in the CV. They emphasized focusing on both the unserved and underserved populations within CV, stressing the need to bring broadband to these areas of the community. The meeting concluded with each agency providing an update on their current and future broadband plans.

The group consensus revolved around municipalities wanting to strengthen broadband services to their constituents and were willing to discuss their progress in these efforts. There was unanimous support in CVAG's efforts to improve broadband in the area as everyone is striving to improve broadband to their constituents.

KEY FINDINGS

Below is a summary of key findings that were shared during the stakeholder engagement process.

- Concerns mentioned regarding broadband services in CVAG jurisdictions included availability, bandwidth, capacity, connectivity, cost, latency, reliability, resiliency, redundancy, and speed.

- Entities focused on economic development made mention of local businesses being restricted with their capabilities due to bandwidth restrictions.

- Organizations ranged from feeling as though they were consistently experiencing internet outages to feeling as though they were very well served by their current broadband services. The majority of agencies felt they were receiving ok to reasonable service.

- A common theme amongst stakeholders experiencing outages is a loss of production and a lack of efficiency and effectiveness in their organization.

- Frontier and Spectrum are the two consistent internet service providers brought up in discussions, with one frequently serving as a backup to the other provider in case of an outage. Pacific Lightwave

was mentioned, but predominantly in the context of business usage. Verizon was also mentioned, but their infrastructure has been sold to Frontier.

- Stakeholders are unaware of any additional providers available to them who can effectively service residential and business customers beyond the ones listed above.
- Broadband service providers' contracts last between month-to-month and 5 years, with multiple organizations using CalNet to manage their contracts.
- Of those who could provide a cost, the price of broadband services ranges from $1,000 to $20,000/month for download speeds between 100 megabytes to 20 gigabytes.
- There appears to be a disconnect between what the service providers claim they can provide versus what providers deliver in terms of services.
- Agencies have identified the digital divide within the unserved and underserved pockets in the community which need improved broadband services and infrastructure available to them.
- Multiple stakeholders are aware of and/or have utilized the Affordable Connectivity Program (ACP)
- SCAG estimated that over 1 million people in the region (Los Angeles and the following Counties: Orange, Imperial, Riverside, Ventura, and San Bernardino) are impacted by the digital divide.
- SCAG suggested the national estimate where 30% of the population in the U.S. lacks digital literacy is due to challenges which include language barriers, lacking learning opportunities due to age, and poor funding in schools. Suggestions for eliminating the digital divide included teaching digital literacy.
- Digital literacy concerns were identified for lower-income youth who don't have access to higher-use technology and for senior citizens who may not be as well versed in how to use a smartphone.
- Agencies are looking to build resiliency in their broadband network to prevent service loss during severe and extreme weather events, such as hurricanes and tropical storms
- Multiple municipalities are looking to provide public Wi-Fi in their downtown areas during events that will require laying down fiber strands.
- The vast majority of organizations are moving to cloud-based services by either utilizing the cloud more or transitioning entirely to the cloud for daily business operations.
- Caltrans' middle mile project and CVAG's CV Sync Project can help reduce the last-mile gaps, creating last mile collaboration possibilities.
- All but one organization interviewed would be interested in participating or learning additional information about CVAG if they were to explore solutions to help improve internet services. The one outlier organization was not comfortable committing to the project on behalf of their IT staff.
- The degree of participation varies greatly amongst organizations. Some would be able to advocate or inform CVAG's efforts to others, while others would be more willing to get involved in oversight management and/or infrastructure ownership.
- Almost all respondents agreed that there are not enough alternatives in the Coachella Valley in

terms of broadband service providers. With additional providers, redundancy and subsidized or reduced costs for low-income groups could be available, along with better speeds and competitive pricing.

- An ideal broadband program for the area would include multi-vendor choices, affordable broadband with a low-cost alternative, connectivity to everybody that includes those outside the city limits that are still within the county, and one that bridges the digital literacy gap in the area.

- Future items to consider include CVAG developing a consortium to spearhead the collaborative effort of the project, ongoing collaboration to gain better insight into the problem and building out the necessary infrastructure needs of today and tomorrow, and supporting Dig-Once initiatives.

- Several organizations had additional thoughts for CVAG to consider when building out their own network, which included:
  - Utilizing the Greater Coachella Valley Chamber of Commerce for nurturing conversations with internet service providers as they already have relationships with these groups.
  - Gaining regional support for a unified regional approach led by CVAG, especially from a grant application perspective. Some agencies have identified being ineligible for grants due to unserved and underserved areas not within low socio-economic areas.
  - Determining whether CVAG can afford the public option because maintenance and operations costs need to be considered as well as the necessity of enticing the right workforce into the CVAG area to run the project.
  - Should the sole-ownership from CVAG or the private sector not be ideal, balancing public/private partnerships will be necessary to figure out how to run the built-out network.
  - Concerns regarding what position CVAG will be in to handle the changes in technology compared from the start to the completion of the project.
  - Cities approached by internet providers are uncertain as to whether the City invests in upgrading their infrastructure, would they still need to pay a monthly bill to the provider for the service?

The table below includes a summary of key findings broken out by the stakeholder groups that were part of the engagement process.

Stakeholder Group	Key Findings
City of Cathedral City	▪ Relies on multiple broadband service providers for their primary and backup internet service. ▪ Identified most residential properties using either coaxial or Digital Subscriber Lines (DSL). ▪ Started utilizing fiber lines in lieu of wireless connections. ▪ Future broadband needs include moving select applications to SAAs or cloud-based systems and improving hardware.
City of Coachella	▪ The City is served by multiple providers and has a built-in redundancy to provide consistent internet service. ▪ They are also conducting their own broadband study. ▪ Conducting City business will rely on internet connections as they move to cloud-based services. ▪ Internet service providers are building out their networks within the City to provide fiber services.
City of Desert Hot Springs	▪ The City is served by multiple broadband providers for their primary and backup networks but lack redundancy. ▪ Most existing communities in the City have access to at least one broadband service provider who provides fiber. ▪ Future broadband initiatives include connecting to all the City's traffic signals, updating electronic systems in the parks, and connecting the Police Department and Fire Stations to the parks.
City of Indian Wells	▪ Experiences of sporadic outages. ▪ Utilizes CV Sync broadband fiber along with additional service providers for their current broadband needs. ▪ Future technology trends must accommodate the City's larger need for capacity as services are moving to the cloud.
City of Indio	▪ Future broadband needs include moving to Software As A Service (SAAS) applications and cloud-based systems. ▪ Currently they are building out the CV Sync fiber network to the main City facilities. ▪ The City has already been looking for a partnership opportunity to provide better broadband services to their residents. ▪ Identified 10,000 residents who receive Affordable Connectivity Program (ACP) support for their broadband needs. At this time, the ACP will be terminated in May 2024. ▪ Welcome the discussion of potential access to the City's fiber for access to the middle mile utilized by the City.

City of La Quinta	▪ Experiences intermittent outages. ▪ City Hall is moving their workflows to ones based entirely online, requiring a major upgrade to retrofit their current network. ▪ Future broadband plans focus on getting a gigabyte connection for fiber in the ground where there isn't fiber in the community and trying to expand to their outlier communities.
City of Palm Desert	▪ Experiences intermittent outages from their service provider. ▪ Conducted previous broadband study efforts and discovered that those near the mountains had issues with broadband and the concern lay with the price of service. ▪ Future broadband needs to focus on capacity for the new facilities the City will be responsible for and business development as they focus on workforce development.
City of Palm Springs	▪ Larger City buildings use multiple internet service providers for redundancy purposes. ▪ Consists of several remote facilities that require internet access at varying speeds dependent on facility use. ▪ Experiences intermittent outages. ▪ In the process of consolidating, simplifying, and updating most core infrastructure to boost broadband connectivity. ▪ Future broadband demands focus on moving more to the cloud, which will help offset bandwidth demands for the City.
City of Rancho Mirage	▪ Requires new development within the City to include in the scope of work installation of fiber in the ground. ▪ Installed City-owned fiber in the ground with future goals of connecting departments to the lines in the future. ▪ Have two broadband providers, one of which is the Corporation for Education Network Initiatives in California (CENIC). ▪ Future broadband needs to focus on building out redundancy and moving everything to SAAS applications. ▪ Identified homeowner's associations (HOAs) as needing additional education on broadband service provider selection.
Agua Caliente Band of Cahuilla Indians	▪ Has started building redundancy with their internet service providers to expand their connectivity. ▪ Cellular service is lacking in certain portions of the area. ▪ Experience intermittent outages which impact revenue and communication amongst their tribe. ▪ Assistance from the Tribe would be limited to expanding broadband service coverage to Tribal locations.

Twenty-Nine Palms Band of Mission Indians	▪ Experiences intermittent outages on a quarterly basis. ▪ Focused on broadband security and redundancy for daily governmental and business needs. ▪ Future broadband growth revolves around meeting needs that support both sustainable and responsible growth.
CVAG	▪ Rarely experience outages, but if there is a disruption, traffic patterns get negatively affected. ▪ Future broadband needs include transitioning more services to the cloud and SAAS applications. ▪ Designing and building CV Sync, which is a fiber-based intelligent transportation system (ITS) network to interconnect the 550+ traffic signals throughout the valley. ▪ Phase 1 of CV Sync built out a fiber backbone ring network. ▪ Phase 2 of CV Sync, which is underway, will interconnect all the traffic signals to the backbone ring network and will also install additional conduit and fiber for broadband services in the same trench as the ITS network.
Cabots Pueblo Museum	▪ The City of Desert Hot Springs oversees the museum's infrastructure. ▪ Heavy winds are a concern for consistent broadband connection. ▪ Current and future workflows heavily rely on using the cloud.
College of the Desert	▪ Currently uses a combination of the CENIC network and three other providers for broadband internet access. ▪ Over the next several months they plan to expand CENIC to all their facilities to create a redundant ring within their network. ▪ Current trends focus on cyber-security and bringing the campus up to date with modern technology. ▪ Interested in helping students receive reduced internet services or working with local businesses to provide internship opportunities for students without a direct fee for the College.
Desert Sands Unified School District	▪ The current broadband provider is meeting their needs and has excess capacity capabilities to accommodate future growth. ▪ Utilizes E-Rate to help subsidize their broadband services. ▪ Future trends in technology focus on mobility, high availability, and redundancies to better serve their students and staff.
Friends of the CV Link	▪ Many of the outages occur during sandstorms and rain events. ▪ Utilizes cellular data for broadband access during community outreach events due to lack of access to Wi-Fi in public spaces.

La Quinta Cove Neighborhood Association	▪ Experiences very few outages from service providers. ▪ Residents within the neighborhood rely on internet service for online schooling as well as conducting Association business. ▪ Willing to assist CVAG efforts by supplying a representative group within the Cove who could provide input or feedback.
Riverside County Information Technology	▪ Identified digital equity, closing the affordability gap, replacing old infrastructure, and providing cheaper alternatives as key to improving residential service. ▪ Outages may be wind, rain, weather, or construction related. ▪ Utilizes multiple carriers but only has redundant broadband services from their primary service provider. ▪ Participation in a solution offered by CVAG to improve internet services would be location dependent.
University of California, Riverside – Palm Desert Center	▪ Utilizes CENIC as one of their internet service providers. ▪ Outages impact access to portals used by the University for conducting business and my impact classes. ▪ Current barrier impacting students includes utilizing the internet for classroom access as part of their access to education.
California Department of Technology (CDT)	▪ CDT invited GoldenStateNet to the interview and GoldenStateNet was able to participate. ▪ Designing and coordinating construction efforts for the middle-mile broadband network as part of the statewide Middle-Mile Broadband Initiative (MMBI). This initiative works with Caltrans to build out the broadband infrastructure in unserved and underserved areas. ▪ Encourage CVAG communities to use as much of the MMBI's fiber strands as necessary to meet their needs. ▪ Recognized that CVAG, not HR Green, would need to lead the efforts for working with CDT on a future proposed network.
Caltrans – District 8	▪ Constructing the middle-mile broadband network as part of the statewide MMBI. This initiative works with the California Department of Technology (CDT) to build out the broadband infrastructure in unserved and underserved areas. ▪ Nearing the end of the design phase of their current segments. Once built, Caltrans hands off the project to CDT to run the fiber. ▪ Identified three rehabilitation pavement projects along I-10 where Caltrans is putting in middle-mile fiber as part of a Dig-Smart initiative in the area.

Southern California Association of Government (SCAG)	▪ Won the LATA Grant which will be used to find three SCAG communities and help them develop last-mile designs. ▪ Working on developing publicly available broadband maps to quantify and display the broadband issues in the SCAG area. ▪ Identified at least 1 million residents within the SCAG area (Los Angeles and the following counties: Orange, Imperial, Riverside, Ventura, and San Bernardino) who are negatively impacted by the digital divide.
Desert Care Network	▪ The hospitals utilize multiple broadband service providers for primary and secondary network backups for redundancy and use broadband circuits to service their Wi-Fi needs. ▪ Outages are impactful as stakeholders who contribute to hospital services utilize their own circuits without redundancy and lose access to broadband, thereby delaying their workflows and diagnosing patients accordingly. ▪ Future broadband needs revolve around capacity and speed as more workflows are performed virtually, i.e. telemedicine. ▪ Interested in participating in CVAG's efforts to improve internet services if they align with their security and legal structure
Desert Valley Builders Association	▪ Economic Development seems to be a driving force behind improved broadband services in the area. ▪ Future business needs include digital forms of communication /next-step workflows and cashless merchandising. ▪ Serves as a source of information between the construction industry, the community, and local agencies. ▪ Recently has experienced almost daily outages forcing employees to work from home if the work required online access.
Greater Coachella Valley Chamber of Commerce	▪ Economic Development, involving both smaller and larger businesses, seems to be a driving force behind improved broadband services in the area. ▪ Improved broadband can help diversify the economy to open the doors for business expansion, change the way the Valley does business, and change the outlook of the Valley. ▪ Without improved broadband for business owners' school-aged children, owners will move, taking their business with them. ▪ Future smaller business needs include cashless merchandising.
Riverside University Health System – Public Health	▪ As a department, outages do not disrupt their daily workflows. ▪ Future broadband services revolve around keeping up with bigger and better capacities for cloud-sharing.

SECTION APPENDIX A: STAKEHOLDER QUESTIONNAIRES

ANCHOR INSTITUTION QUESTIONNAIRE

Your Organization Name: _____

Your Name: _____

Introduction:

HR Green is currently working with the Coachella Valley Association of Governments to create a Broadband Strategic Plan. This Plan will be used to define a path forward to close the broadband gap within the Valley. CVAG is very interested in understanding your current services, your level of satisfaction, and your interest in innovative ways to provide improved broadband to the Valley overall.

The Questions below will help you prepare for our upcoming meeting, and we encourage you to complete this form and bring it to the virtual session.

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?

6. Hypothetically, if CVAG were to explore solutions to help improve internet services to your organization, would you be interested in participating? What type of role, if any, would your organization be interested in playing to help?

7. What are the current trends in technology that are affecting your organization? Looking forward, in five years, what types of broadband service do you expect you will need to effectively meet your organization's needs?

CHAMBER AND ECONOMIC DEVELOPMENT QUESTIONNAIRE

Your Organization Name: _____

Your Name: _____

Introduction:

HR Green is currently working with the Coachella Valley Association of Governments to create a Broadband Strategic Plan. This Plan will be used to define a path forward to close the broadband gap within the Valley. CVAG is very interested in understanding your current services, your level of satisfaction, and your interest in innovative ways to provide improved broadband to the Valley overall.

The Questions below will help you prepare for our upcoming meeting, and we encourage you to complete this form and bring it to the virtual session.

Questions:

1. How well-served do you feel your business community is served today with broadband services? Please explain.

2. How would you rate the services currently available to your membership for reliability and problem resolution? How frequently do users experience outages on your current platform? What has been the impact of those outages?

3. Economic Development is a topic of concern for CVAG. Relative to its impact on Economic Development, how has the presence (or lack) of broadband services impacted your community (Please share specific examples, where possible).?

4. Hypothetically, if CVAG were to explore solutions to help improve internet services to your organization, would you be interested in participating? What type of role, if any, would your organization be interested in playing to help?

5. What are the current trends in technology that are affecting your community and its businesses? Looking forward, in five years, what types of broadband service do you expect you will need to effectively meet your mission to assist in growth and development?

6. What do you think are the benefits of improving access to broadband for your members?

7. What do you think are the risks of not improving access to broadband for your members (aka, doing nothing)?

HIGHER EDUCATION QUESTIONNAIRE

Your Organization Name: _____

Your Name: _____

Introduction:

HR Green is currently working with the Coachella Valley Association of Governments to create a Broadband Strategic Plan. This Plan will be used to define a path forward to close the broadband gap within the Valley. CVAG is very interested in understanding your current services, your level of satisfaction, and your interest in innovative ways to provide improved broadband to the Valley overall.

The Questions below will help you prepare for our upcoming meeting, and we encourage you to complete this form and bring it to the virtual session.

Questions:

1. How well-served is your organization with your current broadband services? Please explain.

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. 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?

4. How long is your current contract? When is the expiration date of services under your current agreement?

5. Hypothetically, if CVAG were to explore solutions to help improve internet services to your organization, would you be interested in participating? What type of role, if any, would your organization be interested in playing to help?

6. What are the current trends in technology that are affecting your students and your district? Looking forward, in five years, what types of broadband service do you expect you will need to effectively meet your organization's needs?

SCHOOL DISTRICT QUESTIONNAIRE

Your Organization Name: _____

Your Name: _____

Introduction:

HR Green is currently working with the Coachella Valley Association of Governments to create a Broadband Strategic Plan. This Plan will be used to define a path forward to close the broadband gap within the Valley. CVAG is very interested in understanding your current services, your level of satisfaction, and your interest in innovative ways to provide improved broadband to the Valley overall.

The Questions below will help you prepare for our upcoming meeting, and we encourage you to complete this form and bring it to the virtual session.

Questions:

1. How well-served is your organization with your current broadband services? Please explain.

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. Do you currently participate in E-Rate or other state/federal funding to pay for services? If so, which programs are you utilizing and are you participating in a leased model, or do you own your infrastructure?

6. How long is your current contract? When is the expiration date of services under your current agreement?

7. Hypothetically, if CVAG were to explore solutions to help improve internet services to your organization, would you be interested in participating? What type of role, if any, would your organization be interested in playing to help?

8. What are the current trends in technology that are affecting your students and your district? Looking forward, in five years, what types of broadband service do you expect you will need to effectively meet your organization's needs?

MEDICAL SYSTEM QUESTIONNAIRE

Your Organization Name: _____

Your Name: _____

Introduction:

HR Green is currently working with the Coachella Valley Association of Governments to create a Broadband Strategic Plan. This Plan will be used to define a path forward to close the broadband gap within the Valley. CVAG is very interested in understanding your current services, your level of satisfaction, and your interest in innovative ways to provide improved broadband to the Valley overall.

The Questions below will help you prepare for our upcoming meeting, and we encourage you to complete this form and bring it to the virtual session.

Questions:

1. How well-served is your organization with your current broadband services? Please explain.

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. Do you currently participate in any federal funding or state grant programs (such as the Healthcare Connect Program) funding to pay for services? Are you currently participating in any Telehealth Networks? If so, are you participating in a leased model, or do you own your infrastructure?

6. How long is your current contract? When is the expiration date of services under your current agreement?

7. Hypothetically, if CVAG were to explore solutions to help improve internet services to your organization, would you be interested in participating? What type of role, if any, would your organization be interested in playing to help?

8. What are the current trends in technology that are affecting your students and your district? Looking forward, in five years, what types of broadband service do you expect you will need to effectively meet your organization's needs?

9. Looking forward, in five years, what types of broadband service do you expect you will need to effectively meet your organization's needs?

MUNICIPAL AND TRIBAL LEADERS QUESTIONNAIRE

Your Organization Name: _____

Your Name: _____

Introduction:

HR Green is currently working with the Coachella Valley Association of Governments to create a Broadband Strategic Plan. This Plan will be used to define a path forward to close the broadband gap within the Valley. CVAG is very interested in understanding your current services, your level of satisfaction, and your interest in innovative ways to provide improved broadband to the Valley overall.

The Questions below will help you prepare for our upcoming meeting, and we encourage you to complete this form and bring it to the virtual session.

1. How well-served is your organization with your current broadband services? Please explain.

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. Who is your current internet provider?

4. What are the current trends in technology that are affecting your students and your district? Looking forward, in five years, what types of broadband service do you expect you will need to effectively meet your organization's needs?

5. How well do you feel the community is served today with broadband services? Please explain.

6. Do you think there are enough desirable alternatives to meet the needs of residents and the business community? Why/Why Not?

7. What are your thoughts about CVAG potentially exploring broadband solutions for the residents and/or the business community?

8. In your opinion, what would an ideal broadband program look like for the region?

9. Do you think that your department/organization would be able to leverage existing systems/programs/staff to help provide broadband services? Why/Why Not?

MUNICIPAL TECHNOLOGY LEADERS' QUESTIONNAIRE

Your Organization Name: _____

Your Name: _____

Introduction:

HR Green is currently working with the Coachella Valley Association of Governments to create a Broadband Strategic Plan. This Plan will be used to define a path forward to close the broadband gap within the Valley. CVAG is very interested in understanding your current services, your level of satisfaction, and your interest in innovative ways to provide improved broadband to the Valley overall.

The Questions below will help you prepare for our upcoming meeting, and we encourage you to complete this form and bring it to the virtual session.

1. How well-served is your organization with your current broadband services? Please explain.
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. Who is your current internet provider?
4. What are the current trends in technology that are affecting your students and your district? Looking forward, in five years, what types of broadband service do you expect you will need to effectively meet your organization's needs?
5. How well do you feel the community is served today with broadband services? Please explain.
6. Do you think there are enough desirable alternatives to meet the needs of residents and the business community? Why/Why Not?
7. What are your thoughts about CVAG potentially exploring broadband solutions for the residents and/or the business community?
8. In your opinion, what would an ideal broadband program look like for the region?
9. Do you think that your department/organization would be able to leverage existing systems/programs/staff to help provide broadband services? Why/Why Not?

Technical Architecture:

1. Can you tell me about the technologies currently in use in your department? What are some of the primary equipment and platforms in use? How many of them require connectivity to central servers or equipment and how are you accomplishing that today?

2. What plans do you have in the next five to 10 years to make significant improvements in the management of infrastructure under your control? Can you describe the capital plan for your department and the types of improvements you feel the community needs?

3. How well does your current technology meet the needs of your staff and of the community? What improvements would you like to see inside your department in terms of improved connectivity?

4. Based on the technology you have in place, can you describe the equipment, standards and versions that are currently deployed on your network? Are you leveraging fiber, wireless or other connections to communicate with your equipment in the field?

5. Can you provide me with any maps or diagrams that would help us better understand the technology and locations for the things we've just discussed?

REGIONAL LEADERS' QUESTIONNAIRE

Your Organization Name: _____

Your Name: _____

Introduction:

HR Green is currently working with the Coachella Valley Association of Governments to create a Broadband Strategic Plan. This Plan will be used to define a path forward to close the broadband gap within the Valley. CVAG is very interested in understanding your current services, your level of satisfaction, and your interest in innovative ways to provide improved broadband to the Valley overall.

The Questions below will help you prepare for our upcoming meeting, and we encourage you to complete this form and bring it to the virtual session.

1. How well-served is your organization with your current broadband services? Please explain.

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. Who is your current internet provider?

4. What are the current trends in technology that are affecting your students and your district? Looking forward, in five years, what types of broadband service do you expect you will need to effectively meet your organization's needs?

5. How well do you feel the region is served today with broadband services? Please explain.

6. Do you think there are enough desirable alternatives to meet the needs of residents and businesses throughout the community? Why/Why Not?

7. What are your thoughts about CVAG potentially exploring broadband solutions for the residents and/or the businesses in the Valley?

8. In your opinion, what would an ideal broadband program look like for the region?

9. Do you think that your department/organization would be able to leverage existing systems/programs/staff to help provide broadband services? Why/Why Not?

REGIONAL TECHNOLOGY LEADERS' QUESTIONNAIRE

Your Organization Name: _____

Your Name: _____

Introduction:

HR Green is currently working with the Coachella Valley Association of Governments to create a Broadband Strategic Plan. This Plan will be used to define a path forward to close the broadband gap within the Valley. CVAG is very interested in understanding your current services, your level of satisfaction, and your interest in innovative ways to provide improved broadband to the Valley overall.

The Questions below will help you prepare for our upcoming meeting, and we encourage you to complete this form and bring it to the virtual session.

1. How well-served is your organization with your current broadband services? Please explain.
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. Who is your current internet provider?
4. What are the current trends in technology that are affecting your students and your district? Looking forward, in five years, what types of broadband service do you expect you will need to effectively meet your organization's needs?
5. How well do you feel the region is served today with broadband services? Please explain.
6. Do you think there are enough desirable alternatives to meet the needs of residents and businesses throughout the region? Why/Why Not?
7. What are your thoughts about CVAG potentially exploring broadband solutions for the residents and/or businesses of their community?
8. In your opinion, what would an ideal broadband program look like for the region?
9. Do you think that your department/organization would be able to leverage existing systems/programs/staff to help provide broadband services? Why/Why Not?

Technical Architecture:

1. Can you tell me about the technologies currently in use in your department? What are some of the primary equipment and platforms in use? How many of them require connectivity to central servers or equipment and how are you accomplishing that today?

2. What plans do you have in the next five to 10 years to make significant improvements in the management of infrastructure under your control? Can you describe the capital plan for your department and the types of improvements you feel the community needs?

3. How well does your current technology meet the needs of your staff and of the region? What improvements would you like to see inside your department in terms of improved connectivity?

4. Based on the technology you have in place, can you describe the equipment, standards and versions that are currently deployed on your network? Are you leveraging fiber, wireless or other connections to communicate with your equipment in the field?

5. Can you provide me with any maps or diagrams that would help us better understand the technology and locations for the things we've just discussed?

SECTION APPENDIX B: RESIDENTIAL/BUSINESS SURVEY QUESTIONS

RESIDENTIAL BROADBAND SURVEY

The purpose of this survey is to learn about broadband connectivity in the Coachella Valley Association of Governments (CVAG) area. Your participation is very important to understand your satisfaction with your current broadband options and the service you are being provided, and to gauge your interest in other broadband options being developed.

The survey takes only a few minutes to complete. All responses are anonymous and confidential.

Please limit participation to one person per household. As this is a survey to assess wired internet service, participants should use a device connected to a wired internet connection (through WiFi or Ethernet), NOT a cellular connection (4G/LTE/5G), to take the survey. Participants with no wired internet connection may take the survey on a mobile device. The survey is open through **June 30, 2024**.

In which of the following areas do you reside in: Cathedral City, Coachella, Desert Hot Springs, Indian Wells, Indio, La Quinta, Palm Desert, Palm Springs, Rancho Mirage, Agua Caliente Band of Cahuilla, Cabazon Band of Mission Indians, Torres Martinez Desert Cahuilla, Twenty-Nine Palms Band of Mission, Other?

Please enter your location (map).

INTERNET

Does your home subscribe to internet service?

- No: Why not? (price, availability – speeds and service, customer service, lacking suitable equipment do not need, privacy and security concerns, services are too complicated, other)
- Yes: Have you taken this survey for another community? (list)

What is your Internet service provider? (list)

How many users typically actively use the Internet at your home? (drop-down list of ranges)

Speed test link

How do you use Internet service at home? (list)

What kinds of devices do you use on the internet? (list)

Rate SATISFACTION with your home Internet service in the following categories (very dissatisfied to very satisfied)

- Customer service experience
- Price
- Reliability (frequency and length of service interruptions)
- Speed/Data Rate
- Overall Satisfaction

Rate level of IMPORTANCE (very unimportant to very important)

- Customer Service experience
- Price
- Reliability (frequency and length of service interruptions)
- Speed/Data Rate

Do you or anyone in your home use the internet to work from home or run a business?

How often do you experience outages of an hour or longer? (never to more frequently than 1 hour per day)

Have you considered moving or relocating as a result of limited access to high-speed Internet? (No, Maybe, Yes)

How likely is it that you would recommend your home Internet service provider to a friend? (very unlikely to very likely)

Do you have any comments, questions or concerns about your current internet service?

If known, approximately what is the total monthly cost of your internet services? Is this part of a bundle?

HIGH-SPEED INTERNET ACCESS IN YOUR COMMUNITY

Do you consider Internet to be an essential public service similar to electricity, water, and transportation?

In your opinion, how important is fast, affordable, reliable, and universally available high-speed internet access in your community in regards to (not important to very important):

- Education
- Economic development and jobs
- Health care
- Quality of life
- Remote work

How well do you think the current providers meet these needs? (not at all to very well)

How strongly do you feel that your community needs to help facilitate better high-speed internet access? (scale of 1 to 5)

Would you participate in an organized effort led by your city, subdivision, neighborhood, or HOA to improve high-speed internet access?

Additional comments, questions, or concerns?

TELL US ABOUT YOUR HOUSEHOLD

Tell us about yourself:

- Gender
- Age (drop down list of ranges)
- What is the highest level of education you have completed? (drop down box of ranges)
- Ethnicity (check boxes)
- What is the range of your current household income (drop down list of ranges)?

CVAG may establish a newsletter for high-speed Internet access updates. If you would like to receive email updates, please supply your email address below.

We appreciate you taking the time to participate in this survey!

BUSINESS BROADBAND SURVEY

The purpose of this survey is to learn about broadband connectivity in the Coachella Valley Association of Governments (CVAG) area. Your participation is very important to understand your satisfaction with your current broadband options and the service you are being provided, and to gauge your interest in other broadband options being developed.

The survey takes only a few minutes to complete. All responses are anonymous and confidential.

Please limit participation to one person per household. As this is a survey to assess wired internet service, participants should use a device connected to a wired internet connection (through WiFi or Ethernet), NOT a cellular connection (4G/LTE/5G), to take the survey. Participants with no wired internet connection may take the survey on a mobile device. The survey is open through **June 30, 2024**.

Is your business in one of the following areas: Cathedral City, Coachella, Desert Hot Springs, Indian Wells, Indio, La Quinta, Palm Desert, Palm Springs, Rancho Mirage, Agua Caliente Band of Cahuilla, Cabazon Band of Mission Indians, Torres Martinez Desert Cahuilla, Twenty-Nine Palms Band of Mission, Other?

Please enter your location (map).

Have you taken this survey for another community (yes/no/not sure)?

INTERNET

Where is your business based (Storefront or In My Home)?

Does your business subscribe to internet service?

- No: Why not? (price, availability – speeds and service, customer service, lacking suitable equipment do not need, privacy and security concerns, services are too complicated, other)
- Yes: Which company do you use for your PRIMARY business Internet service (list)?

Speed test link

How do you use the Internet at your business? (list)

Does your business offer Internet/Wi-Fi to the public/guests?

How many users are typically active at any given time using the Internet at your business (list)?

How often do you experience outages due to Internet connection problems (never to more frequently than 1 hour per day)?

If your organization allows employees to work remotely, has their HOME internet connection limited their ability to do work from home?

Is your current broadband service (yes/no/not sure or not applicable):

- Causing a loss of business?
- Limiting future growth?
- A motivating factor to relocate your business?
- A contributing factor to why you located your business where you did?
- Providing a high level of service to your business?

Rate SATISFACTION with provider for business internet service (very dissatisfied to very satisfied)

- Customer service experience
- Data allowance
- Price
- Reliability (frequency and length of service interruptions)

Speed/data rate
Overall satisfaction

Rate level of IMPORTANCE (very unimportant to very important)
Customer service experience
Data allowance
Price
Reliability (frequency and length of service interruptions)
Speed/data rate

How likely is it that you would recommend your BUSINESS Internet service provider to a friend (very unlikely to very likely)?

Do you have any comments, questions or concerns about your current BUSINESS internet service?

How much does poor or no internet availability impact your ability to open or run a business in your city and county (scale of 1 to 5)?

If known, approximately what is the total monthly cost (rounded to the nearest dollar) of Internet services at your business?
Is this cost part of a bundle?

HIGH SPEED INTERNET ACCESS IN YOUR COMMUNITY

Do you consider Internet to be an essential public service similar to electricity, water, and transportation?

In your opinion, how important is fast, affordable, reliable, and universally available high-speed internet access in your area in regards to following community attributes? (not important to very important)
Education (for kids and adults)
Economic development and jobs
Health care (remote health care, virtual doctor visits)
Quality of life (making my area a good place to live)
Remote work

How well do you think the current providers meet these needs? (not at all to very well)

How strongly do you feel that your community needs to help facilitate better high-speed internet access? (scale of 1 to 5)

Would you participate in an organized effort led by your business community or association to improve high-speed internet access?

Additional comments, questions, or concerns?

CVAG may establish a newsletter for high-speed Internet access updates. If you would like to receive email updates, please supply your email address below.

We appreciate you taking the time to participate in this survey!

SECTION APPENDIX C: RESIDENTIAL COMMENTS

The biggest reason I signed on to this survey was to make the powers that be aware of a very frustrating situation with the cell phone “dead zone” whenever we are in the vicinity of the Citrus Plaza shopping center at 50th and Jefferson. Whenever we try to use our phones in Ralph’s or CVS it’s very, very slow or won’t work at all. Thanks
We used to have Spectrum (32 years) until 6 months ago. Moved Internet to Frontier fiber 6 months ago. Spectrum became so unreliable that we bought TMobile as a backup to Spectrum-- guaranteed we would have some Internet. After moving to Frontier fiber we have had 100 percent reliability. Likely will drop TMobile as a backup provider very soon (not needed). Spectrum is unreliable and had outages too frequent.
It's time. Many other communities have already moved forward with COMMUNITY wide internet access. We are behind the times and this is only going to get worse before it improves. Spectrum does NOT feel it is IMPORTANT to upgrade to fiber. All they keep doing is "more of the same." Well, more of the same is NOT GOOD ENOUGH. It is time to make the internet a PUBLIC UTILITY, not a for-profit corporate grab.
Participation would depend on what I would be asked to do. My spare time is limited.
I think this is great and we appreciate the consideration for the families in the valley that this is a need!
Current internet service is essentially a monopoly business modle.
Need to focus on cell service in the area vs internet.
We live in Outdoor Resort Palm Springs RV Resort. At present time the resort is terminating its bulk service package with Spectrum and all owners will need to obtain internet service on their own. Would be awesome if the city helped promote fiber network within our HOA or similar to assist with better high speed internet.
Although my Internet service is fast and reliable here at my home, WiFi service outside my home in the Coachella Valley is HORRENDOUS! Unreliable, slow, spotty connections. The public WiFi system in Coachella Valley ABSOLUTELY needs to be upgraded to a high quality and reliable system. The worst areas I have found for WiFi reception are in Downtown Palm Springs near Indian Canyon & Taquitz. Another very bad area is in Palm Desert near Ramon and Monterey and the 10 Fwy.
This is a Senior complex and so many residents don't know how to negotiate good for good price. Spectrum takes advantage of the seniors here. They are stuck with cable only because them do not know how to Stream their TV
N/A
Survey is too long
I would hope that Cathedral City and Riverside county governments would work to renew the Federal Afforable Internet program. My bill increased from $5 to $50. I'm on a fixed income, that increase effects my overall financial health, and considering having limited alternatives for internet service, I feel I'm being price gouged.
I had T-Mobile internet service and it worked for several months and then there was no connection. After days of trying to resolve the issue I was told that their cell towers could not handle the volume of of internet users and they had no plans to increase availability. I live in a gated 55+ community so I had no option but to switch to Spectrum. I would prefer a fiber optic option.
You didn't ask about this, but phone signal at our home is almost nonexistent. That should also be addressed in the community. We have to rely on wifi calling for phone use. If the wifi isn't working properly, we're cut off completely.
Yes I think CVAG can and should play a role in coordinating regional broadband expansion in

partnership with other county or local agencies. I think it’s hard for other non regional entities to take on this role because of their limited jurisdiction.
I wish that Spectrum would work with their existing and long-time clients to make their service more affordable and that their Customer Service was more client friendly. I feel like we are taken advantage of because there are not many internet options for us.
, We live in Thermal, just souh of the Coachella southern border.
No
Spectrum has a monopoly here, and doesn't hesitate to charge very high fees for service that's just okay at a bare minimum.

GAP ANALYSIS

SUMMARY

Broadband has become a significant component of most aspects of our lives. Education, healthcare, employment, interactions, commerce, economic development, and delivery of services all rely on broadband. Yet, many citizens, businesses and jurisdictions face barriers to having broadband that is adequate to meet these important needs.

Barriers to good broadband (connectivity that is fast enough, reliable, usable and affordable) can come in two forms.

1. Infrastructure: If there is not broadband infrastructure or if the infrastructure is not adequate to provide good broadband, then it is not possible to connect
2. Adoption: Even when good broadband infrastructure is available, if people cannot afford it or do not understand how to use it, then they still do not have good broadband, even though it is available.

Because many factors determine whether good broadband is available and usable, it is not always straightforward to determine where there are broadband challenges, what they are, and why they exist. Moreover, there are several sources of data that describe broadband, which sometimes agree, and other times are contradictory.

HR Green approaches each situation with a fresh perspective by utilizing a proven process and set of tools that help clarify where broadband is good and where there appear to be broadband challenges. Through our process and tools, HR Green looks at the current landscape of connectivity from two sides:

- Data reported by the Internet Service Providers (ISPs) to the FCC
- Information gathered from sources who can provide their actual experience (survey, stakeholders in the community, independent speed test data, etc.). This actual information helps clarify user results and either confirms or challenges the ISP reported data.

A more detailed description of HR Green's approach can be found in the below section titled "Approach".

Gathering and analyzing these sources of data helps determine what is lacking in connectivity, what stakeholder current needs are, how those needs are being met, and what steps can be taken to achieve the area's broadband goals. This allows us to define specific gaps in the current infrastructure and make recommendations to close them in order to reach the desired level of broadband services.

SUMMARY OF FINDINGS: The findings of the gap analysis will be discussed in more detail in the report section titled "Findings". At a summary level, these are the gaps HR Green has found in the Coachella Valley:

- There are addresses and areas that are unserved and underserved for broadband
- Coordination between jurisdictions and with CVAG can help improve broadband for the unserved and underserved and additionally improve connectivity in other ways
- There are multiple resources to improve broadband (multiple interested ISPs, the State MMBI, CV Sync, jurisdiction Capital Improvement Plans (CIPs), other projects in the Coachella Valley and grant opportunities)
- Although broadband policies and standards have some similarities in the jurisdictions of the Coachella Valley, there is room to make them more standardized. This could be important to help jurisdictions know they have complete policies and construction standards and it could help attract ISP investment because ISPs would know what to expect across the Coachella Valley

DEFINING BROADBAND GOALS

To identify gaps, it is necessary to identify the goals for broadband in the Coachella Valley. The broadband goals will provide the backdrop against which the current circumstances will be measured.

The primary source for defining the goals for the Coachella Valley Broadband Strategic Plan comes from the source grant for the project:

- Target and develop a plan to resolve the broadband connectivity issues for both the unserved and underserved addresses within the project area.
- Because of the work that must be done with jurisdictions (cities, Tribal Authorities and the County) to identify options to improve broadband in the Coachella Valley, a value-added opportunity has been identified in the broadband study project:
- Improve coordination efforts between CVAG, the CV Sync Project, and the municipal and tribal agencies, including their associated projects within the CVAG area.
- This coordination will be necessary to develop broadband improvement solutions for the unserved and underserved BSLs in the Coachella Valley. It can also provide opportunities for other forms of broadband enhancements that could be significant. These efforts are already underway with multiple jurisdictions.

APPROACH

To understand the current broadband circumstances, several different sources of information were collected and analyzed:

- Market Assessment: Internet Service Providers (ISPs) are required to regularly report the addresses they cover, with what speeds and with what type of infrastructure to the FCC on Form 477. This is valuable data, but it is known to often have innacuracies. The 477 data form the basis for the State grant eligibility maps
- Survey: To check the Form 477 reported data, HR Green conducts a citizen and business survey. In the survey questions are asked to determine actual download/upload speeds, provider the customer selected, etc. This information
- Stakeholder meetings: Public agencies and other key stakeholders provide insight into their connectivity needs, level of service and future broadband related plans
- Other Speed Test Data: HR Green also has access to speed test data from organizations that record actual speeds that customers receive in the Coachella Vallety
- Federal Funding Account (FFA) Projects: As of the writing of this report, two grants have been awarded for broadband projects in the Coachella Valley. There are two others that have been applied for, but not awarded yet.

These sources of data help paint a clearer picture of broadband connectivity in the the Coachella Valley. The below graphic shows the sources of data and how they inform the Gap Analysis.

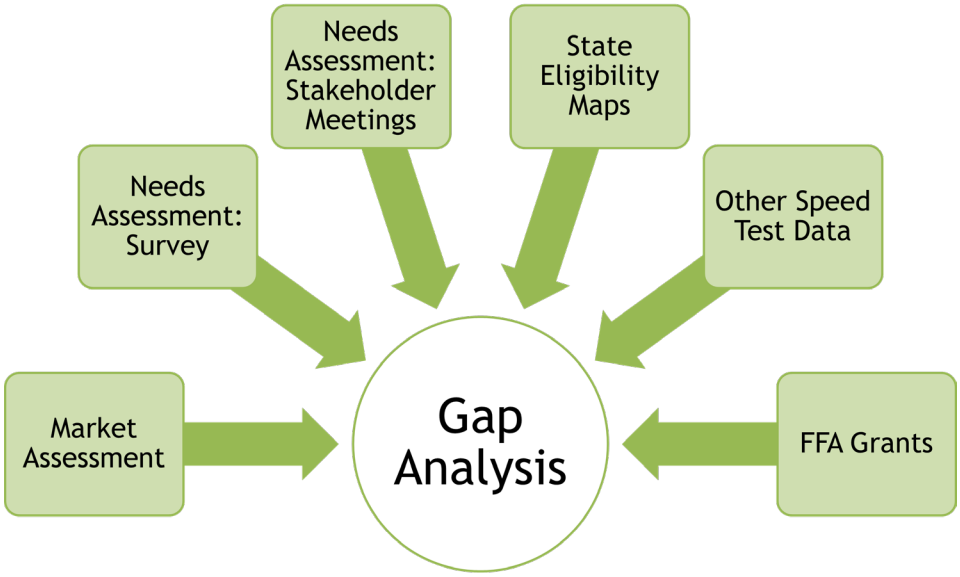


Figure1: Gap Analysis Methodology

GAP ANALYSIS FINDINGS

By combining the research from the listed sources above, a current broadband picture of the CVAG area emerges. Below are the findings HR Green has observed.

FINDING #1: THERE ARE BROADBAND GAPS

HR Green has found that there are unserved and underserved addresses in the Coachella Valley. HR Green developed a map to help show how the different data sources converge to define these gaps in broadband coverage. The map in Figure 2 displays these three data sources:

- Independent speed tests: This data is collected by independent organizations that record the actual speeds that internet users receive. Their results are shown as large areas that distinguish between unserved (red) with less than 25 Mbps upload and 3 Mbps download; underserved (yellow) with less than 100/20; and green (served) with over 100/20 Mbps. These are reported in census block format, so they appear as areas (as opposed to individual locations)
- State and Federal Communications Commission (FCC): These speeds are as reported to the FCC by the Internet Service Providers (ISPs). They appear as small dots with the same color pattern from State and FCC maps
- Survey results: CVAG conducted a survey in which respondents were asked to take a speed test and record the speeds their network achieved. These results appear as large dots with the same color pattern.

The three data sources generally agree in the depiction of unserved (red), underserved (yellow) and served (green). This is not always the case. There can be multiple reasons why the reported data can be different from actuals (independent speed tests and survey results) like misreporting, input errors, time delays, etc., but the data appears to confirm the State and Federal maps.

This basic agreement between data sources is particularly significant because grants are usually based on the State and Federal maps. If the data results are significantly different, it is important to correct them. Fortunately, in the Coachella Valley, the data sources seem to agree.

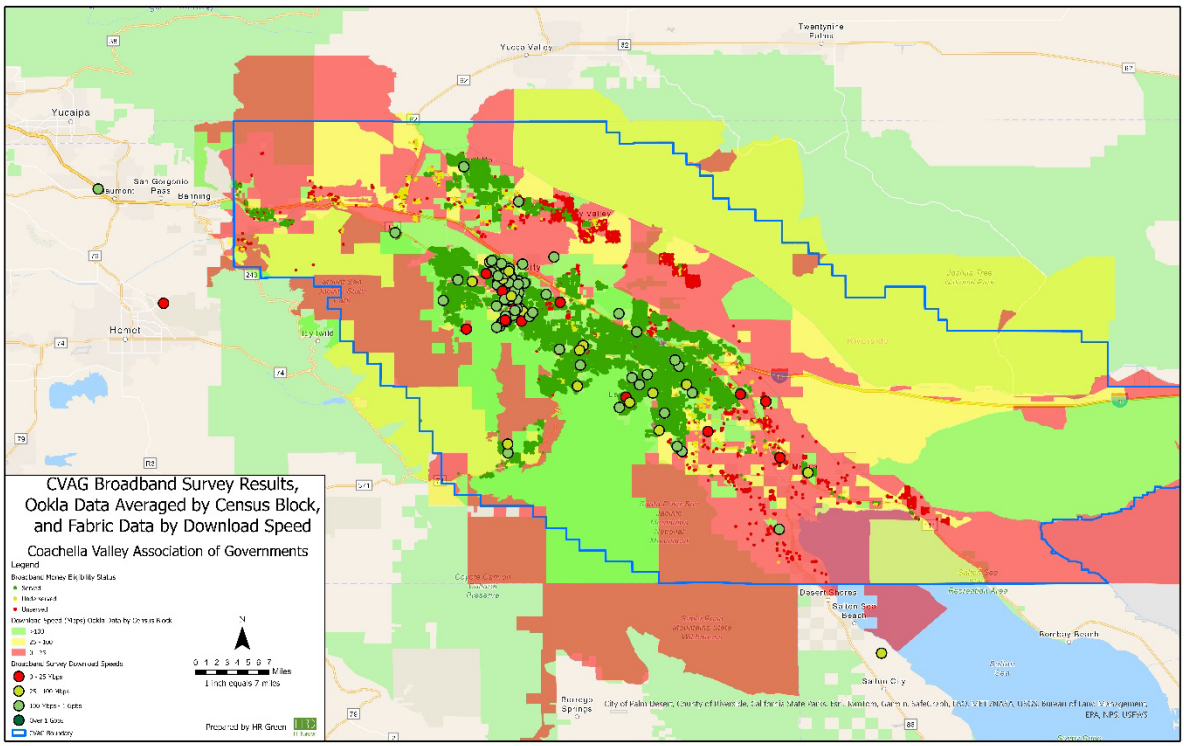


Figure 2: Broadband Needs From Multiple Sources

For a foundational assessment, this map confirms that there are areas in the Coachella Valley that need broadband improvement. For additional details relating to this map, the stakeholder engagement sessions, or the survey results, please see the CVAG Needs Assessment.

FINDING #2: COORDINATION WILL BE IMPORTANT TO FILL GAPS

There are multiple broadband related activities happening in the Coachella Valley. Examples of broadband projects include:

- CV Sync: The CV Sync Intelligent Traffic System (ITS) is distributing conduit and fiber in many areas of the Coachella Valley. If there is available conduit, it could be used for broadband. The fiber is for connectivity of municipal facilities
- State Of California Middle Mile Broadband Initiative: The State is building middle mile fiber through the Coachella Valley
- Jurisdiction Capital Improvement Plan (CIP) Projects: Most of the jurisdictions have projects they are planning. Depending on the work to be done, it could be possible to install broadband related infrastructure as part of their projects
- Existing Broadband Infrastructure: Some jurisdictions have existing broadband related infrastructure that might be able to be utilized in subsequent projects
- ISP Infrastructure And Planned Projects: It is often challenging to get existing and planned infrastructure information from ISPs. However, knowing what areas they cover and what they are generally planning can help understand gaps

- Awarded Grants For Broadband Infrastructure: There have been broadband related grant awards in the Coachella Valley, with the most recent being Future Funding Account (FFA) grant awards.

With this number of broadband related (or potentially related) activities, a key finding is that there is a need to work to coordinate those efforts. in this gap analysis – one potential gap is the need to coordinate multiple efforts to improve broadband.

Towards that end, HR Green has developed an interactive map with broadband related data.

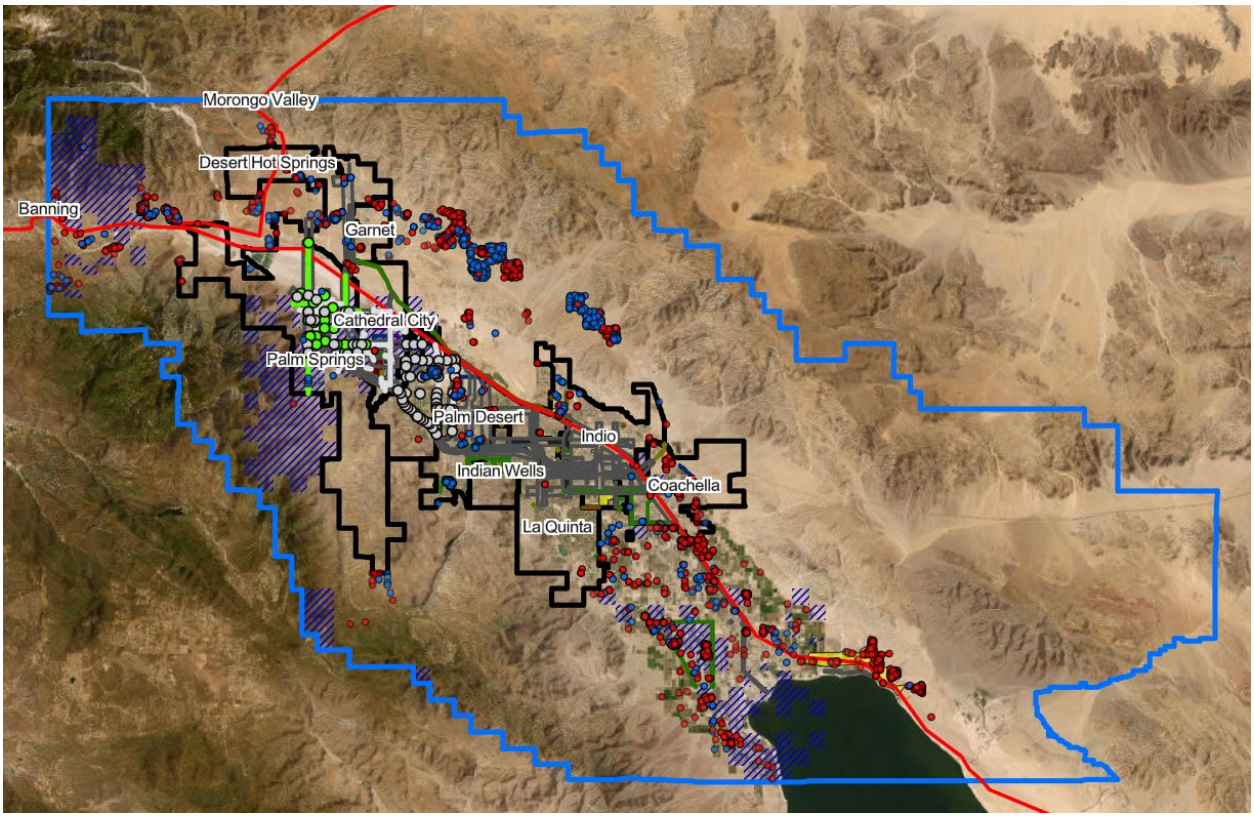


Figure 3 - CVAG Interactive Map

This map includes the CVAG Transportation border (blue), MMBI (red line), jurisdiction boundaries (black), Tribal Authority areas (purple hash lines), unserved and underserved dots, CV Sync (grey lines), CIP projects, etc. In the actual map, users can scroll in and click specific details for attribute data. The hope is that this tool can be used to help coordinate broadband projects and develop ways to reach unserved and underserved addresses.

When significant ISP interest is added and Riverside County's active work to improve broadband access and adoption are added to the other broadband activities, there are significant opportunities to improve broadband and connectivity in the CVAG area. Coordination of these interests and activities will be a key in improving broadband and connectivity.

The map in Figure 3 can play a significant role in coordination of broadband and connectivity related efforts. It can be updated and intended to be a living database to foster collaboration during this project and into the future.

FINDING #3: RESOURCES ARE AVAILABLE TO IMPROVE BROADBAND

Improving broadband and connectivity takes resources. It is important to note that there are significant resources available in the Coachella Valley. Examples of these resources include:

- ISP Investment – several ISPs have indicated a willingness to partner with jurisdictions in the Coachella Valley and invest some of their own resources. Further discussions will need to take place to determine what they will request from jurisdictions
- CV Sync – the conduit available for broadband improvement is a significant resource. ISPs have indicated this could lower their costs significantly. HR Green is currently converting CV Sync CAD files to GIS to determine where and how much conduit is available. The allocatable fiber in CV Sync can also help with jurisdiction connectivity
- Jurisdiction Broadband Assets and CIPs – some jurisdictions have broadband and connectivity infrastructure available – this can be used as "broadband currency" in working with ISPs (ISPs might be able to utilize it to enhance their investments and lower their costs. HR Green also recommends jurisdictions install conduit in their CIP projects when possible to increase the amount of infrastructure available to promote broadband improvement
- State of California Middle Mile Broadband Initiative (MMBI) – middle mile is essential for broadband improvements. The State's MMBI runs through the Coachella Valley. As timelines and pricing develop, this could be a valuable resource for broadband improvement. Also, there are ISPs with middle mile who should also be consulted for opportunities to collaborate
- Grants – there are grants which have been available and other grant opportunities will become available. When there continue to be unserved and underserved addresses, grant responses should be coordinated to leverage grant dollars to improve broadband

FINDING # 4: POLICY AND SPECIFICATION COORDINATION

Jurisdictions in the Coachella Valley have the opportunity to create a more standardized set of broadband related policies and design/construction standards. The primary goals of similar polices and design standards across the entire Coachella Valley are:

1. Protect the jurisdictions – having policy recommendations and design/construction standards to refer to can help all jurisdictions consider and adopt best practices
2. Attract ISP infrastructure investment – the more standardized policies and standards are across the Coachella Valley, the more attractive the entire area is for ISP investment. It is a significant consideration to know what to expect across a broad area
3. Jurisdiction improvements – there are policies like "Dig Once" that can help jurisdictions take steps that will help them develop even more options for the future – implementing those types of best practices can help with future possibilities

Policy recommendations and construction and design standard options are written in separate deliverables.

CONCLUSIONS

There are broadband related gaps in the Coachella Valley. There are also several resources and opportunities to improve broadband and connectivity – filling the identified gaps. Jurisdictions can fill broadband gaps with their own infrastructure when desired or partner with or coordinate ISPs projects.

The table below summarizes the information presented in the above sections to show broadband needs, ISPs already serving each area (see the project Market Analysis) and the FFA award cycle results (the most recent grants that have been awarded).

Coachella Valley Areas	Number of Unserved Addresses	Number of Underserved Addresses	Square Mileage	ISP(s) Serving the Area	Area FFA Status
Bermuda Dunes	5	0	2.95	AT&T Frontier HughesNet Pacific Lightwave Spectrum Starlink T-Mobile Verizon Viasat	N/A
Cabazon	28	6	4.89	AT&T Frontier HughesNet Pacific Lightwave Starlink T-Mobile Verizon Viasat	N/A
Cathedral City	7	0	22.81	AT&T Frontier GeoLinks HughesNet Spectrum Starlink T-Mobile TPx Communications Verizon Viasat	Applied - not awarded

Coachella	56	11	30.08	AT&T Frontier GeoLinks HughesNet Pacific Lightwave Spectrum Starlink T-Mobile Verizon Viasat	N/A
Desert Edge	33	4	2.27	AT&T Frontier HughesNet Spectrum Starlink T-Mobile Verizon Viasat	Applied – not awarded
Desert Hot Springs	30	51	30.61	AT&T Frontier HughesNet One Ring Networks Spectrum Starlink T-Mobile Verizon Viasat	Applied – not awarded
Desert Palms	0	0	2.67	AT&T Frontier GeoLinks HughesNet Spectrum Starlink T-Mobile Verizon Viasat	N/A

Garnet	26	3	7.88	AT&T Frontier GeoLinks HughesNet Spectrum Starlink T-Mobile Verizon Viasat	Applied – not awarded
Indian Wells	0	0	14.59	AT&T Frontier GeoLinks HughesNet Spectrum Starlink T-Mobile Verizon Viasat	N/A
Indio	9	12	33.23	AT&T Frontier GeoLinks HughesNet One Ring Networks Pacific Lightwave Spectrum Starlink T-Mobile Verizon Viasat Viasat Carrier Services	Awarded
Indio Hills	31	147	21.86	Frontier GeoLinks HughesNet One Ring Networks Starlink T-Mobile	N/A

				Verizon Viasat	
La Quinta	5	0	35.68	AT&T Frontier GeoLinks HughesNet Optimum Pacific Lightwave Spectrum Starlink T-Mobile Verizon Viasat	N/A
Mecca	238	8	6.96	AT&T Frontier HughesNet Pacific Lightwave Spectrum Starlink T-Mobile Verizon Viasat Zito Media	N/A
Oasis	594	27	19.63	AT&T Frontier GeoLinks HughesNet Starlink T-Mobile TPx Communications Verizon Viasat Pacific Lightwave	N/A
Palm Desert	67	182	27.02	Astound Broadband AT&T Frontier	N/A

				GeoLinks Hotwire Communications HughesNet Pacific Lightwave Spectrum Starlink T-Mobile Verizon Viasat	
Palm Springs	6	8	94.98	AT&T Frontier GeoLinks HughesNet Pacific Lightwave Spectrum Starlink T-Mobile Verizon Viasat	Applied – not awarded
City of Rancho Mirage	25	204	25.19	AT&T Frontier GeoLinks HughesNet Pacific Lightwave Spectrum Starlink T-Mobile TPx Communications Verizon Viasat	N/A
Sky Valley	372	226	24.32	AT&T Frontier GeoLinks HughesNet Spectrum	Applied – not awarded

				Starlink T-Mobile Verizon Viasat	
Thermal	206	51	9.38	AT&T Frontier GeoLinks HughesNet Pacific Lightwave Spectrum Starlink T-Mobile TPx Communications Verizon Viasat Viasat Carrier Services Zito Media	N/A
Thousand Palms	13	4	23.64	AT&T Frontier GeoLinks HughesNet Spectrum Starlink T-Mobile Verizon Viasat	N/A
Vista Santa Rosa	28	11	16.09	AT&T Frontier GeoLinks HughesNet Pacific Lightwave Spectrum Starlink T-Mobile Verizon Viasat	N/A

Whitewater	209	154	9.88	AT&T Frontier HughesNet Pacific Lightwave Southern California Telephone Starlink T-Mobile Verizon Viasat	N/A

Frontier was also awarded an FFA grant in the southeast part of Riverside County in the Coachella Valley.

Recommendations for improving broadband related gaps will be provided in other documents in this project (high-level designs, ISP interactions, policy recommendations, etc.).

IMPLEMENTATION

SUMMARY

The primary goals of the broadband study were to more clearly define the unserved and underserved addresses in the Coachella Valley and to develop strategies to reach those addresses with better broadband. During the project, HR Green identified, researched and documented existing opportunities and potential strategies to reach the unserved and underserved addresses in the Coachella Valley.

Research found several resources that can all be important in the implementation of strategies to achieve the goals of this study. The primary resources and their role in implementation include:

- CVAG: Central coordination and repository for project related data
- Strategic Advisory Group: Having met monthly throughout this study, the group has knowledge of the components of the study and an established process for coordination
- CV Sync: Has significant resources of available conduit and participates in updating the central GIS data regarding their system
- Jurisdiction CIP projects: Jurisdictions provided the initial CIP data in the CVAG GIS and are strongly encouraged to update CIP information in the CVAG GIS and utilize the GIS for coordination of broadband related projects
- Project deliverables (each of these has a section in this report – refer to the respective section for more information and detail regarding context and specifics used in implementation:
    - Data Collection: A record of the data that was collected in this study that is housed in the CVAG GIS
    - Market Assessment: Documentation of the current Internet Service Providers (ISPs) in the Coachella Valley and what they provide
    - Needs Assessment: Detail of the survey and notes of stakeholder meetings
    - Gap Analysis: A compilation and analysis of the data collected, ISP information and documentation of needs to determine where specific broadband needs exist in the Coachella Valley
    - Governance Models: Clarification of the most common forms of ownership, operation and

maintenance of broadband infrastructure that are referred to in several sections of this report
        - Memorandums Of Understanding (MOUs) to be a reference for formalizing the use of available conduit
    - Policy Recommendations: Policy and design standards recommendations that can be tools in working with ISPs to encourage local and regional broadband improvements
    - Business Models Evaluation: Analysis of broadband infrastructure ownership business models to help jurisdictions evaluate which model to implement as broadband decisions are made
    - Financial Analysis: Clarification of costs in the different governance options to provide financial insight as jurisdictions consider governance models of broadband infrastructure they decide to implement
    - Designs: The Design section of this report contains two categories of designs:
        - HLDs: Three areas were selected to perform a design of fiber networks that connect unserved and underserved addresses – these can be utilized by jurisdictions as they implement next steps with ISPs or a beginning point for feasibility analysis
        - Conduit network: A design to connect segments of the CV Sync network can be a resource for jurisdictions to align CIP projects where appropriate and in discussions with ISPs to plan conduit needs
- ISPs: A list of ISPs in the region and a record of their interest in expanding in the Coachella Valley should be utilized in implementation of next steps with interested ISPs
    - Stakeholder discussions
    - RFEI responses
- MMBI: Middle mile (fiber that connects local networks to the outside internet) is a primary consideration in improving broadband. Continued coordination with the State of California Middle Mile Initiative leadership will be necessary to implement broadband strategies and potential cost saving opportunities like aggregation
- Grants: There will be future grant opportunities for fiber. Utilizing the Grant section of this report to coordinate grant applications is part of the implementation strategy to address costs

The key to improving broadband is to utilize these resources in strategic, planned and coordinated ways that will result in unserved and underserved addresses in the Coachella Valley receiving better service. The key categories that participants in the Coachella Valley should focus on are:

- Utilizing available conduit (in working with ISPs and/or for jurisdiction use): Conduit availability is available in CVAG GIS data and conduit network design can be found in the Design section of this report
- Adopting regional policy and design standards: Specific policies and design standards recommendations can be found in the Policy section of this report
- Continuing to update and maintain the GIS map that has been developed in this study: Included in the CVAG GIS data are jurisdiction CIP information, conduit ownership and availability, grant information, address points the State has determined to be eligible for grants, etc. To keep the data current, jurisdictions need to update their CIP information and any new data regarding conduit condition and available space
- Monitoring and maintaining preparedness for broadband grants: The Grants section of this report outlines multiple potential upcoming grants and a process for coordination for grant submission. Updating the GIS data and following steps to be prepared for grants can provide better grant response content
- State of California Middle Mile Broadband Initiative: Geographical areas that are remote will require middle mile to improve broadband. The MMBI could be a component of assembling middle mile. When the State has determined MMBI pricing, it will be important to determine if their pricing will enable last mile (infrastructure that extends from the middle mile to the addresses). Also, depending on MMBI's pricing structure, there could be an opportunity to have an entity aggregate need (if MMBI's pricing is based on volume), which can dramatically lower costs

This deliverable defines the steps that need to be taken to fully implement these five focus areas.

It is important to note that several CVAG member jurisdictions are already taking steps to improve broadband availability. For example:

- Desert Hot Springs: Working with an ISP to introduce additional broadband service to the community
- Palm Springs: Received LATA funding to do a broadband strategic plan and collaborating with the CV Sync program to expand municipal broadband service to city facilities
- Cathedral City: Analyzing CV Sync infrastructure as part of a plan of internal connectivity
- Rancho Mirage: Joined the CV Sync program since the broadband study was started, which opens up opportunities to leverage CV Sync in that community
- Palm Desert – conducted a broadband strategic plan
- Indio – completed a broadband strategic plan and received federal funding for a portion of its implementation
- Coachella – received LATA funding to conduct a broadband strategic plan
- 29 Palms Band of Cahuilla Indians coordinated with the California Department of Technology to locate a MMBN hub on tribal lands, opening up economic development opportunities for the tribe
- Senior technology staff representing all CVAG member jurisdictions and the same from the three school districts have regularly participated in stakeholder meetings throughout the course of the study there have already been broadband improvement implementation steps taken with the City of Indio. The steps Indio has taken can serve as a guideline for other jurisdictions.

THE IMPLEMENTATION PLAN

The five focus areas defined in the Executive Summary are separate but connected aspects of the study that will need to be utilized and implemented.

The first two are related to the steps necessary to utilize CV Sync and municipal infrastructure (the first focus area in the Executive Summary). Information regarding choosing which model would be best for utilizing CV Sync and municipal infrastructure can be found in the Governance section of the final report.

UTILIZING AVAILABLE CONDUIT (IF A JURISDICTION IS GOING TO INSTALL FIBER)

When a jurisdiction deploys broadband fiber using CV Sync or municipal conduit as part of the project (either for internal government use or to reach unserved and underserved addresses), there are a series of steps that will need to be taken.

The first action a jurisdiction will need to take is to define its broadband and connectivity goals. Having clarity on whether investment is for broadband (reaching unserved and underserved addresses) or to connect jurisdiction facilities is important. Both can be part of the jurisdiction's goals, if they are both desired outcomes the jurisdiction plans to pursue.

Next, if the jurisdiction is considering deploying their own fiber or is partnering with a private ISP, it will need to develop connectivity plans based on their defined goals. These plans will need to include routes, which conduit will be used (or added), what size fiber will be utilized and, eventually, detailed construction and funding plans.

As mentioned, the connectivity plans will need to identify CV Sync and municipal conduit to be utilized in the connectivity plan. The Regional Broadband GIS Map that has been developed in this broadband study is a tool a jurisdiction can use in broadband planning as it provides maps of CV Sync and municipal conduit and available space in each conduit segment.

Next, the jurisdiction will need to verify CV Sync and municipal conduit and handholes locations, availability, capacity, condition, etc. The conduit displayed in the Regional Broadband GIS Map is based on construction plans and as-built drawings and has not been field inspected for current conditions. The jurisdiction will perform those verifications and coordinate with CVAG when CV Sync conduits are involved.

In addition, the jurisdiction will want to determine if there are conduit or handholes that could be added at

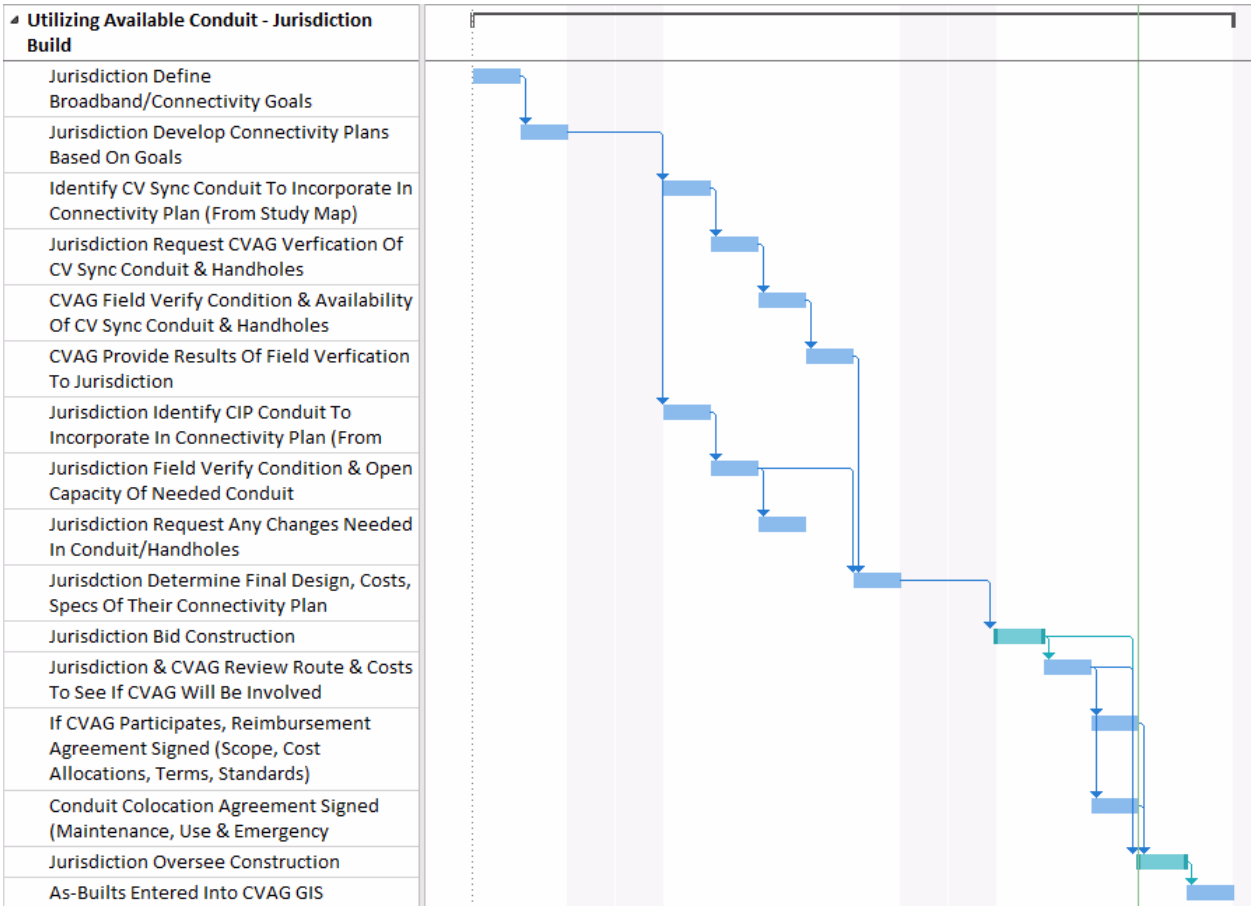
a lower cost during any upcoming municipal CIP projects that could align with their broadband and connectivity expansion plans.

Based on the results of the CVAG and/or jurisdiction field verification and identification of any needed maintenance or repairs to use existing conduits, the jurisdiction will determine final design, costs, and specifications of the infrastructure to be added in their connectivity plan. The study provides recommended technical details, standards and specifications for broadband infrastructure in the Policy and Design Standards chapter. When those details are completed, the jurisdiction will perform their procurement process for bids for the construction and materials of the new infrastructure. Jurisdictions may find less expensive pricing for broadband equipment and materials and may procure them in advance of a construction project and furnish the procured equipment and materials to the contractor. In addition, a jurisdiction should consider requiring the contractor to provide as-built drawings and GIS mapping for the jurisdiction to use and share with the Regional Broadband GIS Map.

If CVAG is participating in the project, the jurisdiction will need to execute a Reimbursement Agreement with CVAG. An example of a reimbursement agreement is provided in the Partner Terms and Negotiations section.

When CV Sync conduit will be included in the jurisdiction's proposed broadband network, the jurisdiction will need to execute a Conduit Colocation Agreement with CVAG. An example of a reimbursement agreement is provided in Partner Negotiation section of this report.

The schedule on the next page shows the steps that will need to be taken and how they are connected.



UTILIZING AVAILABLE CONDUIT (INTERNET SERVIE PROVIDER (ISP) USE)

Some jurisdictions may choose to work with ISPs to have the ISP invest in conduit and fiber to improve broadband and/or connectivity. The ISPs who have expressed interest in expansion in the Coachella Valley have indicated an interest in lowering their costs by utilizing CV Sync or municipal conduit.

Many of the steps for ISPs to use the CV Sync conduit are similar to the above section regarding jurisdiction use, but there are some important differences.

The first difference is the jurisdiction will need to work with the ISP to mutually define the plans for the ISP network. The ISP will develop their plans and construction documents, but the jurisdiction needs to be involved for two reasons:

- To make sure new infrastructure also meets their goals (along with how it meets the ISP's goals)
- For coordination of CV Sync conduit and any conduit the jurisdiction might have available

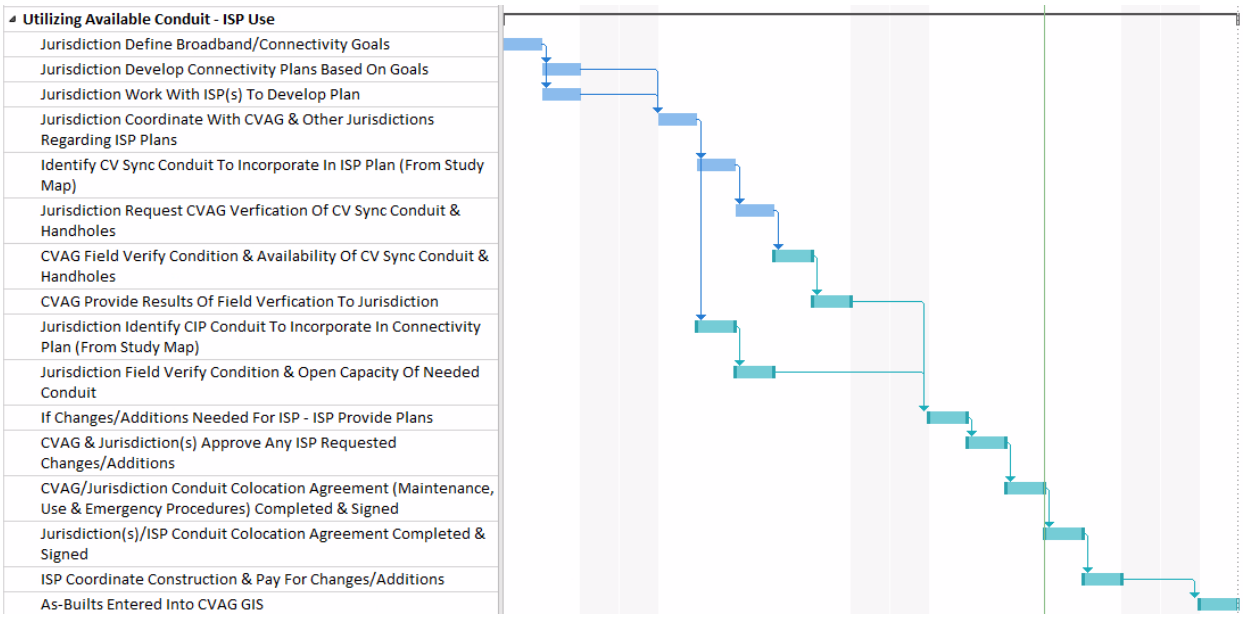
When a jurisdiction proposes to co-locate privately-owned fiber within CV Sync conduits, the jurisdiction will need to enter into a conduit co-location agreement with CVAG for the innerduct within the CV Sync conduit in which the privately-owned fiber will be located. CVAG will not allow a private ISP to enter into a co-location agreement directly with CVAG. It is important to note that there may be CV Sync fiber available only for jurisdiction use. CV Sync fiber cannot be used by ISPs. The agreements that will need to be signed are also somewhat different. The jurisdiction will sign an agreement with CVAG for the jurisdiction to oversee the conduit use. Then, an agreement will be signed with the ISP for them to lease the conduit and maintain it.

It can be important for each jurisdiction to work with CVAG and other jurisdictions in any broadband and connectivity project to leverage synergies and cost savings with other jurisdictions. This can be particularly important in working with ISPs who are investing in new broadband infrastructure. It can be more financially attractive for ISPs to expand into multiple jurisdictions. Talking with ISPs regionally often leads to greater ISP investment and possibly concessions they can provide for government connectivity.

Another potentially significant difference between a jurisdiction utilizing CV Sync conduit for infrastructure they will own versus ISPs utilizing the conduit is who will pay for any maintenance of existing conduit or changes that might be needed. If an ISP desires to use the CV Sync conduit, but there are maintenance or changes, these should be discussed with the ISP and a mutually beneficial outcome be negotiated.

The entity that will build the infrastructure will also need to follow permitting, licensing and facility use arrangements.

Once the above steps have been taken, the ISP then performs construction of their network utilizing available conduit (within the agreements). The jurisdiction should require as-builts that can be entered into the Regional Broadband GIS Map.



ADOPTING REGIONAL POLICY, DESIGN AND GIS STANDARDS

Deliverables of this broadband study include recommended policy, design and standards, including GIS mapping standards, that benefit the jurisdiction as well as the region. The policy and design standards are provided in the policy section of this report, and the GIS standards are contained in the CVAG GIS files and in the Data Collection section of this report.

Adopting uniform policy and design standards across the Coachella Valley could be very attractive to ISPs. Their most significant motivation in deciding where to invest infrastructure capital is speed to market. If they can rely on uniform standards, they have a significant incentive to build in the Coachella Valley.

The schedule below shows the steps that remain to be taken to have uniform policy, design and GIS standards across jurisdictions.

The policy and design standards recommendations documents have been completed as part of this study. GIS standards have been incorporated into the Regional Broadband GIS Map

COACHELLA VALLEY REGIONAL BROADBAND GIS MAP

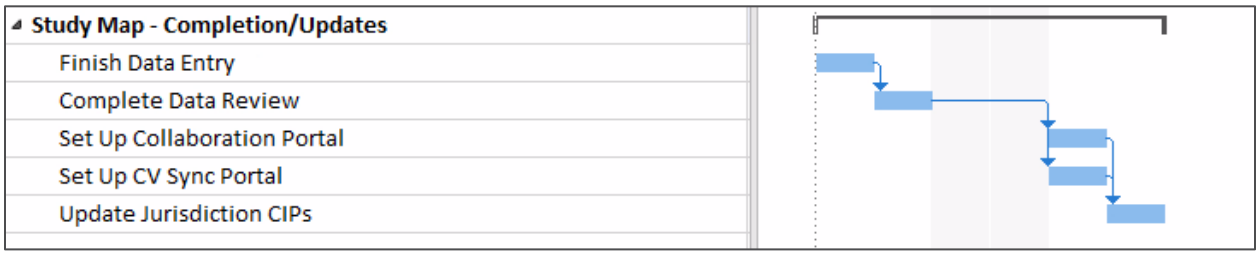
An important deliverable of his project has been the development of a GIS map that displays the geospatial data that has been collected. This includes:

- CV Sync and municipal infrastructure and attributes (including conduit size and available conduit space
- Broadband needs data (including unserved and underserved location, study survey results, and third party speed test results)
- Future Funding Account awards
- MMBI route
- Jurisdiction CIP projects that potentially could be leveraged for installing broadband infrastructure (e.g., roadway reconstruction projects)

Keeping the Regional Broadband GIS Map updated will continue its usefulness for broadband planning and finding solutions to broadband and municipal connectivity needs. In addition, the map can also help jurisdictions coordinate within the region on CIP planning.

There are several steps that need to be implemented to keep the study map updated. These are shown in

the schedule below.



As it is constructed and implemented, CV Sync conduit data will be housed in the Regional Broadband GIS Map.

HR Green provided a portal during the project for stakeholders to review the data as it was added. It is recommended that CVAG set up a permanent data exchange portal for jurisdictions, CVAG, and stakeholders to provide updates to the Regional Broadband GIS Map.

Jurisdictions should be encouraged to utilize the portal for collaboration for continuing efforts to reach the unserved and underserved addresses and to improve connectivity within and between jurisdictions.

When jurisdiction budgets are adopted annually, it is recommended that CVAG prompt jurisdictions to supply any projects that are broadband related or that could contain broadband infrastructure (for example a road construction project that could include conduit).

GRANT APPLICATIONS

There are, typically, specific reasons why addresses remain unserved and underserved. Most often those reasons can be traced to money – either because the costs are too high to reach the addresses with broadband infrastructure or because of a perceived lack of customers' ability to pay for service.

One solution to those challenges is grant funding. The Grants section of this report outlines possible grant sources. Grants specifically offered to improve broadband, and connectivity will very likely continue to be offered. Grants for other needs that can include broadband and connectivity infrastructure are also likely to be available. It is recommended that CVAG maintains a compendium of available broadband grant sources for its jurisdictions.

There are steps that can be taken to prepare for grants in advance. It is important to continue developing relationships with ISPs. Knowing their expansion plans and having relationships within which discussions about grants can be important to help respond quickly when a grant window opens. Monitoring grant sources is also important to know when grants are made available.

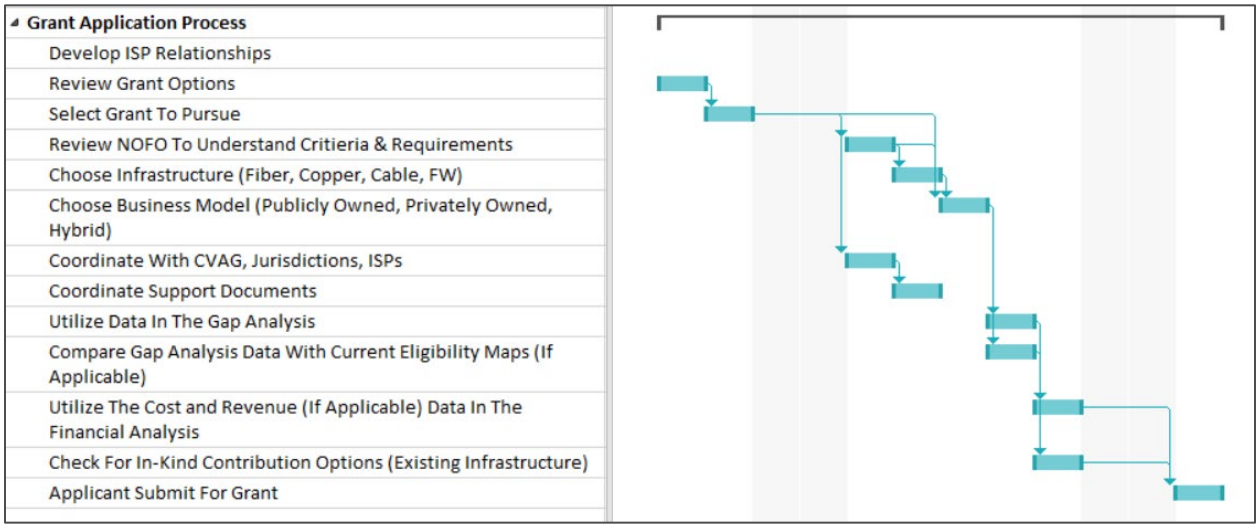
When a grant does open, the Notice Of Funding Opportunity (NOFO) will provide the criteria and requirements, which helps a potential applicant determine who can apply for the grant, the amount of grant funds available and, possibly, the technology that can be deployed (either by direct guidance or by the dollars available).

Based on the grant, ISP intentions and jurisdiction goals, a potential applicant will need to decide its strategy for applying for the funding, including whether the jurisdiction or a partnering ISP will apply for the grant. The Governance section of this report provides guidance to help in the decision of whether the jurisdiction or an ISP should be the applicant. If the jurisdiction considers being the grant applicant, it should be noted that some broadband grants require proof the jurisdiction has the experience needed to operate a broadband utility.

If a grant is needs-based, it will be necessary to refresh the State and/or Federal eligibility data. It is likely eligibility will change based on previous grants and any improvements made in the data.

Many grants require matching funds. Often, existing infrastructure can be considered in-kind contributions that can be applied to the required match. Utilizing the Regional Broadband GIS Map, determining what existing conduit could be used in the project might offset the required match. This might be applicable for the jurisdiction or for the ISP (whoever is chosen as the applicant).

The following schedule displays the steps and how they are related to each other.



THE INDIO MODEL

The City of Indio has been directly working on improving broadband access within the community. There are best practices that have been learned from their efforts:

- Specifically identify the segment(s) of CV Sync and/or municipal conduit that could be leveraged to implement their program
- Field verifying the available capacity in the conduit
- Field verifying the handholes that will be utilized in this instance of new infrastructure to determine there is space available and if other handholes will be needed (and if so, define who will pay for them)
- Prepare necessary agreements for that segment:
    - Define what will be put into the conduit and handholes
    - Define costs and who will pay them for use of the conduit
    - Define the term of the agreement
    - Clarify the purpose of the agreements
- Clearly define and agree upon methods and any design standards for any infrastructure added to what is existing
- Specify who will be responsible for maintenance of the conduit and of anything placed in the conduit
- Define emergency procedures and protocols for any damages or problems with the conduit and contents
- Enter details (what is added in the conduit and what open capacity will be available after the fiber/innerduct is installed) into the Regional Broadband GIS Map

RECURRING TASKS

There are certain tasks that will need to be done on a regular basis. Most have been discussed within this document, but they are listed here to aid in monitoring their progress:

- CIP Project Data: When CIP budgets are finalized annually (June/July) broadband related projects (or projects within which conduit could be added should be forwarded to CVAG to update the Regional Broadband GIS Map
- Strategic Advisory Group (SAG) Meetings: To continue coordination between jurisdictions, it would be beneficial to continue regular meetings of SAG
- ISP Meetings: To continue discussions with ISPs, regular meetings with the ISPs (either as a group or individually) could be important
- CV Sync Data: As more CV Sync infrastructure is deployed (or changed), supplying that information in GIS format to the Regional Broadband GIS Map will be necessary to keep the data updated. Also, reviewing CV Sync data in GIS and in the field and editing the data will improve the accuracy of the information

STATE OF CALIFORNIA MIDDLE MILE BROADBAND INITIATIVE (MMBI)

When this broadband study was completed in February 2026, the State had not completed construction of the MMBI, nor had they determined the pricing structure by which the middle mile could be leased. When it is available for use and pricing is established, it will be necessary to understand how it can help advance broadband solution to the unserved and underserved in the Coachella Valley.

Whoever will build and own broadband infrastructure (jurisdictions or ISPs), sources of connecting to the outside internet are critical. The main question regarding the MMBI is if their pricing will make this source of connection affordable.

Typical middle mile pricing is volume based – the more data consumed, the lower price per data unit. If that is MMBI's chosen pricing structure, CVAG should consider collaborating with its jurisdictions to facilitate aggregated pricing

The most common aggregation model consists of the entities who are buying data capacity building their own fiber to a connection point. All of the entities connecting to that point then share in the costs of building the connection point facility. When the facility is operational, they pay the cost of their use. If this scenario is utilized, in coordinating connection points, CVAG would help lower the costs of internet, but not have to incur any costs to provide that service.

GOVERNANCE

SUMMARY

For the purposes of this memo, the term “broadband” can be understood as retail connectivity to the internet (as opposed to municipal utility or traffic signal connectivity) at Federal Communications Commission (FCC) minimum speeds. Altman Solon, in collaboration with US Ignite, authored a whitepaper that serves as a comprehensive guide for communities exploring the expansion of broadband service. This guide presents various models, from entirely private to completely public broadband networks, and also explores an increasing array of strategies that leverage both public and private investment. The aim of this guide is to assist communities in understanding the capital requirements for different deployment models, the expected returns, and how to sidestep prevalent pitfalls.

This Broadband Models memorandum serves as a strategic guide for the Coachella Valley Association of Governments (CVAG), outlining its aspirations to enhance connectivity infrastructure and guide jurisdictions in their broadband improvement efforts. The memorandum is underpinned by a comprehensive broadband study, which highlights CVAG’s efforts for broadband expansion to establish a robust and far-reaching broadband network across the Coachella Valley.

BROADBAND MODELS

The subsequent sections of this document delve into the specifics of five distinct broadband models. Each model is accompanied by a visual representation to aid in understanding. These visual aids serve to illustrate the unique characteristics and functionalities of each model, providing a comprehensive overview of their individual features.

	Own Rights of Way, Utility Infra.	Own Middle Mile	Own Last Mile	Operate Infrastructure	Service Customer	Example City/County
Full Municipal Broadband	Public Entity (City or Utility)	Public Entity (City or Utility)	Public Entity (City or Utility)	Public Entity (City or Utility)	Public Entity (City or Utility)	Santa Monica, California
Publicly Owned, Privately Serviced	Public Entity (City or Utility)	Public Entity (City or Utility)	Public Entity (City or Utility)	Public Entity / Service Provider	Service Providers (One or Several)	San Bruno, California
Hybrid Ownership	Public Entity (City or Utility)	Public Entity (City or Utility)	Service Providers (One or Several)	Service Providers (One or Several)	Service Providers (One or Several)	Westminster, California
Private Developer, Open Access	Public Entity (City or Utility)	Private Developer	Private Developer	Private Developer	Several Service Providers	Fullerton, California (SiFi Networks)
Full Private Broadband	Public Entity (City or Utility)	Service Providers (One or Several)	Service Providers (One or Several)	Service Providers (One or Several)	Service Providers (One or Several)	Los Angeles, California

Source: “Broadband Models for Unserved and Underserved Communities” – US Ignite Whitepaper

FULL MUNICIPAL BROADBAND MODEL

A full municipal broadband model involves local government or public entities owning, operating, and providing service for the broadband network. This model is the most prevalent among municipally enabled networks.

The essential elements of a full municipal broadband model include:

- **Ownership**: In the full municipal broadband model, the city or a local utility company possesses the broadband infrastructure. This encompasses physical assets like fiber cables, routers, and other essential equipment
- **Operation**: In the full municipal broadband model, the city or a local utility company oversees network operations. This encompasses tasks such as infrastructure maintenance, network traffic management, and ensuring reliability and security.
- **Service Provision**: In the full municipal broadband model, the city or a local utility company delivers broadband services directly to end users. This encompasses tasks such as billing customers, providing customer service, and addressing any issues or complaints.
- **Investment and Risk**: In the full municipal broadband model, the city or a local utility company assumes the entire investment cost and associated risks. However, it also enjoys all the benefits of the network, including any generated profits.
- **Control and Decision Making**: In the full municipal broadband model, the city or a local utility company exercises complete authority over the network and determines all aspects related to it. This encompasses decisions regarding pricing, service offerings, and network upgrades.

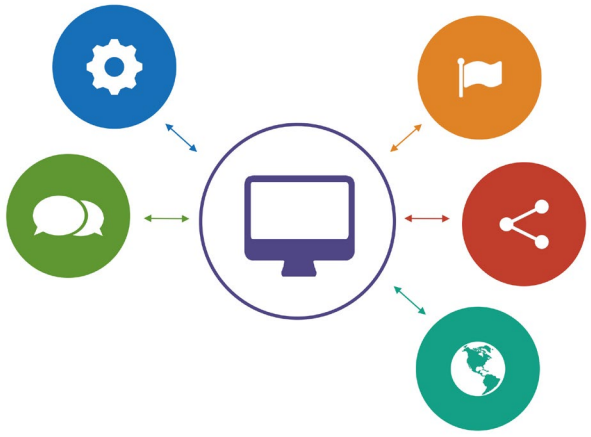
The full municipal broadband model can be successful, but it requires significant investment and carries a high level of risk. Therefore, it may not be the best solution for all communities.

As the municipality builds and owns the infrastructure to deliver retail internet services to customers, it can also use the network for municipal services like utility connections, SCADA, intelligent traffic signals, sustainability, smart connectivity, etc.

MODEL 1: FULL MUNICIPAL BROADBAND RETAIL SERVICE

Staffing

Fully staffed across marketing, **technology**, sales, service, support



Clients

Consumers and/or business customers

Challenges

Communication entity competes with incumbent providers. Complex challenges running ISP. Digital divide issues

Governance

Governmental department or via corporate/private structure

Services

Full-service retail products (Voice, Video and Data) for consumers and businesses

Source: "Broadband Models for Unserved and Underserved Communities" – US Ignite Whitepaper

PUBLICLY OWNED, PRIVATELY SERVED BROADBAND MODEL

The publicly owned, privately served model is a type of broadband network model where the infrastructure is owned by a public entity, but the services are provided by one or more commercial partners.

The essential elements of a publicly owned, privately served broadband model include:

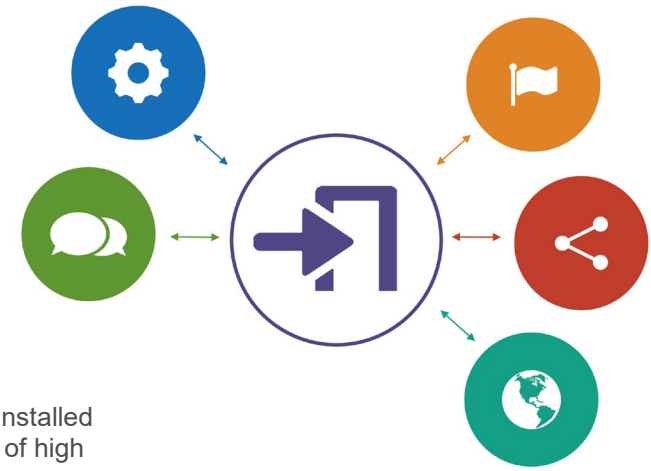
- **Public Ownership**: In the publicly owned, privately served broadband model, one or more commercial partners cater to end users and may manage the infrastructure, while the municipality retains ownership of the underlying network.
- **Private Service Provision**: In the publicly owned, privately served broadband model, commercial partners cater to end users and may also manage the infrastructure. Their responsibilities include billing customers, providing customer service, and addressing any issues or complaints.
- **Risk and Reward Sharing**: In this model, both the public and private entities jointly share the risks and rewards. The public entity assumes the risk associated with the initial infrastructure investment, while the private entity shoulders the operational risks. Additionally, any profits generated from the services are distributed between them.

This model can serve as a viable option for municipalities aiming to provide high-speed internet access to their residents, especially when they lack the necessary resources or expertise to independently manage a broadband network.

MODEL 2: PUBLICLY OWNED, PRIVATELY SERVICED OPEN ACCESS

Staffing

Minimally staffed, frequently supported by outside consultants and experts



Clients

Generally leased access to ISP and other providers, who in turn resell services over community fiber to businesses and residents

Challenges

No guarantees that providers will utilize installed fiber. Cherry-picking of high revenue areas and increased digital divide

Services

Generally, includes a combination of voice, video and data offered as part of a package by providers

Governance

Generally, a governmental or quasi-governmental body manages budget, leasing and decision-making for the entity

Source: "Broadband Models for Unserved and Underserved Communities" – US Ignite Whitepaper

Governance

HYBRID OWNERSHIP BROADBAND MODEL

The hybrid ownership broadband model involves dividing assets between private and public entities within the broadband network. It serves as a balanced approach, bridging the gap between full municipal broadband and full private broadband.

The essential elements of a hybrid ownership served broadband model include:

- **Public Ownership of Middle Mile Infrastructure**: In the hybrid ownership broadband model, the middle mile infrastructure (the infrastructure needed to connect the last mile (see below) to the internet) is owned by the city or a public entity, which could be a state, county, city government, municipal electric utility, or rural cooperative. This infrastructure comprises essential components like fiber cables, routers, and other backbone equipment that form the core of the network.
- **Private Ownership of Last Mile Infrastructure and Service Provision**: In the hybrid ownership broadband model, private service providers both own and manage the last mile (the infrastructure from the middle mile to the end customer) infrastructure. This infrastructure encompasses the network components that link the network's backbone to individual residences and businesses.
- **Risk and Reward Sharing**: In the hybrid ownership broadband model, both public and private entities jointly share the risks and rewards. The public entity assumes the risk associated with the initial investment in the middle mile infrastructure, while the private entity shoulders the operational risks and invests in the last mile infrastructure. Additionally, any profits generated from the services are distributed between them.

This model can serve as a viable option for municipalities aiming to provide high-speed internet access to their residents, especially when they lack the necessary resources or expertise to independently manage a broadband network.

MODEL 3: HYBRID OWNERSHIP INSTITUTIONAL MIDDLE MILE



Source: "Broadband Models for Unserved and Underserved Communities" – US Ignite Whitepaper

PRIVATE DEVELOPER OPEN ACCESS

In the private developer open access broadband model, a private developer owns and operates the broadband infrastructure, while private service providers directly serve end users.

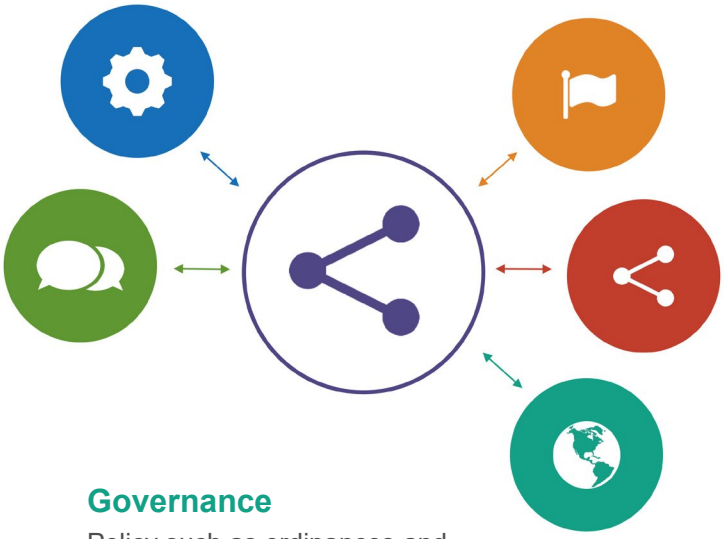
The essential elements of a private developer open access served broadband model include:

- **Private Ownership of Infrastructure**: In the private developer open access broadband model, a private developer assumes ownership and operation of the broadband infrastructure. This encompasses essential physical components like fiber cables, routers, and other necessary equipment.
- **Open Access to Service Providers**: In the private developer open access broadband model, a private developer owns and operates the broadband infrastructure, while multiple private service providers utilize the same infrastructure to offer services directly to end users.
- **Competition Among Service Providers**: In the private developer open access broadband model, competition arises among multiple service providers who can offer their services using the same infrastructure. This competitive environment often results in enhanced service quality and more affordable prices for end users.
- **Risk and Investment**: In the private developer open access broadband model, the private developer assumes the responsibility and financial investment for constructing and maintaining the infrastructure. However, they have the opportunity to recover their investment by charging service providers for utilizing the infrastructure.

This model can serve as a viable option for municipalities aiming to provide high-speed internet access to their residents, especially when they lack the necessary resources or expertise to independently build and operate a broadband network.

MODEL 4: PRIVATE DEVELOPER OPEN ACCESS[2] PUBLIC POLICY

Staffing
Minimally staffed, focusing on use of existing internal resources



Clients
Community is a facilitator only. No specific clients

Challenges
Communication entity competes with incumbent providers. Complex challenges running ISP. Digital divide issues

Governance
Policy such as ordinances and practice changes to support fiber and asset development

Services
No service offering. Policy may facilitate network expansion by providers

[2] Private Developer is defined as private company that builds, owns and operates the network infrastructure and offers open access to it to several retail SPs that provide service on the top.

Source: "Broadband Models for Unserved and Underserved Communities" – US Ignite Whitepaper

FULL PRIVATE BROADBAND MODEL

In the full private broadband model, one or more private service providers take ownership of and manage the network, while also directly serving end users. This model is prevalent and dominates most well-served markets.

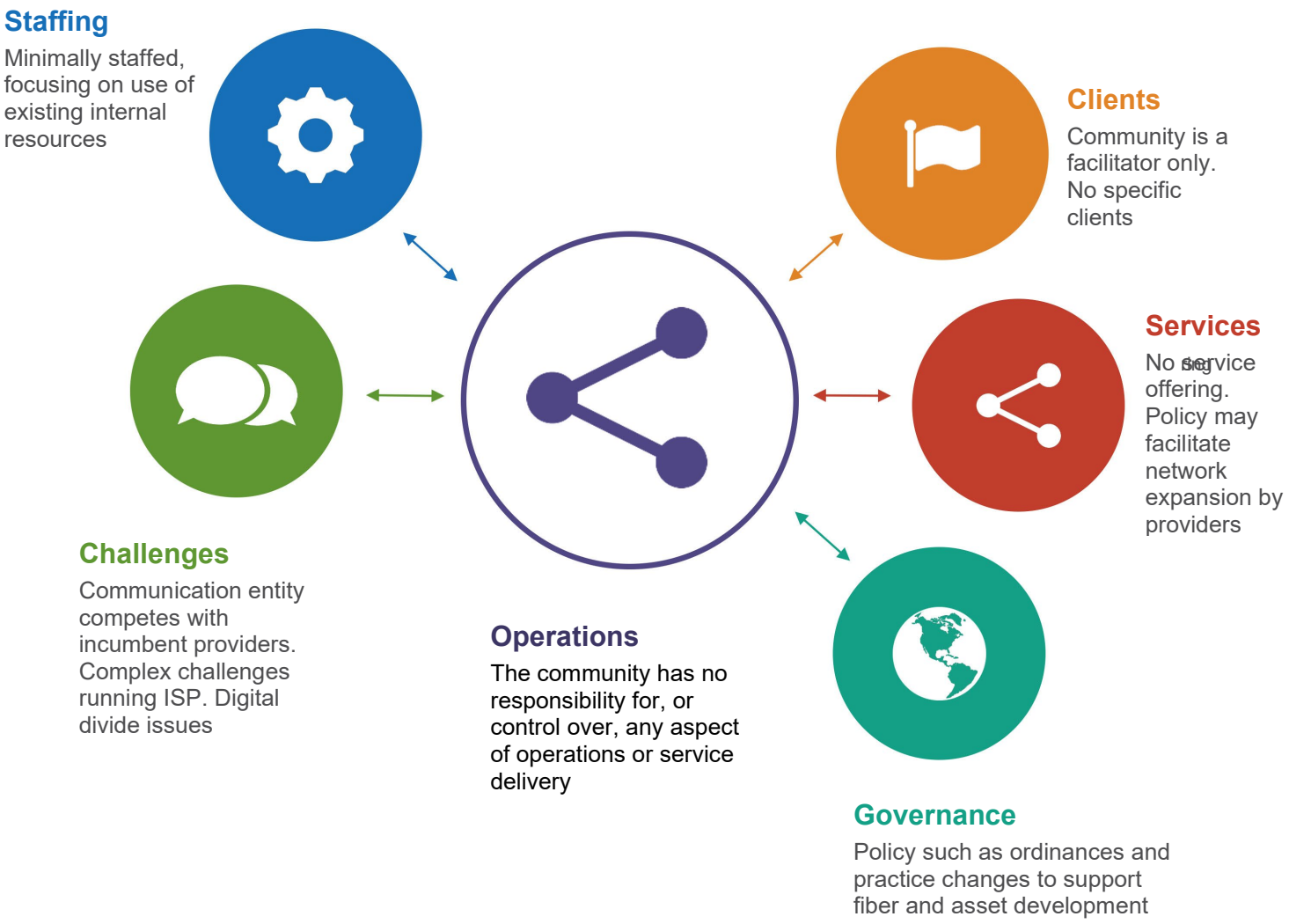
The essential elements of a full private broadband model include:

- **Private Ownership of Infrastructure**: In the full private broadband model, one or more service providers take ownership of the broadband infrastructure. This encompasses essential physical components such as fiber cables, routers, and other necessary equipment.
- **Private Operation**: In the full private broadband model, one or more service providers own and operate the network, handling tasks such as infrastructure maintenance, network traffic management, and ensuring network reliability and security.
- **Private Service Provision**: In the full private broadband model, the private service providers provide the broadband service to the end users. These tasks encompass invoicing customers, delivering customer service, and addressing any concerns or grievances.
- **Risk and Investment**: In the full private broadband model, private service providers shoulder the entire investment cost and associated risks as they own and operate the network. However, they also enjoy the complete benefits of the network, including any profits generated.
- **Control and Decision Making**: In the full private broadband model, private service providers wield complete authority over the network, making decisions regarding pricing, service offerings, and network upgrades.

While this model can achieve success, it might not fully address the requirements of all communities, especially those in rural or underserved areas. In such situations, alternative models like municipal broadband or hybrid approaches may be better suited.

Communities that choose the fully private model will need to consider how they will provide connectivity for delivering municipal services. For example, if a jurisdiction does not own broadband and connectivity infrastructure, they would have to have a different network for applications like traffic signal controls or they would have to define how that could be done on the private service provider network. For some utility applications, that is often done through radio frequency (RF) systems. These can provide some data security, but they typically have ongoing expenses and can become challenging to manage when there are several for multiple utilities.

MODEL 5: FULL PRIVATE BROADBAND[3]



[3] Ful Private Broadband is defined as a private enterprise that builds and operates network infrastructure for the purpose of delivering broadband service to customer.

Source: "Broadband Models for Unserved and Underserved Communities" – US Ignite Whitepaper

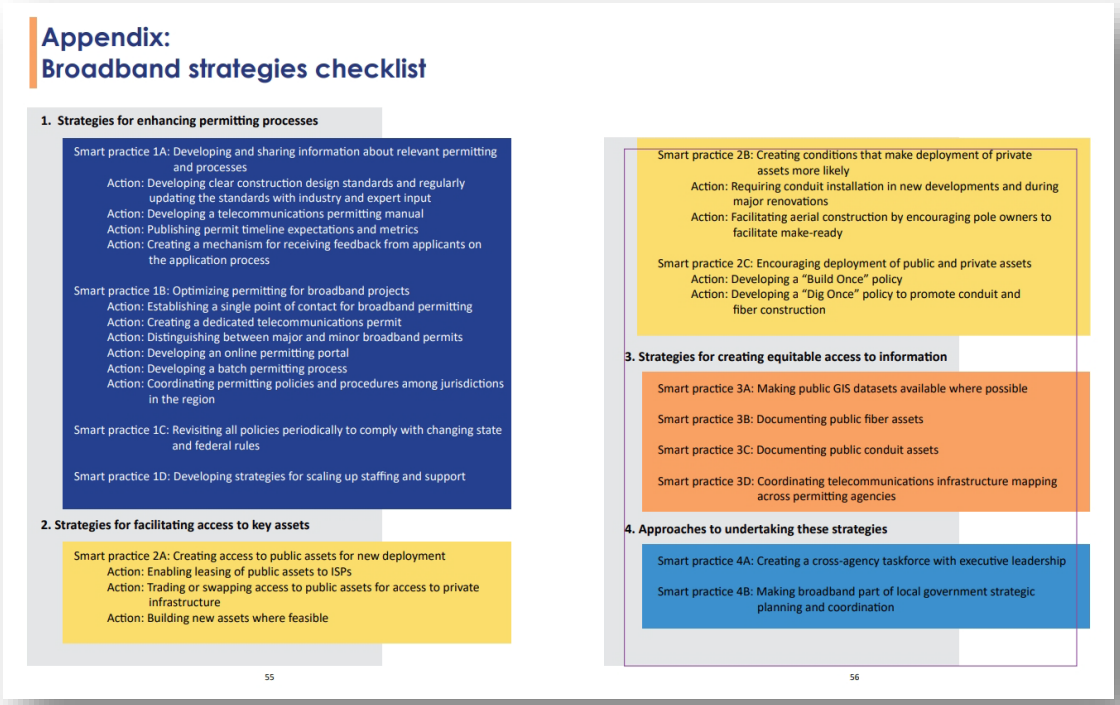
POLICY AND DESIGN STANDARDS

SUMMARY

The policies of a community and a region can have a significant impact on broadband. Some communities want to attract broadband investment from private Internet Service Providers (ISPs). Others desire to control what is being put in their Right of Way (ROW) because of fears of running out of available ROW. Public policies and permitting procedures can support those needs or work against them.

The Coachella Valley Association of Government (CVAG) is in a unique position to support member agencies in developing policies and permitting procedures and to work towards possible consistency among the governing entities in the Coachella Valley (CV). Given there are unserved and underserved addresses in the CV, CVAG can help form policies and municipal/tribal workflows which can make the CV more "broadband-friendly" to incumbents and other service providers, while also safeguarding CVAG jurisdictions and their residents. This process begins with reviewing available resources and building upon these from HR Green's experience in similar projects.

Within California, communities have access to multiple valuable resources developed by the State for this purpose specifically. One such report, the State of California Local Permitting Playbook, is a staple to the policy review process as it helps local governments strategically leverage permit processes to streamline broadband deployments and encourage private sector investment into their communities. HR Green reviewed this playbook as part of our research for this document. We found it provides concrete policy implementation ideas which should be considered by all CVAG constituent communities. The full document can be found here: https://broadbandforall.cdt.ca.gov/wp-content/uploads/sites/19/2022/09/California-Local-Jurisdiction-Permitting-Playbook-1.pdf.



The first step a community needs to take is to define the community's broadband goals. At the highest level, communities want to either attract broadband investment or manage the broadband related construction

ISPs seek to perform in each city's ROW.

What follows in this document is a discussion of HR Green's policy observations combined with insight from the State's playbook. We provide recommendations from the State's playbook below and follow them with our own analysis and experience in the implementation of similar strategies with some of our past clients. We also present additional contextual information and best practices learned from successfully guiding other communities through similar processes.

RECOMMENDED ACTIONS

Drawing from HR Green's experience in reviewing and developing broadband-related policies for local communities, we recommend all CVAG member communities consider taking the following steps:

1. Develop clear construction design standards and regularly update the standards with industry and expert input
2. Develop a telecommunications permitting manual
3. Publish broadband related permit timeline expectations and metrics
4. Create a mechanism for receiving feedback from applicants on the application process
5. Establish a single point of contact for broadband permitting
6. Distinguish between major and minor broadband permits
7. Create a dedicated telecommunications/broadband permit
8. Develop an online permitting tool
9. Develop a batch permitting process
10. Coordinate permitting policies and procedures among jurisdictions in the region
11. Enable leasing of select public assets to ISPs
12. Trade or swap access to public assets for access to private infrastructure
13. Build new public assets where feasible – define these projects in the community's Capital Improvement Plan (CIP) and coordinating with other jurisdictions
14. Require empty conduit installation in new developments and during major renovations
15. Facilitate aerial construction by encouraging pole owners to facilitate the engineering and construction preparations needed (called "make-ready") when aerial is acceptable or needed
16. Develop a "Build Once" policy
17. Develop a "Dig Once" policy
18. Initiate collaborative big-picture planning
19. Build broadband into planning, policies, and procedures of all relevant agencies

BROADBAND POLICY TOPICS TO CONSIDER

MANAGING BROADBAND RELATED WORKLOAD

Many communities significantly underestimate the volume of work a full-scale fiber to the home deployment can generate for their jurisdiction's permitting team. The first 10 items on the Recommended Actions list are intended to mitigate the potential for local governments to be overwhelmed by this work. Overwhelming staff generally results in dramatically slower network deployments and can make the difference between a private Fiber To The Home (FTTH) builder choosing to deploy in one community instead of another. HR Green witnessed this firsthand with a client who aggressively sought an ISP to build fiber in their community. Through their outreach process, they found an ISP who expressed strong interest in making those investments. When the ISP reviewed the community's policies and permitting procedures, they decided to deploy fiber in a neighboring community who had a smoother and less onerous process, resulting in a less expensive permitting process for the ISP.

In addition to potentially being unprepared for the permitting processes, it can be equally difficult to provide the staffing resources required to handle the volume of applications to prevent construction delays in a citywide network deployment – especially given this is often a temporary spike needing specific technical knowledge. Proactive local governments can lean on consultants as vendors to review network project

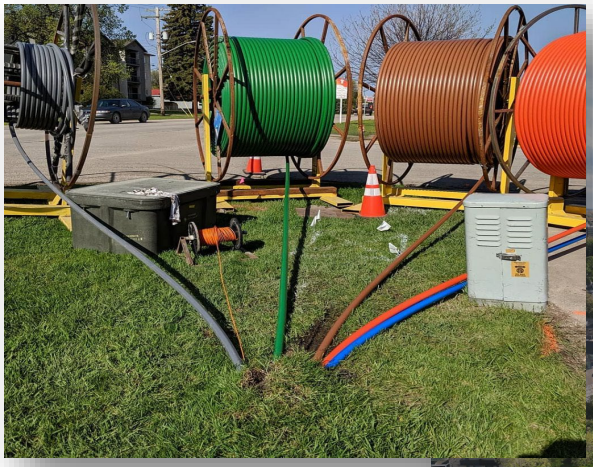
permits to help get them processed in a timely manner. In addition, vendors can also process any other building permits an organization would ordinarily receive, providing the required amount of time and attention necessary to keep these permits moving on time.

It is important for local governments to also think through permit procedures and volumes and how they will address the more technical aspects of broadband deployment. Sometimes, existing municipal engineering departments do not have the staff and expertise to monitor construction progress and adherence to ROW and permitting processes without supplemental help unless specialized and dedicated resources are hired for this purpose. Action item 19 stems from the State's playbook and speaks to this need. This is another area where communities can rely on vendor assistance, particularly to handle temporary increases in volume.

BROADBAND CURRENCY

Recommended Action Items 11 through 14 represent what we refer to as the development of "broadband currency". This refers to the deployment of network assets that can both serve the institutional needs of CVAG's constituent communities by connecting community anchor institutions. Examples of these institutions include sheriff stations, public works facilities, fire stations, and county administrative offices with fiber, while simultaneously serving the dual purpose of helping to support private sector deployment of fiber to the home services.

Having infrastructure that ISPs can lease (examples like open conduit or available excess fiber)

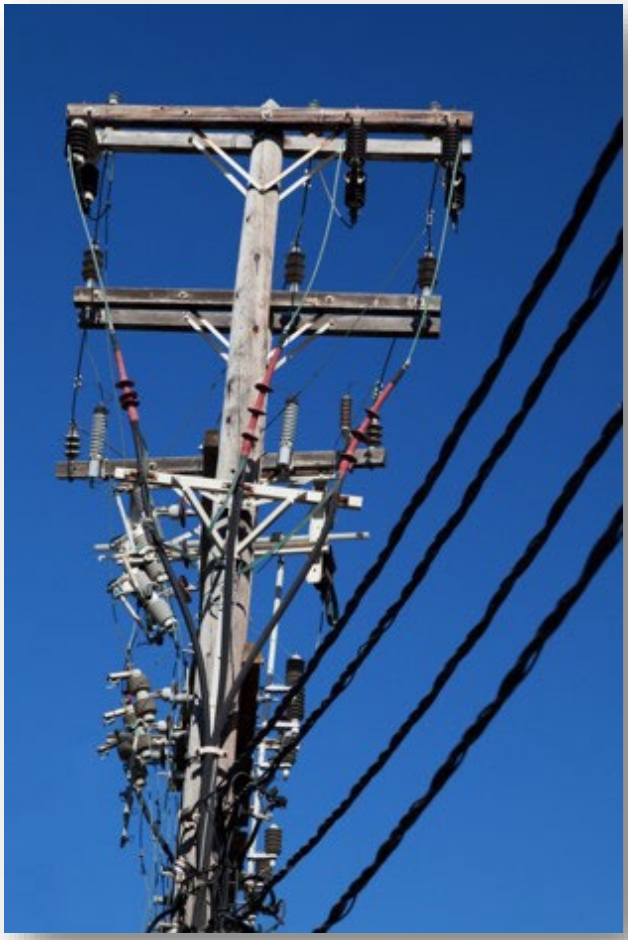




dramatically reduces their cost to build their own middle mile and last mile infrastructure. In El Paso County Colorado, for instance, the County connects each of its facilities to its own fiber network and overbuilds their infrastructure with three spare conduits and significant amounts of dark fiber. This has enabled them to lease their network infrastructure to providers seeking to deliver services to local schools and supported multiple private BEAD applications to build in underserved and unserved pockets of unincorporated residents of the County. It is also possible that this pre-built infrastructure could provide "in kind" investment that could offset the matching requirements of some grant programs. This approach can also direct ISPs to addresses that need to be connected (unserved or underserved addresses, new development areas, agency facilities, etc.).

BROADBAND ON UTILITY POLES

Building broadband infrastructure on utility poles decreases the upfront costs of construction. It can also present challenges. Pole owners are not always receptive to broadband being put on their poles. Sometimes this is because there are already many ISPs who have infrastructure on poles. Other times, poles have to be modified or replaced, and those costs can be significant. Also, the process to design additions to poles and the construction of adding to a pole can be time-consuming and costly.



The next Recommended Action, Item 15, encourages pole owners to facilitate make-ready (see definition in the Action Item) processes, though in practice, can be more difficult to implement. Pole owners are often both highly protective of their own assets and willing to intentionally cause delays to make ready. They may also attempt to leverage a network deployment seeking to use their infrastructure to obtain costly replacements or upgrades to their poles which are not always necessary. Due to this tendency, it can often be quicker and even less expensive to place buried network infrastructure instead of utilizing existing pole lines. Whether or not CVAG and its agencies can successfully encourage a cooperative make ready environment will largely depend on the existing relationship with local pole owners, assuming the community accepts aerial construction.

BROADBAND "ONCE" POLICIES

Recommended Actions Items 16 - 17 address policy implementations which CVAG's constituent communities should consider that will facilitate the creation of neutral network infrastructure (aka broadband currency), as well as protecting and preserving the integrity of their streets and ROWs. CVAG communities are within their authority to preserve the physical integrity of their streets and highways, control the orderly flow of vehicles and pedestrians, and manage the gas, electric, water, cable, broadband, telephone, and other facilities that crisscross its streets and public ROW. In addition, these cities can focus on efficiently using public ROW for a variety of infrastructure and utilities to provide public services; advance their goal of increasing opportunities for access to traffic control, communication, and broadband services; limit the frequency of street closures and the cutting of public streets; and reduce road degradation caused by repeated boring and trenching of public ROW.

CVAG communities should consider requiring street construction permit applications involving directional boring or open trenching within a public ROW to include the strategic co-location and installation of conduit owned by the entity simultaneously with the applicant's street construction activity. This is commonly known as a "Dig Once" or a co-location policy, which according to the Government Accounting Office is a broadband deployment policy focused on increasing coordination between government agencies and utility companies to decrease the frequency of highway or street excavation (GAO Transportation: planning and Flexibility Are Key to Effectively Deploying Broadband Conduit Through Federal Highway Projects). These policies aim to ensure that broadband infrastructure improvements are considered alongside other infrastructure and public works projects. The Federal Highway Administration has listed several best practices for Dig Once policies, noting that Dig Once practices have been "recognized by state and local stakeholders as sensible solutions to expedite the deployment of fiber along main routes when implemented as part of a cooperative planning process (https://www.fhwa.dot.gov/policy/otps/successprac.cfm)."



Dig Once policies encourage or require that every infrastructure project includes notification and facilitation of opportunities to lower the costs of broadband infrastructure investment. Timely placement of empty broadband conduit, which is for fiber-optic cables that support broadband or, where appropriate, wireless facilities for broadband service, can dramatically reduce costs. The cost of building or upgrading a network in areas where streets need to be dug up is substantially higher than the cost of building or upgrading a network where there is sufficient empty space in the conduit that was placed with foresight years earlier via joint trenching. According to The National Broadband Plan …" the cost of running a strand of fiber through an existing conduit is 3-4 times cheaper than constructing a new aerial build (The National Broadband Plan, 2012)." By saving costs, providers may be able to speed up network upgrades, thereby expediting better end-user experience.

Moreover, a co-location/Dig Once policy is important because it gives jurisdictions the ability to create assets, or “broadband currency”, which are a key driver of enhanced broadband and can be a valuable contribution to a P3 agreement with a private service provider. More importantly, it is a very low-cost path to create assets that can drive appealing outcomes. If it is done well, it can allow the cities to maintain control of their own broadband destiny.

As an additional proactive measure, communities can add connectivity standards to their building codes, ensuring that new constructions are equipped with broadband access. This proactive thinking and planning can help alleviate future building challenges to promote and facilitate broadband infrastructure as part of local and regional economic initiatives.

The State Playbook recommends taking the action of initiating collaborative big picture planning to solve regional broadband issues, which is precisely what CVAG is undertaking with the production of this study. Furthermore, CVAG will serve as a crucial step in ensuring that its constituent communities are equipped with the necessary information to advance themselves in addressing their digital divides.

CONSTRUCTION/DEPLOYMENT METHODS

There are two categories of network deployment approaches, aerial placement, and buried placement. However, within these two categories exist subcategories and nuance that can have significant impacts on the cost and time to deploy, as well as on the aesthetics and quality of life in the community.

All else being equal, aerial construction tends to be the fastest and least expensive way to build a network, however there are some important caveats, specifically relating to make-ready and adversarial pole owners.

Make-ready work involves preparing utility poles to accommodate new fiber cables, which may include rearranging existing attachments, replacing poles, or reinforcing structures such as guy wires. In addition to these costs, which cannot be properly understood or accounted for without some amount of engineering analysis, often including expensive boots on the ground, pole owners may take a long time to approve and complete make-ready work, causing significant project delays. The costs associated with make-ready work can therefore be high and are not easy to accurately predict at the outset of a project, especially if pole replacements are needed. Furthermore, coordinating with multiple stakeholders (e.g., electric utility companies, other telecom attachees) can be complex and time-consuming.



Exacerbating these issues can be adversarial pole owners. Some pole owners may refuse access or impose unreasonable conditions for attaching new cables, especially when the pole is owned by a telecom or cable company with existing customers in the area. Disagreements over the allocation of make-ready costs can arise, particularly if the pole owner demands that the new attachees bear the full cost (which

often can include entire pole replacement). Navigating regulatory requirements and resolving disputes can add to the complexity and duration of the project as well, and while the law is generally on the side of the new attachees, the necessity of involving legal counsel to resolve disputes is neither cheap nor quick. This is one of the reasons that a new entrant to a market may often choose to deploy a buried network instead of an aerial one, even if there is an existing pole line which is theoretically available.

AERIAL VS. BURIED CONSTRUCTION IN FTTH NETWORKS

Aerial Construction:

Advantages:

- Cost-Effective: Utilizing existing pole infrastructure can significantly reduce costs compared to buried methods.
- Faster Deployment: Aerial installations can be quicker to deploy, especially in rural areas where poles are already in place.
- Flexibility: Easier to access and modify for maintenance or upgrades.

Disadvantages:

- Vulnerability: Aerial cables are exposed to weather conditions such as wind, ice, and storms, which can lead to damage. They are also significantly vulnerable to wildfire damage, which can be a significant public safety concern, as downed pole lines can impact cellular coverage for civilians and the ability of first responders to have adequate communications during a disaster event
- Aesthetic Impact: Visible cables can be considered unsightly, especially in urban areas.
- Wildlife Interference: Birds and other animals can damage aerial cables.

Buried Construction:

Advantages:

- Protection: Buried cables are shielded from weather and physical damage, leading to higher reliability.
- Aesthetics: Cables are hidden underground, which is more visually appealing.
- Longevity: Generally, buried cables have a longer lifespan due to reduced exposure to external elements.

Disadvantages:

- Higher Costs: The process of burying cables is more expensive due to the need for specialized equipment and labor.
- Complexity: Encountering obstacles like rocks, roots, and existing utilities can complicate and delay the installation.
- Repair Challenges: Fixing buried cables can be more difficult and costly compared to aerial cables.

BURIED DEPLOYMENT APPROACHES: PROS AND CONS

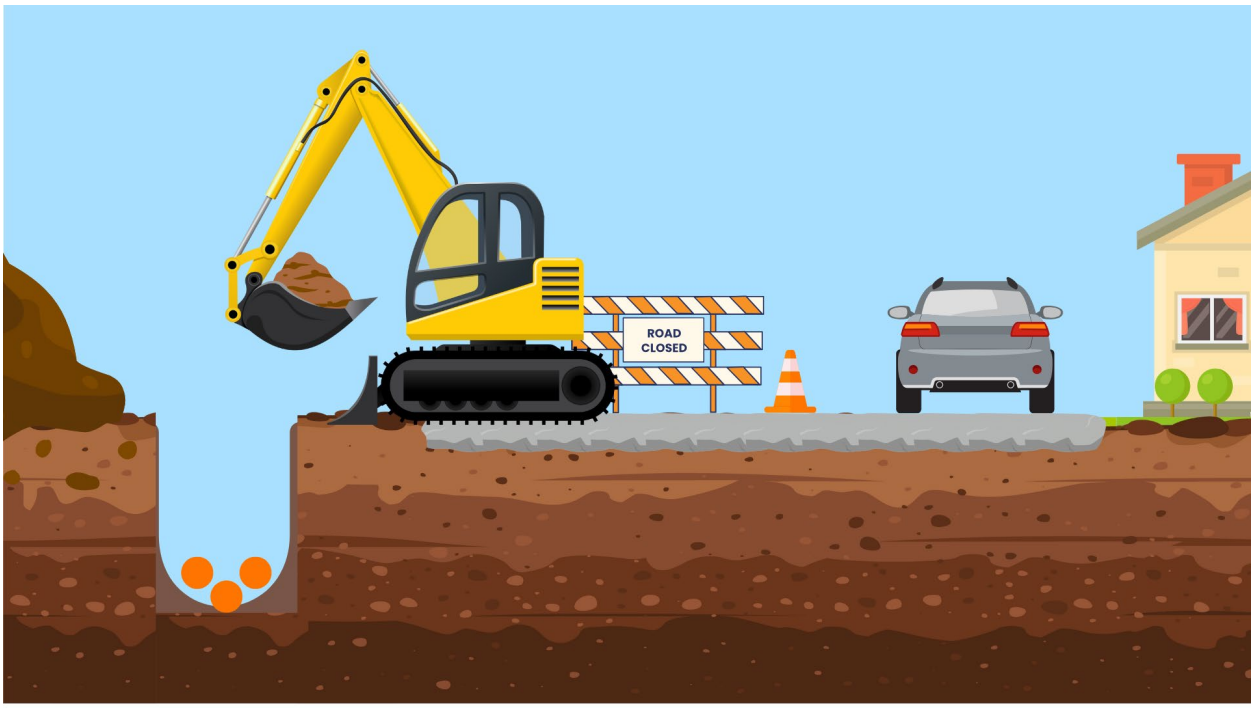
There are 4 relatively common buried construction/deployment methods in common use. They are Directional Boring, Vibratory Plowing, Open Trenching, and Microtrenching. As it is really only feasible in rural areas with no ROW congestion (i.e. no existing utilities in close proximity to the fiber running line), Vibratory Plowing is very rarely a viable approach for most communities.

Directional Boring is a method that offers several advantages, primarily due to its ability to minimize surface disruption. This technique is particularly beneficial in urban areas or locations with existing infrastructure, as it causes less disturbance to the surface and can navigate around obstacles like roads and rivers without significant impact. Additionally, directional boring is versatile and can be used in various



soil types and conditions. However, this method comes with higher costs, largely due to the specialized equipment and expertise required. The planning process is also more complex, necessitating detailed surveys to avoid underground obstacles. The physical pace of directional boring is also slow, relative to the other techniques, often making it an expensive option. To optimize this approach, it is imperative to know precise locations and depths of existing utilities, as well as to have a good grasp on the subsurface conditions—soil type, quantity, type, and density of rock, etc., as these things can have significant implications on the cost per foot to build using directional boring.

Open Trench deployment is known for its simplicity and well-understood processes. This method allows for easier inspection and repair of the cables, making it a reliable choice for many projects. However, open trenching is highly disruptive to the surface, often requiring road closures and significant landscape alteration. The environmental impact is also greater due to the extensive excavation involved, which can be a major drawback in sensitive areas.



Microtrenching stands out for its speed and cost-effectiveness. This method involves creating shallow trenches, which allows for faster deployment compared to traditional trenching methods. The reduced excavation not only lowers costs but also minimizes disruption to traffic and infrastructure, making it an ideal choice for urban environments. Despite these benefits, microtrenching has some limitations. Shallow trenches may expose cables to potential damage from surface activities, and this method is primarily suitable for fiber optic cables rather than larger utilities. Of the three commonly used buried construction methods (Microtrenching, Open Trench, and Directional Boring), Because microtrenching is a hot topic for several reasons, it deserves more discussion included in the section below.

For trench and pavement replacing consideration and details, see Section Appendix A.

MICROTRENCHING

A specific practice which is not mentioned in the California State ROW permitting Playbook, but which could benefit CVAG member jurisdictions, is microtrenching.

Microtrenching is an innovative, yet debated, construction technique used for deploying underground fiber networks which involves creating narrow, shallow trenches, typically ranging from 0.375 inches to 3 inches wide and 6 inches to 26 inches deep, depending on the equipment and project requirements. The process begins with the use of specialized equipment called micro trenchers, which are often paired with a host machine like a stand-on skid steer or ride-on trencher. These machines cut through the upper layer of solid ground or asphalt, minimizing the risk of interfering with existing underground utilities. The resulting cut, or trench, is then used to lay fiber optic cables, which are subsequently covered and sealed, ideally ensuring minimal disruption to the surrounding environment.

Microtrenching has been used in the Coachella Valley by an ISP in Desert Hot Springs.

This method is particularly advantageous in urban areas where space is limited, and traditional trenching methods would cause significant disruption to traffic and daily activities. Network builders are increasingly looking to it as an option because it can be performed significantly faster than traditional directional boring or open trench techniques. Skilled microtrenching crews can install 3-5 times more footage of conduit per day than boring or open trench approaches.



However, planning ahead for network deployments utilizing microtrenching is crucial for permitting jurisdictions, particularly for communities seeking to preserve the integrity of their street surfaces and road and bridge operations. For example, requiring that microtrenching be performed only at the seam between blacktop and a concrete curb for both aesthetic reasons and pavement preservation reasons can have implications for the type of backfill and sealant the crews will need to use. This location forces companies to then confirm their sealant can bond with both the asphalt and the abutting concrete materials.

Proactive policy implementation and clear communication regarding microtrenching helps confirm adherence to safe and approved construction methods and the integrity of the permitting jurisdiction's pavement and street infrastructure. Additional considerations which should be included in preplanning for microtrenching deployments include stringent traffic controls to minimize disruptions and maintain steady traffic flow throughout the construction process, and a robust plan for surface restoration to maintain the area's appearance and ensure community satisfaction. Overall, proactive planning facilitates a smoother deployment process, reduces costs, and accelerates the availability of high-speed internet services to residents.

In recognizing the need to implement public policy initiatives designed to improve the quality of microtrenching deployments and street cut repairs, as well as encouraging joint use of facilities, strategies must be put into place to promote successful implementation. These strategies used by local governments generally fall into the following three categories of policies: incentives, fees, and regulations. Examples of incentive-based policies include providing financial incentives for:

1. Using trenchless technology where technically suitable and requiring justification for not using trenchless technology should the agency deem it suitable.
2. Performing higher quality pavement cut repairs or making smaller and/or less damaging cuts.
3. Coordinating with other utility companies to share trenches or underground resources.

Examples of fee-based policies include:

1. Assessing appropriate fees for pavement degradation.
2. Assessing appropriate permit fees.
3. Implementing a lane rental fee to encourage utility companies to restore traffic as quickly as possible.
4. Requiring a deposit prior to beginning work to protect against poor quality repairs.

5. Assessing penalties within a specified period for non-compliance or for failed repairs.

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

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

ASSESSMENT OF CVAG MEMBER POLICY ENVIRONMENT

REGULATORY REVIEW

BACKGROUND

A review of the cellular and broadband communications regulatory environment is important because CVAG will need to consider these regulations as part of its decision-making process and in recommendations to its member communities. This review included research of the various federal regulations. A review of Federal Communications Commission (FCC) requirements was also performed.

Additionally, this review includes research of public policy development designed to improve the quality of street cut repairs as well as encourage joint use of facilities. This also includes an examination of California's microtrenching regulations, as well as research into the microtrenching policies from some California communities.

FEDERAL REGULATIONS

Section 704 (47 Usc §332(C)(7)

The 1996 Telecommunications Act includes Section 704 (47 USC §332(c)(7), (commonly referenced as 47 USC §332(c)(7) or Section 704) grants local governments ability to regulate wireless infrastructure. Section 704 says in relevant part:

- Land use development standards may not unreasonably discriminate among the wireless providers, and may not prohibit or have the effect of prohibiting the deployment of wireless infrastructure
- Local governments must act on applications for new wireless infrastructure within a "reasonable" amount of time but didn't specify what "reasonable" meant.
- Land use policies may be adopted to promote the location and siting of telecommunications facilities in certain designated areas.
- Encourages the use of third-party professional review of site applications.
- Section 332(c)(7)(B)(iv) states that "…*no State or local government or instrumentality thereof may regulate the placement, construction, and modification of personal wireless service facilities on the basis of the environmental effects of radio frequency emissions to the extent that such facilities comply with FCC regulations concerning the environmental effects* [federal courts have ruled that this includes health effects] *of such emissions*."

In general, this paragraph prohibits local governments from denying an application for a new wireless facility or the expansion of an existing facility on the grounds that radio frequency emissions are harmful to human health provided the wireless service provider met federal standards.

"Shot Clock" Declaratory Ruling

Following the enactment of Section 704 in 1996, wireless infrastructure deployment began across the United States, subject to various local and state regulations enacted in the wake of Section 704. The infrastructure industry eventually appealed to the FCC for assistance in expediting local government review of infrastructure applications, and as a result, the FCC issued what is known as the "Shot Clock" ruling in 2009 which requires infrastructure collocation decisions to be made within 90 days and new tower decisions to be made within 150 days, or the applicant could take the local government to court and request a judicial grant of their application. The US Supreme Court later affirmed that the FCC could impose these timelines on local governments.

(47 Usc §1455) Section 6409(A) In The Middle-Class Tax Relief And Job Creation Act

While the infrastructure industry benefited from the Shot Clock ruling, they still sought additional federal relief from local regulations. In 2012, Congress enacted legislation known as Section 6409(a) (commonly referred to as the **Spectrum Act**) to promote wireless broadband for public safety and commercial purposes.

Section 6409(a) says, in relevant part:

> *"…a State or local government may not deny, and shall approve, any eligible facilities request for a modification of an existing wireless tower or base station that does not substantially change the physical dimensions of such tower or base station."*

Because of a lack of explanation or definitions in Section 6409(a), the FCC was called upon to provide clarification, definitions and guidance to what Congress intended. In a Report and Order released October 21, 2014, in W.T. Docket 13-238, commonly called the "2014 Report and Order" the FCC provided clarifying definitions to the terms used in Section 6409(a).

2014 Report And Order

The introduction of the 2014 Report and Order the FCC states:

> *"Demand for wireless capacity is booming: more consumers are accessing mobile broadband every year, driving more innovation, and expanding access to public safety. But our ability to meet this demand depends on the infrastructure that supports the services. We therefore take concrete steps to facilitate the deployment of the infrastructure necessary to support surging demand, expand broadband access, support innovation and wireless opportunity, and enhance public safety - all to the benefit of consumers and the communities in which they live. (Paragraph 2) …Accordingly, our actions are intended to encourage deployments on existing towers and structures - rather than entirely new towers in recognition that collocations almost always result in less impact or no impact at all."* (Paragraph 3).

The effect on local government planning:

> *"Notwithstanding section 704 of the Telecommunications Act of 1996 or any other provision of law, a State or local government* ***may not deny, and shall approve****, any eligible facilities request for a modification of an existing wireless tower or base station that does not substantially change the physical dimensions of such tower or base station. An eligible facilities request is one that requests modification of an existing wireless tower or base station that involves (a) collocation of new transmission equipment; (b) removal of transmission equipment; or (c) replacement of transmission equipment."*

The 2014 Report and Order reaffirms that broadcasting infrastructure is also considered a wireless tower or base station for purposes of Section 6409(a) and that transmission equipment includes antennas, cables, and auxiliary power equipment, such as generators. It also defined "existing" as:

> *"…the term "existing" requires that wireless towers or base stations have been reviewed and approved under the applicable local zoning or siting process or that the deployment of existing transmission equipment on the structure received another form of affirmative State or local regulatory approval (e.g., authorization from a State public utility commission). Thus, if a tower or base station*

was constructed or deployed without proper review, was not required to undergo siting review, or does not support transmission equipment that received another form of affirmative State or local regulatory approval, the governing authority is not obligated to grant a collocation application under Section6409(a).”

A wireless tower that does not have a permit because it was not in a zoned area when it was built but was lawfully constructed is considered an “existing” tower. In other words, a collocation application that “shall be approved” under Section 6409(a) has to be for a location that has been previously reviewed and approved through the local regulatory approval process and is not a “substantial change” to the original approval.

Under the new FCC definition, a “**substantial change**” to an eligible tower or base station is as follows: For towers outside of public rights-of-way, it increases the height of the tower by more than 10%, or by the height of one additional antenna array with separation from the nearest existing antenna not to exceed twenty feet, whichever is greater; (b) for those towers in the rights-of-way and for all base stations, it increases the height of the tower or base station by more than 10% or 10 feet, whichever is greater; or for towers outside of public rights-of-way, it protrudes from the edge of the tower more than twenty feet, or more than the width of the tower structure at the level of the appurtenance, whichever is greater; (b) for those towers in the rights-of-way and for all base stations, it protrudes from the edge of the structure more than six feet; or it involves installation of more than the standard number of new equipment cabinets for the technology involved, but not to exceed four cabinets; or it entails any excavation or deployment outside the current site of the tower or base station;

> it would defeat the existing concealment elements of the tower or base station; or it does not comply with conditions associated with the prior approval of construction or modification of the tower or base station unless the non-compliance is due to an increase in height, increase in width, addition of cabinets, or new excavation that does not exceed the corresponding “substantial change” thresholds identified above. We further provide that the changes in height resulting from a modification should be measured from the original support structure in cases where the deployments are or will be separated horizontally, such as on buildings’ rooftops; in other circumstances, changes in height should be measured from the dimensions of the tower or base station inclusive of originally approved appurtenances and any modifications that were approved prior to the passage of Section 6409(a).

The 2014 Report and Order affirm that these standards apply equally to legally nonconforming structures in the jurisdiction. They too will be eligible for Section 6409(a) modifications.

Wireless facility modifications under Section 6409(a) should remain subject to building codes and other non-discretionary structural and safety codes. In particular, the FCC clarified that Section 6409(a) does not *“preclude States and localities from continuing to require compliance with generally applicable health and safety requirements on the placement and operation of backup power sources, including noise control ordinances if any.”*

As for timelines, local government has sixty (60) days to review a new collocation application for an eligible facility under Section 6409(a). The timeline starts when the application is submitted. Local government can then *“stop”* or *“toll”* the clock within the initial thirty (30) days if the application is incomplete. The local government’s request for additional information “must specify the code provision, ordinance, application instruction, or otherwise publicly stated procedures that require the information to be submitted.”

The time clock restarts when the applicant resubmits the missing information. If the application is still incomplete local government can then *“stop”* or *“toll”* the process again by again identifying, in writing, missing information. The clock will restart again upon the second resubmission. After that local government cannot stop the clock because of incompleteness.

If the local government does not complete the application review within sixty (60) days (subject to the tolling provisions above), the 2014 Report and Order adopts a *“deemed granted”* remedy. If, after reviewing a proposed Section 6409(a) application, the local government determines that the application request is not eligible for Section 6409(a) processing because it constitutes a *“substantial change”*, then the ninety (90) day timeline from the 2009 Shot Clock ruling applies, starting from the day the local government decides the application is not Section 6409(a) eligible. The 2014 Report and Order does suggest that the *“deemed*

granted" isn't necessarily the last word on the subject. Acknowledging that judicial determination may be necessary, the 2014 Report and Order states:

> *"…. a State or local authority may challenge an applicant's written assertion of a deemed grant in any court of competent jurisdiction when it believes the underlying application did not meet the criteria in [Section 6409(a)] for mandatory approval, would not comply with applicable building codes or other non-discretionary structural and safety codes, or for other reasons is not appropriately "deemed granted".*

The 2014 Report and Order emphasizes that Section 6409(a) applications must be tailored to request permissible information and then must be acted upon quickly in order to avoid a *"deemed granted"* remedy.

The 2014 Report and Order points out that Section 6409(a) applies only to local government in its regulatory capacity and NOT as a landlord. Should the local government choose, in the capacity as landlord, to limit the number and type of infrastructure applicants on local government property, Section 6409(a) will not apply. Furthermore, specific to the use of publicly owned property for the use of wireless communications equipment, the FCC states in the Report and Order:

> *"We find insufficient evidence in the record to make a determination that municipal property preferences are per se unreasonably discriminatory or otherwise unlawful under Section 332(c)(7). To the contrary, most industry and municipal commenters support the conclusion that many such preferences are valid."*

Thus, local governments can continue the practice of promoting a preference for sitting wireless infrastructure on public property in local regulations.

2018 Report And Order

The FCC's Declaratory Ruling and Third Report and Order adopted September 26, 2018, became effective nationwide on January 14, 2019.

> *"In this document, the FCC issues guidance and adopts rules to streamline the wireless infrastructure siting review process to facilitate the deployment of next-generation wireless facilities. Specifically, the FCC identifies specific fee levels for the deployment of Small Wireless Facilities, and it addresses state and local consideration of aesthetic concerns that effect the deployment of small wireless facilities. The FCC also addresses the "shot clocks" governing the review of wireless infrastructure deployments and established two new shot clocks for small wireless facilities."*

The following are the timelines for action by local government established by the FCC's Third Report and Order:

- 60 days to collocate a small wireless facility on an existing structure
- 90 days to collocate a facility other than a small wireless facility on an existing structure
- 90 days to deploy a small wireless facility using a new structure
- 150 days to deploy a facility other than a small wireless facility using a new structure

After the submission of a small wireless facility application, the local government has ten (10) days from the date of filing to determine if the application is complete or incomplete and notify the applicant. If the application is incomplete, then the shot clock stops and then restarts again from zero when the supplemental information is provided to the local government. As stated in paragraph 143 of the Third Report and Order,

> *"…once the applicant submits the supplemental information in response to a siting authority's timely request, the shot clock resets, effectively giving the siting authority an additional 60 days to act on the small wireless facilities collocation application."*

After the initial notice and response period, the standard tolling process then starts, meaning if the application remains incomplete, the local government must notify the applicant in detail as to the remaining insufficient items and the shot clock stops on that date and restarts from when the applicant resubmits until the application is finalized.

The shot clock and tolling system for facilities other than small wireless sites starts when an application is submitted to the local government. The local government has thirty (30) days to review the application to determine if the materials are complete or incomplete. If the application is not complete, the locality must provide in writing to the applicant with a detailed summary of deficiencies. At that point, the shot clock stops and then restarts from the point where it stopped when the applicant submits revised materials, and so forth until the application process is finalized.

The FCC also addressed zoning related practices that could be interpreted as an effective prohibition of small wireless deployments and cautioned local governments to avoid land use regulatory practices that could create a barrier to entry or efficient deployment of this type of infrastructure. Two specific areas, fees and aesthetics, were discussed in the document.

The FCC Order includes a section regarding underground requirements. The Order states that some jurisdictions have requirements that all infrastructure, including small cell equipment, must be deployed underground. The FCC Order goes on to say that a blanket requirement that all wireless facilities be deployed underground "*would amount to an effective prohibition given the propagation characteristics of wireless signals."* The FCC Order, therefore, concludes that aesthetics criteria also apply to undergrounding requirements.

While the FCC Order does not specify a specific spacing requirement, it does state that minimum spacing requirements, such as preventing a provider from replacing preexisting facilities or collocating equipment on an existing structure, would likely be unreasonable. The Order states that local governments have traditionally imposed minimum spacing between small cell wireless facilities that effectively limits the use of available utility poles.

The FCC determined that aesthetics requirements are not preempted if they are (1) reasonable, (2) no more burdensome than those applied to other types of infrastructure deployments, and (3) objective and published in advance (paragraph 86). A local government's aesthetics requirements must be objective, clearly defined, and ascertainable (paragraph 88) and cannot be so costly that the design standards could be a deterrent (effective prohibition) to the cost of the small wireless facility deployment.

While the FCC did not mandate a certain fee for small wireless facility application permits or third-party reviews, the FCC did provide parameters for what it deemed to be "reasonable" safe harbor fees for the following matters:

- $500 (non-recurring) for a single application that includes up to five (5) small wireless facilities and an additional $100 for each additional small wireless facility beyond the initial five (5) sites.
- $1,000 (non-recurring) for a new pole (not a collocation) for a small wireless facility.
- $270 (recurring) per small wireless facility per year for each collocation, new pole, and subsequent collocations on said facilities.

Any possible ROW access fee or fee for attachment to municipally owned structures in the ROW; provided they are (1) a reasonable approximation of costs, (2) those costs themselves are reasonable, and (3) are non-discriminatory (paragraphs 79-80).

The FCC did allow that while the above fee parameters were their interpretation of "reasonable" under applicable federal laws, there was room for some variance from same, stating:

> *"…there should be only very limited circumstances in which localities can charge higher fees consistent with the requirements of Section 253. In those limited circumstances, a locality could prevail in charging fees that are above this level by showing that such fees nonetheless comply with the limits imposed by Section 253—that is, that they are (1) a reasonable approximation of costs, (2) those costs themselves are reasonable, and (3) are nondiscriminatory. Allowing localities to charge fees above these levels upon this showing recognizes local variances in costs."*

Federal Legal Challenges

Shortly after the FCC's Declaratory Ruling and Third Report and Order (known as the Small Cell Order) was released in September 2018 it was challenged by a coalition of local government entities and wireless carriers, including AT&T, Verizon, and Sprint (now T-Mobile). These organizations filed appeal petitions requesting federal courts to review the FCC Order.

Local government entities filed suit against the FCC claiming that the Order is a federal overreach. For instance, the CEO and Executive Director of the U.S. Conference of Mayors stated that the Order "misapplies federal law to federalize local public property" and "needlessly introduce[s] increased risk of right-of-way and other public safety hazards." On the other hand, several wireless carriers filed suit against the FCC claiming that the FCC did not go far enough, arguing that the Order should have included a *"deemed granted"* provision automatically approving applications after the shot clocks expire.

The United States Judicial Panel on Multidistrict Litigation designated the U.S. Court of Appeals for the Tenth Circuit as the court in which to consolidate the various petitions for review. The Tenth Circuit on January 10, 2019, turned down a motion to stay the FCC's revised rules related to the rollout of small cell / 5G technologies. The Court concluded that the cities' motion to stay the ruling did not adequately demonstrate that they would suffer irreparable harm without putting the ruling on hold. Also, on January 10, 2019, the Tenth Circuit, granted a motion to transfer the various petitions for review to the United States Court of Appeals for the Ninth Circuit.

On August 12, 2020, a panel of three judges from the 9th Circuit granted in part, and denied in part, petitions for review of three orders of the Federal Communications Commission ("FCC") concerning the newest generation of wireless broadband technology known as "5G" that requires the installation of thousands of "small cell" wireless facilities.

The orders, issued in 2018, are known as the Small Cell Order, the Moratoria Order, and the One Touch Make-Ready Order. The first two orders spelled out the limits on local governments' authority to regulate telecommunications providers. The third order was intended to prevent owners and operators of utility poles from discriminatorily denying or delaying 5G and broadband service providers access to the poles.

The panel held that, given the deference owed to the agency (FCC) in interpreting and enforcing the Act, the Small Cell and Moratoria Orders were, except for one provision, in accord with the congressional directive in the Act, and not otherwise arbitrary, capricious, or contrary to law. The exception was the Small Cell Order provision dealing with the authority of local governments around aesthetic regulations. The panel held that to the extent that provision required small cell facilities to be treated in the same manner as other types of communications services, the regulation was contrary to the congressional directive that allowed different regulatory treatment among types of providers, so long as such treatment did not "unreasonably discriminate among providers of functionally equivalent services." [47 U.S.C. § 332(c)(7)(B)(i)(I)] The panel also held that the FCC's requirement that all aesthetic criteria must be "objective" lacked a reasoned explanation.

FCC Maximum Permissible Exposure Regulations

The FCC is required by the National Environmental Policy Act of 1969, among other things, to evaluate the effect of emissions from FCC-regulated transmitters on the quality of the human environment. Several organizations, such as the American National Standards Institute, the Institute of Electrical and Electronics Engineers, Inc. and the National Council on Radiation Protection and Measurements have issued recommendations for human exposure to RF electromagnetic fields. The potential hazards associated with RF electromagnetic fields are discussed in OET Bulletin No. 56, *"Questions and Answers About the Biological Effects and Potential Hazards of Radio frequency Electromagnetic Fields."*

On August 1, 1996, with the adoption and release of Report and Order, FCC 96-623, the Commission adopted the NCRP's recommended Maximum Permissible Exposure limits for field strength and power density for the transmitters operating at frequencies of 300 kHz to 100 GHz. In addition, the Commission adopted the specific absorption rate (SAR) limits for devices operating within proximity to the body as specified within the ANSI/IEEE C95.1-1992 guidelines. The Commission's requirements are detailed in Parts 1 and 2 of the FCC's Rules and Regulations [47 C.F.R. 1.1307(b), 1.1310, 2.1091, 2.1093].

According to *47 CFR 1.1310*, the criteria listed in Table 1, shown below, shall be used to evaluate the environmental impact of human exposure to radiofrequency (RF) radiation.

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposure				
0.3–3.0	614	1.63	*100	6
3.0–30	1842/f	4.89/f	*900/f^2	6
30–300	61.4	0.163	1.0	6
300–1,500	.....	.....	f/300	6
1,500–100,000	.....	.....	5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3–1.34	614	1.63	*100	30
1.34–30	824/f	2.19/f	*180/f^2	30
30–300	27.5	0.073	0.2	30
300–1,500	.....	.....	f/1500	30
1,500–100,000	.....	.....	1.0	30

f = frequency in MHz * = Plane-wave equivalent power density

Table 1. Limits for Maximum Permissible Exposure (MPE)

Occupational/controlled exposure limits apply in situations in which persons are exposed because of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when a person is transient through a location where occupational/ controlled limits apply provided he or she is made aware of the potential for exposure. The phrase fully aware in the context of applying these exposure limits means that an exposed person has received written and/or verbal information fully explaining the potential for RF exposure resulting from his or her employment. Apart from transient persons, this phrase also means that an exposed person has received appropriate training regarding work practices relating to controlling or mitigating his or her exposure. Such training is not required for transient persons, but they must receive written and/or verbal information and notification (for example, using signs) concerning their exposure potential and appropriate means available to mitigate their exposure. The phrase exercise control means that an exposed person is allowed to and knows how to reduce or avoid exposure by administrative or engineering controls and work practices, such as use of personal protective equipment or time averaging of exposure.

General population/uncontrolled exposure limits apply in situations in which the general public may be exposed, or in which persons who are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

The FCC states that certain applicants are required to routinely perform an environmental evaluation with respect to determining compliance with the Commission's exposure limits. If an applicant determines the site is not within compliance, the submission of an Environmental Analysis is required. The SAR limits for portable and mobile devices became effective August 7, 1996. The Commission's limits for field strength and power density became effective October 15, 1997, for all services except the Amateur Radio Service. The new limits became effective for the Amateur Radio Service on January 1, 1998. As of September 1, 2000, all FCC licensees were required to comply with the FCC's RF exposure limits (See 47 C.F.R. 1.1307(b)(5)).

Public Policies

Public policy developments to control pavement utility cuts in highways and streets and to minimize damage to public infrastructure, evolved from requirements outlined in states and local government codes for rules to control the rights-of-way access demands of telecommunication companies. The rush of

telecommunications companies requesting access magnified the need for better control of utility street cuts and improved standards for how cuts are repaired.

Government agencies realize that excessive utility cuts in pavements under their responsibility are causing premature deterioration of the pavement structures. They also realize that additional money is required to maintain these pavement structures at acceptable levels of serviceability. One method of recovering the cost of damaged pavements is to require the telecommunications companies or their contractors that are performing the work to pay a fee commensurate with the damage done to the pavement.

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

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

Additional impacts include other indirect costs, or those that cannot be directly quantified, localized air quality and the financial impact to local businesses whose access is impeded due to construction work zones.

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

1996 Telecommunications Act

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

Around the United States, state and local governments are taking steps to re-examine current ROW management policies subject to the 1996 Act. The proliferation of new technologies has resulted in additional demands being placed on the allocation of public property. As both the trustee and the landlord of the public ROW, state and local governments have an obligation to develop a framework that provides for efficient and cost-effective management of the rights-of-way, protection of public safety and maximizes revenue and recovers costs associated with the regulation and management of rights-of-way access.

Moreover, the framework adopted by state and local governments must establish a level playing field that will allow qualified providers within each classification of service to enter the market on a competitively neutral basis. Thus, jurisdictions are examining existing rights-of-way access policies, fees, and compensation methods to ensure the proposed policies and fee structures are implemented on a fair and competitively neutral basis.

Some of the effects of the Act include the following:

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

Local governments are implementing public policy initiatives that are designed to improve the quality of street cut repairs as well as encourage joint use of facilities.

Some of the information above, plus additional information regarding ***Pavement Utility Cuts*** can be found on the Federal Highway Administration (FHWA) website at:

https://www.fhwa.dot.gov/utilities/utilitycuts/man01.cfm.

Microtrenching Regulations

On October 8, 2021, California's Governor signed into law the *Broadband Deployment Acceleration Best Practices Act of 2021*, also known as Senate Bill (SB) 378.

According to State Senator Lena A. Gonzales, who introduced the Bill, "*SB 378 will help promote the deployment of broadband infrastructure and internet connectivity for all Californians by requiring local jurisdictions to allow fiber cables to be installed using cost-effective techniques including open trenching or boring, or micro-trenching, if specified criteria is met. Specifically, this bill will create a best practices standard for deploying broadband infrastructure that local planning agencies must follow when an entity seeks to deploy broadband in their community*".

The SB 378 Legislative Counsel's Digest states: *Existing law, the Permit Streamlining Act, governs the approval process that a city or county is required to follow when approving, among other things, a permit for construction or reconstruction for a development project for a wireless telecommunications facility and a collocation or siting application for a wireless telecommunications facility.*

This bill would require a local agency to allow, except as provided, microtrenching for the installation of underground fiber if the installation in the microtrench is limited to fiber. The bill would also require, to the extent necessary, a local agency with jurisdiction to approve excavations to adopt or amend existing policies, ordinances, codes, or construction rules to allow for microtrenching. The bill would provide that these provisions do not supersede, nullify, or otherwise alter the requirements to comply with specified safety standards. The bill would authorize a local agency to impose a fee for its reasonable costs on an application for a permit to install fiber, as provided. By imposing new duties on local agencies with regard to the installation of fiber, the bill would impose a state-mandated local program.

The bill would include findings that changes proposed by this bill address a matter of statewide concern rather than a municipal affair and, therefore, apply to all cities, including charter cities.

The enacted version of *SB 378* states:

SECTION 1. This act shall be known as the Broadband Deployment Acceleration Best Practices Act of 2021.

SECTION 2. The Legislature hereby finds and declares all of the following:

a. *Californians need improved access to high-speed internet now more than ever to meet a variety of demands including, but not limited to, remote work, distance learning, telehealth,*

emergency response and public safety, agriculture, innovation, and commerce.

b. *High-speed internet is delivered to Californians through wireline and wireless broadband infrastructure that is installed either aerially or underground. Wireless broadband service relies on wireline facilities, especially fiber backhaul lines.*

c. *Deployment of fiber is critical to connect more Californians to high-speed internet.*

d. *Quick and cost-effective ways to install fiber include trenching and boring as well as microtrenching.*

e. *By expediting fiber permit applications, local agencies will help promote the deployment of fiber for high-speed internet access across California.*

SECTION 3. Section 65964.5 is added to the Government Code, to read:

a. *For purposes of this section, the following definitions apply:*

1. *"Fiber" means fiber optic cables, and related ancillary equipment such as conduit, ancillary cables, hand holes, vaults, and terminals.*

2. *"Local agency" means a city, county, city and county, charter city, special district, or publicly owned utility.*

3. *"Microtrench" means a narrow open excavation trench that is less than or equal to 4 inches in width and not less than 12 inches in depth and not more than 26 inches in depth and that is created for the purpose of installing a subsurface pipe or conduit.*

4. *"Microtrenching" means excavation of a microtrench.*

b. *(1) The local agency with jurisdiction to approve excavations shall allow microtrenching for the installation of underground fiber if the installation in the microtrench is limited to fiber, unless the local agency makes a written finding that allowing microtrenching for a fiber installation would have a specific, adverse impact on the public health or safety.*

2. *Upon mutual agreement, a microtrench may be placed shallower than 12 inches in depth.*

3. *To the extent necessary, a local agency with jurisdiction to approve excavations shall adopt or amend existing policies, ordinances, codes, or construction rules to allow for microtrenching pursuant to this subdivision.*

4. *Nothing in this section shall supersede, nullify, or otherwise alter the requirements to comply with safety standards, including, but not limited to, the following:*

A. *Article 2 (commencing with Section 4216) of Chapter 3.1 of Division 5 of Title 1.*

B. *Public Utilities Commission General Order No. 128, or a successor standard.*

c. *A local agency may impose a fee on an application for a permit to install fiber consistent with Section 50030. The reasonable costs of providing the service for which the fee is charged, as that phrase is used in Section 50030, shall be limited to the reasonable costs of the local agency to process, and issue the permit and inspect the installation that is the subject of the permit, including any costs incurred if the applicant elects to expedite processing and review.*

d. *The Legislature finds and declares that installation of fiber is critical to the deployment of broadband services and other utility services, is a matter of statewide concern, and is not a municipal affair as that term is used in Section 5 of Article XI of the California Constitution. Therefore, this section applies to all cities, including charter cities.*

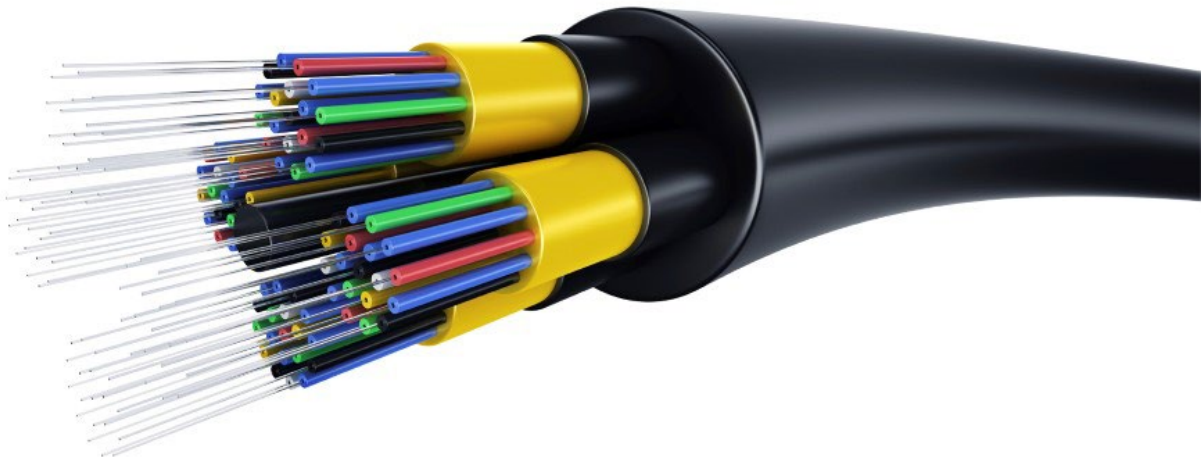
SECTION 4. No reimbursement is required by this act pursuant to Section 6 of Article XIIIB of the California Constitution because a local agency or school district has the authority to levy service charges, fees, or assessments sufficient to pay for the program or level of service mandated by this act, within the meaning of Section 17556 of the Government Code.

Implementation Of Microtrenching Policies

In response to the enactment of SB 378, some California local government agencies have implemented microtrenching policy initiatives including:

- City of Los Angeles – Department of Public Works – Bureau of Engineering – Standard Plan S-474-0
- City of San Diego – City Engineer - Microtrench Standard Drawing SDG 165

While it is not included in this Plan, CVAG may want to develop microtrenching policy guidelines for its members based upon the examples above.



BROADBAND READY CHECKLIST

Broadband policies and permit procedures have multiple stakeholders, facets and challenges. HR Green developed the Broadband Ready Checklist on the following pages to help communities have an orderly and comprehensive list of topics that can be addressed as they prepare their policies and permit procedures.

There are some topics that are represented by a line that might need some additional information. For example, the first section is for a shot clock. When an ISP submits a permit request, there are different rules that can apply (State and Federal). The amount of time a municipality has to respond to a permit application can vary by infrastructure type, so it is important to know these time limits.

Another example is the section regarding ROW availability. If a municipality has road segments that are running out of available ROW, the municipal leaders can require additional steps be taken if an ISP desires to use that road segment. To do that, the community needs to be able to provide some information regarding the lack of available ROW. The checklist lists some of the steps a community can take to have that information available if an ISP requests to be in that ROW.

ISP PERMIT/CONSTRUCTION CHECKLIST

Community:

Date:

_____ Shot clock:

Start:	_____	Updated	_____
Updated	_____	Updated	_____
Updated	_____	Updated	_____

For Our Community to Have Prepared:

_____ ROW Goals in Place: _____ Attract ISPs or _____ Manage ROW

_____ RFEI (RFI) process

_____ Build specifications

- _____ Locations of infrastructure and equipment
- _____ Approval for hut/cabinet locations
- _____ Depth, distance from other utilities
- _____ Aerial or buried (who owns the poles – pole attachment agreements)
- _____ All components underground?
- _____ What infrastructure: Fiber, micro-trenching, etc.
- _____ Location in ROW and location of handholes
- _____ Alignment with green belt areas, historical areas, etc.
- _____ Restoration
- _____ Inspection

_____ ROW Availability

- _____ Map
- _____ ISP requirements in different categories

_____ Permit/Permit Process

- _____ Tracking system/software
- _____ Approval chain

_____ Detail in prints (reference Build Specifications)
_____ PE stamp
_____ Permitting capacity
_____ Inspections
_____ Size of permit project area
_____ Strong language for
    _____ Stop work order/hold on future permits
    _____ Rejecting applications for something already in code (particularly if ISP tries to work before full permit process)
    _____ Fines
_____ Restoration
_____ Traffic control plan

_____ Policies - time is of the essence
_____ Permit and design requirements
_____ Dig once
_____ Pavement degradation
_____ Can recoup all costs (permit fee, outside consultant, inspection, locates, etc.)
_____ Documentation justifying costs (permit fees, outside consultant, etc.)
_____ ROW Management (map and ramifications)
_____ Locates
_____ Sign standards (what signs the ISP will put up) - size, number, information
_____ CIP and other City/utility project alignment

To Be Provided By The ISP and Contractor(s) (In Addition to Permit Requirements):

_____ Escrow/bond - permit holder, but make sure ties back to ISP
_____ Names and contact information for all crews
_____ All contractors and subcontractors must be licensed and bonded

Construction process:

_____ Pre-con process and checklist

_____ Review permit details, design details and construction process
_____ Will all construction be in the ROW and/or existing utility easements?
_____ How will the ISP determine customer pricing? This is particularly important if there is an RFI process (or the ISP is asking for any accommodation)- knowing that service will be affordable is important for the long-term vision of the community
_____ Affordable/Low-Cost options
_____ Public Outreach
    _____ Required documentation, truck identification, badges
    _____ Public Meeting
    _____ Digital Literacy (ISPs participation in)
    _____ Participation at local events to get the message out/promote their product and get people to sign up
    _____ Joining local chambers of commerce
_____ As-built delivery schedule

_____ During construction:
_____ Locations of infrastructure
_____ Locates and a workable timeline
_____ Complaints
_____ Process for utility hits
_____ Restoration
_____ Inspection (frequency and criteria)

_____ Post construction:
_____ As-builts: GIS
_____ How will maintenance be handled?

ROW MANAGEMENT GUIDELINE POLICY TEMPLATE

Right of Way Management Policy

CVAG MEMBER JURISDICTION **ADMINISTRATIVE POLICY X-XX**

OFFICE OF THE JURISDICTION MANAGER

ENGINEERING SERVICES

RESTRICTED RIGHT OF WAY POLICY

1.0 **Purpose**

1.1 The Jurisdiction Council adopted via modification to Jurisdiction Code Chapter XXX, Section XXX on DATE, certain language intended to allow for the beneficial use of public right of way by communication providers. The provisions of the ordinance and the contents of this policy were developed with input from representatives of the most common users of public right of way for communication.

1.2 It is the belief of the CVAG MEMBER JURISDICTION that proactive management of the Community's Right of Way will guarantee that the use of the right of way will serve community needs, protect the health and welfare of its residents and businesses, and provide long-term access to those who in the future may wish to deploy communications and other assets.

1.3 Jurisdiction Manager or his/her designee were directed to create a policy and management system under which restricted Right of Way shall be identified, categorized and managed such that access for future use under Section 7-2-7(a) is maintained.

2.0 **Scope**

2.1 The Jurisdiction shall require that this policy be implemented for management of all public rights of way on Jurisdiction-owned streets rated as Arterial classification or higher.

2.2 The policy can be modified partially or in its entirety at any time by action of the Jurisdiction Manager or his/her designee.

3.0 **Policy**

3.1 The Jurisdiction has previously defined processes by which communication providers may make application to deploy communication transmission systems including, copper, coaxial cables, fiber or other wired technologies (hereafter designed "Cable"). Except as noted in this Policy, all existing Jurisdiction processes identified via separate ordinance or policy shall be followed.

3.2 **Identification of Transmission System Assets**

Communication Providers shall be required to provide information to the Jurisdiction in a format suitable for conversion into the Jurisdiction's GIS system for any new deployment of Cable in public rights of way covered by this Policy. Complete as-built information shall be submitted to the Jurisdiction via a GIS shapefile following material completion of work permitted by the Jurisdiction no later than 90 days following completion of the construction of such work. As-built information will include the location of deployed Cables at an accuracy of not less than 3 centimeters, but do not require depth of placement data.

The Jurisdiction shall track all current and proposed deployments in its GIS system, and will make available to the public and Communication Providers a map of current deployed Cable.

Provider Cables displayed on Jurisdiction GIS maps and publicly available shall be presented in such a way as to conceal the identity of individual provider Cables

3.3 Preferred Right of Way Use

In order to maximize the efficacy of available Right of Way, the Jurisdiction has established a preferred hierarchy for deployment of Cables by Providers. Cables shall be located in areas of available Right of Way as follows (Most Preferred to Least Preferred):

a) Edge of Pavement to Edge of Right of Way: This preferred alternative should be studied and used in all instances.

b) Parkway and Grass Medians: Should Right of Way identified in section 3.3(a) or in Section 3.5 of this policy not be available the City may, at its sole discretion, allow Providers to deploy Cable in Parkway or Grass Medians.

c) Sidewalk and other Paved Right of Way: The City desires to retain access to the Right of Way under sidewalks and other paved infrastructure to maintain a deployment corridor of last resort. Sidewalks and other Paved Right of Way may be used for Cable deployment only with the express permission of the City.

3.4 Classification of Public Right of Way

Public Right of Way covered under this policy shall be classified into one of three categories. Roadways shall be defined as restricted under this policy if one or more of the characteristics is met.

GREEN – Non Restricted Right of Way
More than 10 feet of right of way is available on one or both sides of the roadway
Less than 60% of the available right of way has been consumed by current communication transmission systems.

YELLOW – Moderately Restricted Right of Way
Ten feet or less of right of way available on one or both sides of the roadway
60% of the available right of way has been consumed by current communication transmission systems.
Jurisdiction has public safety needs that could require larger than normal amounts of ROW based on anticipated or future need.

RED – Severely Restricted Right of Way
Six feet or less of right of way available on one or both sides of the roadway
75% of the available right of way has been consumed by current communication transmission systems.
Jurisdiction has public safety needs that could require larger than normal amounts of ROW based on anticipated or future need; or anticipates significant restrictions due to natural terrain or other utility use.

When detailed location data is not available, the Jurisdiction will estimate consumed right of way using a formula that multiplies the number of current deployed Cables times 15 inches to estimate the total consumed right of way in each area.

3.5 Joint Use and Existing Municipal Infrastructure

The Jurisdiction has developed, with input from Communication Providers, a joint use infrastructure model by which multiple communication providers consolidate their Cables into a single, shared duct-bank and standardized engineering, materials, and construction specifications (Attachment A).

Joint Use Infrastructure enables the Jurisdiction and Communication Providers the ability to share the cost of the deployment equally, enables the deployment of multiple Cables in order to consume significantly less Right of Way, and preserves right of way for future uses.

Providers will be required to sign a Master Agreement (Attachment B), which outlines the terms and conditions of use, financial considerations, maintenance and upkeep requirements and other conditions related to the Joint Use Utility.

A Memorandum of Understanding (Attachment C) will be issued to Providers for all planned Joint Use Infrastructure under consideration by the Jurisdiction. This MOU is intended to achieve the goals outlined in this section by providing open and inclusive access for Providers prior to the execution of final design and construction.

3.6 New Cable Construction

Providers who desire to deploy new Cable construction utilizing Public Right of Way shall comply with the requirements outlined below.

Green – Unrestricted Right of Way
Providers who wish to deploy Cable in an Unrestricted Right of Way shall follow all current policies related to deployment of underground utilities identified via then-current policies of the Jurisdiction.

Yellow – Moderately Restricted Right of Way
Providers who wish to deploy Cable in a Yellow Restricted Right of Way shall be required to create additional capacity at least equal to the amount of Right of Way being utilized. Provider may meet this requirement in a number of ways, as follows:

- Deployment in New Roadway: The Jurisdiction will create Joint Use Infrastructure in areas of new construction that are designated Yellow Zones. Providers will be required to follow the process outlined in Section 3.5 of this Policy to occupy Joint Use Infrastructure.
- Deployment in Existing Roadway (With Existing Ducts and Joint Use Infrastructure Available): Providers may utilize existing ducts and Joint Use Infrastructure where available. The Jurisdiction will sell or lease capacity at the then-current rates identified in this Policy.
- Deployment in Existing Roadway (Without Existing Ducts and Joint Use Infrastructure Available) - Provider shall demonstrate that it has made all reasonable effort to minimize the impact to Right of Way or to create additional capacity within the given Right of Way. At a minimum, Provider will allow the Jurisdiction or other Providers to leverage open trenches to deploy shadow conduit by providing at least 120 days of notice of proposed construction. The Jurisdiction may deploy shadow conduit by reimbursing the Provider for the proven, incremental cost of materials and labor to place the Jurisdiction's conduit. Providers who desire to place shadow conduit shall make reasonable cost-sharing arrangements at industry-standard rates. Further, the Jurisdiction may, in limited cases but at its sole discretion, request that the Joint Use Infrastructure process be

started where such deployments may further the goals of the Jurisdiction.

- Relocation of Existing Cables – The Jurisdiction may, from time to time, widen, realign or otherwise modify existing roadway covered by this Policy. Should Cable relocation be required, the Jurisdiction will work with Providers to identify the lowest-cost alternatives suitable to relocate existing Cables or to create new Joint Use Infrastructure as outlined in Section 3.5 of this Policy.

Red – Severely Restricted Right of Way

Due to the limited availability of Right of Way for future public safety use, Providers who wish to deploy Cable in a Red Restricted Right of Way shall be required to show that the deployment will not further encumber the Right of Way. The Jurisdiction requires that Providers must create additional capacity at least equal to the amount of right of way being used for the deployment, as follows:

- Deployment in New Roadway: The Jurisdiction may create Joint Use Infrastructure in areas of new construction that are designated Red Zones. Providers will be required to follow the process outlined in Section 3.5 of this Policy to occupy Joint Use Infrastructure.
- Deployment in Existing Roadway (With Existing Ducts and Joint Use Infrastructure Available): Providers must utilize existing ducts and Joint Use Infrastructure where available. The Jurisdiction will sell or lease capacity at the then-current rates identified in this Policy.
- Deployment in Existing Roadway (Without Existing Ducts and Joint Use Infrastructure Available) - Providers shall work with Jurisdiction staff to create a Relocation Plan for existing and planned Cables to new Joint Use Infrastructure. Upon request, the City shall identify current Providers in the Right of Way and will organize the Relocation Plan following the steps outlined in Section 3.5.
- Relocation of Existing Cables – The Jurisdiction may, from time to time, widen, realign or otherwise modify existing roadway covered by this Policy. The City shall cause all current Providers with Cable in the Right of Way to relocate into Joint Use Infrastructure as outlined in Section 3.5 of this Policy.

4.0 **Distribution**

Originally distributed to all Department Directors and Development Services

Authorized by the Jurisdiction Council effective January XX, 202____.

Jurisdiction Manager Date

For more details regarding ROW colocation and Master Agreements for colocation/joint use, see Section Appendix D.

FIBER OPTIC NETWORK DESIGN SPECIFICATION

The design specifications below is a prescriptive standards document for fiber and conduit installation that is generalized to be presented as a “policy guideline” to the member communities of CVAG. It should still be considered as a draft, as it is still under review by Advantec and HR Green technical staff. Please note that ‘typical’ engineering drawings still need to be added to the draft before this document is finalized.

1. FIBER OPTIC CABLE AND INTERCONNECT SPECIFICATIONS

1.1 APPLICABLE STANDARDS

The following standards are applicable to the design, installation, and testing of fiber optic cable and interconnect components:
- TIA/EIA-598-C: Optical Fiber Cable Color Coding
- TIA-568: Commercial Building Telecommunications Cabling Standard
- ITU-T G.652: Characteristics of a Single-Mode Optical Fiber and Cable
- ANSI/TIA-942: Telecommunications Infrastructure Standard for Data Centers
- IEEE 802.3: Ethernet Standards
- ISO/IEC 11801: Generic Cabling for Customer Premises

1.2 PRODUCTS

1.2.1 FIBER OPTIC CABLE

Fiber optic cables shall be constructed in accordance with TIA-568 and ITU-T G.652 standards. Cables shall be suitable for the intended environment (indoor/outdoor) and application (backbone, last mile, etc.).

1.2.2 OPTICAL FIBER

OPTICAL FIBERS SHALL BE SINGLE-mode (SMF) or multi-mode (MMF) as specified in the project requirements. Single-mode fibers shall comply with ITU-T G.652.D specifications. Multi-mode fibers shall comply with TIA-568 specifications.

1.2.3 BUFFER TUBES/RIBBONIZED FIBER

Buffer tubes and fiber ribbons shall be manufactured in accordance with TIA-568 standards. They shall provide protection to the optical fibers and allow for easy identification and access.

1.2.4 COLOR CODE

Color coding for optical fibers, buffer tubes, and ribbons shall comply with TIA/EIA-598-C standards. The color code shall be used consistently throughout the installation for easy identification and maintenance.

1.2.5 STRENGTH MEMBER

Strength members shall be included in the cable construction to provide mechanical support and protect the fibers from tensile stress.

1.2.6 WATER BLOCKING COMPOUND

Water blocking compounds shall be used in outdoor and underground cables to prevent water ingress. These compounds shall be non-toxic, non-corrosive, and pass the FOTP- 81B standard test to verify that water blocking compounds filling the cable will not flow from the cable within the manufacturer specified temperature range.

1.2.7 RIPCORD

Ripcords shall be included in the cable construction to facilitate easy jacket removal during installation. Ripcords shall be durable and positioned to allow for efficient cable preparation.

1.2.8 FILLER

Fillers may be used in the cable construction to maintain the circular cross-section and provide additional protection to the fibers. Fillers shall be made of suitable materials that do not degrade over time.

1.2.9 OUTER JACKET

The outer jacket shall provide protection against environmental factors such as moisture, UV radiation, and physical damage. Jacket materials shall be selected based on the installation environment and comply with relevant standards.

1.2.10 CONDUITS

Conduits shall be used to protect fiber optic cables in underground and outdoor installations. Conduits shall be made of PVC or HDPE and comply with industry standards for strength and durability.

1.2.11 PULL BOXES

Pull boxes shall be installed at regular intervals along the conduit path to facilitate cable installation and maintenance. Pull boxes shall be sized appropriately and provide adequate space for cable storage and splicing and shall be verified by a 3rd Party Nationally Recognized Independent Testing Laboratory as meeting all test provisions of ANSI/SCTE 77 2007 Specification for Underground Enclosure Integrity, minimum Tier 15 rating. For details regarding pull boxes, see Section Appendix B.

1.2.12 MANHOLES

Manholes shall be used in underground installations to provide access to fiber optic cables for maintenance and splicing. Manholes shall be constructed in accordance with local standards and provide adequate space for technicians to work safely and shall consist of a pre-cast concrete, minimum 4-foot square vault with a base and cast-iron frame ring and cover. The manhole shall be designed to provide a pre-cast conduit entrance depth of 3 feet. Each manhole, frame and cover shall conform to AASHTO HS20-44. Each Manhole shall be equipped with a removable ladder that is engineered to support 300 pounds. The ladder support shall be permanently fixed to the manhole.

1.3 PERFORMANCE REQUIREMENTS

1.3.1 OPERATING TEMPERATURE

Fiber optic cables and components shall be designed to operate within the temperature range specified by the manufacturer. Typical operating temperature ranges are -40°C to +70°C for outdoor cables and -20°C to +60°C for indoor cables.

1.3.2 BEND RADIUS

The minimum bend radius for fiber optic cables shall be maintained during installation and operation to prevent damage to the fibers. The bend radius shall be at least 20 times the cable diameter during installation and 10 times the cable diameter after installation.

1.3.3 CABLE STRENGTH

Fiber optic cables shall be designed to withstand the mechanical stresses encountered during installation and operation. Cables shall comply with industry standards for tensile strength, crush resistance, and impact resistance per the FOTP-25B standard.

1.3.4 WATER PENETRATION

Outdoor and underground fiber optic cables shall be designed to prevent water ingress. Cables shall be tested for water penetration in accordance with the FOTP- 82 standard.

1.3.5 SPLICING MATERIALS

Splicing materials shall be compatible with the fiber optic cables and provide reliable, low-loss connections. Materials such as splice sleeves, heat shrink tubing, and splice trays shall comply with industry standards.

1.3.6 SPLICE TRAYS

Splice trays shall be used to organize and protect fiber splices. Trays shall be designed to accommodate the number of splices required and provide adequate space for fiber routing and protection.

1.3.7 CABLE TERMINATIONS

Cable terminations shall be performed using connectors that comply with industry standards. Connectors

shall provide low insertion loss and high return loss to ensure reliable network performance. Unless otherwise specified in the design engineering plans or by the City Engineer or designee in consultation with the City's IT department, only LC Duplex type connectors should be used. All connectors shall be compliant with the TIA/EIA-568-A and TIA/EIA-604 standards, as applicable.

1.3.8 PRE-TERMINATED CONNECTOR ASSEMBLIES (PIGTAILS)

Pre-terminated connector assemblies (pigtails) shall be used to simplify installation and reduce the need for field terminations. Pigtails shall be manufactured and tested in accordance with industry standards and shall consist of fiber optic cables with factory-installed LC duplex type connectors on one end of the cable and an un-terminated optical fiber on the other.

1.3.9 BUFFER TUBE FAN-OUT KITS

Buffer tube fan-out kits shall be used to transition from multi-fiber buffer tubes to individual fibers for cable termination. Kits shall be compatible with the cable construction and provide adequate protection for the fibers.

1.3.10 PATCH PANELS

Patch panels shall be used to organize and manage fiber optic connections. Panels shall be designed to accommodate the required number of connections and provide easy access for maintenance.

1.3.11 PRE-TERMINATED PATCH PANELS

Pre-terminated patch panels shall be manufactured and tested in accordance with industry standards. The panel shall include factory-installed and terminated LC duplex type panel connectors, depending upon the application

1.3.12 FIELD ASSEMBLED AND TERMINATED PATCH PANELS

Field assembled and terminated patch panels shall be used when pre-terminated panels are not practical. Panels shall be designed to accommodate field terminations and provide adequate space for fiber routing and protection. A field-assembled patch panel shall be a termination panel that includes a connector panel, and the hardware required to mount the patch panel within an approved cabinet at the field device location.

1.3.13 CONNECTOR PANEL

Connector panels shall be used to organize and manage fiber optic connections. Panels shall be designed to accommodate the required number of connections and provide easy access for maintenance.

1.4 HANDLING

1.4.1 CABLE END-SEALING

Cable ends shall be sealed to prevent moisture ingress and protect the fibers during storage and installation. Sealing materials shall be compatible with the cable construction and provide a reliable seal.

1.4.2 PROTECTIVE WRAP

Fiber optic cables shall be protected with a wrap or other suitable material during storage and transportation to prevent damage. Protective materials shall be durable and provide adequate protection for the cables.

1.4.3 PACKAGING, SHIPPING AND RECEIVING

Fiber optic cables and components shall be packaged, shipped, and received in accordance with industry standards. Packaging materials shall provide adequate protection for the cables and components during transportation and storage.

1.5 INSTALLATION

1.5.1 GENERAL

Installation of fiber optic cables and components shall be performed in accordance with industry standards and manufacturer recommendations and within the parameters of the appropriate permitting jurisdiction, including Subsurface Utility Engineering (SUE), should it be a requirement of said jurisdiction.

All materials and installation practices shall be in accordance with the applicable OSHA requirements as found in 29 Code of Federal Regulations (CFR) Part 1926.

1.5.2 FIBER OPTIC CABLE INSTALLATION

Fiber optic cables shall be installed in accordance with industry standards and manufacturer recommendations. Proper techniques shall be used to maintain the minimum bend radius, avoid excessive pulling tension, and protect the fibers from damage.

1.5.3 CONDUIT INSTALLATION

Conduits shall be installed in accordance with industry standards and local regulations. Proper techniques shall be used to ensure the conduits provide adequate protection for the fiber optic cables.

1.5.4 HAND HOLE / PULL BOX AND MANHOLE INSTALLATION

Hand holes, pull boxes, and manholes shall be installed in a neat and workmanlike manner and in accordance with industry standards and local regulations. Proper techniques shall be used to ensure these structures provide adequate access and protection for the fiber optic cables. Conduits shall enter the hand hole/pull box from beneath the hand hole/pull box at a 45 degree slope or less. Conduits can also enter through the bottom quarter of the hand hole/pull box sidewall. If penetrating through the sidewall, the diameter of the hole shall match the outer diameter of the conduit being installed. The outer hole shall be sealed with an approved duct seal. A coarse aggregate drain of as a minimum 18” clean stone or gravel conforming to the dimensions shown on the plan details shall be provided.

Hand holes/pull boxes shall be set flush with the sidewalk, pavement, or 1” above the surface of the ground unless otherwise shown on the plans. Unless noted otherwise, all excavated areas to be restored to natural contours. Do not dispose of spoils in mapped floodplains or wetlands.

Compaction shall be no less than 90% (95% in areas under existing/future pavement) of the maximum standard proctor density. Compaction and compaction testing shall be incidental.

See Section Appendix B for hand hole/pull box details/

1.6 TESTING AND CERTIFICATION

1.6.1 MANUFACTURER'S TESTING

Fiber optic cables and components shall be tested by the manufacturer in accordance with industry standards. Test results shall be provided to verify compliance with performance specifications. For fiber test station details, see Section Appendix C.

1.6.2 DOCUMENTATION

Documentation shall be provided for all fiber optic cables and components, including test results, installation records, splice and maintenance logs, and as built documentation. As built documentation shall be provided in a shapefile or OTHER FORMAT INGESTIBLE TO THE CITY’S GIS, OR AS SPECIFIED BY THE CITY.

1.6.3 INSTALLATION TESTING

Fiber optic cables and components shall be tested after installation to verify proper performance. Testing shall be performed in accordance with industry standards and project requirements, and test results/documentation shall be PROVIDED TO THE CITY VIA A LIVE TRACKER SPREADSHEET AND/OR IN ANY OTHER FORMAT REQUESTED BY THE CITY.

1.6.4 END TO END ATTENUATION TESTING

End to end attenuation testing shall be performed to verify the total loss of the fiber optic link. Testing shall be performed in accordance with industry standards and project requirements, and test results/documentation shall be provided to the City via a live tracker spreadsheet and/or in any other format requested by the City.

1.6.5 OTDR TRACING

Optical Time Domain Reflectometer (OTDR) tracing shall be performed to verify the integrity of the fiber optic link. Testing shall be performed in accordance with industry standards and project requirements,

and test results/documentation shall be provided to the City via a live tracker spreadsheet and/or in any other format requested by the City.

1.6.6 CONTINUITY TESTING

Continuity testing shall be performed to verify the continuity of the fiber optic link. Testing shall be performed in accordance with industry standards and project requirements, and test results/documentation shall be provided to the City via a live tracker spreadsheet and/or in any other format requested by the City.

1.6.7 SPLICE LOSS TESTING

Splice loss testing shall be performed to verify the loss at each splice point. Testing shall be performed in accordance with industry standards and project requirements, and test results/documentation shall be provided to the City via a live tracker spreadsheet and/or in any other format requested by the City.

1.6.8 CONNECTOR LOSS TESTING

Connector loss testing shall be performed to verify the loss at each connector. Testing shall be performed in accordance with industry standards and project requirements, and test results/documentation shall be provided to the City via a live tracker spreadsheet and/or in any other format requested by the City.

2. DEPLOYMENT/CONSTRUCTION METHOD

2.1 INSTALLATION METHOD

All work shall conform to the requirements of CALTRANS standard plans and specifications (latest edition) CA MUTCD (latest edition), standard plans and specifications for public works construction (Greenbook), city/county standard plans (latest editions), and as directed by the engineer.

2.1.1 DIRECTIONAL BORING VS OPEN-CUT TRENCHING

Directional boring shall be used in areas where open-cut trenching is not feasible or would cause significant disruption. Open-cut trenching is only suitable for areas with minimal surface obstructions and where restoration is manageable.

2.1.2 USE OF HDPE IN BORED SEGMENTS

Unless otherwise specified, grey colored 3” Schedule 80 High-Density Polyethylene (HDPE) conduit shall be used in directional boring segments. All new conduit shall include a #8 bare bond wire and pull tape.

2.1.3 AVOIDANCE OF PAVEMENT CUTS

Pavement cuts should be avoided whenever possible to minimize disruption and restoration costs.

2.2 TRENCHING TECHNIQUES

Trenches shall be excavated to a depth that ensures the conduit is protected from surface loads and environmental factors. Proper backfill materials and compaction techniques should be used to prevent settling and damage to the conduit. However, use of open trenching should be limited to colocation opportunities with CIP or other projects when the incremental cost of additional conduit to an already open trench would be negligible. For trench and pavement details see Section Appendix A.

2.3 MICROTRENCHING

Use of microtrenching must be approved by the Director of Public Works and must comply with the local jurisdiction policy governing microtrenching. The trench/cut must have proper backfill and sealant to ensure longevity, minimal surface disruption, and to maintain the aesthetic and physical integrity of the pavement.

2.4 UTILITY SEPARATION

Adequate separation shall be maintained between fiber optic cables and other utilities to prevent interference and damage. Design engineering shall be performed to comply with the California Department of Transportation (CALTRANS) and the California Public Utilities Commission (CPUC)

clearance requirements as follows:

2.4.1 CLEARANCE REQUIREMENTS FOR BURIED TELECOMMUNICATIONS CONDUIT

According to CPUC General Order 128, Rule 31.4, which governs underground utility construction, the following clearances shall be maintained:

2.4.2 FROM WATER, GAS, AND OTHER FOREIGN SUBSTRUCTURES

- Independently Installed:
- Parallel Installation: Minimum 12 inches of horizontal clearance
- Crossing Installation: Minimum 6 inches of vertical clearance
- Concurrently Installed:
- Same clearances as above, but less separation may be allowed by mutual agreement

2.4.3 FROM OTHER TELECOMMUNICATIONS (COMMUNICATION SYSTEMS)

- Independently Installed:
- Minimum separation of:
- 3 inches of concrete, or
- 4 inches of brick masonry, or
- 12 inches of earth
- Concurrently Installed:
- Less separation may be allowed by mutual agreement

2.4.4 DEPTH REQUIREMENTS

- Minimum 24 inches

2.5 BACKFILL MATERIALS AND COMPACTIONDS

Use appropriate backfill materials to protect the conduit and ensure proper compaction. Compaction should be performed in layers to prevent settling and maintain the integrity of the trench.

2.6 SURFACE RESTORATION TO LOCAL STANDARDS

Restore the surface to its original condition or better, following local standards and regulations. Ensure proper sealing and finishing to prevent future damage and maintain aesthetics.

3. CONDUIT

3.1 CONDUIT TYPE

All conduits shall be Schedule 80 in the diameters, quantities and colors as shown on the project detail sheet and shall be compliant with all ASTM and Telcordia/ Bellcore GR-356- CORE requirements. All HDPE conduits shall be factory lubricated, low friction, high-density conduit constructed of virgin high-density polyethylene resin. Conduit shall be capable of being coiled on reels in continuous lengths, transported, stored outdoors, and subsequently uncoiled for installation, without affecting its properties or performance. PVC conduit shall be certified by the manufacturer as meeting ANSI/UL 6 and 651. The manufacturer shall be ISO 9000 compliant.

3.2 CONDUIT SIZE

Default conduit shall be grey colored schedule 80 3” HDPE conduit. However, conduit size may also be selected based on the number and size of fiber optic cables required by the project, and forecasted future expansion needs for a given cable path, accounting as well for spare capacity in both dark fiber and duct space. Project planning shall ensure the conduit has sufficient capacity to accommodate the cables without excessive bending or crowding and that the appropriate amount of spare capacity is included in the engineered design.

3.3 MINIMUM BURIAL DEPTH AND COVER

Per the CALTRANS standards for depth requirements and clearances to other underground utilities, the

minimum depth shall be 24” unless otherwise noted by the permitting authority with jurisdiction of the ROW or in special circumstances such as microtrenched segments.

3.4 CONDUIT INSTALLATION

Design engineering shall adhere to manufacturer specifications, within the bounds of constructability, to ensure conduit is installed correctly and in straight runs with minimal bends, to reduce stress on the fiber optic cables. Contractor shall be responsible for adhering to standard industry installation techniques and procedures and those outlined by the manufacturer recommendations.

4. CABINETRY AND ENCLOSURES

4.1 CABINET TYPES AND PURPOSES

4.1.1 PULL BOX SIZES AND MATERIALS

The appropriate pull boxes shall be selected based on the number of cables and splices to be housed. Pull boxes shall be made from fiberglass reinforced, polymer concrete. All pull boxes shall be compatible with the fiber optic cable and shall be approved by the City. Pull boxes shall be verified by a 3rd Party Nationally Recognized Independent Testing Laboratory as meeting all test provisions of ANSI/SCTE 77 2007 Specification for Underground Enclosure Integrity, must have a minimum Tier 15 rating, with Tier 22 rated pull boxes used where required by engineering considerations. Pull boxes shall be UL listed. Certification documents shall be submitted with material submittals. Pull boxes shall have a detachable cover with a skid-resistant surface. Pull boxes 24 inches and wider shall have split lids with a removable support brace. Each pull box shall have a locator disk manufactured into the lid that operates at the frequency of 101.4 kHz for communication line locating. The locator disk shall be compatible with a Dynatel cable locator or equivalent. For pull box details, see Section Appendix B.

4.1.2 SPACING AND ACCESSIBILITY

Pull boxes shall be placed at regular intervals as specified by the engineering design, to facilitate cable installation and maintenance, at a distance not to exceed 500 ft. In the field, contractor shall ensure pull boxes are installed so as to be easily accessible for technicians, within reason.

4.1.3 HAND HOLE / PULL BOX AND MANHOLE INSTALLATION

As specified by the engineering design, and per manufacturer recommendations, hand holes and pull boxes shall be installed at strategic locations to provide access points for cable installation and maintenance, and to ensure that maximum bend radiuses are not exceeded at ninety degree turns in the network, such as at intersections. Proper installation of hand holes shall ensure proper sealing and drainage to prevent water ingress

4.1.4 MANHOLES

Manholes may be used for larger installations and where multiple conduits intersect. Manholes shall be constructed in accordance with local standards and provide adequate space for technicians to work safely, and shall consist of a pre-cast concrete, minimum 4-foot square vault with a base and cast-iron frame ring and cover. The manhole shall be designed to provide a pre-cast conduit entrance depth of 3 feet. Each manhole, frame and cover shall conform to AASHTO HS20-44. Each Manhole shall be equipped with a removable ladder that is engineered to support 300 pounds. The ladder support shall be permanently fixed to the manhole

4.1.5 Patch Panels, Pre-Terminated Panels, and Connector Assemblies

Patch panels shall be used to organize and manage fiber optic connections. Pre-terminated panels should be used where possible, however field assembled patch panels or connector assemblies shall also be acceptable. Patch panels shall be compatible with the fiber optic cable being terminated and color-coded to match the optical fiber color scheme. The patch panel shall accommodate a minimum of six LC duplex type panel connectors, depending upon the application. The patch panel shall not exceed a 14-inch length by 6-inch width by 4-inch depth and shall be suitable for mounting within an approved cabinet at the field device location.

4.2 STRUCTURAL AND FIELD PLACEMENT DETAILS

4.2.1 CABINET FOUNDATIONS AND COMPLIANCE WITH TRAFFIC STANDARDS

Cabinets shall be installed on stable foundations to prevent shifting and damage. Their placement must comply with local traffic standards to ensure cabinets do not obstruct pedestrian or vehicle traffic.

4.2.2 VAULT LABELING AND IDENTIFICATION

Vault lids/hand hole lids shall be clearly labeled to facilitate maintenance and troubleshooting. Labels shall be engraved into the lids or made of a material that is durable and capable of withstanding southern California's environmental conditions.

5. FIBER OPTIC SYSTEM DESIGN AND PERFORMANCE REQUIREMENTS

5.1 FIBER OPTIC CABLE COMPONENTS

All fiber optic cables shall be new and unused outdoor cable consisting of dispersion- unshifted, single-mode fiber (SMF) and shall be suitable for underground (i.e., in conduit) applications. All fiber optic cable shall be splice-compatible with existing SMF and require no electronic equipment for dispersion compensation between new and existing fiber. All components that comprise a single length of cable shall be continuous and of the same material.

Optical fibers used in the cable shall meet or exceed the most recent version of Telecommunications Industry Association (TIA) and Electronic Industries Alliance (EIA) TIA/EIA-492 specifications. Use only optical fibers meeting the additional requirements as follows:

Mode field Diameter At 1310 nm	8.3±0.4μm
Cladding Diameter	125.0±0.7μm
Coating Diameter (uncolored)	245±10μm
Core-to-Cladding Offset	≤ 0.5 μm
Cladding no-circularity	≤1.0%
Cladding/coating concentricity error	≤ 12.5 μm
Attenuation Coefficient At 1310 nm	≤ 0.35 dB/km
Attenuation Coefficient At 1550 nm	≤ 0.22 dB/km
Attenuation Coefficient At 1383 nm ± 3 nm (at water peak)	0.32 to 0.34 dB/km
Cable cut-off wavelength	≤ 1260 nm
Maximum Fiber Dispersion At 1285 – 1330 nm	≤ 3.5 ps/(nm·km)
Maximum Fiber Dispersion At 1270 – 1340 nm	≤ 5.3 ps/(nm·km)
Maximum Fiber Dispersion At 1550 nm	≤ 18 ps/(nm·km)
Zero-dispersion wavelength	1300 – 1322 nm
Zero-dispersion slope	≤ 0.090 ps/(nm2·km)
PMD link design value	≤ 0.06 ps/√ km
Proof Test	.7 GN/m2 (100 ksi)
Dynamic Stress Corrosion Susceptibility Parameter	≥ 20
Coating Strippability	1.3 – 8.0 N (0.3 – 2.0 lbf)
Fiber Curl Radius	≥ 4.0 m
Permissible Bending Radius	≥ 15 mm

5.2 STRENGTH MEMBER, WATER BLOCKING, RIPCORDS, FILLERS

5.2.1 STRENGTH MEMBER

Fiber optic cable shall contain a central anti-buckling member that consists of a glass reinforced plastic

rod. Fiber optic cable shall withstand a pulling tension of 600 pounds during installation without increasing the fiber attenuation more than 0.8 decibel per mile, without changing other optical fiber characteristics after the tensile load is removed, and without damage to any components of the fiber optic cable. Tensile strength shall be provided by high tensile strength dielectric yarns and shall be helically stranded evenly around the cable core.

5.2.2 WATER BLOCKING COMPOUND.

Fiber optic cable shall contain a dry water-blocking material to prevent the ingress of water within the outer cable jacket. Use dry water-blocking material for fiber optic cables used for either aerial or underground installations. Gel filled water-blocking compound shall not be allowed in the cable core interstices in either the backbone cable or the lateral cables. Apply dry water-blocking tape longitudinally around the outside of the central buffer tubes. The tape shall be held in place by a single polyester binder yarn. Water-blocking tapes and yarns shall be non-nutritive, dielectric, and homogeneous, and free from dirt and foreign matter. Binders shall be applied with sufficient tension to secure the buffer tubes to the central member without crushing the buffer tubes. The binders shall be non-hygroscopic, non-wicking (or rendered so by the flooding compound), and dielectric with low shrinkage. Construct all cables with water-blocking tape that complies with the requirements of the FOTP- 81B standard and is subjected to water penetration tests as defined in the FOTP- 82B standard.

5.2.3 RIPCORD

The cable shall contain at least one ripcord under the sheath. The ripcord shall permit the removal of the sheath by hand or with pliers.

5.2.4 FILLER

Fillers or rods may be included in the cable core to lend symmetry to the cable cross section if required.

5.3 PERFORMANCE STANDARDS

5.3.1 OPERATING TEMPERATURE

The shipping and the operating temperature range of the fiber optic cable shall meet or exceed -40°C to +75°C (-40º to +167º F) as defined in the environmental requirements section of the NEMA TC 2 standard. The installation temperature range of the fiber optic cable shall meet or exceed -30°C to +60°C (-22º to +140º F), per Telcordia/ Bellcore GR-1221. The operating temperature range of the cable as defined by Telcordia/ Bellcore GR-1221 shall be -40°C to +70°C (-40°F to 158°F).

5.3.2 BEND RADIUS

The fiber optic cable shall be capable of withstanding a minimum unloaded bend radius of 10 times the cable diameter (when the long-term tension load is less than 800 N or 200 lbs.) and a minimum loaded bend radius of 20 times the cable diameter when loaded to pulling tension of 2700 N (600 lbs.). Test the cable as required in the FOTP- 33A standard. The bending of the fiber optic cable up to the minimum bend radius shall not affect the optical characteristics of the fiber.

5.3.3 CABLE STRENGTH

The fiber optic cable shall be capable of withstanding a pulling tension of 2700 N (600 lbs.) during installation without increasing the fiber attenuation more than 0.8 decibel per mile and without changing other optical fiber characteristics after the tensile load is removed. The optical fiber shall be proof tested by the fiber manufacturer at a minimum of 690 Megapascals, MPa (100 kilo pounds per square inch, ksi). The cable shall withstand 25 impact cycles and the change in attenuation shall not exceed 0.2 decibel at 1,550 nanometers when tested according to the requirements as detailed in the FOTP-25B standard. The fiber optic cable shall withstand a minimum compression load of 860 kilopascals, kPa (125 pounds per square inch, psi) when applied uniformly over the length of the sample at the rate of 0.15 to0.8 inch per minute and maintained for 10 minutes as defined in the FOTP-41A standard. The change in attenuation shall not exceed 0.15 decibel during loading at 1,550 nanometers, and that no fiber displays a measurable change in attenuation after load removal.

5.3.4 WATER PENETRATION

The fiber optic cable shall be capable of withstanding the tests for water penetration defined in the FOTP-82 standard. A one-meter length of cable shall be able to withstand a one-meter static head of water applied at one end for 24 hours without water leaking through the other open cable end.

5.4 SPLICING MATERIALS AND TRAYS

5.4.1 SPLICE ENCLOSURES

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

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

The splice enclosure shall preserve the mechanical and environmental integrity of the fiber optic cable, encase the sheath opening in the cable, and organize and store the optical fiber. All hinges and latching devices shall be stainless steel. The enclosure shall be airtight and shall prevent water intrusion. The splice enclosure shall accommodate pressurization and shall have the ability to be reentered without requiring specialized tools or equipment. The enclosure shall provide fiber and splice organizers including splice trays and strain relief. Splice enclosures shall allow re-entry and shall be hermetically sealed to protect internal components from environmental hazards such as moisture, insects, and UV light.

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

Mechanical	Resist compression deformation to a maximum of 400 pounds
	Withstand an impact energy to a maximum of 40 foot-pounds at 0 degrees Farehneit
	Axial Tension: 100 pounds for 30 minutes
	Cable Torsion: ten 90-degree rotations
	Cable Flexing: ten 90-degree bends
Environmental	Hydrostatic Pressure Head: Up to 20 foot-pounds (-9 pounds per square inch)
	Withstand 40 freeze/thaw temperature cycles
	Ultraviolet resistant during a maximum 30-day exposure in compliance with the requirements detailed in the ASTM B117 standard
Chemical	Withstand a 90-day exposure to solutions of 3%

	sulfuric acid, 0.2 normal of sodium hydroxide, 10% Igepal, kerosene, and be fungus resistant as required in the ASTM G21 standard

5.5 TERMINATIONS AND CONNECTOR ASSEMBLIES

Cable terminations must use connectors that comply with TIA-568 standards. Pre-terminated connector assemblies (pigtails) should be used for efficient installation and maintenance. Cable terminations shall use LC duplex type connectors only, as specified in the plans or by the City Engineer or designee in consultation with the City's IT Department. All LC duplex type fiber optic connectors, whether factory pre-terminated or field-installed, shall be ultra-physical contact or angled physical contact, depending upon the type of application, with pre-radiused tips.

LC duplex type connectors shall provide minimum 50-pound pullout strength. The optical fiber within the body of all connectors shall be mechanically isolated from cable tension, bending, and twisting.

All connectors shall be compliant with the TIA-568-A and TIA/EIA-604 standards, as applicable, and are tested according to the Telcordia/Bellcore GR-326-CORE standard. When tested according to the TIA and EIA's FOTP-171, connector tests shall average an insertion loss of ≤0.4 decibel and a maximum loss of ≤0.75 decibel. Test the connectors as detailed in FOTP-107 to reflectance values of ≤ -50 decibels.

5.6 FIELD ASSEMBLED VS PRE-TERMINATED PATCH PANELS

Patch panels can be either field assembled or pre-terminated. Field assembled panels allow for customization during installation, while pre-terminated panels offer faster deployment and consistent performance.

A pre-terminated patch panel shall be a termination panel that includes a factory installed all-dielectric SMF cable stub. The panel shall include factory-installed and terminated LC duplex type panel connectors, depending upon the application. The cable stub shall be of adequate length to splice the stub and provide a fiber connection between the panel and the backbone fiber cable or as directed by the City Engineer or designee in consultation with the City's IT Department.

A field-assembled patch panel shall be a termination panel that includes a connector panel, and the hardware required to mount the patch panel within an approved cabinet at the field device location and connect the panel to the backbone fiber cable.

5.7 COLOR CODE AND BUFFER TUBES

Color coding for fibers and buffer tubes must follow TIA/EIA-598-C standards. This ensures consistent fiber identification and simplifies splicing and troubleshooting.

5.8 FIBER OPTIC CABLE INSTALLATION

Installation guidelines for fiber optic cables include maintaining the minimum bend radius, controlling pulling tension, and ensuring proper slack storage and routing. All equipment shall be installed according to the latest version of the manufacturer's installation procedures and the industry-accepted installation standards, codes, and practices, or as directed by the City. All materials and installation practices shall be in accordance with the applicable OSHA requirements as found in 29 Code of Federal Regulations (CFR) Part 1926.

Prior to any fiber optic work, the Contractor shall give the City Engineer or designee a detailed installation and splicing schedule a minimum of one week, prior to commencing work. All installation, splicing, termination, and testing shall be listed on the schedule and any revisions to this schedule shall be re-submitted to the City Engineer or designee as soon as the changes are made.

Develop a nomenclature plan for identification of fiber optic cable. Submit the nomenclature plan to the City Engineer or designee for approval. Use approved cable nomenclature to create cable tags for the identification of fiber optic cable. Provide cable tag identification on all test results or fiber related

documents provided to the City Engineer or designee.

The Contractor shall provide the City Engineer or designee with two copies of the cable manufacturer's installation instructions for all fiber optic cable. All installations shall be in accordance with the manufacturer's recommendations except as otherwise directed by the City Engineer or designee in consultation with the City's IT Department. All additional costs including fiber optic cable associated to damages caused by the Contractor's neglect of recommended procedures shall be the Contractor's responsibility.

The Contractor shall submit a Method Statement (Plan) to the City indicating cable routing, splice points and cable end splicing locations. Installation of the cable will not be permitted until the schematic diagram has been approved by the City. Install cable tags within 1 foot of each splice and/or termination point indicating the cable type, fiber count, and each fiber optic cable's origination and termination points. Cable tags shall be permanent labels suitable for outside plant applications and are affixed to all fiber optic cables. Lettering shall be in permanent ink and displays the phrase "FIBER OPTIC CABLE".

Fiber optic cable including both backbone cables and lateral cables shall be installed in continuous runs. Lateral cables shall have slack and include a maximum of three locations of appropriate strain relief within all field equipment cabinets. Under no conditions shall fiber optic cable be cut or spliced at intermediate points without approval from the City of Palm Springs.

When lateral fiber cables are to be spliced into existing fiber cable carrying communications data, extreme caution shall be used by the Contractor to avoid damage to the cable and conduit system. If any existing fiber splices or terminations are damaged due to new cable installation the Contractor shall repair the splice or termination at the Contractor's expense. If damage is caused to the fiber cable at mid-span locations, it shall be replaced to current standards from existing cable end splice location to cable end splice location at no additional cost to the project.

5.8.1 PULLING

If a mechanical pulling machine is used to install the fiber cable, the machine must be equipped with a monitored or recording tension meter. The pulling machine or meter shall be capable of alerting the installer when the cable pulling tension approaches the manufacturer's maximum allowable tension. The Contractor may supplement this procedure with a breakaway tension limiter set below the lowest recommended tensile limit of the cables being pulled. Intermediate pulleys shall be used at all pull boxes or manholes along the installation run to prevent cable damage. The manufacturer's recommended limits for cable pull lengths shall not be exceeded. The maximum pulling tension shall be 2700N (600 lbs.) during installation (short term) and 890 N (200 lbs.) long term installed. All cables shall have a minimum bending radius based on the diameter of the cable and shall meet the following.

1. Pulled under tension, (Short Term) – 20 (Twenty times the cable diameter)
2. Pulled not under tension, (Long Term) – 10 (Ten times the cable diameter)

The central strength member and aramid yarn shall be attached directly to the pulling eye during cable pulling. Use pulling attachments, such as "basket grip" or "Chinese finger" type, to ensure that the optical and mechanical characteristics are not degraded during the fiber optic cable installation. The cable shall be continuously lubricated as it enters the conduit. The cable pulling lubricant used during installation shall be recommended by the optical fiber cable manufacturer. Liquid detergent shall not be used.

If cable installation limits are met and the entire length cannot be installed completely from the shipping reel, installation shall be continued from the mid-point of the run. The Contractor shall first pull one-half of the cable from the reel at the mid-point through the conduit to one end of the run. The other half of the cable shall be removed from the reel and carefully placed on the ground in a figure eight pattern with a minimum loop diameter of 10 feet. While installing the remaining cable, care shall be taken to avoid any dragging against the ground resulting in damage or excess bending of the cable. The Contractor shall not kink, twist, or bend the cable during installation coiling or uncoiling.

If pulleys and sheaves will be used to mechanically pull through pull boxes and manholes, provide a drawing of the proposed layout showing that the cable will never be pulled through a radius less than the manufacturer's minimum bend radius. Use large diameter wheels, pulling sheaves, and cable guides to

maintain the appropriate bend radius. Always provide tension monitoring during the pulling operation.

If the Contractor must install new cable in conduits which contain existing fiber or electrical wiring, the Contractor shall be responsible for any damage to the existing cables or wires. After this installation the Contractor shall perform a functional test of all the equipment connected by the existing fiber cables or electrical wiring to ensure proper working conditions.

If an existing fiber optic cable is damaged during construction, it shall be removed from both points of termination and replaced, at no cost to the project. In no case shall the fill of any new conduit exceed the requirements of the National Electrical Code (NEC). The Contractor shall provide documentation to the City Engineer or designee supporting the conduit fill. All costs associated with equipment testing and repairs shall be included in the cost of the fiber optic cable.

5.8.2 BLOWING

Blowing cable is an acceptable alternative to pulling cable. If the Contractor chooses to use this method, submittals for cable installation shall be submitted along with complete information on fiber installation equipment. Use either the high airspeed blowing (HASB) method or the piston method. When using the HASB method, the volume of air passing through the conduit shall not exceed 600 cubic feet per minute or the conduit manufacturer's recommended air volume, whichever is more restrictive. When using the piston method, the volume of air passing through the conduit shall not exceed 300 cubic feet per minute or the conduit manufacturer's recommended air volume, whichever is more restrictive.

5.8.3 SLACK CABLE STORAGE

Provide and store fiber optic cable at each pull box and manhole to allow for future splices, additions, or repairs to the fiber network. Store the fiber optic cable without twisting or bending the cable below the minimum bend radius. Store 50 feet of fiber optic cable in manholes and an additional 20 ft. at each splice, with 10 feet of cable on each side of the cable splice point or as shown in the plans. Store 25 feet of spare fiber optic cable in pull boxes.

The Contractor shall coil 100 feet of cable in the manholes. The Contractor shall coil 50 feet of backbone cable in pull boxes. The Contractor shall coil 50 feet of lateral cable in the manholes. The Contractor shall coil 25 feet of lateral cable in pull boxes. Backbone and lateral buffer tubes and fiber strands shall be labeled on the splice tray prior to sealing of the closure as shown on the Project Detail Sheet. The Contractor shall ensure that all cable coils and splice canisters are attached to the cable management hardware in all pull boxes and manholes.

5.8.4 SPLICING

Perform all optical fiber splicing using the fusion splicing technique, and according to the latest version of the manufacturer's cable installation procedures; industry-accepted installation standards, codes, and practices; or as directed by the City. The fusion splicer shall be calibrated and certified within one year before splicing on this project. All certification documentation shall be presented to the City prior to the start of splicing.

The Contractor shall notify the City at least twenty-four hours prior to beginning the proposed splicing procedures. Four (4) hours prior to sealing the closure and installation in the pull box or manhole the Contractor shall again contact the City. If the City's representative cannot be on site, eight (8) digital pictures shall be taken at varying angles showing all completed splice work within the splice enclosure. These pictures shall include exposed fiber stands, (both spliced and uncut) in all splice trays and remaining buffer tubes showing appropriate coiling. One picture shall also include the complete re-assembly of all interior parts prior to final re-assemble and sealing. Once the canister and fiber coil are installed in the pull box or manhole, two (2) pictures shall be taken of the installation utilizing the fiber management hardware.

The optical fibers shall be fusion spliced and shall meet the following minimum requirements:

(a) Splice loss <0.15 dB

(b) Reflection <50 dB

(c) Completed splice shall be stable from -40º F to +185º F (-40ºC to +85ºC)

All splices shall match fiber and buffer tube colors unless shown otherwise in the plans. Where a fiber cable is to be accessed for lateral or drop signal insertion, only open the buffer tube containing the fiber to be accessed and only cut the actual fiber to be accessed. If a fiber end is not intended for use, cut the fiber to a length equal to that of the fiber to be used and neatly lay it into the splice tray. Treat any fibers exposed during splicing with a protective coating and place in a protective sleeve or housing to protect the fiber from damage or contaminants.

If an existing closure, or a closure provided by the Contractor requires reentry and resealing, it shall be conducted per the manufacturer's recommendation for re-entry. The Contractor shall use caution not to damage the fiber strands or buffer tubes existing inside.

5.9 HANDLING: CABLE END-SEALING, WRAP, PACKAGING

Handling procedures must include cable end-sealing to prevent moisture ingress, protective wrap to avoid physical damage, and proper packaging for shipping and receiving.

6. TESTING AND CERTIFICATION

6.1 MANUFACTURER'S TESTING

Contractor shall provide documentation of all factory tests performed by the manufacturer for all fiber optic cable, splicing material, cable terminations, and patch panels For test station details see Section Appendix C.

6.2 DOCUMENTATION

Comprehensive documentation must be provided for all fiber optic installations. This includes detailed records of cable routes, splice locations, connector types, and test results. Documentation should be maintained in both digital and physical formats and must be accessible for future reference and maintenance activities.

6.3 INSTALLATION TESTING

Installation testing is critical to verify the integrity and performance of the fiber optic network. Testing should be conducted using industry-standard equipment and procedures, including Optical Time Domain Reflectometer (OTDR) tracing, end-to-end attenuation testing, and continuity testing. All test results must be documented and compared against manufacturer specifications to ensure compliance.

6.3.1 END-TO-END ATTENUATION TESTING

End-to-end attenuation testing measures the total signal loss across the entire fiber optic link. This testing should be performed using calibrated light sources and power meters, and results should be recorded for each fiber strand. Acceptable attenuation levels must be defined based on the network design and application requirements.

6.3.2 OTDR TRACING

OTDR tracing is used to identify and locate faults, splices, and connectors within the fiber optic network. OTDR traces should be performed for each fiber strand, and results should be analyzed to ensure there are no unexpected losses or reflections. Detailed OTDR reports must be included in the installation documentation.

6.3.3 CONTINUITY TESTING

Continuity testing verifies that there are no breaks or discontinuities in the fiber optic cables. This testing should be performed using a visible light source or continuity tester, and results should be documented for each fiber strand.

6.3.4 SPLICE LOSS TESTING

Splice loss testing measures the signal loss at each splice point within the fiber optic network. This testing should be performed using calibrated equipment, and results should be recorded for each splice. Acceptable splice loss levels must be defined based on industry standards and network design

requirements in consultation with the City IT Department or their representative.

6.3.5 CONNECTOR LOSS TESTING

Connector loss testing measures the signal loss at each connector within the fiber optic network. This testing should be performed using calibrated equipment, and results should be recorded for each connector. Acceptable connector loss levels must be defined based on industry standards and network design requirements in consultation with the City IT Department or their representative.

7. APPLICABLE STANDARDS

7.1 APPLICABLE CODES AND TECHNICAL SPECIFICATIONS

This section outlines the applicable codes and technical specifications that must be adhered to in the design, installation, and maintenance of the fiber optic network. Compliance with these standards ensures interoperability, performance, and reliability of the network components and systems.

7.2 INDUSTRY STANDARDS

The following industry standards are applicable:

1. The most current version of the following standards from American National Standards Institute (ANSI)/ Telecommunications Industry Association (TIA)/ Electronic Industries Alliance (EIA)
    a. ANSI/ TIA/ EIA – 492 CAAA – Detail Specification for Single Mode Optical Fibers
    b. EIA/ TIA – 455-x – Fiber Optic Test Procedures (FOTP's) Note: These are commonly known as TIA Fiber Optic Test Procedures (FOTPs) but are officially called "EIA-455-x, e.g. EIA-455-61 is FOTP-61.
    c. EIA/ TIA – 568-A – Commercial Building Telecommunications Wiring Standard
    d. EIA/ TIA – 598-C – Standard for Color Coding of Optical Fiber Cables
    e. EIA/ TIA – 604 – Fiber Optic Connector Intermateability Standards (FOCIS)
2. The most recent version of the following standards from American Society for Testing and Materials (ASTM)
    a. ANSI/ ASTM A555-79 – Specification for General Requirements for Stainless Steel Wire and Wire Rods
3. The most recent version of the following standards from International Organization for Standardization (ISO)
    a. ISO 9000/9001 – Accreditation and Certification Standards
4. The most recent version of the following standards from National Electric Code (NEC)
    a. NEC Article 770 – Requirements for Fiber Optic Wiring
5. The most recent version of the following standards from National Electric Safety Code (NESC)
    a. Section 350G – Markings on Direct Buried Cable
6. The most recent version of the following standards from National Electrical Manufacturers Association (NEMA)
    a. NEMA TC- 7 – Smooth-wall Coilable Electrical Polyethylene Conduit
    b. NEMA TC- 2 – Electrical Polyvinyl Chloride (PVC) Conduit
7. The most recent version of the following standards from Occupational Safety and Health Administration (OSHA)
    a. Part 1926 Safety and Health Regulations for Construction
8. The most recent version of the following standards from Society of Cable Telecommunications Engineers (SECT)
    a. ANSI/SCTE 77- Specification for Underground Enclosure Integrity
9. The most recent version of the following standards from Telcordia (formerly Bellcore) Generic Requirements (GR)

   a. Telcordia/ Bellcore GR-771-CORE – Generic Requirements for Fiber Optic Splice Closures
   b. Telcordia/Bellcore GR-326-CORE – Generic Requirements for Single-Mode Optical Connectors and Jumper Assemblies
   c. Telcordia/ Bellcore GR-356-CORE – Generic Requirements for Optical Cable Innerduct, Associated Conduit, and Accessories
   d. Telcordia/Bellcore GR-1221-CORE – Generic Reliability Assurance Requirements for Passive Optical Components
10. The most recent version of the following standards from Underwriters Laboratories (UL)
   a. ANSI/ UL 6 – Electrical Rigid Metal Conduit Standard

ANSI/ UL 651 – STANDARD FOR SCHEDULE 40, 80, TYPE EB AND A RIGID PVC CONDUIT FITTINGS

7.3 REGULATORY CODES

The following regulatory codes must be adhered to in the design and installation of the fiber optic network:

1. National Electrical Code (NEC): Regulations for electrical wiring and installations, including requirements for fiber optic cabling.
2. Building Industry Consulting Service International (BICSI): Guidelines for the design and installation of telecommunications infrastructure, including fiber optic cabling.
3. Occupational Safety and Health Administration (OSHA): Regulations for workplace safety, including guidelines for the handling and installation of fiber optic cabling.

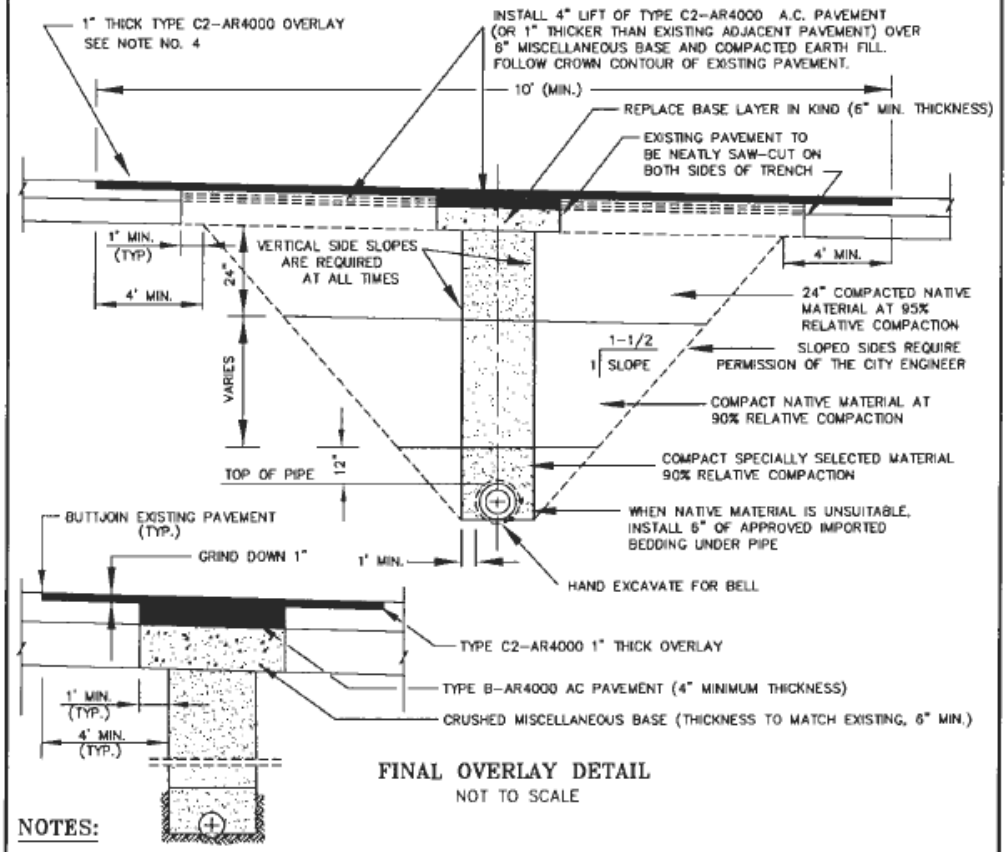
7.4 MANUFACTURER SPECIFICATIONS

All fiber optic components and systems must comply with the manufacturer's specifications to ensure proper performance and reliability. This includes adherence to the following:

1. Cable specifications: Minimum bend radius, tensile strength, operating temperature range, and environmental ratings.
2. Connector specifications: Insertion loss, return loss, and compatibility with fiber types.
3. Splicing and termination specifications: Requirements for splice trays, splice sleeves, and termination procedures.

Section Appendix A
Trench and Pavement Replacement Detail

NO.	REVISIONS	APPROVED	DATE



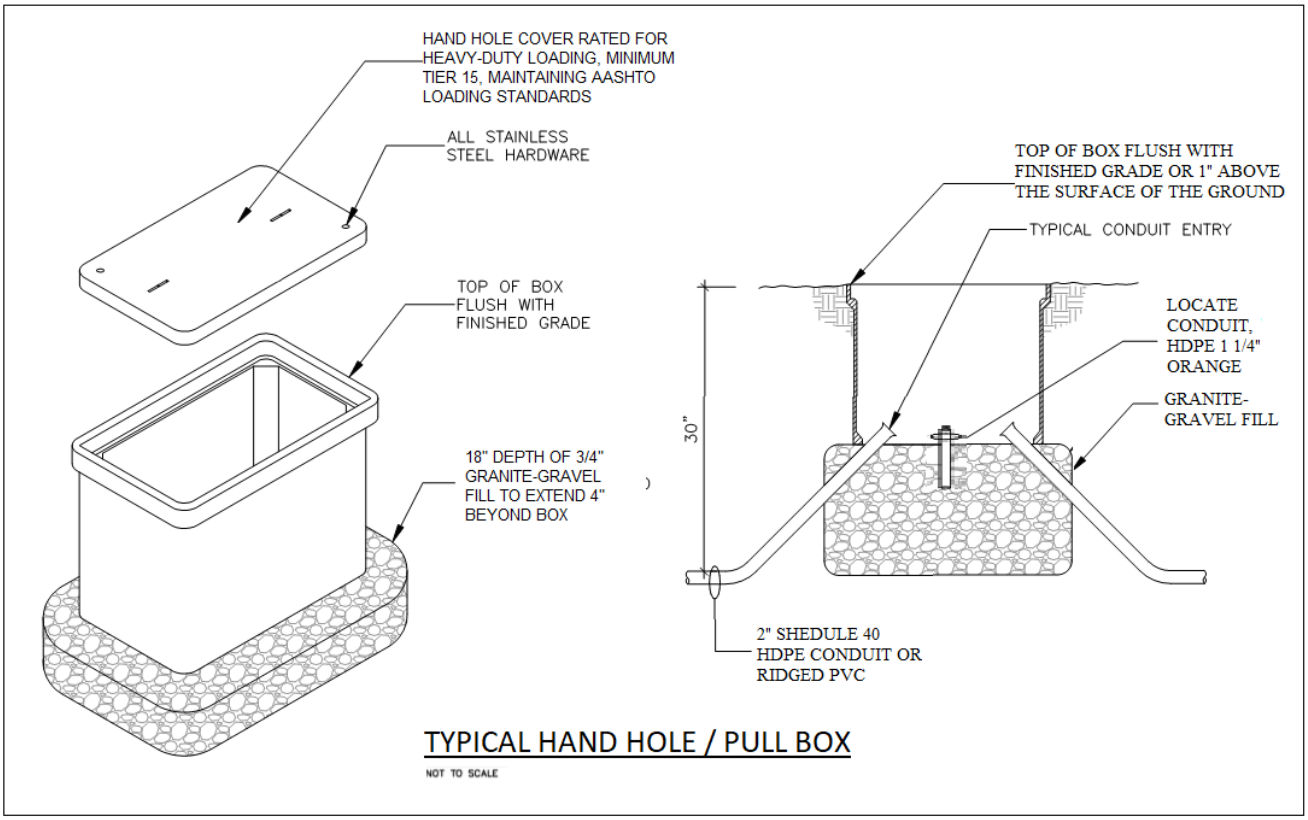
FINAL OVERLAY DETAIL
NOT TO SCALE

NOTES:

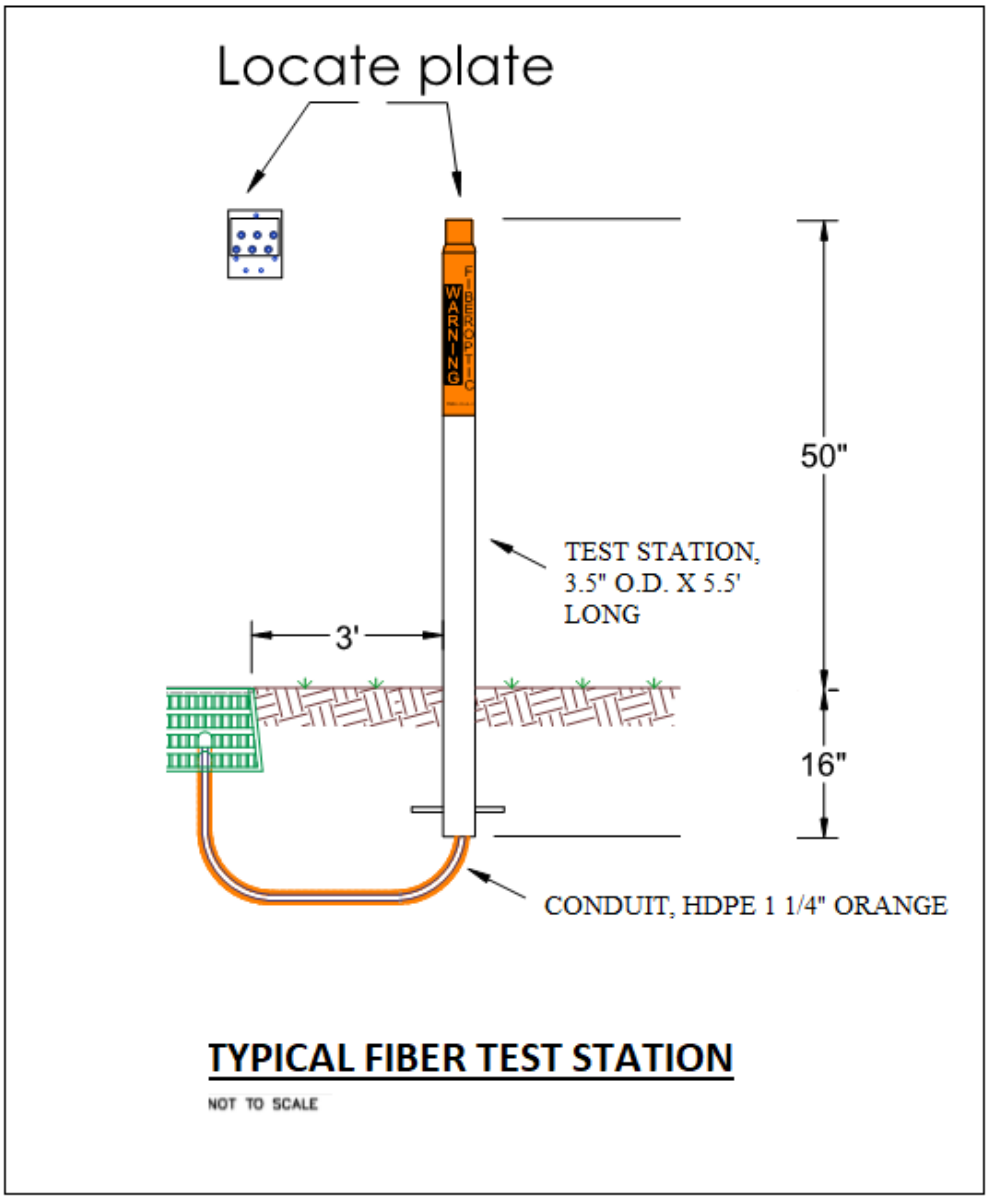
1. TRENCHES SHALL BE PAVED WITH TEMPORARY A.C. PAVEMENT IMMEDIATELY FOLLOWING WORK, AND SHALL BE PERMANENTLY PAVED WITHIN ONE WEEK, UNLESS APPROVED BY THE CITY ENGINEER.
2. A MINIMUM OF 1' OF EXISTING PAVEMENT SHALL BE SAWCUT AND REMOVED. REMOVALS SHALL EXTEND BEYOND ANY AREAS OF UNDERMINED OR COMPROMISED A.C. PAVEMENT.
3. PERMANENT A.C. PAVEMENT SHALL BE INSTALLED WITH A MINIMUM 4" THICK LIFT OF TYPE B-AR4000 A.C. PAVEMENT, OR 1" THICKER THAN EXISTING A.C. PAVEMENT.
4. A FINAL 1" THICK OVERLAY WITH TYPE C2-AR4000 A.C. PAVEMENT SHALL BE INSTALLED TO A MINIMUM WIDTH OF 10', EXTENDING 4' PAST TRENCH SIDES USING A BARBER GREEN PAVER, OR EQUAL. EXISTING A.C. PAVEMENT SHALL BE GROUND 1" FOR FINAL OVERLAY WHERE REQUIRED.
5. FLOATERS OF A.C. PAVEMENT 5' IN WIDTH OR LESS BETWEEN EDGES OF TRENCH AND EXISTING EDGE OF PAVEMENT, CURB OR GUTTER SHALL BE REMOVED AND REPLACED.
6. ALL SHORING, SLOPING OR BENCHING SHALL BE DONE IN COMPLIANCE WITH CAL-OSHA CONSTRUCTION SAFETY ORDERS; SOILS WITHIN THE CITY OF PALM SPRINGS ARE TYPICALLY CLASSIFIED AS CLASS C; CHECK JOB SITE SOIL CONDITIONS.
7. ALL EDGES OF CONSTRUCTION ("BUTT" JOINTS) SHALL BE MADE ON LANE LINES OR AT THE CENTER OF TRAVEL LANES; EDGES SHALL NOT BE ALLOWED WITHIN THE WHEEL PATH OF VEHICLES USING THE STREET.
8. ASPHALT BINDER USED IN THE ASPHALT CONCRETE PAVEMENT SHALL COMPLY WITH SPECIFICATIONS FOR PERFORMANCE GRADED (PG) 70-10 ASPHALT BINDER, IN ACCORDANCE WITH SECTION 92 "ASPHALTS" OF THE CALTRANS STANDARD SPECIFICATIONS.

CITY OF PALM SPRINGS PUBLIC WORKS & ENGINEERING DEPARTMENT	APPROVED: DMB	DATE: 7/14/03
	CITY ENGINEER	28931 R.C.E.
TRENCH AND PAVEMENT REPLACEMENT DETAIL	DRAWN BY: G.F.F.	FILE NO. STANDARDS
	CHECKED BY: M.L.F.	DWG. NO. 115

Section Appendix B
Hand Hole / Pull Box



Section Appendix C
Fiber Test Station



Section Appendix D
Collodation Details – Handholes and Colocation Agreements

Handhole Colocation

A. General

Handhole colocation is used primarily to provide access to telecommunications pathway to deliver fiber optic cable and enable open access in the public right-of-way within the West Des Moines service territory. The pathways to the open access distribution system may include all or some of the following, conduits, handholes, innerducts and fiber cable.

B. Handhole Colocation Design

- On all new arterial City R/W underground installations, handhole colocation shall follow the utility accommodation policy
- Handholes shall conform to Figures 9E.1 and 9E.2
- Install PRIMARY hand hole (48" X 48" X 48" DEEP) – Tier 15 minimum - maintain AASHTO loading standards at the following locations:
  - If multiple duct bank paths intersect ("T location")
  - Approximately every 500 - 1000' if no handhole is installed
  - At Street crossing to support common crossing for multiple paths
  - At 90 degree turns
  - At access location where secondary lateral path intersect –i.e. installing conduit to meter/home
- Install SECONDARY handholes (30" X 48" X 36" DEEP) – Tier 15 minimum - maintain AASHTO H20 loading standards at the following locations:
  - Future access location where secondary lateral path intersect –i.e. installing conduit to meter/home
- Place lateral conduit between each secondary handhole and primary handhole

Figure 9E.1. Primary Handhole, Side View

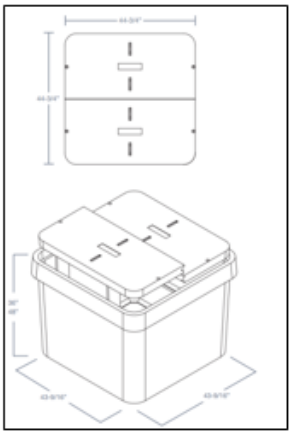
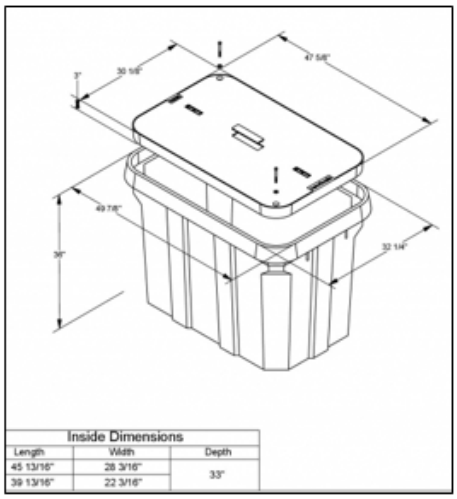


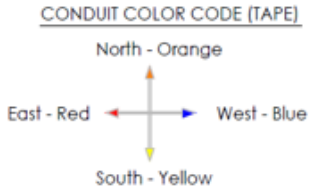
Figure 9E.2. Secondary Handhole, Side View



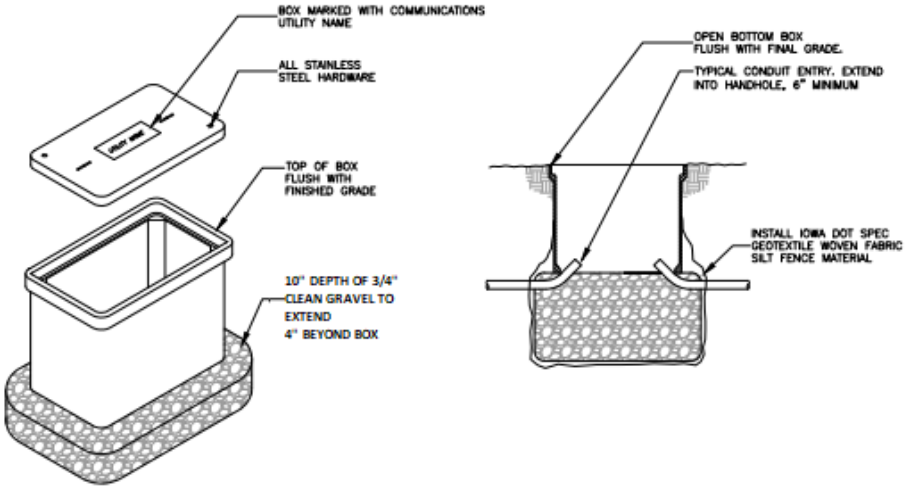
C. Handhole Installation

In order for the handhole to perform at its full capacity, the system shall be constructed in a neat and workmanlike manner to ensure that:

- Handhole will be positioned in accordance the utility accommodation policy
- Install depth or 48" – 48 ½" (Primary) or 36" – 36 ½" (Secondary), flush with final grade or follow NESC code standards per City, County or DOT requirements
- Label conduit using conduit color code chart



- Conduit will enter from the bottom of the hand hole, entering from the corresponding path side
- Knock outs will not be utilized
- Cap all unused conduit and duct seal conduit after fiber cables have been added
- Hand hole will be positioned parallel with right of way
- ¾" clean gravel (Pea gravel) - min 10" depth to extend 4" beyond box



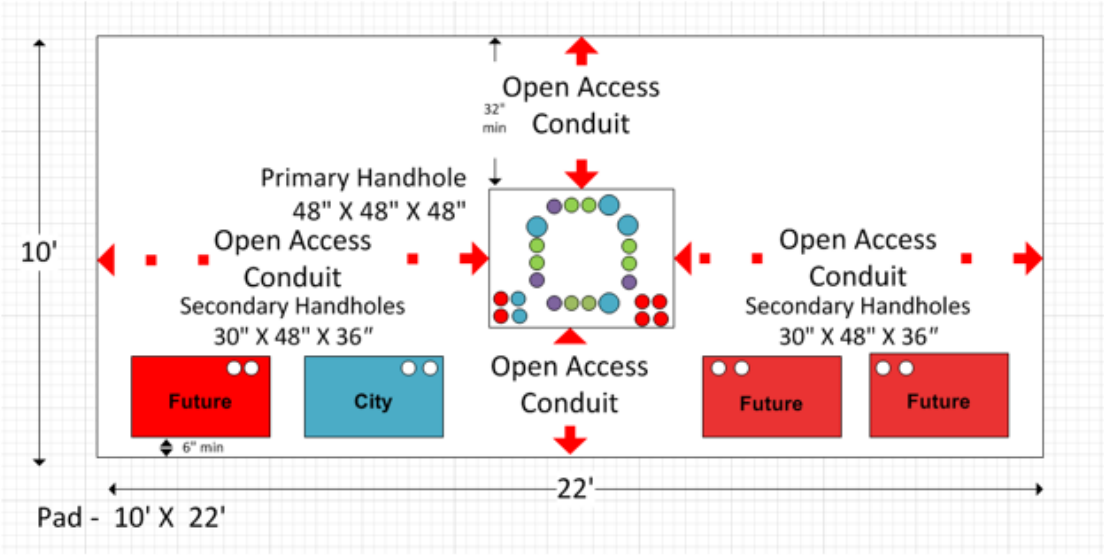
Installations that do not meet these criteria will be rejected.

D. Handhole Framing for Secondary Handhole Placements

A grass area will be landscaped to secure the handholes.

- Grass area shall conform to Figure 9E.3
- Place handhole flush to grade
- Grass area will be sloped away from handhole matching parking area grading
- 2" minimum (6" typical) spacing between handholes

Figure 9E.3. Grass Area, Top View



Master Agreement

MASTER CONDUIT LICENSE AND SHARING AGREEMENT

for the use of the City of _____ owned and operated Conduit

This Master Conduit License Agreement ("Agreement") is entered into this _____ day of _____, 20____ by and between CARRIER California LLC ("CARRIER"), a limited liability company, and the City of _____ a municipality organized and existing under the laws of the State of California. The City and CARRIER are sometimes referred to herein individually as a "Party" or collectively as the "Parties."

Background

WHEREAS, this Agreement is made in light of the following premises and circumstances, all of which are a part of this Agreement:

A. CARRIER, a private limited-liability company authorized to provide communications or telecommunications services in the State of California, will be the owner of certain fiber optic cables comprising a component of its communications or telecommunications facilities network that CARRIER plans to install within the public rights of way ("ROW") and in conduit under the ROW within the geographic boundaries of the City for the provision of communications or telecommunications service (the "Network");

B. The City is a political subdivision of the State of California with jurisdiction over the ROW for certain purposes including the intended uses of CARRIER and is the owner of certain conduits located within the ROW;

C. The intent of the Parties is to increase broadband access to businesses and residents of _____in a manner that reduces costs of investment, speeds time to market and preserves public ROW for' future public safety needs;

D. The City is entitled to manage the public ROW and to require fair and reasonable terms of process and compensation based on principles of ROW preservation and cost recovery as a condition to allowing CARRIER access to the ROW;

E. The City and CARRIER desire to enter into an agreement to govern the terms and conditions under which the City will reserve certain conduits or space within its conduits to accommodate the installation and maintenance of CARRIER's fiber optic cable for the use of CARRIER as required by CARRIER in connection with implementation of the Network installation in the ROW. Said Conduit, subject to this Agreement, will be specifically identified in a supplement to this Agreement approved in writing by both Parties.

Agreement Terms and Conditions

NOW **THEREFORE,** in consideration of the promises and mutual covenants contained herein, the City and CARRIER for valuable consideration, the sufficiency of which is hereby acknowledged, hereby agree as follows:

1. Definitions

For the purpose of this Agreement, the following terms when used herein shall have the following meanings:

(i) "Access Point" means a Manhole, Vault, Handhole, Junction Box or Pedestal through which the City Conduit may be accessed for the purposes of running and accessing fiber optic cable.

(ii) "Authorized Contractors" means third party contractors (whether independent or affiliated

with the City) that have been approved and authorized by the City to utilize Access Points and to make splices or perform other work on the fiber optic cable as provided for in this Agreement.

(iii) "City Conduit" means the physical multiple conduit manifold system owned by the City and installed within City right-of-way through which fiber optic cable is run from Access Point to Access Point throughout the geographic area of the City.

(iv) "Conduit" refers to the physical pipe or tube through which fiber optic cable is run from Access Point to Access Point throughout the geographic area of the City.

(v) "Fiber Optic Cable" means optical fiber components to be installed by either CARRIER or the City in the Licensed Conduit identified and agreed to within an approved Supplement to this Agreement.

(vi) "Fiber Route Map" means the map of the composite routes of the various Fiber Segments comprising the fiber cabling to be installed as part of the Network. The Fiber Route Map shall be updated and provided in "As-Built" form as necessary to reflect modifications to the Fiber Segments or additional Fiber Segments comprising CARRIER Cable made in accordance with the Supplements to this Agreement.

(vii) "Fiber Segment" means a continuous run of multi-strand fiber optic cable covering a portion of the fiber cable route.

(viii) "Handhole" means a buried box, with a lid that is even with the surface of the ground, used to store, terminate, splice or transfer fiber optic cable and access conduit.

(ix) "Junction Box" means a box where fiber optic cable splices and connections are made and accessed and to access conduit.

(x) Licensed Conduit" means all or a portion of City Conduit specifically identified in an approved Supplement to this Agreement, in which space shall be reserved and/or designated for CARRIER to "pull" or "run" and then maintain fiber' optic cable in accordance with and subject to the terms of this Agreement.

(xi) "Manhole" means a subsurface enclosure which qualified personnel may enter and use for the purpose of installing, operating and maintaining facilities.

(xii) "Pedestal" means an above ground structure used to store, terminate, splice or transfer, or access conduit containing fiber optic cable.

(xiii) "Underlying Rights" means with respect to the Public ROW the exact legal interest of the City in any portion of the ROW being made available to CARRIER whether that right be by license, easement, or fee simple interest.

(xiv) "Vault" means an underground structure used to store, terminate, splice or transfer, or access conduit containing fiber optic cable.

2. License

2.1 License Grant

Subject to the terms, conditions and limitations set forth herein, the City hereby grants to CARRIER a license and right for the use of Licensed Conduit for the installation and maintenance of fiber optic cable owned or employed by CARRIER. The duration of the foregoing license shall continue in perpetuity so long as the City Conduit remains in place and is in use by the City and its successors in interest and assigns, but nothing herein shall obligate the City to continue to maintain and operate the City Conduit or any portion thereof or to maintain any attachment rights related thereto during any periods in which the City is not otherwise using or planning to use the City Conduit for the provision of services to the City's customers. If only City and CARRIER are utilizing City Conduit, City or its successors in interest shall give CARRIER prior written notice

and a reasonable opportunity to assume responsibility for maintaining and operating each City Conduit Segment before removing such City Conduit Segment or' ceasing to use such City Conduit Segment for the provision of services. Except where the City is otherwise legally obligated to remove a City Conduit Segment in a shorter period of time, such prior notice shall be given at least ninety (90) days in advance of such removal. Notwithstanding the foregoing, in the event that (i) the City or its successor in interest proposes to cease using a City Conduit Segment for the provision of services to customers and (ii) such City Conduit Segment contains Fiber' Optic Cable owned by City and CARRIER and that is in use by CARRIER, CARRIER shall have the option, in order to avoid removal of such City Conduit Segment, of assuming responsibility for the operation and maintenance of the City Conduit Fiber Segment.

2.2 Scope of Grant

(i) The City shall provide CARRIER with access to the subject Licensed Conduit. To the extent that the City has authority to use and authorize third party use of Access Points, it will grant permission to Authorized Contractors to use such Access Points for installation, splicing and maintenance of Fiber in the Licensed Conduit as directed by CARRIER and at MMC's sole cost. The City shall have no obligation whatsoever to install any additional conduit or to allocate any additional space in existing City Conduit to meet the needs of CARRIER.

(ii) CARRIER shall undertake to obtain and provide all approvals, authorizations, coordination and supervision that is necessary in connection with its use of the subject Licensed Conduit and installation of fiber optic cable. Without limiting the foregoing, CARRIER shall have the sole responsibility for performing all activities and paying all costs necessary to install fiber within the Licensed Conduit and make the Fiber operational, including but not limited to: (i) splicing the Fiber to achieve interconnection between or within the applicable Fiber Segments and between the Fiber and fiber optic cable belonging to others, and (ii) providing, attaching and interconnecting equipment, electronics and lasers as required to transmit or receive optical signals via CARRIER's fiber optic cable installed in the Licensed Conduit. CARRIER shall further have the sole responsibility for paying all costs and for constructing or otherwise providing facilities needed to connect the Licensed Conduit and CARRIER 's fiber optic cable to any other network or facilities via appropriate Access Points. Except as otherwise approved by the City, such approval not to be unreasonably withheld, all installation of fiber' optic cable in the City Conduit shall be carried out only by Authorized Contractors and, to the extent reasonably practicable, only during regularly scheduled maintenance windows or at other times that are reasonably convenient for the City.

(iii) The City represents and warrants that the Underlying Rights that it possesses in the Public ROW are sufficient for CARRIER to install and operate its Fiber in the Licensed Conduit without any claims by third parties that CARRIER's intended uses are outside the scope of the Underlying Rights.

(iv) The City and CARRIER agree and acknowledge that CARRIER's use of the City Conduit and installation of CARRIER 's owned fiber optic cable within such City Conduit does not and will not create or convey to CARRIER any ownership or property rights of any nature in any City owned Fiber Optic Cable or of any Access Points of the Network. CARRIER may not encumber, offer as collateral, or allow any third-party claims of any type on or against the City Conduit.

2.3 Designation of Licensed Fiber Strand

At any time following completion of the City Conduit construction and installation, CARRIER may notify the City of its desire to access the City Conduit reserved for its use by the City. Such notice shall be written and shall be provided no fewer than sixty (60) days prior to the date on which_____ desires to access the City Conduit for purposes of installation of Fiber Optic Cable. CARRIER's notice shall identify all of the following: (1) CARRIER's planned use for the Fiber Optic Cable to be installed in the City Conduit, (2) the specific portions of the

City Conduit in which CARRIER intends to install, light and use Fiber Optic Cable, (3) the Access Points CARRIER desires to use (if any) to access and splice the Fiber Optic Cable to be run within the City Conduit, (4) all personnel or contractors that CARRIER proposes to use to perform any work activity involving the Conduit Fiber, including but not limited to construction and installation of fiber drops or laterals to ancillary Access Points or to lasers, electronics or other equipment, facilities or networks for purposes of lighting and using the Fiber optic cable, and (5) CARRIER's plans for interconnecting with and using the Fiber Cable to be run within the City Conduit, including relevant technical and functional network specifications and design criteria for CARRIER's systems that may facilitate consultation and cooperation of CARRIER and the City in the interest of efficient and effective implementation of CARRIER's plans in accordance herewith.

(i) Within ten (10) days following receipt of such initial notice, the City shall provide a diagram designating the specific City Conduit that is available to CARRIER to run Fiber Optic Cable for all purposes hereunder.

(ii) To the extent that CARRIER's contractors will have access to any conduit that is not exclusively licensed to CARRIER, the City shall have the right to determine in advance whether CARRIER's personnel and/or proposed contractors are qualified to perform such work activities and may disapprove any proposed personnel or contractor in its sole reasonable discretion. The City shall identify the reasons for such disapproval in writing and CARRIER may propose alternate personnel or contractors.

(iii) CARRIER is solely responsible for obtaining all public, private or government approvals, authorizations, permits, certifications, easements, rights of way and attachment rights beyond those requited for installation and maintenance within the City Conduit, if any, that are necessary in order for CARRIER to install, light and transmit or receive signals using the Fiber optic cable installed in said City Conduit, and shall provide documentary evidence thereof as and when reasonably requested by the City.

2.4 Limitations and Requirements for Use of the City Conduit

(i) The City and CARRIER agree and acknowledge that CARRIER may use the Licensed Conduit to place and utilize Fiber Optic Cable for any lawful purpose for which the Fiber Optic Cable is technically suited, provided that CARRIER shall use the Fiber Optic Cable solely for its business purposes.

(ii) If the City determines for any reason that it is necessary to relocate, modify, underground or otherwise alter ("Relocation or Modification") all or any portion of the City Conduit, the City shall provide CARRIER written notification prior to making the proposed relocation, modification or alteration. Such notice shall be given at least sixty (60) days in advance except in circumstances in which the City is legally obligated to take action more promptly and the prior notification requirement of this section shall not apply to emergency situations, in which case the City will give notice as quickly as is reasonably practicable. City, CARRIER and any other conduit licensees shall share the costs on a pro-rata basis based upon the percentage of conduit being used by each.

(iii) Any Fiber Optic Cable, equipment, electronics, lasers, or other network facilities provided by

CARRIER shall be installed and maintained in accordance with the requirements and specifications of then current editions of the National Electrical Code (NEC), and the National Electrical Safety Code (NESC), each of which are incorporated by reference in this Agreement. Further, CARRIER and its consultants and contractors shall at all times comply with the applicable rules and regulations of the Occupational Safety and Health Act of 1970 (OSHA), with all applicable state and federal statutes and laws, and with all applicable regulations, rules and orders issued by any state or federal agency having jurisdiction thereof, including without limitation the Federal Communications Commission, the California Utilities Board, or other applicable regulatory agency.

(iv) The City reserves the right to make periodic inspections at any time of any part of

CARRIER's Fiber Optic Cable equipment, electronics, lasers, or facilities (including interconnected fiber or copper cable) utilized by CARRIER in conjunction with the subject Fiber Optic Cable for purposes of assuring compliance with the terms and conditions hereof and with applicable laws, rules and regulations as reasonably necessary to prevent or detect interference with or damage to the City Conduit or breaches of CARRIER's obligations hereunder. Except in the case of an emergency, the City shall give CARRIER 48 hours' notice before carrying out such inspections and CARRIER shall be permitted, but not required, to have a representative present for such inspections. Such inspections shall be conducted at the City's expense unless the City determines that CARRIER is not in compliance with the terms of this Agreement. In such instance, CARRIER shall be responsible for paying the City for all reasonable costs incurred by the City in making the inspection. CARRIER agrees that such periodic inspections by the City, or the failure to do so, shall not relieve CARRIER of any responsibility, obligation or liability whether assumed under this Agreement or otherwise existing.

3. Maintenance

(i) The City shall maintain or arrange for maintenance of all the City Conduit and facilities interconnected with or comprising a part of City Conduit and Cable that are owned by the City, provided that the City's obligation to maintain such facilities shall not in any way extend beyond the term of any other agreement with CARRIER for ROW use or equipment attachments to CARRIER's facilities and provided further that such obligation shall cease earlier as to any City Conduit segments with respect to which the City and its successors in interests ether: (1) lose the necessary attachment and access rights to enable such maintenance; or (2) permanently cease to use such City Conduit segments for the provision of services to their customers, provided that before removing any such City Conduit segment the City gives CARRIER prior written notice and an opportunity to assume responsibility for maintaining and operating such City Conduit Segment as provided in Section 2.1.

(ii) CARRIER shall have sole responsibility for maintaining all of its Fiber Optic Cable, equipment, electronics, laser's, and other' facilities installed in the City Conduit or interconnected to the Fiber Optic Cable installed in the City Conduit. CARRIER shall maintain its equipment, electronics, lasers and interconnecting fibers and facilities in good repair and in a manner that will not interfere with, or degrade the quality or reach of any signal, transmission or telecommunications carried on the City Cable or the City owned Fiber Optic Cable running within the same Conduit. If CARRIER's equipment or facilities should cause any type of interference with, or degradation of, any signal, transmission or telecommunications on the City Cable, CARRIER agrees to correct the condition within forty-eight (48) hours for any problem causing a degradation, but not disruption, of any signal, transmission or telecommunications on the City Cable. If CARRIER fails to take such corrective action, the City may in its sole discretion, correct said condition at CARRIER's expense. The City shall notify CARRIER in writing prior to performing such work whenever practicable. When the City reasonably believes, however, that such conditions pose an immediate threat to public safety or interfere with the performance of the City's service obligations to its customers, or pose an immediate threat to the physical integrity of the City Cable or' other facilities, the City may perform such work and/or take such action, including temporary disconnection of CARRIER's equipment and facilities from the City Cable, that it reasonably deems necessary without first giving written notice to CARRIER shall be responsible for paying the City for all reasonable costs incurred by the City in taking such corrective actions if the City shows that the problem was in fact caused by CARRIER's equipment or facilities. The City shall bear the cost of any reconnection or restoration of CARRIER's equipment or facilities that is made necessary as a result of the City's mistaken actions. The City shall be indemnified by CARRIER for such work in accordance with Section 4 below.

4. Liability and Damages

(i) CARRIER, its personnel, agents and contractors shall exercise reasonable caution to avoid damaging the facilities of the City and shall make an immediate report to the City of the occurrence of any such damage caused by its personnel, agents or contractors. CARRIER agrees to reimburse the City for all reasonable costs incurred by the City for repair of such facilities damaged by CARRIER, its personnel, agents and contractors.

(ii) CARRIER shall be liable to the City for all of its actions or omissions that cause damage to the City Cable, the Access Points and all other facilities and equipment associated with the Network, or that interfere with, disrupt or degrade the quality or reach of any signal, transmission or telecommunications carried on the City Cable or the Network, but shall not be liable for any special, indirect, or consequential damages arising from CARRIER's actions or omissions.

(iii) The City shall not be liable to CARRIER for any special, indirect, or consequential damages arising from any interruption or degradation of CARRIER's communications carried on Licensed Fiber.

5. Mutual Indemnification

(i) Both the City and CARRIER (as "Indemnifying Party") hereby agree to indemnify, defend and hold harmless the other (as "Indemnitee") from and against any third party demand, claim, action, suit or proceeding ("Claim") and any resulting loss, liability, cost, expense or fine, including court and appeal costs and reasonable attorneys' fees and expenses ("Losses"), that are caused by or arise out of the actual or alleged acts or omissions, whether negligent or willful, of the Indemnifying Party, its personnel, agents, contractors or assigns, in connection with the performance under this Agreement or otherwise in connection with the construction (including any excavation), installation, operation, maintenance or use of the City Conduit or any equipment or facilities interconnected or associated therewith.

(ii) Notwithstanding the foregoing, each party's respective obligations as an Indemnifying Party under paragraph (i) above shall not include any liability or obligation to defend:

(a) to the extent that Losses arise out of or are caused by the Indemnitee's intentional misconduct.;

(b) to the extent that the defense of any Claim is prejudiced, or the resulting Losses are caused by the Indemnitee's failure or refusal to provide the Indemnifying Party with timely notice of the Claim, or to cooperate in the defense thereof, or are caused by the Indemnitee entering into a settlement or compromise of the Claim without the prior written approval of the Indemnifying Party; or

(c) to the extent that Losses result from the Indemnitee's failure or refusal to take commercially reasonable actions as the Indemnifying Party may request, and at the Indemnifying Party's sole cost and expense, in order to mitigate or lessen such Losses.

(iii) Notwithstanding anything herein to the contrary, CARRIER shall also indemnify the City against any third-party claims or charges comprising pass-throughs of property taxes imposed upon structures located in the ROW by reason of the City's attachments of facilities to such structures or improvements made to such structures in order to accommodate such attachments.

(iv) Also, notwithstanding anything to the contrary, the City shall also indemnify and defend CARRIER against any third-party claims or charges alleging trespass by CARRIER or that the Underlying Rights that the third party granted to the City is insufficient to permit CARRIER to use the City Conduit for its business purposes.

6. Insurance

CARRIER shall at all times during the term of this agreement maintain insurance coverage as required by City and set out in Exhibit A, and as such minimum insurance coverage may from time to time be amended. CARRIER shall make available to the City proof of Insurance (which is available at CARRIER evidencing coverage currently in effect prior to commencing installation of any Fiber Optic Cable within the City Conduit. CARRIER shall provide the City with thirty (30) days prior written notice of cancellation or any material adverse change in conditions. All policies shall include the City as an additional insured.

7. Assignment

(i) Upon notice to City, CARRIER may assign, sub-license, or transfer in any manner, in whole or in part, its rights, duties or obligations under this Agreement, which does not require the prior written consent of the City.

(ii) The City may not assign, sub-license, or transfer in any manner, in whole or in part, its rights, duties or obligations under this Agreement at any time and for any reason without the prior written consent of CARRIER, which shall not be unreasonably withheld.

Neither this Agreement nor any term or provision hereof, nor any inclusion by reference shall be construed as being for the benefit of any person or entity not a signatory hereto.

8. Termination

The Parties shall have the right to terminate this Agreement and the license granted herein under the following circumstances:

(i) The City may terminate this Agreement (a) upon thirty (30) days written notice with an opportunity to cure within ten (10) days therefrom in the event that CARRIER commits a material breach of this Agreement, becomes subject to any bankruptcy or insolvency proceeding under Federal or state statute or becomes insolvent or becomes subject to direct control by a trustee, receiver or similar authority, or uses the Licensed Fiber for any unlawful purpose, or (b) upon sixty

(60) days written notice in the event that the City for any reason ceases to have rights to operate and maintain the City Cable or any significant portion thereof

(ii) CARRIER may terminate this agreement upon sixty (60) days written notice.

(iii) In the event of termination in accordance herewith for any reason, CARRIER shall remove all fiber optic cable, equipment, electronics, lasers and fiber or other facilities installed by CARRIER in the City Conduit within one-hundred eighty (180) days after the effective date of the termination. All costs of any kind arising from removal of CARRIER's equipment, lasers and fiber, or other facilities shall be borne entirely by CARRIER.

9. General Provisions

9.1 Notices

(i) All notices required or permitted to be given to either party by the other party under any provisions of this Agreement shall be in writing. Notice shall be deemed served when delivered by hand or sent by a nationally recognized overnight courier service to the other

party's address set forth below during normal business hours. If a Notice is mailed, service is deemed complete upon the earlier of actual delivery or the close of business on the third business day following the date when the Notice is placed in a receptacle regularly maintained by the U.S. Postal Service addressed to the party at the address set forth below with postage pre-paid.

(ii) Notices shall be given to the

following: If to the City:

City of _____

Address
Address

If to CARRIER:

CARRIER California LLC

Address
Address

With a copy to:

CARRIER California LLC

Address
Address

Or to such other addresses and persons as CARRIER or the City may hereafter designate in a notice given in accordance with this Section 9.1.

9.2 Non-Waiver

Failure of the City to take action to enforce compliance with any of the terms or conditions of this Agreement, or to give notice or declare this Agreement or any authorization granted hereunder terminated, or to exercise any right or privilege hereunder, shall not be construed as a continuing or future waiver of such term, condition, right or privilege, but the sane shall be and remain at all times in full force and effect.

9.3 Headings

All headings contained in this agreement are for convenience only and are not intended to affect the meaning or interpretation of any part of this Agreement.

9.4 Governing Law

This Agreement and the rights and obligations contained in it shall be construed in accordance with, and governed by, the laws of the State of California without regard to its choice of law provisions.

9.5 Counterparts

This Agreement may be executed in any number of counterparts, each of which when executed shall be deemed an original, but all of which together shall constitute one and the same instrument.

9.6 Confidentiality

The parties acknowledge that CARRIER may disclose proprietary and confidential network and business information to the City in order to perform this Agreement. The City agrees to take all reasonable steps to protect proprietary and confidential information, so long as specifically marked as such, from public disclosure and to make available such information internally only to the City's personnel with a need to know or to its legal counsel. The City shall not disclose information marked proprietary or confidential except as required by state law in response to a formal request pursuant to the applicable Freedom of Information Law. The City shall notify CARRIER within 48 hours of receiving a request under the applicable Freedom of Information Law for information about this Agreement.

9.7 Legal Capacity

Both parties represent and warrant that they have the legal capacity to enter into this Agreement and that no Applicable Law prevents the execution and enforcement of this Agreement.

9.8 Venue

Venue for any complaint, cause, case or action arising from or related to this Agreement shall be in the State of California, County of Kankakee.

9.9 Option to purchase

The Parties agree that CARRIER may purchase some or all of the conduit licensed pursuant to this Agreement under the following conditions:

(i) A purchase price has been mutually agreed to by the Parties. Such purchase price shall be based upon the costs of installation of such conduit incurred by City.
(ii) Such purchase would not unduly interfere with the operations of City or other Licensee's utilization of shared City conduit.

(iii) CARRIER will be solely responsible for the conduit and its maintenance.

Any purchase pursuant to this section shall require the Parties to enter into a separate agreement memorializing the terms of such purchase.

IN WITNESS WHEREOF, the Parties hereto have executed this Agreement as of the date first written above.

City of _____ CARRIER California LLC

(The City)

By:		By:	
Name:		Name:	
Title:		Title:	
Date:		Date:	

INSURANCE REQUIREMENTS

Sample

Insurance Requirements

The Contractor shall obtain and maintain through the term of this agreement *and two years beyond,* insurance with terms and limits of coverage equal to or in excess of those set forth in the specifications governing the services provided, but in no event, are such terms and limits to be less than those set forth below. The limits under insurance policies required by this Contract shall in no-way limit the Contractors actual liability.

(1) Commercial General Liability

Including coverage for premises and operations, independent contractors, products & completed operations, contractual liability, explosion, collapse and underground hazards (XCU), personal injury/advertising injury. The City shall be included as additional insured on a primary and non-contributory basis.; include waiver of subrogation in favor of the City

Bodily Injury & Property Damage - Each Occurrence	$1,000,000
Personal Injury & Advertising Injury - Per Person	$1,000,000
_____General Aggregate on the Above	$2,000,000
Products & Completed Operations General Aggregate	$2,000,000
_____ Fire Damage Limit	$100,000
Medical Expense Limit	$5,000

(2) Business Automobile Liability Insurance

Including coverage for all owned, non-owned and hired automobiles with limits of liability not less than the following. The City shall be included as additional insured on a primary and non- contributory basis; including waiver of subrogation in favor of the City, MCS-90 endorsement as necessary if transporting hazardous materials and ISO CA 9948 Pollution Liability, upset and overturn. The limit can be satisfied by providing a primary policy or in combination with an excess liability policy.

Bodily Injury & Property Damage — Each Accident	$1,000,000

(3) Workers Compensation and Employers Liability

As required by any applicable law or regulation. The policy will include waiver of subrogation endorsement in favor of the City of _____

Part 1- Workers Compensation Benefits	Statutory

(4) Employers Liability:

Bodily Injury Each Accident	$500,000
Bodily Injury by Disease Policy Limit	$500,000
Bodily Injury by Disease Each Employee	$500,000

(5) Umbrella Liability

The contractor will maintain umbrella liability insurance on an occurrence basis in excess of the general liability, automobile liability and employer's liability insurance described above which is at least broad as all

underlying policies; including but not limited to Additional Insured and Waiver of Subrogation and Primary and Non-Contributory

_____ Each Occurrence Limit	$2,000,000
_____ Aggregate Limit	$2,000,000

(6) Cyber Insurance

The contractor will maintain comprehensive cyber insurance that includes both third party liability and first party coverages.

_____ Each Occurrence Limit	$2,000,000
_____ Aggregate Limit	$2,000,000

(7) Third Party Crime of Client Property

The contractor will maintain a crime insurance policy that protects against direct loss of money, securities or property by a client resulting from theft or forgery.

Each Occurrence Limit	$25,000

Before providing any services, the Contractor shall make available to _____, proof of adequate insurance, per this Agreement, to be in force.

Any subcontractors utilized shall be subject to the same insurance requirements above.

Supplement Number_____ to Master Conduit License and Sharing Agreement.

Pursuant to the Master Conduit License and Sharing Agreement between City of_____ and CARRIER California LLC, dated _____ and attached hereto, the Parties hereby agree to the following SUPPLEMENT:

1. CARRIER shall be licensed for the following described conduit, equipment and services:

[this section shall describe in detail the exact conduit or portion of conduit company will be provided access to and any additional equipment or services (e.g. pull ropes, tracing wire, separate handholds)]

2. CARRIER shall pay to the City the following fee for such license

[this section shall describe in detail the costs to be paid by company to City for the above described access and services]

IN WITNESS WHEREOF, the Parties hereto have executed this Supplement as of the date below.

City of _____

By: _____

Name: _____

Title:_____

Date: _____

CARRIER

By: _____

Name: _____

Title:_____

Date: _____

ADDENDUM C

MEMORANDUM OF UNDERSTANDING

Memorandum of Understanding between the City of _____, CA and telecommunications providers for participation in a colocation conduit duct bank and colocated handholes.

Purpose. It is the intent of the Parties to cooperate so as to reduce the costs for new broadband investment, shorten time to market for providers and preserve public right-of-way in _____. The purpose of this MOU is to set forth the anticipated relationship between the City of _____ ("City") and the signing Provider ("Provider") for construction, use, security and maintenance of conduit duct banks and corresponding collocated handholes.

Subsequent Agreements. The commitments made within this MOU will be followed by a Master Agreement between the Parties that has final pricing and contract details. Given that road construction and opportunities to cooperate will occur over time, a Supplement will be added to the Provider's Master Agreement for each specific road segment the Provider chooses to participate in. All terms in this MOU are intended to be incorporated into the Master Agreement.

Duration. The Master Agreement will continue until terminated by the mutual agreement of the Parties. Each Supplement will be for a term of 20 years, with 10-year extensions upon mutual agreement of the Parties. If the Provider company is sold or merged, the Master Agreement and any existing Supplements are assignable to the new owner. If the Provider closes or ceases to do business, the conduit, handholes and contents become property of the City.

Location. This duct bank and handhole(s) made available for collaboration within the City of _____ are generally described in Exhibit A. Each Supplement shall further describe the specific conduit or handholds to be leased or purchased.

Charges. Provider selects one of the following options:

5.1 Early Adopters. Rates for Providers who choose to lease or purchase conduit in the duct bank BEFORE construction of the duct bank begins.

A. _____ LEASE – Provider chooses to lease conduit from the City _____

_____ # of 4" Conduit x _____ per linear foot = _____ total lease cost
_____ # of ____" Conduit x _____ per linear foot = _____ total lease cost

Terms: Unless otherwise agreed within a Supplement, Lessee will pay an amount equal to five years of payments at the commencement a Supplement. The remaining balance of the lease shall be paid in equal installments on the anniversary of the signature date of the Supplement beginning with the first anniversary and ending with the 20th anniversary of the signature date.

B. _____ PURCHASE – Provider chooses to purchase conduit

_____ # of 4" Conduit x _____ per linear foot = _____ purchase payment
_____ # of ____" Conduit x _____ per linear foot = _____ purchase payment

5.2 Post Construction Adopters. Lease and Purchase may be available after construction and implementation at a 30 % increase to the above costs and only to the extent that capacity remains available.

5.3 Good Faith Estimate. The costs quoted in this MOU are based on the City's current and best

estimates of potential construction costs. Actual purchase and lease costs in the Supplement for this project will be determined based on bid costs at the time of project letting.

Pull Rope. Pull rope is not included in the pricing and must be requested by Lessee (see Section 13).

Assignment of Ducts. The City will assign a duct(s), color(s) and handhole(s) location to each provider. That duct(s), color(s), path(s) will be maintained and consistent in this segment and any other segments the Provider purchases and/or leases. This will be verified by an inspector on behalf of the City.

Handholes.

8.1 Handhole Layout. Handhole locations will be determined by the City based on Right of Way availability. The typical layout will be a Primary Handhole (City owned) that provides a path from the Duct Bank to Secondary Handholes (Provider Owned/Leased). There should be no Provider loops or splices in the primary handhole. Primary Handholes will be strategically placed at major intersections. The average span between Handhole Farms will be approximately 500' to 1,000'. City will seek input from MOU participants regarding handhole locations and build-back easements in order to maximize the value for participants wherever possible.

The City will work with Providers to establish guidelines on aesthetics and safety for cabinets, equipment and power. For power options, the City will meet with Mid American Energy with Providers being invited when possible.

8.2 Handhole Security. The Primary Handhole will only be accessible by the City after fiber is pulled by the Providers. Secondary (Provider) handholes will only be accessible by the Provider whose fiber runs through it. Providers can secure their handholes with their preference of locking system. The City will work with providers to establish a system of emergency access.

No Provider is allowed to access the Primary Handhole without permission and access by the City. No Provider is allowed to access any other Provider's handhole(s) without written permission. Doing so will be considered criminal trespass, under full enforcement of criminal laws. If a Provider feels that their Handhole(s) has been entered by an unauthorized party with criminal intent, they should contact the appropriate authority, then the City.

If a Provider ceases to be in business or abandons their conduit and fiber and has their own handhole locking system, they will provide the City with the ability to access their Handhole(s).

8.3 Handhole Placement. As part of the Duct Bank, primary handholes will be place during construction. They are part of the purchase/lease cost. Secondary handholes are not included in the cost above and are the responsibility of the Provider (unless specified in Section 13).

8.4 Handhole Access. Providers will have the Right to Access their Secondary Handhole(s) whenever they need to, subject to City Codes.

8.5 Subsequent Handholes. There may arise a need for handhole(s) which are located outside of the master handhole locations. When that occurs, Provider will utilize the typical City permit process for approval and placement

Assignment of Infrastructure. If Provider wishes to lease, sub-lease or sell all or part of their conduit(s) and handhole(s), notice must be given to the City in writing thirty (30) days prior to the transaction. The City retains exclusive right to approve or deny transactions.

Maintenance. During construction of the duct bank and primary handhole system, the contractor will be the owner of the materials and infrastructure. When the City accepts the system, the City will be the

owner, at which time Providers will be granted their rights as owners/lessees when they have finalized the purchase of their conduit(s) and handholes(s).

The City will continue to be the owner of any conduits and handholes not purchased and all of the primary handholes.

The City will work with Providers to establish emergency joint maintenance procedures that take into account maintenance requirements in Provider contracts. If there are any costs beyond what is paid by the person or entity that caused the damage, they will be divided among the owners of the damaged conduits.

Provider is responsible for maintenance of all of their specific infrastructure (examples being conduit, fiber, splices and all other infrastructure other than conduit and handhole(s)).

Subcontractors. If the Provider uses subcontractors, it is the Provider's responsibility to inform them of the provisions of the Master Agreement and any Supplements and are also responsible for any security issues or damage that they cause.

Locates. Tracing wire will be installed in two conduits in each duct bank system and such cost is included in the rates above. A locating post will be installed at each handhole farm. Locates will be the responsibility of the owner (see Section 10 for ownership definition). The City will talk with locating organizations to see if there are joint locating options available and will discuss those (if any) with Providers.

Additional Equipment Request. The City will attempt to accommodate additional equipment requests at the time of construction. Please indicate below if any of the following should be included in order to price into the construction plan and final costs:

- ☐ Secondary Handhole: A Check indicates that Secondary handholes should be placed for MOU participant at the time of duct bank construction. Please indicate handhole size if not standard size and placement:

  _____.

- ☐ Pull Rope: A Check indicates that a Pull Rope should be placed for MOU participant at the time of duct bank construction.

- ☐ Tracing Wire: A Check indicates that Tracing Wire should be placed for MOU participant at the time of duct bank construction.

- ☐ Other Requirements: A Check indicates that you have special conditions not addressed in this MOU. Please indicate any special equipment or conditions that you would like the City to include in this build.

  _____.

  _____.

  _____.

Notices. Any notices about this project, construction, use and maintenance will be sent to the Provider address listed with the signature below. Notices to the City should be sent to the signatory address and department with the signature below.

The Parties, through the signature of its duly authorized representative identified below, affirmatively represents that the signatory possesses all necessary power, authority and legal capacity to

(1) act on behalf of their organization

(2) enter into and bind their organization's intended obligations under this MOU

(3) accept written notice for project obligations or designate who is to receive written notice in appropriate section below.

EXECUTED as of the date first written above.

CITY OF _____, CA

By: _____

City Manager

Address: _____

_____

Phone: _____

Email: _____

PROVIDER

By: _____

Written Name: _____

Title: _____

Address: _____

_____

Phone: _____

Email: _____

DESIGNATED PROVIDER NOTIFICATION RECIPIENT (if different than signatory)

PROVIDER NOTICES

By: _____

Written Name: _____

Title: _____

Address: _____

_____

Phone: _____

Email: _____

Additional resources can be found at:

Next Century Cities: Becoming Broadband Ready: https://nextcenturycities.org/wp-content/uploads/Becoming-Broadband-Ready-Toolkit-web.pdf

State of California Local Permitting Playbook: https://broadbandforall.cdt.ca.gov/wp-content/uploads/sites/19/2022/09/California-Local-Jurisdiction-Permitting-Playbook-1.pdf

BUSINESS MODEL ANALYSIS

SUMMARY

The goal of the Coachella Valley Association of Governments (CVAG) broadband study is to determine options to reach broadband unserved and underserved addresses in the Coachella Valley. There are different approaches that can be taken to accomplish that goal, based on which entity (a jurisdiction, an Internet Service Provider (ISP) or a partnership between the two) decides to build, own and operate the infrastructure needed to improve broadband. The Governance section of this report details the factors to consider in deciding which approach to take.

Each possibility of ownership and operations of broadband networks defined in the Governance deliverable contains risks and rewards. They also contain financial factors and implications that have to be considered to evaluate their viability. This Business Model Analysis deliverable details the factors to consider of each applicable business model.

The first step of the Business Model Analysis is to define the options that are applicable. Thus, business models that could be evaluated should be able to accomplish (or provide ways to reach) the goal of improving broadband in the Coachella Valley.

CVAG is in the process of building the CV Sync intelligent traffic signal network. There will be excess conduit capacity in segments of the CV Sync system. The available conduit capacity can be found in the Design deliverable GIS data completed in this study. There could also be excess conduit capacity in other underground infrastructure in the public Right Of Way (ROW) that jurisdictions have installed and own that could also potentially be used to reach unserved and unserved addresses.

To determine which business models to evaluate, three considerations must be evaluated:

1. Who will own the excess conduit capacity
2. Who will use it to reach unserved and underserved addresses
3. What other broadband infrastructure will be put in place and who will own and operate the new infrastructure

As is defined in the Governance Deliverable, the business models for broadband ownership fall into these categories:

- Fully Municipal Broadband
- Publicly Owned, Privately Serviced
- Hybrid Ownership
- Private Developer Open Access
- Full Private Broadband

From meetings with CVAG and with jurisdiction leaders, the options that seem most likely are:

- Most jurisdictions in the Coachella Valley indicated an openness to building broadband infrastructure (conduit, a fiber ring or municipal network). CVAG is not considering building broadband related infrastructure at this time
- CVAG and local jurisdictions will govern the use of excess capacity in CV Sync and in their own conduit, so it may be possible they will lease excess conduit capacity to public-private partnerships or directly with private ISPs
- ISPs are considering building their own networks, which would likely utilize excess conduit, if available

An important note: **Jurisdictions can plan for and improve the factors of any of the business models by making strategic investments in new conduits as they build roadways, bridges, parks, and other public infrastructure.** As part of this broadband study, a GIS tool has been developed in which CV Sync infrastructure and jurisdiction CIP projects are documented. The Gap Analysis section of

this report shows examples of the information in GIS. Utilizing this tool to plan and document future projects will provide coordination and continual improvement of information.

ANALYSIS OF APPLICABLE OPTIONS

COMMUNITY FACTORS IN BUSINESS MODEL SELECTION FACTORS

There are different factors to be considered in the evaluation of broadband business models. From a US Ignite broadband analysis white paper (https://www.us-ignite.org/wp-content/uploads/2020/07/USIgnite_Altman-Solon_Whitepaper-on-Broadband-Models_FINAL_7-9-2020.pdf), there are four categories that help determine what business models are available to a community:

Key Decision Factors	Options	Definition	Impact on City Decision
Capital Availability	Good Access to Capital / Funding	There's sufficient financing sources to fund significant part of the build	Good capital availability should push city to own / fund larger part of the project without bringing in private ISPs
	Poor Access to Capital / Funding	There's limited capital / funding availability, seeking commercial capital will be required to fund	
Existing Infrastructure	Good Existing Infrastructure / Capabilities	There's existing public utility with conduit / infrastructure and operating capabilities	Presence of existing infrastructure and/or capabilities should push city to take more control over project, provides a "bargaining" chip with ISPs
	Poor Existing Infrastructure / Capabilities	There's no existing utility or there is but infrastructure and operating capabilities are poor	
Partnership Options	Viable ISP Partner(s)	City has attractive demographics or good value proposition for third party ISP	Lack of viable ISP partnerships limits city options to those models that require significant involvement from the ISP
	No Partner Options	City is too small, too remote, or otherwise unattractive for 3rd party ISP	
Objective and Risk Tolerance	Community Benefit	Using the broadband infrastructure to create innovation and benefit community in non-financial ways	Strong public support towards anchoring project around community benefits should push city to seek more control / ownership over infrastructure
	Meeting Financial Goals (High Risk)	Using the broadband infrastructure to meet measurable financial goals while maximizing broadband availability	Focus on meeting financial goals / targets should push city to more predictable financial models (e.g., 3rd party driven)
	Meeting Financial Goals (Low Risk)		

The decisions in these four critical areas can help a community determine what options are possible.

EVALUATION OF BUSINESS MODELS

Based on the entities involved in broadband in the Coachella Valley, multiple scenarios are possible. This report focuses on the options of CVAG and member jurisdictions (ISPs develop their own options). Below is an evaluation of the potential risks and rewards of each applicable model.

1. **Fully Municipal Network (Publicly Built, Owned, and Operated)**

   While CVAG as an organization is not pursuing this, individual member jurisdictions may choose to build and operate their own local networks.

   - **Rewards:**

- **Direct Mission Alignment:** The jurisdiction can prioritize reaching unserved and underserved residents that private ISPs might ignore due to low profitability
- **Rate Control:** Jurisdictions have the power to set affordable prices and service standards, potentially reducing the "digital divide" in low-income areas
- **Long-Term Revenue:** Successful networks can provide a steady stream of non-tax revenue for the city once the initial debt is paid off

- **Risks:**
  - **Financial & Debt Burden:** These projects require significant upfront capital (CapEx) and often involve taking on significant public debt or otherwise encumber substantial city revenues
  - **Operational Complexity:** Local governments must act as a 24/7 service provider, requiring expertise in tech support, maintenance, and marketing that they may not possess. Staff can be hired or augmented with persons who contain fiber network and the required business experience, but the jurisdiction can still be at risk in not having the background in managing a for profit, competitive enterprise
  - **Sustainability:** If the "take rate" (the percentage of residents who sign up) is lower than projected, the network can become a financial drain on taxpayers

2. **Publicly Owned, Privately Serviced (Leasing Excess Capacity)**

   This model could apply to a full network (the jurisdiction owning all of the network and contracting out the operations and maintenance). However, contracting the services does not alter some of the more significant risks listed in the previous section.

   The analysis for this model focuses on the jurisdiction managing the "excess conduit" from **CV Sync** and any infrastructure they deploy, leasing the excess capacity to one or more private ISPs through public-private partnerships.

   - **Rewards:**
     - **Asset Monetization:** Turns existing infrastructure (conduit and fiber in the Right-of-Way) into a productive revenue-generating asset
     - **Reduced Public Risk:** The city owns the "static" parts (conduit), while the private ISP handles the "dynamic" parts like electronics and customer service
     - **Reduced Costs To Reach Unserved and Underserved Addresses**: The cost of building conduit is one of the most expensive capital expenses in a network. By providing this infrastructure as an operating expense for an ISP, the business model can be changed in a way that reaching the unserved and underserved can be more financially feasible
     - **Incentivizes Competition:** By leasing to multiple providers (Open Access), a city can enable competition on price and speed, benefiting the consumer

   - **Risks:**
     - **Coordination Difficulty:** Success depends on jurisdictions coordinating complex leasing policies and technical specifications across borders
     - **Limited ISP Interest:** If the wholesale lease price is too high or the population density is too low, private ISPs may still decline to lease conduit or provide service

3. **Private ISP Build-out (Private Ownership using Public Assets)**

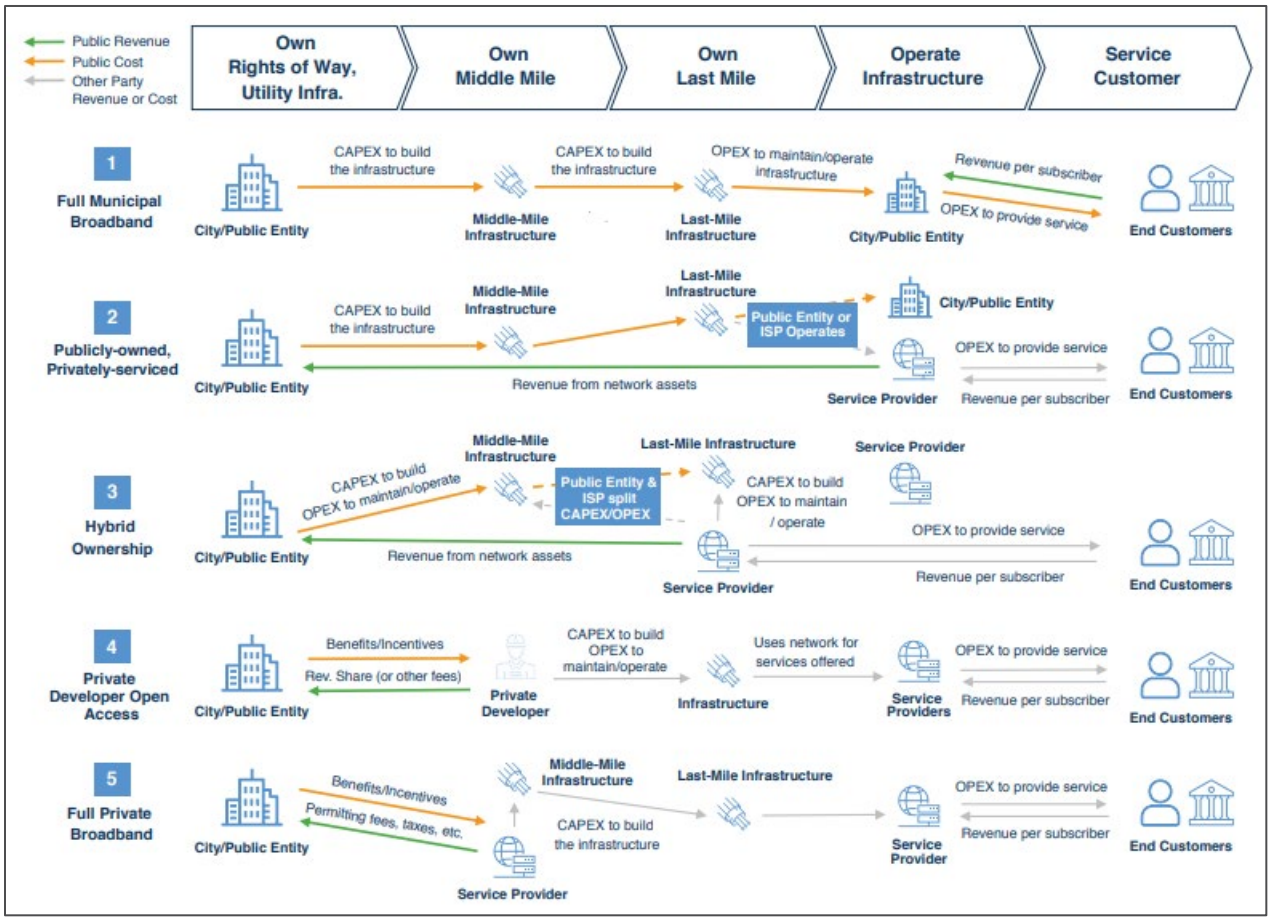
   Private ISPs build their own networks, potentially utilizing the excess public conduit provided by CV Sync where available to reduce their construction costs.

   - **Rewards:**
     - **Fastest Deployment:** Private companies often move faster than public agencies to deploy new technology once the financial barriers (like conduit costs) are lowered
     - **Zero Public Debt:** The financial risk of the build-out rests entirely on the private provider, protecting the city's general fund
     - **Technological Innovation:** Private ISPs are motivated to upgrade electronics and speeds regularly to stay competitive in the market

   - **Risks:**
     - **"Cherry-Picking":** Private firms are profit-driven and may only build in affluent neighborhoods, leaving the "gaps" in underserved areas unaddressed
     - **Loss of Public Control:** With the network being privately owned, the city has little to no say over future price hikes or service quality

Summary of Strategic Trade-offs

The following diagram illustrates how these models balance the risk and reward between the public and private sectors. The following chart from the US Ignite whitepaper shows the flow of cost and revenue through the broadband ownership models.



CRITICAL SUCCESS FACTORS FOR COACHELLA VALLEY

Regardless of the model chosen, the analysis concludes that three things are essential:

1. **Coordination:** It will be difficult to fill broadband gaps on a jurisdiction-by-jurisdiction basis. Regional cooperation and coordination will be needed to achieve the maximum benefit through the conduit
2. **Policy Alignment:** Standardizing how "excess capacity" is governed across the valley is necessary to attract private investment
3. **Resource Management:** Effectively utilizing the existing **CV Sync** and other public infrastructure is the most efficient way to reach unserved addresses
4. **ISP Relationships:** There are ISPs in the Coachella Valley who are interested in working with jurisdictions to expand their networks. Having excess conduit capacity is a significant factor in helping them lower their costs. Working with them to use the conduit, what addresses need to be reached, and other connectivity needs will be important in taking full advantage of this resource

FINANCIAL ANALYSIS

SUMMARY

The goal of this broadband study was to clarify broadband needs in the Coachella Valley and to define ways broadband can be improved. This study has highlighted multiple steps jurisdictions can take that can lead to improving broadband and connectivity in the Coachella Valley.

Options to improve broadband focus in results of this study mainly on utilizing excess available conduit space that is available in the CV Sync traffic signal network that is being constructed and conduit available (currently for in the future) in jurisdiction CIP project construction. Either jurisdictions or Internet Service Providers (ISPs) could lower deployment costs by installing fiber in the available conduit to improve broadband.

There are other options to improve broadband, utilizing other infrastructure or other broadband technologies. For example, fiber could be run aerially on utility poles. The main factor in determining the viability of aerial fiber construction is whether poles are available and the cost to attach, when available. It is often assumed that aerial construction is less expensive than underground. That can be the case if pole owners allow attachments, have available space, have reasonable attachment fees and it is not necessary to replace poles. Any of those factors can make aerial construction not viable.

Other broadband technologies like fixed wireless, Citizen Broadband Radio Service (CBRS) or satellite can be utilized to improve broadband for lower costs, but the solution those technologies provide are typically less reliable or provide less capacity than fiber. The Market Assessment section of this report provides details regarding ISPs that utilize different technologies.

The focus of this section is the financial analysis of utilizing the excess capacity in the CV Sync conduit network. Because the conduit is documented and a significant amount is currently in place, this could provide an economical way to secure the most reliable and most future-proof technology – fiber.

This Financial Analysis deliverable defines the financial ramifications of the following scenarios regarding conduit and fiber:

- Jurisdictions adding conduit:
    - Adding telecommunications infrastructure (conduit and possibly fiber) during other Capital Improvement Plan (CIP) projects, particularly in areas where there are unserved and underserved addresses. This is commonly referred to as a “Dig Once” approach
    - Building conduit segments connecting CV Sync conduit system segments to create a full conduit network in the Coachella Valley (either as part of other CIP projects or as individual projects for specific purposes)
- Jurisdictions building full fiber networks in their communities that include unserved and underserved addresses (utilizing CV Sync conduit and any conduit they have installed in CIP projects to lower implementation costs)
- Working with ISPs for the ISPs to install networks, most likely utilizing CV Sync conduit and any other jurisdiction owned conduit to lower ISP costs to:
    - Attract ISPs
    - Negotiate commitments from ISPs to reach the unserved and underserved addresses
    - Negotiate ways ISPs can meet connectivity needs jurisdictions are trying to meet
    - Generate revenue in conduit leases to ISPs

Jurisdictions have an enviable starting point: CV Sync and other local agency infrastructure. There is available capacity in many CV Sync conduit segments. Also, there is excess fiber capacity in the CV Sync fiber segments. Details of available capacity can be found in the Regional Broadband Map.

The excess conduit capacity can be utilized to improve broadband (either through jurisdictions building networks or working with ISPs for them to lower their costs in broadband deployments). The excess fiber capacity cannot be utilized for retail broadband but is a resource to improve connectivity within and

between local jurisdictions.

When ISPs desire to use conduit, there is a process they must follow to ensure there is available conduit capacity where they intend to build and for the arrangements that will be necessary to utilize any available conduit capacity. The process and procedures for ISPs to install their fiber in CV Sync conduit are defined in the Implementation Plan section of this report. Jurisdictions will make decisions and arrangements regarding conduit use.

This deliverable will explore the financial requirements and implications of the above scenarios. To determine costs, high-level designs were completed and costs from California projects were utilized. The first two options (jurisdictions adding conduit and jurisdictions building full fiber networks) will be discussed in detail in individual sections of the report. Working with ISPs will be discussed as parts of those sections.

BENEFIT OF ADDING CONDUIT DURING OTHER PROJECTS

TYPICAL CONDUIT INSTALLATION COST

The cost of installation of conduit varies greatly depending on multiple factors, such as:

- In rural settings methods like plowing installation (a piece of equipment opens a trench, installs the conduit, then closes the trench) much like a tractor moving along the Right of Way (ROW) – this is a much less expensive than other methods
- If there are large rocks or a rock table, costs increase significantly
- In a more urban setting, the conduit usually has to be installed using boring equipment to go under driveways, roads, etc. this is more expensive than plowing. In the Policy section of this report there are policies and design guidelines that provide recommended standards for multiple construction techniques including aerial, plowing, trenching, directional boring, microtrenching, etc. Many telecommunications owners prefer aerial and microtrenching because of their perceived lower costs. Cost can be lower in those construction methods, but those costs can vary significantly based on the circumstances in the construction path. For other considerations regarding those methods, refer to that report section
- The availability and cost of labor, equipment and the conduit can fluctuate considerably
- Government requirements for labor and installation also significantly impact the cost of installation
- Other factors can also raise and lower costs of installation

In a more urban setting (where there are driveways, roads, sidewalks, etc., in California in 2026, construction companies have reported to HR Green that it is not uncommon for construction companies to charge $55/lf to install the conduit. Labor and materials costs can vary greatly, so costs need to be verified for current prices.

The actual cost of the conduit is one of the least expensive factors. The State of California reported to the Advisory Group for the project that they have surplus materials for sale. Those materials include:

Product Category	Part Number	Details	Manufacture	Available Qty	Unit Price	Current Market Price
Fiber	MMBI-288EV4-14100D53 CUT REEL	288F RIBBON NON-ARMORED MMBI	Corning	4134524	$ 2.04	$ 2.00
Conduit		SDR 11 Conduit, 102" reel	Dura-Line	17200320	$ 1.49	$ 0.82
Vault Type 1	PG3048Z9755C6	TYPE 1 VAULT - TIER 22, 30" X 48" X 36"	Concast	820	$ 1,237.00	$ 1,330.00
Vault Type 1 Lids	PG3048HH00BN6P	Lids for Vault Type 1	Concast	820	$ 591.00	$ 605.00
Vault Type 2	A6001433HDAPCX36	TYPE 2 VAULT - TIER 22, 48" X 48" X 48"	Concast	134	$ 3,210.00	$ 3,410.00
Vault Type 2 Lids	A6001434HD-MMBN	Lids for Vault Type 2	Concast	134	$ 746.00	$ 790.00
Vault Type 3	FHR-30-48-36-KIT	TYPE 3 VAULT - AASHTO H-20, 30" X 48" X 36"			$ 1,668.00	$ 1,720.00
Vault Type 3 Lids		Lids for Vault Type 3			$ 589.00	$ 589.00
Huts	12' x 20' Concrete Shelters - Manual Transfer Switch, 200amp, 1phase, Square D, DTU224N - 60KW LP/NG Generators - Exterior Finish Upgrade"	12' x 20' Concrete Shelters (Hut)	Sabre	15	$. 440,089	

Figure 1 - State MMBI Surplus Materials

The cost for conduit is $1.49 per lineal foot.

Adding those together, the price to install conduit per lineal foot would be expected to be approximately $56.49.

As can be seen from the above construction company costs for labor and equipment and the State of California price for conduit, the most expensive component of installation is the labor and equipment cost.

INSTALLATION COST AS PART OF ANOTHER PROJECT

Conduit can be installed as part of other projects, typically referred to as "Dig Once". For example, when another utility is being installed or replaced, it is possible that conduit could be placed in the trench that is open for the other project. This can apply to water, sewer, electric (with some conditions), roads, other telecommunications installation, trails, sidewalks, etc.).

The reasons why it is so important to consider installing conduit during other projects is when a trench is already opened, the cost of labor can decrease between 75% - 100% (sometimes contractors will place the conduit at no extra labor cost or if jurisdiction employees are performing the work, it can be done with no extra labor charges). When that can happen, the price can change from $56.49/lf to $14/lf or even $1.49/lf.

Then the conduit is available to have fiber placed in it. When fiber is being pulled through conduit, the cost is $2.04/lf (from the MMBI chart) and the labor is much less expensive.

AVAILABLE CONDUIT CAPACITY

The available CV Sync conduit capacity is an extremely valuable commodity. As is shown in the numbers in the previous section, utilizing the conduit could save whoever utilizes it 75% to 100% of the cost of deployment.

Jurisdictions can also view CIP work as opportunities to install conduit very inexpensively, possibly for only the cost of materials. This CIP conduit installation can develop a very valuable asset. The jurisdiction could utilize it for any fiber deployment they consider and/or it can be used in discussions with ISPs. As was clearly communicated in discussions with ISPs as part of this project, this is something they are very interested in.

These cost variables also point out the importance of having "dig once" policies within which any work that is being done in the ROW (any work that has a permit needed) can be evaluated to see if it would make sense to install conduit during the construction. Again, when possible, conduit can be installed for a fraction of the cost of regular installation.

COSTS SAVINGS CAN PROVIDE MULTIPLE BENEFITS

With such a significant conduit cost savings from CV Sync and potential for savings from CIP project and dig once conduit placement, there are several benefits jurisdictions can realize.

Revenue

Previously installed conduit it less expensive. Therefore, whoever utilizes it will be able to install fiber at a reduced rate. This greatly reduces the Capital Expense (CapEx) necessary to build a network.

Because of those savings, jurisdictions can lease the conduit to ISPs at rates that would still be far less than the cost to install the conduit (within the guidelines of grants and agreements). Moreover, for ISPs, this becomes an Operations Expense (OpEx) instead of CapEx. For some ISPs, that difference will be intriguing.

Making Jurisdiction Options More Feasible

For jurisdictions considering building their own networks or rings, the cost savings of only paying for fiber installation (which is far less in conduit) can make project financially feasible when having to pay full CapEx and OpEx costs make the math difficult.

BUILDING FULL NETWORKS

NETWORK COSTS

The first step in building full networks is determining costs. These can be used by jurisdictions to evaluate their internal options and/or to discuss options with ISPs.

As was mentioned in previous sections, it is important to note that the costs and potential revenue are estimates. Both are dependent on multiple factors and will vary (sometimes significantly) based on timing, conditions, market pressures, etc. Cost numbers in this deliverable are based on current projects in California and revenue figures have been derived from what ISPs are currently charging from similar technologies. Therefore, these numbers can provide a relevant general understanding but also be expected to change for specific projects.

After having identified broadband concerns in the CVAG area (please reference the Gap Analysis deliverable), the next step is to work on ways to improve those issues. To provide information for the improvement process, it can be helpful to have a clear idea of what infrastructure will be needed to connect addresses that are unserved or underserved and the associate costs. To provide that information, HR Green defined three areas with unserved and underserved addresses and performed a conceptual (high-level) design with expected costs for an underground fiber network.

Typically, unserved and underserved addresses have not been adequately connected for identifiable reasons. If serving those addresses made financial sense, the market would have already reached them.

The most common of reason potential customers do not have adequate service is the cost to deploy infrastructure. In urban areas with a high density of addresses, it usually makes financial sense for private internet service providers (ISPs) to make the investment in the network to connect those customers. When addresses are far apart or there are other impediments that make infrastructure deployment cost more, it can be difficult for an ISP to make a profit on their investment in a reasonable timeframe.

From the Gap Analysis, HR Green identified three areas with unserved and underserved addresses to perform high-level designs (HLDs). These HLDs provide representative costs that can be used to understand infrastructure costs in the Coachella Valley.

The costs vary greatly in the different identified areas. Area 1, Cabinet C has a high-level cost of just over

$1,000 per passing (each address the network goes past). Area 3, Cabinet D has a cost per passing of over $15,000.

Such a wide variance can be attibuted to the number of addresses in the HLD and how far apart the addresses are. These numbers show how dramatically these variables impact costs.

Typically, an ISP looks for a cost per passing that is under $2,000 (and probably closer to $1,000) for infrastructure investment to make sense. Even with lower costs per passing, there are still key variables. One signficant factor is how close their existing network is - or at least a middle mile connection (the infrastructure (usually fiber) that they can connect the network they build to these homes and businesses to their other network or to the outside internet). Other factors that can add to costs of infrastructure can be local government policies and permit procedures, environmental factors, etc.

In the HLDs in this report, the average cost per passing is approximately $5,000. This points out why they are unserved or underserved addresses. There is likely a combination of rurality leading to not enough addresses or the addresses being too far apart to provide an adequate return on investment. The clusters of addresses could also be far enough apart that the cost to reach them is too high.

The intent of developing these HLDs is to help formulate options to improve the service to the unserved and underserved addresses. Knowing locations, layout options and costs can help with developing a plan. Basically, there are three options:

- The community deploy infrastructure – if a community has the financial means and political will to build infrastructure, they can build and own the network, provide middle mile, etc. Please see the “Governance” deliverable for options on government involvement
- ISP infrastructure investment – knowing the costs in these HDLs can help the community discuss with ISPs ways to help the ISPs overcome the reasons why they have not already built the infrastructure to these addresses
- Grants – the main intent for most broadband grants is to change the math by lowering the costs of deployment, making the return make better financial sense

METHODOLOGY

The first step in developing conceptual designs (HLDs) was to define representative areas to design networks. Three areas are shown in the map below.

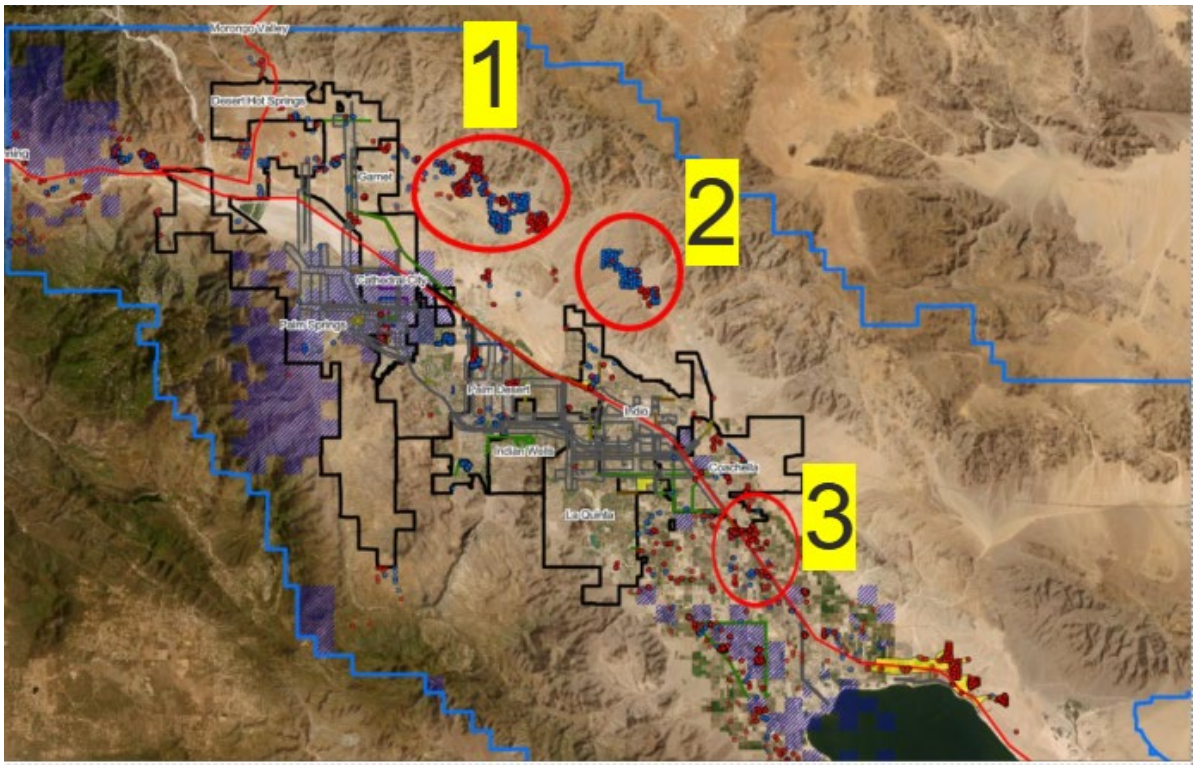


Figure 2 - Three Areas Defined For HLD

The HLD design standard includes the following details:

- All fiber is buried underground
- The architecture is GPON – this defines that the fiber is designed in a passive optical network managed by equipment on both ends of the fiber
- The design is organized into cabinets based on distances and numbers of addresses
- Connection to middle mile is not taken into account in these designs (if middle mile is not close, there could be significant costs to connect these networks to other networks or to the outside internet
- These designs do not include the equipment, operations costs or debt service costs to run the network (this is further shown in the HLDs)

HLD AREA#1

HLD Area #1 in the map in Figure 1 has been broken out into the following cabinets (also referred to as service boundaries). The red dots are addresses.

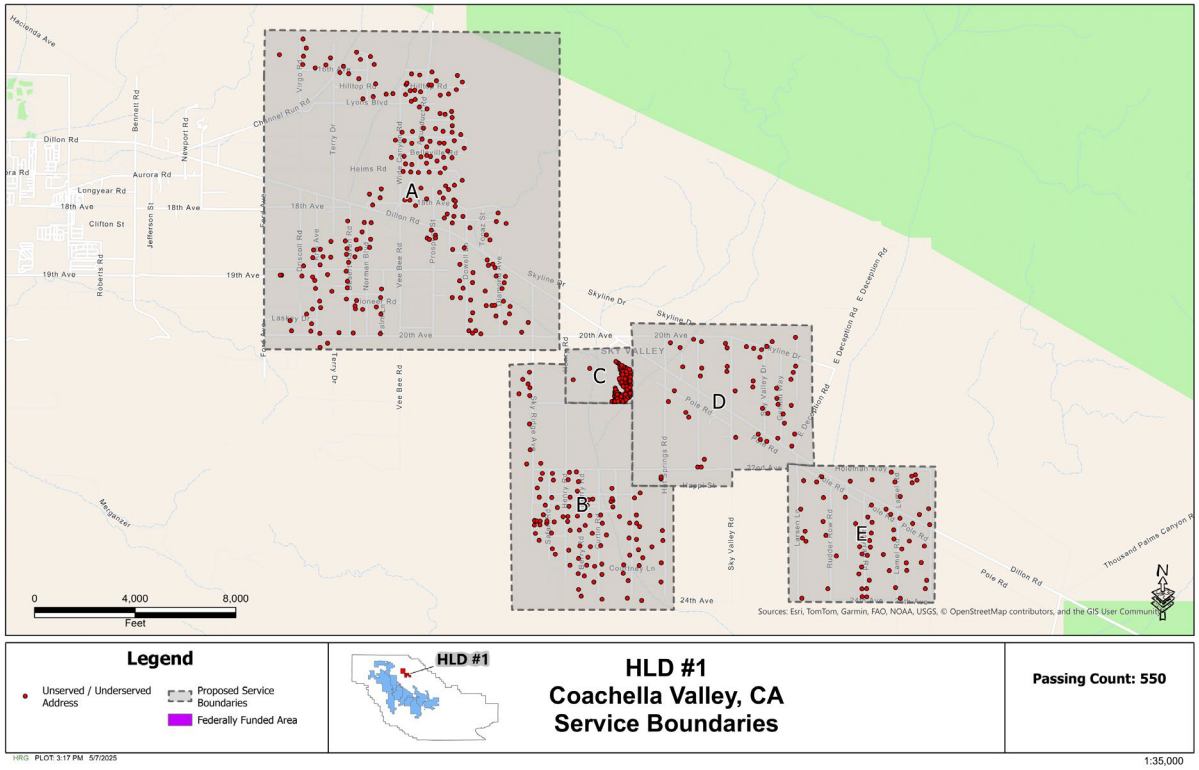
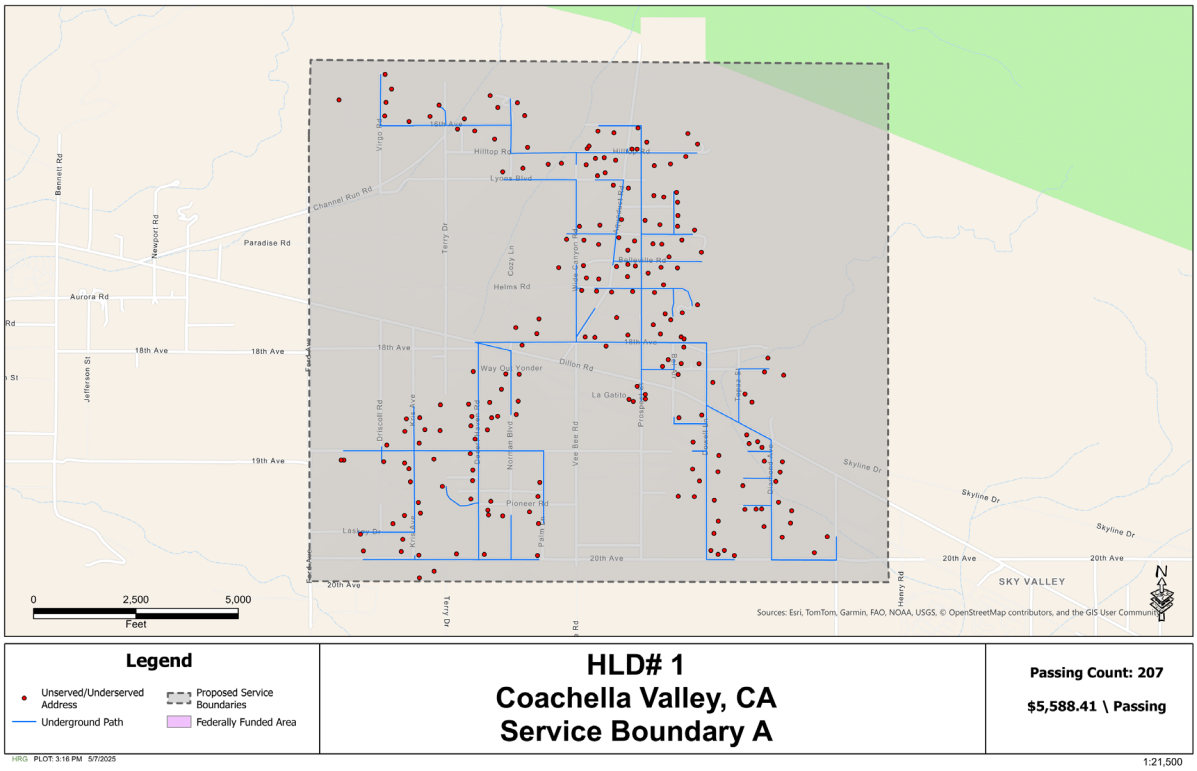


Figure 3 – Service Boundaries (Cabinets) in Area # !

SERVICE BOUNDARY A

The below map shows an HLD network for Area 1 Service Boundary A. The blue line is the Outside Plant (OSP) fiber network. OSP refers to the fiber and splicing that are required for a network (without the operating equipment). The red dots are underserved addresses (as identified in the legend). The legend also identifies that there are 207 passings (addresses) and the cost for just the OSP is $5,588.41 per passing or $1,156,801.50 for this build. That does not include some important costs, which are identified in the full spreadsheet after the map and summary costs.



Engineering	95,251
Materials	210,038
Construction - AER	-
Construction - UG	851,513
Total Cost	$ 1,156,801.60

Passings	207
Cost Per Passing	$ 5,588.41

Figure 4 - Area # 1 Service Boundary A
Map and Summary Costs

The full breakout of high-level costs is below. This spreadsheet includes OSP material costs and construction labor to build it. This does not include all costs for the OSP build, but it does have the most substantial ones.

It is important to notice the bottom of the spreadsheet. There are significant costs which are intentionally

not included in these numbers. The reason they are not is, depending on who will build the network, the costs might or might not be incurred. For example, if an ISP deploys the infrastructure, they would likely be able to connect it to their existing network access equipment, thus not incurring that expense. If a community decided to build the network and did not have equipment (which they would probably not unless they were already operating a fiber network), they would have to purchase it. Also, this does not include costs of operating the network – this is solely for outside plant infrastructure and construction costs.

All of the “Miscellaneous Costs” at the bottom are costs that could be incurred, but they will depend on who builds and owns the network. Again, this also does not include the costs of operating the network or debt service for any financing.

Also, “drops” are not included in this list of costs and that can be a significant number. They are the fiber that runs from the OSP network (the blue line) to the building (house, business, apartment, etc.). The reason they are not part of these numbers is they are not usually installed until the customer at the address signs an agreement for service. Therefore, it is not possible to know the true cost until it is known who is signing up for service. However, this can be a significant cost in the project, so it would need to be accounted for.

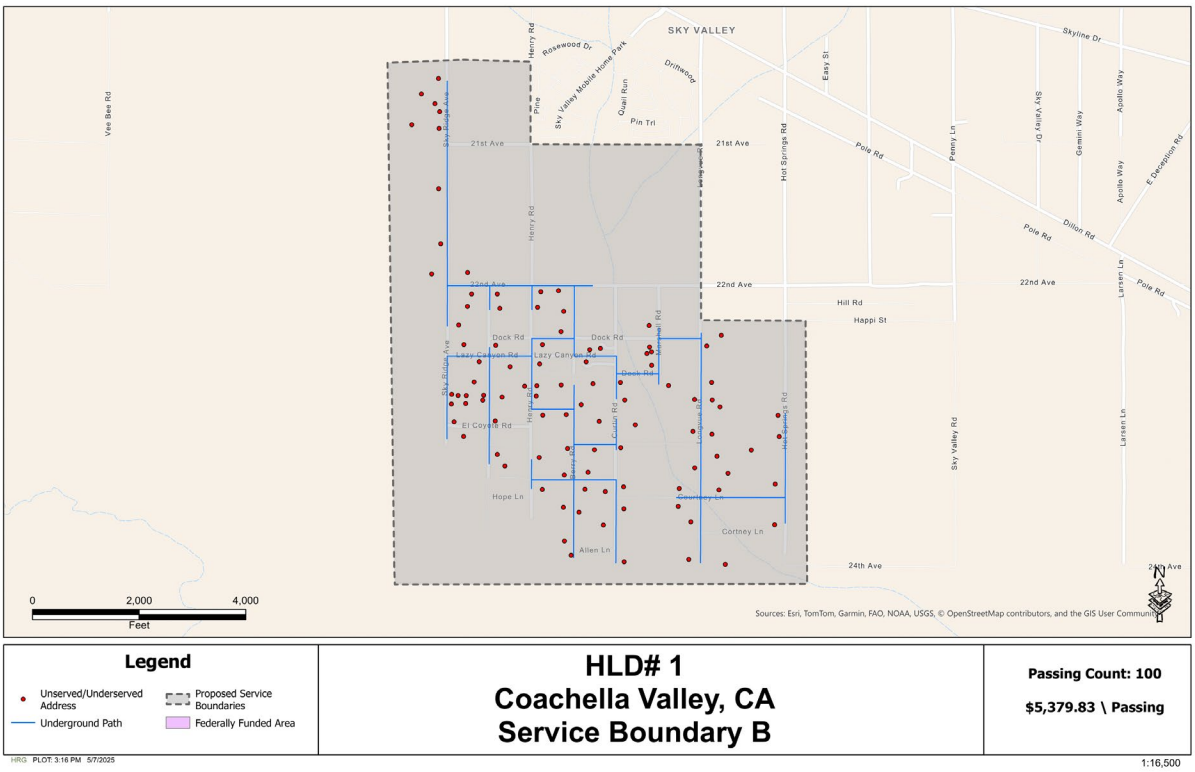
There is a typical process that is followed in building a network. The beginning point is the HLD and it is done from a desktop perspective (not field verified). If a project is moving forward, the HLD is used for a field verification, then a detailed design is completed from the field verification notes. If a community desired to build their own network, the HLDs developed for the Broadband Study could be used. Typically, if an ISP is going to do a build, they do their own HLD, field verification and detail design.

However, these HLDs and costs are important for CVAG jurisdictions to know and understand. They are the first step in the process if a jurisdiction is considering their own infrastructure build. If jurisdictions are considering working with or coordinating an ISP, then these numbers can help to have a clearer understanding of what the ISP is trying to work through to make the numbers make business sense.

Group - Summ	Group	Id	Description	Unit	Quantity	Unit Cost	Total Cost
Engineering	Cables	3	Traffic Control (No Drops)	feet	42,146	$ 0.70	$ 29,502.29
Engineering	Cable installation - Underground	NO-ENG	Underground Engineering - Underground Route Design	feet	79,598	$ 0.80	$ 63,678.69
Construction -UG	Cable installation - Underground	NO-ENG	Underground Engineering - Underground Permitting	feet	79,598	$ 0.35	$ 27,859.42
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 2" duct &	feet	159	$ 13.00	$ 2,069.56
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 1.25" duct	feet	1,035	$ 12.00	$ 12,417.34
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 1.25" duct	feet	11,940	$ 11.25	$ 134,322.23
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 2" ducts	feet	1,433	$ 11.25	$ 16,118.67
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 1.25" duct	feet	3,025	$ 10.00	$ 30,247.38
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 2" duct	feet	11,940	$ 8.75	$ 104,472.84
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 1.25" duct	feet	50,067	$ 8.25	$ 413,055.77
Construction -UG	Cable installation - Underground	BH8058	Underground Construction - Install #12 TRACER WIRE GREEN S	feet	79,598	$ 0.14	$ 11,143.77
Construction -UG	Cable installation - Underground	NO-CON	CABLE PULLING (MSTs)	feet	36,148	$ 1.20	$ 43,378.03
Construction -UG	Cable installation - Underground	NO-CON	CABLE PULLING (1 cable)	feet	15,586	$ 1.00	$ 15,586.35
Construction -UG	Cable installation - Underground	NO-CON	PMO (Underground)	feet	79,598	$ 0.48	$ 38,207.21
Construction -UG	Miscellaneous	45	Underground Construction - Provide and place fiber markers	count	5	$ 30.00	$ 150.00
Construction -UG	Cable installation - Underground	76	OTDR End to End Test of Fiber Cable	count	228	$ 20.00	$ 4,554.00
Materials	Cables	F5154	Aerial / Underground Material -Provide 48-ct fiber cable	feet	35,492	$ 0.45	$ 15,971.18
Materials	Cables	F5152	Aerial / Underground Material -Provide 96-ct fiber cable	feet	2,731	$ 0.84	$ 2,293.71
Materials	Cables	F5180	Aerial / Underground Material -Provide 144-ct fiber cable	feet	1,321	$ 0.99	$ 1,308.13
Materials	Cables	F5259	Aerial / Underground Material -Provide 216-ct fiber cable	feet	2,603	$ 1.36	$ 3,539.62
Materials	Terminals, cabinets, splitters	F5282	Provide and Place 432 Cabinet	count	1	$ 8,590.32	$ 8,590.32
Materials	Terminals, cabinets, splitters	F5156	1x32 DISTRIBUTION FIBER SPLITTER	count	7	$ 941.22	$ 6,588.54
Materials	Terminals, cabinets, splitters	F5144	Provide and Place (Raychem B) UG Splice Closure	count	31	$ 421.58	$ 13,068.98
Materials	Terminals, cabinets, splitters	F5079	Provide and Place (Raychem D) UG Splice Closure	count	2	$ 529.39	$ 1,058.78
Materials	Pedestals, flowerpots, pits, vaults e	C4073	Underground Construction - Provide and SET 35x15x17 DOGHO	count	26	$ 985.87	$ 25,632.62
Materials	Pedestals, flowerpots, pits, vaults e	C4082	Underground Construction - PROVIDE AND PLACE PEDESTAL 1	count	199	$ 229.17	$ 45,547.54
Materials	Pedestals, flowerpots, pits, vaults e	BH8132	Underground Construction - PROVIDE AND PLACE 17x30x24 Ya	count	32	$ 610.94	$ 19,427.89
Materials	Pedestals, flowerpots, pits, vaults e	BH8054	Underground Construction - PROVIDE AND PLACE 24x36x30 HA	count	26	$ 854.29	$ 22,211.54
Materials	Pedestals, flowerpots, pits, vaults e	BH8134	Underground Construction - PROVIDE AND PLACE 30x48x36 M	count	2	$ 1,736.63	$ 3,473.26
Materials	Pedestals, flowerpots, pits, vaults e	BH8134	Underground Construction - PROVIDE AND PLACE 30x48x36 M	count	1	$ 1,736.63	$ 1,736.63
Materials	Slackloops	F5154	Underground Construction -Underground Slack Loop 48Ct Fibe	feet	1,950	$ 0.45	$ 877.50
Materials	Slackloops	F5152	Underground Construction -Underground Slack Loop 96Ct Fibe	feet	300	$ 0.84	$ 252.00
Materials	Slackloops	F5180	Underground Construction -Underground Slack Loop 144Ct Fit	feet	75	$ 0.99	$ 74.25
Materials	Slackloops	F5259	Underground Construction -Underground Slack Loop 216Ct Fit	feet	150	$ 1.36	$ 204.00
Materials	Connectorized drop hubs	F5232	2 PORT MST 100' DIELECTRIC	count	14	$ 65.99	$ 923.86
Materials	Connectorized drop hubs	F5233	2 PORT MST 250' DIELECTRIC	count	11	$ 90.72	$ 997.92
Materials	Connectorized drop hubs	F5234	2 PORT MST 500' DIELECTRIC	count	31	$ 143.05	$ 4,434.55
Materials	Connectorized drop hubs	F5235	2 PORT MST 750' DIELECTRIC	count	21	$ 181.45	$ 3,810.45
Materials	Connectorized drop hubs	F5236	2 PORT MST 1000' DIELECTRIC	count	30	$ 218.55	$ 6,556.50
Materials	Connectorized drop hubs	F5237	2 PORT MST 1500' DIELECTRIC	count	49	$ 398.41	$ 19,522.09
Materials	Connectorized drop hubs	F5255	4 PORT MST 100' DIELECTRIC	count	2	$ 82.79	$ 165.58
Materials	Connectorized drop hubs	F5240	4 PORT MST 750' DIELECTRIC	count	1	$ 202.51	$ 202.51
Materials	Connectorized drop hubs	F5241	4 PORT MST 1000' DIELECTRIC	count	1	$ 241.38	$ 241.38
Materials	Connectorized drop hubs	F5250	4 PORT MST 1500' DIELECTRIC	count	4	$ 331.68	$ 1,326.72
Materials	Cables - Drops	51	DROP Footage (avg per drop amount/# passings)	feet		$ 2.06	$ -
Miscellaneous	Special Permits			count		$ 3,000.00	$ -
Miscellaneous	Middle Mile Connection			feet			$ -
Miscellaneous	Central Office			bid			$ -
Miscellaneous	Network Access Equipment			bid	-		$ -
Miscellaneous	Shelters			count			$ -
Miscellaneous	Contingency			count			$ -
					-		
						Total:	$ 1,156,801.60

Figure 5 - Area # 1 Service Boundary A Labor and Material OSP Costs

SERVICE BOUNDARY B



Engineering	44,785
Materials	104,356
Construction - AER	-
Construction - UG	388,842
Total Cost	$ 537,983.30

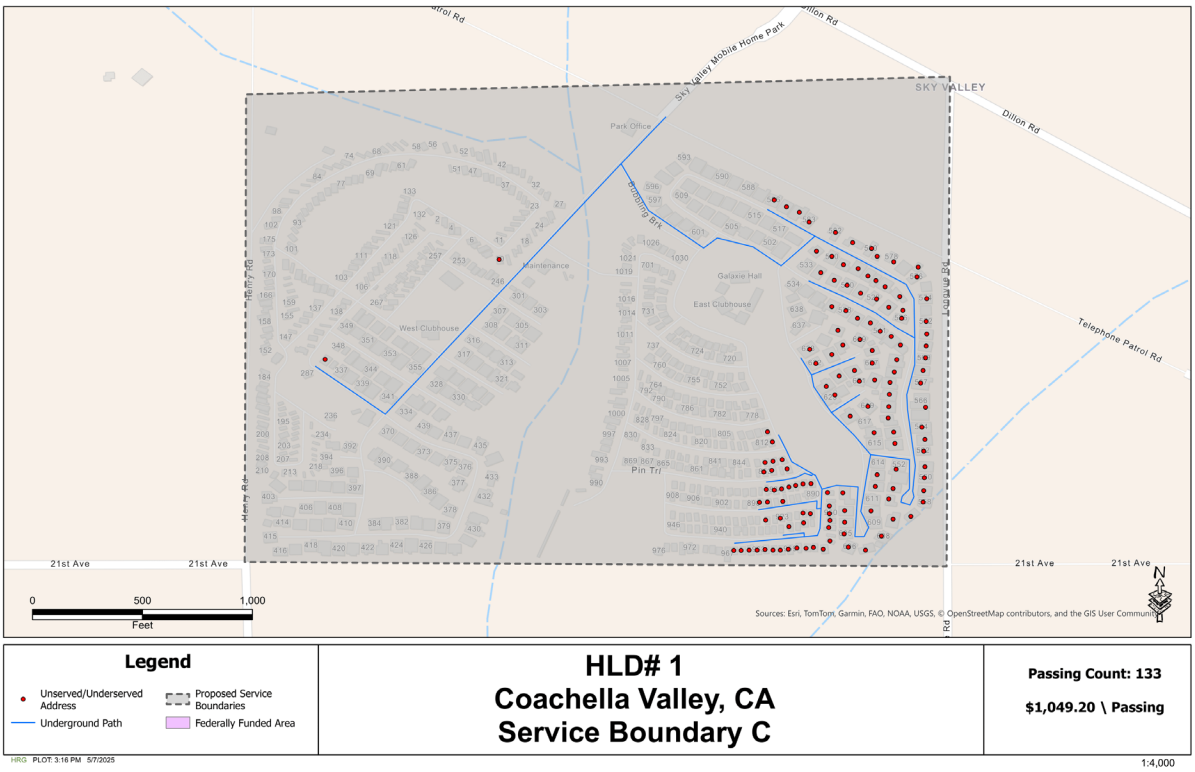
Passings	100
Cost Per Passing	$ 5,379.83

Figure 6 - Area # 1 Servic Boundry B Map and Summary Costs

Group - Summary	Group	Id	Description	Unit	Quantity	Unit Cost	Total Cost
Engineering	Cables	3	Traffic Control (No Drops)	feet	20,975	$ 0.70	$ 14,682.64
Materials	Cables	F5154	Aerial / Underground Material -Provide 48-ct fiber cable	feet	19,707	$ 0.45	$ 8,868.15
Materials	Cables	F5152	Aerial / Underground Material -Provide 96-ct fiber cable	feet	1,268	$ 0.84	$ 1,065.29
Materials	Cables	51	DROP Footage (avg per drop amount/# passings)	feet		$ 2.06	$ -
Engineering	Cable installation - Underground	NO-ENG	Underground Engineering - Underground Route Design	feet	36,444	$ 0.80	$ 29,155.02
Construction -UG	Cable installation - Underground	NO-ENG	Underground Engineering - Underground Permitting	feet	36,444	$ 0.35	$ 12,755.32
Engineering	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 2" du	feet	73	$ 13.00	$ 947.54
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 1.25"	feet	474	$ 12.00	$ 5,685.23
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 1.25"	feet	5,467	$ 11.25	$ 61,498.86
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 2" du	feet	656	$ 11.25	$ 7,379.86
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 1.25"	feet	1,385	$ 10.00	$ 13,848.63
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 2" du	feet	5,467	$ 8.75	$ 47,832.45
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 1.25"	feet	22,923	$ 8.25	$ 189,115.84
Construction -UG	Cable installation - Underground	BH8058	Underground Construction - Install #12 TRACER WIRE GRE	feet	36,444	$ 0.14	$ 5,102.13
Construction -UG	Cable installation - Underground	NO-CON	CABLE PULLING (MSTs)	feet	14,815	$ 1.20	$ 17,777.41
Construction -UG	Cable installation - Underground	NO-CON	CABLE PULLING (1 cable)	feet	7,699	$ 1.00	$ 7,699.27
Construction -UG	Cable installation - Underground	NO-CON	CABLE PULLING (2 cables)	feet	283	$ 1.50	$ 423.92
Construction -UG	Cable installation - Underground	NO-CON	PMO (Underground)	feet	36,444	$ 0.48	$ 17,493.01
Construction -UG	Miscellaneous	45	Underground Construction - Provide and place fiber mark	count	1	$ 30.00	$ 30.00
Materials	Terminals, cabinets, splitters	F5282	Provide and Place 432 Cabinet	count	1	$ 8,590.32	$ 8,590.32
Materials	Terminals, cabinets, splitters	F5156	1x32 DISTRIBUTION FIBER SPLITTER	count	4	$ 941.22	$ 3,764.88
Materials	Terminals, cabinets, splitters	F5144	Provide and Place (Raychem B) UG Splice Closure	count	14	$ 421.58	$ 5,902.12
Materials	Pedestals, flowerpots, pits, vaults	C4073	Underground Construction - Provide and SET 35x15x17 DC	count	14	$ 985.87	$ 13,802.18
Materials	Pedestals, flowerpots, pits, vaults	C4082	Underground Construction - PROVIDE AND PLACE PEDEST	count	94	$ 229.17	$ 21,484.69
Materials	Pedestals, flowerpots, pits, vaults	BH8132	Underground Construction - PROVIDE AND PLACE 17x30x	count	15	$ 610.94	$ 9,164.10
Materials	Pedestals, flowerpots, pits, vaults	BH8054	Underground Construction - PROVIDE AND PLACE 24x36x	count	14	$ 854.29	$ 11,960.06
Materials	Pedestals, flowerpots, pits, vaults	BH8134	Underground Construction - PROVIDE AND PLACE 30x48x	count	1	$ 1,736.63	$ 1,736.63
Materials	Slackloops	F5154	Underground Construction -Underground Slack Loop 48Ct	feet	975	$ 0.45	$ 438.75
Materials	Slackloops	F5152	Underground Construction -Underground Slack Loop 96Ct	feet	75	$ 0.84	$ 63.00
Construction -UG	Cable installation - Underground	76	OTDR End to End Test of Fiber Cable	count	110	$ 20.00	$ 2,200.00
Materials	Connectorized drop hubs	F5232	2 PORT MST 100' DIELECTRIC	count	1	$ 65.99	$ 65.99
Materials	Connectorized drop hubs	F5233	2 PORT MST 250' DIELECTRIC	count	10	$ 90.72	$ 907.20
Materials	Connectorized drop hubs	F5234	2 PORT MST 500' DIELECTRIC	count	13	$ 143.05	$ 1,859.65
Materials	Connectorized drop hubs	F5235	2 PORT MST 750' DIELECTRIC	count	10	$ 181.45	$ 1,814.50
Materials	Connectorized drop hubs	F5236	2 PORT MST 1000' DIELECTRIC	count	13	$ 218.55	$ 2,841.15
Materials	Connectorized drop hubs	F5237	2 PORT MST 1500' DIELECTRIC	count	23	$ 398.41	$ 9,163.43
Materials	Connectorized drop hubs	F5255	4 PORT MST 100' DIELECTRIC	count	1	$ 82.79	$ 82.79
Materials	Connectorized drop hubs	F5238	4 PORT MST 250' DIELECTRIC	count	1	$ 112.51	$ 112.51
Materials	Connectorized drop hubs	F5240	4 PORT MST 750' DIELECTRIC	count	1	$ 202.51	$ 202.51
Materials	Connectorized drop hubs	F5250	4 PORT MST 1500' DIELECTRIC	count	1	$ 331.68	$ 331.68
Materials	Connectorized drop hubs	F5260	6 PORT MST 250' DIELECTRIC	count	1	$ 134.59	$ 134.59
Miscellaneous	Special Permits			count		$ 3,000.00	$ -
Miscellaneous	Middle Mile Connection			feet			$ -
Miscellaneous	Central Office			bid			$ -
Miscellaneous	Network Access Equipment			bid			$ -
Miscellaneous	Shelters			count			$ -
Miscellaneous	Contingency			count			$ -
						Total:	$537,983.30

Figure 7 - Area # 1 Service Boundary B Labor and Material OSP Costs

SERVICE BOUNDARY C



Engineering	9,802
Materials	35,912
Construction - AER	-
Construction - UG	93,829
Total Cost	$ 139,543.42

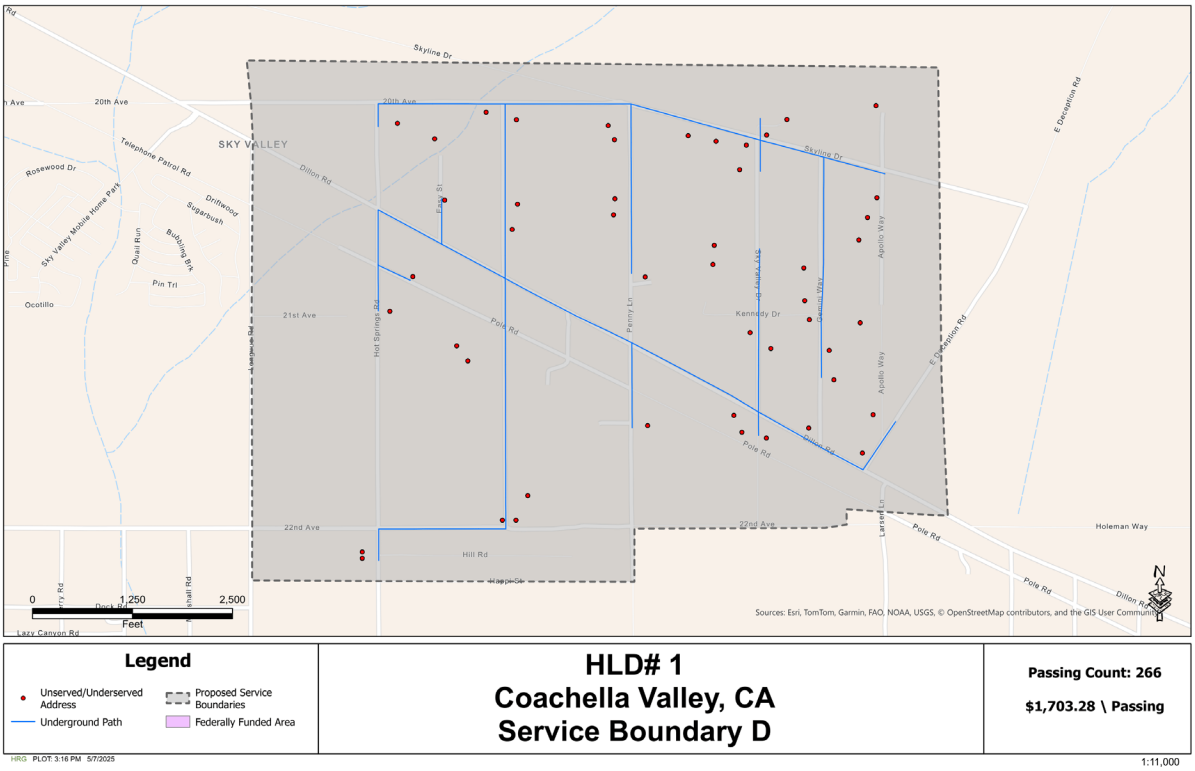
Passings	133
Cost Per Passing	$ 1,049.20

Figure 8 - Area # 1 Service Boundary C
Map and Summary Costs

Group - Summary	Group	Id	Description	Unit	Quantity	Unit Cost	Total Cost
Engineering	Cables	3	Traffic Control (No Drops)	feet	3,857	$ 0.70	$ 2,700.13
Materials	Cables	F5154	Aerial / Underground Material -Provide 48-ct fiber cable	feet	645	$ 0.45	$ 290.36
Materials	Cables	F5152	Aerial / Underground Material -Provide 96-ct fiber cable	feet	1,251	$ 0.84	$ 1,050.87
Materials	Cables	F5180	Aerial / Underground Material -Provide 144-ct fiber cable	feet	1,961	$ 0.99	$ 1,941.44
Materials	Cables	51	DROP Footage (avg per drop amount/# passings)	feet		$ 2.06	$ -
Engineering	Cable installation - Underground	NO-ENG	Underground Engineering - Underground Route Design	feet	8,598	$ 0.80	$ 6,878.47
Construction -UG	Cable installation - Underground	NO-ENG	Underground Engineering - Underground Permitting	feet	8,598	$ 0.35	$ 3,009.33
Engineering	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 2" du	feet	17	$ 13.00	$ 223.55
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 1.25"	feet	112	$ 12.00	$ 1,341.30
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 1.25"	feet	1,290	$ 11.25	$ 14,509.28
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 2" du	feet	155	$ 11.25	$ 1,741.11
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 1.25"	feet	327	$ 10.00	$ 3,267.28
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 2" du	feet	1,290	$ 8.75	$ 11,285.00
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 1.25"	feet	5,408	$ 8.25	$ 44,617.65
Construction -UG	Cable installation - Underground	BH8058	Underground Construction - Install #12 TRACER WIRE GRE	feet	8,598	$ 0.14	$ 1,203.73
Construction -UG	Cable installation - Underground	NO-CON	CABLE PULLING (MSTs)	feet	2,912	$ 1.20	$ 3,494.16
Construction -UG	Cable installation - Underground	NO-CON	CABLE PULLING (1 cable)	feet	1,872	$ 1.00	$ 1,872.43
Construction -UG	Cable installation - Underground	NO-CON	CABLE PULLING (2 cables)	feet	270	$ 1.50	$ 404.92
Construction -UG	Cable installation - Underground	NO-CON	PMO (Underground)	feet	8,598	$ 0.48	$ 4,127.08
Construction -UG	Miscellaneous	45	Underground Construction - Provide and place fiber mark	count	1	$ 30.00	$ 30.00
Materials	Terminals, cabinets, splitters	F5282	Provide and Place 432 Cabinet	count	1	$ 8,590.32	$ 8,590.32
Materials	Terminals, cabinets, splitters	F5156	1x32 DISTRIBUTION FIBER SPLITTER	count	5	$ 941.22	$ 4,706.10
Materials	Terminals, cabinets, splitters	F5144	Provide and Place (Raychem B) UG Splice Closure	count	3	$ 421.58	$ 1,264.74
Materials	Pedestals, flowerpots, pits, vaults	C4073	Underground Construction - Provide and SET 35x15x17 DC	count	1	$ 985.87	$ 985.87
Materials	Pedestals, flowerpots, pits, vaults	C4082	Underground Construction - PROVIDE AND PLACE PEDEST	count	26	$ 229.17	$ 6,015.71
Materials	Pedestals, flowerpots, pits, vaults	BH8132	Underground Construction - PROVIDE AND PLACE 17x30x	count	4	$ 610.94	$ 2,565.95
Materials	Pedestals, flowerpots, pits, vaults	BH8054	Underground Construction - PROVIDE AND PLACE 24x36x	count	1	$ 854.29	$ 854.29
Materials	Pedestals, flowerpots, pits, vaults	BH8134	Underground Construction - PROVIDE AND PLACE 30x48x	count	1	$ 1,736.63	$ 1,736.63
Materials	Slackloops	F5154	Underground Construction -Underground Slack Loop 48Ct	feet	75	$ 0.45	$ 33.75
Materials	Slackloops	F5152	Underground Construction -Underground Slack Loop 96Ct	feet	75	$ 0.84	$ 63.00
Materials	Slackloops	F5180	Underground Construction -Underground Slack Loop 144(	feet	75	$ 0.99	$ 74.25
Construction -UG	Cable installation - Underground	76	OTDR End to End Test of Fiber Cable	count	146	$ 20.00	$ 2,926.00
Materials	Connectorized drop hubs	F5232	2 PORT MST 100' DIELECTRIC	count	1	$ 65.99	$ 65.99
Materials	Connectorized drop hubs	F5234	2 PORT MST 500' DIELECTRIC	count	2	$ 143.05	$ 286.10
Materials	Connectorized drop hubs	F5237	2 PORT MST 1500' DIELECTRIC	count	1	$ 398.41	$ 398.41
Materials	Connectorized drop hubs	F5239	4 PORT MST 500' DIELECTRIC	count	1	$ 165.20	$ 165.20
Materials	Connectorized drop hubs	F5240	4 PORT MST 750' DIELECTRIC	count	1	$ 202.51	$ 202.51
Materials	Connectorized drop hubs	F5241	4 PORT MST 1000' DIELECTRIC	count	1	$ 241.38	$ 241.38
Materials	Connectorized drop hubs	F5242	6 PORT MST 500' DIELECTRIC	count	1	$ 184.33	$ 184.33
Materials	Connectorized drop hubs	F5243	6 PORT MST 750' DIELECTRIC	count	2	$ 300.38	$ 600.76
Materials	Connectorized drop hubs	F5244	6 PORT MST 1000' DIELECTRIC	count	3	$ 264.41	$ 793.23
Materials	Connectorized drop hubs	F5256	6 PORT MST 1500' DIELECTRIC	count	1	$ 376.82	$ 376.82
Materials	Connectorized drop hubs	MST-UG8-100	8 PORT MST 100' DIELECTRIC	count	1	$ 150.00	$ 150.00
Materials	Connectorized drop hubs	F5245	8 PORT MST 250' DIELECTRIC	count	1	$ 166.22	$ 166.22
Materials	Connectorized drop hubs	F5246	8 PORT MST 500' DIELECTRIC	count	1	$ 226.30	$ 226.30
Materials	Connectorized drop hubs	F5322	8 PORT MST 750' DIELECTRIC	count	2	$ 255.93	$ 511.86
Materials	Connectorized drop hubs	F5265	12 PORT MST 500' DIELECTRIC	count	2	$ 292.48	$ 584.96
Materials	Connectorized drop hubs	F5247	12 PORT MST 1000' DIELECTRIC	count	2	$ 392.32	$ 784.64
Miscellaneous	Special Permits			count		$ 3,000.00	$ -
Miscellaneous	Middle Mile Connection			feet			$ -
Miscellaneous	Central Office			bid			$ -
Miscellaneous	Network Access Equipment			bid			$ -
Miscellaneous	Shelters			count			$ -
Miscellaneous	Contingency			count			$ -
						Total:	$ 139,543.42

Figure 9 - Area # 1 Service Boundary C Labor and Material OSP Costs

SERVICE BOUNDARY D



Engineering	37,277
Materials	80,593
Construction - AER	-
Construction - UG	335,204
Total Cost	$ 453,073.46

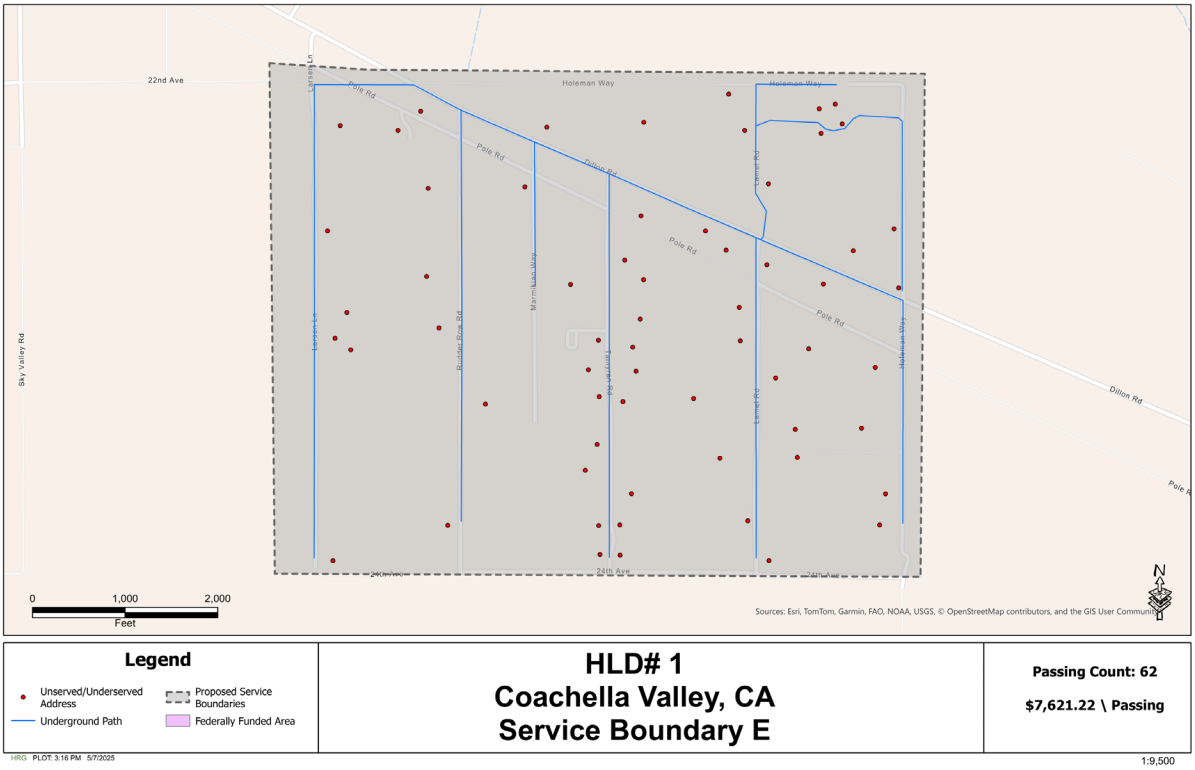
Passings	48
Cost Per Passing	$ 9,439.03

Figure 10 - Area # 1 Service Boundary D
Map and Summary Costs

Group - Summary	Group	Id	Description	Unit	Quantity	Unit Cost	Total Cost
Engineering	Cables	3	Traffic Control (No Drops)	feet	17,294	$ 0.70	$ 12,106.00
Materials	Cables	F5154	Aerial / Underground Material -Provide 48-ct fiber cable	feet	9,287	$ 0.45	$ 4,179.11
Materials	Cables	F5152	Aerial / Underground Material -Provide 96-ct fiber cable	feet	4,812	$ 0.84	$ 4,042.48
Materials	Cables	F5180	Aerial / Underground Material -Provide 144-ct fiber cabl	feet	1,307	$ 0.99	$ 1,293.65
Materials	Cables	F5259	Aerial / Underground Material -Provide 216-ct fiber cabl	feet	1,888	$ 1.36	$ 2,567.91
Materials	Cables	51	DROP Footage (avg per drop amount/# passings)	feet		$ 2.06	$ -
Engineering	Cable installation - Underground	NO-ENG	Underground Engineering - Underground Route Design	feet	30,473	$ 0.80	$ 24,378.57
Construction -UG	Cable installation - Underground	NO-ENG	Underground Engineering - Underground Permitting	feet	30,473	$ 0.35	$ 10,665.63
Engineering	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 2" du	feet	61	$ 13.00	$ 792.30
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 1.25"	feet	396	$ 12.00	$ 4,753.82
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 1.25"	feet	4,571	$ 11.25	$ 51,423.55
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 2" du	feet	549	$ 11.25	$ 6,170.83
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 1.25"	feet	1,158	$ 10.00	$ 11,579.82
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 2" du	feet	4,571	$ 8.75	$ 39,996.10
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 1.25"	feet	19,168	$ 8.25	$158,133.14
Construction -UG	Cable installation - Underground	BH8058	Underground Construction - Install #12 TRACER WIRE GRE	feet	30,473	$ 0.14	$ 4,266.25
Construction -UG	Cable installation - Underground	NO-CON	CABLE PULLING (MSTs)	feet	13,570	$ 1.20	$ 16,283.65
Construction -UG	Cable installation - Underground	NO-CON	CABLE PULLING (1 cable)	feet	11,242	$ 1.00	$ 11,242.05
Construction -UG	Cable installation - Underground	NO-CON	PMO (Underground)	feet	30,473	$ 0.48	$ 14,627.14
Construction -UG	Miscellaneous	45	Underground Construction - Provide and place fiber marl	count	7	$ 30.00	$ 210.00
Materials	Terminals, cabinets, splitters	F5282	Provide and Place 432 Cabinet	count	1	$ 8,590.32	$ 8,590.32
Materials	Terminals, cabinets, splitters	F5156	1x32 DISTRIBUTION FIBER SPLITTER	count	9	$ 941.22	$ 8,470.98
Materials	Terminals, cabinets, splitters	F5144	Provide and Place (Raychem B) UG Splice Closure	count	12	$ 421.58	$ 5,058.96
Materials	Terminals, cabinets, splitters	F5079	Provide and Place (Raychem D) UG Splice Closure	count	1	$ 529.39	$ 529.39
Materials	Pedestals, flowerpots, pits, vaults	C4073	Underground Construction - Provide and SET 35x15x17 D(	count	8	$ 985.87	$ 7,886.96
Materials	Pedestals, flowerpots, pits, vaults	C4082	Underground Construction - PROVIDE AND PLACE PEDEST	count	49	$ 229.17	$ 11,172.04
Materials	Pedestals, flowerpots, pits, vaults	BH8132	Underground Construction - PROVIDE AND PLACE 17x30x	count	8	$ 610.94	$ 4,765.33
Materials	Pedestals, flowerpots, pits, vaults	BH8054	Underground Construction - PROVIDE AND PLACE 24x36x	count	8	$ 854.29	$ 6,834.32
Materials	Pedestals, flowerpots, pits, vaults	BH8134	Underground Construction - PROVIDE AND PLACE 30x48x	count	1	$ 1,736.63	$ 1,736.63
Materials	Pedestals, flowerpots, pits, vaults	BH8134	Underground Construction - PROVIDE AND PLACE 30x48x	count	1	$ 1,736.63	$ 1,736.63
Materials	Slackloops	F5154	Underground Construction -Underground Slack Loop 48C	feet	600	$ 0.45	$ 270.00
Materials	Slackloops	F5152	Underground Construction -Underground Slack Loop 96C	feet	225	$ 0.84	$ 189.00
Materials	Slackloops	F5180	Underground Construction -Underground Slack Loop 144(	feet	75	$ 0.99	$ 74.25
Materials	Slackloops	F5259	Underground Construction -Underground Slack Loop 216(	feet	75	$ 1.36	$ 102.00
Construction -UG	Cable installation - Underground	76	OTDR End to End Test of Fiber Cable	count	293	$ 20.00	$ 5,852.00
Materials	Connectorized drop hubs	F5239	4 PORT MST 500' DIELECTRIC	count	2	$ 165.20	$ 330.40
Materials	Connectorized drop hubs	F5241	4 PORT MST 1000' DIELECTRIC	count	1	$ 241.38	$ 241.38
Materials	Connectorized drop hubs	F5250	4 PORT MST 1500' DIELECTRIC	count	3	$ 331.68	$ 995.04
Materials	Connectorized drop hubs	F5301	6 PORT MST 100' DIELECTRIC	count	4	$ 124.05	$ 496.20
Materials	Connectorized drop hubs	F5260	6 PORT MST 250' DIELECTRIC	count	5	$ 134.59	$ 672.95
Materials	Connectorized drop hubs	F5242	6 PORT MST 500' DIELECTRIC	count	8	$ 184.33	$ 1,474.64
Materials	Connectorized drop hubs	F5243	6 PORT MST 750' DIELECTRIC	count	3	$ 300.38	$ 901.14
Materials	Connectorized drop hubs	F5244	6 PORT MST 1000' DIELECTRIC	count	2	$ 264.41	$ 528.82
Materials	Connectorized drop hubs	F5256	6 PORT MST 1500' DIELECTRIC	count	9	$ 376.82	$ 3,391.38
Materials	Connectorized drop hubs	F5261	8 PORT MST 1500' DIELECTRIC	count	1	$ 401.19	$ 401.19
Materials	Connectorized drop hubs	MST-UG12-100	12 PORT MST 100' DIELECTRIC	count	1	$ 200.00	$ 200.00
Materials	Connectorized drop hubs	F5265	12 PORT MST 500' DIELECTRIC	count	2	$ 292.48	$ 584.96
Materials	Connectorized drop hubs	F5247	12 PORT MST 1000' DIELECTRIC	count	1	$ 392.32	$ 392.32
Materials	Connectorized drop hubs	F5262	12 PORT MST 1500' DIELECTRIC	count	1	$ 482.21	$ 482.21
Miscellaneous	Special Permits			count		$ 3,000.00	$ -
Miscellaneous	Middle Mile Connection			feet			$ -
Miscellaneous	Central Office			bid			$ -
Miscellaneous	Network Access Equipment			bid			$ -
Miscellaneous	Shelters			count			$ -
Miscellaneous	Contingency			count			$ -
						Total:	$453,073.46

Figure 11 - Area # 1 Service Bounday D Labor and Material OSP Costs

SERVICE BOUNDARY E



Engineering	41,736
Materials	83,214
Construction - AER	-
Construction - UG	347,565
Total Cost	$ 472,515.59

Passings	62
Cost Per Passing	$ 7,621.22

Figure12 - Area # 1 Service Boundary E
Map and Summary Costs

Group - Summary	Group	Id	Description	Unit	Quantity	Unit Cost	Total Cost
Engineering	Cables	3	Traffic Control (No Drops)	feet	21,193	$ 0.70	$ 14,834.84
Materials	Cables	F5154	Aerial / Underground Material -Provide 48-ct fiber cable	feet	21,193	$ 0.45	$ 9,536.68
Materials	Cables	51	DROP Footage (avg per drop amount/# passings)	feet		$ 2.06	$ -
Engineering	Cable installation - Underground	NO-ENG	Underground Engineering - Underground Route Design	feet	32,568	$ 0.80	$ 26,054.68
Construction -UG	Cable installation - Underground	NO-ENG	Underground Engineering - Underground Permitting	feet	32,568	$ 0.35	$ 11,398.92
Engineering	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 2" du	feet	65	$ 13.00	$ 846.78
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 1.25"	feet	423	$ 12.00	$ 5,080.66
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 1.25"	feet	4,885	$ 11.25	$ 54,959.10
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 2" du	feet	586	$ 11.25	$ 6,595.09
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 1.25"	feet	1,238	$ 10.00	$ 12,375.97
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 2" du	feet	4,885	$ 8.75	$ 42,745.96
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 1.25"	feet	20,485	$ 8.25	$169,005.32
Construction -UG	Cable installation - Underground	BH8058	Underground Construction - Install #12 TRACER WIRE GRE	feet	32,568	$ 0.14	$ 4,559.57
Construction -UG	Cable installation - Underground	NO-CON	CABLE PULLING (MSTs)	feet	11,376	$ 1.20	$ 13,650.87
Construction -UG	Cable installation - Underground	NO-CON	CABLE PULLING (1 cable)	feet	10,017	$ 1.00	$ 10,016.65
Construction -UG	Cable installation - Underground	NO-CON	PMO (Underground)	feet	32,568	$ 0.48	$ 15,632.81
Construction -UG	Miscellaneous	45	Underground Construction - Provide and place fiber mark	count	6	$ 30.00	$ 180.00
Materials	Terminals, cabinets, splitters	F5282	Provide and Place 432 Cabinet	count	1	$ 8,590.32	$ 8,590.32
Materials	Terminals, cabinets, splitters	F5156	1x32 DISTRIBUTION FIBER SPLITTER	count	2	$ 941.22	$ 1,882.44
Materials	Terminals, cabinets, splitters	F5144	Provide and Place (Raychem B) UG Splice Closure	count	16	$ 421.58	$ 6,745.28
Materials	Pedestals, flowerpots, pits, vaults	C4073	Underground Construction - Provide and SET 35x15x17 DC	count	13	$ 985.87	$ 12,816.31
Materials	Pedestals, flowerpots, pits, vaults	C4082	Underground Construction - PROVIDE AND PLACE PEDEST	count	60	$ 229.17	$ 13,750.20
Materials	Pedestals, flowerpots, pits, vaults	BH8132	Underground Construction - PROVIDE AND PLACE 17x30x	count	10	$ 610.94	$ 5,865.02
Materials	Pedestals, flowerpots, pits, vaults	BH8054	Underground Construction - PROVIDE AND PLACE 24x36x	count	13	$ 854.29	$ 11,105.77
Materials	Pedestals, flowerpots, pits, vaults	BH8134	Underground Construction - PROVIDE AND PLACE 30x48x	count	1	$ 1,736.63	$ 1,736.63
Materials	Slackloops	F5154	Underground Construction -Underground Slack Loop 48Ct	feet	1,200	$ 0.45	$ 540.00
Construction -UG	Cable installation - Underground	76	OTDR End to End Test of Fiber Cable	count	68	$ 20.00	$ 1,364.00
Materials	Connectorized drop hubs	F5232	2 PORT MST 100' DIELECTRIC	count	8	$ 65.99	$ 527.92
Materials	Connectorized drop hubs	F5233	2 PORT MST 250' DIELECTRIC	count	5	$ 90.72	$ 453.60
Materials	Connectorized drop hubs	F5234	2 PORT MST 500' DIELECTRIC	count	11	$ 143.05	$ 1,573.55
Materials	Connectorized drop hubs	F5235	2 PORT MST 750' DIELECTRIC	count	4	$ 181.45	$ 725.80
Materials	Connectorized drop hubs	F5236	2 PORT MST 1000' DIELECTRIC	count	10	$ 218.55	$ 2,185.50
Materials	Connectorized drop hubs	F5237	2 PORT MST 1500' DIELECTRIC	count	13	$ 398.41	$ 5,179.33
Miscellaneous	Special Permits			count		$ 3,000.00	$ -
Miscellaneous	Middle Mile Connection			feet			$ -
Miscellaneous	Central Office			bid			$ -
Miscellaneous	Network Access Equipment			bid			$ -
Miscellaneous	Shelters			count			$ -
Miscellaneous	Contingency			count			$ -
						Total:	$472,515.59

Figure 13 - Area # 1 Service Boundary E Labor and Material OSP Costs

HLD AREA #2

From the original three areas, the following three service boundaries (cabinets) were defined (boundaries A, B and C).

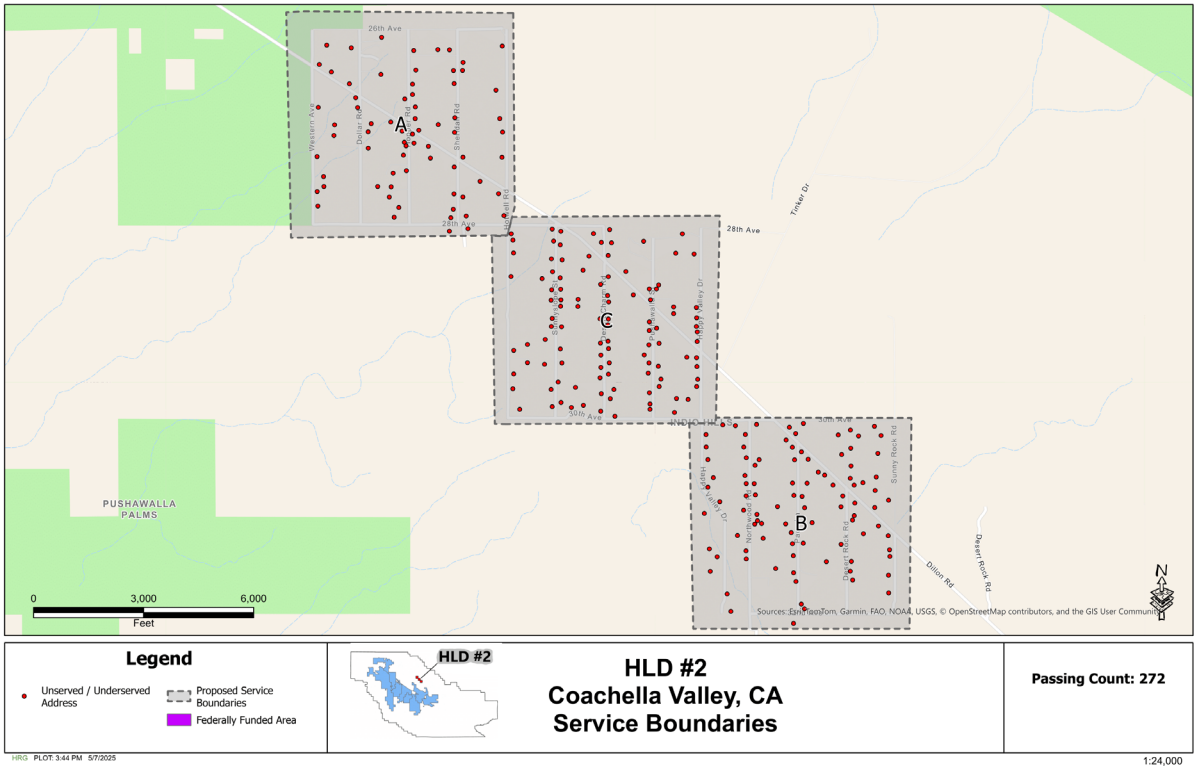
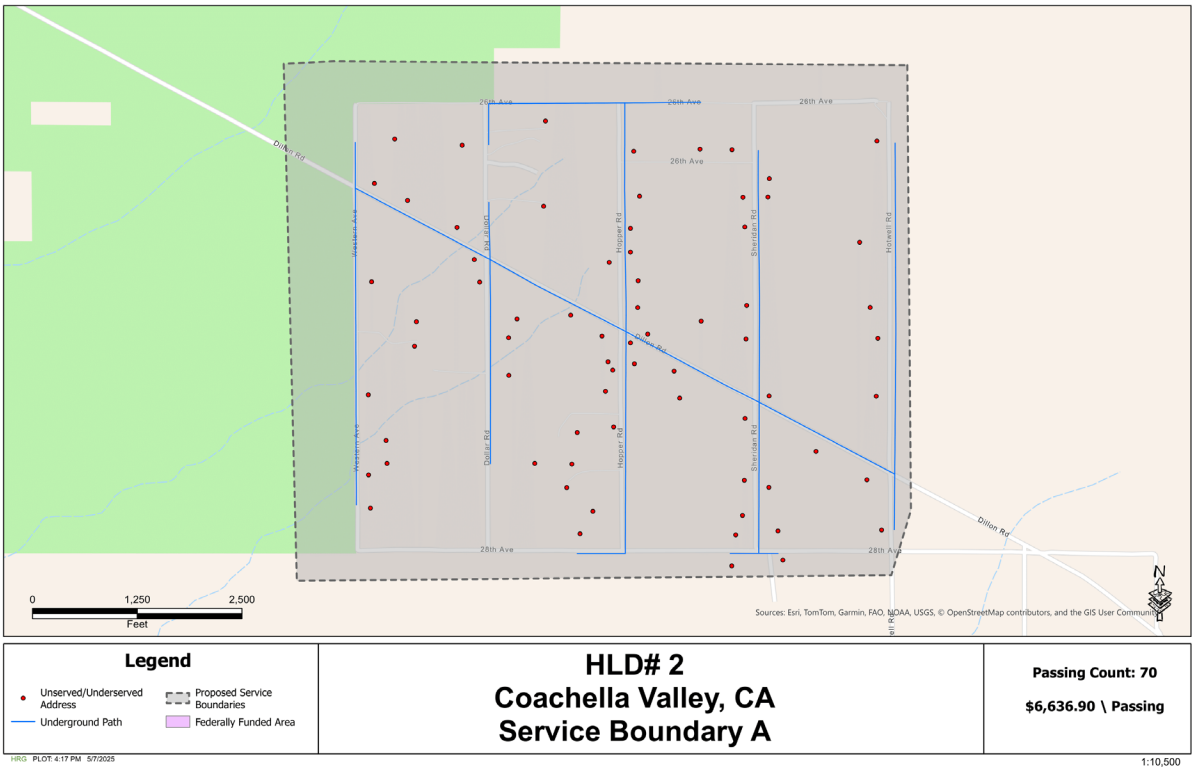


Figure 14 - Service Boundaries (Cabinets) in ARea # 2

SERVICE BOUNDARY A



Engineering	40,534
Materials	84,867
Construction - AER	-
Construction - UG	339,182
Total Cost	$ 464,582.95

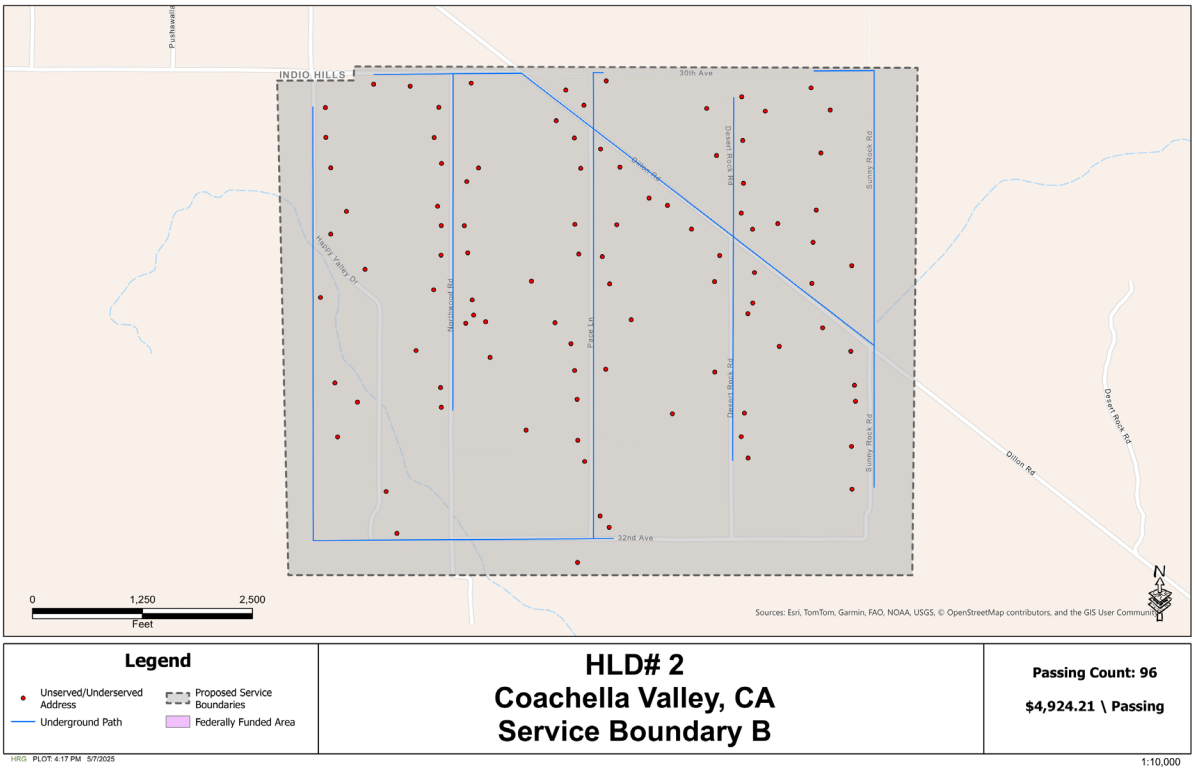
Passings	70
Cost Per Passing	$ 6,636.90

Figure 15 - Area # 2 Service Boundary A
Map and Summary Costs

Group - Summary	Group	Id	Description	Unit	Quantity	Unit Cost	Total Cost
Engineering	Cables	3	Traffic Control (No Drops)	feet	20,111	$ 0.70	$ 14,077.47
Materials	Cables	F5154	Aerial / Underground Material -Provide 48-ct fiber cable	feet	19,917	$ 0.45	$ 8,962.46
Materials	Cables	F5152	Aerial / Underground Material -Provide 96-ct fiber cable	feet	194	$ 0.84	$ 163.05
Materials	Cables	51	DROP Footage (avg per drop amount/# passings)	feet		$ 2.06	$ -
Engineering	Cable installation - Underground	NO-ENG	Underground Engineering - Underground Route Design	feet	32,030	$ 0.80	$ 25,623.79
Construction -UG	Cable installation - Underground	NO-ENG	Underground Engineering - Underground Permitting	feet	32,030	$ 0.35	$ 11,210.41
Engineering	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 2" du	feet	64	$ 13.00	$ 832.77
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 1.25"	feet	416	$ 12.00	$ 4,996.64
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 1.25"	feet	4,804	$ 11.25	$ 54,050.17
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 2" du	feet	577	$ 11.25	$ 6,486.02
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 1.25"	feet	1,217	$ 10.00	$ 12,171.30
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 2" du	feet	4,804	$ 8.75	$ 42,039.02
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 1.25"	feet	20,147	$ 8.25	$166,210.29
Construction -UG	Cable installation - Underground	BH8058	Underground Construction - Install #12 TRACER WIRE GRE	feet	32,030	$ 0.14	$ 4,484.16
Construction -UG	Cable installation - Underground	NO-CON	CABLE PULLING (MSTs)	feet	11,633	$ 1.20	$ 13,960.19
Construction -UG	Cable installation - Underground	NO-CON	CABLE PULLING (1 cable)	feet	6,539	$ 1.00	$ 6,539.30
Construction -UG	Cable installation - Underground	NO-CON	PMO (Underground)	feet	32,030	$ 0.48	$ 15,374.27
Construction -UG	Miscellaneous	45	Underground Construction - Provide and place fiber mark	count	4	$ 30.00	$ 120.00
Materials	Terminals, cabinets, splitters	F5282	Provide and Place 432 Cabinet	count	1	$ 8,590.32	$ 8,590.32
Materials	Terminals, cabinets, splitters	F5156	1x32 DISTRIBUTION FIBER SPLITTER	count	3	$ 941.22	$ 2,823.66
Materials	Terminals, cabinets, splitters	F5144	Provide and Place (Raychem B) UG Splice Closure	count	13	$ 421.58	$ 5,480.54
Materials	Pedestals, flowerpots, pits, vaults	C4073	Underground Construction - Provide and SET 35x15x17 DC	count	11	$ 985.87	$ 10,844.57
Materials	Pedestals, flowerpots, pits, vaults	C4082	Underground Construction - PROVIDE AND PLACE PEDEST	count	74	$ 229.17	$ 16,901.29
Materials	Pedestals, flowerpots, pits, vaults	BH8132	Underground Construction - PROVIDE AND PLACE 17x30x	count	12	$ 610.94	$ 7,209.09
Materials	Pedestals, flowerpots, pits, vaults	BH8054	Underground Construction - PROVIDE AND PLACE 24x36x	count	11	$ 854.29	$ 9,397.19
Materials	Pedestals, flowerpots, pits, vaults	BH8134	Underground Construction - PROVIDE AND PLACE 30x48x	count	1	$ 1,736.63	$ 1,736.63
Materials	Slackloops	F5154	Underground Construction -Underground Slack Loop 48Cf	feet	900	$ 0.45	$ 405.00
Materials	Slackloops	F5152	Underground Construction -Underground Slack Loop 96Cf	feet	75	$ 0.84	$ 63.00
Construction -UG	Cable installation - Underground	76	OTDR End to End Test of Fiber Cable	count	77	$ 20.00	$ 1,540.00
Materials	Connectorized drop hubs	F5232	2 PORT MST 100' DIELECTRIC	count	8	$ 65.99	$ 527.92
Materials	Connectorized drop hubs	F5233	2 PORT MST 250' DIELECTRIC	count	5	$ 90.72	$ 453.60
Materials	Connectorized drop hubs	F5234	2 PORT MST 500' DIELECTRIC	count	15	$ 143.05	$ 2,145.75
Materials	Connectorized drop hubs	F5235	2 PORT MST 750' DIELECTRIC	count	9	$ 181.45	$ 1,633.05
Materials	Connectorized drop hubs	F5236	2 PORT MST 1000' DIELECTRIC	count	10	$ 218.55	$ 2,185.50
Materials	Connectorized drop hubs	F5237	2 PORT MST 1500' DIELECTRIC	count	13	$ 398.41	$ 5,179.33
Materials	Connectorized drop hubs	F5239	4 PORT MST 500' DIELECTRIC	count	1	$ 165.20	$ 165.20
Miscellaneous	Special Permits			count		$ 3,000.00	$ -
Miscellaneous	Middle Mile Connection			feet			$ -
Miscellaneous	Central Office			bid			$ -
Miscellaneous	Network Access Equipment			bid			$ -
Miscellaneous	Shelters			count			$ -
Miscellaneous	Contingency			count			$ -
						Total:	$464,582.95

Figure 16 - Area # 2 Service Boundary A Labor and Material OSP Costs

SERVICE BOUNDARY B



Engineering	41,853
Materials	91,685
Construction - AER	-
Construction - UG	339,186
Total Cost	$ 472,724.06

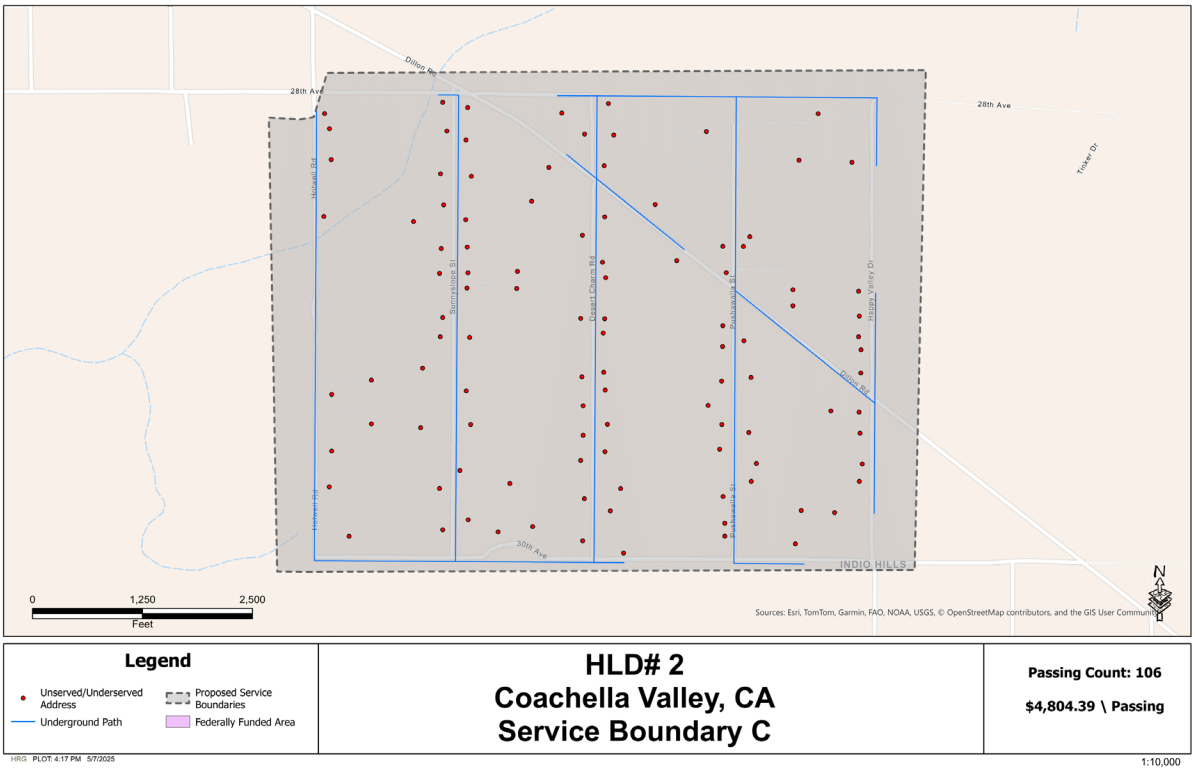
Passings	96
Cost Per Passing	$ 4,924.21

Figure 17 - Area # 2 Service Boundary B
Labor and Material OSP Costs

Group - Summary	Group	Id	Description	Unit	Quantity	Unit Cost	Total Cost
Engineering	Cables	3	Traffic Control (No Drops)	feet	21,746	$ 0.70	$ 15,222.42
Materials	Cables	F5154	Aerial / Underground Material -Provide 48-ct fiber cable	feet	21,650	$ 0.45	$ 9,742.36
Materials	Cables	F5152	Aerial / Underground Material -Provide 96-ct fiber cable	feet	97	$ 0.84	$ 81.17
Materials	Cables	51	DROP Footage (avg per drop amount/# passings)	feet		$ 2.06	$ -
Engineering	Cable installation - Underground	NO-ENG	Underground Engineering - Underground Route Design	feet	32,241	$ 0.80	$ 25,792.59
Construction -UG	Cable installation - Underground	NO-ENG	Underground Engineering - Underground Permitting	feet	32,241	$ 0.35	$ 11,284.26
Engineering	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 2" du	feet	64	$ 13.00	$ 838.26
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 1.25"	feet	419	$ 12.00	$ 5,029.56
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 1.25"	feet	4,836	$ 11.25	$ 54,406.24
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 2" du	feet	580	$ 11.25	$ 6,528.75
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 1.25"	feet	1,225	$ 10.00	$ 12,251.48
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 2" du	feet	4,836	$ 8.75	$ 42,315.97
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 1.25"	feet	20,279	$ 8.25	$ 167,305.25
Construction -UG	Cable installation - Underground	BH8058	Underground Construction - Install #12 TRACER WIRE GRE	feet	32,241	$ 0.14	$ 4,513.70
Construction -UG	Cable installation - Underground	NO-CON	CABLE PULLING (MSTs)	feet	10,005	$ 1.20	$ 12,005.89
Construction -UG	Cable installation - Underground	NO-CON	CABLE PULLING (1 cable)	feet	5,927	$ 1.00	$ 5,927.14
Construction -UG	Cable installation - Underground	NO-CON	PMO (Underground)	feet	32,241	$ 0.48	$ 15,475.55
Construction -UG	Miscellaneous	45	Underground Construction - Provide and place fiber mark	count	1	$ 30.00	$ 30.00
Materials	Terminals, cabinets, splitters	F5282	Provide and Place 432 Cabinet	count	1	$ 8,590.32	$ 8,590.32
Materials	Terminals, cabinets, splitters	F5156	1x32 DISTRIBUTION FIBER SPLITTER	count	3	$ 941.22	$ 2,823.66
Materials	Terminals, cabinets, splitters	F5144	Provide and Place (Raychem B) UG Splice Closure	count	12	$ 421.58	$ 5,058.96
Materials	Pedestals, flowerpots, pits, vaults	C4073	Underground Construction - Provide and SET 35x15x17 DC	count	9	$ 985.87	$ 8,872.83
Materials	Pedestals, flowerpots, pits, vaults	C4082	Underground Construction - PROVIDE AND PLACE PEDEST	count	91	$ 229.17	$ 20,911.76
Materials	Pedestals, flowerpots, pits, vaults	BH8132	Underground Construction - PROVIDE AND PLACE 17x30x	count	15	$ 610.94	$ 8,919.72
Materials	Pedestals, flowerpots, pits, vaults	BH8054	Underground Construction - PROVIDE AND PLACE 24x36x	count	9	$ 854.29	$ 7,688.61
Materials	Pedestals, flowerpots, pits, vaults	BH8134	Underground Construction - PROVIDE AND PLACE 30x48x	count	1	$ 1,736.63	$ 1,736.63
Materials	Slackloops	F5154	Underground Construction -Underground Slack Loop 48Ct	feet	825	$ 0.45	$ 371.25
Materials	Slackloops	F5152	Underground Construction -Underground Slack Loop 96Ct	feet	75	$ 0.84	$ 63.00
Construction -UG	Cable installation - Underground	76	OTDR End to End Test of Fiber Cable	count	106	$ 20.00	$ 2,112.00
Materials	Connectorized drop hubs	F5232	2 PORT MST 100' DIELECTRIC	count	8	$ 65.99	$ 527.92
Materials	Connectorized drop hubs	F5233	2 PORT MST 250' DIELECTRIC	count	4	$ 90.72	$ 362.88
Materials	Connectorized drop hubs	F5234	2 PORT MST 500' DIELECTRIC	count	19	$ 143.05	$ 2,717.95
Materials	Connectorized drop hubs	F5235	2 PORT MST 750' DIELECTRIC	count	7	$ 181.45	$ 1,270.15
Materials	Connectorized drop hubs	F5236	2 PORT MST 1000' DIELECTRIC	count	15	$ 218.55	$ 3,278.25
Materials	Connectorized drop hubs	F5237	2 PORT MST 1500' DIELECTRIC	count	20	$ 398.41	$ 7,968.20
Materials	Connectorized drop hubs	F5239	4 PORT MST 500' DIELECTRIC	count	1	$ 165.20	$ 165.20
Materials	Connectorized drop hubs	F5240	4 PORT MST 750' DIELECTRIC	count	1	$ 202.51	$ 202.51
Materials	Connectorized drop hubs	F5250	4 PORT MST 1500' DIELECTRIC	count	1	$ 331.68	$ 331.68
Miscellaneous	Special Permits			count		$ 3,000.00	$ -
Miscellaneous	Middle Mile Connection			feet			$ -
Miscellaneous	Central Office			bid			$ -
Miscellaneous	Network Access Equipment			bid			$ -
Miscellaneous	Shelters			count			$ -
Miscellaneous	Contingency			count			$ -
						Total:	$472,724.06

Figure 18 - Area # 2 Service Boundary B Labor and Material OSP Costs

SERVICE BOUNDARY C



Engineering	44,886
Materials	100,237
Construction - AER	-
Construction - UG	364,142
Total Cost	$ 509,265.15

Passings	106
Cost Per Passing	$ 4,804.39

Figure 19 - Area # 2 Service Boundary C
Map and Summary Costs

Group - Summary	Group	Id	Description	Unit	Quantity	Unit Cost	Total Cost
Engineering	Cables	3	Traffic Control (No Drops)	feet	23,578	$ 0.70	$ 16,504.40
Materials	Cables	F5154	Aerial / Underground Material -Provide 48-ct fiber cable	feet	20,683	$ 0.45	$ 9,307.16
Materials	Cables	F5152	Aerial / Underground Material -Provide 96-ct fiber cable	feet	2,895	$ 0.84	$ 2,431.91
Materials	Cables	51	DROP Footage (avg per drop amount/# passings)	feet		$ 2.06	$ -
Engineering	Cable installation - Underground	NO-ENG	Underground Engineering - Underground Route Design	feet	34,360	$ 0.80	$ 27,487.94
Construction -UG	Cable installation - Underground	NO-ENG	Underground Engineering - Underground Permitting	feet	34,360	$ 0.35	$ 12,025.97
Engineering	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 2" du	feet	69	$ 13.00	$ 893.36
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 1.25"	feet	447	$ 12.00	$ 5,360.15
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 1.25"	feet	5,154	$ 11.25	$ 57,982.38
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 2" du	feet	618	$ 11.25	$ 6,957.89
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 1.25"	feet	1,306	$ 10.00	$ 13,056.77
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 2" du	feet	5,154	$ 8.75	$ 45,097.40
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 1.25"	feet	21,612	$ 8.25	$ 178,302.25
Construction -UG	Cable installation - Underground	BH8058	Underground Construction - Install #12 TRACER WIRE GRE	feet	34,360	$ 0.14	$ 4,810.39
Construction -UG	Cable installation - Underground	NO-CON	CABLE PULLING (MSTs)	feet	10,492	$ 1.20	$ 12,590.43
Construction -UG	Cable installation - Underground	NO-CON	CABLE PULLING (1 cable)	feet	9,014	$ 1.00	$ 9,014.04
Construction -UG	Cable installation - Underground	NO-CON	PMO (Underground)	feet	34,360	$ 0.48	$ 16,492.76
Construction -UG	Miscellaneous	45	Underground Construction - Provide and place fiber mar	count	4	$ 30.00	$ 120.00
Materials	Terminals, cabinets, splitters	F5282	Provide and Place 432 Cabinet	count	1	$ 8,590.32	$ 8,590.32
Materials	Terminals, cabinets, splitters	F5156	1x32 DISTRIBUTION FIBER SPLITTER	count	4	$ 941.22	$ 3,764.88
Materials	Terminals, cabinets, splitters	F5144	Provide and Place (Raychem B) UG Splice Closure	count	13	$ 421.58	$ 5,480.54
Materials	Pedestals, flowerpots, pits, vaults	C4073	Underground Construction - Provide and SET 35x15x17 D	count	11	$ 985.87	$ 10,844.57
Materials	Pedestals, flowerpots, pits, vaults	C4082	Underground Construction - PROVIDE AND PLACE PEDEST	count	95	$ 229.17	$ 21,771.15
Materials	Pedestals, flowerpots, pits, vaults	BH8132	Underground Construction - PROVIDE AND PLACE 17x30x	count	15	$ 610.94	$ 9,286.29
Materials	Pedestals, flowerpots, pits, vaults	BH8054	Underground Construction - PROVIDE AND PLACE 24x36x	count	11	$ 854.29	$ 9,397.19
Materials	Pedestals, flowerpots, pits, vaults	BH8134	Underground Construction - PROVIDE AND PLACE 30x48x	count	1	$ 1,736.63	$ 1,736.63
Materials	Slackloops	F5154	Underground Construction -Underground Slack Loop 48C	feet	900	$ 0.45	$ 405.00
Materials	Slackloops	F5152	Underground Construction -Underground Slack Loop 96C	feet	75	$ 0.84	$ 63.00
Construction -UG	Cable installation - Underground	76	OTDR End to End Test of Fiber Cable	count	117	$ 20.00	$ 2,332.00
Materials	Connectorized drop hubs	F5232	2 PORT MST 100' DIELECTRIC	count	9	$ 65.99	$ 593.91
Materials	Connectorized drop hubs	F5233	2 PORT MST 250' DIELECTRIC	count	3	$ 90.72	$ 272.16
Materials	Connectorized drop hubs	F5234	2 PORT MST 500' DIELECTRIC	count	17	$ 143.05	$ 2,431.85
Materials	Connectorized drop hubs	F5235	2 PORT MST 750' DIELECTRIC	count	13	$ 181.45	$ 2,358.85
Materials	Connectorized drop hubs	F5236	2 PORT MST 1000' DIELECTRIC	count	12	$ 218.55	$ 2,622.60
Materials	Connectorized drop hubs	F5237	2 PORT MST 1500' DIELECTRIC	count	21	$ 398.41	$ 8,366.61
Materials	Connectorized drop hubs	F5255	4 PORT MST 100' DIELECTRIC	count	1	$ 82.79	$ 82.79
Materials	Connectorized drop hubs	F5239	4 PORT MST 500' DIELECTRIC	count	1	$ 165.20	$ 165.20
Materials	Connectorized drop hubs	F5244	6 PORT MST 1000' DIELECTRIC	count	1	$ 264.41	$ 264.41
Miscellaneous	Special Permits			count		$ 3,000.00	$ -
Miscellaneous	Middle Mile Connection			feet			$ -
Miscellaneous	Central Office			bid			$ -
Miscellaneous	Network Access Equipment			bid			$ -
Miscellaneous	Shelters			count			$ -
Miscellaneous	Contingency			count			$ -
						Total:	$ 509,265.15

Figure 20 - Area # 2 Service Boundary C Labor and Material OSP Costs

HLD AREA #3

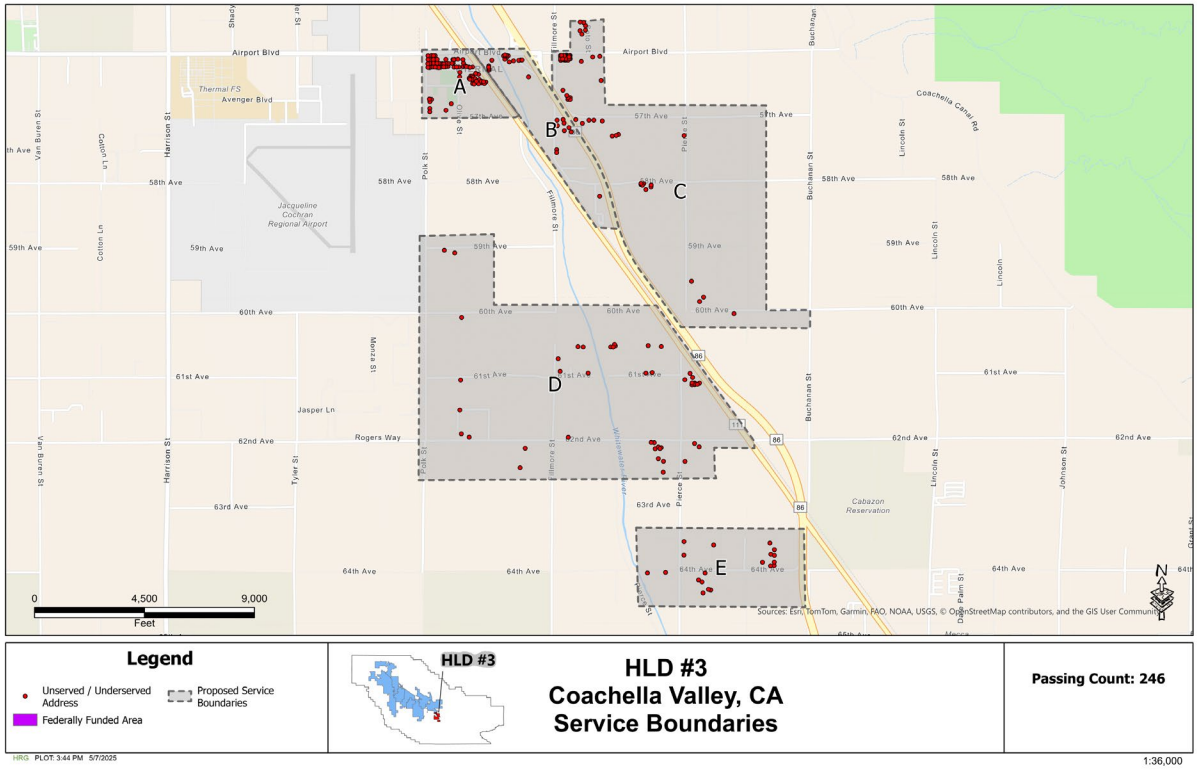
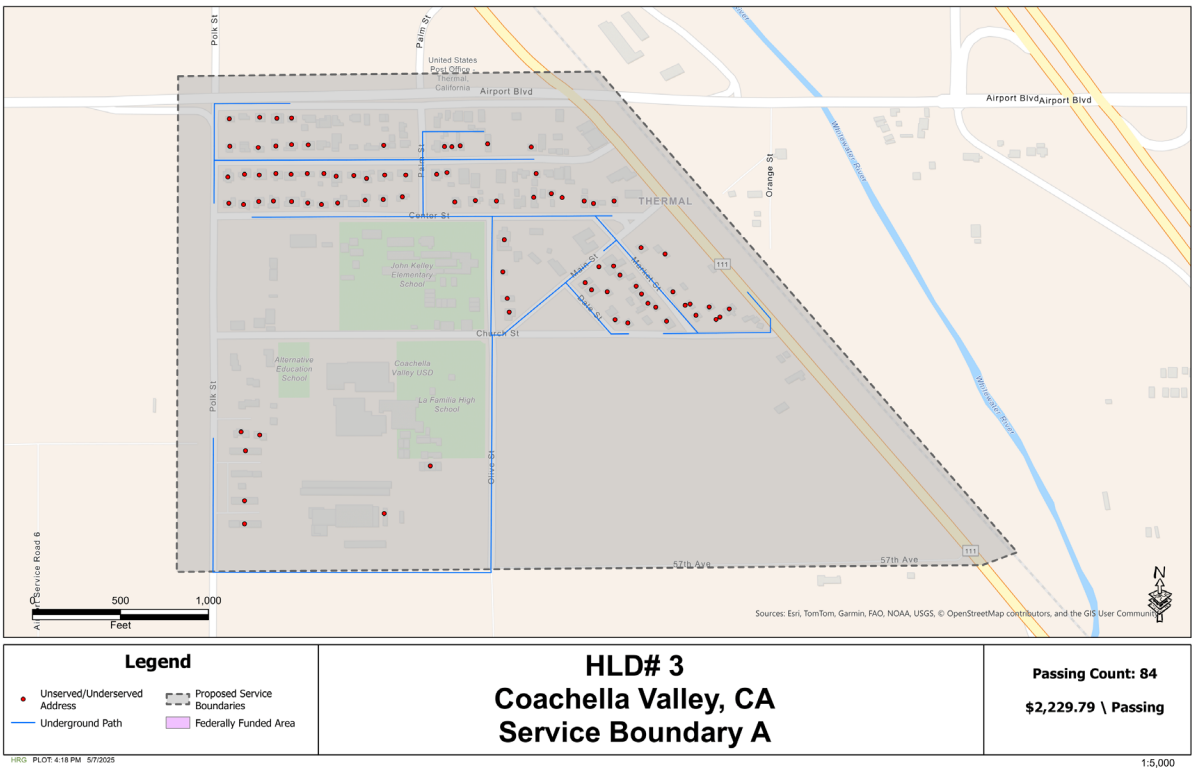


Figure 21 - Service Boundary (Cabinets) in Area # 3

SERVICE BOUNDARY A



Engineering	12,607
Materials	48,043
Construction - AER	-
Construction - UG	126,652
Total Cost	$ 187,302.72

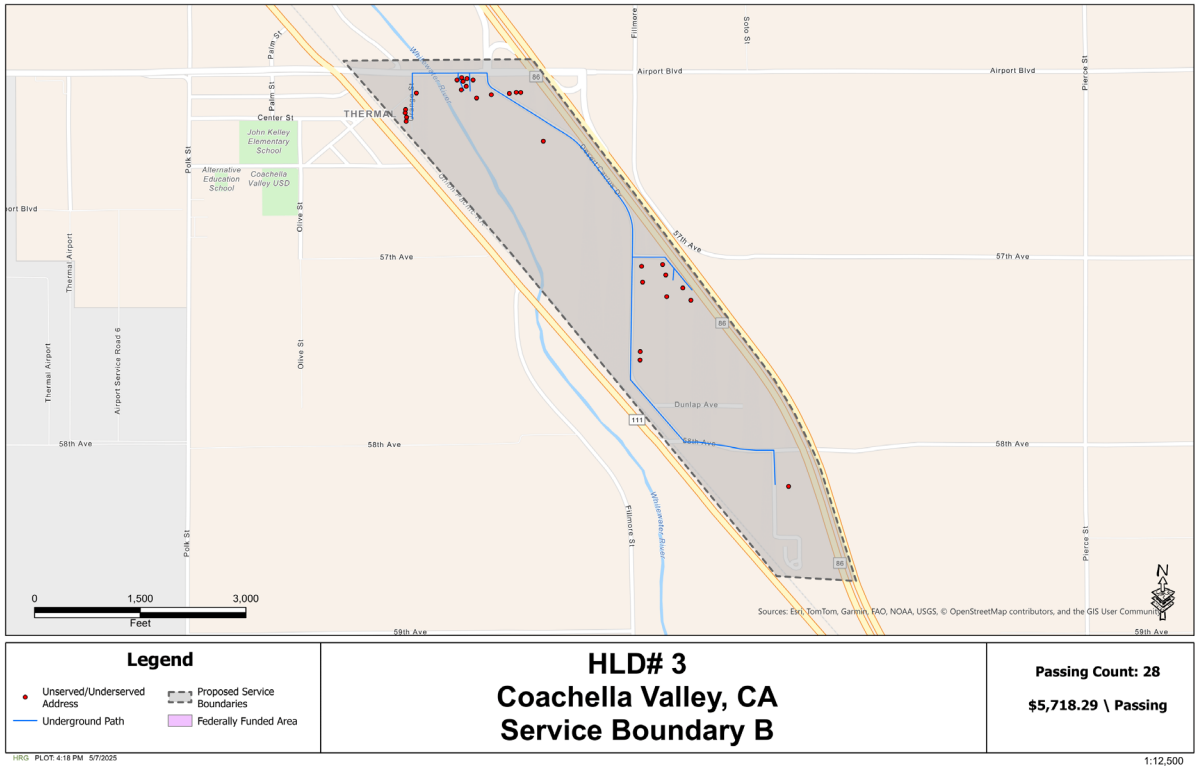
Passings	84
Cost Per Passing	$ 2,229.79

Figure 22- Area # 3 Service Boundary A
Map and Summary Costs

Group - Summary	Group	Id	Description	Unit	Quantity	Unit Cost	Total Cost
Engineering	Cables	3	Traffic Control (No Drops)	feet	4,114	$ 0.70	$ 2,879.89
Materials	Cables	F5154	Aerial / Underground Material -Provide 48-ct fiber cable	feet	3,386	$ 0.45	$ 1,523.92
Materials	Cables	F5152	Aerial / Underground Material -Provide 96-ct fiber cable	feet	728	$ 0.84	$ 611.23
Materials	Cables	51	DROP Footage (avg per drop amount/# passings)	feet	-	$ 2.06	$ -
Engineering	Cable installation - Underground	NO-ENG	Underground Engineering - Underground Route Design	feet	11,777	$ 0.80	$ 9,421.35
Construction -UG	Cable installation - Underground	NO-ENG	Underground Engineering - Underground Permitting	feet	11,777	$ 0.35	$ 4,121.84
Engineering	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 2" du	feet	24	$ 13.00	$ 306.19
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 1.25"	feet	153	$ 12.00	$ 1,837.16
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 1.25"	feet	1,767	$ 11.25	$ 19,873.16
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 2" du	feet	212	$ 11.25	$ 2,384.78
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 1.25"	feet	448	$ 10.00	$ 4,475.14
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 2" du	feet	1,767	$ 8.75	$ 15,456.90
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 1.25"	feet	7,408	$ 8.25	$ 61,112.17
Construction -UG	Cable installation - Underground	BH8058	Underground Construction - Install #12 TRACER WIRE GRE	feet	11,777	$ 0.14	$ 1,648.74
Construction -UG	Cable installation - Underground	NO-CON	CABLE PULLING (MSTs)	feet	5,426	$ 1.20	$ 6,511.53
Construction -UG	Cable installation - Underground	NO-CON	CABLE PULLING (1 cable)	feet	1,700	$ 1.00	$ 1,699.71
Construction -UG	Cable installation - Underground	NO-CON	PMO (Underground)	feet	11,777	$ 0.48	$ 5,652.81
Construction -UG	Miscellaneous	45	Underground Construction - Provide and place fiber mark	count	1	$ 30.00	$ 30.00
Materials	Terminals, cabinets, splitters	F5282	Provide and Place 432 Cabinet	count	1	$ 8,590.32	$ 8,590.32
Materials	Terminals, cabinets, splitters	F5156	1x32 DISTRIBUTION FIBER SPLITTER	count	3	$ 941.22	$ 2,823.66
Materials	Terminals, cabinets, splitters	F5144	Provide and Place (Raychem B) UG Splice Closure	count	6	$ 421.58	$ 2,529.48
Materials	Pedestals, flowerpots, pits, vaults	C4073	Underground Construction - Provide and SET 35x15x17 DC	count	5	$ 985.87	$ 4,929.35
Materials	Pedestals, flowerpots, pits, vaults	C4082	Underground Construction - PROVIDE AND PLACE PEDEST	count	43	$ 229.17	$ 9,739.73
Materials	Pedestals, flowerpots, pits, vaults	BH8132	Underground Construction - PROVIDE AND PLACE 17x30x	count	7	$ 610.94	$ 4,154.39
Materials	Pedestals, flowerpots, pits, vaults	BH8054	Underground Construction - PROVIDE AND PLACE 24x36x	count	5	$ 854.29	$ 4,271.45
Materials	Pedestals, flowerpots, pits, vaults	BH8134	Underground Construction - PROVIDE AND PLACE 30x48x	count	1	$ 1,736.63	$ 1,736.63
Materials	Slackloops	F5154	Underground Construction -Underground Slack Loop 48Ct	feet	225	$ 0.45	$ 101.25
Materials	Slackloops	F5152	Underground Construction -Underground Slack Loop 96Ct	feet	225	$ 0.84	$ 189.00
Construction -UG	Cable installation - Underground	76	OTDR End to End Test of Fiber Cable	count	92	$ 20.00	$ 1,848.00
Materials	Connectorized drop hubs	F5232	2 PORT MST 100' DIELECTRIC	count	3	$ 65.99	$ 197.97
Materials	Connectorized drop hubs	F5233	2 PORT MST 250' DIELECTRIC	count	4	$ 90.72	$ 362.88
Materials	Connectorized drop hubs	F5234	2 PORT MST 500' DIELECTRIC	count	1	$ 143.05	$ 143.05
Materials	Connectorized drop hubs	F5235	2 PORT MST 750' DIELECTRIC	count	4	$ 181.45	$ 725.80
Materials	Connectorized drop hubs	F5236	2 PORT MST 1000' DIELECTRIC	count	5	$ 218.55	$ 1,092.75
Materials	Connectorized drop hubs	F5237	2 PORT MST 1500' DIELECTRIC	count	3	$ 398.41	$ 1,195.23
Materials	Connectorized drop hubs	F5255	4 PORT MST 100' DIELECTRIC	count	1	$ 82.79	$ 82.79
Materials	Connectorized drop hubs	F5238	4 PORT MST 250' DIELECTRIC	count	2	$ 112.51	$ 225.02
Materials	Connectorized drop hubs	F5239	4 PORT MST 500' DIELECTRIC	count	2	$ 165.20	$ 330.40
Materials	Connectorized drop hubs	F5240	4 PORT MST 750' DIELECTRIC	count	2	$ 202.51	$ 405.02
Materials	Connectorized drop hubs	F5241	4 PORT MST 1000' DIELECTRIC	count	1	$ 241.38	$ 241.38
Materials	Connectorized drop hubs	F5250	4 PORT MST 1500' DIELECTRIC	count	3	$ 331.68	$ 995.04
Materials	Connectorized drop hubs	F5260	6 PORT MST 250' DIELECTRIC	count	1	$ 134.59	$ 134.59
Materials	Connectorized drop hubs	F5242	6 PORT MST 500' DIELECTRIC	count	1	$ 184.33	$ 184.33
Materials	Connectorized drop hubs	F5243	6 PORT MST 750' DIELECTRIC	count	1	$ 300.38	$ 300.38
Materials	Connectorized drop hubs	F5246	8 PORT MST 500' DIELECTRIC	count	1	$ 226.30	$ 226.30
Miscellaneous	Special Permits			count		$ 3,000.00	$ -
Miscellaneous	Middle Mile Connection			feet			$ -
Miscellaneous	Central Office			bid			$ -
Miscellaneous	Network Access Equipment			bid			$ -
Miscellaneous	Shelters			count			$ -
Miscellaneous	Contingency			count			$ -
						Total:	$187,302.72

Figure 23 - Area # 3 Service Boundary A Labor and Material OSP Costs

SERVICE BOUNDARY B



Engineering	13,343
Materials	30,472
Construction - AER	-
Construction - UG	116,297
Total Cost	$ 160,112.17

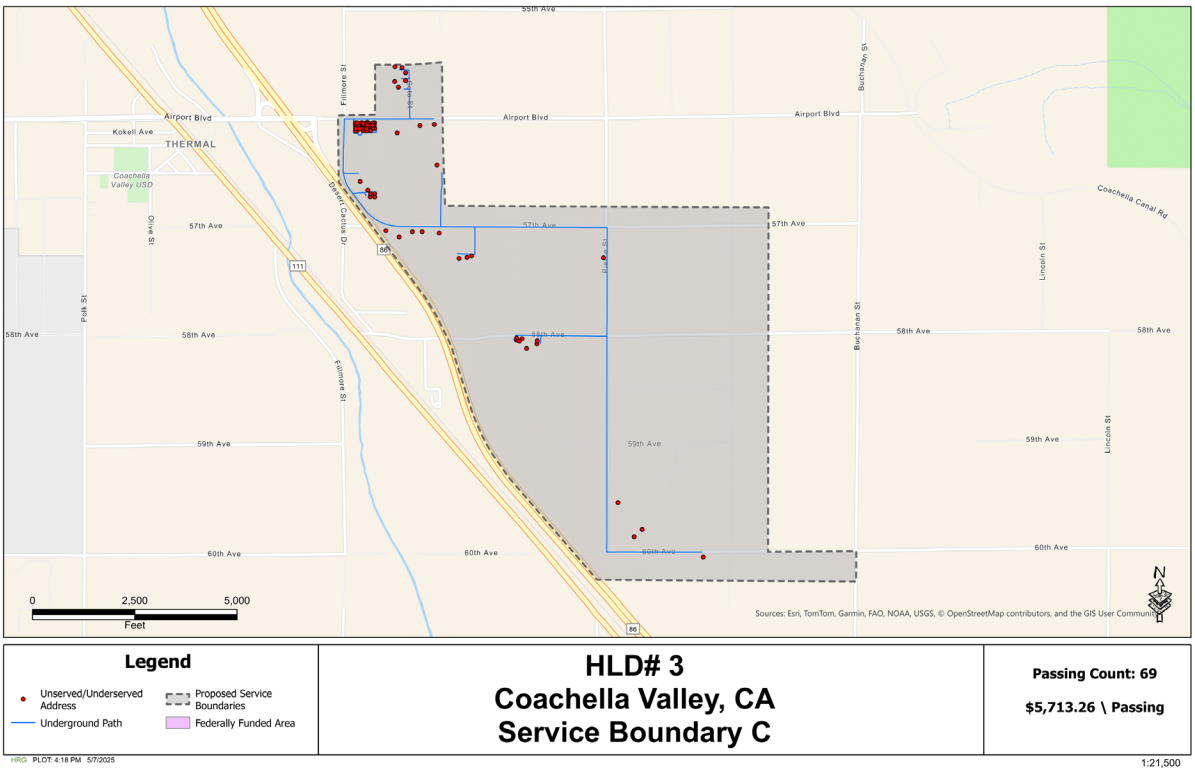
Passings	28
Cost Per Passing	$ 5,718.29

Figure 24 - Area # 3 Service Boundary B
Map and Summary Costs

Group - Summary	Group	Id	Description	Unit	Quantity	Unit Cost	Total Cost
Engineering	Cables	3	Traffic Control (No Drops)	feet	6,273	$ 0.70	$ 4,391.07
Materials	Cables	F5154	Aerial / Underground Material -Provide 48-ct fiber cable	feet	6,273	$ 0.45	$ 2,822.83
Materials	Cables	51	DROP Footage (avg per drop amount/# passings)	feet	-	$ 2.06	$ -
Engineering	Cable installation - Underground	NO-ENG	Underground Engineering - Underground Route Design	feet	10,838	$ 0.80	$ 8,670.05
Construction -UG	Cable installation - Underground	NO-ENG	Underground Engineering - Underground Permitting	feet	10,838	$ 0.35	$ 3,793.15
Engineering	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 2" du	feet	22	$ 13.00	$ 281.78
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 1.25"	feet	141	$ 12.00	$ 1,690.66
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 1.25"	feet	1,626	$ 11.25	$ 18,288.39
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 2" du	feet	195	$ 11.25	$ 2,194.61
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 1.25"	feet	412	$ 10.00	$ 4,118.27
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 2" du	feet	1,626	$ 8.75	$ 14,224.30
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 1.25"	feet	6,817	$ 8.25	$ 56,238.82
Construction -UG	Cable installation - Underground	BH8058	Underground Construction - Install #12 TRACER WIRE GRE	feet	10,838	$ 0.14	$ 1,517.26
Construction -UG	Cable installation - Underground	NO-CON	CABLE PULLING (MSTs)	feet	3,953	$ 1.20	$ 4,743.62
Construction -UG	Cable installation - Underground	NO-CON	CABLE PULLING (1 cable)	feet	3,580	$ 1.00	$ 3,580.23
Construction -UG	Cable installation - Underground	NO-CON	PMO (Underground)	feet	10,838	$ 0.48	$ 5,202.03
Construction -UG	Miscellaneous	45	Underground Construction - Provide and place fiber mark	count	3	$ 30.00	$ 90.00
Materials	Terminals, cabinets, splitters	F5282	Provide and Place 432 Cabinet	count	1	$ 8,590.32	$ 8,590.32
Materials	Terminals, cabinets, splitters	F5156	1x32 DISTRIBUTION FIBER SPLITTER	count	1	$ 941.22	$ 941.22
Materials	Terminals, cabinets, splitters	F5144	Provide and Place (Raychem B) UG Splice Closure	count	3	$ 421.58	$ 1,264.74
Materials	Pedestals, flowerpots, pits, vaults	C4073	Underground Construction - Provide and SET 35x15x17 DC	count	3	$ 985.87	$ 2,957.61
Materials	Pedestals, flowerpots, pits, vaults	C4082	Underground Construction - PROVIDE AND PLACE PEDEST	count	18	$ 229.17	$ 4,010.48
Materials	Pedestals, flowerpots, pits, vaults	BH8132	Underground Construction - PROVIDE AND PLACE 17x30x	count	3	$ 610.94	$ 1,710.63
Materials	Pedestals, flowerpots, pits, vaults	BH8054	Underground Construction - PROVIDE AND PLACE 24x36x	count	3	$ 854.29	$ 2,562.87
Materials	Pedestals, flowerpots, pits, vaults	BH8134	Underground Construction - PROVIDE AND PLACE 30x48x	count	1	$ 1,736.63	$ 1,736.63
Materials	Slackloops	F5154	Underground Construction -Underground Slack Loop 48Ct	feet	225	$ 0.45	$ 101.25
Construction -UG	Cable installation - Underground	76	OTDR End to End Test of Fiber Cable	count	31	$ 20.00	$ 616.00
Materials	Connectorized drop hubs	F5232	2 PORT MST 100' DIELECTRIC	count	1	$ 65.99	$ 65.99
Materials	Connectorized drop hubs	F5233	2 PORT MST 250' DIELECTRIC	count	1	$ 90.72	$ 90.72
Materials	Connectorized drop hubs	F5234	2 PORT MST 500' DIELECTRIC	count	1	$ 143.05	$ 143.05
Materials	Connectorized drop hubs	F5236	2 PORT MST 1000' DIELECTRIC	count	1	$ 218.55	$ 218.55
Materials	Connectorized drop hubs	F5237	2 PORT MST 1500' DIELECTRIC	count	6	$ 398.41	$ 2,390.46
Materials	Connectorized drop hubs	F5239	4 PORT MST 500' DIELECTRIC	count	2	$ 165.20	$ 330.40
Materials	Connectorized drop hubs	F5240	4 PORT MST 750' DIELECTRIC	count	1	$ 202.51	$ 202.51
Materials	Connectorized drop hubs	F5250	4 PORT MST 1500' DIELECTRIC	count	1	$ 331.68	$ 331.68
Miscellaneous	Special Permits			count		$ 3,000.00	$ -
Miscellaneous	Middle Mile Connection			feet			$ -
Miscellaneous	Central Office			bid			$ -
Miscellaneous	Network Access Equipment			bid			$ -
Miscellaneous	Shelters			count			$ -
Miscellaneous	Contingency			count			$ -
						Total:	$160,112.17

Figure 25 - Area # 3 Service Boundary B Labor and Material OSP Costs

SERVICE BOUNDARY C



Engineering	35,141
Materials	58,059
Construction - AER	-
Construction - UG	301,016
Total Cost	$ 394,215.27

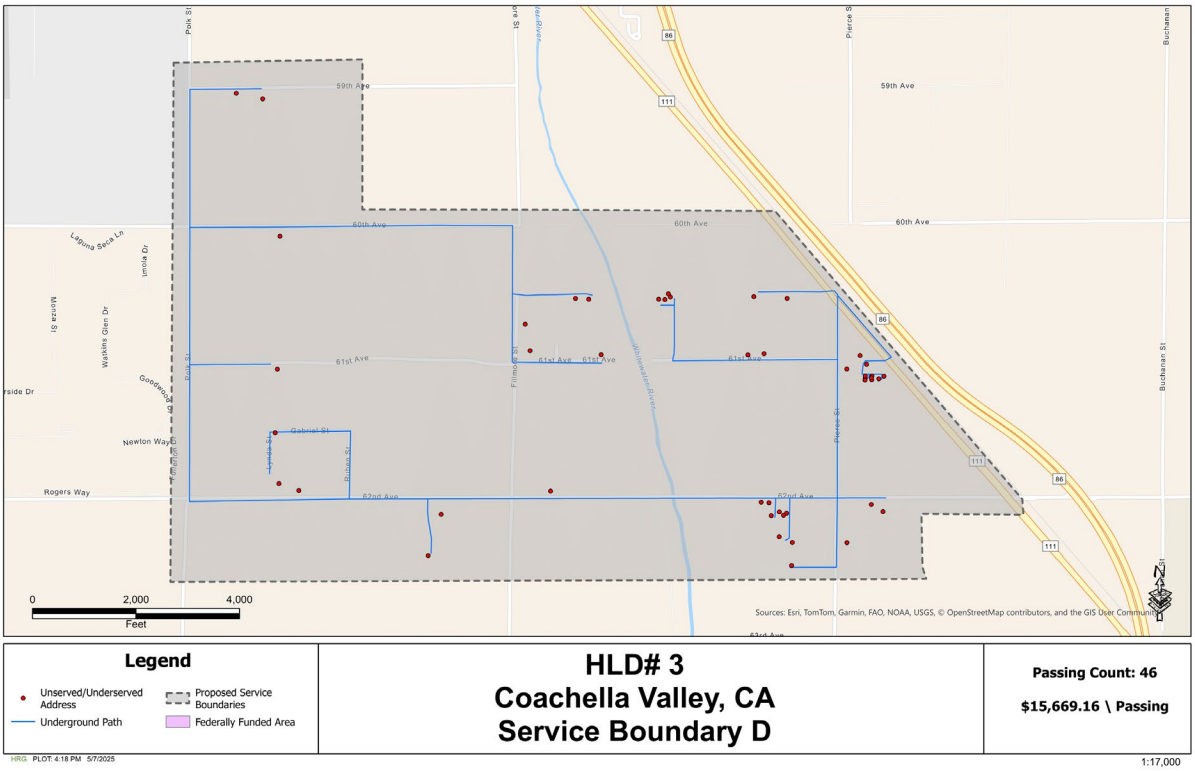
Passings	69
Cost Per Passing	$ 5,713.26

Figure 26 - Area 3 Service Boundary C
Map and Summary Costs

Group - Summary	Group	Id	Description	Unit	Quantity	Unit Cost	Total Cost
Engineering	Cables	3	Traffic Control (No Drops)	feet	17,592	$ 0.70	$ 12,314.71
Materials	Cables	F5154	Aerial / Underground Material -Provide 48-ct fiber cable	feet	16,715	$ 0.45	$ 7,521.95
Materials	Cables	F5152	Aerial / Underground Material -Provide 96-ct fiber cable	feet	877	$ 0.84	$ 736.67
Materials	Cables	51	DROP Footage (avg per drop amount/# passings)	feet	-	$ 2.06	$ -
Engineering	Cable installation - Underground	NO-ENG	Underground Engineering - Underground Route Design	feet	27,634	$ 0.80	$ 22,107.53
Construction -UG	Cable installation - Underground	NO-ENG	Underground Engineering - Underground Permitting	feet	27,634	$ 0.35	$ 9,672.04
Engineering	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 2" du	feet	55	$ 13.00	$ 718.49
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 1.25"	feet	359	$ 12.00	$ 4,310.97
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 1.25"	feet	4,145	$ 11.25	$ 46,633.06
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 2" du	feet	497	$ 11.25	$ 5,595.97
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 1.25"	feet	1,050	$ 10.00	$ 10,501.08
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 2" du	feet	4,145	$ 8.75	$ 36,270.16
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 1.25"	feet	17,382	$ 8.25	$ 143,401.84
Construction -UG	Cable installation - Underground	BH8058	Underground Construction - Install #12 TRACER WIRE GRE	feet	27,634	$ 0.14	$ 3,868.82
Construction -UG	Cable installation - Underground	NO-CON	CABLE PULLING (MSTs)	feet	8,801	$ 1.20	$ 10,561.15
Construction -UG	Cable installation - Underground	NO-CON	CABLE PULLING (1 cable)	feet	15,058	$ 1.00	$ 15,058.44
Construction -UG	Cable installation - Underground	NO-CON	PMO (Underground)	feet	27,634	$ 0.48	$ 13,264.52
Construction -UG	Miscellaneous	45	Underground Construction - Provide and place fiber mark	count	12	$ 30.00	$ 360.00
Materials	Terminals, cabinets, splitters	F5282	Provide and Place 432 Cabinet	count	1	$ 8,590.32	$ 8,590.32
Materials	Terminals, cabinets, splitters	F5156	1x32 DISTRIBUTION FIBER SPLITTER	count	3	$ 941.22	$ 2,823.66
Materials	Terminals, cabinets, splitters	F5144	Provide and Place (Raychem B) UG Splice Closure	count	9	$ 421.58	$ 3,794.22
Materials	Pedestals, flowerpots, pits, vaults	C4073	Underground Construction - Provide and SET 35x15x17 DC	count	7	$ 985.87	$ 6,901.09
Materials	Pedestals, flowerpots, pits, vaults	C4082	Underground Construction - PROVIDE AND PLACE PEDEST	count	38	$ 229.17	$ 8,593.88
Materials	Pedestals, flowerpots, pits, vaults	BH8132	Underground Construction - PROVIDE AND PLACE 17x30x	count	6	$ 610.94	$ 3,665.64
Materials	Pedestals, flowerpots, pits, vaults	BH8054	Underground Construction - PROVIDE AND PLACE 24x36x	count	7	$ 854.29	$ 5,980.03
Materials	Pedestals, flowerpots, pits, vaults	BH8134	Underground Construction - PROVIDE AND PLACE 30x48x	count	1	$ 1,736.63	$ 1,736.63
Materials	Slackloops	F5154	Underground Construction -Underground Slack Loop 48Ct	feet	600	$ 0.45	$ 270.00
Materials	Slackloops	F5152	Underground Construction -Underground Slack Loop 96Ct	feet	75	$ 0.84	$ 63.00
Construction -UG	Cable installation - Underground	76	OTDR End to End Test of Fiber Cable	count	76	$ 20.00	$ 1,518.00
Materials	Connectorized drop hubs	F5232	2 PORT MST 100' DIELECTRIC	count	2	$ 65.99	$ 131.98
Materials	Connectorized drop hubs	F5233	2 PORT MST 250' DIELECTRIC	count	4	$ 90.72	$ 362.88
Materials	Connectorized drop hubs	F5234	2 PORT MST 500' DIELECTRIC	count	4	$ 143.05	$ 572.20
Materials	Connectorized drop hubs	F5235	2 PORT MST 750' DIELECTRIC	count	3	$ 181.45	$ 544.35
Materials	Connectorized drop hubs	F5236	2 PORT MST 1000' DIELECTRIC	count	5	$ 218.55	$ 1,092.75
Materials	Connectorized drop hubs	F5237	2 PORT MST 1500' DIELECTRIC	count	7	$ 398.41	$ 2,788.87
Materials	Connectorized drop hubs	F5239	4 PORT MST 500' DIELECTRIC	count	1	$ 165.20	$ 165.20
Materials	Connectorized drop hubs	F5250	4 PORT MST 1500' DIELECTRIC	count	2	$ 331.68	$ 663.36
Materials	Connectorized drop hubs	F5260	6 PORT MST 250' DIELECTRIC	count	1	$ 134.59	$ 134.59
Materials	Connectorized drop hubs	F5256	6 PORT MST 1500' DIELECTRIC	count	1	$ 376.82	$ 376.82
Materials	Connectorized drop hubs	F5322	8 PORT MST 750' DIELECTRIC	count	1	$ 255.93	$ 255.93
Materials	Connectorized drop hubs	F5265	12 PORT MST 500' DIELECTRIC	count	1	$ 292.48	$ 292.48
Miscellaneous	Special Permits			count		$ 3,000.00	$ -
Miscellaneous	Middle Mile Connection			feet			$ -
Miscellaneous	Central Office			bid			$ -
Miscellaneous	Network Access Equipment			bid			$ -
Miscellaneous	Shelters			count			$ -
Miscellaneous	Contingency			count			$ -
						Total:	$ 394,215.27

Figure 27 - Area # 3 Service Boundary C Labor and Material OSP Costs

SERVICE BOUNDARY D



Engineering	68,037
Materials	85,311
Construction - AER	-
Construction - UG	567,434
Total Cost	$ 720,781.24

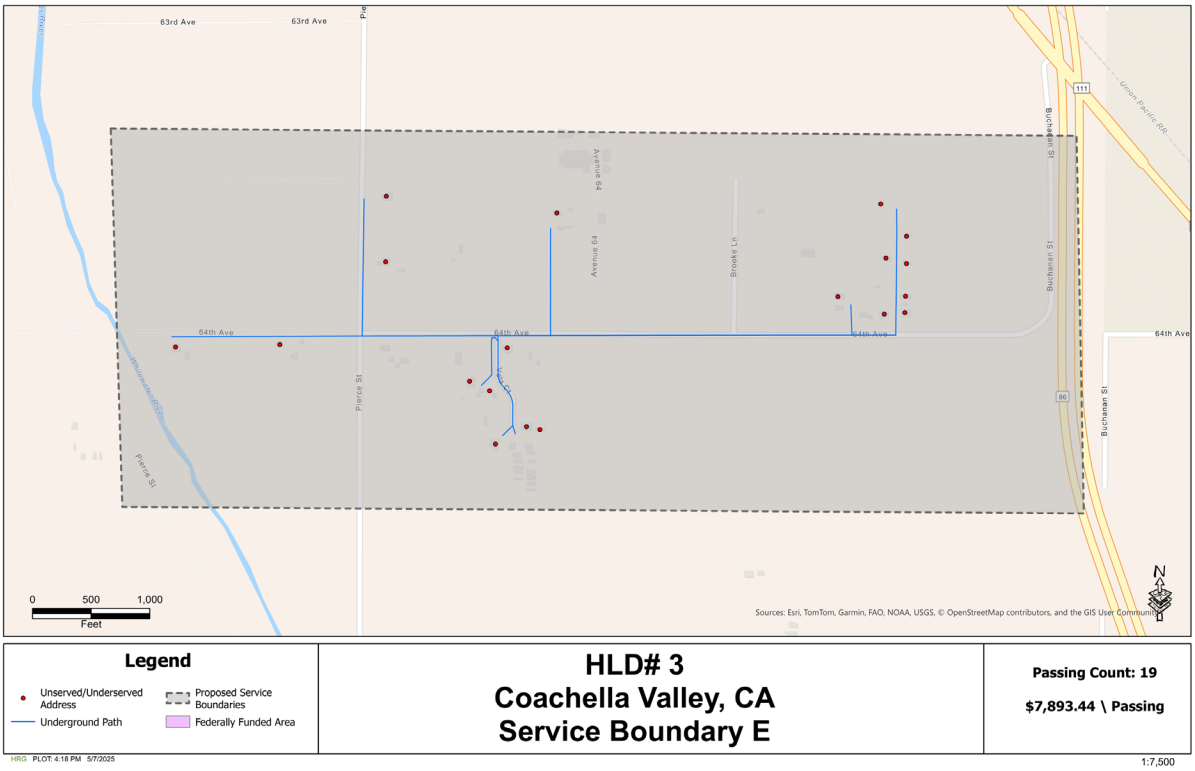
Passings	46
Cost Per Passing	$ 15,669.16

Figure 28 - Area # 3 Service Boundary D
Map and Summary Costs

Group - Summary	Group	Id	Description	Unit	Quantity	Unit Cost	Total Cost
Engineering	Cables	3	Traffic Control (No Drops)	feet	35,950	$ 0.70	$ 25,164.81
Materials	Cables	F5154	Aerial / Underground Material -Provide 48-ct fiber cable	feet	35,950	$ 0.45	$ 16,177.38
Materials	Cables	51	DROP Footage (avg per drop amount/# passings)	feet		$ 2.06	$ -
Engineering	Cable installation - Underground	NO-ENG	Underground Engineering - Underground Route Design	feet	51,903	$ 0.80	$ 41,522.51
Construction -UG	Cable installation - Underground	NO-ENG	Underground Engineering - Underground Permitting	feet	51,903	$ 0.35	$ 18,166.10
Engineering	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 2" du	feet	104	$ 13.00	$ 1,349.48
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 1.25"	feet	675	$ 12.00	$ 8,096.89
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 1.25"	feet	7,785	$ 11.25	$ 87,586.54
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 2" du	feet	934	$ 11.25	$ 10,510.38
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 1.25"	feet	1,972	$ 10.00	$ 19,723.19
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 2" du	feet	7,785	$ 8.75	$ 68,122.86
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 1.25"	feet	32,647	$ 8.25	$ 269,338.34
Construction -UG	Cable installation - Underground	BH8058	Underground Construction - Install #12 TRACER WIRE GRE	feet	51,903	$ 0.14	$ 7,266.44
Construction -UG	Cable installation - Underground	NO-CON	CABLE PULLING (MSTs)	feet	15,325	$ 1.20	$ 18,390.13
Construction -UG	Cable installation - Underground	NO-CON	CABLE PULLING (1 cable)	feet	33,497	$ 1.00	$ 33,497.26
Construction -UG	Cable installation - Underground	NO-CON	PMO (Underground)	feet	51,903	$ 0.48	$ 24,913.50
Construction -UG	Miscellaneous	45	Underground Construction - Provide and place fiber mark	count	27	$ 30.00	$ 810.00
Materials	Terminals, cabinets, splitters	F5282	Provide and Place 432 Cabinet	count	1	$ 8,590.32	$ 8,590.32
Materials	Terminals, cabinets, splitters	F5156	1x32 DISTRIBUTION FIBER SPLITTER	count	2	$ 941.22	$ 1,882.44
Materials	Terminals, cabinets, splitters	F5144	Provide and Place (Raychem B) UG Splice Closure	count	18	$ 421.58	$ 7,588.44
Materials	Pedestals, flowerpots, pits, vaults	C4073	Underground Construction - Provide and SET 35x15x17 DC	count	15	$ 985.87	$ 14,788.05
Materials	Pedestals, flowerpots, pits, vaults	C4082	Underground Construction - PROVIDE AND PLACE PEDEST	count	38	$ 229.17	$ 8,593.88
Materials	Pedestals, flowerpots, pits, vaults	BH8132	Underground Construction - PROVIDE AND PLACE 17x30x	count	6	$ 610.94	$ 3,665.64
Materials	Pedestals, flowerpots, pits, vaults	BH8054	Underground Construction - PROVIDE AND PLACE 24x36x	count	15	$ 854.29	$ 12,814.35
Materials	Pedestals, flowerpots, pits, vaults	BH8134	Underground Construction - PROVIDE AND PLACE 30x48x	count	1	$ 1,736.63	$ 1,736.63
Materials	Slackloops	F5154	Underground Construction -Underground Slack Loop 48Ct	feet	1,350	$ 0.45	$ 607.50
Construction -UG	Cable installation - Underground	76	OTDR End to End Test of Fiber Cable	count	51	$ 20.00	$ 1,012.00
Materials	Connectorized drop hubs	F5232	2 PORT MST 100' DIELECTRIC	count	3	$ 65.99	$ 197.97
Materials	Connectorized drop hubs	F5233	2 PORT MST 250' DIELECTRIC	count	2	$ 90.72	$ 181.44
Materials	Connectorized drop hubs	F5234	2 PORT MST 500' DIELECTRIC	count	5	$ 143.05	$ 715.25
Materials	Connectorized drop hubs	F5235	2 PORT MST 750' DIELECTRIC	count	3	$ 181.45	$ 544.35
Materials	Connectorized drop hubs	F5236	2 PORT MST 1000' DIELECTRIC	count	4	$ 218.55	$ 874.20
Materials	Connectorized drop hubs	F5237	2 PORT MST 1500' DIELECTRIC	count	15	$ 398.41	$ 5,976.15
Materials	Connectorized drop hubs	F5256	6 PORT MST 1500' DIELECTRIC	count	1	$ 376.82	$ 376.82
Miscellaneous	Special Permits			count		$ 3,000.00	$ -
Miscellaneous	Middle Mile Connection			feet			$ -
Miscellaneous	Central Office			bid			$ -
Miscellaneous	Network Access Equipment			bid			$ -
Miscellaneous	Shelters			count			$ -
Miscellaneous	Contingency			count			$ -
						Total:	$ 720,781.24

Figure 29 - Area # 3 Service Boundary D Labor and Material OSP Costs

SERVICE BOUNDARY E



Engineering	10,571
Materials	28,843
Construction - AER	-
Construction - UG	110,561
Total Cost	$ 149,975.27

Passings	19
Cost Per Passing	$ 7,893.44

Figure 30 - Area # 3 Service Boundary E
Map and Summary Costs

Group - Summary	Group	Id	Description	Unit	Quantity	Unit Cost	Total Cost
Engineering	Cables	3	Traffic Control (No Drops)	feet	3,293	$ 0.70	$ 2,304.77
Materials	Cables	F5154	Aerial / Underground Material -Provide 48-ct fiber cable	feet	3,293	$ 0.45	$ 1,481.64
Materials	Cables	51	DROP Footage (avg per drop amount/# passings)	feet		$ 2.06	$ -
Engineering	Cable installation - Underground	NO-ENG	Underground Engineering - Underground Route Design	feet	10,007	$ 0.80	$ 8,005.98
Construction -UG	Cable installation - Underground	NO-ENG	Underground Engineering - Underground Permitting	feet	10,007	$ 0.35	$ 3,502.61
Engineering	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 2" du	feet	20	$ 13.00	$ 260.19
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 1.25"	feet	130	$ 12.00	$ 1,561.17
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 1.25"	feet	1,501	$ 11.25	$ 16,887.60
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 2" du	feet	180	$ 11.25	$ 2,026.51
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 1.25"	feet	380	$ 10.00	$ 3,802.84
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 2" du	feet	1,501	$ 8.75	$ 13,134.80
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 1.25"	feet	6,295	$ 8.25	$ 51,931.26
Construction -UG	Cable installation - Underground	BH8058	Underground Construction - Install #12 TRACER WIRE GRE	feet	10,007	$ 0.14	$ 1,401.05
Construction -UG	Cable installation - Underground	NO-CON	CABLE PULLING (MSTs)	feet	6,450	$ 1.20	$ 7,739.41
Construction -UG	Cable installation - Underground	NO-CON	CABLE PULLING (1 cable)	feet	3,293	$ 1.00	$ 3,292.54
Construction -UG	Cable installation - Underground	NO-CON	PMO (Underground)	feet	10,007	$ 0.48	$ 4,803.59
Construction -UG	Miscellaneous	45	Underground Construction - Provide and place fiber mark	count	2	$ 30.00	$ 60.00
Materials	Terminals, cabinets, splitters	F5282	Provide and Place 432 Cabinet	count	1	$ 8,590.32	$ 8,590.32
Materials	Terminals, cabinets, splitters	F5156	1x32 DISTRIBUTION FIBER SPLITTER	count	1	$ 941.22	$ 941.22
Materials	Terminals, cabinets, splitters	F5144	Provide and Place (Raychem B) UG Splice Closure	count	3	$ 421.58	$ 1,264.74
Materials	Pedestals, flowerpots, pits, vaults	C4073	Underground Construction - Provide and SET 35x15x17 DC	count	3	$ 985.87	$ 2,957.61
Materials	Pedestals, flowerpots, pits, vaults	C4082	Underground Construction - PROVIDE AND PLACE PEDEST	count	18	$ 229.17	$ 4,010.48
Materials	Pedestals, flowerpots, pits, vaults	BH8132	Underground Construction - PROVIDE AND PLACE 17x30x	count	3	$ 610.94	$ 1,710.63
Materials	Pedestals, flowerpots, pits, vaults	BH8054	Underground Construction - PROVIDE AND PLACE 24x36x	count	3	$ 854.29	$ 2,562.87
Materials	Pedestals, flowerpots, pits, vaults	BH8134	Underground Construction - PROVIDE AND PLACE 30x48x	count	1	$ 1,736.63	$ 1,736.63
Materials	Slackloops	F5154	Underground Construction -Underground Slack Loop 48Ct	feet	225	$ 0.45	$ 101.25
Construction -UG	Cable installation - Underground	76	OTDR End to End Test of Fiber Cable	count	21	$ 20.00	$ 418.00
Materials	Connectorized drop hubs	F5233	2 PORT MST 250' DIELECTRIC	count	1	$ 90.72	$ 90.72
Materials	Connectorized drop hubs	F5234	2 PORT MST 500' DIELECTRIC	count	1	$ 143.05	$ 143.05
Materials	Connectorized drop hubs	F5235	2 PORT MST 750' DIELECTRIC	count	2	$ 181.45	$ 362.90
Materials	Connectorized drop hubs	F5236	2 PORT MST 1000' DIELECTRIC	count	5	$ 218.55	$ 1,092.75
Materials	Connectorized drop hubs	F5237	2 PORT MST 1500' DIELECTRIC	count	4	$ 398.41	$ 1,593.64
Materials	Connectorized drop hubs	F5240	4 PORT MST 750' DIELECTRIC	count	1	$ 202.51	$ 202.51
Miscellaneous	Special Permits			count		$ 3,000.00	$ -
Miscellaneous	Middle Mile Connection			feet			$ -
Miscellaneous	Central Office			bid			$ -
Miscellaneous	Network Access Equipment			bid			$ -
Miscellaneous	Shelters			count			$ -
Miscellaneous	Contingency			count			$ -
						Total:	$149,975.27

Figure 31 - Area # 3 Service Boundary E Labor and Material OSP Costs

COST AND REVENUE ANALYSIS OF BUILDING FULL NETWORKS

In building full networks there are several factors that determine financial feasibility. A full feasibility study is usually only undertaken by the entity who is going to build a network. The costs of the feasibility are usually built into the financing costs of the project. Full feasibility includes a detailed cost of construction (CapEx), Operations (OpEx), financing debt burden, access to middle mile, access to transport to the outside internet, etc.

However, a higher-level analysis can provide important information and considerations. The chart below is an analysis regarding each of the networks in this section. There are important assumptions that must be evaluated for the information to be of maximum usefulness:

- Service boundaries, passings (number of addresses) and CapEx Costs are taken from the sections above
- Customer Fee is a national average of $75/mo. This could vary greatly depending on what ISP decides to charge
- Take Rate is an estimate of how many of the passings would choose to purchase services. This number is volatile based on cost, other service options, etc. Fifty percent would be considered a high take rate, however in the areas of the Coachella Valley who have bad service (and have not had good service), the take rate could be significantly higher.
- OpEx Cost is a percentage of annual revenue. Fifty percent is an average and includes salaries, transport and debt burden. This percentage varies greatly depending on size of the organization. There are many organizations who have lower OpEx and many who have higher.
- Years to pay off is an important number. In this table, it is a function of CapEx cost divided by the revenue minus OpEx.
- Most of these numbers make projects not feasible (which is why they are currently unserved or underserved). The math does not work for ISPs to build these networks with this long to even recoup their CapEx costs. However, the assumed variables impact the numbers significantly. For example, if the CapEx is lower (for example, using conduit that was installed as part of CV Sync, CIP or dig once projects), take rates are higher and OpEx is lower, these projects become feasible. Particularly, with existing conduit, the CapEx costs could be reduced by half or even more.

Area	Service Boundary	Passings	CapEx Cost	Customer Fee	Take Rate	Revenue Per Year	OpEx Cost %	OpEx Cost/Year	Years to Pay Off
Area 1	A	207	1,156,802	75	0.50	93,150	0.50	46,575	25
	B	100	537,983	75	0.50	45,000	0.50	22,500	24
	C	133	139,543	75	0.50	59,850	0.50	29,925	5
	D	48	453,073	75	0.50	21,600	0.50	10,800	42
	E	62	472,516	75	0.50	27,900	0.50	13,950	34
Area 2	A	70	464,583	75	0.50	31,500	0.50	15,750	29
	B	96	472,724	75	0.50	43,200	0.50	21,600	22
	C	106	509,265	75	0.50	47,700	0.50	23,850	21
Area 3	A	84	187,303	75	0.50	37,800	0.50	18,900	10
	B	28	160,112	75	0.50	12,600	0.50	6,300	25
	C	69	394,215	75	0.50	31,050	0.50	15,525	25
	D	46	720,781	75	0.50	20,700	0.50	10,350	70
	E	19	149,975	75	0.50	8,550	0.50	4,275	35

Figure 10 - High-Level Feasibility Analysis

ISP/PARTNER RFP DEVELOPMENT AND EVALUATION

SUMMARY

The Coachella Valley Association of Governments (CVAG) utilized regional funding to build a traffic signal synchronization system within participating jurisdictions. This system is referred to as CV Sync.

CVAG's leadership recognized the potential to leverage the CV Sync program to expand broadband in the Coachella Valley. To develop a plan to take that next step, CVAG has undertaken a comprehensive broadband strategic plan, which is funded through the California Public Utilities Commission Local Agency Technical Assistance program. This initiative aims to evaluate the current state of high-speed internet access within the CVAG project area (particularly unserved and underserved addresses), identify areas for improvement, and develop a strategic plan to improve connectivity for all residents.

To better understand the current state of broadband and identify needs and possible solution in the Coachella Valley, several tasks have been completed:

- Market Assessment
- Survey
- Stakeholder Meetings (including Internet Service Providers (ISPs))
- Importing current State and Federal Communications Commission (FCC) data
- Gap Analysis

These steps helped to evaluate the current broadband strengths and weaknesses and more clearly identify unserved and underserved areas within the project boundaries, following the requirements of the grant funding for the broadband strategic plan.

As is detailed in the Market Assessment and Stakeholder Meetings Report, HR Green had discussions with twenty (20) Internet Service Providers (ISPs). Eight (8) communicated that they either did not have plans to expand existing infrastructure in the Coachella Valley or did not have assets close enough to the Coachella Valley extend their networks into this area. Those ISPs are:

- Netfortris/Sangoma
- Anza
- Astound
- Optimum
- Consolidated Communications
- TPx Communications
- AT&T
- Underline

Twelve (12) ISPs in the Coachella Valley and surrounding areas expressed interest in having continuing discussions about possibly adding broadband infrastructure in the Coachella Valley. Those ISPs are:

- Frontier
- Charter
- Cityside Fiber
- Crown Castle
- Hotwire Communications

- Onward
- Pacific Lightwave
- Race Communications
- Southern California Telephone Company
- GeoLinks
- Zito Media
- Zayo

This is a significant number of ISPs with whom exploring broadband options is a possibility.

The Gap Analysis deliverable in this strategic plan detailed the broadband needs in the Coachella Valley. With that understanding of broadband needs, the next step was to begin the process of exploring the available options of how to fill the identified gaps to improve broadband.

Given the important role ISPs would play in broadband improvement (building and operating their networks to provide broadband services to CVAG residents, businesses and anchor institutions), it was important to more accurately determine their interest and intentions. To begin the process of moving from general interest from the ISPs to working with them to develop actual infrastructure projects, CVAG issued a Request for Expressions of Interest (RFEI – see Section Appendix A for the original RFEI). In the RFEI, ISPs were asked to focus their responses on four key areas:

1. Broadband Network Expansion
2. Grant Applications
3. Leveraging CVAG and Jurisdiction Fiber Assets
4. Broadband Adoption & Affordability

RFEI RESPONSES

Five responses were received. In alphabetical order, the ISPs that provided responses were:

- Cityside Fiber
- EntryPoint Networks, Inc. (EntryPoint)
- GeoLinks
- Race Communications
- Zayo

While the responses varied in comprehensiveness, they provide valuable information and starting points for discussions between CVAG, its member jurisdictions, and the ISPs.

It is important to point out that the responses were very different. The responding ISPs have dissimilar approaches, utilize different technologies and to some degrees do not target the same customers. These differences can be summarized as follows:

Cityside Fiber	Fiber	Orange County - might expand here
EntryPoint Networks	Fiber	Open Access - interested in expanding here
GeoLinks	Fixed Wireless	Some service here - interested in expanding
Race Communications	Fiber	Some service here - build only HOAs
Zayo	Fiber	Middle Mile

Fiber can be described as wrapped glass strands that are deployed in bundles within a protective tubing (conduit). It has the greatest capacity and typically has the least physical and capacity impediments to reliable service. Fixed wireless is a point to point system that can have an important role in network deployments (mainly where it is too costly to deploy fiber) and, depending on locations of equipment, can provide the level of service many residential customers need. Fiber is more expensive to deploy, but has advantages. Having four (4) of five (5) respondents who are fiber providers could have significant positive impacts on broadband in the Coachella Valley.

Another important distinction is the third column that provides some extra information about the ISPs. EntryPoint operates an Open Access model. That means that they provide the infrastructure and work with other providers to offer services over their network. In many cases, this model leads to more flexible arrangements with jurisdictions and greater competition for customers. Zayo provides “middle mile” services. This means they provide the main way that ISPs utilize to connect their networks to the outside internet. Zayo does offer some services to governments, schools and some businesses, but they do not connect residential addresses. Zayo provides the way for ISPs who provide the connection to residential homes to connect to the internet.

As grants becoming available, municipal Right-Of-Way (ROW) construction projects are designed and built, and with further conversations with ISPs about their potential investments take place, the information these ISPs provided in their responses can help guide conversations and plan development. Full responses can be found in Section Appendices B through F.

RECOMMENDATIONS AND NEXT STEPS

The number of responses and the options responses provide are not always helpful (either there are not many responses, or the ISPs do not offer insights or suggestions from which to work). These five responses give insights to build upon. Moreover, these ISPs have good reputations for their processes and services. Also, because their technologies and customer focuses are different, there are multiple paths CVAG can pursue to improve broadband in the Coachella Valley. These details can be helpful in focusing on how to best work with them.

HR Green’s recommendations for next steps with the ISPs are as follows:

1. CV Sync Conduit: Many ISPs expressed interest in seeing what CV Sync or other agency-owned conduit is available to leverage for deploying their fiber. This could greatly lower their implementation costs and potentially accelerate expanding broadband to areas of need in the Coachella Valley. Particular attention will be paid to addresses this study has identified as being unserved or unserved with broadband service. The California Public Utilities Commission has used the definition of “unserved” as 25 Mbps download and 3 Mbps upload speeds – however, according to their “California Broadband Data Processing and Validation” document dated 12/31/23, they indicate they will begin using 100/10 after 2024 *(https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/communications-division/documents/broadband-mapping/broadband_data-of-dec_2023/california-broadband-data-processing-and-validation---2024_final.pdf)*.
   HR Green is converting the CV Sync design plans to Geographic Information System (GIS) mapping to provide a tool for capital planning by member jurisdictions and a resource for ISPs to identify opportunities to leverage public infrastructure to advance broadband availability in the Coachella Valley.

2. Conduit Use: It will be important to have a process that is as streamlined as possible for how ISPs will be able to leverage publicly owned conduits.

   Conduit that has excess capacity could either be owned by a jurisdiction or by CV Sync. In either case, the arrangements to utilize the excess capacity (where available) will be administered by the jurisdiction. When CV Sync owns the conduit, they will formalize an agreement with the jurisdiction, and the jurisdiction will make final arrangements with the ISP requesting use. The agreements between CV Sync and jurisdictions are approved by CVAG and are ready for use between CV Sync and jurisdictions.

CVAG and member jurisdictions will need to decide what their pricing will be (ensuring it is cost effective for the ISPs, if possible) and what documents they will need to use with ISPs to formalize conduit use.

3. Letters of Support for Grants: None of the ISPs indicated an interest in letters of support from CVAG or member jurisdictions for state or federal broadband grants (e.g., BEAD and CASF funding programs). It is recommended that CVAG and its member jurisdictions continue to engage with ISPs on grant opportunities as they become available.

4. Policies: All RFEI respondents requested that policies be as uniform as possible throughout the Coachella Valley and that there be some consideration how the jurisdictions can work with the ISPs in ways that will not compromise jurisdiction needs but be able to help ISPs build as quickly as possible.

   As part of this Broadband Strategic Plan, broadband related policy recommendations have been made and can be found in the policy recommendations deliverable. These include recommendations regarding process, what the ISP must provide, construction standards, etc.

   To the degree possible, adoption of these recommendations by all jurisdictions could help them know that they have industry best practices and provide a consistent set of policies for ISPs. Having as much standardization as possible is a significant incentive for ISPs to invest in infrastructure. Even if the policies are somewhat more restrictive than other areas, if ISPs know what to expect across a larger area, that often encourages them to invest there.

5. Ongoing Engagement: It is recommended that CVAG and its member jurisdictions continue engaging with ISPs, particularly the five that responded to the REFI. Communication will help keep them interested and help explore options to improve broadband. Working to coordinate these discussions can help keep options moving forward.
   Based on their specific responses, the possible next steps for each respondent are:

   - Cityside Fiber: Provide available conduit maps to them and have a follow-up discussion to see if they are building towards the Coachella Valley or if the available conduit is enough of an incentive for them to invest here.
   - EntryPoint Networks, Inc. (EntryPoint): Provide available conduit maps and coordinate discussions with specific jurisdictions with whom EntryPoint wants to work with to begin their network deployment in the Coachella Valley.
   - GeoLinks: Discuss with them if they applied for and were awarded BEAD grant funds in the Coachella Valley. Provide the available conduit maps to GeoLinks to see if that helps them decide on any next steps in the Coachella Valley.
   - Race Communications: Given Race builds for HOAs and are building in the Coachella Valley currently, continued discussions with them about their next communities could be helpful. They indicated they build their own middle mile also, so conversations with them about potential collaborations might be productive.
   - Zayo: Coordination with build projects is a key in working with Zayo. They could provide middle mile for other ISPs or they might want to build to certain areas for schools, businesses or other anchor institutions.

BACKGROUND INFORMATION

The following are background and supplemental information from which HR Green developed conclusions and recommendations.

RFEI FOLLOW UP DISCUSSION SUMMARY

After the ISPs presented their RFEI responses, HR Green had a follow up meeting with each of them to further clarify their answers. Here is a summary of the information that was noted from those discussions.

ISP	ISP Type	Method of Installation?	What are They Interested In Doing?	Have They Applied for BEAD in the Area?	Current Projects	What are Their Opportunities for Development in the CV?	Information the ISPs Need from CVAG	What Does CVSync's Conduit Mean to the ISP?	How Will the ISP use the MMBI?	Interest in Talking with CVAG Juris.	Additional Information Pertaining to the ISP
EntryPoint Networks, Inc.	ISP and Research and Dev.	Buried	Deploy an open access network in the Valley – requires working closely with jurisdictions	No, they did not prequal or ask for letters of support. They didn't feel like they had enough time to do a viable request	They have three projects going for FFA between Quanta and EntryPoint. Half of their projects are publicly funded.	Several jurisdictions could be good opportunities. City of Coachella may be eligible for grants	Which jurisdictions want to talk. What are the costs and potential revenue	This could be significant for projects to make financial sense	There is a potential for MMBI depending on costs and locations. Would help to have GIS	Yes	They are agnostic if it's a private or publicly funded or operated network. Already work with Zayo
GeoLinks	Last Mile	Fixed Wireless	Partnering for other options in the Valley. Hybrid fixed-wireless deployment mixed with fiber extensions	They have not gone after BEAD yet, but they submitted their pre-qualifications	In discussions with La Quinta but would like to see where else fixed wireless could fit into municipal projects	Potential for a fixed wireless deployment in La Quinta.	Discussions with CVAG about where fixed wireless may benefit the area.	Availability for a partner opportunity with another ISP.	If they need backhaul, but probably not	Yes	Faster and cheaper deployment. Vendors help them with capacity, incr. distance, keep costs down. Have and

											offer redundancy
Race Communications	Last Mile	Fiber	Continued buildout of their FTTH network	Have not mentioned applying for BEAD. It needs to make sense for them to apply for grants.	Already completed a fiber to the home (FTTH) project in Desert Hot Springs. In late 2025, Race will begin building in Indio. They are talking with Cathedral City.	Worked through options for micro trenching and developed a standard. Continuing discussions with Indio, Cathedral City, Desert Hot Springs, and La Quinta	Interested in knowing how CVAG can help with getting uniform permitting as this is the biggest hurdle they need to get over.	Wants to reduce their backbone costs by knowing what cities are going to be built out. The CVAG conduit will be the key to figure this out .	This will help lower network installation costs.	Yes	Just received half a billion dollars from private equity - they need to build to a certain amount of homes by 2029 in 33 cities. They are not tied to the cities but just need to meet the number of homes criteria.
Zayo	Middle Mile	Buried and aerial.	Potential Build, Operate, and Commercialize the network for revenue generation.	No	None, but are a nationwide company and would be looking to expand from Riverside to Indio.	Supportive of providing the backbone for other ISPs to build out to customers	Identify the precise segments of the CVSync project when completed. How will conduit capacity be used by the municipalities? How does the agreement process work	They would need an additional conduit with 12 of their fibers for their network	Interested in this as this will lower materials needed and intent of the project	Yes	They are most interested in the shortest route from Riverside to Indio.

							for ISPs trying to access CVSync conduit? How many municipal facilities are there as part of this project?				

EVALUATION

Receiving responses of interest from four active middle- or last-mile ISPs and one response from a development and operation firm validates the interest in fulfilling CVAG's goals and processes. Highlights from the responses include:

- None of the five responses indicated a need for a letter of support from CVAG for BEAD as they are not pursuing grant funding at this time within the CV.
- EntryPoint indicated they will be partnering with Quanta Telecom Solutions, LLC. to plan, design, finance, construct, and deploy broadband in the CV should they move forward with a project.
- Cityside Fiber is not planning to expand into the CV without the invitation and support from a local jurisdiction
- EntryPoint wants to work with CVAG to identify a project or a set of projects within CV that can successfully be funded, built, and operated as open access networks. They will work with private equity and infrastructure fund partners to fund the network construction and ongoing O&M.
- GeoLinks suggests a phased hybrid fiber-wireless network within the CV which would deliver symmetrical speeds up to 1 Gbps to homes, businesses, and institutions.
- Race Communications has already completed a fiber to the home (FTTH) project in Desert Hot Springs. In late 2025, Race will begin construction in Indio and Cathedral City.
- Zayo is interested in expanding into the CV and suggested providing the middle-mile network with their Digital Equity Access Network, which would be a plug and play opportunity for ISPs

LETTERS OF SUPPORT AND PURSUING UPCOMING GRANTS

Each of the five responses was evaluated for indication of support from CVAG for Broadband Equity, Access, and Deployment (BEAD) funding requests. None of the responses indicated a need for support from CVAG for BEAD funding at this time. Each of the five responses for the responses received have been included below in alphabetical order:

- Cityside Fiber: The areas Cityside Fiber is currently providing service to within Orange County do not qualify for BEAD grants. Therefore, they are not applying for BEAD and do not intend to apply for BEAD funds in the Coachella Valley. They also do not mention requiring letters of support from CVAG, indicating to HR Green that they do not need support from CVAG for this grant.
- EntryPoint Networks, Inc.: EntryPoint does not mention BEAD in their response or request a letter of support, indicating to HR Green that they do not need support from CVAG for this grant.
- GeoLinks: Although GeoLinks explicitly states that they have secured over $100 million in state and federal broadband grants, they do not explicitly mention BEAD in their response, nor request letters of support. Therefore, this indicates to HR Green that they do not need support from CVAG for this grant.
- Race Communications: Race mentions in their response if they were to locate an area for federal grant, then they would look to the local governments within the CVAG community to write letters of support for Race's project. However, they do not mention BEAD funding in their response. Therefore, this indicates to HR Green that they do not need support from CVAG for this grant.
- Zayo: Zayo mentions that they are well-positioned to support ISPs and local governments, including CVAG, through the BEAD funding applications. However, they do not explicitly mention applying for BEAD in tandem with CVAG in their response, nor requesting letters of support. Therefore, this indicates to HR Green that they do not need support from CVAG for this grant.

ADDITIONAL OBSERVATIONS FROM THE RESPONSES

Based on these responses, HR Green highlights the following observations:

- The five responses present distinct options: EntryPoint has a funding partner in Quanta but will want to see how costs can be dealt with (for example, using existing conduit). Cityside is waiting on an opportunity with one of CVAG's member cities, GeoLinks will build out a hybrid model, and Zayo focuses on the middle mile, while Race already has planned construction projects in the CV (in HOAs). HR Green recommends evaluating these models to determine which best meets CVAG and its member community's needs. Should CVAG require technical assistance in further evaluating these responses and options, HR Green is available to answer any questions
- Responses to the RFEI may not be mutually exclusive. For the responses CVAG finds beneficial, further discussions with the appropriate providers to determine the next steps CVAG should be initiated. Examples of possible next steps include discussion with Zayo to provide middle mile network for the other respondents or respondents could collocate or share infrastructure
- Given that EntryPoint can work with CVAG to identify and bring to fruition a fiber project into the CV, CVAG should decide if this is the preferred model to compliment Race Communication's scheduled work and possibly GeoLink's fixed wireless
- Open Access Network: On the third page of the response, EntryPoint mentions developing and operating fiber networks as an open access platform. This is a significant incentive for the Coachella Valley as this provides a competitive market for ISPs, which can result in lowered costs and improved services for residents and businesses. Further discussions to clarify the logistics of this network could be valuable
- Gap Analysis: EntryPoint states they have a gool to determine speed test data for the surrounding area to evaluate speeds, availability, and affordability to prioritize project areas. Confirming where the speed test data is collected from to determine whether the data source is reliable could be beneficial
- Broadband Network Expansion: Race Communications secured $500 million in capital in late 2024 to expand their fiber network across California to as many as 1 million locations. It could be helpful to confirm with Race where these locations are and whether any of them include the CVAG project area.
- Low-Income Standards and Programs: Race Communications claims their affordable entry level package for participants with a price of $35 for 3000 Mbps speeds. It could be helpful to request from them what the requirements are to subscribe to this package option to confirm this is a viable option for those in need.
- It could be helpful to keep the ISPs that are interested in discussions regarding network build out in the CV appraised of current and future network designs, terms and conditions when they become available to CVAG to determine if there is as a potential overlap of interest in a project
- Riverside County has worked on developing digital literacy programs for the citizens of member jurisdiction and tribes. Working with those and talking with ISPs about how to add to the County's work will be important. Digital literacy programs provide individuals both the ability to navigate the digital world and the skillset necessary for today's technology-based workforce. All age groups ranging from children to the elderly should be considered as stakeholders for these programs
- For resources on how to develop and implement these programs, please refer to the California Emerging Technology Fund at https://www.cetfund.org/action-and-results/public-policy-initiatives/digital-literacy/.
- For an additional resource, please refer to the Houston-Galveston Area Council for digital literacy program development to help bridge their digital divide issue. This report may be found at: https://www.h-gac.com/broadband.
- CVAG could conduct a formal Request for Proposal (RFP) to select a specific ISP for particular needs. However, unless CVAG or a jurisdiction identifies a competitive issue that requires

resolution, an RFP does not appear to be necessary.

SECTION APPENDICES

Section Appendix A – Original RFEI

Section Appendix B – Cityside Fiber

Section Appendix C – EntryPoint

Section Appendix D – GeoLinks

Section Appendix E – Race Communications

Section Appendix F – Zayo

SECTION APPENDIX A – ORIGINAL RFEI

HRGreen.
FIBER AND BROADBAND

Coachella Valley Association of Governments
Request for Expressions of Interest (RFEI)



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REQUEST FOR EXPRESSIONS OF INTEREST (RFEI) OVERVIEW

ABOUT THE COACHELLA VALLEY ASSOCIATION OF GOVERNMENTS

The Coachella Valley spans approximately 2,500 square miles, home to over 500,000 residents and has a diverse business landscape, including tourism, agriculture, and retail. The region is distinguished by its iconic landmarks, such as Joshua Tree National Park, the Salton Sea, and the San Jacinto Mountains, and is served by major transportation routes, including Interstate 10 and State Route 111.

Several parts of the Coachella Valley are member agencies of the Coachella Valley Association of Governments (CVAG), a regional planning organization that facilitates cooperation and collaboration among local governments. CVAG plays a pivotal role in addressing regional challenges and fostering balanced growth and an enhanced quality of life for its communities. Its initiatives span transportation, energy and environmental sustainability, and public safety, making it a key driver of the Valley's development.

CVAG's member agencies include the cities of Blythe, Cathedral City, Coachella, Desert Hot Springs, Indian Wells, Indio, La Quinta, Palm Desert, Palm Springs, and Rancho Mirage, along with Riverside County and several tribal governments, including the Agua Caliente Band of Cahuilla Indians, Cabazon Band of Mission Indians, Torres Martinez Desert Cahuilla Indians, and Twenty-Nine Palms Band of Mission Indians.

Recognizing the growing need for robust digital infrastructure, CVAG is actively exploring strategies to expand and enhance broadband services across the region. These efforts focus on increasing access to high-speed internet for all neighborhoods while supporting local businesses and residents. CVAG is evaluating opportunities to collaborate with private-sector partners and leverage public investments to extend fiber optic networks. The objective is to develop shovel-ready last-mile projects capable of delivering symmetrical 100 Mbps upload and download speeds to residents, public institutions, and businesses, ensuring reliable and equitable digital connectivity throughout the Valley.

PURPOSE OF THIS RFEI

CVAG is seeking proposals from qualified organizations ("Respondents") interested in working with CVAG and/or its member agencies to facilitate the expansion of broadband services in the region's unserved and underserved areas[1]. Additionally, this process may present opportunities for collaboration with public agencies in the Coachella Valley to further enhance broadband access and connectivity (see the following sections for more details).

In today's digital landscape, high-quality broadband is a critical factor in a community's ability to drive economic growth, enhance quality of life, and maintain a competitive edge. Reliable broadband access benefits residents, businesses, anchor institutions, economic development efforts, and government services, making it a fundamental component of employment opportunities, lifestyle, and overall well-being.

Looking toward the future, CVAG is committed to working with private-sector partners to deploy a world-class broadband network in areas that do not currently meet the served threshold. CVAG also seeks to explore additional strategies for improving regional connectivity, ensuring that the Coachella Valley remains at the forefront of digital innovation and accessibility.

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1 Per the FCC, a location is considered "served" by broadband if it has access to reliable broadband service with download speeds of at least 100 Megabits Per Second (MBPS) and upload speeds of 20 MBPS. An "unserved" location has access to 25 MPS of download and 3 MBPS of upload speed, and "underserved" locations have between 20/3 and 100/20.

THE OPPORTUNITY

The CVAG broadband study has identified broadband and connectivity challenges in the Coachella Valley, but it has also highlighted significant opportunities for collaboration and infrastructure development that could deliver lasting benefits.

This is a critical and dynamic moment for broadband expansion in the Coachella Valley. Multiple projects are currently under construction or in development, including:

- CVSync traffic signal connectivity
- City Capital Improvement Projects (CIP)
- State Broadband Middle Mile Projects
- Other CVAG-led initiatives

These projects already incorporate or could include broadband infrastructure—primarily conduit—across large portions of the region. CVAG is actively exploring ways to optimize these assets, including policy and permitting solutions and broader collaborative efforts to improve connectivity.

With growing momentum around broadband and connectivity initiatives, this is a unique window of opportunity to take meaningful steps while projects are underway, and funding opportunities are available.

There are multiple potential solutions to:

- Expand broadband service to unserved and underserved areas
- Enhance regional connectivity and digital infrastructure
- Leverage public grant funding for financially sustainable projects

This RFEI has been initiated to identify one or more partners interested in expanding broadband network connectivity within the project's limits. CVAG invites ISPs and stakeholders to propose opportunities for:

- Serving unserved and underserved areas
- Collaborative projects that improve connectivity across the Coachella Valley

TIME-SENSITIVE ACTION REQUIRED

Time is of the essence. Two immediate opportunities require urgent attention and action:

1. Grant Funding (BEAD and Other Public Grants)
   - ISPs seeking BEAD grant funding and requiring letters of support from CVAG and/or its member agencies must act quickly – the dates of this RFEI are defined by the current BEAD schedule.
   - CVAG needs timely information on which areas ISPs plan to target to coordinate and prepare supporting documentation.
   - If ISPs require address or cost data, sufficient time must be allocated for data development.
2. Leveraging Ongoing Construction Projects
   - Several active infrastructure projects either include or could integrate broadband.
   - Once these projects are completed, the opportunity to incorporate broadband will be lost.
   - Collaborative efforts must be identified and initiated immediately.

COLLECTED DATA & MAPPING INSIGHTS

The maps below provide an overview of broadband needs and opportunities in the region. Additional details are available in subsequent sections.

Each map illustrates:

- Unserved (red dots) and underserved (blue dots) broadband serviceable locations (BSLs) from the Fabric Data
- The State Broadband Middle Mile Initiative (red line)

- Boundaries of incorporated cities and Tribal Authorities in the Coachella Valley

Figures 2 and 3 also depict:

- The CV Sync project, including broadband-ready conduit at various locations
- Planned Capital Improvement Projects (CIPs) by CVAG member jurisdictions

Additionally, CVAG is developing a conceptual conduit network to interconnect existing and planned conduit infrastructure into a comprehensive regional broadband network. While maps for this initiative are not yet available, planning is actively underway.

CALL TO ACTION

ISPs and potential broadband partners are encouraged to engage with CVAG as soon as possible to:

- Identify and pursue broadband expansion opportunities
- Leverage public grants and funding
- Integrate broadband infrastructure into ongoing projects

This RFEI presents a rare opportunity to shape broadband connectivity in the Coachella Valley. Immediate collaboration and swift action will be critical to closing the digital divide and ensuring long-term broadband accessibility for residents, businesses, and public institutions.

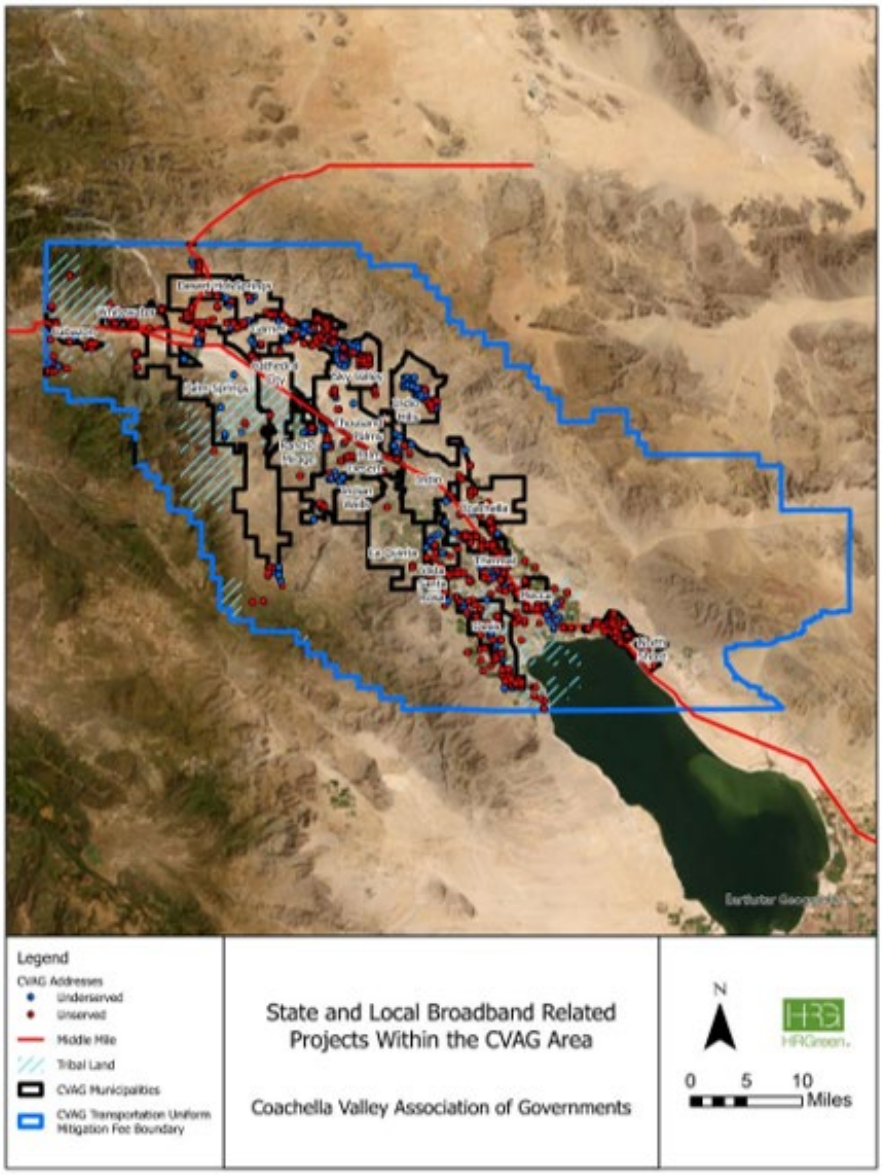


Figure 1 – Unserved (Red) and Underserved (Blue) Addresses

The map in Figure 2 below shows projects that are being planned and constructed in the Northwest part of the Coachella Valley. This map includes CVSync construction (which includes extra open conduit) and other planned projects (that either do or could include extra conduit).

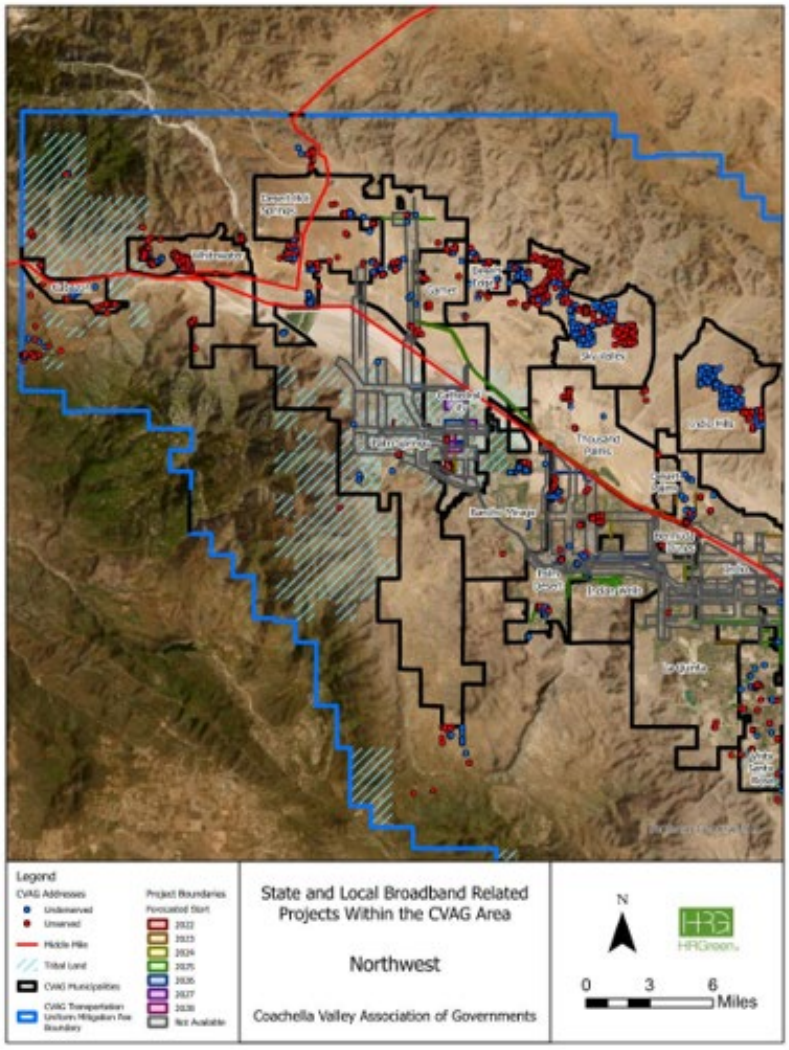


Figure 2 - Current and Planned Broadband Projects Northwest

Figure 3 below shows the same in the Southeast part of the Valley.

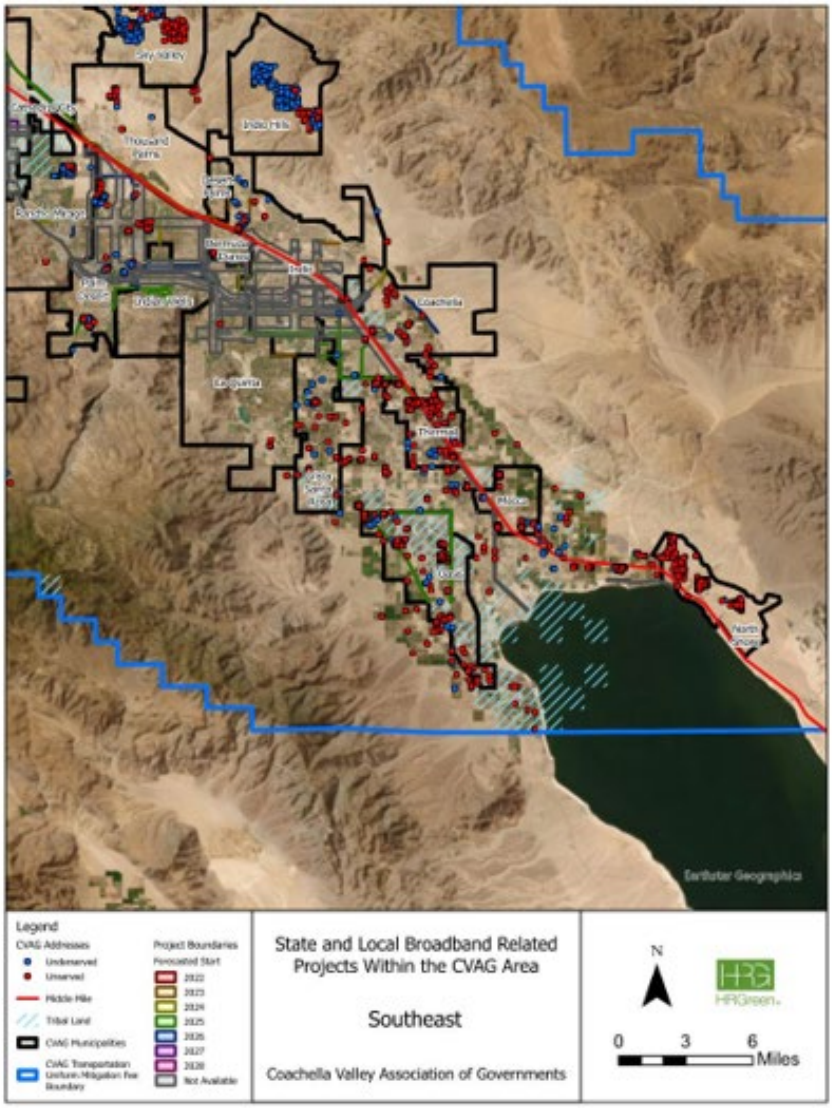


Figure 3 - Current and Planned Broadband Projects Southeast

RFEI REQUEST SUMMARY

As part of this Request for Expressions of Interest (RFEI), CVAG encourages Respondents to define projects they wish to pursue. These projects may focus on:

- Expanding broadband access to unserved and underserved addresses
- Identifying collaborative opportunities to improve broadband infrastructure in the Coachella Valley
  - Regarding collaborative opportunities, the City of Coachella has provided specific detail for their community and asks Respondents to consider a distinct response for their city. Information for the City of Coachella can be found in Appendix B

If a Respondent identifies an opportunity of interest, it is essential to clearly define the proposed project(s) in the response. Providing comprehensive project details will help facilitate early-stage coordination and planning. Additionally, Respondents should outline how CVAG and its member agencies can support project implementation, such as:

- Letters of support for grant applications (e.g., BEAD and other broadband grants)
- Access to conduit infrastructure
- Middle-mile network access

UNPRECEDENTED BROADBAND FUNDING OPPORTUNITIES

Recent legislative initiatives have created historic broadband funding opportunities that could significantly enhance infrastructure investment. The State of California is currently developing processes and guidelines for distributing broadband grants through the Broadband Equity, Access & Deployment (BEAD) Program, part of the Infrastructure Investment and Jobs Act. More details about the State's rollout of this program are expected in March 2025. Additionally, other Federal and State grant opportunities will likely become available.

These funding programs represent a once-in-a-lifetime opportunity to expand high-speed broadband access—a critical component for economic participation, education, and healthcare in the modern era.

CVAG'S ROLE IN SUPPORTING ISP PARTNERS

CVAG is committed to working with Internet Service Providers (ISPs) to:

- Provide letters of support for ISPs seeking Federal and State broadband grants
- Help coordinate conduit access to reduce deployment costs
- Explore the potential for "in-kind" contributions to offset grant-matching requirements

By releasing this RFEI, CVAG aims to identify:

- Potential broadband project opportunities
- Innovative, cost-effective, and efficient solutions to expand connectivity across the region

CALL TO ACTION

This is a critical moment to improve broadband access in the Coachella Valley and develop a next-generation digital infrastructure that will enable long-term connectivity and collaboration. Your response to this RFEI will help shape the region's broadband future and define your role in this transformative process.

RFEI DETAILS

RFEI FOCUS AREAS

This Request for Expressions of Interest (RFEI) focuses on two key categories:

- BEAD-Focused: Identifying the specific addresses Respondents aim to serve and what support they require (e.g., letters of support). Keep in mind that California's BEAD grant program is expected to open in late March 2025.
- Broadband Opportunities-Focused: Based on the information provided in the maps, what projects do Respondents propose in one or more cities?

Respondents will be asked to:

- Provide detailed information on broadband expansion plans in the Coachella Valley.
- Inform CVAG of any additional information needed to move forward with project discussions.

Respondents may submit proposals for either or both categories.

- If you plan to apply for BEAD funding but do not seek partnership opportunities with CVAG, please indicate this in your response.
- Conversely, if you do not intend to participate in BEAD but are interested in partnering with CVAG, please elaborate on your proposed collaboration based on the details outlined in this RFEI.

WHY RESPONDING IS CRITICAL

Responding to only one of the above categories has no impact on your chances of participating in broadband projects in the Coachella Valley. However, not responding at all may limit your ability to be involved in these opportunities.

- If you seek support for BEAD funding, a response is required.
- For other broadband opportunities, even if you require more information, please indicate what details you need in your response. CVAG is prepared to work with Respondents, and those who do not submit an RFEI may fall behind other firms, resulting in a competitive disadvantage for future deployment opportunities.

RFEI AREAS OF OPPORTUNITY

This RFEI is divided into four areas, and Respondents may choose to respond to one, all, or a combination of the following:

1. Broadband Network Expansion – Plans to add or expand broadband infrastructure in the Coachella Valley.
2. Grant Applications – Assistance with grant submissions, including local government support for BEAD applications.
3. Leveraging CVAG and City Fiber Assets – Utilizing existing fiber, conduit, or other city-owned assets to support broadband expansion.
4. Broadband Adoption & Affordability – Strategies to ensure equitable access to broadband for residents who may face financial or technological barriers.

PREFERRED PARTNERSHIP APPROACHES

CVAG is open to a variety of partnership models but prioritizes collaborations with Respondents who:

- Support the construction of a last-mile fiber optic network for unserved and underserved areas.
- Work with CVAG and its member jurisdictions to secure broadband grants when external funding is required for network deployment.
- Utilize low-cost dark fiber, open conduit, or other municipal assets to help solve last-mile connectivity challenges.

This RFEI is an opportunity for Internet Service Providers (ISPs), technology firms, and broadband stakeholders to shape the future of broadband access and connectivity in the Coachella Valley. We encourage all interested parties to submit a response to maximize opportunities for collaboration and funding.

RFEI SUBMISSION REQUIREMENTS

Please include the following in your response document, in addition to the details outlined in other parts of this RFEI:

1. Cover Letter: Provide a narrative detailing how your proposal benefits CVAG and its constituent communities.
2. Summary Sheet: Offer concise, short-form responses to each of the four parts of the RFEI.
3. Respondent Qualifications: Describe other networks your organization has designed, built, maintained, or operated. Include specifics on broadband speeds, service availability, adoption rates among different end-user categories, and any unique capabilities or attributes.
4. Collaborative Experience: Discuss your joint efforts with other service providers, government agencies, or non-profit entities. Explain why your firm is a suitable ISP for this project, including relevant staff qualifications. (Note: Experience with region-wide engagement in areas like the Coachella Valley is not required but will be viewed positively.)
5. Standard Contract Agreements: Include any standard contract agreements your company typically uses that are relevant to the proposal.
6. Additional Information: Provide any further details you deem necessary to inform CVAG about your proposal.

Please keep your responses to less than 40 pages, excluding any attached reference materials.

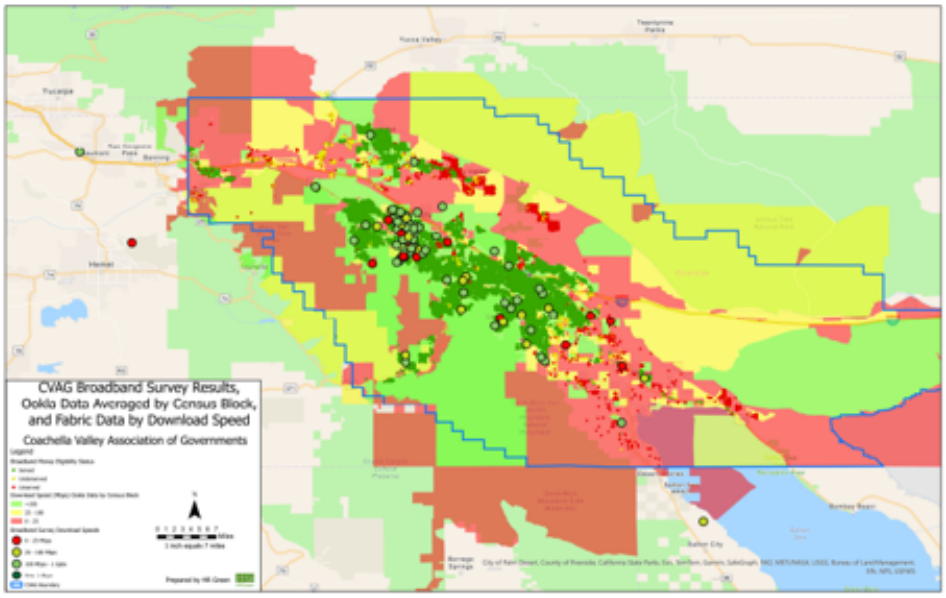


Figure 4 - Survey Results and Third-Party Speed Test Results

In 2024, CVAG also surveyed residents and businesses regarding their broadband service quality and availability. The results, included in Appendix A, are provided to help identify and target grant-eligible neighborhoods. (Note: Only two business responses were received, and these have not been included in the Appendix.)

Respondents are invited to submit project plans aimed at achieving ubiquitous broadband coverage throughout the CVAG project area. Please describe, in order of priority and likelihood, the potential CVAG community broadband projects of interest to your organization. Your submission should include the following information:

1. Current Service Provision: Indicate whether you already provide service in the area.
2. Expansion Plans: Detail any existing expansion plans or interest in expanding into the region. If possible, include a GIS Shapefile, KMZ, or another mapping format that delineates the area of desired expansion.
3. Service in Unserved/Underserved Areas: Describe your expectations or plans to offer end-user service in unserved and underserved areas within and beyond the municipal and tribal boundaries of CVAG member jurisdictions. Provide details on your proposed network design, including fiber (or other technological) capacity, anticipated drop counts (with take rate estimates), and Customer Premise Equipment (CPE). (GIS shapefiles are preferred.)
4. Timeline: Outline a likely timeline with key milestones for project implementation.
5. Service Options: Specify the service options (including speeds and pricing) that would be offered as a result of the project.
6. Affordable Pricing: Explain the availability of pricing plans for eligible low-income households.

7. Ubiquitous Deployment Commitment: Discuss your organization's willingness to meet a ubiquitous deployment requirement with last-mile coverage in the proposed areas.
8. Strategic Alignment: Provide a strategic statement on how you will meet CVAG's network expansion needs amid ongoing population growth, new construction, and development.
9. Additional Options: Identify any other options or innovative ideas that could further benefit CVAG and its communities.

Additionally, please include any further information you deem relevant to partnering with CVAG and its member jurisdictions on a broadband improvement initiative for residents, anchor institutions, and businesses. CVAG is interested in exploring various types of partnerships with selected internet service providers, including collaborations for internal connectivity needs, and welcomes creative ideas that enhance broadband availability, affordability, and adoption.

This comprehensive information will assist CVAG in determining the best provider partner(s) and in supporting the selected respondent's broadband infrastructure deployment.

Below is a polished version of the submission requirements, organized by section.

GRANT APPLICATIONS

CVAG will support applications for the upcoming Broadband Equity, Access, and Deployment (BEAD) program. CVAG aims to leverage these funds to create immediate impacts in partnership with the private sector. In your response, please address the following:

- **Area of Interest:**
  - Identify the specific CVAG agency member areas—with a higher prevalence of unserved and underserved addresses—where you would be interested in deploying broadband infrastructure.
- **Funding Estimates:**
  - Provide an estimate of the total funding required to complete the project and indicate the minimum grant funding that would create a differentiating impact on the project's financial feasibility.
- **State Coordination:**
  - Note that, as in other States with active BEAD programs, certain information (such as predefined eligible project areas) may be supplied by the State Broadband Office. Additional analysis required for this RFEI may also apply to your BEAD funding applications, including estimates of the subsidy required to meet your financial targets.
- **Grant Partnership and Experience:**
  - Describe your intent to pursue grant funding in coordination with CVAG and its member jurisdictions. Please include details of your previous successes with federally and state-funded middle-mile and last-mile projects.

LEVERAGING CVAG/CVAG MEMBER AGENCY BROADBAND ASSETS

This section focuses on how CVAG's broadband assets could be utilized to extend last-mile service. Under CVAG's preferred Public-Private Partnership (P3) model, you may develop a technical delivery plan in which CVAG, and a private partner jointly deploy and allocate capacity within existing broadband assets to serve public and anchor institutions. The primary available asset is open conduit throughout the Coachella Valley. In your response, please address the following options:

- **Collocating Along the Proposed CVSync Route:**
  - The broadband study maps (Figures 2 and 3) show the CVSync route, a two-phase project initiated in February 2023 to build a fiber-based Intelligent Transportation System (ITS) network. Phase 1 established a fiber backbone ring network along major corridors (111 and

Washington Street & Ramon Road). Phase 2 will interconnect over 550 traffic signals, install additional conduit and fiber along 49 corridors (including Indian Canyon Drive and Fred Waring Drive), and support broadband services within the same trench.

- More information on the CVSync route is available at https://www.cv-sync.com/.
- Please indicate any preliminary possibilities for collocation near the CVSync conduit in your response. Note that CVAG is also exploring the design of additional conduit to complete a comprehensive network extending CVSync and municipal CIP projects.

- **Collocating Along City CIP Routes:**
  - Municipal CIP projects are identified in the project maps with documented timeframes.
  - Identify routes that could support your network expansion and indicate your interest in collaborating with local agencies to secure additional conduit.
- **Leasing Dark Fiber:**
  - Evaluate the possibility of leasing dark fiber from these routes to support your network deployment projects.
- **Technical Strategies:**
  - Outline strategies for maximizing network security, enhancing user access management, and ensuring redundancy and resiliency.

BROADBAND ADOPTION & AFFORDABILITY

Although broadband services may be available in the CVAG project area, various groups may face barriers to adoption due to financial constraints, language barriers, age-related challenges, and other factors. Federal programs exist to address these issues, and CVAG may consider and promote additional measures tailored to its member jurisdictions. In your response, please address the following:

- **Adoption Strategies:**
  - Describe how you plan to resolve ongoing broadband adoption challenges within the CVAG project area. This may include initiatives to target socioeconomically disadvantaged populations and other groups facing barriers.
- **Affordable Service Plans:**
  - Indicate whether you offer discounted internet service plans for eligible low-income subscribers, similar to the Affordable Connectivity Program.
- **Innovative Programs:**
  - Provide details on any additional programs or initiatives you propose to improve broadband adoption, whether related to cost reduction, technical training, or accessibility improvements.

GENERAL REQUIREMENTS

All responses to this RFEI must be complete and follow the format outlined below. Failure to include all requested information or significant deviations from this format may result in rejection of your submission.

- **Ownership and Disclosure:**
  - All responses will become the property of CVAG and may be subject to California Public Records Act requests unless designated as Confidential. Include all required information and any additional data you deem pertinent.
- **Presentation Requests:**
  - At its discretion, CVAG may request presentations from respondents. Do not withhold information in anticipation of an oral presentation, as such presentations may not be solicited.
- **Cost Responsibility:**
  - CVAG will not reimburse any costs associated with preparing, submitting, or presenting your response.

MANDATORY REQUIREMENTS

Before submitting your response, ensure your submission meets all the following mandatory requirements:

- **Experience:**
  - Demonstrate substantial and relevant industry experience.
  - Provide a detailed description of your organization's current operations and qualifications.
  - Highlight current or past engagements with federal, state, or municipal agencies that align with this RFEI's scope.
- **Organization:**
  - Present an overview of your organizational structure, including key departments and leadership roles.
  - If your corporate headquarters is outside of California, describe your local presence and the organizational framework supporting your operations within the state.
- **Company References:**
  - Include at least three (3) references—one from a California-based contact and one from a state or local government client.
  - References must provide the contact's name, title, organization, address, telephone number, and email address.
  - Inability to provide or establish contact with these references may result in disqualification.

GENERAL ORGANIZATION OF RESPONSE CONTENT

Respondent must provide the following information (depending on what you are requesting):

- **Cover Letter:**
  - Include the name and address of the business entity submitting the response.
- **Detailed Responses:**
  - Provide detailed responses to each of the five parts outlined above and any other RFEI submission requirements.
  - Clearly indicate if you are not responding to one or more parts.
- **Experience Profile:**
  - Include a comprehensive overview of your experience with similar projects, detailing:
    - The size and scope of your operations (number of employees, years in business, etc.).
    - The nature of previous similar work, particularly within the last three (3) years.
    - Your experience with state agencies.
    - Your experience with local governments.
    - Any additional pertinent information.
- **Grant Funding Coordination:**
  - Discuss your intent to pursue grant funding in coordination with CVAG.
  - Describe your previous successes with middle-mile and last-mile projects funded by federal and state grant sources.
- **Broadband Improvement Opportunities:**
  - Describe any additional opportunities for broadband improvements in ~~the Coachella~~ Valley.
  - Outline potential collaborations with CVAG, local cities, Tribal Authorities, and/or Riverside County.
- **Additional Information:**
  - Provide any further details relevant to partnering with CVAG on a broadband improvement initiative that supports broadband service availability, affordability, and adoption.

This document is intended to provide clear and organized guidance for your RFEI response. Please ensure that your submission adheres to these requirements and includes all necessary information.

QUESTIONS AND RESPONSE GUIDELINES

Respondents may submit questions by email to HR Green no later than 2:00 p.m. by the deadline set forth in the Schedule of Events. Questions concerning this RFEI must be in writing and addressed to HR Green at the email address below. On or about the date set forth in the Schedule of Events, HR Green expects to electronically respond with answers to the written questions.

QUESTIONS CONTACT

If you have any questions, please respond to Monika Kazmierski at monika.kazmierski@hrgreen.com.

RESPONSE GUIDELINES

Submit one (1) electronic copy titled "RFEI No. 2025.001CVAG Broadband Deployment Opportunities" to monika.kazmierski@hrgreen.com.

Each original proposal and copy shall contain a cover sheet with the following: "RFEI No. 2025.001 CVAG Broadband Network Deployment" and the name and address of Respondent. Proposal pages must be numbered consecutively.

Proposals must be organized as described in the section titled "General Organization of Response Content" below. Proposals not organized in this manner may be subject to disqualification. Conciseness and clarity of content are required; vague and general Proposals and proposals which exceed the page limit may be considered non-responsive, which may result in disqualification of such proposals. Proposals must be complete; failure to provide all required information may result in the disqualification of the proposal.

SCHEDULE OF EVENTS

- Issuance of RFEI: March 19, 2025
- Public Information Session March 26, 2025
- Deadline for Submission of Questions: March 31, 2025
- Deadline for Submission of Response: April 9, 2025
- Interviews (if required): April 11, 2025
- The intent of the schedule is to overlap with the California BEAD timeline – allowing Respondents to have a better understanding if they will need BEAD support. If Respondents are pressed for time working on this and BEAD applications, please submit to us what you ~~can~~ within this timeline.

RESPONSE EVALUATION

The response will be evaluated on completeness and compliance with the requirements (within the context of the above schedule). The Coachella Valley Association of Governments may eliminate any responses that (a) are non-conforming, (b) do not meet the minimum requirements, (c) are not economically competitive with other responses, or (d) are submitted by respondents that lack appropriate qualifications. Please be certain that all required information is included in your response as CVAG will not be required to notify you of incompleteness, seek clarification, or ask for additional information. Failure to provide the information set forth herein may be grounds for elimination of consideration.

The Coachella Valley Association of Governments desires to work with providers to improve broadband in the Coachella Valley, so please provide all of the information and suggestions you can to facilitate that dialog.

CVAG will evaluate responses based on merit and the following criteria:

1. Completeness of response (within context of the schedule notes above)
2. Willingness to provide last-mile service in identified regions and unserved areas of CVAG
3. Approach and philosophy concerning broadband deployment
4. Qualifications, experience, and references
5. Comparative financial and partnership arrangements requested
6. Overall professional organization and quality of the RFEI

CVAG reserves the right to reject any and all submissions. It is not assumed there will be any direct contracts awarded from this RFEI, rather the intention is for this to being collaborative negotiations with qualified respondents. CVAG reserves the right to end discussions with any and all firms. CVAG is not liable to any Respondent for costs associated with responding to this RFEI, or any other costs associated with this RFEI.

CVAG may consult references familiar with the Respondent regarding its prior operations and projects, financial resources, reputation, performance, or other matters. Submission of a response shall constitute permission for CVAG to make inquiries and authorization to third parties to respond to them.

RESPONDER SELECTION

There will be no contracts directly resulting from this RFEI process – it is intended to coordinate next steps. The Coachella Valley Association of Governments reserves the right to reject any or all responses or portions thereof, to issue RFEI updates at any time, and to subsequently pursue any (or no) partnership discussions based on CVAG policies and needs. CVAG reserves the right to initiate discussions without further consideration of the responses submitted; there may be no best and final offer procedure. Interviews and negotiations may be conducted with one or more of the respondents. Although there will be no contracts issued directly from this process, failure to respond could leave interested firms out of next steps.

CONFIDENTIALITY

Any portions of the response containing confidential or proprietary information should be clearly marked "Proprietary and Confidential".

APPENDIX A – BROADBAND SURVEY RESULTS

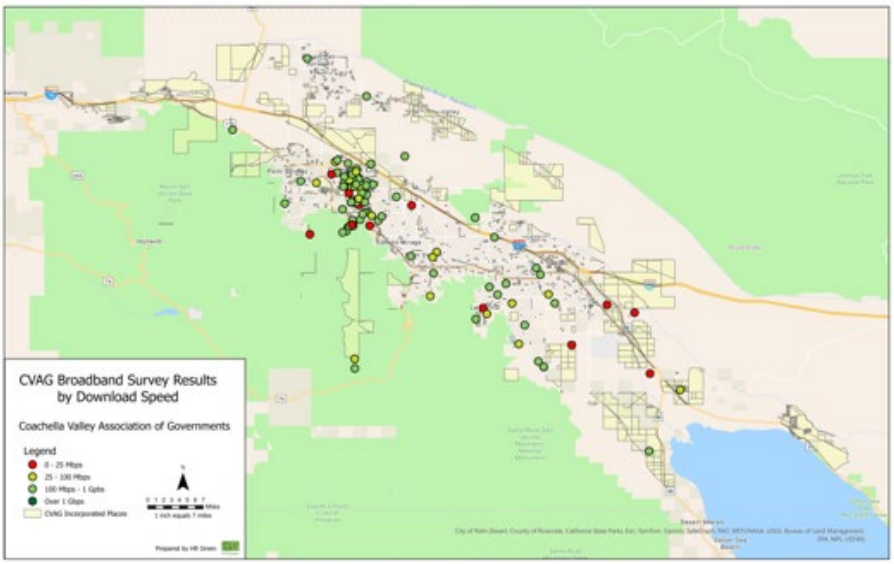


Figure 5 - CVAG Broadband Survey Results by Download Speed

The map above shows the actual download speeds conducted by citizens in the area. Citizens were asked to perform a speed test on their current devices and were ~~stressed to~~ not use their cell phones to conduct this test to provide a better understanding of the true network speeds experienced at home. Results indicated there are several pockets of underserved and unserved locations in the Coachella Valley which need to be addressed to improve the broadband network.

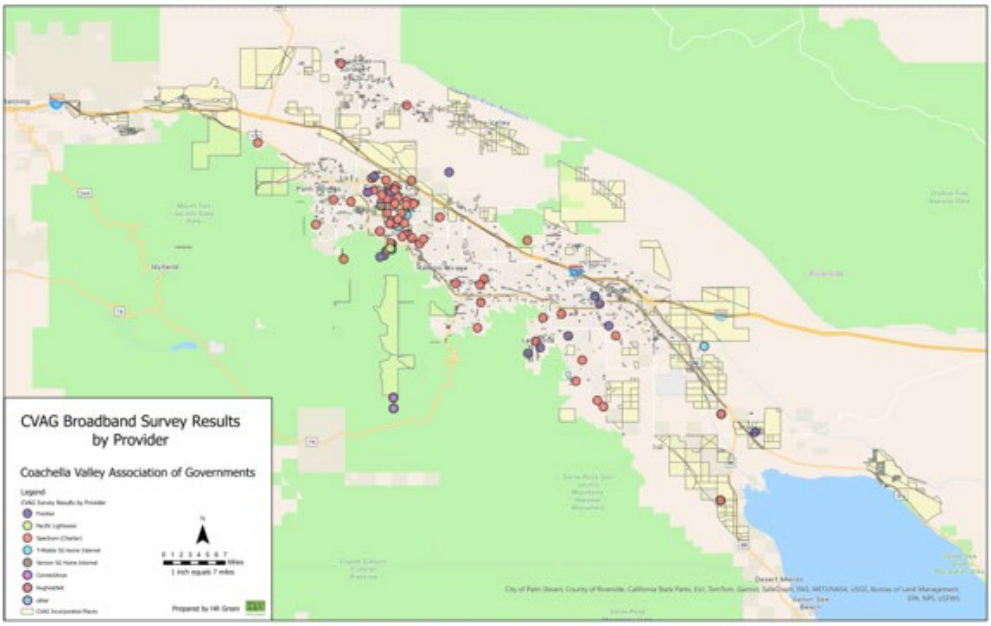


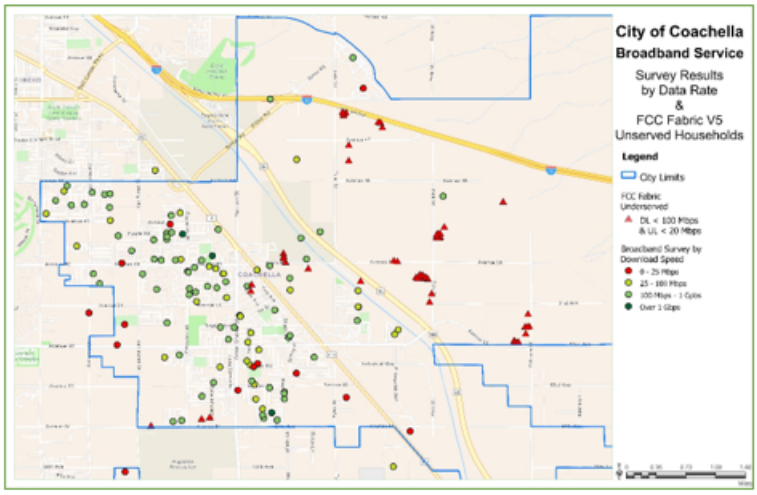
Figure 6 - CVAG Broadband Survey Results by Provider

Respondents of the CVAG survey were asked about which provider they currently use. This data was extracted from the survey and mapped to depict which provider is servicing which address within the Coachella Valley. The data is limited to whatever information was provided from the survey but should illustrate the current provider breakdown in the area.

APPENDIX B – CITY OF COACHELLA SPECIFIC BROADBAND COLLABORATION OPPORTUNITIES

The City of Coachella is interested in hearing from industry leaders and community stakeholders on collaborative strategies to improve regional broadband infrastructure and how that can improve broadband in the City of Coachella. Through a section of your RFEI response geared specifically to the City of Coachella, the City hopes to connect with providers to gain a better understanding of existing and planned private sector efforts to deploy broadband infrastructure, improve service quality, and promote affordability and adoption within our City.

Opportunities for collaboration with private sector partners and regional organizations have the potential to expedite broadband deployment, enhance internet service quality throughout the City, and support the needs of local businesses and residents, while reducing capital costs, promoting market competition, and improving operational efficiency. The multiple infrastructure projects currently underway, including CVSync, the California Middle Mile Initiative, and the City's ongoing and planned CIP projects present opportunities to synchronize initiatives, amplify broadband investment, and gain benefits from scalable colocation projects, particularly for underserved areas.



To support this engagement effort, the map data from an ongoing project to evaluate broadband infrastructure in the City of Coachella may provide insight in facilitating discussion. It combines data on broadband availability by speed from official FCC Fabric Version 5 and the results of the City's public survey. The survey data offers a deeper perspective, accuracy, and nuanced detail of actual broadband services experienced by residents.

Please provide a section of your response specifically for the City of Coachella.

SECTION APPENDIX B – CITYSIDE FIBER RESPONSE

March 24, 2025

Ken Demlow, Senior Project Manager
HR Green, Inc
1260 Corona Pointe Court, Suite 305
Corona, CA 92879

Re: Coachella Valley Association of Governments
Request for Expression of Interests (RFEI)
Broadband Network Deployment

Dear Ken,
Cityside Fiber is a Fiber to the Home (FTTH) infrastructure developer and Internet Service Provider (ISP) based in Orange County, California. We are 100% privately funded and working in several cities in Orane County to deploy fiberoptic infrastructure for next generation internet service. Cityside was founded in 2021 and obtained its Certificate of Public Convenience and Necessity (CPCN) in 2022. We have constructed approximately 750,000 l.f. of fiber optic infrastructure and providing service to approximately 1,500 customers at this time in: Tustin, Dana Point, Lake Forest, Mission Viejo, Irvine and Laguna Hills. We are continuing to construct additional fiber and increasing number of customers on a daily basis.

In most locations in urban Orange County, the existing telecommunications infrastructure can provide broadband service at greater than "unserved" or "underserved" speeds, according to the FCC definition. Since the areas we are working in Orange County do not qualify for BEAD or other public grant programs, we are not applying for BEAD and do not intend to apply for BEAD funds in the Coachella Valley. For this reason, we will not be submitting a complete response to the RFEI.

Even though we are not submitting a complete response, we are willing to engage in dialogue with CVAG or any of the cities in the Coachella Valley who would like to encourage deployment of FTTH fiber optic infrastructure in their jurisdiction. We believe opportunities exist, however, Cityside Fiber is not capable of constructing infrastructure on a speculative basis, without the support and cooperation of the local jurisdiction.

Please let me know if you have any questions or like to discuss further.

Sincerely,

Patrick Thomas, Director of Government Relations
Cityside Fiber

Summary Sheet

1. Broadband Network Expansion
Cityside Fiber is currently working in several cities in Orange County and planning to expand further in Orange County. We are not planning to expand into the Coachella Valley at this time, without the invitation and support from a local jurisdiction.

2. Grant Applications
Cityside is 100% privately funded and not using or applying for BEAD or other government funding programs at this time.

3. Leveraging CVAG and City Fiber Assets
Cityside is working with cities in Orange County on utilizing City assets such as conduit used for traffic signal communications and other purposes.

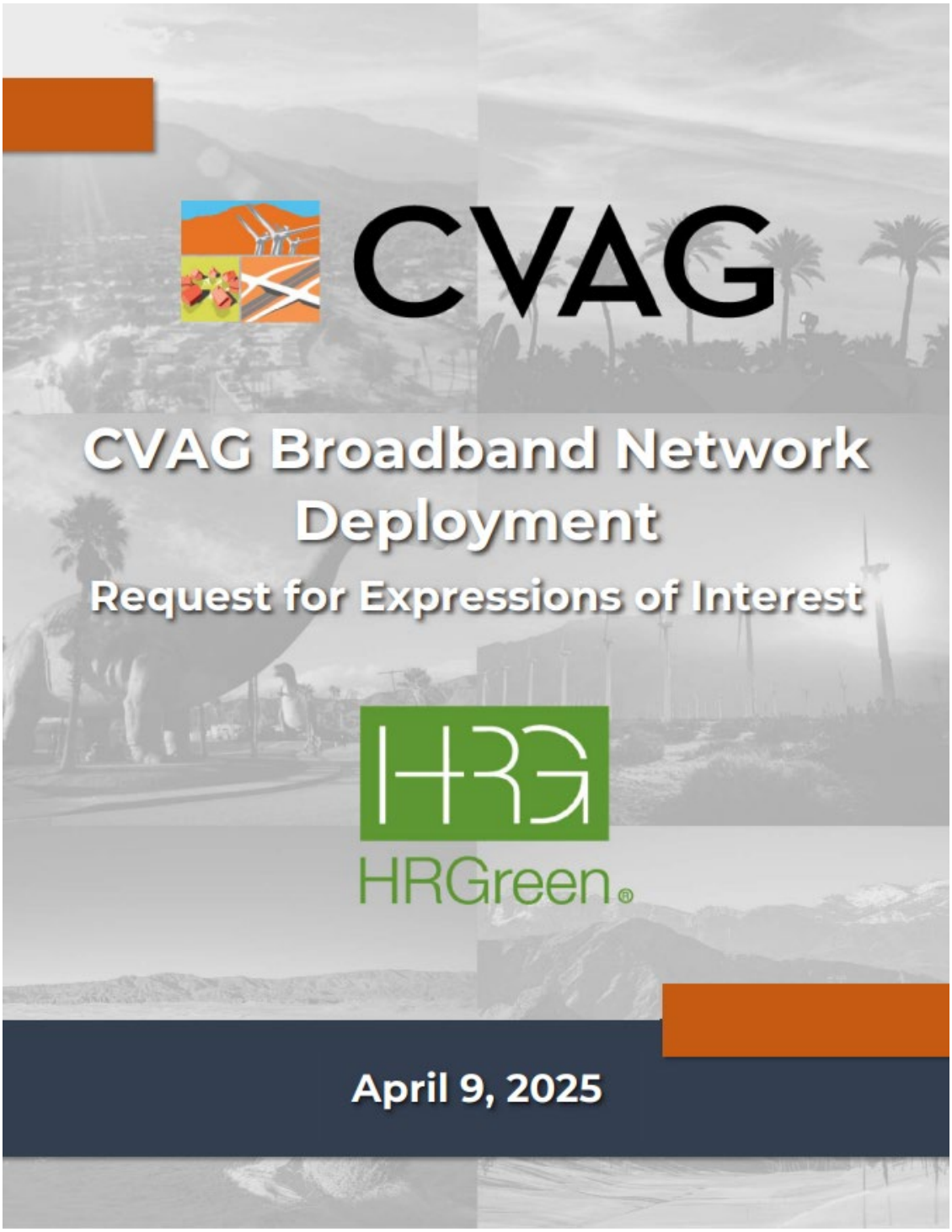
4. Broadband Adoption and Affordability
Cityside has established pricing for services based on input and approval of private investors, and pricing of comparable service providers in the area.

Respondent Qualifications
Cityside Fiber was founded by senior executives from Crown Castle, one of the largest owners of wireless cell towers, small cells and fiber optic infrastructure in the United States.

Collaborative Experience
Cityside Fiber is constructing the fiber optic infrastructure to the home, as well as serving as internet service provider (ISP) for customers who choose the Cityside service.

Standard Contracts
Cityside Fiber was granted a Certificate of Public Convenience and Necessity (CPCN) by the California Public Utilities Commission (CPUC), Decision 22-05-017, issued May 24, 2022.

SECTION APPENDIX C – ENTRYPOINT RESPONSE



LETTER OF TRANSMITTAL

April 9, 2024

Ken Demlow
Project Director, HR Green
Coachella Valley Association of Governments
1260 Corona Pointe Court, Suite 305
Corona, CA 92879

Dear Ken,

EntryPoint Networks, Inc. ("EntryPoint") and our partner, Quanta Telecom Solutions, LLC. ("Quanta"), a subsidiary of Quanta Services, Inc. are excited about the opportunity to collaborate on this RFEI response for the Coachella Valley Association of Governments (CVAG). Our combined skills and expertise align perfectly with CVAG's long-term goals for broadband infrastructure and its potential to be a transformative infrastructure for economic development in the Coachella Valley.

EntryPoint Networks, Inc. builds fiber-to-the-premise (FTTP) networks, operates FTTP networks, and develops Automated Open Access® technologies to support our projects. We are focused on changing the broadband infrastructure and service delivery model with a technology stack designed to reduce subscriber costs, increase reliability, and offer standard bandwidth speeds to 1 Gbps symmetrical and greater.

Quanta is an industry-leading infrastructure solutions provider specializing in engineering, construction, and maintenance, providing an industry-wide perspective, innovative technologies, and proprietary methodologies. Together we have the experience, technology, and domain knowledge to effectively build and operate last-mile fiber networks that provide gigabit speeds to residents and businesses in the community.

Emerging technologies will require a continuous acceleration in data transfer rates, low latency, and symmetrical speeds for efficient AI model training and deployment, real-time data analysis, real-time fraud detection, and other applications where slight delays can have significant consequences. We believe that these market forces will make fiber optic networks the resounding choice for digital infrastructure. An automated open access model provides the flexibility and level of automation needed to enable a new marketplace for internet service providers (ISPs), internet of things, smart city, smart grid, public safety, telemedicine, and education solutions.

EntryPoint and Quanta herein convey our interest in collaborating with HR Green and CVAG to plan, design, finance, construct, and deploy affordable, accessible, and reliable broadband infrastructure in the Coachella Valley.

Sincerely,

Jeff Christensen
President / CEO
EntryPoint Networks, Inc.

OVERVIEW

Automated Open Access®

EntryPoint Networks develops and operates city-scale fiber networks and software technologies to maintain and operate these networks as automated open access platforms. The objective of an Open Access Network is to give subscribers more than 1 or 2 ISPs to choose from across shared infrastructure and to deliver additional value to subscribers via an open system. Open Access works like other shared infrastructure (e.g., Roads and Airports) where there is a common infrastructure that is available or open to any service provider. Automated Open Access® enables all the goals of open access but leverages automation to simplify the process for both the subscriber and the network operator. For example, in an Automated Open Access® system, subscribers can provision access to an ISP by clicking the subscribe button and terminate an ISP connection by clicking unsubscribe. This process takes approximately 45 seconds. There is no need to schedule an appointment for a technician to come to your home because the software automation eliminates manual processes.

A key goal of an open access system is to lower costs and improve service by increasing choice and competition. For an open access system to realize its full potential, the infrastructure owner should be a neutral host. The role of a neutral host is to control and manage the infrastructure without privileging one service provider over another. A true open access network depends on enabling robust shared infrastructure operated on a non-discriminatory basis. The EntryPoint Automated network management and operations framework is designed for open access networks. It simplifies the management process by automating functions like provisioning, allocating resources, and network monitoring. EntryPoint's customers benefit from a unified network management approach with automation driven by the end user.

Range of Related Services

A key objective of integrating software-defined networking (SDN) with open access is to transform the network from the ability to do one thing (i.e., delivering the internet across a single service provider) to a network that can do many things simultaneously. Subscribers and service providers can create their virtual wire to isolate services and are empowered with tools that give them choices and appropriate levels of control. This dynamic marketplace of services puts downward pressure on prices. The operator is liberated to perform their role independently of other stakeholders (i.e., will not be encumbered by service providers or operations). Operational efficiencies are enhanced via software control. Service providers control their virtual space, pricing, and value proposition and are free to innovate.

EntryPoint and Quanta build networks that bring maximum value to communities by leveraging technology tools and open network management systems as a distinct alternative to the traditional vertically integrated internet service provider model. In EntryPoint's automated open access model, the infrastructure is managed as an open infrastructure that is open to any interested service provider from any service category and is designed to move control to local stakeholders. The network operator becomes a neutral host of the infrastructure and provides a business model and technology components to produce network access and affordability for all residents, businesses, and anchor institutions.

Our objective in our response herein is to align with CVAG's ambition to deploy valley-wide infrastructure, fostering universal high-speed broadband access and economic development.

RESPONDENT INFORMATION

EntryPoint Networks, Inc.

EntryPoint was formed in 2013 and initially focused on research and development activities around merging the open access model with software-defined networking and network automation in partnership with the University of Utah School of Computing. In 2015, the U.S. Department of Energy awarded EntryPoint and the School of Computing an SBIR Grant to continue its work under research titled *Edge Intelligence for Virtualization and Security in Open Networks*. EntryPoint launched its first network and added consulting services to its product offerings in 2016. The Company has provided open access consulting services to more than fifty communities since 2019. EntryPoint maintains offices in Utah and Idaho and partners with clients across the U.S. on projects with populations ranging from 10,000 to 600,000. EntryPoint now focuses on development and operating FTTP networks.

EntryPoint is a private corporation and for much of its history was self-funded by the founders of the company. In August 2022, two investor partnerships, the Stena Group and Aurelius Capital, took lead positions in funding the organization's growth. EntryPoint currently employs 14 employees and is headquartered in Salt Lake City, Utah and has employees in six different states.

EntryPoint Networks, Inc.
Headquarters
1949 West Printers Row
Salt Lake City, Utah 84119
+1 844 423 1238

Company Profile

Founded	2013
Type of Business Organization	Corporation
State in which company was incorporated	Delaware
Tax ID Numbers	#203905626
Principal Ownership	Private Corporation
President	Jeff Christensen
Head of Finance	Brad Banyai
Website	www.entpnt.com

Authorized Officer

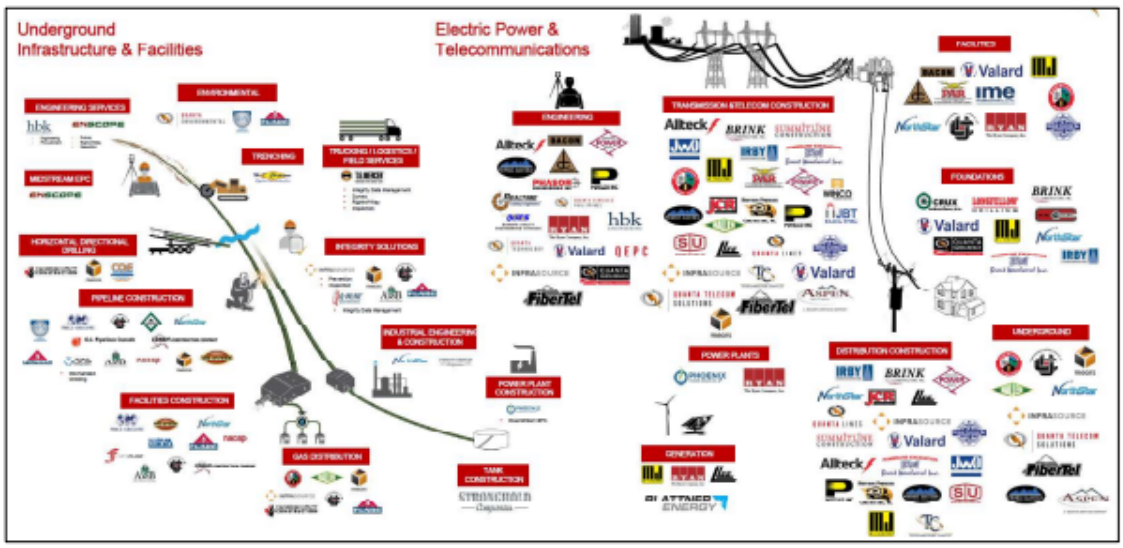
Name	Devin Cox
Title	Head of Business Development & Marketing
Email	dcox@entpnt.com
Phone	+1 801 518 7333

Quanta Telecom Solutions

Quanta Telecommunications Solutions, LLC ("Quanta Telecom"), is a wholly owned subsidiary of Quanta Services, Inc. ("Quanta"). Quanta, established in 1998, provides engineering and construction services for the telecommunications, electric power, and natural gas industries. With over 250 operating companies providing services across the country, Quanta is the largest specialized services contractor in North America and a recognized market leader in the utility, energy, and communications infrastructure industries with decades of experience in construction and maintenance. We employ over 47,000 professionals and maintain nearly 60,000 pieces of equipment. We self-perform and manage 3rd party subcontractors, mitigating risk and providing cost certainty to our customers. Our world-class safety program and strong balance sheet provide customers with the confidence that Quanta's execution and management can be relied upon. Quanta Telecom has been in business since 2016.

Below is a graphic illustrating the Quanta Services family of companies organized by industry and specialization. Quanta Solutions primarily serves as a PMO (Project Management Organization) group that focuses on Broadband feasibility studies and large project development. We are strategically positioned to leverage the vast resources and reach of Quanta companies to provide our customers with the most comprehensive industry knowledge and best product. Our Team works closely with owners, municipalities, and contractors, offering a unique perspective to emphasize efficiency and constructability in the deployment and expansion of fiber optic networks.

Quanta Services, Inc. is comprised of over 250 operating companies, and has over 300 offices in the US.



Quanta Telecom – Headquarters	Local Quanta Operating Company
2707 N Loop W, Suite 400 Houston, TX 77008 + 1 713 569 1045	FiberTel – Sacramento, CA 1174 National Drive Suite 90 Sacramento, CA 95834

Company Profile

Founded	2016
Type of Business Organization	LLC
State in which company was incorporated	Delaware
Tax ID Numbers	81-1923479
Principal Ownership	Quanta Services (Publicly Traded)
President	Earl C. "Duke" Austin, Jr.
Regional President West - Operations	Loren Chandler
Website	www.quantaservices.com/

Authorized Officer

Name	Danny Gray
Title	President - FiberTel
Email	danny.gray@fibertelllc.com
Phone	+1 801-489-0659

Meet Our Team

EntryPoint

We have noted the primary EntryPoint | Quanta project team members below. We will also introduce other team members to support our efforts once the scope of work has been further defined.



Jeff Christensen |President & CEO, EntryPoint Networks, Inc.
Subject Matter Expertise | Strategic Planning, Risk, Business Analytics, and Relationship Management.

LinkedIn

Jeff Christensen has an M.S. in Management from Purdue University's Krannert School of Management and a B.S. in Organizational Psychology from the University of Utah. Before Jeff's tenure at EntryPoint, he served as Chief Operating Officer at FutureVision Technologies (FVTech) and VP of Operations at Emdeon.

At EntryPoint, Jeff oversees ongoing research & development. He also manages strategic partnerships, manufacturing collaboration, client relationships, deployments, business development, customer support, and strategy development. Jeff was the principal investigator for a Department of Energy grant: *Edge Intelligence for Virtualization and Security in Open Networks*.



Brad Banyai |Head of Finance, EntryPoint Networks, Inc.
Subject Matter Expertise | Network Financial Modeling, Funding Analysis, Project and Relationship Management

LinkedIn

Brad Banyai attended the University of Utah from 1981 to 1984. Prior to starting EntryPoint Networks in 2006, he served as president and CFO of Future Vision Technologies (FVTech) and vice president of product management at Emdeon. In 1989, Brad launched his first company, Brinton-Banyai Corporation.

As Head of Finance, Brad manages financial modeling, operational cost projections, and project cost structure analysis, forecasting, and break-even points for clients. Brad's focus is on overseeing the financial health of EntryPoint and supporting clients in developing actionable financial frameworks for broadband feasibility studies, Automated Open Access® project implementations, and network operation modeling.



Bruce Patterson | Head of Operations, EntryPoint Networks, Inc.
Subject Matter Expertise | Project Management, Network Planning, Implementation, and Network Operations

LinkedIn

Bruce Patterson is the recognized thought leader behind the "Ammon Model," which includes Automated Open Access® and a business model that mitigates risk for cities while creating local network ownership of infrastructure that is treated as a true public utility.

Bruce was the technology director at the City of Ammon from 2006 – 2021. He was responsible for Ammon's strategy, including community engagement, legal framework, business model, network planning, design, construction, and network operations. In 2016, EntryPoint launched its first fiber-to-the-home project in partnership with the City of Ammon in eastern Idaho. At that time, Bruce was the Technology Director at the City. Since then, more than one hundred articles have been written about the Ammon network. In 2016, the Ammon network was named the Network of the Year by NATOA. In 2019, Fast Company Magazine described the Ammon network as "the Best Fiber Optic Network in America." In 2020, the Open Technology Institute released its annual survey of global internet costs and listed Ammon as the city with the lowest cost for gig internet access worldwide. Under Bruce's leadership, the City of Ammon took the average residential internet speed from 30 Mbps download/5 Mbps upload to 1,000 x 1,000 Mbps symmetrical (download and upload) while reducing the average monthly residential cost from $93.00 to $49.00 per month.

Bruce left the City of Ammon in June 2021 to become the Head of Operations at EntryPoint. Bruce's primary responsibilities at EntryPoint include network planning, network design, cost projections, construction oversight, and network operations and management.

Bruce attended Idaho State University and studied Computer Programming from 1982-1983. In 2011, he received his Fiber Optics Technician certification from Electronics Technicians Association International® (ETA International). Bruce has also held a series of licenses and certifications over the course of his career, such as his master journeyman's license, and completed a three-year electrical apprenticeship.

https://www.fastcompany.com/90416863/the-city-with-the-best-fiber-optic-network-in-america-might-surprise-you

https://www.newamerica.org/oti/reports/cost-connectivity-2020/

FiberTel / Quanta



Daniel Gray | President, FiberTel LLC a Quanta Services, Inc. Company
Subject Matter Expertise | Engineering and Operations
LinkedIn

Daniel oversees operations for FiberTel LLC a Quanta Service, Inc. Company in Utah, Washington, California, Nevada, Colorado, and the Oregon markets. He is also responsible for the profit and loss within a 120 million dollar a year business.

Daniel has over 23 years of field experience in telecommunications projects which includes inspecting OSP construction, resident engineer FTTH projects, OSP engineering, project engineer, project manager, account management, and operations leadership. He has in-depth knowledge of writing new construction contracts for RUS Projects. Understands the capabilities and requirements of equipment such as ONT, NID, MDU, PON, and GPON cabinets, remote sites and fiber huts, for FTTH deployments. He also has experience with central office equipment, fiber frame, fiber splitters, fiber distribution panels, switches, routing, DWDM, fiber cards, etc. Daniel's experience also includes:

- Experience with Aerial Plant design and Construction. Familiar with RUS Aerial units and National Electrical Safety Code.
- In depth experience with Aerial Make Ready and Pole Attachment Requirements.
- Manage and oversee warehouse material with over 3.5mil in product
- Lead a team of over 100 internal employees and 75 subcontract employees
- Responsible for all phases of EPC Telecommunications project (Engineer, Procurement, Construct, and Close outs)
- Create design maps for proposed routes, and FTTH cable schematics including
- Staking / engineering new projects or routine jobs with tabulation of units and cost estimates
- Involved in all aspects of Designing and Staking multiple FTTH Projects
- Create splicing schematics with cable sizes and fiber counts
- Permitting to multiple agencies, search county court records for exists, easements or for information on landowner to obtain private easement



Matt Vaughan | Program Manager, Quanta Services, Inc.
Subject Matter Expertise | Project Management
LinkedIn

After graduating from Texas A&M University with a degree in Petroleum Engineering, Matt began his career in 2014 in the Oil & Gas Industry as a Production Engineer with Laredo Energy. He was responsible for the design and fracking of dry gas wells in the Eagle Ford Shale in S. Texas. After nearly 3 years, Matt left the Oil Industry to pursue his desire to work in full- time ministry as a Pastor at a church in Houston TX. Matt joined Quanta Telecommunication Solutions in 2021 as a part of the program solutions team and has quickly learned the industry landscape and gained experience in all phases of aerial & underground construction as well as project management and controls. Matt is a certified PMP (Project Management Professional).

PROPOSED PARTNERSHIP

The EntryPoint – Quanta team will work with HR Green and CVAG representatives to identify a project or set of projects within the Coachella Valley that can successfully be funded, built, and operated as open access networks.

Hexvarium

Quanta owns an analysis tool that will be used to help the partners refine the project scope. GAP Analysis and Speed test data will be acquired using our array of public and privately purchased data sources. We believe that the speed test data that we collect and analyze is the most robust in the industry and will give us an accurate look at the actual speeds provided in the area by ISPs compared to their advertised offerings. After compiling the data in the speed tests and other market research data, Quanta and EntryPoint will work with HR Green to evaluate broadband speeds, availability, and affordability to refine potential project opportunities and to prioritize areas where we will be able to successfully deploy capital.

Funding

EntryPoint will work with Private Equity and Infrastructure fund partners to arrange funding for the network construction services, and ongoing maintenance and operations. EntryPoint's partner, Quanta Telecom, will support EntryPoint's efforts to arrange financing for network construction. Quanta's telecom portfolio has built thousands of aerial and underground plants across the nation using various project financing structures all in support of project success.

As a member of the Quanta Services family, Quanta Telecom benefits from the financial strength of Quanta Services, allowing Quanta Telecom to undertake and complete projects according to customer requirements. Quanta Telecom's financial information is consolidated with that of Quanta Services. Quanta Services is a publicly traded company that files periodic reports with the U.S. Securities and Exchange Commission (SEC), including Annual Reports on Form 10-K and Quarterly Reports on Form 10-Q. As required by applicable securities laws, Quanta Services reports material financial information, on a consolidated basis, in these filings or other filings with the SEC and through press releases. Further information could be shared or presented in smaller group setting. Please follow the following links for reported financial information: https://investors.quantaservices.com/secfilings/annual-reports for the latest annual reports and https://investors.quantaservices.com/sec-filings/quarterly-reports for the latest quarterly reports.

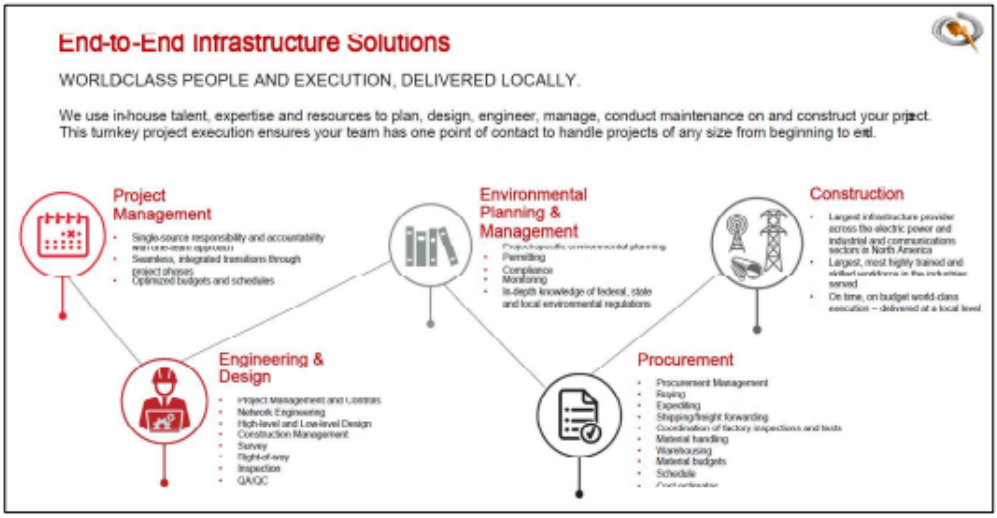
Grant Funding

EntryPoint has successfully helped numerous cities, towns, and counties apply for and receive broadband grants over the past 10 years. EntryPoint and Quanta are currently supporting 5 grant funded projects.

Design & Construction

Quanta is a Program Management Organization offering engineering and construction services for nationwide telecom network builds. Our mission statement is to be the leading communication infrastructure solutions provider to the customers we serve. We aim to make our customers successful. Allowing Quanta Telecom's program management team to lead the execution efforts streamlines communication, enhances quality, and provides responsiveness. Quanta Telecom provides a turnkey telecommunication solution: network program management, engineering, procurement, construction, and drop services. One single provider for end-to-end services allows for overall flow, clear communications, and project execution.

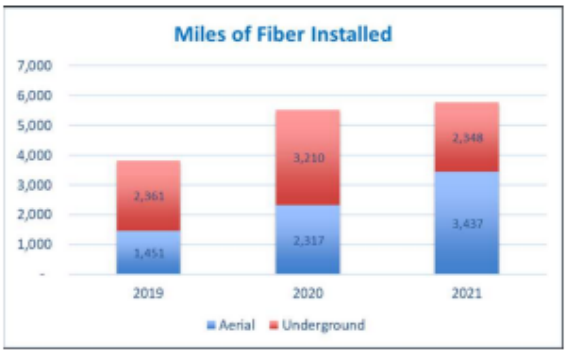
Quanta Telecom has been successful in providing cross-functional nationwide professional services and construction resources for the telecommunications and electrical power industry. Working with Quanta Telecom, Frisco will receive a single-point-of-contact while leveraging the local knowledge, experience, and relationships of other Quanta companies and their input and resources for this Broadband Analysis. Additionally, we will deploy our industry leading Broadband Analysis tool to accomplish the scope of this project.



Quanta Telecom and the Quanta family of companies, like FiberTel, have a fruitful history of providing services to municipal communities. Below is a graphic illustrating the Quanta Services family of companies organized by industry and specialization. Quanta Telecom Solutions primarily serves as a PMO (Project Management Organization) group that focuses on Broadband feasibility studies and large project development. We are strategically positioned to leverage the vast resources and reach of Quanta companies to provide our customers with the most comprehensive industry knowledge and best product.

For aerial construction, we will utilize existing support infrastructure, including over-lashing, where feasible. Where necessary, we will place new strand and/or self-support cable where applicable. For both methods, we will follow existing ROW's and easements, working with the local power company, city, county, state, railroads, etc. for approvals.

Below is an illustration of the various customers that Quanta Telecom has had success providing services for in the recent past.



The partnership between EntryPoint Networks and Quanta is seamless. We seek to design and implement networks that bring maximum community value by leveraging superior communication infrastructure solutions, advanced technology tools, financing solutions and an automated open network management platform. We will work with HR Green and CVAG to develop and deploy an affordable, accessible, and reliable fiber-optic broadband infrastructure.

Network Operations

Customer Service

EntryPoint does not use outsourced subcontractors for customer service. The EntryPoint Automated Open Access® platform utilizes a virtual network operator that combines network resources and functionality into a single, software-based administrative entity capable of providing access and control to users in software that creates an experience equivalent to owning the underlying infrastructure. These responsibilities include the provisioning and monitoring of the circuits or links used by providers and end users. These functions require an interface for each system user or stakeholder, including the physical infrastructure provider, retail service providers, and end users to access and perform self-service tasks. Monitoring, messaging, and alarming should be clear and simple for every stakeholder to help users troubleshoot problems. A virtual operator performs these functions in software to improve efficiency and costs.

Providing effective end user support will require specific levels of participation from the subscriber, retail service providers, virtual network operator, and physical infrastructure provider. Logical support tiers would include the following:

Tier 0: FAQs, automated help desk, and self-support tools for subscribers available in the portal. This initial level of support is completely self-serve on the part of the subscriber and incurs no cost for other stakeholders.

Tier 1: Service provider provides customer support to troubleshoot service problems and identify if escalation to tier 2 is required. This level of support is provided by the service provider and accounted for within the costs charged to the subscriber for their service.

Tier 2: The network operator provides service provider support to troubleshoot operator issues affecting service delivery and identify if escalation to tier 3 is required. This level of support is provided by the network operator and accounted for in the costs charged to the subscriber for network operational support.

Tier 3: Physical plant technicians provide operator support to troubleshoot physical plant issues and assist the virtual network operator in determining if there is a need for immediate or scheduled software remedies. This

level of support is provided by the operator's plant technicians and accounted for in the costs charged to the subscriber for network operational support.

Tier 4: Software development and support provides operator support for bug fixes, broken or incorrect functionality, or other issues arising from the current software implementation. This level of support is provided by the operator's software technicians and is accounted for in the costs charged to the subscriber for network operational support.

Software as a Service (SaaS)

EntryPoint system support for the operator is available from 8:00 a.m. to 8:00 p.m. ET, with emergency support available after hours. All software system upgrades and improvements are included in the monthly subscription.

Network Operations Center Professional Services

EntryPoint allows clients to purchase network monitoring and management services in addition to the SaaS services. EntryPoint's network operations center (NOC) services include the following:

- 24/7/365 – Network Monitoring
- Tier 2 – Subscriber Support (as submitted by the operator or service provider–this is not intended to be direct subscriber support)
- Tier 1 – Service Provider (ISP) Support
- Remote Network Trouble Shooting/Repairs
- Coordination with Local Network Maintenance Staff

EntryPoint can provide full-service NOC operations and services for an additional fee per subscriber per month.

Billing Services

The platform has an auto-billing and payment dashboard using a standard online payment gateway integration.

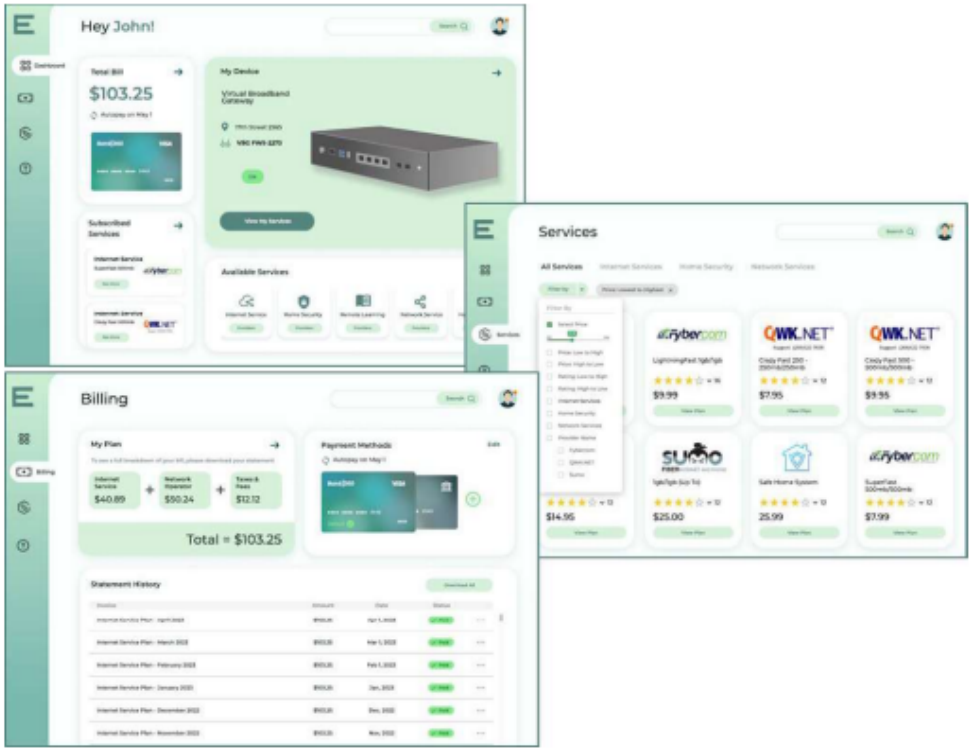
Overview of Customer-initiated Enrollment in Services

EntryPoint's open access management platform includes the following features, functionality, and services:

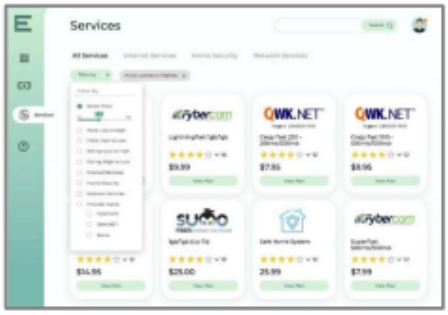
- Subscriber view, ISP view, and network operator view of the platform.
- Customer can add/remove services autonomously (without vendor or service provider involvement).
- Multiple ISPs able to service a single location using the same customer premise equipment (CPE).
- System scalability.

**Sample illustrations on the following page.*

EntryPoint Networks Subscriber Portal Sample



EntryPoint is not an internet service provider but can guarantee the ability to bring multiple ISPs to the network to offer their products and services. Automated open access is a platform designed to accommodate any service from any service category that can deliver value across a fiber-optic network. We accomplish this by moving the service provider to the cloud where they offer their plans in a competitive marketplace environment.



Click here: Subscriber Portal Demo

In an Automated Open Access® network, the ISP onboarding process has been automated which means the integration for ISPs is simple. It takes less than 90 minutes and $250 for an ISP to integrate onto the EntryPoint Network system and become a service provider. EntryPoint has deployed four Automated Open Access® networks in four different cities. There are eight ISPs working in these four deployments and each of them has requested to be invited to participate in all future network deployments. This is easy to do because in the EntryPoint model, the ISP is moved to the cloud which enables ease of entrance into new markets creating immediate opportunities for growth.

ISP Onboarding Steps:

- **Step 1** – Configure the provider portal, one of four portals that are native to the EntryPoint system.
- **Step 2** – Create an account inside the system. The EntryPoint team then stands up an instance of the EntryPoint provider portal. Then, the operator adds the new provider inside the operator management portal.
- **Step 3** – The service provider selects the operator as one of the preferred networks where the service provider offers services.
- **Step 4** – The service provider publishes their services to the operator so the operator can present those services in the subscriber portal. The service provider can then control and manage the services they offer.

The above functionality depends on the service provider's ability to connect to the operator network via a middle-mile network. In the last month, EntryPoint onboarded a new ISP into one of its client networks, and the entire process took less than 60 minutes.

Local Operations

In the EntryPoint Model, the only piece of the overall mix of services that is local is the physical maintenance or break/fix component of Network Operations. We will provide the training and management of new employees to fulfill these functions.

ADDITIONAL INFORMATION

Current Projects

The EntryPoint – Quanta Teams are currently building FTTP projects in Orangeburg SC (Private Equity Funded), Jamestown NY (Grant Funded), Marin County CA (Grant Funded), Chico CA (Grant Funded), and Placerville CA (Grant Funded).

Case Studies

Sherburne, New York

With infrastructure funding assistance from the New York Governor's Office and the New York Power Authority, Sherburne, New York, has begun deploying a municipal fiber network covering the Sherburne region (approximately 1,800 households) in upstate New York. Sherburne is utilizing EntryPoint's Automated Open Access® platform to manage the network as part of its fiber deployment. Sherburne began connecting residential customers in February 2023 and anticipates completing the network build in the next 12 months with expansion plans into neighboring communities.

Sherburne Receives 2023 Local Government Achievement Award from NYCOM

Ammon, Idaho

Utilizing the EntryPoint Automated Open Access® software and technology, the municipal automated open access model has taken the average residential internet speed from 30 Mbps download/5 Mbps upload to 1,000 x 1,000 Mbps symmetrical (download and upload) while at the same time reducing the average monthly residential cost from $93.00 per month to $49.00 per month for those who have not paid off their infrastructure, and $27.00 per month for those who have paid off their infrastructure. New construction includes municipal fiber, providing residents instant access to 1-gigabit symmetrical service from multiple providers for under $30 per month. Because the municipal utility model separates infrastructure costs from service costs, monthly costs continue to decrease for the residents and businesses in Ammon. Citywide take-rates are around 65% (approximately 3,000 households) and continue to increase. The capital costs for the initial infrastructure improvement have been repaid.

Ammon's Model: The Virtual End of Cable Monopolies

Home | Ammon Fiber

Mountain Home, Idaho

In 2021, EntryPoint wrote a grant application to the State of Idaho on behalf of Mountain Home, Idaho, for the initial backbone of the Mountain Home fiber network. The grant application was successful and included both backbone infrastructure and community Wi-Fi in a number of public facilities. In March 2022, the City Council voted to deploy a municipal open access fiber network managed by EntryPoint's automated network operations platform. Phase 1 of the network deployment began in the summer of 2022 and continues today.

Moutian Home Embraces Open Access


THANK YOU
THANK YOU
For Your Consideration
ENTRY POINT NETWORKS
www.entpnt.com

SECTION APPENDIX D – GEOLINKS

GEOLINKS

California Internet, L.P. DBA GeoLinks

RFEI No. 2025.001 CVAG Broadband Network Deployment

GeoLinks
251 Camarillo Ranch Road,
Camarillo, CA 93012

GEOLINKS

California Internet, L.P. DBA GeoLinks

Tuesday, April 8, 2025

CVAG Executive Committee
c/o Coachella Valley Association of Governments
74-199 El Paseo Suite 100
Palm Desert, CA 92260

Dear CVAG Executive Committee,

GeoLinks is pleased to submit this proposal in response to the Coachella Valley Association of Governments' (CVAG) Request for Expressions of Interest (RFEI) regarding regional broadband expansion. As a pioneer in hybrid fiber-wireless deployments, we bring a proven track record of connecting underserved communities, delivering innovative broadband solutions, and advancing digital equity.

This proposal outlines how GeoLinks intends to collaborate with CVAG and its member agencies to enhance connectivity across the Coachella Valley. Our vision includes:

- **Rapid deployment of scalable, resilient broadband infrastructure**, targeting unserved and underserved areas;
- **Strategic use of public fiber and conduit assets** to reduce costs and accelerate timelines;
- **Support for federal and state funding applications**, ensuring the region secures its fair share of infrastructure investment;
- **Implementation of community-based adoption and affordability programs**, helping bridge the digital divide for low-income and marginalized residents.

GeoLinks is uniquely positioned to support CVAG's mission, having delivered public-private broadband solutions in collaboration with cities, counties, school districts, and tribal governments across California. We are excited about the opportunity to bring that same spirit of innovation, reliability, and local partnership to the Coachella Valley.

We thank you for your leadership on broadband equity and infrastructure development, and we look forward to working together to create a more connected and inclusive future for all CVAG communities.

Sincerely,

Aaron Frye
Vice President, Network Operations
GeoLinks
afrye@geolinks.com
888-225-1572

Javier Mendoza
Vice President, Community
GeoLinks
jmendoza@geolinks.com
888-225-1572

Summary Sheet – Short-Form Responses

Broadband Network Expansion
GeoLinks proposes a phased hybrid fiber-wireless expansion plan to reach unserved and underserved areas in the Coachella Valley. Leveraging fixed wireless technology, middle-mile backhaul, and selective fiber extensions, we aim to deliver symmetrical speeds of up to 1 Gbps to homes, businesses, and anchor institutions.

Grant Applications
GeoLinks has an experienced support team with expertise in mapping, budgeting, letters of support, and engineering planning. We've secured over $100 million in state and federal broadband grants since 2020 and can work in coordination with cities and CVAG.

Leveraging CVAG and City Fiber Assets
We will work with CVAG and member cities to integrate public fiber and conduit into our design, reducing capital costs and enabling rapid deployment. GeoLinks has extensive experience interconnecting with municipal and utility-owned infrastructure.

Broadband Adoption & Affordability
We will further extend GeoLinks service offerings to the region in support of CVAG's and California's affordability goals. We deliver reliable, high-speed broadband, with a strong focus on meeting the unique needs of rural and underserved communities.

Respondent Qualifications
GeoLinks is an award-winning, California-based Competitive Local Exchange Carrier (CLEC) and Internet Service Provider (ISP) that specializes in designing, building, and operating scalable broadband networks in both rural and urban environments. Our infrastructure spans more than 10,000 square miles and includes hybrid fixed wireless and fiber-optic technologies that enable high-speed, low-latency connectivity.

Network Design & Deployment Experience

- **Imperial Valley Border Infrastructure Project (2023–2024):** GeoLinks designed and built a fixed wireless infrastructure to connect critical facilities along the U.S.-Mexico border, enabling 1 Gbps symmetrical speeds and serving over 2,000 users in remote areas.
- **Rural California (2021–2024):** GeoLinks has built and deployed high-speed broadband to serve more than 7,500 residential locations.
- **California Library Partnership:** Partnered to connected over 30 library branches with gigabit service using hybrid infrastructure, while ensuring uptime of over 99.99%.

Service Availability & Performance

- **Speeds:** Residential offerings from 25 Mbps to 1 Gbps; business and anchor institution services up to 10 Gbps.
- **Uptime SLA:** 99.99% network reliability, backed by 24/7 Network Operations Center (NOC).

Unique Capabilities

- Rapid hybrid builds that reduce permitting delays and extend coverage quickly.
- In-house engineering, construction, and tower crews to control quality and timelines.
- Proprietary spectrum and tower network enabling flexible middle-mile and last-mile deployment strategies.
- Proven ability to operate and maintain complex broadband networks in remote and topographically challenging areas.

Collaborative Experience

GeoLinks is deeply experienced in public-private partnerships and interagency collaborations. Our team has led projects that required coordination across municipal departments, school districts, county agencies, tribal governments, and utilities.

Examples of Collaborative Work

- **California Department of Education (CDE) Learning Loss Mitigation Program:** GeoLinks deployed free or subsidized high-speed broadband to over 10,000 students in partnership with school districts and counties across California.
- **San Diego County Public Safety Infrastructure:** GeoLinks integrated services with county fiber assets and collaborated with public safety agencies to expand coverage into underserved canyons and rural zones.
- **Tribal Partnerships:** In collaboration with multiple California tribal governments, GeoLinks delivered middle-mile and last-mile solutions under federal grant programs, managing environmental review, permitting, and culturally sensitive construction practices.

Organizational Structure and Staff Expertise

Headquartered in Southern California, California Internet, L.P. DBA GeoLinks is a leading telecommunications company and competitive local exchange carrier (CLEC) public utility, nationally recognized for its innovative Internet and Digital Voice solutions. Ranked on Inc. Magazine's Inc. 5000 Fastest Growing Companies in America three-years running, GeoLinks delivers Enterprise-Grade Internet, Digital Voice, SD-WAN, Cloud On-ramping, Layer 2 Transport, and both Public and Private Turnkey Network Construction expertly tailored for businesses and Anchor Institutions nationwide.

GeoLinks utilizes 100+ full time employees (which include executives, engineers, infrastructure and operations experts, etc.), giving the company the capacity to execute large scale network deployments throughout California in a rapid fashion. GeoLinks maintains a large and diverse client base utilizing both wholly owned network and leased network assets. The GeoLinks executive team collectively possesses more than 150 years combined telecommunications and ISP experience.

- **Executive Leadership:** Proven track record in infrastructure financing, rural broadband deployment, and public agency collaboration.
- **Network Engineering Team:** Licensed professional engineers with expertise in fixed wireless, fiber, microwave, and GIS modeling.
- **Grants & Regulatory Team:** Specialists in BEAD, CPF, and other state/federal programs with experience submitting over $250 million in successful broadband grant applications.
- **Community Engagement Team:** Bilingual outreach specialists who support community onboarding, accessibility and affordability program enrollment, and adoption campaigns.

Why GeoLinks is Right for This Project

Our deep technical expertise, commitment to equity, and history of successful collaboration with public agencies make GeoLinks a uniquely qualified partner for CVAG. We understand the complexities of regional deployment and are prepared to work hand-in-hand with member cities to design and execute a shared broadband vision for the Coachella Valley.

GeoLinks Awards & Recognition (2019–2024)

Company Awards

- **Inc. 5000 Fastest-Growing Private Companies (2019–2023):**
  Recognized five consecutive years for sustained revenue growth and innovation.
- **Top Telecommunications Company – Inc. Regionals: California (2022):**
  Ranked among the top 10 telecom companies in the state.
- **Telecom Tech Outlook "Top 10 Wireless Solution Providers" (2021):**
  Honored for GeoLinks hybrid fixed wireless platform and innovation in last-mile delivery.
- **Los Angeles Business Journal "Top Places to Work" (2020 & 2021):**
  Acknowledged for workplace excellence, team culture, and community engagement.
- **U.S. Small Business Administration (SBA) "Exporter of the Year" (2020):**
  Recognized for expanding high-speed wireless technologies internationally.

Public Sector Recognition

- **California Public Utilities Commission (CPUC):**
  Commended for successful project delivery and service outcomes.
- **CENIC Partner Spotlight (2022):**
  Celebrated for enabling advanced research network connections for schools and libraries.
- **State of California Letters of Support (Multiple Years):**
  Received from cities, counties, and school districts for broadband grant applications and infrastructure collaborations.

Impact Metrics

- GeoLinks was the largest construction grant winner for California K-12 schools and libraries from **2016- 2018 and 2020**. In 2017 alone, GeoLinks expanded its customer base to include nearly 30 rural school districts and surrounding communities throughout the state that previously had not had access to any high-speed broadband service.
- **Over $100M** in secured broadband grant funding for underserved regions.
- GeoLinks network **covers over 25,000 low-income households**.
- **99.99% service uptime** across mission-critical clients, including public safety and healthcare.

Signatures

Aaron Frye

Vice President, Network Operations

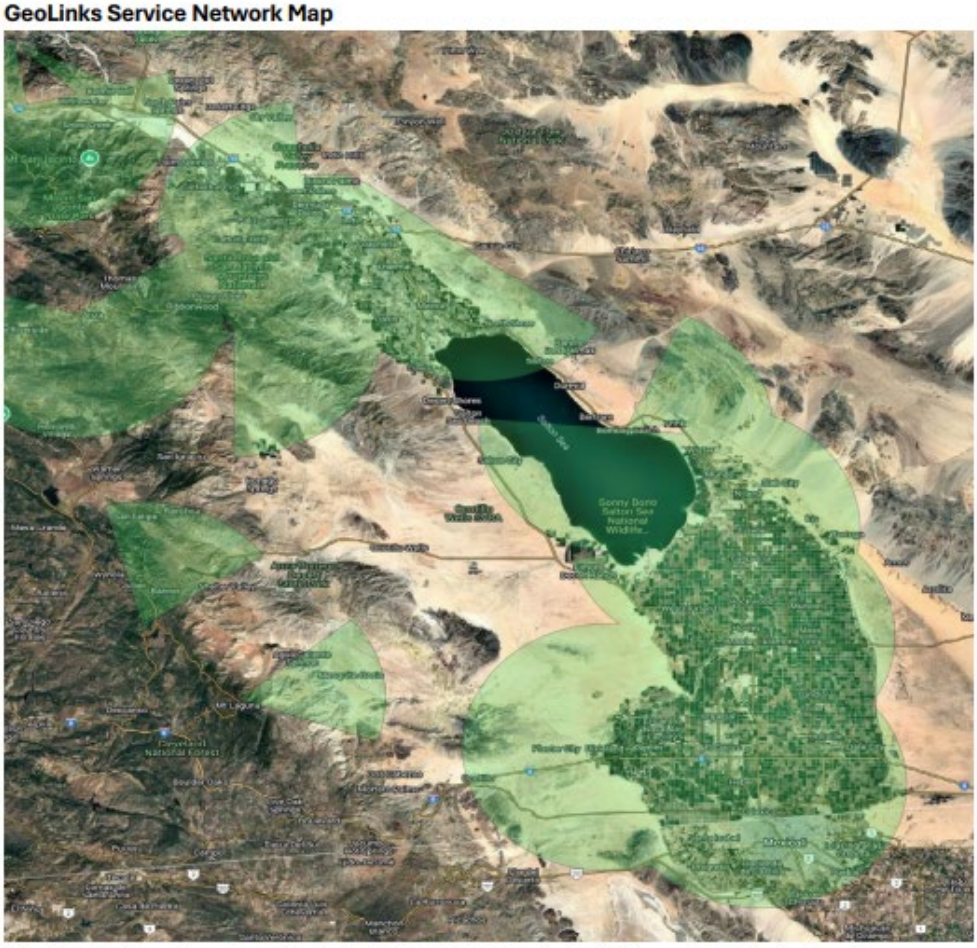
Vice President, Community

ADDENDUM

1. Reference Business and Government Contacts
2. Service Territory Map
3. Standard Business Contract

GeoLinks Client Reference Contacts
Organization: Val Verde Unified School District **Contact name:** Matthew Penner **Title:** Director of Information and Instructional Technology, CITE Certified CTO **Address:** 975 WEST MORGAN ST. PERRIS, CA 92571 **Telephone:** (951) 940-6100 **Contact email:** mpenner@valverde.edu
Organization: Carmel Unified School District **Contact name:** Manuel Carrera **Title:** Senior Director, Information Technology **Address:** 4380 Carmel Valley Road Carmel CA 93923 **Contact telephone:** (831)624-1546 ext. 2044 **Contact email:** mcarrera@carmelunified.org
Organization: Lake Linx **Contact name:** Nicholas Magarett **Title:** Co-Founder **Address:** 3700 Golden Spur St, Lake Isabella, CA 93240 **Telephone:** (760)-417-6073 **Contact email:** nicholas@lakelinx.com

GeoLinks Service Network Map



GeoLinks California network footprint, highlighting Coachella Valley and neighboring service areas

GeoLinks current and planned broadband coverage across California, with specific attention to scalable infrastructure in the Coachella Valley region. Our network spans over 10,000 square miles with connectivity in rural, tribal, and urban markets.



California Internet LP DBA GeoLinks | 251 Camarillo Ranch Road, Camarillo, CA 93012 | www.geolinks.com

Account Name

Quote Number
Created Date
Expiration Date

Prepared by Agent Prepared by Agent (Email)

Name of Contact
Contact Phone
Contact Email

Contract Term (Months)

Billing Address Name
Billing Address

Service Address Name
Service Address

Subtotal
Total Price
Grand Total

All applicable government-compliant taxes & fees will be added to the contract rate(s) shown above. By signing this Quote (hereinafter referred to as the "Agreement"), the undersigned ("Customer") agrees and authorizes GeoLinks to provide the services listed herein. Customer also hereby agrees to the Terms and Conditions, Service Level Agreement, Voice over Internet Protocol Service Policy, Acceptable Use Policy, and Privacy Policy ("Provisions") available at www.GeoLinks.com, which are incorporated by reference. Upon acceptance of signed Agreement, GeoLinks will deliver services. Upon completion of service delivery, GeoLinks will transmit an invoice to Customer for Services. This Agreement, Provisions and the invoice will constitute the entire agreement between the parties.

Account:
Signature:
Name:
Title:
Date:

California Internet LP DBA GeoLinks

Signature:

Name:

Title:

Date:

TERMS AND CONDITIONS

California Internet, L.P. DBA GeoLinks ("GEOLINKS") provides Internet and Voice services (referred to herein as the "Services"). Please refer to www.geolinks.com for full Terms and Conditions. The Service Quote, Terms and Conditions along with the Service Level Agreement (for Internet Services), Voice over Internet Protocol ("VoIP") Services Policy (for VoIP Services), Acceptable Use Policy (AUP), Privacy Policy, and the original Service Quote (collectively referred to as the "Agreement") constitute the entire understanding between Customer and GEOLINKS with respect to Services provided, superseding all previous communications or agreements regarding such subject matter. GEOLINKS reserves the right, in its sole discretion, to change, modify, add or remove portions of this Agreement at any time.



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SERVICE REGISTRATION PROCEDURES. Upon signing up for the Service and at subsequent times as requested by GEOLINKS, Customer agrees to provide true, accurate, current, and complete personal name and/or business name, administrator name, billing address, shipping address, the addresses where the Services will primarily be used, 911 registered address for each applicable device, email address, contact phone number, payment information, and other data which may be necessary to administer Customer GEOLINKS account ("Account") (collectively, "Registration Data"). Customer represents and warrants that the information Customer provides is accurate, current, and complete, and agrees to promptly update any of the information if it changes. If Customer provides Registration Data that is, or that GEOLINKS suspects to be, false, inaccurate, not current, incomplete, fraudulent, or otherwise unlawful, GEOLINKS has the right, in its sole discretion, to suspend or terminate the Service and refuse any and all current or future use of all Services by Customer, Customer business(es), affiliates and all users of Customer Account. At all times, Customer shall maintain and promptly update Registration Data.

PRODUCT PRICING AND AVAILABILITY. With respect to its advertising, offering, or sale of Applications, Services, or any other products (collectively, "Products"), GEOLINKS attempts to describe its products as accurately as possible. Nevertheless, GEOLINKS does not warrant that any descriptions, pricing, availability, or other information relating to the advertising, offering, or sale of Products (collectively, "Product Information") from its Website, marketing materials, promotional flyers, advertisements, or other printed or electronic materials (collectively, "Product Materials") is accurate, complete, reliable, current, or error-free. Despite our efforts, it is possible that Product Information may be mispriced, described inaccurately, or that the Product may be unavailable. In the event GEOLINKS determines that a Product is mispriced, described inaccurately, or unavailable, GEOLINKS reserves the right to take any action it deems reasonable and necessary to rectify the error, including without limitation, canceling Customer Account or subscription to the Services. Customer agrees to notify GEOLINKS immediately if Customer becomes aware of any pricing or descriptive errors or inconsistencies with any Products Customer orders through the Product Materials and comply with any corrective action taken by GEOLINKS.

Customer agrees to pay a one-time, non-refundable Installation Fee (Non-Recurring Fee) if such fee is designated in the Agreement. On a monthly basis, throughout the Term as defined on the Agreement, Customer agrees to pay GEOLINKS for the Services in the manner set forth in the Agreement (the "Monthly Recurring Charges"). In the event that GEOLINKS incurs additional outside vendor cost over and above usual and customary charges in order to provide service to Customer, and as attributable to Customer-specific requests or premises requirements, Customer shall be responsible for any and all such charges. Such costs may include, but are not limited to, extended wiring charges, alternative business hour service installation charges or emergency service repair charges, etc.

Customer acknowledges responsibility for all necessary approvals, permission from property manager or owner at Customer's end-user location, and applicable permits and/or use fees to be attained, if any, for full access by GEOLINKS prior to installation of GEOLINKS equipment and while GEOLINKS services are provided. If GEOLINKS arrives for installation but cannot complete installation due to lack of access (necessitating a second trip by GEOLINKS to the End-User location), Customer agrees to pay GEOLINKS a fee of $650 (six hundred fifty dollars) to reimburse GEOLINKS for its additional expenses incurred.

Customer acknowledges and agrees that the Services may not be available 100% of the time. Credit allowances for interruption of the Services may only be provided on a case-by-case basis at the sole discretion of GEOLINKS and shall be Customer's sole remedy for any Service interruptions or other issues with the Services.

In the event that Customer changes its wiring and/or terminating equipment so as to require the redesign of the service, Customer shall pay all costs and expenses incurred by GEOLINKS for the change in service.

RATE CHANGES. Rates will not be increased during the Initial Term, with the exception of tax or fee changes and international toll calling rates. Otherwise, GEOLINKS may change the prices for the Services, toll charges, fees and taxes, from time to time. In the event of a change in prices or toll charges, GEOLINKS will post such changes to its Website currently located at www.geolinks.com. International toll calling rates are updated monthly on the first of each month and no other notice shall be provided for changes to international toll calling rates. The Service Fees effective upon any renewal of the Agreement shall be GEOLINKS' then-current Service Fees for the applicable Services.

EQUIPMENT. To use GEOLINKS' Services, GEOLINKS may provide certain equipment for Customer use. Nothing contained herein shall be interpreted to give or convey to Customer, or any other person, any right, title or interest whatsoever in Equipment. Any and all GEOLINKS equipment installed or provided to customers pursuant to execution of the Agreement or delivery of the Services stated therein shall remain the sole and exclusive property of GEOLINKS. Equipment shall remain personal property if GEOLINKS, notwithstanding that it may be, or become, attached to, or embedded in, realty not belonging to or occupied by GEOLINKS. Customer shall not tamper with, remove or conceal any identifying plates, tags or labels identifying GEOLINKS' ownership interest in Equipment. Customer may need to purchase certain equipment for GEOLINKS' VoIP Services. This is explained in more detail in GEOLINKS' VoIP Services Policy.

Equipment, hardware and software not provided and owned by GEOLINKS are the sole and exclusive responsibility of Customer (Customer Equipment). In the event that GEOLINKS has provided the equipment, GEOLINKS only acts as a wholesaler and all failures and/or disputes will be governed by the manufacturer(s)' warranty(s) & policies, and are not the obligation or responsibility of GEOLINKS unless otherwise stated in Agreement or attachments thereto.

GEOLINKS only provides the Services and permission to use certain equipment to Customer. GEOLINKS is not responsible for the security of Customer's network and circuits against or for any damages that may result from any unauthorized access to Customer's network from third parties. GEOLINKS urges Customers to seek independent advice with respect to products, equipment (including configurations), and services available to make Customer's computer network and circuits more secure from third parties.

LOST, STOLEN, ALTERED OR BROKEN EQUIPMENT. Customer shall not modify the Equipment in any way without the express written permission of GEOLINKS. Customer shall not use the Equipment except with the Services provided hereunder. Customer will be responsible to provide the equipment with appropriate and adequate protection against power surges and such other potential damage and harm exclusive of customary wear and tear associated with its assigned use. Any and all such damage to the equipment that results from Customer's failure to so provide such protection shall be Customer's sole responsibility. Except as otherwise provided for hereunder, Customer is responsible for all lost, stolen or broken equipment and may be required to purchase a replacement to continue to use the Services. Replacement charges will be based on the fair retail price of Equipment, plus applicable shipping costs and taxes. Customer shall immediately notify GEOLINKS of any lost or stolen Equipment and shall cooperate with GEOLINKS in all reasonable aspects to eliminate actual or potential unauthorized use of the Equipment. At GEOLINKS' sole option, failure to report lost or stolen Equipment in a timely manner will cause Customer to be responsible for all Service Fees accrued until the time that GEOLINKS is informed of the loss or theft and GEOLINKS is entitled to terminate the Services and Agreement following Customer's breach of this Section. Equipment not provided by GEOLINKS shall not be used by Customer unless specifically agreed to in writing by GEOLINKS. Equipment not provided by GEOLINKS shall not be supported.

GEOLINKS

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EQUIPMENT RETURN POLICY. Any and all equipment provided by GEOLINKS to Customer that is used to maintain such Services must be returned to GEOLINKS undamaged, upon the expiration or Termination of the Agreement, to: California Internet, L.P., 251 Camarillo Ranch Rd, Camarillo, CA 93012. If Customer fails to return such equipment in similar condition as initially provided to Customer, taking into account reasonable wear and tear, Customer may be responsible for replacement cost of the Equipment. Customer is responsible for all return shipping charges for any hardware returned to GEOLINKS for any reason, including situations in which hardware is covered under warranty.

TERM. Customer agrees to maintain Services for the period set forth in the Service Quote (the "Term"). The Term shall automatically renew on a month-to-month basis unless either party provides notice to the other of its intent to terminate this Agreement not less than thirty (30) days before the end of the then current Term. The Term begins upon activation of Customer's Services (Activation Date) and expires no later than the last day of Customer's Term.

For avoidance of doubt, the provisions of this Agreement relating to intellectual property ownership, customer representations, confidentiality, use policies and restrictions, equipment, number porting and availability, storage of user information, customer feedback, publicity rights, non-disparagement, additional software licenses, indemnification, force majeure, warranty disclaimers, limitations of liability, notices, assignment, future changes, interpretation, dispute resolution and arbitration, and choice of law shall survive termination or expiration of this Agreement for the maximum term allowable by law.

ADDITIONAL SERVICES. At Customer's option, Services may be upgraded (e.g. a plan with higher speeds or more minutes and/ or features) or the number of Services may be increased at any time during the Initial Term or Renewal Term (any such upgrade or increase, "Additional Services") by Customer entering into an addendum to its Service Order that sets forth the specific Additional Services desired. Each addendum to a Service Order shall be subject to GEOLINKS' acceptance, which shall be deemed given if GEOLINKS thereafter provides the Additional Services. Upon acceptance by GEOLINKS, such Service Order addendum shall be deemed an amendment to the Agreement, subject to all of the terms and conditions herein, and the Service Fees shall be increased to reflect the Additional Services, subject to the same pricing and payment terms as are set forth in the Service Order. Additional Services shall be provided for a term that is coterminous with the Initial Term or Renewal Term of the Agreement.

SERVICE DOWNGRADES. A processing fee may apply when "downgrading" an existing plan to a plan with lower monthly fees (e.g., a plan with lower speeds or fewer minutes and/or features). Any reduction in the number of lines or seats under a Service Plan shall be treated as a termination of Service with respect to those lines or seats. If Customer receives any equipment discounts associated with a Service plan and subsequently changes that plan to one that does not offer those equipment discounts, Customer will be responsible for reimbursement of such discounts.

TERMINATION. Customer may terminate Services by providing thirty (30) days written notice prior to the end of the Term or any renewal term period, as the case may be ("Termination Notice"). Any and all notices must be in writing or via email, sent to GEOLINKS by one of the listed contacts on the current Customer Information form on file, ATTN: Customer Care Department, 251 Camarillo Ranch Rd, Camarillo, CA 93012.
Unless otherwise provided for in the Agreement, if a Customer terminates the Agreement, or some of the Services provided under the Agreement, before the end of the Initial Term or any Renewal Term (the "Terminated Term"), GEOLINKS will charge Customer, and Customer will pay, an early termination charge equal to 100% of the Monthly Service Fee for the terminated Service(s) multiplied by the number of months remaining in the Terminated Term on the date of termination. Customer will also be responsible for any applicable unpaid fees or charges.

In the event a delinquent Customer seeks to terminate the Agreement early, or termination occurs prior to completing the first year of the contract, Customer must pay 100% of all remaining contract fees. Customer must give GEOLINKS 30-days advance notice, and must make a lump-sum payment to GEOLINKS and return all GEOLINKS equipment, as applicable, within 10 days of the early termination date.

GEOLINKS may change suspend or discontinue any aspect of the Services at any time, including but not limited to upgrades, downgrades and cancellations with thirty (30) days prior written notice of such change to occur. Upon such written notice, Customer may terminate Services, effective on the effective date of any applicable change without penalty.

DEFAULT. Upon default by Customer, GEOLINKS may change, suspend or discontinue any aspect of the Services to Customer until Customer remedies the default or GEOLINKS may terminate this Agreement and services being provided hereunder. Customer is in default of this Agreement if it: i) Is more than ten (10) days past due in paying any GEOLINKS invoice pursuant to its terms, excluding those amounts which Customer has notified GEOLINKS as reasonably being in dispute; ii) Fails to keep an automatic payment method on file pursuant to the terms of this Agreement; iii) Fails to cure any non-monetary breach of any terms of the agreement within thirty (30) days of receiving written notice of the default from GEOLINKS; or iv) Files or initiates proceedings or has proceedings filed or initiated against it, seeking liquidation, reorganization or other relief (such as the appointment of a trustee, receiver, liquidator, custodian or such other official) under any bankruptcy, insolvency or other similar law.

If GEOLINKS terminates this Agreement pursuant to this section, GEOLINKS shall have the right to seek full payment for any amounts due GEOLINKS for services rendered prior to the date of termination plus the remaining payments due during the initial term of the Agreement.

IMMEDIATE TERMINATION. GEOLINKS shall be entitled, in good faith, and in its reasonable discretion, to suspend, terminate or change the Services without advanced notice for Customer's material breach of the Agreement, suspected fraud or use of Services for any unlawful purpose, or any misuse of the Services that adversely affects the Services, GEOLINKS, its network or other Customers' use of the Services. GEOLINKS may require, and if required, Customer shall pay, an activation fee as a condition to changing or resuming a suspended or terminated account. Please refer to GEOLINKS' AUP for more information.
In the event of termination by GEOLINKS during the Initial Term or any Renewal Term, an early termination charge will apply and disconnection fees and other charges may also apply.

PAYMENT. Customer agrees pay the Service Fee for Services ordered by Customer, and all other amounts due under the Agreement. No refund, transfer or proration shall be made of any unused Plan Credits, Additional Credits, Promotional Credits, or international calling credits or of any remaining periods/months on any Service plan. Any applicable initiation charges, usage, monthly recurring charges, support charges, taxes and other fees are billed in full in advance on the first day of each billing period.

LATE/NON-PAYMENT. Failure to pay in full within thirty (30) days from the due date will result in immediate account suspension and GEOLINKS shall have no liability for such suspension under any circumstances. Accounts will be reactivated, at GEOLINKS' sole discretion, only when the account balance is paid in full and a $35

reconnection fee is paid. Customer agrees and acknowledges that time is of the essence for payment of all fees and charges. If any charges for the Services or Products are due but unpaid for any reason including, but not limited to non-payment, Customer will be subject to: (a) a late fee of 1.5% per month (but in any event no greater than the maximum amount permitted by law); (b) a $250.00 fee for any and all collection attempts necessary to rectify and/or reactivate any delinquent account and/or Services (the "Collections Fee"); and (c) the termination of any and all Services purchased by Customer under any Agreement with GEOLINKS.

Customer agrees to assume any and all costs and expenses incurred by GEOLINKS in connection with collecting any and all unpaid amounts, including, but not limited to, reasonable attorneys' fees. Any and all returned checks shall incur a $30.00 returned check fee. GEOLINKS may, in its sole discretion, consider successive returned checks as failure to pay and therefore shall be subjected to the penalties set forth herein. Due dates and late fees for VoIP services and bundled services (VoIP and Internet) shall be governed by GEOLINKS' VoIP Services Policy.

BILLING DISPUTES. Customer must dispute any charges for the Services in writing to GEOLINKS within thirty (30) days of the date of the charge by GEOLINKS. If Customer fails to provide a written statement explaining in reasonable detail Customer reasons for disputing the charge within such time period, Customer hereby irrevocably waives any objection and further recourse with regard to such charges. Written statements disputing charges must be sent to ATTN: Customer Care Department, 251 Camarillo Ranch Rd, Camarillo, CA 93012, or to customerservice@geolinks.com.

Customer waives the right to dispute any charges due to a service interruption or service problem unless it has notified GEOLINKS of the service issue via email to customerservice@geolinks.com within 10 days of discovering the problem, and has allowed GEOLINKS 14 days to fix the problem.

TAXES AND FEES. Please note that taxes, surcharges, and fees are subject to change at any time. Customer may be responsible for paying all charges for Customer Account, including but not limited to toll-free, local, long distance, international, additional feature charges, 411 and operator assisted charges, and directory assistance charges, and for all taxes, surcharges, and fees imposed on Customer or GEOLINKS as a result of Customer use of the Service, unless otherwise specified in the Agreement. Customers with a past due balance on previous or multiple accounts will be charged the full balance upon opening a new account or updating their credit card information on file. GEOLINKS also reserves the right to charge termination and transfer fees consistent with each plan's terms and conditions and as provided in this Agreement.

PAYMENT AUTHORIZATION. Customer must provide GEOLINKS with an automatic payment method, such as a valid credit card or bank account (including proper billing information), for recurring payments. Customer authorizes GEOLINKS to collect from that payment method all charges associated with the Service including, but not limited to, monthly recurring service payments, any applicable termination fees, etc. Any such authorization will remain valid until thirty (30) days after Customer terminates GEOLINKS' authority to charge that payment method. Upon termination of payment authorization, Customer must provide an alternate automatic payment method. Failure to provide such alternate automatic payment information within ten (10) days of payment authorization termination will constitute default under the Agreement and may result in disconnection of Customer's service. All charges and fees associated with such default will be immediately due. You agree to advise and notify us of any changes to your payment method, such as credit card account number or expiration date changes. If the credit card or other payment method on Customer's Account is declined or fails for any reason, GEOLINKS will use reasonable efforts to contact Customer regarding the failed billing attempts.
Notwithstanding the foregoing, GEOLINKS reserves the right to disconnect Customer's Service if the credit card on file is declined or fails for any reason and services remain unpaid pursuant to the terms set forth herein. GEOLINKS reserves the right to continue to attempt charging the credit card for any outstanding Service charges and additional fees and pursue any other legal remedies available.

ACCOUNT OWNERSHIP. The Account Owner shall be the legal entity (e.g., corporation, partnership, individual) or individual that signs up for the Services with GEOLINKS. If no legal entity or individual is provided upon sign-up, the Account Owner shall be the owner of the credit card used to open the Account. Subsequent changes to ownership must be supported by appropriate legal documentation. If Account Owner signs up for Services at more than one location, all Services shall be billed on one invoice and sent to the Account Owner. GEOLINKS shall not adjudicate ownership-related disputes, or any other internal business dispute. If GEOLINKS is unable to determine the valid owner of the Account, GEOLINKS reserves the right to suspend or terminate the Account and Services.

FRAUDULENT ACTIVITY OR ERRONEOUS CHARGES. In the event of suspected fraudulent activity or erroneous charges on Customer Account, Customer agrees to contact GEOLINKS as soon as possible by contacting customerservice@geolinks.com. Customer is solely liable for any transactions or activities by Customer or anyone else that occur on Customer Account, and in no event shall GEOLINKS be liable for any unauthorized use of Customer Account.

SECTION APPENDIX E – RACE COMMUNIATIONS

Race Communications RFEI Response for

HRGreen.
FIBER AND BROADBAND

April 9, 2025

Submitted by:

Jim Miller, VP Business Development
Race Communications
jmiller@race.com
O: 661 749-0911
C: 661 742-7869
1325 Howard Ave #604
Burlingame, CA 94010

Confidential

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April 9, 2025

HR Green
Ken Demlow
1260 Corona Pointe Court Ste 305
Corona, CA 92879

Dear Mr. Demlow,

I wanted to take a moment to express my sincere gratitude for the opportunity to present Race Telecommunications to the Coachella Valley Association of Governments and HR Green. It is truly an honor to discuss how our company can meet your region's broadband and voice needs.

We celebrated our 30th anniversary in 2024 and I am filled with pride reflecting on the journey Race has undertaken since its inception. Our commitment to excellence in providing fiber-based products to communities, residents, and businesses across California has been unwavering. I am particularly proud to note that the core family values instilled within Race from its inception remain integral to our operations today. These values, coupled with the dedication of our 300 employees, have been instrumental in shaping Race into the successful company it is today.

At Race, we take immense pride in our California roots and the strategic placement of our offices and warehouses throughout the state. This ensures that we can promptly address any issues that may arise within our network and service areas, thereby ensuring uninterrupted connectivity for our valued customers. Additionally, our Call Center in Kern County has consistently achieved impressive Net Promoter Scores (NPS) of over 70 for the past three years, a testament to our unwavering commitment to customer satisfaction.

One of Race's key strengths lies in not only building fiber networks but also in effectively operating and meeting the unique needs of the communities we serve. With over three decades of experience in network operations, Race is uniquely positioned to partner with the Coachella Valley Association of Governments and build upon the foundation laid by your Broadband Services department.

We are eager to earn your business and have the opportunity to serve you and your residents for many years to come. Thank you once again for considering Race Telecommunications as your trusted partner.

Best regards,

Raul Alcaraz

Raul Alcaraz, CEO

History

History of Race Communications

At Race Communications, we believe high-speed, reliable Internet is essential for all economic and community development. We've witnessed the transformational powers of fiber Internet and the enormous success a community can have with the proper network connectivity.

Since our early inception back in 1994, Race Communications has evolved into a California licensed last-mile telecommunications company (CLEC) that designs, builds, and operates fiber-to-the-home networks. With remote work, school, and the increased use of IoT being the standard, the demand for reliable connectivity is higher than ever before.

As such, we have dedicated extensive resources to designing, building, and providing fiber-based Internet services to over a hundred thousand homes and businesses in rural, urban, and developing communities in California. Whether we're bringing fiber to police departments to strengthen their field communications or partnering with real estate developers to bring high-speed Internet to business complexes and new housing developments, Race has always kept its eye on emerging technologies.

Working in partnership with several private investors and developers and non-profit community advocacy groups, Race focuses its efforts towards building world-class fiber networks for fast, high-quality internet connectivity. This has made us the preferred fiber provider for residential, business and enterprise customers throughout the 30+ communities we serve in California.

Our network allows homes to seamlessly connect to a wealth of entertainment and cloud services. With unmatched speed, limitless potential, and affordable pricing, Race Communications' customers thrive in an increasingly digital world. In addition, our fiber network provides significant economic improvements to local businesses and organizations.

Executive Team

Raul Alcaraz, CEO
Raul Alcaraz is one of the founders and CEO of Race Communications. A true self-starter, he launched Race Communications in 1994 and has grown the company through his unique blend of understanding innovative technology and outstanding leadership skills. Alcaraz oversees the corporate direction and strategy for Race's overall field operations, including sales, support, marketing, and alliances and partnerships. In addition, he focuses on strategy leadership, customers, and community efforts.

Alex Alcaraz, CFO
Alex Alcaraz has several years of financial experience and a track record of driving financial success in a tech environment across multiple platforms. He is responsible for the financial management of Race Communications, its financial reporting and transparency and long-term financial planning. Alcaraz shapes the company's strategies to capture profitable growth and makes it possible for the company to sustain its growth while continuing to offer affordable prices to its customers.

Ricardo Alcaraz, VP of Operations
Ricardo Alcaraz began his career with Race in 2000 as the first official employee and has covered many roles in the company, including project manager, technician, and sales support. Over the years with Race, Ricardo's work ethic, attention to detail, passion for efficiency, dedication to proper process, and knowledge of the multiple roles have prepared him to perform as the VP of Operations and an integral member of the Executive Staff.

Domenic Pacini, VP of Construction
Domenic Pacini is the third founder of Race Communications and is responsible for bringing the fiber network to life in various communities. As head of construction for Race, Pacini aims to bring optimized, high quality, and consistent services to customers and partners across California. He brings more than 25 years of diverse experience to the company as a product-centric founder, general manager, and in IT. He also has extensive product and technical operations experience within the telecommunications industry.

Carlos Alcantar, CTO
Dedicated to everything he does, Carlos Alcantar brings his strong work ethic to Race Communications as the Chief Technical Officer. He oversees the development and implementation of Race's cutting-edge technology and provides strategic direction to several functions and business operations. These include the Engineering, Operations, and Supplier Management functions, and Test & Evaluation, Research & Technology, and Information Technology.

Kaitlin Colston, VP Marketing and Sales
With over a decade of experience in sales and marketing, Kaitlin Colston has a strong track record of scaling companies and building high-performing teams through strategic growth initiatives. She combines data-driven insights with a people-first mindset to lead sales and

marketing strategies that support sustainable growth, drive revenue, and build stakeholder trust. Known for connecting authentically with communities and maintaining an approachable leadership style, Kaitlin ensures each growth strategy delivers meaningful, community-oriented impact.

Jim Miller, VP Business Development and Community Relations
Jim Miller serves with a wealth of knowledge of the telecommunications industry. As VP of Las Americas Broadband, he helped launch cutting-edge systems in Baja, California. In 2004, he started High Desert Wireless, the first ISP in Mojave, CA, and the Tehachapi Valley region. Two years later, in 2006, the Kern County Board of Supervisors awarded his company Tech Company of the year. Following this, High Desert Wireless became the premier ISP of choice in the region among leading aerospace and green energy companies in the region.

Roberto Alcantar, VP OSP Projects
A San Francisco native, Roberto Alcantar had a great interest in all things tech from an early age. As a young adult, co-founded Race Communications with Raul Alcaraz. Since founding the company, Roberto has held various roles within the company, producing significant business value for Race in the form of customer satisfaction and loyalty, market share and productivity.

Experience

Race's dedication to building a family culture among its 300 employees and the communities it serves are a standout quality that sets us apart in the Broadband industry. This emphasis on fostering a close-knit environment can have significant benefits for a region like Coachella Valley.

1. Personalized Service: A family culture translates into a more personalized approach to customer service. Employees who feel like part of a close-knit family are more likely to go above and beyond to meet the needs of the community members they serve.
2. Community Engagement: By fostering a sense of belonging and camaraderie among its employees and the community, Race is more actively engaged in local events, initiatives, and causes. This involvement will strengthen the bond between the company and Coachella Valley residents, contributing to a more vibrant and supportive community environment.
3. Reliability and Trustworthiness: A company culture built on family values emphasizes trust, reliability, and integrity. In the context of providing essential services like fiber internet, these qualities are crucial for earning and maintaining the trust of customers. Coachella Valley residents can feel confident in Race's commitment to providing high-quality service and support.
4. Long-Term Commitment: The fact that Race has maintained its family culture for over 30 years and continues to prioritize it suggests a long-term commitment to both its employees and the communities it serves. This stability can be reassuring for Coachella Valley residents, knowing they can rely on Race for their current and future broadband needs.
5. Community Empowerment: A strong sense of community within Race can empower employees to take ownership of their roles and contribute positively to the areas they serve. This empowerment can lead to innovative solutions tailored to the specific needs of Coachella Valley residents, further enhancing the overall quality of life for its residents.

In summary, Race's unique emphasis on building a family culture benefits communities like Coachella Valley by fostering personalized service, community engagement, reliability, trustworthiness, long-term commitment, and community empowerment. These qualities will contribute to a stronger, more connected, and thriving community environment.

Where is Race?

Race operates in 18 California Counties consisting of over 30+ different and unique communities.

Kern County	Sonoma County	Butte County
Los Angeles County	San Francisco County	Nevada County
San Bernardino County	Colusa County	Tulare County
Riverside County	Sutter County	Merced County
San Diego County	Yuba County	San Joaquin County
Madera County	Fresno County	Stanislaus County

As previously mentioned, Race always has its eyes focused on emerging technologies. With that, we are proud that we are also the first at many things.

2002
Race becomes the sole Fiber provider in Playa Vista, CA serving both residents and businesses

2010-2023
Race receives 13 California Advanced Service Fund grants from the CPUC to build over $150M of fiber networks in unserved and underserved areas of California.

2014
The city of Boron becomes the first city in California to have 1Gbs fiber internet deployed to all city residents.

2023
The city of Lancaster becomes the first city in California to have 10Gbs fiber internet deployed to all 57,000 homes

Race's experience ranges from building and operating fiber networks in Communities as small as 300 homes up to large communities with 60,000 homes. Race has achieved its success in these communities by not only working with the residents but also the stakeholders, whether that be city officials, Chambers, or HOA boards.

Race's ongoing expansion efforts, as evidenced by our significant fiber builds in California, indicate a dedication to improving broadband access across the state. This means that regions like Coachella Valley can anticipate continued investment in infrastructure and technological advancements to support their growing needs.

Stability Amidst Market Volatility: In a market where fiber products may face backorders and pricing volatility[1], Race's established presence and experience in the industry can provide a sense of stability. This means that Coachella Valley can rely on Race to navigate challenges and maintain a consistent level of service and support.

Overall, Race's combination of reliable service, community engagement, commitment to expansion, and stability in the face of market fluctuations make it uniquely positioned to benefit regions like Coachella Valley.

[1] Federal grants totally $4B for California are expected to enter the market late 2024 and 2025 making product and contractors a short supply.

Product Offerings

PRODUCTS AND SERVICES

LIFE GIGAFIED

Residents in our company's fiber footprint can enjoy Gigabit download and upload speeds available with fiber-optic technology as well as fiber-based phone services.



Basic Broadband + $35
- Symmetrical speeds of up to 25Mbps download and upload
- Equipment included
- NO data caps

Gigafy $70
- Symmetrical - speeds of up to 1,000 Mbps download and upload
- Perfect for multiple users and simultaneous streams.
- Home WiFi management app included

Gigafy+ $120
- Symmetrical - speeds of up to 10 Gbps download and upload
- Perfect for modern connected homes and multiple devices
- Home WiFi management app included



Unlimited Phone $10*
- Unlimited calling in North America
- Low international rates
- Battery back-up available*

In addition to our Residential plans, Race offers the following Small Business Plans:

300Mbs symmetrical Broadband	$89
600Mbs symmetrical Broadband	$119
1000Mbs (1Gbs) symmetrical Broadband	$199
10000Mbs (10Gbs) symmetrical Broadband	$269

For our Enterprise customers, Race being a CLEC offers a full array of customized telecommunication products tailored to their unique needs.

RFEI Submission Requirements #2

RFEI Areas of Opportunity

1. **Broadband Network Expansion-**

   In 2024, Race completed its FTTH project in Desert Hot Springs. In 2025, Race started designing projects in Indio and Cathedral City with construction to begin in late 2025. Race continues to review other cities within the Coachella Valley. All 3 of these projects are self-funded through Race. In late 2024, Race secured $500M in capital to accelerate the expansion of its fiber network across the state. This significant infusion of capital will support Race's ambitious plan to extend its FTTH network to as many as 1 million locations throughout California over the next several years.

2. **Grant Applications**

   Race has previously received over $150M in the state funded CASF grants. We continue to monitor the new Federal grants to see if they can enhance the outlying areas of our current and future build communities. If we were to locate an area for the federal grant within our areas then we would look to the local governments within the CVAG group to write letters of support for our project.

3. **Leveraging CVAG and City Fiber Assets**

   When Race expands within a new community, we always meet with community members to see what resources they might have available for either purchase or long term IRU. With Race being a CLEC and offering 911 phone services, we would need for these assets to meet carrier grade status. The CVAG network as described by HR Green is of interest. Race would want further details to see what's available from a conduit lease to dark fiber lease.

4. **Broadband Adoption and Affordability**

   Race was an active member in the federal ACP program. We delivered on fiber a 100Mbs/100Mbs package for $30 dollars to participants of the program. This allowed these participants to have a net cost of zero for the service which also included a wifi router. Race understands that the internet is not just for entertainment, but for schoolwork, work from home, and telehealth needs. With that we designed a package that could support all this in the home at the same time not limiting the family to a single task at a time. As new funding opportunities arise, Race is very flexible to work with to create special packages. Until that time we have a very affordable standard entry level price of $35 for 300Mbs/300Mbs with a router.

RFEI Submission Requirements #3

Respondent Qualifications:

Race is an active CLEC through the California Public Utility Commission holding Utility License No. 7060. Our records are public through the state and our status is active and green from day one of inception. We take pride in not only building our networks but operating them in a way that meets or exceeds our customers' needs. Listed above are all the counties that Race operates within the state of California.

RFEI Submission Requirements #4

Collaborative Experience:

Being a licensed Competitive Local Exchange Carrier (CLEC) means Race has certain legal protections for its conduits and fibers, both at the federal and state levels. This adds another layer of security and stability to its operations, ensuring Race can provide consistent and regulated services to their customers. This, unlike an ISP, allows Race to have not only reciprocal relations with other Telecommunication carriers, but also other utilities such as power, water, and gas. As a CLEC, Race is building networks that are here for the next 50+ years.These networks not only are designed to meet the needs of the residents today but also in the future. Today Race is offering 10Gbs as its top residential speed, however, we are already testing 50Gbs which will be a product in the very near future. Being a CLEC and having the financial means for future upgrades, makes Race stand apart from an ISP who typically just meets the consumers needs of today and doesn't have the means for future upgrades.

RFEI Submission Requirements #5

Standard Contract Agreements:

Being a CLEC, Race has statewide access to PUE's and ROW's, therefore we do not need to enter into agreements with each community. For IRU's, our agreements are confidential and unique to each carrier protected under NDA's.

RFEI Submission Requirements #6

Additional Information:

Once again, being a CLEC, Race is very proud of the network we have built and the carrier-grade equipment we deploy not only throughout the network but also into the customer's home. Below are the standards we build in all of our networks:

The Race network architect standard is to utilize all network elements that are entirely standard-based and conform to Open Systems Interconnection[2] (OSI) standards.

Access

Race currently deploys ITU-T G.984[3] Gigabit-capable Passive Optical Networks (GPON) and the next generation platforms running ITU-T G.9807.1[4] 10-Gigabit-capable symmetric passive optical network (XGS-PON) using both Calix E7-2 / E9 OLTs and ONTs for its access platform. Race has been deploying carrier class Calix platforms and ONTs for well over a decade, with thousands of ports deployed, Race has a full understanding of the Calix platform. Race stays highly active with Calix in implementing new feature sets, as well as reporting and working with Calix to resolve any software bugs.

Race has standardized operations using three different models of Calix ONTs, for the ease of troubleshooting and warehouse management.

1. Calix GP1101X ONT is used when a homeowner or business would like to use their own router for services up to 10 Gigabit symmetrical.

2. Calix GigaSpire u10xe, is a Wi-Fi 6E router based ONT, which provides your typical nat / dhcp / Wi-Fi 6e functionalities for services up to 10 Gigabit symmetrical.

3. Calix 803G ONT is used when a homeowner or business would like to use their own router for services up to 1 Gigabit symmetrical.

4. Calix GigaSpire u6.1, is a Wi-Fi 6 router providing your typical nat / dhcp / Wi-Fi 6 functionalities for services up to 1 Gigabit symmetrical.

5. GigaSpire u4m Mesh BLAST, is a next generation Wi-Fi mesh device that extends your network in your home or business giving you the ultimate Wi-Fi experience.

[2] https://en.wikipedia.org/wiki/Open_Systems_Interconnection
[3] https://www.itu.int/rec/T-REC-G.984.1/en
[4] https://www.itu.int/rec/T-REC-G.9807.1/en

As part of Race's use of the Calix GigaSpire[5] family of products, Race subscribes to the Calix Service Cloud[6] Offering which allows for the following.

- Get End-to-End Visibility into Subscriber In-Home Experience
- Reduce Truck Rolls and Eliminate Unnecessary Product Swaps
- Proactively Identify and Resolve Subscriber Issues
- Streamline Performance Testing

Utilizing Calix Service Cloud[7], Race Communications' customer service team is equipped with advanced real-time troubleshooting tools and access to sophisticated analytics. This technology empowers the team to swiftly diagnose issues, whether they originate from the WAN, the gateway, the Wi-Fi network, or any subscriber devices, through a comprehensive end-to-end overview. This capability significantly enhances the efficiency and effectiveness of the customer support process, ensuring prompt and accurate resolution of technical problems.

Race leverages the Calix SmartHome[8] Managed Services, providing all its subscribers with access to an expanding suite of tools designed to enrich, manage, and secure their connected lifestyle. This portfolio of SmartHome managed services equips subscribers with the necessary resources to optimize and safeguard their digital environment, ensuring a seamless and secure connected experience.

- **Race CommandIQ** app[9] (Calix CommandIQ[10]) gives you easy access to a snapshot view of your home network. Through the app, you can view all the connected devices on your network, set up parental controls or a guest network, change your SSID and password, and more.
- **ExperienceIQ**[11] allows subscribers to easily create online rules for the users and devices in their home networks. It prioritizes the applications and devices that access Wi-Fi, protects children from inappropriate content and set time limits for them.
- **ProtectIQ**[12] is a network-level security application that proactively keeps malicious websites, viruses, and intrusions away from subscriber homes 24x7. ProtectIQ leverages a large cloud database of known virus and ransomware threats.

Race has a standard of using a 1x32 split ratio on PON applications. Race at times may use a combination of split ratio's eg. One 1x2 to two 1x16 but the result is still 32 ports per physical PON network port. The following are OLT/ PON/ Splitter/ Fiber characteristics used as part of the Race engineering standards.

XGS-PON ONT Application Tolerance Characteristics
1577nm = +9.0 dBm to -28.0 dBm

[5] https://www.calix.com/products/platform/unlimited-subscriber/gigaspire.html
[6] https://www.calix.com/products/platform/cloud/service.html
[7] https://www.calix.com/products/platform/cloud/service.html
[8] https://www.calix.com/products/smartlife/smarthome.html
[9] https://apps.apple.com/us/app/race-commandiq/id1615711719 | https://play.google.com/store/apps/details?id=com.race.smarthome&hl=en_US&gl=US
[10] https://www.calix.com/products/smartlife/smarthome/commandiq.html
[11] https://www.calix.com/products/smartlife/smarthome/experienceiq.html
[12] https://www.calix.com/products/smartlife/smarthome/protectiq.html

1270nm = +9.0 dBm to +4.0 dBm

GPON ONT Application Tolerance Characteristics
1490nm = -8.0 dBm to -27.0 dBm
1310nm = +5.0 dBm to +0.5 dBm

PLC Splitter Max Insertion Loss (Wavelength Range (nm) 1260-1650)
1x2 = 3.6 - 4.0
1x4 = 7.2 - 7.7
1x8 = 10.0 - 10.7
1x16 = 13.6 - 14.0
1x32 = 16.8 - 17.6
1x64 = 20.5 - 21.0
Note: Connector type to be SC/APC

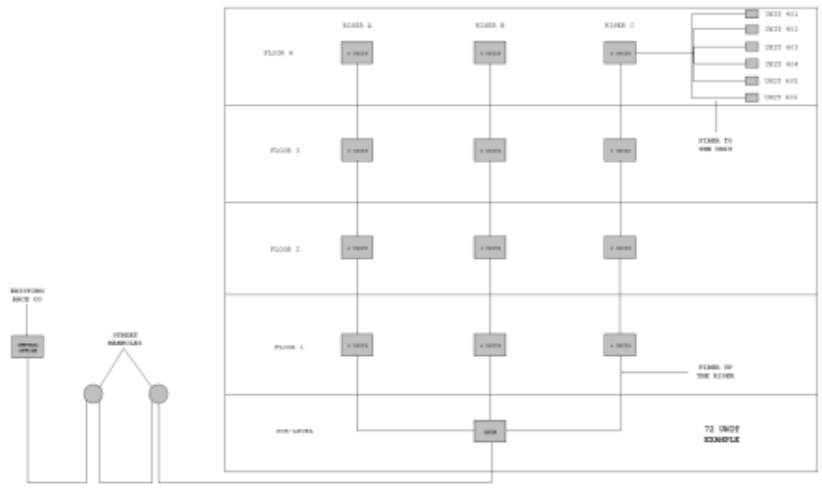
Single mode Fiber Span Loss
Span loss should be at least 0.5 dB/km (dB/3280.84ft) at 1310 and 1550 nm for outside-plant applications

Splice Loss
0.05 to 0.3 dB. EIA/TIA-568A specifies a maximum loss of 0.3 dB.

Connector Loss
0.75 dB. EIA/TIA-568A specifies a maximum loss of 0.75 dB.

Below is a network conceptual design for a typical residential building from the street to the home using PON infrastructure.

Race Communications
Sample Inner Building Network Schematics



Transport

At the heart of the network is the transport layer, Race makes a conscious effort in utilizing existing infrastructure when available as part of its network planning strategy.
Current long-haul and metro providers utilized are

- Zayo
- Lumen (Formally Century Link / Level3)
- Crown Castle
- Southern California Edison Carrier Solutions (SCE)

Race consistently adheres to a core standard within its network architecture, mandating the presence of at least two physically distinct paths with separate entry points for transport, thereby ensuring network resilience. Although initial constraints in new constructions may temporarily limit the availability of such diverse paths, Race diligently prioritizes the rapid implementation of redundant transport pathways as construction parameters permit. This strategic commitment fortifies resilience throughout all levels of the network infrastructure.

Race Communications has been utilizing the Calix E9-2 Advanced Services Module (ASM) Platform as its preferred IP Core Transport platform for many years. This sophisticated platform has enabled Race to consolidate functions that were previously managed across several platforms, enhancing operational efficiency and streamlining network management processes.

Race maximizes the potential of the Calix E9-2 ASM Platform through the adoption of various standards and applications. This strategic approach not only enhances network efficiency and

service provision but also ensures robust reliability and scalability across the IP Core infrastructure.

1. Intermediate System to Intermediate System (IS-IS) Intra-domain Routing Protocol, as specified in RFC-1142[13] and ISO Draft Proposal 10589. IS-IS is a method used by network devices, such as routers, to exchange information about the structure of a network. This protocol facilitates the efficient and reliable routing of information within a network by ensuring all devices are aware of the network's layout.
2. Multiprotocol Label Switching (MPLS) as specified in RFC-3031[14], functions akin to a sophisticated routing mechanism, assigning labels to data packets to facilitate their expedited navigation through the network. This streamlined approach enhances data transmission efficiency and optimizes overall network performance.
3. Virtual Private LAN Service (VPLS) as specified in RFC-4761 [15] uses MPLS (Multiprotocol Label Switching) technology to create a virtualized network that is both scalable and flexible, allowing for the seamless exchange of data across different sites while maintaining the privacy and security of a private network.
4. VPWS (Virtual Private Wire Service) as specified in RFC-4664[16], creates a virtual point-to-point or point-to-multipoint connection over a packet-switched network, seamlessly linking distant networks or devices. It provides dedicated connectivity, ideal for connecting data centers or branch offices, by utilizing a shared network infrastructure to mimic a private, direct line.

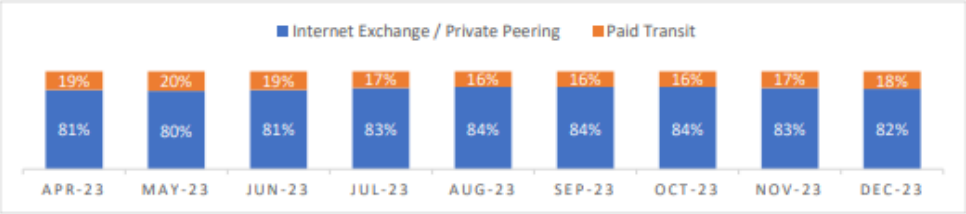
IP/Data Border Routing

Established presence in key data centers[17] enables Race to establish interconnections with an extensive network of carriers, as well as direct connections with major Content Delivery Networks (CDNs) such as Netflix, YouTube, Google, and Akamai through both private and public peering. This strategic placement also facilitates our ability to offer businesses access to essential services including Amazon Web Services Direct Connect, Google Cloud Interconnect, and Microsoft Azure ExpressRoute. Our interconnections serve as a vital conduit for our customers, extending their reach globally.

As of December 2023, 82% of internet traffic pertaining to Race customers was efficiently routed through public internet exchange or private interconnect. This statistic not only underscores the substantial reliance on these network infrastructures but also highlights their pivotal role in enhancing data transmission quality and reliability. The utilization of internet exchange points and private interconnects is instrumental in reducing latency, improving bandwidth efficiency, and ensuring secure and direct data pathways, thereby significantly contributing to the overall performance and resilience of the network architecture.

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[13] https://datatracker.ietf.org/doc/html/rfc1142
[14] https://datatracker.ietf.org/doc/html/rfc3031
[15] https://datatracker.ietf.org/doc/html/rfc4761
[16] https://datatracker.ietf.org/doc/html/rfc4664#section-2.1
[17] https://www.peeringdb.com/net/2009 - AS30041 - Race Communications - PeeringDB



Over time, Race has meticulously developed and refined route maps, applying them to route distribution protocols to ensure optimal network performance. These route maps are in a constant state of evolution, mirroring the dynamic and ever-changing nature of the internet, much like the perpetual motion of the ocean.

Within the Race Core Routing Network, traffic is routed to a multitude of paid transit, public / private peering. Public and private peering is done with minimum port speeds of 100G where traffic is distributed amongst all links using BGP4 routing tables. Internet traffic is very much like traffic on a highway, one must be prepared for the unknown and congestion and shifting of traffic around is part of the day-to-day operation of keeping a network operating.

The following is the list of Race's Paid Transit and Internet Exchange Points:

Carrier	**Type**
Zayo Group	Paid Transit
Arelion (Telia Carrier)	Paid Transit
GTT	Paid Transit
Astound	Paid Transit
Any2 Exchange[18]	Internet Exchange
Equinix IX[19]	Internet Exchange

The following is the list of Race's Direct BGP Peers

Peer Name	AS Num	Data Center	Peer Name	AS Num	Data Center
AKAMAI ANY2WEST IPV4 SESSION 1	AS20940	LSANCARC	TELIA ANY2WEST IPV4	AS1299	LSANCARC
AKAMAI ANY2WEST IPV4 SESSION 2	AS20940	LSANCARC	TELIA ANY2WEST IPV6	AS1299	LSANCARC
AKAMAI IPV4 SESSION 1	AS20940	SNJSCASV	TENCENT ANY2WEST IPV6	AS132203	LSANCARC
AKAMAI IPV4 SESSION 2	AS20940	SNJSCASV	TENCENT IPV4	AS132203	SNJSCASV
AKAMAI IPV6 SESSION 1	AS20940	LSANCARC	TENCENT IPV4 ANY2WEST	AS132203	LSANCARC
AKAMAI IPV6 SESSION 1	AS20940	SNJSCASV	TENCENT IPV6	AS132203	SNJSCASV
AKAMAI IPV6 SESSION 2	AS20940	LSANCARC	THE FUSION NETWORK ANY2WEST IPV4	AS19754	LSANCARC
AKAMAI IPV6 SESSION 2	AS20940	SNJSCASV	TRANSTELCO ANY2 PEERING	AS32098	LSANCARC
AMAZON ANY2WEST IPV4 SESSION 1	AS16509	LSANCARC	TRANSTELCO ANY2WEST IPV6	AS32098	LSANCARC
AMAZON ANY2WEST IPV4 SESSION 2	AS16509	LSANCARC	TSI ANY2WEST IPV4	AS30188	LSANCARC
ANY2 ROUTE SERVERS IPV4 SESSION 1	AS19996	LSANCARC	TWITCH ANY2WEST IPV4 SESSION 1	AS46489	LSANCARC

[18] https://www.coresite.com/solutions/interconnection/peering-exchanges/any2-internet-peering-exchange
[19] https://ix.equinix.com/home/

ANY2EASY ROUTE SERVER	AS19996	LSANCARC	TWITCH ANY2WEST IPV4 SESSION 2	AS46489	LSANCARC
ANY2EASY ROUTE SERVER_2	AS19996	LSANCARC	TWITCH ANY2WEST IPV6 SESSION 1	AS46489	LSANCARC
APPLE ANY2WEST IPV4 SESSION 1	AS714	LSANCARC	TWITCH ANY2WEST IPV6 SESSION 2	AS46489	LSANCARC
APPLE ANY2WEST IPV4 SESSION 2	AS714	LSANCARC	YAHOO ANY2WEST IPV4 SESSION 1	AS10310	LSANCARC
APPLE ANY2WEST IPV6 SESSION 1	AS714	LSANCARC	YAHOO ANY2WEST IPV4 SESSION 2	AS10310	LSANCARC
APPLE ANY2WEST IPV6 SESSION 2	AS714	LSANCARC	YAHOO ANY2WEST IPV6 SESSION 1	AS10310	LSANCARC
APPLE IPV4	AS714	SNJSCASV	YAHOO ANY2WEST IPV6 SESSION 2	AS10310	LSANCARC
APPLE IPV6	AS714	SNJSCASV	YAHOO! IPV4	AS10310	SNJSCASV
ARELION IPV4	AS1299	SNJSCASV	YAHOO! IPV4	AS10310	SNJSCASV
ARELION IPV6	AS1299	SNJSCASV	YAHOO! IPV6	AS10310	SNJSCASV
ASTOUND IPV4	AS11404	SNFCCAMM	YAHOO! IPV6	AS10310	SNJSCASV
ASTOUND IPV6	AS11404	SNFCCAMM	ZAYO IPV4	AS6461	SNFCCAMM
ATLANTIC METRO ANY2WEST IPV4 SESSION 1	AS29838	LSANCARC	ZAYO IPV4	AS6461	SNFCCAMM
ATLANTIC METRO ANY2WEST IPV4 SESSION 2	AS29838	LSANCARC	ZSCALER IPV4	AS22616	SNJSCASV
ATLANTIC METRO ANY2WEST IPV6 SESSION 1	AS29838	LSANCARC	ZSCALER IPV4	AS22616	SNJSCASV
ATLANTIC METRO ANY2WEST IPV6 SESSION 2	AS29838	LSANCARC	EQUINIX SV5 ROUTE COLLECTOR	AS30041	SNJSCASV
BLIZZARD IPV4	AS57976	SNJSCASV	FASTLY ANY2WEST IPV4 SESSION 1	AS54113	LSANCARC
BLIZZARD IPV6	AS57976	SNJSCASV	FASTLY ANY2WEST IPV4 SESSION 2	AS54113	LSANCARC
CATO ANY2WEST IPV4	AS13150	LSANCARC	FASTLY IPV6 SESION 1	AS54113	LSANCARC
CHINA MOBILE ANY2 PEERING	AS58453	LSANCARC	FASTLY IPV6 SESION 2	AS54113	LSANCARC
CIRA ANY2WEST IPV4	AS55195	LSANCARC	GOOGLE ANY2WEST IPV4	AS15169	LSANCARC
CIRA ANY2WEST IPV6	AS55195	LSANCARC	GOOGLE IPV4	AS15169	SNJSCASV
CITYLINK TELECOM ANY2 PEERING	AS7850	LSANCARC	GOOGLE IPV6	AS15169	SNJSCASV
CLOUDFLARE IPV4	AS13335	SNJSCASV	GOOGLE PNI IPV4	AS15169	LSANCARC
CLOUDFLARE IPV6	AS13335	SNJSCASV	GOOGLE PNI IPV4	AS15169	SNJSCASV
DIGITALOCEAN IPV4	AS14061	SNJSCASV	GOOGLE PNI IPV4 ANY2WEST	AS15169	LSANCARC
DIGITALOCEAN IPV6	AS14061	SNJSCASV	GOOGLE PNI IPV6	AS15169	LSANCARC
DROPBOX IPV4	AS19679	SNJSCASV	GOOGLE PNI IPV6	AS15169	SNJSCASV
DROPBOX IPV6	AS19679	SNJSCASV	GOOGLE PNI IPV6 ANY2WEST	AS15169	LSANCARC
EBAY IPV4	AS62955	SNJSCASV	GTT	AS3257	SNJSCASV
EBAY IPV6	AS62955	SNJSCASV	GTT IPV6	AS3257	SNJSCASV
EDGECAST ANY2WEST IPV4 SESSION 1	AS15133	LSANCARC	HURRICANE ELECTRIC ANY2WEST IPV4	AS6939	LSANCARC
EDGECAST ANY2WEST IPV4 SESSION 2	AS15133	LSANCARC	HURRICANE ELECTRIC ANY2WEST IPV6	AS6939	LSANCARC
EDGECAST ANY2WEST IPV6 SESSION 1	AS15133	LSANCARC	HURRICANE IPV4	AS6939	SNJSCASV
EDGECAST ANY2WEST IPV6 SESSION 2	AS15133	LSANCARC	HURRICANE IPV6	AS6939	SNJSCASV
EDGECAST IPV4	AS15133	SNJSCASV	I3D.NET IPV4	AS49544	SNJSCASV
EDGECAST IPV6	AS15133	SNJSCASV	I3D.NET IPV6	AS49544	SNJSCASV
EDGIO ANY2WEST IPV4 SESSION	AS22822	LSANCARC	INFORELAY_WEST_2 ANY2 PEERING	AS33597	LSANCARC
EDGIO ANY2WEST IPV6 SESSION	AS22822	LSANCARC	INTELIQUENT BGP IPV4	AS40160	LSANCARC
EDGIO IPV4	AS22822	SNJSCASV	INTERACTIVE3D ANY2WEST IPV4	AS49544	LSANCARC
EDGIO IPV6	AS22822	SNJSCASV	INTERACTIVE3D ANY2WEST IPV6	AS49544	LSANCARC
EQUINIX SV5 ROUTE COLLECTOR	AS30041	SNJSCASV	IXREACH BSO ANY2WEST IPV4	AS4455	LSANCARC
FASTLY ANY2WEST IPV4 SESSION 1	AS54113	LSANCARC	IXREACH BSO ANY2WEST IPV6	AS4455	LSANCARC
FASTLY ANY2WEST IPV4 SESSION 2	AS54113	LSANCARC	KENTIK	AS30041	SNJSCASV
FASTLY IPV6 SESION 1	AS54113	LSANCARC	KENTIK	AS30041	SNJSCASV

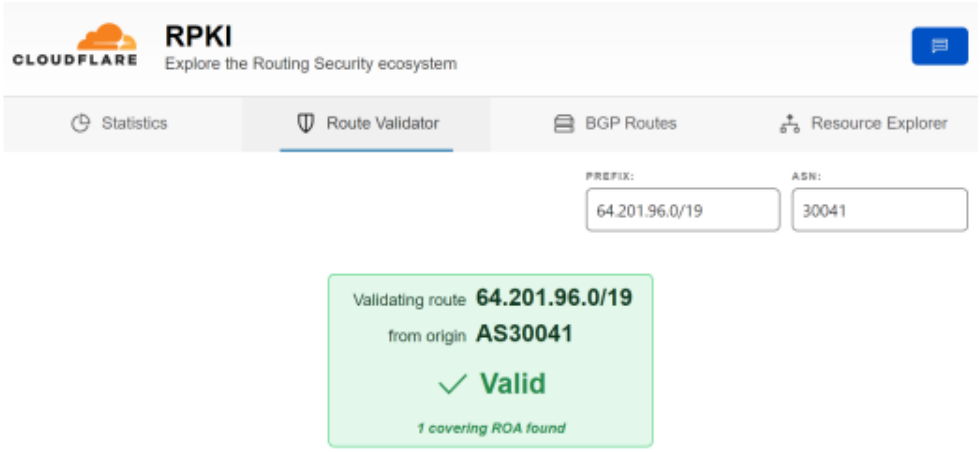
FASTLY IPV6 SESION 2	AS54113	LSANCARC	KENTIK ANY2WEST IPV4	AS30041	LSANCARC
GOOGLE ANY2WEST IPV4	AS15169	LSANCARC	KENTIK ANY2WEST IPV6	AS30041	LSANCARC
GOOGLE IPV4	AS15169	SNJSCASV	KENTIK IPV6	AS30041	SNFCCAMM
GOOGLE IPV6	AS15169	SNJSCASV	KENTIK IPV6	AS30041	SNJSCASV
GOOGLE PNI IPV4	AS15169	LSANCARC	KENTIK ROUTE-REFLECTOR-CLIENT	AS30041	LSANCARC
GOOGLE PNI IPV4	AS15169	SNJSCASV	LINODE IPV4	AS63949	SNJSCASV
GOOGLE PNI IPV4 ANY2WEST	AS15169	LSANCARC	LINODE IPV6	AS63949	SNJSCASV
GOOGLE PNI IPV6	AS15169	LSANCARC	LOSNETTOS ANY2WEST IPV4	AS226	LSANCARC
GOOGLE PNI IPV6	AS15169	SNJSCASV	LSCANCARC-RR2	AS30041	SNJSCASV
GOOGLE PNI IPV6 ANY2WEST	AS15169	LSANCARC	LSCANCARC-RR2	AS30041	SNJSCASV
GTT	AS3257	SNJSCASV	META ANY2WEST IPV4 SESSION 1	AS32934	LSANCARC
GTT IPV6	AS3257	SNJSCASV	META ANY2WEST IPV4 SESSION 2	AS32934	LSANCARC
HURRICANE ELECTRIC ANY2WEST IPV4	AS6939	LSANCARC	META IPV4 SESSION 1	AS32934	SNJSCASV
HURRICANE ELECTRIC ANY2WEST IPV6	AS6939	LSANCARC	META IPV4 SESSION 2	AS32934	SNJSCASV
HURRICANE IPV4	AS6939	SNJSCASV	META IPV6 SESSION 1	AS32934	LSANCARC
HURRICANE IPV6	AS6939	SNJSCASV	META IPV6 SESSION 1	AS32934	SNJSCASV
I3D.NET IPV4	AS49544	SNJSCASV	META IPV6 SESSION 2	AS32934	LSANCARC
I3D.NET IPV6	AS49544	SNJSCASV	META IPV6 SESSION 2	AS32934	SNJSCASV
INFORELAY_WEST_2 ANY2 PEERING	AS33597	LSANCARC	MICRON21 ANY2 PEERING	AS38880	LSANCARC
INTELIQUENT BGP IPV4	AS40160	LSANCARC	MICROSOFT ANY2WEST IPV4 SESSION 1	AS8075	LSANCARC
INTERACTIVE3D ANY2WEST IPV4	AS49544	LSANCARC	MICROSOFT ANY2WEST IPV4 SESSION 2	AS8075	LSANCARC
INTERACTIVE3D ANY2WEST IPV6	AS49544	LSANCARC	MICROSOFT SVS IPV4 SESSION 1	AS8075	SNJSCASV
IXREACH BSO ANY2WEST IPV4	AS4455	LSANCARC	MICROSOFT SVS IPV4 SESSION 2	AS8075	SNJSCASV
IXREACH BSO ANY2WEST IPV6	AS4455	LSANCARC	MICROSOFT SVS IPV6 SESSION 1	AS8075	SNJSCASV
KENTIK	AS30041	SNJSCASV	MICROSOFT SVS IPV6 SESSION 2	AS8075	SNJSCASV
KENTIK	AS30041	SNJSCASV	NETFLIX ANY2WEST IPV4 SESSION 1	AS2906	LSANCARC
KENTIK ANY2WEST IPV4	AS30041	LSANCARC	NETFLIX ANY2WEST IPV4 SESSION 2	AS2906	LSANCARC
KENTIK ANY2WEST IPV6	AS30041	LSANCARC	NETFLIX ANY2WEST IPV6 SESSION 1	AS2906	LSANCARC
KENTIK IPV6	AS30041	SNFCCAMM	NETFLIX ANY2WEST IPV6 SESSION 2	AS2906	LSANCARC
KENTIK IPV6	AS30041	SNJSCASV	NETFLIX IPV4 SESSION 1	AS2906	SNJSCASV
KENTIK ROUTE-REFLECTOR-CLIENT	AS30041	LSANCARC	NETFLIX IPV4 SESSION 2	AS2906	SNJSCASV
LINODE IPV4	AS63949	SNJSCASV	NETFLIX IPV6 SESSION 1	AS2906	SNJSCASV
LINODE IPV6	AS63949	SNJSCASV	NETFLIX IPV6 SESSION 2	AS2906	SNJSCASV
LOSNETTOS ANY2WEST IPV4	AS226	LSANCARC	OVHCLOUD IPV4	AS16276	SNJSCASV
LSCANCARC-RR2	AS30041	SNJSCASV	OVHCLOUD IPV6	AS16276	SNJSCASV
LSCANCARC-RR2	AS30041	SNJSCASV	PATH NETWORK IPV4	AS396998	SNJSCASV
META ANY2WEST IPV4 SESSION 1	AS32934	LSANCARC	PATH NETWORK IPV6	AS396998	SNJSCASV
META ANY2WEST IPV4 SESSION 2	AS32934	LSANCARC	QUADRANET ANY2WEST IPV4	AS8100	LSANCARC
META IPV4 SESSION 1	AS32934	SNJSCASV	QUADRANET ANY2WEST IPV6	AS8100	LSANCARC
META IPV4 SESSION 2	AS32934	SNJSCASV	QWILT ANY2WEST IPV4	AS20253	LSANCARC
META IPV6 SESSION 1	AS32934	LSANCARC	QWILT ANY2WEST IPV6	AS20253	LSANCARC
META IPV6 SESSION 1	AS32934	SNJSCASV	RIOT GAMES ANY2WEST IPV4	AS6507	LSANCARC
META IPV6 SESSION 2	AS32934	LSANCARC	ROBLOX ANY2WEST IPV4 SESSION 1	AS22697	LSANCARC
META IPV6 SESSION 2	AS32934	SNJSCASV	ROBLOX ANY2WEST IPV4 SESSION 2	AS22697	LSANCARC
MICRON21 ANY2 PEERING	AS38880	LSANCARC	ROBLOX ANY2WEST IPV6 SESSION 1	AS22697	LSANCARC

MICROSOFT ANY2WEST IPV4 SESSION 1	AS8075	LSANCARC	ROBLOX ANY2WEST IPV6 SESSION 2	AS22697	LSANCARC
MICROSOFT ANY2WEST IPV4 SESSION 2	AS8075	LSANCARC	ROBLOX IPV4	AS22697	SNJSCASV
MICROSOFT SV5 IPV4 SESSION 1	AS8075	SNJSCASV	ROBLOX IPV4	AS22697	SNJSCASV
MICROSOFT SV5 IPV4 SESSION 2	AS8075	SNJSCASV	ROBLOX IPV6	AS22697	SNJSCASV
MICROSOFT SV5 IPV6 SESSION 1	AS8075	SNJSCASV	ROBLOX IPV6	AS22697	SNJSCASV
MICROSOFT SV5 IPV6 SESSION 2	AS8075	SNJSCASV	ROUTE SERVERS IPV4 SESSION 2	AS19996	LSANCARC
NETFLIX ANY2WEST IPV4 SESSION 1	AS2906	LSANCARC	SALESFORCE IPV4	AS14340	SNJSCASV
NETFLIX ANY2WEST IPV4 SESSION 2	AS2906	LSANCARC	SALESFORCE IPV6	AS14340	SNJSCASV
NETFLIX ANY2WEST IPV6 SESSION 1	AS2906	LSANCARC	SONIC IPV4	AS7065	SNJSCASV
NETFLIX ANY2WEST IPV6 SESSION 2	AS2906	LSANCARC	SONIC IPV6	AS7065	SNJSCASV
NETFLIX IPV4 SESSION 1	AS2906	SNJSCASV	SONIC TELECOM IPV4	AS46375	SNJSCASV
NETFLIX IPV4 SESSION 2	AS2906	SNJSCASV	SONY ANY2WEST IPV4 SESSION 1	AS33353	LSANCARC
NETFLIX IPV6 SESSION 1	AS2906	SNJSCASV	SONY ANY2WEST IPV4 SESSION 2	AS33353	LSANCARC
NETFLIX IPV6 SESSION 2	AS2906	SNJSCASV	SONY IPV4	AS33353	SNJSCASV
OVHCLOUD IPV4	AS16276	SNJSCASV	SONY IPV6	AS33353	SNJSCASV
OVHCLOUD IPV6	AS16276	SNJSCASV	STACKPATH IPV4 SESSION 1	AS33438	LSANCARC
PATH NETWORK IPV4	AS396998	SNJSCASV	STACKPATH IPV4 SESSION 2	AS33438	LSANCARC
PATH NETWORK IPV6	AS396998	SNJSCASV	STACKPATH IPV6 SESSION 1	AS33438	LSANCARC
QUADRANET ANY2WEST IPV4	AS8100	LSANCARC	STACKPATH IPV6 SESSION 2	AS33438	LSANCARC
QUADRANET ANY2WEST IPV6	AS8100	LSANCARC	SUDJAM ANY2 PEERING	AS19740	LSANCARC
QWILT ANY2WEST IPV4	AS20253	LSANCARC	SV5-IX IPV4	AS65517	SNJSCASV
QWILT ANY2WEST IPV6	AS20253	LSANCARC	SV5-IX IPV6	AS65517	SNJSCASV
RIOT GAMES ANY2WEST IPV4	AS6507	LSANCARC	SV5-IX-RS1 IPV4	AS24115	SNJSCASV
ROBLOX ANY2WEST IPV4 SESSION 1	AS22697	LSANCARC	SV5-IX-RS2 IPV4	AS24115	SNJSCASV
ROBLOX ANY2WEST IPV4 SESSION 2	AS22697	LSANCARC	TELIA ANY2WEST IPV4	AS1299	LSANCARC
ROBLOX ANY2WEST IPV6 SESSION 1	AS22697	LSANCARC	TELIA ANY2WEST IPV6	AS1299	LSANCARC
ROBLOX ANY2WEST IPV6 SESSION 2	AS22697	LSANCARC	TENCENT ANY2WEST IPV6	AS132203	LSANCARC
ROBLOX IPV4	AS22697	SNJSCASV	TENCENT IPV4	AS132203	SNJSCASV
ROBLOX IPV4	AS22697	SNJSCASV	TENCENT IPV4 ANY2WEST	AS132203	LSANCARC
ROBLOX IPV6	AS22697	SNJSCASV	TENCENT IPV6	AS132203	SNJSCASV
ROBLOX IPV6	AS22697	SNJSCASV	THE FUSION NETWORK ANY2WEST IPV4	AS19754	LSANCARC
ROUTE SERVERS IPV4 SESSION 2	AS19996	LSANCARC	TRANSTELCO ANY2 PEERING	AS32098	LSANCARC
SALESFORCE IPV4	AS14340	SNJSCASV	TRANSTELCO ANY2WEST IPV6	AS32098	LSANCARC
SALESFORCE IPV6	AS14340	SNJSCASV	TSI ANY2WEST IPV4	AS30188	LSANCARC
SONIC IPV4	AS7065	SNJSCASV	TWITCH ANY2WEST IPV4 SESSION 1	AS46489	LSANCARC
SONIC IPV6	AS7065	SNJSCASV	TWITCH ANY2WEST IPV4 SESSION 2	AS46489	LSANCARC
SONIC TELECOM IPV4	AS46375	SNJSCASV	TWITCH ANY2WEST IPV6 SESSION 1	AS46489	LSANCARC
SONY ANY2WEST IPV4 SESSION 1	AS33353	LSANCARC	TWITCH ANY2WEST IPV6 SESSION 2	AS46489	LSANCARC
SONY ANY2WEST IPV4 SESSION 2	AS33353	LSANCARC	YAHOO ANY2WEST IPV4 SESSION 1	AS10310	LSANCARC
SONY IPV4	AS33353	SNJSCASV	YAHOO ANY2WEST IPV4 SESSION 2	AS10310	LSANCARC
SONY IPV6	AS33353	SNJSCASV	YAHOO ANY2WEST IPV6 SESSION 1	AS10310	LSANCARC
STACKPATH IPV4 SESSION 1	AS33438	LSANCARC	YAHOO ANY2WEST IPV6 SESSION 2	AS10310	LSANCARC
STACKPATH IPV4 SESSION 2	AS33438	LSANCARC	YAHOO! IPV4	AS10310	SNJSCASV
STACKPATH IPV6 SESSION 1	AS33438	LSANCARC	YAHOO! IPV4	AS10310	SNJSCASV
STACKPATH IPV6 SESSION 2	AS33438	LSANCARC	YAHOO! IPV6	AS10310	SNJSCASV

SUDJAM ANY2 PEERING	AS19740	LSANCARC	YAHOO! IPV6	AS10310	SNJSCASV
SV5-IX IPV4	AS65517	SNJSCASV	ZAYO IPV4	AS6461	SNFCCAMM
SV5-IX IPV6	AS65517	SNJSCASV	ZAYO IPV4	AS6461	SNFCCAMM
SV5-IX-RS1 IPV4	AS24115	SNJSCASV	ZSCALER IPV4	AS22616	SNJSCASV
SV5-IX-RS2 IPV4	AS24115	SNJSCASV	ZSCALER IPV4	AS22616	SNJSCASV

Race provides both IPv4 and IPv6 addresses for all subscribers, ensuring a broad and versatile connectivity range. Additionally, Race adheres to RPKI (Resource Public Key Infrastructure) compliance, enhancing the security and integrity of the internet routing infrastructure by validating the authenticity of the route announcements.

RPKI Example Query Below



Covering ROAs:

Trust Anchor	Prefix	Max Length	ASN	Expiration	Match
ARIN	64.201.96.0/19	24	30041	in 2 months	✓

The RPKI Portal is made available solely for informational purposes.

Race currently deploys Arista Series Routers. Race currently uses the following standard routing protocols for route distribution.

1. IETF RFC-4271 Border Gateway Protocol 4[20] (BGP). Race utilizes BGP4 for exchanging routes between external autonomous system (AS) such as transit and peers using the Exterior Border Gateway Protocol (eBGP) as well as Internal Border Gateway

[20] https://tools.ietf.org/html/rfc4271

Protocol (iBGP) for exchanging those external routes between internal routers within the Race AS (AS30041[21]). Both eBGP and iBGP are functions of BGP4.

2. Intermediate System to Intermediate System (IS-IS) Intra-domain Routing Protocol, as specified in RFC-1142[22] and ISO Draft Proposal 10589. IS-IS is a method used by network devices, such as routers, to exchange information about the structure of a network. This protocol facilitates the efficient and reliable routing of information within a network by ensuring all devices are aware of the network's layout.

Voice

Race maintains a direct interconnection with the Public Switched Telephone Network (PSTN) through traditional Time-Division Multiplexing (TDM) technology. In response to the evolving landscape of voice services towards packet-based technology, Race has proactively established redundant Session Initiation Protocol (SIP) Trunks with a number of prominent Voice Carriers, including:

- AT&T
- Verizon
- Sinch (formerly Inteliquent)
- ThinQ
- Aperion
- Bandwidth.com

This setup ensures our voice services are both robust and reliable, keeping you connected in the digital age.

Race prioritizes quality over price, and the company has discovered that by reducing the use of Least Cost Routing (LCR) has greatly decreased support related calls, ultimately providing a better user experience.

Race currently deploys MetaSwitch Call Feature Server (CFS) which provides all Class 5 Features as well as a MetaSwitch Media Gateway for converting all Legacy TDM circuits (T1/DS3) to packet-based voice. As of recent Race has replaced it's Acme Packet Session Border Controller (SBC) with a MetaSwitch Perimeta SBC, for all SIP Trucking.

Race takes advantage of the following protocols for the delivery of voice services.

1. IETF RFC-3435[23] Media Gateway Control Protocol (MGCP) Version 1.0. Race utilizes MGCP as its protocol of choice for deployment of POTS lines deployed off Calix ONT's.

[21] https://www.peeringdb.com/net/2009 - AS30041 - Race Communications - PeeringDB
[22] https://datatracker.ietf.org/doc/html/rfc1142
[23] https://tools.ietf.org/html/rfc3435

2. IETP RFC-3261[24] Session Initiation Protocol (SIP). Race utilizes SIP for delivery of SIP Trunks to end customers and external carrier interconnect for both origination and terminating of voice traffic.

3. ITU Q-Series Recommendations[25] Integrated Services User Part (ISUP). Race utilizes ISUP to setup up phone calls in the public switched telephone network (PSTN).

4. ITU-T I.431[26] Primary Rate Interface (PRI). Race utilizes PRIs for delivery of voice Trunk Services over Integrated Services Digital Network (ISDN).

[24] https://tools.ietf.org/html/rfc3261
[25] https://www.itu.int/rec/T-REC-Q/en/
[26] https://www.itu.int/rec/T-REC-I.431/en

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SECTION APPENDIX F – ZAYO

Proposal Prepared for:

RFEI No. 2025.001 CVAG Broadband Network Deployment

Coachella Valley Association of Governments (CVAG)

Executive Proposal - CONFIDENTIAL

Zayo Group
1821 30th Street, Unit A
Boulder, CO 80301



Response Due: April 9, 2025
Submitted by:
ZeeAnn Kane, Account Director
(505) 450-2027 (Mobile)
zeeann.kane@zayo.com

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Disclaimer: The information, illustrations, maps, and other images contained herein is representative of Zayo's networks in general terms and should not be relied on or treated as a substitute for specific information relevant to particular circumstances. Although we make reasonable efforts to update this information, we make no representations, warranties or guarantees, whether express or implied, that the content is accurate, complete or up-to-date. Any reliance you place on such material is strictly at your own risk.

Notwithstanding anything in this Request For Expressions of Interest (RFEI) to the contrary, and except as to pricing, any requirements to meet state and federal law, and governing law, if Zayo is selected to provide the services contained in this response, The Coachella Valley Association of Governments and Zayo agree to negotiate the terms and conditions of an agreement governing the services awarded to Zayo. In the event that Zayo and Customer are unable to mutually agree and execute an Agreement, the services shall be governed by Zayo's standard form MSA and Service Schedule.

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Cover Letter

April 9, 2025

The Coachella Valley Association of Governments
c/o HR Green
Attn: Monika Kazmierski
monika.kazmierski@hrgreen.com

RE: The Coachella Valley Association of Governments Request for Expressions of Interest (RFEI) for Broadband Network Deployment

Dear Monika:

The Zayo Group ("Zayo") appreciates the opportunity to provide The Coachella Valley Association of Governments ("CVAG") with a comprehensive response to its RFEI for Broadband Network Deployment. Zayo has a strong interest in working closely with the City to realize its specific objective to expand broadband services in the City's unserved and underserved areas. We have an industry-leading team of experts with experience working with state, county, and city governments across the US on broadband middle mile infrastructure and digital equity expansion projects.

As an introduction, Zayo is a company with proven success in delivering middle-mile fiber solutions across the nation. Zayo collaborates with local, state and federal entities to ensure long-term sustainability and economic viability through numerous models, including revenue-share agreements and shared infrastructure agreements. By deploying a unique middle-mile architecture, Zayo lowers barriers for Internet Service Providers (ISPs) by offering pre-provisioned backhaul and standard pricing, making it easier for smaller providers to expand last-mile connectivity.

Should you have any questions about our proposal, please feel free to contact any of us on your dedicated core account team:

Zayo Group – Main Proposal Contacts		
Main Contact at Zayo	**Technical Contact at Zayo**	**Funding Contact at Zayo**
ZeeAnn Kane Sr. Account Director ZeeAnn.Kane@zayo.com (505) 450-2027	**Fitzcurby Bent** Sr. Solutions Engineer Fitzcurby.Bent@zayo.com (925) 565-4133	**Mark Allen** PM, Government Stimulus Mark.Allen@zayo.com (720) 335-8526

Sincerely,
ZeeAnn Kane
ZeeAnn Kane
Sr. Account Director

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Executive Summary

Zayo is grateful for the opportunity to submit a response to the CVAG's RFEI for Broadband Network Deployment. Zayo has a strong interest in supporting the CVAG's goal to bridge the digital divide and provide broadband middle-mile fiber infrastructure to serve underserved households, community anchor institutions and local government facilities. Zayo can develop and deploy municipal fiber ring(s) and a ubiquitous broadband network throughout the City to reach unserved and underserved areas. Zayo will be responsible for the design, construction, operation, maintenance, and commercialization of the fiber infrastructure.

We deliver and support an array of services and solutions, giving Zayo ISP partners the option of managing their own network or subscribing to a lit service where technologies run atop our fiber. As the City's network requirements evolve, be assured that Zayo's full suite of industry-leading networking services will enable the City to pivot in whichever direction is required.

Why Zayo?

At Zayo, we are dedicated to addressing the challenges of connecting middle-mile infrastructure to all American communities. Our Broadband Infrastructure Deployment Alliance program (zBIDA) offers comprehensive support to ISPs like you, helping you access and utilize federal and state funds for successful partnerships and last-mile project execution.

We are at a critical moment in our efforts to bridge the digital divide in our country. Our goal is to assist you in expanding affordable, accessible, and reliable broadband access to ensure that unserved and underserved communities can enjoy economic growth, improved education, and an overall better quality of life. Zayo's mission is to connect what's next, and that includes everyone.

Zayo has a strong track record in expanding middle-mile broadband infrastructure and leveraging public grant funding to deliver scalable and financially sustainable solutions. In 2023, Zayo was awarded $92.9 million through the NTIA Middle Mile Grant Program to support projects across eight states, covering over 2,100 route miles. These initiatives targeted unserved and underserved areas, using socio-economic indicators to prioritize connectivity needs. A notable example is the Prineville-Reno Fiber-Optic Project, which utilized existing conduit infrastructure to enhance redundancy and reliability for communities facing limited bandwidth options. Additionally, Zayo received $153 million for the Nevada Middle Mile Network, spanning over 800 miles and connecting more than 40,000 underserved locations while supporting AI data center hubs in Reno and Las Vegas.

Zayo's ability to utilize existing conduit infrastructure further strengthens its suitability for middle-mile projects. The company has experience populating conduits with fiber and commercializing them effectively, as demonstrated in and Boulder. This approach reduces construction costs, accelerates deployment timelines, and integrates seamlessly into local infrastructure plans. In Boulder, Zayo partnered with the city to lease unused conduits while installing new fiber and additional conduit for municipal use. This collaborative model aligns well with revenue-sharing agreements and ensures long-term sustainability.

By combining expertise in middle-mile network development, effective use of existing infrastructure, and innovative architectures like the Digital Equity Access Network (DEAN), Zayo is well-positioned to address regional connectivity challenges while maximizing the impact of public grant funding.

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Detailed Responses to RFEI Areas of Opportunity

Part 1: Broadband Network Expansion - Plans to add or expand broadband infrastructure in the Coachella Valley

Zayo Response:

Zayo is interested in expanding into Coachella Valley and considers itself to be the "carrier of carriers" as the underlying provider for hundreds of regional telecoms, carriers, and cable companies. Today, Zayo coordinates, through a dedicated business unit, with many California-based ISPs to ensure successful deployments on projects similar to the one described in this proposal. Additionally, the Government Stimulus team at Zayo was created with the specific purpose of developing partnerships with regional and local carriers under the Zayo Broadband Infrastructure Development Alliance program (zBIDA).

Zayo's Digital Equity Access Network (DEAN) is the architecture that gives ISPs a plug-and-play way to connect to Zayo's middle mile networks and plus pre-provisioned, dedicated fiber backhaul. This lowers the cost for ISPs to build out desperately needed middle mile networks.

For carriers, this means it will be more cost-effective to extend their last-mile connections into previously under-connected communities, addressing the most common barrier to entry. These connections are critical in getting faster, better-performing, cost-optimized Internet connectivity to under-connected homes and businesses.

Today, Zayo is deploying a unique network architecture in eight states alongside our government partners at the federal, state, and county levels. Zayo's Digital Equity Access Network (DEAN) uses packet and Wavelength equipment installed at Intermediate Line Amplifier (ILA) sites, creating a robust packet layer along the fiber route. Zayo's architecture introduces multiple access points including ILAs and handholds, serving as physical on-ramps for ISPs to interconnect with Zayo's middle-mile network. Zayo can deploy these access points on an on-demand or through careful selection based on published eligible addresses within the City.

Key Features of the Digital Equity Access Network (DEAN):

- **Accessibility:** Make-ready access points exist for packet services from the nearest Intermediate Line Amplifier (ILA), providing the physical on-ramp to interconnect with our middle-mile network. Important to the DEAN design is the availability of a common location where access ramps provide up to a 100G Wavelength backhaul optical solution.
- **Affordability**: DEAN lowers the barrier to entry for rural ISPs to build last-mile FTTH by providing pre-provisioned, dedicated fiber backhaul and competitive IP pricing that matches metro fiber rates.
- **Flexibility:** DEAN allows Zayo to increase the number of access points and reduce the fiber miles needed to construct to reach Zayo's middle-mile network, aiding in cost-effective expansion in unserved and underserved areas.
- **Scalability:** DEAN will support future growth, improving connectivity for anchor institutions and fostering local business development with future-proof broadband.

Zayo will provide competitive rates to carriers in the City to standardize middle-mile costs. This will reduce last-mile ISP deployment costs with the intent of cost-savings being passed on to all residents, including those at eligible low-income addresses. This will enable the ISPs to offer affordable internet to the lower-income

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communities in Coachella Valley. Due to the key features mentioned above, the deployment of DEAN ensures a future-proof and resilient network that will support population growth and economic development.

The installation of an open-access middle-mile network will provide other benefits to the City. Zayo will identify Community Anchor Institutions (CAIs) and commercial enterprises in the City that would benefit from an increased network footprint. Finally, Zayo will leverage our expertise in navigating the needs and nuances of educational intuitions in the City. As the largest E-rate service provider, Zayo connects over 19,000 K-12 schools across the U.S.

In the above section, Zayo described the DEAN. Below is the proposed associated rate card that will be made available to last-mile ISPs in the City of Coachella Valley.

Service Options - Rate Card Sample Pricing:

Carrier Grade Ethernet Bandwidth:

- 100G Term: 36 to 60 months
- Monthly Recurring Charge (MRC): $5,500 to $7,000
- Non-Recurring Charge (NRC) $10,000 Pricing is based on both the ALOC and ZLOC falling on the route

IP Bandwidth:

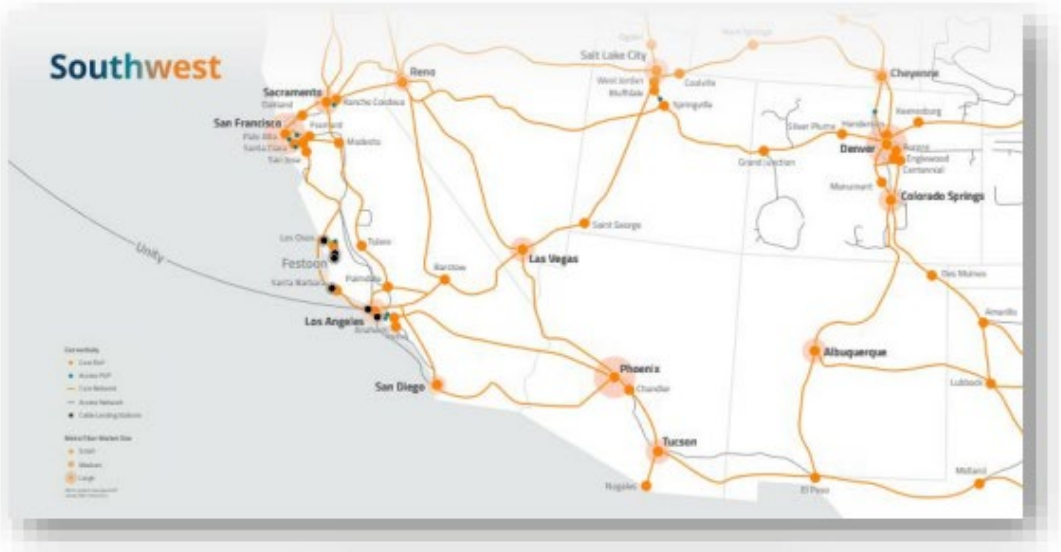
- 10G Term: 36 to 60 months
- MRC: Price : 36mo: $2,200 | 60mo: $2,000
- NRC: $2,500 Pricing is based on 50% committed information rate w/ bursting charges to apply

* Note: Service options are subject to Zayo Board approval.

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As the largest independent fiber provider in North America, Zayo has the fiber expertise, financial means, operational experience, and solutions required to design and deliver robust middle-mile fiber infrastructure and an exceptional networking experience to the City. In the Coachella Valley area, Zayo is planning to grow its already substantial investment in our fiber footprint in Southern California (see fiber map below).

Zayo California & Southwest Fiber Map





Gaps in middle-mile infrastructure have created unique challenges for local ISPs to enable affordable last-mile services in non-metropolitan communities. The lack of robust broadband infrastructure also deters large

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enterprises from establishing themselves in these locations. This cycle results in higher per-capita broadband costs that remain high without competitive pressures to lower prices.

Part 2: Grant Applications – Assistance with grant submissions, including local government support for BEAD applications.

Zayo Response:

Zayo's Broadband Infrastructure Deployment Alliance (zBIDA) program is well-positioned to support local governments and ISPs in navigating the complexities of BEAD funding applications. With extensive experience in securing over $300 million in federal and state funding, Zayo offers comprehensive assistance throughout the grant submission process. This includes helping applicants craft compelling network narratives, align with national strategic partners, plan budgets, and ensure compliance with government regulations. By leveraging its expertise and established relationships with over 860 carriers globally, Zayo provides a strong foundation for successful BEAD applications.

Zayo's zBIDA program also enables applicants to demonstrate financial, technical, and organizational capacity—key requirements for BEAD eligibility. The company can assist with securing letters of credit (LOC) proportional to grant funding and provide access to its robust financing ecosystem. Additionally, Zayo's partnerships with leading manufacturers like Ciena ensure reliable network solutions that meet technical compliance standards.

Zayo is dedicated to helping communities thrive by securing essential government funding. Zayo's involvement in government programs such as the Broadband and Cellular Expansion, Broadband Equity, Access, and Deployment (BEAD), and the National Telecommunications and Information Administration (NTIA) aims to bridge the digital gap of unequal access for individuals living in underserved areas.

The middle mile, which connects local networks to the Internet backbone, is the 'missing piece' in remote and rural connectivity. Last-mile connectivity is only as good as the middle-mile connectivity behind it. In other words, if last-mile fiber is connected to copper middle-mile infrastructure, customers will still experience latency and packet loss.

Presently, Zayo proudly serves many of California's most significant residential ISPs, utilities, wireless carriers, data centers, and an array of enterprises, reflecting our enduring commitment to the State's diverse and dynamic telecommunications needs. We have also identified some large enterprise customers to be served by this route thus enhancing the financial feasibility of the project.

When it comes to connecting the under-connected, much of the focus has traditionally been on building out the last mile. While that's still important, the middle mile represents a compelling opportunity for carriers to scale their network further and faster while providing reliable, cost-effective, high-speed bandwidth for their customers. Zayo is actively bridging connectivity gaps and transforming digital landscapes. Example of Zayo's involvement in the following government funded projects to reduce digital inequity include:

National Telecommunications and Information Administration (NTIA)

In June 2024, the NTIA approved nearly $1 billion for 35 middle-mile projects across 350 counties, funding 12,000 miles of fiber-optic cable that would supplement the BEAD Program. As the only national provider,

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Zayo was granted over $300 million in middle-mile government grants to help fund the construction of critical middle-mile network infrastructure to connect unserved and underserved areas.

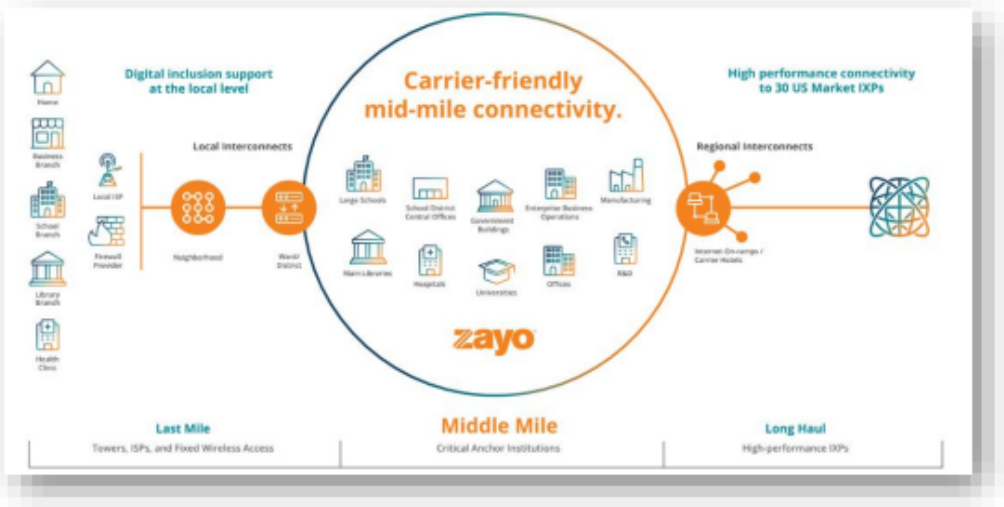
Government Funding Summary:

- $92.9 million from NTIA grants for three routes across 8 states and 43 cities—encompassing more than 2,100 route miles.
- $153 million funded by NTIA and state treasury funds by the state of Nevada to construct two long-haul dark fiber routes along Interstate 80 and across Interstate 15 and U.S. Route 93.
- $29 million in Clark County, Nevada from the American Rescue Plan Act (ARPA) to provide enterprise-grade network to state facilities spanning 227 sites.
- $27.8 million funded by Dallas County, Texas from the American Rescue Plan Act (ARPA) to develop 30 miles of new middle mile fiber network.

Zayo is deeply committed to supporting opportunities for connectivity for all. We have significant regional knowledge, having built and operated similar major networks throughout the State of Texas and the United States. Zayo is at the forefront of expanding connectivity and proud to be taking decisive steps to close the digital divide and bring robust connectivity to underserved communities.

Zayo's Broadband Infrastructure Deployment Alliance (zBIDA) Overview

zBIDA empowers broadband providers to secure government funding, leverage Zayo's expertise and network, and deliver reliable and affordable Internet access to unserved and underserved communities.



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3. Leveraging CVAG and City Fiber Assets – Utilizing existing fiber, conduit, or other city-owned assets to support broadband expansion.

Zayo Response:

Zayo would explore opportunities with CVAG to populate the planned empty conduit with fiber in the deployment of the Digital Expansion Access Network. By leveraging existing conduit, Zayo's approach accelerates deployment timelines and supports commercialization opportunities, aligning with CVAGs goals of enhancing broadband access and levering upcoming BEAD funding in California.

4. Broadband Adoption & Affordability – Strategies to ensure equitable access to broadband for residents who may face financial or technological barriers.

Zayo Response:

Zayo follows five primary elements of Digital Equity to improve broadband adoption in the City:

1. Affordable broadband
2. Internet-enabled devices
3. Digital literacy training
4. Technical support for empowering applications
5. Greater accessibility for community members, especially those traditionally underserved and underrepresented.

Zayo has partnered with Ciena to provide free digital equity resources that include the following topics:

- Internet 101: Basics and beyond
- The Internet: Where Can It Take You?
- Internet Search: Helpful Tips for Finding Information Online
- Stay Safe Online: Essential Tricks and Key Tips
- Safe or Scam: Tackling disinformation in the digital age

Zayo encourages HR Green to visit our Digital Equity landing page at zayo.com/digital-equity.

Zayo will implement best practices and lessons learned from the ongoing implementation of the ARPA-funded Dallas County Middle Mile and Digital Equity project. For example, beyond the infrastructure investment made in Dallas County, Zayo is also partnering with Texas-based nonprofit Compudopt, which provides technology access and education to under-resourced youth and their communities. With a $150K investment over two years, Zayo will fund the distribution of laptops including two years of multi-language tech support and warranties, to Dallas County students and school-aged children.

Combined with Compudopt's digital literacy and workforce development curriculums for new Internet users, this initiative is expected to positively impact approximately 1,500 individuals. Megan Steckly, Compudopt CEO, encapsulated this strategy in stating that, "While device accessibility is the first step toward digital equity,

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we must equip our communities with the knowledge and resources to make the most of their computers. Compudopt is proud to partner with Zayo and Dallas County to continue advancing our North Texas impact and laying the foundation for economic mobility."

To improve equitable broadband adoption, Zayo has learned about the importance of empowering local and trusted digital equity service providers. One of the challenges of delivering digital equity services and ensuring adequate attendance is having a community member lead the instruction and/or distribution at a trusted community location. Digital skills training or distributing laptops should be held at a community institution already providing services to their community, like a library or YMCA.

As an infrastructure provider, Zayo acknowledges that some elements of digital equity and broadband adoption are best suited for local non-profits, as is mentioned above with Compudopt. However, Zayo can control the improvement of broadband affordability by providing competitive middle-mile and backhaul services to our last-mile ISP partners. The proposed network in the City will leverage Zayo's new Digital Equity Access Network (DEAN) architecture, which enhances unserved and underserved connectivity by lowering the barrier to entry for local ISPs to build last-mile infrastructure by providing pre-provisioned, dedicated fiber backhaul, and competitive IP pricing that matches metro market rates.

President of Blue Mountain Networks Joe Franell, said, "The pricing has to make sense for the local service provider business model or we fail collectively. That is why this new model that Zayo has embraced is super exciting. To enable connectivity in some of these rural and remote communities is astounding."

Finally, Zayo has exacting standards when it comes to our subcontractors who participate in our network expansion. In keeping with our high standards, our subcontractors are intensely vetted. We are proud of the fact that we have identified several HUB (SBE, MWBE, DVE) qualified vendors with whom we work on a regular basis. Leveraging local work forces, especially those that are SBE, fosters economic growth and local job creation.

Experience Profile

Zayo Company Profile & Experience

Zayo Response:

Zayo provides mission-critical bandwidth to the world's most impactful companies, fueling the innovations that are transforming our society. Our customers are the enterprises advancing communications who all rely on Zayo's end-to-end high performance fiber networks, infrastructure, and global reach to move, process and store enormous volumes of data.

Zayo provides communications infrastructure solutions, including fiber and bandwidth connectivity, colocation and cloud infrastructure to the world's leading businesses and government entities. Customers include wireless and wireline carriers, media and content companies, federal, state, city and local government, finance, healthcare and other large enterprises.

Zayo's group of companies (includes North America, Europe and Global Reach) has more than 146,000 route miles of fiber and includes extensive metro connectivity to thousands of buildings and data centers. In addition to high-capacity dark fiber, wavelengths, Ethernet and other connectivity solutions, Zayo provides users with flexible, customized solutions and self-service through Tranzact, an innovative online platform for managing and purchasing bandwidth.

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As the largest independent fiber provider in North America, Zayo is in a great position to serve Coachella Valley and we can best leverage our network building experience to meet and ultimately surpass your expectations. We will extend our massive backbone network directly to your sites by building new fiber infrastructure that connects your locations. With expertise in building fiber networks and creating metro campus facilities, Zayo is the fitting choice for Coachella Valley's critical infrastructure.

In addition to Zayo's technical expertise, one of the company's hallmarks is the emphasis on building strong working relationships with each of our customers through close coordination and communication throughout the construction process. We have extensive experience in oversight of construction and ongoing maintenance. For the past few years, Zayo has grown its network by 5,000 to 10,000 miles per year. In 2021, in metro and long haul fiber, Zayo grew its worldwide fiber network by 8,514 route miles and in California specifically, with primary routes expanding into key markets with Long Haul connectivity:



The expansion of middle mile infrastructure is a game-changer—it's the backbone that bridges major internet hubs to local networks, unlocking the potential for high-speed, reliable connectivity in even the most remote regions. But the real magic happens at the last mile—where that power finally reaches homes, schools, businesses, and community spaces.

Together, middle mile expansion and last mile connectivity are transforming how communities access opportunity. From enabling digital learning and telehealth to empowering local businesses and remote work, this infrastructure is more than cables and towers—it's a lifeline for economic growth, innovation, and digital equity across the province. This is where Zayo turns connection into impact.

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Umatilla to Reno: $24M NTIA Middle Mile Grant Award

PROJECT INFORMATION & ROUTE DETAILS

Fiber construction has started in California and we're close to completing all fiber construction in Oregon and Nevada. This project should be completed by March 2025.

- Total Route Miles: 622 miles
- Total Access Points & ILA's: 33
- Dedicated Fiber for DEAN: 12
- Towers: 2 *(constructed by vertical bridge)*

Enabling last mile connectivity in:

- Oregon → Fort Rock, La Pine, Lakeview, Lone, Mayville, Mitchell, Paisley, Prineville, and Umatilla
- California → Alturas, Spanish Springs, and Herlong
- Nevada→ Panther Valley and Reno



Zayo is Local

Zayo's Wavelengths network in the Sacramento Area connects key data centers as well as high bandwidth-consuming buildings with low latency and diverse routing options

Connecting 119 Key Data centers across California

1,110 Locations Connected in San Francisco
407 Locations Connected in Sacramento
611 Locations connected in Los Angeles

Investments in Network Expansion



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Company History

Zayo was founded in 2007 in order to take advantage of the favorable Internet, data, and wireless growth trends driving the demand for bandwidth infrastructure, colocation and connectivity services. These trends have continued in the years since our founding, despite volatile economic conditions, and we believe that we continue to be well-positioned to continue to capitalize on those trends. To address the demand, we have assembled a large portfolio of fiber networks and colocation assets through both acquisitions and customer demand driven investments in property and equipment. Highlights of Zayo history include:

- 2014: Zayo, valued at $5 billion, goes public.
- 2015: Zayo increases its fiber footprint and metro density in the UK and mainland Europe.
- 2016: Zayo becomes the only Pan-U.S./Canada fiber network provider.
- 2017: Zayo acquires Electric Lightwave, fortifying its network in and between key western markets
- 2018: Zayo acquires Spread Networks, creating the lowest latency NY-CHI fiber route

Zayo is headquartered in Boulder, Colorado with European headquarters in London and Paris. Zayo has over 15 years of experience in outside plant fiber optic cable construction and provided fiber-based services. We collaborate with enterprise and carrier customers with large and growing needs for bandwidth to develop fiber-based bandwidth solutions to meet their specific requirements.

A majority of our services are provided end-to-end exclusively over our fiber network, which provides many benefits including:

- The ability to rapidly and cost effectively scale, or increase bandwidth, to meet the growing network requirements of our customers.
- Ease in identifying and responding to customer service inquiries over one contiguous fiber network.
- Avoidance of the cost of third-party service providers, including ILECs.

All services are provided over our modern fiber optic cable and are monitored by our Network Operations Center 24 hours a day, 7 days a week.

In June, 2023 - Zayo was awarded $92.9M from the **NTIA Middle Mile Grant Program** as a part of the overall national efforts to **close the digital divide**. We are ready to build what's next: A connected future where access to reliable broadband is a fundamental right for all.

- On the heels of Zayo's various events celebrating our Oregon-California-Nevada long-haul route, funded in part by the National Telecommunications and Information Administration (NTIA), the State of Nevada awarded Zayo its Middle Mile Network Project, funded by additional grants totaling $153M from the Office of Science, Innovation and Technology and, again, the NTIA. The Nevada Middle Mile Network Project will:
    - Connect over 40,000 unserved or underserved locations between Reno and Las Vegas, including households, schools, and other critical community institutions.
    - Accelerate economic development in Nevada by addressing growing bandwidth needs in Reno and Las Vegas for data center hubs, including artificial intelligence infrastructure, and other high-bandwidth use cases.

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- Increase long-haul connectivity between Nevada and other key markets, including diverse connections from Reno to Phoenix and Las Vegas to Salt Lake City. We are excited to expand our strong partnership with the State of Nevada, the federal government, and local ISPs to help bridge the digital divide and stimulate long-term economic growth in Nevada and surrounding states.

Zayo's Government Qualifications

Zayo recognizes that as innovations transform IT, government agencies are being challenged to modernize their infrastructure and adopt new technologies while improving access, enhancing local connectivity and securing their operations at a record pace. Keeping up with the continuing catalyst of change means: integrating legacy technologies, meeting government standards, containing costs, serving unserved/underserved communities, scaling for the future, shortening deployment timeframes, and securing and protecting all data in the most resilient matter possible.

The challenge of modernizing technology and building high performance networks while addressing federal mandates require purpose-built solutions from a provider that understands your core mission. With more than 15 years of experience working with federal, state, and local government agencies and system integrators, Zayo's extensive network and portfolio of services deliver proven solutions you can rely on.

Zayo's robust fiber-based network solutions modernize and equip government agencies to meet challenges head on. This unique opportunity is achieved by scaling and securing their network, reducing deployment and upgrade timelines, and containing costs and positioning agencies to adopt emerging IoT, software-defined, Zero Trust, and 5G technologies.

- Zayo is a trusted partner to 150+ public sector entities globally
- Zayo provides services to 18 of the 20 largest government contractors
- Zayo provides connectivity to major GovCloud facilities and is connected to 1,300+ data centers
- Zayo provides service to 32 on-net Department of Defense facilities
- Zayo connects directly to 40 Health and Human Services facilities
- Zayo serves 2 of the top 3 major Federal Science Agencies

A few of our U.S. Federal Government customers include:

- Department of Commerce
- Department of Defense
- Department of Health & Human Services
- Department of Transportation
- Department of Energy
- Department of Veterans Affairs
- NASA
- U.S. Postal Service
- Smithsonian Institute

The U.S. General Services Administration has granted to Zayo an IT Schedule 70 contract that eliminates the need for multiple contracts, allowing you to purchase services directly from Zayo.

On June 20th, 2024, the National Telecommunications and Information Administration (NTIA) announced it awarded $92.3 million to Zayo from the NTIA Middle Mile Grant Program as a part of the overall national efforts to close the digital divide and bring reliable network infrastructure to all.

As the only national provider awarded in this latest round of grants from NTIA, the funds will be directed towards three separate projects to bring reliable and affordable network infrastructure to the unserved and underserved areas across 8 states and over 2,100 route miles. Locations were selected on a needs-based

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criterion including current broadband speeds, rurality, and socio-economic indicators to identify opportunities where network investments could make the largest impact to the communities they serve.

Zayo's Middle-Mile Success

Zayo and Zayo's contractors and subcontractors aim to comply with all applicable federal, state, and local laws, rules, regulations, and requirements, including items required in the NTIA MMG project awards.

Zayo was also awarded the fiber-based Wide Area Network solution that will provide metro dark fiber and 10G lit Ethernet to County and State facilities throughout Clark County, Nevada. This project would also comply with Treasury and National Institute of Standards construction and progress reporting standards. Zayo is actively working on several other projects with state and local organizations with similar requirements.



These projects mark the latest steps in Zayo's strategy to extend middle-mile connectivity across the U.S. Over the last five years, Zayo has built and operated over 4,000 new route-miles of long-haul fiber routes across 17 states. Through its acquisition of Education Networks of America (ENA) in 2021, Zayo is also now the largest independent provider of K-12 E-rate services in the nation, connecting almost 20,000 schools in the U.S. Zayo will continue to expand its network and services to support the growing needs of underserved communities to close the digital divide.

Zayo has a strong track record in expanding middle-mile broadband infrastructure and leveraging public grant funding to deliver scalable and financially sustainable solutions. **In 2023, Zayo was awarded $92.9 million through the NTIA Middle Mile Grant Program to support projects across eight states, covering over 2,100 route miles.** These initiatives targeted unserved and underserved areas, using socio-economic

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indicators to prioritize connectivity needs. A notable example is the Prineville-Reno Fiber-Optic Project, which utilized existing conduit infrastructure to enhance redundancy and reliability for communities facing limited bandwidth options. Additionally, Zayo received $153 million for the Nevada Middle Mile Network, spanning over 800 miles and connecting more than 40,000 underserved locations while supporting AI data center hubs in Reno and Las Vegas.

Zayo's ability to utilize existing conduit infrastructure further strengthens its suitability for middle-mile projects. The company has experience populating conduits with fiber and commercializing them effectively, as demonstrated in and Boulder. This approach reduces construction costs, accelerates deployment timelines, and integrates seamlessly into local infrastructure plans. In Boulder, Zayo partnered with the city to lease unused conduits while installing new fiber and additional conduit for municipal use. This collaborative model aligns well with revenue-sharing agreements and ensures long-term sustainability.

By combining expertise in middle-mile network development, effective use of existing infrastructure, and innovative architectures like the Digital Equity Access Network (DEAN), Zayo is well-positioned to address regional connectivity challenges while maximizing the impact of public grant funding.

High Bandwidth and Secure Government Solutions

Federal, state, and local agencies rely on Zayo for highly secure-bandwidth solutions, including Dark Fiber, Wavelengths, Ethernet, IP, Cloud, and Colocation. We are fully equipped to meet the unique network demands of government organizations.

The Zayo Difference for Government

Build high performance networks with Zayo's uniquely dense and expansive fiber infrastructure. Our assets empower you to scale services and applications with the ease, agility and high-quality bandwidth you need to meet your objectives. Further, our fiber network philosophy supports innovation for the continual deployment for all wholesale types on an open access approach for residential services.

Zayo Understands Compliance

Zayo is an active participant in many government-funded programs on various levels. From state specific programs such as the California Teleconnect Fund to the federally funded E-Rate and Rural Health Care programs created by the FCC, we are committed to maintaining full compliance as a service provider.

Optimize Efficiencies and Control Costs

Zayo will build an efficient and scalable network for you, customized to your requirements. Our portfolio of services is designed to help you scale easily, so you can address your inevitable bandwidth growth far into the future. Government entities are constantly balancing new requirements with increasingly tight budgets. Zayo will help you minimize those costs and simplify processes so you can focus on strategic mandates.

Modernize with High Performance Networks

Making technology more efficient as mandated by the Federal Technology Acquisition Reform Act (FITARA) is critical to enabling the high performance networks needed for the future. Zayo's fiber infrastructure provides secure, reliable and scalable connectivity to assure your agency has the bandwidth and flexibility to efficiently connect to data centers, agency offices, military bases and the cloud.

Experience Constructing Fiber Optic Networks

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Zayo has a significant amount of experience constructing fiber-optic networks, and thus is comfortable navigating all of the challenges that are faced in doing so. Zayo will take care of the following aspects of delivery as well:

- Acquisition of franchise agreements (right to own or operate fiber-optic infrastructure in a particular municipality)
- Permitting
- Search and acquisition of Third Party Duct (lowers underground construction costs)
- Acquisition of aerial attachment rights (if applicable)

Most of the challenges faced in construction projects of this nature involve access rights and securing construction permissions from third parties. All construction work will be done in strict accordance with federal, state, local, and applicable private rules and laws regarding safety and environmental issues, including those set forth by OSHA and the EPA. The resulting network will comply with the current requirements of all governing entities (FCC, NEC, DEC, and other national, state, and local codes). Zayo only installs premium, carrier-grade compliant fiber and other OSP construction materials from top tier manufacturers.

Proposed Team Qualifications and Experience

ZeeAnn Kane - Account Director

ZeeAnn has over 30 years of business and sales experience with over 24 of those years in telecommunications. As an experienced technology professional, she has helped companies within different verticals solve not only their complex network, data and security challenges – but help to solve business problems. Whether to U.S.- only companies with a national presence, global organizations, or government entities, ZeeAnn provides the collected talent and technologies of a strong team that I have assembled to resolve complex data, IT, security and networking challenges.

Fitzcurby Bent - Senior Solutions Engineer

Based out of San Francisco CA, Fitzcurby has over 30 years of telecommunications solutions engineering experience. Fitzcurby joined Zayo over 6 years ago as a Senior Solutions Engineer designing fiber networks for over 9 years. Fitzcurby is highly skilled in MPLS and Metro Ethernet solutions. Fitzcurby has extensive knowledge of Layer1, Layer 2 Layer 3 and Layer 7.

Connor Parson - Head of Long Haul OSP Deployment

Connor graduated from the Colorado School of Mines with a Bachelor's in Petroleum Engineering in 2016. He began his professional career with Zayo Group as an intern in OSP Large Projects in December 2016 and has been steadily climbing the ladder with such roles as OSP Project Manager in January 2017, Manager OSP Deployment in January 2021, and landing on his current position as Sr. Manager, Large Projects in July 2021. Utilizing a highly effective team of project managers, Connor oversees the construction of long haul fiber routes in the central US and has managed over 3,000 miles of new fiber deployments during his 6 year career at Zayo. Most recently, he has managed builds from Denver to Salt Lake City (530 miles), Denver to Dallas (930 miles) and St. Louis to Indianapolis (250 miles).

Dave Snyder - Sr. Manager, Facilities Deployment, Zayo

Dave is a highly skilled telecom program manager with expertise in process development and implementation. He joined Zayo Group in February, 2013 as an ISP Corporate Security Implementation, moving into the Project Manager Long Haul Dark Fiber position in May, 2014 and then landing his current role as Sr. Manager within Facilities Deployment in March, 2017. As Senior

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Manager of the Facilities Deployment program Dave has successfully delivered 100s of ILA's across the nation. Through years of experience building out Long-Haul ILA huts, Dave has learned the importance of proper planning in order to successfully deliver projects on time and under budget. Drawing on this experience, his team is able to anticipate and mitigate schedule and budget risks to keep projects on track.

Value-Added Services/Solutions

Zayo offers a full suite of solutions to meet the City's current and future network requirements for a carrier-grade network that provides equipment and circuit redundancy, QoS for voice and video traffic, and the capability of provisioning tenant-type services to isolate different instances with QoS attributes. Zayo's Ethernet services adhere to the Metro Ethernet Forum (MEF) current industry standards based on layer-2 services that can be consumed by the enterprise or used between access, transit, and end-user service providers for backhaul, cloud access, or multi-provider end-to-end seamless on-net and off-net connectivity. Zayo can provide pricing for the services included in Zayo's Product Portfolio below to meet current and future City broadband infrastructure needs.



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Project References

Zayo Response:

California Department of Insurance
300 Capitol Mall, Suite 1700 Sacramento, CA 95814
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Phone: (916) 492-3322

California Department of Technology
707 3rd Street, 2nd Floor, West Sacramento, CA 95605
Contact: Yonnie Langham, Account Manager
Email: yonnie.langham@state.ca.gov
Phone: (916) 857-9815

Dallas County
500 Elm St., Dallas, TX 75202
Contact: Charles Reed
Email: charles.reed@dallascounty.org
Phone: (214) 653-6655

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Additional Information

Zayo's Broadband Infrastructure Deployment Alliance (zBIDA)

zBIDA empowers broadband providers to secure government funding, leverage Zayo's expertise and network, and deliver reliable and affordable Internet access to unserved and underserved communities.



Overview

At Zayo, we are dedicated to addressing the challenges of connecting middle-mile infrastructure to all American communities. Our Broadband Infrastructure Deployment Alliance program (zBIDA) offers comprehensive support to ISPs like you, helping you access and utilize federal and state funds for successful partnerships and infrastructure project execution.

Our goal is to assist you in expanding affordable, accessible, and reliable broadband access to ensure that unserved and underserved communities can enjoy economic growth, improved education, and an overall better quality of life. Zayo's mission is to connect what's next, and that includes everyone.

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Zayo's Broadband Infrastructure Deployment Alliance (zBIDA)

Where can zBIDA Support?

Proposal and Application Support

Zayo supports you from day 0. To start, we help you with your grant applications. Together we can:

- Create compelling network narratives
- Align with national strategic partners
- Plan and budget all costs associated and support your financial goals
- Navigate government regulations and ensure compliance

We help guide you through the process with support – all while keeping it affordable.

Last Mile Network Access and Support

Once you've won your grant, you can build the last mile via Zayo's Middle Mile network. With us, you have full access to a carrier-neutral open-access network that leverages our Digital Expansion Access Network (DEAN) architecture. Our design provides flexible interconnection points and if necessary, we can help you with your equipment installations, reducing network complexity.

Zayo's zBIDA program streamlines the process of expanding network infrastructure by providing comprehensive support at every step. With zBIDA, you can ensure reliable and affordable Internet access, fostering economic and AI growth.

Why Work With Zayo?

- **Extensive Fiber Network:** Zayo has the largest independently owned fiber network, with over 15 years of experience in route design.
- **Proven Success Securing Grants:** Zayo's secured a total of **$300M+ in government funding**
  - $29M in Clark, County Nevada via the American Rescue plan act
  - $152M funded by the NTIA and State Treasury Funds via the State of Nevada
  - And, **$92.9 million of NTIA grants for network infrastructure** across eight states, making Zayo the only national provider awarded in the latest round of NTIA grants.
- **Strong Carrier Relationships:** With 860+ carrier relationships worldwide, Zayo ensures flexibility and fairness.
- **Historical Success:** Our new 193-mile middle-mile fiber network will serve 20,000 households, 10 unserved communities, 143 critical institutions, and one tribal area with broadband.
- **Reliable Network Solutions:** Partnering with leading manufacturers like Ciena ensures robust and reliable network solutions.

Zayo's zBIDA program enables ISPs to expand broadband coverage under government funding. With an 18.7M fiber mile network, innovative solutions, and comprehensive support, Zayo is the ideal partner for leveraging government funding to build and enhance fiber networks across the nation.

Reach out to Zayo's dedicated middle-mile team to learn more.

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Your Middle Mile Partner in Connecting What's Next

At Zayo, we are redefining middle-mile networks to bridge the digital divide and meet the infrastructure demands of the AI era. Our mission is clear, to build where it matters most: at the intersection of underserved and unserved communities and the rapidly growing rural AI data center clusters.

2007 — Zayo was founded

2012 — Nationwide fiber network; *13+ acquisitions*; Expanded to Europe

2018 — Became only Pan-US/ Canadian Independent Provider; *Acquired Allstream & 20+ years of Managed Services*; Acquired Spread networks

2021 — Acquired QOS Networks; Acquired ENA; became largest E-rate service provider

2023 — Invested $250M in infrastructure; Launched Preferred Carrier Program; Awarded $92M in NTIA MMGP funds; Awarded ~$27M in ARPA funding in Clark County, NV

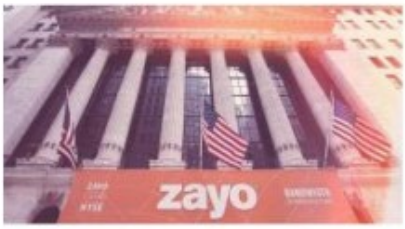
2024 — Awarded ~$200M in additional government funding projects; Won Dallas County Metro Fiber Middle Mile Build; Introduced DEAN Architecture

2025 — Announced 5K+ more fiber miles to meet AI demand; Announced intent to acquire Crown Castle Fiber Solutions business



Zayo Long Haul – Network Build and Operation Partner

Zayo delivers a unique long haul middle mile fiber solution for ISPs to leverage pre-installed infrastructure and lie equipment to mitigate costs. This design, our Digital Expansion Access Network (DEAN), has been successfully adopted on all government funded routes.



Zayo Long Haul – Government Partner and Commercialization Expert

Zayo provides flexible and innovative commercial models such as public-private partnerships, zBIDA (Zayo broadband infrastructure deployment alliance) program, construction services, O&M and network commercialization to drive long haul network supporting AI, last mile ISP partners, and government entities.

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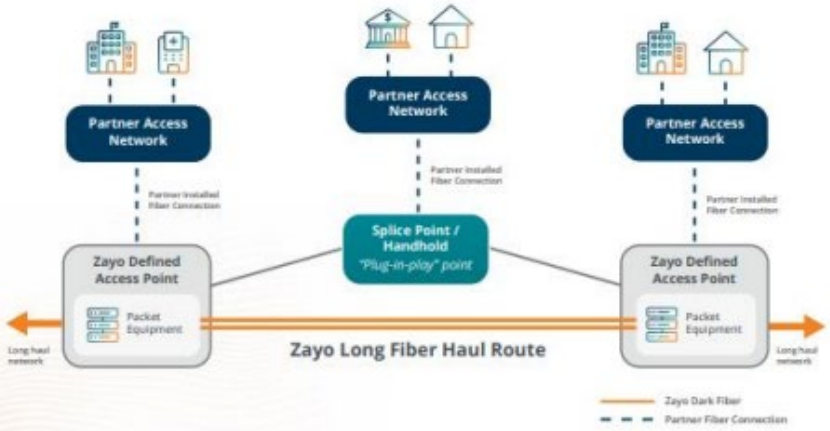
Your Middle Mile Partner in Connecting What's Next

Building Next generation AI Corridors and Middle-Mile Open Access Network

We don't just connect endpoints, we create the foundation for digital transformation. Substantial data center growth is driving the need for diverse, scalable network into and out of states. By backing workforce development and ensuring that rural communities have the connectivity they need to thrive, we're building AI corridors that will power the next wave of innovation. Our nationwide long-haul network fuels high-speed Internet access, supporting AI-driven industries and driving economic opportunity.

As the national leader in middle-mile infrastructure, Zayo is unmatched in building and securing funding for long haul networks. Whether public or private, no other provider is scaling at our pace. We maximize hyperscaler investments and leverage government broadband funding to accelerate cost-efficient, future-ready infrastructure.

Digital Expansion Access Network (DEAN)



Zayo, your partner in connecting what's next

850+
Carriers Supported

$300M+
in government grants supporting broadband since 2023

16.5M
Fiber Mile Open Access Network

Facilitated over
$1B
In E-rate funding

Connecting
20%
of all U.S. public schools

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Your Middle Mile Partner in Connecting What's Next

Digital Expansion Access Network (DEAN) Overview

In traditional long-haul architecture, router nodes are located at points of presence (PoPs) at either end of the route, supporting IP and wavelength networks.

Zayo's architecture introduces multiple network connection points, serving as physical on-ramps for local internet carriers to interconnect with Zayo's middle-mile network. These network on-ramps are strategically placed near rural underserved populations to provide affordable lit services to last mile internet carriers.

NTIA MMGP Funded - DEAN Routes Overview

Dallas to El Paso



- 649 route miles
- 28 access points and ILAs
- 9 towers connected
- Federal Grant: $55M (60% of total project cost)
- Commercialized with 3+ hyperscalers
- Proximity to key Stargate AI DC location
- 400+ Community Institutions passed
- Estimated completion 06/2028. Engineering and EA are underway, drawings 99% complete.

Dallas to Atlanta



- 822 route miles
- 74 access points and ILAs
- 18 towers connected
- Federal Grant: $14M (70% of total project cost)
- Commercialized with 5+ hyperscalers
- Provides critical MM access to 5 States
- 430+ Community Institutions passed
- Estimated completion 03/2026. 63% of permits received, 28% of microducts placed, and 12% of fiber deployed.

Umatilla to Reno



- 622 route miles
- 33 access points and ILAs
- 2 towers connected
- Federal Grant: $21M (50% of total project cost)
- Commercialized with 5+ hyperscalers
- Connectivity to tribes, underserved areas and critical AI datacenter location
- 200+ Community Institutions passed
- OR/NV delivered. 170 out of 194 miles in CA complete.

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Your Middle Mile Partner in Connecting What's Next

Our Work In Action: State Of Nevada

Nevada Governor's Office of Science and Technology, Nevada Department of Transportation (NDOT) & Nevada System of Higher Education (NSHE) chose Zayo as the single private-sector middle mile fiber construction partner



- Over 800 route miles
- 40+ access points and ILAs
- Estimated completion - 2027 for I-80 and 2028 for U93 routes
- Revenue share with the State on PPP model
- Commercialized with growing datacenters and hyperscalers to ensure project sustainability
- Passes 40,000+ underserved households and tribal areas

Challenges

State of Nevada **needed a partner** to build long haul dark fiber to support the expansion of last-mile services to underserved communities.

State of Nevada **chose Zayo because of our innovative approach** to building middle-mile infrastructure as a whole and **share revenue** with the state.

Solution

- Zayo will offer layer 0-4 network services
- Supports the expansion of last mile services to critical anchor institutions
- Zayo collaborated with State Broadband directors to determine optimal access points and recommendations for local ISPs

Results

Zayo bridged the gap between customer's increase in costs and reduced budgets by providing an efficient solution design.

This network will provide leased dark and lit fiber solutions to state facilities, ensuring connectivity for the next 40 years.

Learn More about Zayo's digital infrastructure fueling last-mile growth and the AI corridor

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Zayo Relevant Agreements
Zayo Master Customer Agreement

MASTER CUSTOMER AGREEMENT

This Master Customer Agreement ("MCA") is effective as of _____ ("Effective Date") between Zayo Group, LLC, a Delaware limited liability company, with an address of 1401 Wynkoop Street, Suite 500, Denver, CO 80202 (collectively "Zayo" and each entity controlled by, controlling or under common control with Zayo, a "Zayo Affiliate") and **(Insert Customer Name)** , a **(Insert Country/State/Province/etc.) (Insert corporation/limited liability company/partnership/etc.)** with an address of **(Insert Address)** ("Customer"). Zayo and Customer each may be referred to herein as a "Party" and collectively as the "Parties".

ARTICLE 1 - GENERAL

1.1 Agreement Structure. This MCA provides general terms and conditions under which Customer may from time to time purchase access to and utilization of selected portions of the Zayo fiber network and associated infrastructure ("Access") and certain related telecommunications and infrastructure services ("Services") from Zayo. Terms and conditions that apply to Access and to each type of Service are set forth in customer schedules (each a "Customer Schedule"). Access and Services may also be referred to as offerings ("Offerings") in the Customer Schedule and Customer Orders. This MCA, applicable Customer Schedules, and Customer Orders are collectively the "Agreement". Any part of the Agreement may be entered into and performed by any Zayo Affiliate, including those authorized to provide Access or Services in any country or jurisdiction.

1.2 Orders for Access and/or Services. Customer may request that Zayo provide Access and/or Services by submitting a customer order in a form provided by Zayo ("Customer Order"). Customer is responsible for the accuracy of all information that it provides to Zayo. Customer Orders shall set forth the term, pricing, Access and Service type and location(s), monthly recurring charge ("MRC"), non-recurring charge ("NRC") and any additional terms applicable to the Access and/or Services. All Customer Orders are subject to availability and acceptance by Zayo, and are governed by this Agreement.

1.3 Term. The term of each Access and/or Service shall commence on the Activation Date (as defined in the applicable Customer Schedule) for such Access and/or Service and continue for the period of time specified in that the applicable Customer Order. Thereafter, the term shall automatically renew for one year periods (collectively, the "Order Term") until terminated by either Party upon at least ninety (90) days' written notice prior to the end of the Order Term. Customer is responsible for payment to Zayo for the Access and Services to be terminated through the date of termination. The term of the Agreement is coterminous with the longest Order Term hereunder.

1.4 Order of Precedence. In the event of an express conflict between terms in the Agreement, precedence will be given, as applicable, in the following order: (a) the Customer Order, but solely with respect to the Services covered by such Customer Order (b) the Customer Schedule, but solely with respect to the Services covered by such Customer Schedule, and (c) the MCA.

ARTICLE 2 - PAYMENT TERMS

2.1 Invoicing and Payment Terms. Zayo commences billing and Customer shall be liable for payment upon the Activation Date. Zayo will provide Customer with a monthly-itemized invoice for the Access and Services together with all other charges due. Customer shall pay to Zayo all amounts due in full, without offset or reduction, within thirty (30) days from the date of the invoice ("Due Date"). Invoice amounts not paid on or before the Due Date shall bear interest at the rate of one and one-half percent (1.5%) per month or the highest lawful rate, whichever is lower. Unless otherwise stated in the Agreement, Zayo invoices NRCs upon Zayo's acceptance of a Customer Order.

2.2 Invoice Disputes. If Customer reasonably disputes any portion of an invoice, Customer shall timely pay all undisputed amounts and shall notify Zayo in writing and provide detailed documentation supporting its dispute by the Due Date or Customer's right to any billing adjustment shall be waived. If the dispute is resolved against Customer, Customer shall pay such amounts due plus interest, as set forth in Section 2.1 above, from and after the Due Date.

2.3 Taxes and Other Fees and Surcharges. Excluding taxes based on Zayo's net income, Customer shall be responsible for all Taxes (defined below) and Other Fees and Surcharges (defined below) arising in any jurisdiction imposed on or incident to the provision, sale or use of Access or Services, including but not limited to value added, consumption, sales, use, gross receipts, foreign withholding (which will be grossed up), excise, access and bypass (collectively "Taxes") and any property, franchise, rights of way, license or permit, regulatory or other taxes, duties, fees, charges or surcharges (collectively "Other Fees and Surcharges"). Charges for Access and Services are exclusive of any Taxes and Other Fees and Surcharges. Taxes and Other Fees and Surcharges may be recovered through

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imposition of a percentage surcharge on the charges for Access and Services to Customer. Customer may present Zayo with a valid exemption certificate (in a form reasonably acceptable to Zayo); Zayo will give effect thereto prospectively.

2.4 **Portability**. Customer may terminate an existing Service (the "**Original Service**") and make a one-time request that such Service be replaced by a new Service ("**Replacement Service**"), and Customer will not incur any early termination liability with respect to the Original Service, as long as: (a) the Original Service is On-Net, (b) the Original Service has been in-service for at least twelve (12) months of the Order Term, and (c) Customer submits, and Zayo accepts, a Customer Order for the Replacement Service that complies with the requirements of this provision (the "**Replacement Customer Order**"). The Replacement Customer Order shall reflect (i) an Order Term of at least one (1) additional year beyond the expiration date of the Order Term for the Original Service, (ii) an MRC at least equal to the MRC of the Original Service and (iii) an NRC to implement the Replacement Service (which may include costs incurred but not recovered under the Original Service). Customer may not terminate the Original Service until commencement of the Replacement Service, and must provide Zayo at least thirty (30) days' written notice of disconnection prior to disconnection of the Original Service. Customer must pay all charges for the Original Service through the disconnection date. "**On-Net**" means any Service which connects two locations to which Zayo is already providing the same type of Service at the time of the Order and which is provisioned entirely on Zayo facilities and does not include any third party services or special construction.

ARTICLE 3 - DEFAULT

If Customer fails to make any payment due under the Agreement by the Due Date, and such failure continues for five (5) days after receiving notice of the failure to make payment, or if a Party fails to cure any material breach of any term of the Agreement within thirty (30) days of receiving notice of the breach from the other Party, then the non-breaching Party may: (a) terminate the Agreement in whole or in part and (b) subject to the liability limitations stated herein, pursue any available remedies at law or in equity.

ARTICLE 4 - LIABILITIES

4.1 **Damage Limitations**. Except for indemnity obligations arising under Section 4.4, confidentiality obligations arising under Section 5.1, or payment obligations arising under this Agreement: (i) each Party's total liability for any and all causes and claims whether based in contract, warranty, tort or otherwise shall be limited to the actual direct damages sustained by the damaged Party under this Agreement, but in no event greater than an amount equivalent to the total MRC payable by Customer over the preceding twelve (12) months for the Access or Service affected or if the claim arises prior to the Activation Date, an amount equivalent to the total MRC payable by Customer for the first twelve (12) months of the Order Term, and (ii) NEITHER PARTY SHALL BE LIABLE TO THE OTHER PARTY FOR ANY DAMAGES FOR LOST PROFITS, LOST REVENUES, LOSS OF GOODWILL, LOSS OF DATA, ANTICIPATED SAVINGS OR COST OF PURCHASING REPLACEMENT SERVICES, OR ANY INDIRECT, INCIDENTAL, SPECIAL, CONSEQUENTIAL, EXEMPLARY OR PUNITIVE DAMAGES ARISING OUT OF THE PERFORMANCE OR FAILURE TO PERFORM UNDER THE AGREEMENT. Notwithstanding anything to the contrary, Customer's sole and exclusive remedy for any non-performance, defect or failure to deliver the Access or Service are the performance credits and/or other remedies expressly stated in the relevant Customer Schedule.

4.2 **No Warranty**. ZAYO MAKES NO WARRANTIES OR REPRESENTATIONS, EXPRESS OR IMPLIED, EITHER IN FACT OR BY OPERATION OF LAW, STATUTORY OR OTHERWISE, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE.

4.3 **No Liability for Certain Actions**. Zayo exercises no control over and is not responsible for the content of any information transmitted or received through the use of the Access or the Services. Other than as expressly stated in the Agreement, Customer shall be solely responsible for all of the security and confidentiality of information it transmits using the Access or Service.

4.4 **Indemnification**. Each Party (an "**Indemnifying Party**") shall indemnify, defend and hold harmless the other Party, its directors, officers, employees, agents, contractors, successors and assigns ("**Indemnified Party**") harmless from and against all losses, damages, costs, expenses and liabilities (including reasonable attorney's fees and expenses) incurred by such Indemnified Party arising from any third party claims relating to: (i) any physical damage to tangible property, or personal injury or death caused by the gross negligence or willful misconduct of the Indemnifying Party, or (ii) infringement or misappropriation of such third party's intellectual property right caused by the Indemnifying Party, provided, however, that Zayo is not obligated to indemnify Customer, and Customer shall defend and indemnify Zayo as an Indemnified Party, for any claims or actions commenced by any third party, including end users, arising from or in connection with goods or services provided by Customer that incorporate any of the Access or Services.

ARTICLE 5 – MISCELLANEOUS PROVISIONS

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5.1 Confidentiality. Information or documentation exchanged between the Parties in performing this Agreement, including the terms of this Agreement, are subject to the terms of any non-disclosure agreement in effect between the Parties, and if none, neither Party will disclose Confidential Information to third parties (other than to vendors, if and as needed to perform under this Agreement) without the express consent of the other Party. Each Party will limit disclosure and access to Confidential Information to those of its employees, vendors, or other representatives who reasonably require such access to perform under this Agreement and who are subject to confidentiality obligations at least as restrictive as those required herein. "**Confidential Information**" means any information disclosed by one Party to the other in connection with the Agreement, including any terms of this Agreement and does not include information that: (i) is independently developed by the receiving Party, (ii) is lawfully received by the receiving Party free of any obligation to keep it confidential, or (iii) becomes generally available to the public other than by breach of this Agreement.

5.2 Force Majeure. Neither Party shall be liable, nor shall any credit allowance or other remedy be extended, for any failure or hindrance of performance hereunder due to causes beyond its reasonable control (a "**Force Majeure Event**"). The Party claiming relief under this Section shall notify the other Party of the occurrence or existence of the event and of the termination of such event.

5.3 Subject to Laws. Each Party is responsible for complying with laws and regulations applicable to it, including but not limited to applicable: (a) federal, state and local laws; (b) regulations, rulings and orders of government agencies; (c) data protection legislation; (d) laws, statutes, regulations and codes relating to anti-bribery and anti-corruption; and (e) import, export and economic sanction laws and regulations. Neither Party shall use the Access or Services for any unlawful purposes.

5.4 Governing Law; Venue; Prevailing Party. The Agreement shall be governed by and construed in accordance with the laws of Delaware, without giving effect to any conflict of law principles. Venue arising under the Agreement shall be Delaware. The United Nations Convention on Contracts for the International Sale of Goods does not apply. If suit is brought or an attorney is retained by either party to enforce the terms of the Agreement or to collect any money as due hereunder or to collect any money damages for breach hereof, the prevailing party shall be entitled to recover its reasonable attorneys' fees and related expenses incurred in connection therewith.

5.5 Notices. Notices under this Agreement shall be in writing and delivered by electronic mail or certified mail, return receipt requested, or by a nationally recognized courier to the persons whose names and business addresses appear below, and such notice shall be effective on the date of receipt, or refusal of delivery, by the receiving Party. **In lieu of the foregoing notice requirement, if Customer is disconnecting Access or discontinuing Service(s) of any type for any reason, Customer must submit the disconnection request through the form located at** https://www.zayo.com/disconnectservice/

If to Zayo:
Zayo Group, LLC
Attn: General Counsel, Legal
1401 Wynkoop Street, Suite 500
Denver, CO 80202
Email: legal@zayo.com

Billing Disputes:
Zayo Group, LLC:
Attn: Accounts Receivable
1401 Wynkoop Street, Suite 500
Denver, CO 80202
Email: customerservice@zayo.com

If to Customer:
[INSERT CUSTOMER NAME]
Attn: **(insert Name)**
(Address)
City State Zip

Email: **(insert email)**

(if this "Customer" section is left blank, notice shall be deemed effective if delivered to Customer's registered office address or the last Customer address provided to Zayo by Customer)

5.6 Assignment. Neither Party shall transfer or assign, voluntarily or by operation of law or otherwise, its obligations under the Agreement without the prior written consent of the other Party, except no such consent shall be required in the event of a merger, reorganization, consolidation or sale of substantially all of the Party's assets or business in which case the assigning Party shall provide notice to the non-assigning Party; provided, however, that Customer may only transfer or assign under this provision if its account balance with Zayo is current. Zayo may assign in whole or in part the Agreement or any of its rights and obligations hereunder to any Zayo Affiliate without prior notice to Customer. The Agreement shall be binding upon and inure to the benefit of the Parties and their respective successors and assigns.

5.7 No Third Party Beneficiaries; Relationship and Counterparts. The Agreement is not intended for, nor shall it be for the benefit of or enforceable by, any third party or person not a Party hereto, including without limitation, end users. The Agreement does not create a partnership, joint venture or agency relationship between the Parties. Neither Party shall have any authority to bind the other Party to any agreement, understanding or other instrument, in any manner whatsoever. The Agreement may be executed in one or more counterparts, all of which taken together shall constitute one instrument. The Agreement may be executed via a recognized electronic signature service and/or signed, scanned and emailed to Zayo, and any such signatures shall be treated as original signatures.

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5.8 **Entire Agreement; Amendment.** The Agreement constitutes the entire and final agreement and understanding between the Parties, expressed or implied, with respect to the Access and Services ordered after the Effective Date and supersedes all other prior or contemporaneous representations, understandings or agreements. No alteration or variation of the terms of any provision shall be valid unless made in writing and signed by the Parties. If any provision of the Agreement shall be held to be invalid or unenforceable, the remaining provisions of the Agreement shall be unimpaired and shall remain in effect and be binding upon the Parties. No course of dealing and no failure to exercise any right hereunder shall be construed as a waiver of any provision hereof.

ZAYO GROUP, LLC	[CUSTOMER NAME HERE]
Signature: _____	Signature: _____
Name: _____	Name: _____
Title: _____	Title: _____

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Zayo Customer Schedule

CUSTOMER SCHEDULE
DARK FIBER

This Dark Fiber Customer Schedule ("**Customer Schedule**") dated **MONTH DAY**, 20 YR, is subject to, and made a part of, that Master Customer Agreement or Master Service Agreement ("**MCA**" or "**Master Customer Agreement**") dated **MONTH DAY**, 20 YR entered into between the undersigned Parties. Zayo owns and operates fiber networks and other related telecommunications facilities and is in the business of leasing dark optical fiber strands ("**Dark Fiber**") within the Zayo network ("**Dark Fiber Offerings**" or "**Offerings**"). Capitalized terms not defined herein will have the meaning ascribed to them in the MCA.

1. **DEFINITIONS.** The following additional definitions shall apply to Dark Fiber Offerings:

   1.1 **Allocated MRC** means a portion of a Monthly Recurring Charge allocated by Segment on a pro-rata basis, unless otherwise specified in a Customer Order.

   1.2 **Costs** mean any applicable cancellation, termination or other charges from a third party, charges for make ready work, permitting and engineering fees, building access or license fees, Zayo standard labor charges, special construction charges and/or materials and equipment costs.

   1.3 **Customer Requirements** shall have the meaning set forth in Section 4.1 below.

   1.4 **Demarcation Point** is the network interface point specified on a Customer Order where Customer's handoff occurs.

   1.5 **Estimated Access Date** is the date or access/delivery interval, specified in a Customer Order, in which Zayo estimates the Dark Fiber Offering to be available to Customer.

   1.6 **Offering Specifications** means both the definitions and performance specifications of an Offering detailed herein and in a Customer Order.

   1.7 **Segment** is a span of Dark Fiber between Locations specified in a Customer Order.

2. **GRANT OF LEASE.** As of the Activation Date for any Dark Fiber ordered under a Customer Order, Zayo agrees to lease to Customer, and Customer agrees to lease from Zayo, the number of strands of Dark Fiber in the configuration described in the Customer Order. Any materials, components, equipment, optical fiber cable and other property of Zayo shall remain Zayo's property even if affixed to or installed within the real property of Customer. Customer acknowledges that it has no option to purchase any part of the materials, components, equipment, optical fiber cable and other property of Zayo installed between the Demarcation Points. Customer shall keep Zayo's facilities and the Dark Fiber free from all liens, including but not limited to mechanics liens, and encumbrances by reason of the use of the Dark Fiber by Customer. If Customer fails to pay, or bring appropriate challenge to, any taxes, assessments, or other fees, and such failure results in the imposition of a lien or encumbrance on the Dark Fiber or an assessment directly against Zayo, Zayo shall have the right to pay the same and charge the amount thereof to Customer, who shall pay the same promptly upon demand. This right is in addition to any other right provided to Zayo herein to remedy a breach of this Customer Schedule. Customer shall be responsible for obtaining and maintaining any rights or licenses required for it to lease, use, occupy or operate the Dark Fiber.

3. **CUSTOMER REQUESTS AND ACCESS**

   3.1. **Customer Order Acceptance.** Within five (5) business days of Zayo's acknowledgment to Customer of receipt of a Customer Order, Zayo will notify Customer (in writing or electronically) of its acceptance of the Customer Order ("**Customer Order Acceptance**"), at which time such Customer Order becomes a binding obligation to purchase the Offerings therein, or rejection of such Customer Order, in which case Zayo will communicate to Customer why it is unable to accept such Customer Order. Zayo may accept or reject any submitted Customer Order in its sole discretion. Unless otherwise provided in the MCA or this Customer Schedule, Customer's obligations specified in an accepted Customer Order are non-cancellable. Dark Fiber Offerings are subject to availability and Zayo retains the right to cancel a Customer Order at any time prior to delivery of the Activation Notice (as defined below).

   3.2. **Activation.** After Zayo has determined that the Offering conforms to the relevant Offering Specifications as described in Exhibit B at the time of delivery, Zayo will provide Customer with a Close Out Package as defined in Exhibit B ("**Activation Notice**"). The "**Activation Date**" shall be the earlier of (i) the date on which Customer begins using the Offering for any purpose other than testing or (ii) the date that Zayo has sent the Activation Notice to Customer. Customer shall have ten (10) days in which to notify Zayo that it is rejecting the Offering that does not meet the Offering Specifications. If Customer has notified Zayo within such ten (10) day period that the Offering does not meet the

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Offering Specifications, and provided that such notification is legitimate, then Zayo shall take such steps reasonably necessary to cause the Offering to meet the Offering Specifications, at which time Zayo shall issue a new Activation Notice and the acceptance process above shall be repeated. Customer's failure or delay to test the Offering or failure or delay to utilize the Offering on or after the Customer Activation Notice date shall not prevent Zayo from billing Customer for the Offering. The billing of any recurring charges shall begin on the Activation Date and continue throughout the Order Term. If the Activation Date is delayed as a result of Customer's failure to meet its responsibilities under the MCA or this Customer Schedule including obtaining the necessary Customer Requirements, Zayo may continue with the acceptance procedures to the extent possible and the Activation Date will be deemed to occur as of the Estimated Access Date or the date that Zayo is ready to provide access to the related Offering, whichever is later.

3.3. **Incrementally Provided Segments.** Unless otherwise specified in a Customer Order, Zayo may incrementally provide access to individual Segments of an Offering, when ready, which may result in different Activation Dates for such incrementally provided Segments. The initial Order Term for each incrementally provided Segment shall begin on its respective Activation Date and end after the period specified as the Order Term from the Activation Date of the last Segment provided. The charge associated with a provided Segment will be based on the Allocated MRC.

4. COMPONENTS AND INSTALLATION

4.1. **Access and Customer Premises Obligations.** In support of Zayo meeting the Estimated Access Date, Customer specifically acknowledges that Customer is responsible for all work and Costs on the premise side of each Demarcation Point, including technically compatible cross-connections. In addition, Customer shall be responsible for securing all rights and paying the related Costs to connect to the Demarcation Point and for securing all rights and paying the related Costs to access, occupy, and conduct typical telecommunication operations within and to each respective building (including any necessary rights for Zayo to enter and access each building), and for providing all necessary cable pathways in and to the respective buildings (all of the preceding may include, but not be limited to, construction permits and underlying rights, wayleaves, building access and/or occupancy agreements, building access and/or occupancy fees, lateral/conduit fees, riser fees, cross-connects and cross-connect fees, coordination at any third party owned location, and, where applicable, necessary space for Zayo's fiber termination panel). All of the above, collectively, shall be referred to as "**Customer Requirements**" and Customer shall reimburse Zayo in the event that a third party bills Zayo for charges related to such Customer Requirements. If Customer satisfies a Customer Requirement by purchasing Service from Zayo, Zayo may pass through and Customer shall pay Zayo for any increase in the charges to Zayo by a third party which Zayo utilizes to provide Customer the Customer Requirement. Customer acknowledges that any delay in Customer providing such Customer Requirements may delay Zayo from completing work at any location.

4.2. **Zayo Facilities.** Zayo, or its agent, may provide, install, maintain, repair, operate and control Zayo's conduit, optical fiber cable, fiber termination panels or any other components or equipment ("**Zayo Facility(ies)**"). Any facilities, components, or equipment that is not a Zayo Facility is a "**non-Zayo Facility(ies).**" Customer shall be liable for any loss of or damage to Zayo Facilities caused by Customer's negligence, intentional acts, or unauthorized maintenance and shall reimburse Zayo for the same. If, on responding to a Customer initiated support call, Zayo reasonably determines that the cause of the deficiency was a failure, malfunction or the inadequacy of facilities, components, or equipment other than Zayo Facilities, Customer shall compensate Zayo for actual time and materials expended during the support call and for any work performed by Zayo on non-Zayo Facilities.

5. USE OF DARK FIBER

5.1. Subject to the limitations set forth in this Customer Schedule, Customer shall use the optical fiber strands of the Offering solely for lawful purposes. In no event whatsoever shall Customer directly or indirectly transfer, sell, assign, swap, exchange, lease, sublease, license, sublicense, resell or grant indefeasible or other rights of use in or to all or any part of the optical fiber strands as "dark fiber" as such term is commonly understood in the telecommunications industry. A violation of this provision shall be a material default and shall subject Customer to immediate termination.

5.2. Except as expressly set forth herein as part of the access rights included within the Dark Fiber Offering, the lease does not include the right of Customer to own, control, access, maintain, splice, adjust, align, cut, modify or revise the Dark Fiber. Customer will not install any components or equipment to be used with the Offering that damages or interferes with the Zayo network.

6. MAINTENANCE, RELOCATION AND ADJUSTMENTS

6.1. **Maintenance.** Zayo or its affiliates shall provide Routine Maintenance and Non-Routine Maintenance as defined in and in accordance with Exhibit A. In the event Zayo responds to a perceived or actual interruption of Customer's access to the Zayo network and it is determined that the interruption was not attributed to the failure of Zayo's network

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or Customer's failure to identify deficiencies in the Close Out Package within the period described in Section 3.2, Zayo reserves the right to charge the Customer the Cost of such Non-Routine Maintenance.

6.2. **Relocation.** Customer acknowledges and agrees that, after the Activation Date, Zayo may be required (i) by any governmental authority under the power of eminent domain or otherwise, (ii) by the grantor or provider of any underlying right, (iii) by any other person having the authority to so require, or (iv) by the occurrence of any Force Majeure Event, to relocate the Segment(s) of the Zayo network. In such event Customer shall reimburse Zayo for its proportionate share of the Costs related to such relocation, which shall be the number of Customer fibers divided by the total amount of fibers in use for the particular Segment.

6.3. **Adjustments.** The Monthly Recurring Charge for the Dark Fiber Offering shall be adjusted annually effective December 31st of each year by the greater of (i) four percent (4%) or (ii) the cumulative increase in the U.S. Consumer Price Index, All Urban Consumers (CPI-U), U.S. City Average, published by United States Department of Labor, Bureau of Labor Statistics ("CPI Adjustment") for the preceding 12 month period. In the event the Bureau of Labor Statistics (or any successor organization) no longer publishes the CPI-U, Zayo may, in its reasonable discretion, designate a replacement index.

DATED this _____day of _____, 20____.

ZAYO GROUP, LLC		**ENTER CUSTOMER NAME HERE ("CUSTOMER")**	
Signature:	_____	Signature:	_____
Name:	_____	Name:	_____
Title:	_____	Title:	_____

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Exhibit A

Maintenance & Repair

1. **Purpose.** This Exhibit describes the policies and procedures Zayo utilizes to maintain the Dark Fiber Offering. Zayo shall ensure that the Dark Fiber Offering is maintained according to the procedures specified herein, through application of commercially reasonable and accepted industry standards, and in accordance with manufacturers' specifications. The purpose and result of maintenance shall be to maintain (in the case of Routine Maintenance) or restore (in the case of Non-Routine Maintenance) the functionality of the Dark Fiber Offering. Zayo reserves the right to modify these procedures as appropriate to ensure that performance specifications are achieved.

2. **Network Maintenance.** Zayo performs cable and conduit maintenance and repair, on a twenty-four (24) hour per day, seven (7) days per week basis (24x7). Zayo utilizes only qualified personnel, office services, vehicles, and all tools and materials required for the safe and proper performance of network monitoring, maintenance procedures and emergency restoration.

3. **Routine Maintenance.** Routine Maintenance is maintenance and repairs that Zayo deems necessary to ensure proper functioning of the Zayo network. Zayo shall perform routine and preventative maintenance and all cable and locate activities as a part of the local "Call Before You Dig" program. Planned network maintenance that does or does not potentially involve the disruption of functionality of the Dark Fiber Offerings is also considered Routine Maintenance. The nature of such a planned Routine Maintenance activity is such that it can be pre-scheduled so as to allow notification to Customer as appropriate. The Zayo NOC will generally conduct such planned Routine Maintenance outside normal working hours anytime between 12:00 AM to 5:00 AM (local time) seven (7) days a week. Zayo will provide Customer with fourteen (14) days prior notice of Routine Maintenance that affects availability. All maintenance other than Routine Maintenance as described above shall be deemed to be Non-Routine Maintenance.

4. **Non-Routine & Emergency Maintenance.** For any Non-Routine Maintenance performed to restore functionality of the Dark Fiber Offerings (including, but not limited to, emergency repairs required due to cable cuts, fires, remodeling work or other acts of third parties or Force Majeure events), Customer will first use commercially reasonable efforts to determine that any disruption in the functionality of the Dark Fiber Offering is not on the Customer's side of the Demarcation Point. After verifying that the problem is not on Customer's side of the Demarcation Point, Customer shall open a Trouble Case for Technical Support by contacting Zayo Customer Support at 1-866-236-2824 (US and Canada) / +4420 3846 4222 (Europe) / 00800 4997 0737 (France) , or noc@zayo.com. Escalation procedures following opening of a Trouble Case can be found at https://tranzact.zayo.com/#!/escalation-lists.

5. **Optical Fiber Repair & Restoration.** Following receipt of Customer's notification of a Trouble Case, Zayo shall reasonably endeavor to respond on-site (if necessary) to the affected location(s) within two (2) hours of the initial Trouble Case, provided Zayo has all necessary access to the Customer Location(s), including Customer's Premises. In the event of a fiber failure, Zayo shall reasonably endeavor to begin Dark Fiber Offering restoration within two (2) hours following identification of such failure. Zayo shall use its best efforts to then restore the functionality of the Dark Fiber Offering no later than six (6) hours following initiation of restoration activities. During an outage Zayo shall contact Customer on a regular basis, to update the status of restoration. Zayo is responsible for ensuring that the maintenance personnel are properly trained and otherwise qualified to perform the maintenance on the Offerings. Customer shall procure for Zayo reasonable 24x7x365 access to Customer's Location(s) for purposes of both Routine and Non-Routine Maintenance.

6. **Mean Time to Repair Credits.**

   6.1 The term "Outage" shall be defined as a total loss of the ability of a strand of Dark Fiber to pass light for a continuous and uninterrupted period of time; provided, however, that any such interruption will not be deemed an Outage if caused by: (a) any act or omission of the Customer or its End User Customers, or their representatives, contractors, agents, authorized invitees, successors or assigns; (b) the configuration, failure or malfunction of non-Zayo Facilities; (c) scheduled maintenance or planned enhancements or upgrades to Zayo's network; (d) Zayo not having reasonable and uninterrupted access to any premises or site respecting the Outage (the "**Outage Site**"); or (e) a Force Majeure Event. Each of the events described in this Section 6.1shall be deemed an "**Excused Outage.**"

   6.2 **Outage Credits.** In the event an Outage takes longer than twelve (12) hours to repair following Zayo's arrival at (and having continuous and uninterrupted access to) the Outage Site, then subject to Section 6.3 below, Customer shall be entitled to an Outage credit equal to one (1) day of pro-rated MRC of the affected Dark Fibers for every full hour greater than twelve (12) hours for which the Outage persists ("Outage Credit"). The pro-rated MRC shall be determined by dividing the total MRC for all Dark Fibers in the Order by the number of Dark Fibers in the Order, then multiplying that number by the total number of Dark Fibers affected by the Outage, then dividing that by the number of days in the month.

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6.3 Credit Process. In order to receive an Outage Credit, Customer must (a) immediately report the Outage to the NOC and open a trouble ticket and (b) make a written request for the same within thirty (30 days following the end of the month in which the Outage occurred along with providing sufficient detail to permit Zayo to investigate the Outage Credit request. Upon receipt of Customer's request, Zayo will investigate the claim under the terms described in this Customer Schedule. Credits will be granted only if Customer has paid all outstanding invoices by the Due Dates thereof. The issuance of credits pursuant to this Section is Zayo's sole obligation and, along with termination in accordance with Section 6.4 (Chronic Outage), Customer's sole remedy for any failure or non-performance of Offerings set forth in this Customer Schedule. Outage Credits shall be deducted from the charges payable by Customer hereunder and shall be expressly indicated on the Customer invoice. The maximum Outage Credit in a calendar month shall not exceed 50% of the MRC for the affected Dark Fiber.

6.4 Chronic Outage: Customer may terminate the affected Segment without incurring early termination charges if: Customer experiences three (3) or more related Outages on the same Segment, each with an Outage Duration lasting more than one (1) hour in any thirty (30) day period. In order to exercise a right to terminate under this Section, Customer must notify Zayo of its intent to terminate the affected Offering in writing within thirty (30) days after the event giving rise to a right of termination. Customer shall be deemed to have waived its right to terminate under this Section if it fails to provide the requisite notice within such thirty (30) day period. Zayo reserves the right to refuse the foregoing termination right if Customer has any past-due balances. Notwithstanding the foregoing, Customer may not terminate the affected Dark Fiber Offering under this Section if Zayo is able to cure (to Customer's reasonable satisfaction) the issue(s) giving rise to such Outages under this provision within thirty (30) calendar days of the chronic outage triggering event.

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Exhibit B

Zayo-Provided Dark Fiber Specification & Testing Acceptance Objectives

Unless otherwise defined herein, capitalized terms shall have the meaning given them in Zayo's standard Dark Fiber Schedule ("Schedule") in use at the time of testing.

Pursuant to Section 3.2 of the Schedule, Zayo will perform testing on the Zayo-provided Dark Fiber Offering as described herein, on a per Fiber Span (defined below) basis and provide test results to the Customer at the e-mail address provided by Customer ("Close Out Package"). In the event the Dark Fiber is OOS (defined below), Customer shall accept or reject the Dark Fiber as set forth in Section 3.2 of the Schedule.

1.0 Definitions

Connector – Dark Fiber Strand polished to a flat surface and housed within an adapter to enable the transfer of light to another connection. All Connectors on Dark Fiber are created in a manufacturer lab per industry standard.

Mated Connector – Two Dark Fiber Connectors linking together Dark Fibers, generally at a cross-connect at a termination panel.

In-Line Connector – Connectors used to link Segments between Demarcation Points. In-Line Connectors are always mated with another In-Line Connector.

Front End Connector (FEC) – Connector at the Demarcation Point, marking the beginning or end of the Segment.

Dark Fiber Strand or Strand - a single optic fiber.

Dead Zone – A portion of the Dark Fiber that cannot be accurately measured without the use of a Launch Reel.

Fiber Span - A Segment of one or many Dark Fiber optic strands that are terminated to a Connector on each end.

Fusion Splice – The act of using a fusion splice machine to melt two ends of Dark Fiber for purposes of joining together.

Launch Reel – Spool of fiber used to accurately measure the insertion loss at the Front End Connector, eliminating the Dead Zone.

OOS - Any event not meeting the criteria in Section 4.2 or 4.4 will be considered out of specification ("OOS").

OTDR (Optical Time Domain Reflectometer) – Instrument used to measure a Dark Fiber path by injecting pulses of lights at a specific timed rate within a specific range. The pulses are then analyzed by the OTDR upon returning to the point of origin by means of reflection due to characteristics of the Dark Fiber.

Pulse Width – Length of time a single pulse of light enters the fiber optic glass.

Range – Distance that the OTDR will perform measurement of a Span.

Power Meter – Instrument used to measure the loss of light that occurs on a given Span.

Pigtail – The opposing end of Dark Fiber glass that has been lab polished in a Connector.

Trace - Test performed on a single Dark Fiber Strand with certain parameters. Each Trace represents a single test that is performed on a Dark Fiber Strand from a single direction.

2.0. Fiber Performance.

Zayo will endeavor to meet the following ITU Specifications for Dark Fiber:

Table 1 –Fiber specification limits

Parameter	ITU-T G652 & G.657	ITU-T G.655
Dispersion @1550nm [ps/(nm*km)]	≤18.5	≥2.0 to ≤8.0
Typical Attenuation @1550 (dB/km)	≥0.18 to ≤0.25	≥0.19 – ≤0.25
Zero Dispersion Wavelength (nm)	≥1300 to ≤1324	≥1450 to ≤1520
Mode Field Diameter @ 1550nm (µm)	≥9.3 to ≤10.9	≥9.2 to ≤10.0

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Polarization Mode Dispersion (ps/√km)	≤0.2	≤0.1

Dark Fiber types may differ across a Fiber Span. In the event that non-Zayo Facilities, including cross-connects, campus and entrance cables, riser cables and third-party outside plant are required to deliver the Offerings, Zayo will use commercially reasonable efforts to meet the Specifications set forth in this Exhibit B, but failure of non-Zayo Facilities to meet the Specifications in this Exhibit B is not a violation.

3.0. Span Loss Requirements

Each Strand within a Span will be measured Bi-Directionally using a recently calibrated and industry-accepted light (laser) source and Power Meter Units in order to measure Span Loss.

3.1. Attenuation per Fiber Strand Formula

The applicable formula to be applied will depend on distance - See Table 2 below.

*1550 Wavelength = [Span Length (km) * 0.25dB] + [Number of Splices * 0.15dB] + [Number of Mated Connectors * 0.5 dB] + [2dB]*
*1310 Wavelength = [Span Length (km) * 0.40dB] + [Number of Splices * 0.25dB] + [Number of Mated Connectors * 0.5 dB] + [2dB]*
**A 2db buffer is included to allow for fiber degradation and repairs over the life of the Dark Fiber.*

4.0. OTDR Testing

Each Strand will be tested bi-directionally using a recently calibrated OTDR. Zayo will use the appropriate settings as per the OTDR manufacturer's recommendation depending on dark fiber type and segment distance. Bi-directional OTDR Traces will be recorded using the same setting on the OTDR.

4.1. Fiber Span Traces

For each Fiber Strand delivered to the Customer, Zayo will perform Fiber Span Traces and Front End Connection ("FEC") Traces.

Fiber Span Traces will be measured bi-directional and used to ensure all splices and In-line connectors are visible and within spec and will be measured in the following wavelengths, depending on Distance.

1625nm testing will only be performed for Long Haul Dark Fiber services and Fiber Characterization testing.

Table 2 – Wavelength Test Parameters

OTDR Testing Requirements by Span Length	
< 50KM	*> 50KM*
1310 nm	1550 nm
1550 nm	1625 nm

4.2. Fiber Span Loss Thresholds

4.2.1. Splice Loss

All splices will be performed by Fusion Splicing. The target allowance of a single splice event is 0.30 dB bi-directionally at 1550nm for homogeneous core types. The target allowance of a single splice event is 0.40 dB bi-directionally at 1550nm for heterogeneous core types.

In the event of an OOS, Zayo has the right to waive the target allowance provided the average splice loss on the entire Span does not exceed 0.15 dB bi-directionally at 1550nm. The Span will be considered to have met the splice loss criteria.

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4.2.2. Connector Loss

All In-line Connectors will be factory polished (hand polish is not acceptable). The maximum allowance of a Connector with a Pigtail Splice will not exceed a combined 0.50 dB loss. Any In-line jumper (cross-connect) including the patch cord and two Connectors will not exceed a combined 1.00 dB loss.

4.2.3. Reflectance

The maximum allowance of any FEC or In-line Connector will not exceed a reflectance of -45.0 dB.

4.3. FEC Traces

FEC traces will be performed unidirectional at each side of the Strand (unless Zayo is handing off the Dark Fiber in the field via stub cable) to ensure any connectors within the first 500 feet are measurable and outside of the Dead Zone. FEC traces will be taken at low pulse width and range using a 1km Launch Reel between the OTDR and connector.

4.4. FEC Loss Thresholds

4.4.1. Connector Loss

Maximum allowance of a Connector with Pigtail Splice will not exceed a combined 0.50 dB loss.

5.0. Fiber Characterization

Zayo is not obligated to perform this test and additional charges may apply. Zayo will perform fiber characterization testing only upon Customer request, at Customer's sole cost and expense. Fiber Characterization testing includes Chromatic Dispersion and Polarization Mode Dispersion and Optical Return Loss.

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PARTNER TERMS AND NEGOTIATIONS

SUMMARY

As part of this broadband study, several steps have been completed to reach out to and connect with Internet Service Providers (ISPs). There are multiple places in this project final report to find details regarding the interactions with ISPs:

- The Market Assessment section of the report provides a list of the ISPs in the Coachella Valley and others who have expressed an interest in potentially expanding into the area. This section also provides details on what infrastructure they have deployed, what percent of the Coachella Valley they cover, services they provide, plans they offer, etc.
- Each of the ISPs was contacted for a more detailed discussion regarding their coverage and intentions regarding expansion in the Coachella Valley
- To more clearly define ISP plans, a Request For Expressions of Interest (RFEI) was released in March 2025. The RFEI and the results can be found in the RFEI section of this report
- There were follow-up conversations with each of the five respondents to clarify their responses (notes of those discussions can be found in the Partner RFP Development and Evaluation section of this report). All members of the Strategic Advisory Group for this study were invited to the RFIE follow-up discussions

This base of information and relationship building indicates there are significant opportunities for collaboration to reach unserved and underserved addresses with better broadband (and improve connectivity) in the Coachella Valley.

This section of the report outlines steps, considerations and processes to continue building relationships with ISPs and to negotiate with them to achieve mutually beneficial goals.

STEPS NEEDED BEFORE ENGAGING AND NEGOTIATING WITH ISPS

1. Define Jurisdiction Broadband Goals: Deciding if the jurisdiction is solely interested in working towards helping the current unserved and underserved residents or if there are other connectivity-related goals that can include or build upon reaching those with broadband needs.
2. Regional Approach: Collaborating with CVAG and other jurisdictions is important to see if it is possible to take a regional approach to meeting broadband needs. This scale can increase interest from ISPs, lower costs and potentially find other mutually beneficial opportunities. In the Policy and Design Standards sections of this report, there are recommendations for policies and broadband construction design standards that could be ratified on a regional scale (by all of the jurisdictions in

the Coachella Valley). If an ISP can know that policies and design standards are mostly uniform across the region, that can be a key factor in decisions they make to invest in deploying new infrastructure. Having those adopted (as uniformly as possible) would be a major incentive to attract ISP investment with very little expenditure from the jurisdictions (as mentioned below – depending on the governance model selected)

3. Governance Model: Select the partnership model that aligns optimally with the jurisdiction's broadband goals. Refer to the Governance section of this final report for more information on the various partnership models.

4. Available Information: Information collected in this study can help in discussions and negotiations with ISPs. Particularly:

    - The Regional Broadband GIS Map contains unserved and underserved addresses and available conduit that ISPs could be interested in (therefore a negotiation tool)
    - The Market Assessment section of this report contains background on the majority of IPSs in the region
    - The Needs Assessment section of this report contains interactions with ISPs
    - The Partner RFP Development section of this report contains Request For Expressions Of Interest responses and a record of conversations with the respondent ISPs
    - Design documents in the Design section can provide insight into cost concerns the ISPs might have

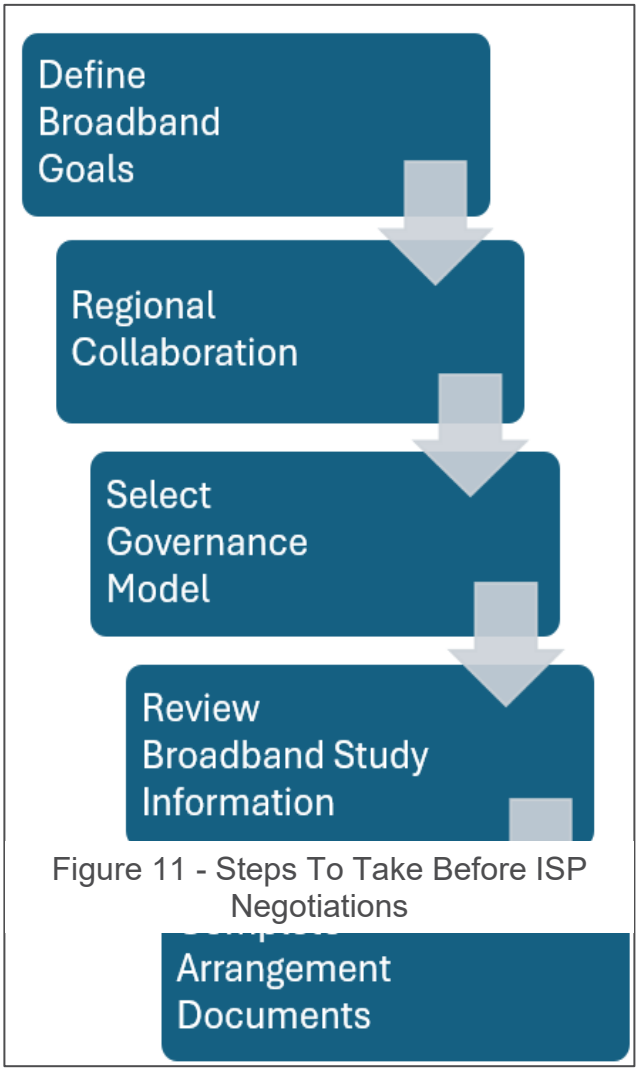


Figure 11 - Steps To Take Before ISP Negotiations

5. Arrangement Documents: During this study, documents to formalize broadband infrastructure partnership arrangements have been developed. Template agreements are provided in the appendices of this section for a jurisdiction and its ISP partner to use available public conduit, a reimbursement agreement for one jurisdiction to leverage a CVAG construction contract, and an agreement for a jurisdiction to access the regional CV Sync program fiber optic cable for jurisdiction operations. It will be necessary for each jurisdiction to review and modify the template agreements to meet their needs for a given ISP partnership opportunity. It is also important to communicate to ISPs that they have to seek approval and make arrangements with the appropriate jurisdiction before accessing conduit

CONSIDERATIONS FOR ENGAGING AND NEGOTIATING WITH AN ISP

If the governance model selected includes partnering with an ISP, there are some important factors to consider in engaging and negotiating a partnership.

- Speed To Market: For many ISPs, the most significant factor in determining where they invest in new infrastructure is speed to market. The longer the process takes the more they are either tying up their capital with no return or missing other opportunities. The larger the area they can deploy more quickly, the more attractive that area is. That reality highlights the opportunity that can be raised by having regional policies and design standards. Also, if a jurisdiction wants an ISP to deploy in their area, whatever ways the jurisdiction can streamline and shorten the process will be relevant (particularly if there is no regional draw)
- Costs: In the Design section of this report, there are sample high-level designs of networks for potential build areas that contain unserved and underserved address. These are meant to help jurisdictions decide governance models and to help in discussion with ISPs (if the selected governance model includes ISPs). Understanding what the ISPs are facing in terms of costs and Return on Investment can help keep conversations realistic and focused on solutions
- Available Conduit: Available conduit can save significant costs. In the Regional Broadband GIS Map that was created as part of this study, there are two options for potentially available conduit:
    - CV Sync
    - Jurisdiction CIP projects that do or will include conduit.

    Refer to the Regional Broadband Interactive Map for detailed information

    As is detailed in the Design section of this report, the cost to deploy conduit (which is usually the first step in deploying fiber (the fiber then is run inside the conduit)) is approximately $51/lineal foot. If the conduit is in place, placing the fiber in the conduit is less than $3 per lineal foot

    This makes the clear point that most ISPs want to utilize existing fiber. They are usually willing to pay a lease fee to use the fiber as long as the fee is reasonable

- ISPs are typically high risk, high reward entrepreneurial companies. They usually invest tens of millions of dollars (or more) to build infrastructure that no one has to subscribe to. Working together to take advantage of opportunities can develop long-term mutually beneficial relationships. Helping each other understand needs and motivations can make it far easier to find win/wins

STEPS TO TAKE TO ENGAGE AND NEGOTIATE WITH AN ISP

Below are steps to consider taking to engage and negotiate with ISPs. There is a section of this report that defines a full implementation plan for the different aspects of this study. It also includes implementation steps for utilizing CV Sync conduit. Regarding engagement and negotiating with ISPs, below are recommended steps to consider:

- Review this study to see if the ISP had interacted with CVAG. If the ISP responded to the RFEI, review their plans and goals
- Clarify specific details regarding their plans:
    - The technology the ISP is using (fiber, cable, copper, DSL, fixed wireless, satellite). This can be important for future plans and options for the jurisdiction. For example, if no fiber is being deployed, the capacity and speed needs of the citizens, businesses and public agencies might not keep up with future needs
    - Their plan regarding reaching some unserved and underserved or all within the jurisdiction
    - Whether their pricing will be affordable (in the short run and in the long run)
    - What is their track record in construction, restoration, customer service, financially, etc.
    - If they have plans to help with digital literacy

  - Some ISPs offer incentives to jurisdictions with examples being lower rates for jurisdiction facilities, some form of revenue sharing, etc.
  - Supplying GIS as-builts so they can be added to the jurisdiction's GIS and to CVAG's Regional Broadband GIS Map
- Providing "Broadband Currency": In negotiating with ISPs, it is important to remember jurisdiction broadband goals. If a jurisdiction goal is to attract an ISP, jurisdictions have "broadband currency" (specific things ISPs are looking for in decisions to invest in infrastructure). Examples of broadband currency jurisdictions have are:
  - Helping the ISP improve speed to market through policies focused on efficient permitting and project controls
  - Providing options to lower costs. **Available conduit was mentioned by ISPs as something they would be very interested in – therefore, it is negotiating tool.** These can help bring an ISP to the jurisdiction and give the jurisdiction room to request what the jurisdiction would like to see
- With the above in mind, jurisdictions can approach the ISPs who have participated in this study, knowing that the ISPs know some details about needs and opportunities in the Coachella Valley and are familiar with many of the details. For ISPs who have not participated in the study, it will be important to help them understand as much as possible about the preparations that have been accomplished
- Follow the jurisdiction permit process (hopefully with regional alignment). Policies should be updated to align with jurisdiction goals before ISP negotiations begin, if possible. Examples of broadband related policies can be found in the Policy section of this report
- Complete specific MOUs with CVAG and with ISPs for use of available conduit. Examples of the Reimbursement Agreement and License Agreement are in Section Appendix A and B (respectively). In negotiating MOUs for ISPs to use existing conduit, longer term MOU terms and leases will be more preferable. ISPs will be installing fiber in the conduit, so they will not want short leases that could jeopardize their fiber

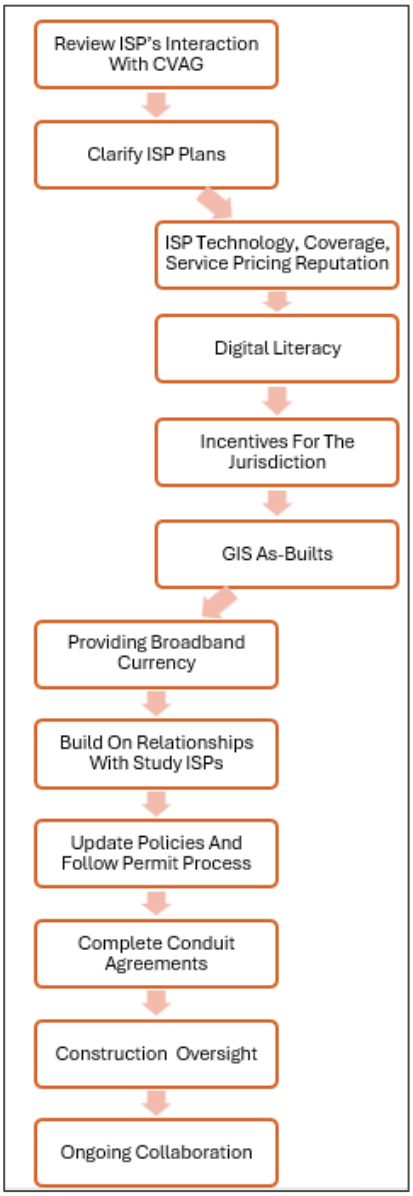


Figure 12 - Engaging And Negotiating With ISPs

- Have a plan for construction oversight to ensure the infrastructure is built according to plans and permits. The negotiating point of this requirement is the ISP should pay for this as long as it is a reasonable cost. If the jurisdiction desires to attract and ISP, fees can be negotiated (ensuring costs do not force an ISP to build in another jurisdiction
- Continue discussions and meetings with them during construction (and after) to work towards continuing to identify mutually beneficial opportunities. These often arise quickly and need quick decisions – having the process and relationship to collaborate on short notice can help with leveraging possibilities

SECTION APPENDIX A – CV SYNC BROADBAND CO-LOCATION REIMBURSEMENT AGREEMENT

Purpose of this agreement:

- Reimbursement of CVAG member jurisdiction to CVAG for the full cost of designing, constructing, and installing either shared fiber from the CV Sync fiber optic cable for jurisdiction use, co-located jurisdiction fiber optic cable within CV Sync conduit, or both. (Additional verbiage to be added to this document for fiber use-related costs, in addition to anonymizing the document into more of a template)
- Requirement of a Time Trigger for CVAG member jurisdiction to initiate and/or complete actions.
- Establish the maximum amount of the reimbursement.
- Establishes the scope of the Project.
- Establishes mutual responsibilities of the Parties.

REIMBURSEMENT AGREEMENT

BY AND BETWEEN CVAG AND JURISDICTION

FOR THE

CO-LOCATION OF JURISDICTION BROADBAND FIBER OPTIC CABLE WITHIN CVAG CV SYNC CONDUIT

THIS AGREEMENT is made and entered into this **___th day of MONTH YEAR**, by and between the **JURISDICTION**, a municipal corporation, ("**City**") or a federally recognized Indian tribe (**"JURISDICTION"**, or the "**Tribe**") and the **Coachella Valley Association of Governments**, a California joint powers authority, **("CVAG")**, and is made with reference to the following background facts and circumstances:

RECITALS

The "Coachella Valley Area Transportation Study", a valley-wide study prepared under the auspices of CVAG, has identified various transportation and highway projects and corridors throughout the Coachella Valley to be of regional importance. This project is included in the 2016 Transportation Project Prioritization Study (TPPS) document; and,

Approval of a highway financing measure by the voters of Riverside County in November of 1988, as well as the approval of an extension of Measure A by the voters in November of 2002, has created a source of funds with which to construct such projects; and,

CVAG by agreement with its member agencies and with the Riverside County Transportation Commission ("RCTC"), has been designated as the agency through which such funds are to be conveyed and disbursed for the purpose of completing said regional transportation projects; and,

CVAG Executive Committee, on July 31, 2006, approved the implementation of the amended Transportation Uniform Mitigation Fee "TUMF" Fee Ordinance to increase the collected TUMF Fee, effective January 1, 2007; and,

CVAG has planned for the regional synchronization of traffic signals, the modernization and standardization of hardware and software, and preparation for future intelligent transportation system infrastructure (ITS) in the Coachella Valley; and,

JURISDICTION is developing a broadband fiber network to serve municipal facilities, residents and businesses along corridors included in the scope of the CV Sync project; and,

In February 2018, the Executive Committee approved the Master Plan for CV Sync; and,

The approved CV Sync Master Plan includes conduit and fiber optic cable that reserves fibers not only for the traffic management systems, communications and Intelligent Transportation Systems ("ITS") elements, but it also includes reserving fibers for future applications such as Smart Cities and others for the future; and

In MONTH 2018, **JURISDICTION** and CVAG executed a Multi-Agency Participating Agreement for Coachella Valley Regional Traffic Signal Synchronization Program; and

In February 2021, the Executive Committee awarded the construction of Phase I of the CV Sync project; and,

In December 2022, the Executive Committee awarded the construction of Phase II of the CV Sync project; and,

The CV Sync project installed fiber optic cable in either conduits owned by the **JURISDICTION** or conduits owned by CVAG, with construction plans for the CV Sync projects indicating the ownership of said conduits; and

In June 2023, the Executive Committee authorized a contract change order with Crosstown Electric and

Data, Inc., and a reimbursement agreement with **JURISDICTION** to cover all costs associated with the co-location of **JURISDICTION** broadband fiber with the construction of the CV Sync Phase II project; and,

In October 2023, **JURISDICTION** authorized a reimbursement agreement with CVAG in an amount not to exceed $900,000 for work related to the co-location of **JURISDICTION** broadband fiber with the construction of CV Sync Phase II; and,

Whereas, CVAG will expend Measure A or TUMF funds to front the cost of the co-location of **JURISDICTION** broadband fiber with the construction of the CV Sync Phase II project with said expended funds to be fully reimbursed to CVAG by **JURISDICTION**.

NOW, THEREFORE, in consideration of the mutual covenants and subject to the conditions contained herein, the parties do agree as follows:

1. The Project is generally described as and consists of the following: **Co-Location of JURISDICTION Broadband Fiber with CVAG CV Sync Conduit.** These services will hereinafter be referred to as the "Project".
2. The scope of work of the Project is more particularly described in **Exhibit "A"**, entitled "Scope of Services " attached hereto and made a part hereof. The cost estimate for the Project is more particularly described in **Exhibit "B"** - "Estimate of Cost", attached hereto and made a part hereof. The cost estimate includes a calculation intended to allow CVAG to recover an amount representing the time of its contracted engineering staff working on the Project.
3. This Agreement shall establish a Time Trigger, which will require that the start of the Construction Phase of the Project must begin by March 31, 2024.
4. The total estimated cost of the Project shall not exceed $900,000. **JURISDICTION** shall coordinate the design of the Project improvements with the CV Sync improvements subject to approval by CVAG. CVAG shall be responsible to pay CVAG's contractor for the Project. **JURISDICTION** shall reimburse CVAG one hundred percent (100%) for the cost of the Project.
5. CVAG may decline or delay regional funds to **JURISDICTION** should CVAG determine that such action is necessary to maintain a minimum balance of TUMF or Measure A funds.
6. CVAG shall be responsible for initial payment of all covered costs as they are incurred. Following payment of such costs, CVAG shall submit invoices to **JURISDICTION** requesting reimbursement of one hundred percent of those for the Project. Each invoice shall be accompanied by detailed contractor invoices, or other demands for payment addressed to CVAG, and documents evidencing CVAG's payment of the invoices or demands for payment. CVAG shall also submit a Project Completion Report, in a form acceptable to **JURISDICTION**, with each statement. CVAG shall submit invoices not more often than monthly and not less often than quarterly.

   6.1 Upon receipt of an invoice from CVAG, **JURISDICTION** may request additional documentation or explanation of the Project costs. Undisputed reimbursement amounts shall be paid by **JURISDICTION** to CVAG within thirty (30) days.

   6.2 If a post-payment audit or review indicates that **JURISDICTION** has provided reimbursement to CVAG in an amount in excess of One-Hundred Percent of eligible costs, CVAG shall reimburse **JURISDICTION** for the excess payments within thirty (30) days of notification by CVAG.
7. Prior to any final payment to Agency by CVAG, a final report shall be submitted to **JURISDICTION** by CVAG containing a record of all payments made for said Project and the source of funds of all such payments, together with a record of all change orders, cost over-runs, and other expenses incurred. Final payment will thereafter be paid by **JURISDICTION** in accordance with CVAG rules, regulations and policies concerning project cost determination and expense eligibility.
8. The format used for all bids solicited by **JURISDICTION** for the Project shall require itemization sufficient to allow quantities of each bid item to be easily discernible.

9. The parties agree that should unforeseen circumstances arise which result in new work not covered in Exhibit "A," an increase of any costs over those shown in Exhibit "B," or other changes in the Scope of Work are proposed, CVAG will in good faith consider an amendment to this Agreement to provide for further appropriate reimbursement if the proposed amendment is in accordance with the policies, procedures, and cost determination/expense eligibility criteria adopted by CVAG. Non-substantive changes may be made to this agreement subject to CVAG's General Counsel's approval.

10. CVAG shall maintain an accounting of all funds received from **JURISDICTION** pursuant to this Agreement in accordance with generally accepted accounting principles. CVAG agrees to keep all Project contracts and records for a period of not less than three years from the date a notice of completion is filed by **JURISDICTION** on such Project; or, if the Project is not one as to which a notice of completion would normally be recorded, for three years from the date of completion. CVAG shall permit **JURISDICTION**, at any reasonable time, upon reasonable notice, to inspect any records maintained in connection with the Project. **JURISDICTION** shall have no duty to make any such inspection and shall not incur any liability or obligation by reason of making or not making any such inspection.

11. The occurrence of any one or more of the following events shall, at CVAG's option, constitute an event of default and **JURISDICTION** shall provide CVAG with immediate notice thereof.

    11.1 Any warranty, representation, statement, report or certificate made or delivered to CVAG by **JURISDICTION** or any of **JURISDICTION**'s officers, employees or agents now or hereafter which is incorrect, false, untrue or misleading in any material respect;

    11.2 **JURISDICTION** shall fail to pay, perform or comply with, or otherwise shall breach, any obligation, warranty, term or condition in this Agreement or any amendment to this Agreement, or any agreement delivered in connection with the Project; or,

    11.3 There shall occur any of the following: dissolution, termination of existence or insolvency of **JURISDICTION**; the commencement of any proceeding under any bankruptcy or insolvency law by or against **JURISDICTION**; entry of a court order which enjoins, restrains or in any way prevents **JURISDICTION** from paying sums owed to creditors.

12. No waiver of any Event of Default or breach by one party hereunder shall be implied from any omission by the other party to take action on account of such default, and no express waiver shall affect any default other than the default specified in the waiver and the waiver shall be operative only for the time and to the extent therein stated. Waivers of any covenant, term, or condition contained herein shall not be construed as a waiver of any subsequent breach of the same covenant, term or condition. The consent or approval by one party to or of any act by the other party shall not be deemed to waive or render unnecessary the consent or approval to or of any subsequent or similar act.

13. This Agreement is made and entered into for the sole protection and benefit of CVAG and **JURISDICTION** and no third person shall have any right of action under this Agreement.

14. This Agreement is for funding purposes only and nothing herein shall be construed so as to constitute CVAG as an owner or a partner or joint venture with **JURISDICTION** as to the Project. CVAG shall assume the defense of, indemnify and hold harmless **JURISDICTION** and their respective officers, directors, agents, employees, servants, attorneys, and volunteers, and each and every one of them, from and against all actions, damages, claims, losses and expenses of every type and description to which they may be subjected or put by reason of or resulting from the actions or inactions of CVAG related to the Project or taken in the performance of this Agreement or any agreement entered into by **JURISDICTION** with reference to the Project.

15. The parties shall attempt in good faith to resolve any dispute arising out of or relating to this Agreement promptly by negotiations between the parties' authorized representatives. The disputing party shall give the other party written notice of any dispute. Within twenty (20) days after delivery of such notice, the authorized representatives shall meet at a mutually acceptable

time and place, and thereafter as often as they reasonably deem necessary to exchange information and to attempt to resolve the dispute. If the matter has not been resolved within thirty (30) days of the first meeting, any party may initiate mediation of the dispute. The mediation shall be facilitated by a mediator that is acceptable to both parties and shall conclude within sixty (60) days of its commencement, unless the parties agree to extend the mediation process beyond such deadline. Upon agreeing on a mediator, the parties shall enter into a written agreement for the mediation services with each party paying a pro rate share of the mediator's fee, if any. Each party shall bear its own legal fees and expenses. If, after good faith efforts to mediate a dispute the parties cannot agree to a resolution of the dispute, any party may pursue whatever legal remedies may be available to it at law or in equity, before a court of competent jurisdiction and with venue in Riverside County. Should litigation arise out of this Agreement for the performance thereof, the court shall award costs and expenses, including reasonable attorney's fees, to the prevailing party.

16. Any agency receiving federal funds must have an approved Disadvantaged Business Enterprise program. All recipients of Federal Highway Administration (FHWA) funds must carry out the provisions of Part 26, Title 49 of the Code of Federal Regulations (CFR) which established the Federal Department of Transportation's policy supporting the fullest possible participation of firms owned and controlled by minorities and women in the Department of Transportation programs. Except to the extent that such or other contrary federal regulations may apply, **JURISDICTION** covenants that, by and for itself and all persons claiming under or through it, there shall be no discrimination against or segregation of any person or group of persons on account of race, color, creed, religion, sex, marital status, national origin or ancestry in the performance of this Agreement.
17. **JURISDICTION** and CVAG warrant that all aspects of the Project undertaken by them shall be undertaken in compliance with all applicable local, state and federal rules, regulations and laws. **JURISDICTION** will execute and deliver to CVAG such further documents and do other acts and things as CVAG may reasonably request in order to comply fully with all applicable requirements and to effect fully the purposes of this Agreement.
18. This Agreement may not be assigned without the express written consent of CVAG first being obtained.
19. **JURISDICTION** and their successors in interest and assigns shall be bound by all the provisions contained in this Agreement.
20. No officer or employee of CVAG shall be personally liable to **JURISDICTION** or any successor in interest, in the event of any default or breach by CVAG or for any amount with may become due to Crosstown or to its successor, or for breach of any obligation of the terms of this Agreement.
21. No officer or employee of CVAG shall have any personal interest, direct or indirect, in this Agreement; nor shall any such officer or employee participate in any decision relating to this Agreement which effects his or her personal interest or the interest of any corporation, partnership or association in which she or he is, directly or indirectly, interested, in violation of any state, federal or local law.
22. **JURISDICTION** warrants that the funds received by CVAG pursuant to this Agreement shall only be used in a manner consistent with CVAG's reimbursement policy and all applicable regulations and laws. Any provision required to be included in this type of agreement by federal or state law shall be deemed to be incorporated into this Agreement.
23. All notices or other communications required or permitted hereunder shall be in writing and shall be either personally delivered (which shall include delivery by means of professional overnight courier service which confirms receipt in writing, such as Federal Express or UPS); sent by telecopier or facsimile machine capable of confirming transmission and receipt; or sent by certified or registered mail, return receipt requested, postage prepaid to the following parties at the following addresses or numbers:

If to **JURISDICTION:**NAME

TITLE

JURISDICTION NAME

ADDRESS

CITY, STATE, ZIPCODE

TELEPHONE NUMBER

If to **CVAG**:Tom Kirk

Executive Director

Coachella Valley Association of Governments

74-199 El Paseo, Suite 100

Palm Desert, CA 92260

Telephone: (760) 346-1127

Notices sent in accordance with this paragraph shall be deemed delivered upon the next business day following the: (i) date of delivery as indicated on the written confirmation of delivery (if sent by overnight courier service); (ii) the date of actual receipt (if personally delivered by other means); (iii) date of transmission (if sent by telecopier or facsimile machine); or (iv) the date of delivery as indicated on the return receipt if sent by certified or registered mail, return receipt requested. Notice of change of address shall be given by written notice in the manner detailed in this paragraph.

24. This Agreement and the exhibits herein contain the entire agreement between the parties and is intended by the parties to completely state the agreement in full. Any agreement or representation respecting the matter dealt with herein or the duties of any party in relation thereto, not expressly set forth in this Agreement, is null and void.
25. If any term, provision, condition, or covenant of this Agreement, or the application thereof to any party or circumstance, shall to any extent be held invalid or unenforceable, the remainder of the instrument, or the application of such term, provision, condition or covenant to persons or circumstances other than those as to whom or which it is held invalid or unenforceable, shall not be affected thereby and each term and provision of this Agreement shall be valid and enforceable to the fullest extent permitted by law.
26. In the event either party hereto brings an action or proceeding for a declaration of the rights of the parties, for injunctive relief, for an alleged breach or default, or any other action arising out of this Agreement, or the transactions contemplated hereby, the prevailing party in any such action shall be entitled to an award of reasonable attorneys' fees and costs incurred in such action or proceeding, in addition to any other damages or relief awarded, regardless of whether such action proceeds to final judgment.
27. Time is of the essence in this Agreement, and each and every provision hereof in which time is an element.
28. This Agreement and all documents provided for herein shall be governed by and construed in accordance with the laws of the State of California. Any litigation arising from this Agreement shall be adjudicated in the courts of Riverside County, Desert Judicial District, State of California.
29. **JURISDICTION** and Agency warrant that the execution, delivery and performance of this Agreement and any and all related documents are duly authorized and do not require the further consent or approval of any body, board or commission or other authority.

30. This Agreement may be executed in one or more counterparts and when a counterpart shall have been signed by each party hereto, each shall be deemed an original, but all of which constitute one and the same instrument.

IN WITNESS WHEREOF, the parties hereto have caused this agreement to be executed by their duly authorized representatives on the above referenced date:

ATTEST: **JURISDICTION**

By: _____ By: _____

NAME, TITLE NAME, TITLE

ATTEST: **CVAG**

By: _____ By: _____

Allen McMillen, Contract Analyst II Tom Kirk, Executive Director

SCOPE OF SERVICES

REIMBURSEMENT AGREEMENT

BY AND BETWEEN CVAG AND JURISDICTION

DESIGN AND CONSTRUCTION FOR

CO-LOCATION OF JURISDICTION BROADBAND FIBER OPTIC CABLE WITHIN CVAG CV SYNC CONDUIT

The Scope of Services for this Project includes design and construction costs for Co- location of City of Indio Broadband Fiber Optic Cable within CVAG's CV Sync Conduit.

The intersection traffic signals will be constructed to be consistent with the Regional Traffic Signal Synchronization Master Plan and incorporate best practices consistent with the Regional ATP Design Guidelines.

The City of Indio will be installing broadband communications innerduct and handholes/splice vaults for the City's broadband network and infrastructure along the CV Sync Phase II Project Corridors. CVAG's Phase II contractor, Crosstown Electrical and Data, Inc. will perform the construction under the existing CVAG contract. The proposed innerduct will be installed within the CV Sync existing and new conduits and it will be labeled accordingly. It is anticipated the City will be installing the broadband fiber optic cable inside the innerduct as a separate contract. Crosstown will be required to protect in-place the CV Sync infrastructure including but not limited to 144 single-mode fiber optic cable, conduit, splice vaults, splice enclosures, and communication hubs.

REIMBURSEMENT AGREEMENT

BY AND BETWEEN CVAG AND JURISDICTION

DESIGN AND CONSTRUCTION FOR

CO-LOCATION OF JURISDICTION BROADBAND FIBER OPTIC CABLE WITHIN CVAG'S CV SYNC CONDUIT

The City of Indio has authorized a not-to-exceed amount of $900,000 for engineering and construction to co-locate City broadband fiber optic cable within CVAG's conduit utilized for its regional CV Sync Program.

CVAG is currently under contract with Crosstown Electric and Data Inc. for construction of Phase II of CV Sync, which includes regional corridors within the City of Indio.

The City has coordinated the proposed co-location of broadband fiber within CV Sync conduit with CVAG's design engineer, Advantec Consulting Engineers.

CVAG will execute Contract Change Orders (CCOs) with Crosstown Electrical and Data Inc. necessary to perform the construction work. CVAG will break out engineering costs specific to the Project.

CVAG as Lead Agency agrees to invoice the City of Indio for 100% of the Engineering and Construction Project costs up to a maximum, not-to-exceed, amount of $900,000.

SECTION APPENDIX B – CV SYNC BROADBAND CO-LOCATION LICENSE AGREEMENT

LICENSE AGREEMENT

BY AND BETWEEN CVAG AND CITY OF INDIO

FOR THE

CO-LOCATION OF CITY OF INDIO BROADBAND FIBER OPTIC CABLE WITH CVAG CV SYNC CONDUIT

THIS AGREEMENT is made and entered into this **29th day of September, 2025**, by and between the **City of Indio**, a municipal corporation, ("**CITY**") and the **Coachella Valley Association of Governments (CVAG)**, a California joint powers authority. **CVAG** and **CITY** are sometimes referred to herein individually as a "Party" or collectively as the "Parties." Reference of such agreement is made as to the following background facts and circumstances:

RECITALS

A. **CVAG** has planned for the regional synchronization of traffic signals, the modernization and standardization of hardware and software, and preparation for future intelligent transportation system infrastructure ("ITS") in the Coachella Valley generally known as the "Coachella Valley Regional Traffic Signal Synchronization Program" or "CV Sync"; and

B. **CITY** is developing a broadband fiber network to serve municipal facilities, residents and businesses along corridors included in the scope of the CV Sync project; and

C. In February 2018, the **CVAG** Executive Committee ("Executive Committee") approved the Master Plan for CV Sync; and

D. The approved CV Sync Master Plan includes conduit and fiber optic cable that reserves fibers not only for the traffic management systems, communications and ITS elements, but it also includes reserving fibers for future applications such as Smart Cities and others for the future; and

E. In 2018, **CITY** and **CVAG** executed a Multi-Agency Participating Agreement for Coachella Valley Regional Traffic Signal Synchronization Program; and

F. In February 2021, the Executive Committee awarded the construction of Phase I of the CV Sync project; and

G. In December 2022, the Executive Committee awarded the construction of Phase II of the CV Sync project; and

H. The CV Sync project installed fiber optic cable in either conduits owned by **CITY** or conduits owned by **CVAG**, with construction plans for the CV Sync projects indicating the ownership of said conduits; and

I. In June 2023, the Executive Committee authorized a contract change order with Crosstown Electric and Data, Inc., and a reimbursement agreement with **CITY** to cover all costs associated with the co-location of **CITY** broadband fiber with the construction of the CV Sync Phase II project; and

J. In October 2023, **CITY** authorized a reimbursement agreement with **CVAG** in an amount not to exceed $900,000 for work related to the co-location of **CITY** broadband fiber with the construction of CV Sync Phase II; and

K. In February 2024, **CVAG** and **CITY** executed said reimbursement agreement for co-location of **CITY** broadband fiber with the construction of CV Sync, including provisions for City to use for

municipal purposes a portion of the CV Sync fiber optic cable for municipal purposes; and

L. **CITY** is developing a fiber network to serve residents and businesses and desires to co-locate said network with the CV Sync conduit; and

M. The intent of the Parties is to increase broadband access to businesses and residents of the Coachella Valley in a manner that reduces costs of investment, speeds time to market and preserves public right of way (ROW) for future public safety needs; and

N. The Parties desire to enter into an agreement to govern the terms and conditions under which **CVAG** will reserve certain conduits or space within its conduits to accommodate the installation and maintenance of **CITY**'s fiber optic cable for the use of **CITY** in connection with implementation of broadband fiber optic cable and related equipment installation in the ROW by **CITY** or **CITY**'s contractors, vendors, and assigns. Said Conduit, subject to this Agreement, is specifically identified in Attachment "A" and incorporated by reference herein.

NOW, THEREFORE, in consideration of the mutual covenants and subject to the conditions contained herein, the parties do agree as follows:

I. Definitions

For the purpose of this Agreement, the following terms when used herein shall have the following meanings:

A. "Access Point" means a Manhole, Vault, Pull Box, Junction Box, Pull Box, Hub or Pedestal through which the CV Sync Network may be accessed for the purposes of running and accessing fiber optic cable.

B. "Authorized Contractors" means third party contractors (whether contracted by **CITY** or contracted by **CVAG**) that have been approved and authorized by **CVAG**, have all required licensing, bonding, and insurance, to utilize Access Points and to make splices or perform other work on the CV Sync Network as provided for in this Agreement.

C. "CV Sync Network" means the conduit, fiber optic cable and related infrastructure comprising the Coachella Valley Regional Traffic Signal Synchronization Program.

D. "CVAG Conduit" refers to the physical pipe or tube owned by **CVAG** that is part of the Coachella Valley Regional Traffic Signal Synchronization Program.

E. "CVAG Fiber Optic Cable" means fiber optic cable and related infrastructure owned by **CVAG** in the CV Sync Network identified in Attachment "A" to this Agreement.

F. "Fiber Route Map" means the map of the composite routes of the CV Sync Network. The Fiber Route Map shall be updated and provided in "As-Built" form as necessary to reflect modifications to the Fiber Segments or additional Fiber Segments in accordance with this Agreement.

G. "Fiber Segment" means a continuous run of multi-strand fiber optic cable covering a portion of a fiber cable route.

H. "Junction Box" means a box where fiber optic cable splices and connections are made and accessed and to access conduit.

I. "City Conduit" refers to the physical pipe or tube owned by **CITY** that is part of the Coachella Valley Regional Traffic Signal Synchronization Program.

J. "Licensed Conduit" means a portion of CVAG Conduit specifically identified in Attachment "A" to this Agreement, which shall be reserved and/or designated for **CITY** to use in accordance with and subject to the terms of this Agreement. Said conduit may be owned by **CITY** or by **CVAG**. If said conduit is owned by **CITY**, **CITY** has executed a Participation Agreement with **CVAG** allowing **CVAG** to access **CITY** signal controllers, signal communications systems, traffic management system, arterial management systems, video management systems, and other ITS technologies (hardware and software) to construct the CV Sync Network.

K. “Manhole” means a subsurface enclosure which qualified personnel may enter and use for the purpose of installing, operating and maintaining facilities.

L. “Pedestal” means an above ground structure used to store, terminate, splice or transfer, or access conduit containing fiber optic cable.

M. “Project” means the use of Licensed Fiber by **CITY**, including interconnections with fiber optic cable and related equipment owned by **CITY**.

N. “Pull Box” means a buried box, with a lid that is even with the surface of the ground, used to store, terminate, splice or transfer fiber optic cable and access conduit.

O. “Vault” means an underground structure used to store, terminate, splice or transfer, or access conduit containing fiber optic cable.

II. License

A. License Grant

Subject to the terms, conditions and limitations set forth herein, **CVAG** hereby grants to **CITY** a license and right for the use of Licensed Conduit for the installation and maintenance of fiber optic cable owned or employed by **CITY**. The duration of the foregoing license shall continue in perpetuity so long as the CV Sync Network installation remains in place and is in use by **CVAG** and its successors in interest and assigns, but nothing herein shall obligate **CVAG** to continue to maintain and operate the CV Sync Network or any portion thereof or during any periods in which **CVAG** is not otherwise using or planning to use the CV Sync Network. If only **CVAG** and **CITY** are utilizing the CV Sync Network, **CVAG** or its successors in interest shall give **CITY** prior written notice and a reasonable opportunity to assume responsibility for maintaining and operating each CV Sync Network segment before removing such CV Sync Network segment or ceasing to use such CV Sync Network segment for the provision of services. Except where **CVAG** is otherwise legally obligated to remove a CV Sync Network segment in a shorter period of time, such prior notice shall be given at least ninety (90) days in advance of such removal.

B. Scope of Grant

1. **CVAG** shall provide **CITY** with access to the subject Licensed Conduit. To the extent that **CVAG** has authority to use and authorize third party use of Access Points, it will grant permission to Authorized Contractors to use such Access Points for installation, splicing and maintenance of Fiber in the Licensed Conduit as directed by **CITY** and at **CITY**’s sole cost, provided that the conduit capacity does not exceed limits recognized by industry standards. **CVAG** shall have no obligation whatsoever to install any additional conduit or to allocate any additional space in existing CVAG Conduit to meet the needs of **CITY**.

2. **CITY** shall undertake to obtain and provide all approvals, authorizations, coordination and supervision that is necessary in connection with its use of the subject Licensed Conduit and installation of fiber optic cable. Without limiting the foregoing, **CITY** shall have the sole responsibility for performing all activities and paying all costs necessary to install fiber within the Licensed Conduit and make the fiber operational, including but not limited to: (i) splicing the fiber to achieve interconnection between or within the applicable fiber segments and between the fiber and fiber optic cable belonging to others and (ii) providing, attaching and interconnecting equipment, electronics and lasers as required to transmit or receive optical signals via **CITY**’s fiber optic cable installed in the Licensed Conduit. **CITY** shall further have the sole responsibility for paying all costs and for constructing or otherwise providing facilities needed to connect the Licensed Conduit and **CITY**’s fiber optic cable to any other network or facilities via appropriate Access Points. Except as otherwise approved by **CVAG** (which approval shall not be unreasonably withheld), all installation of fiber optic cable in Licensed Conduit shall be carried out only by Authorized Contractors and, to the extent practicable, only during regularly scheduled maintenance windows or at other times that are reasonably convenient for **CVAG**.

3. **CVAG** and **CITY** agree and acknowledge that **CITY**’s use of Licensed Conduit and installation of **CITY**’s owned fiber optic cable within such Licensed Conduit does not and will not create or convey to **CITY** any ownership or property rights of any nature in the CV Sync Network or of any Access

Points, aside from any portions of the CV Sync Network that are owned by **CITY** and subject to the terms of the Participation Agreement between **CITY** and **CVAG**. **CITY** may not encumber, offer as collateral, or allow any third-party claims or liens of any type on or against the CV Sync Network.

4. **CVAG** reserves the right to make inspections at any time during the construction or installation of any part of **CITY**'s fiber optic cable equipment, electronics, lasers or facilities (including interconnected fiber or copper cable) utilized by **CITY** in conjunction with the subject Licensed Fiber for purposes of assuring compliance with the terms and conditions hereof and with applicable laws, rules and regulations as reasonably necessary to prevent or detect interference with or damage to the CV Sync Network or breaches of **CITY**'s obligations hereunder. Such inspections shall be conducted at **CVAG**'s expense unless **CVAG** determines that **CITY** is not in compliance with the terms of this Agreement. In such instance, **CITY** shall be responsible for paying **CVAG** for all reasonable costs incurred by **CVAG** in making the inspection. **CITY** agrees that such inspections by **CVAG**, or the failure to do so, shall not relieve **CITY** of any responsibility, obligation or liability whether assumed under this Agreement or otherwise existing.

C. Designation of Licensed Fiber Strand

1. At any time following completion of the CV Sync Network construction and installation, **CITY** may notify **CVAG** of its desire to access the Licensed Conduit reserved for its use by **CVAG**. Such notice shall be written and shall be provided no fewer than sixty (60) days prior to the date on which **CITY** desires to access the CV Sync Network for purposes of installation of fiber optic cable. **CITY**'s notice shall identify all of the following: (1) **CITY**'s planned use for the fiber optic cable to be installed in Licensed Conduit, (2) the specific portions of the Licensed Conduit in which **CITY** intends to install, light and use fiber optic cable, (3) the Access Points **CITY** desires to use (if any) to access and splice the fiber optic cable to be run within Licensed Conduit, (4) all personnel or contractors that **CITY** proposes to use to perform any work activity involving the Licensed Conduit, including but not limited to construction and installation of fiber drops or laterals to ancillary Access Points or to lasers, electronics or other equipment, facilities or networks for purposes of lighting and using the fiber optic cable, and (5) **CITY**'s plans for interconnecting with and using the fiber optic cable to be run within Licensed Conduit, including relevant technical and functional network specifications and design criteria for **CITY**'s systems that may facilitate consultation and cooperation of **CITY** and **CVAG** in the interest of efficient and effective implementation of **CITY**'s plans in accordance herewith.

2. Within ten (10) days following receipt of such initial notice, **CVAG** shall provide **CITY** with a diagram designating the specific Licensed Conduit that is available to **CITY** to run fiber optic cable hereunder and identified in **CITY**'s notice.

3. To the extent that **CITY**'s contractors will have access to any conduit that is not exclusively licensed to **CITY**, **CVAG** shall have the right to determine in advance whether **CITY**'s personnel and/or proposed contractors are qualified to perform such work activities and may disapprove any proposed personnel or contractor in its sole reasonable discretion. **CVAG** shall identify the reasons for such disapproval in writing and **CITY** may propose alternate personnel or contractors.

4. **CITY** is solely responsible for obtaining all public, private or government approvals, authorizations, permits, certifications, easements, rights of way and attachment rights beyond those required for installation and maintenance within Licensed Conduit, if any, that are necessary in order for **CITY** to install, light and transmit or receive signals using the fiber optic cable installed in said Licensed Conduit, and shall provide documentary evidence thereof as and when reasonably requested by **CVAG**.

D. Limitations and Requirements for Use of CVAG Conduit and Fiber Strands

1. **CVAG** and **CITY** agree and acknowledge that **CITY** may use the Licensed Conduit for any lawful purpose for which the fiber optic cable is technically suited, provided that **CITY** shall use the fiber optic cable solely for its business purposes.

2. If **CVAG** determines for any reason that it is necessary to relocate, modify, underground or otherwise alter ("Relocation or Modification") all or any portion of Licensed Conduit, **CVAG** shall

provide **CITY** written notification prior to making the proposed relocation, modification or alteration. Such notice shall be given at least sixty (60) days in advance except in circumstances in which **CVAG** is legally obligated to take action more promptly and the prior notification requirement of this section shall not apply to emergency situations, in which case **CVAG** will give notice as quickly as is reasonably practicable. **CITY** shall have no responsibility for costs and expenses relating to any such Relocation or Modification of Licensed Conduit unless the Relocation or Modification is at the request of or required by **CITY** (if applicable). If and to the extent that such Relocation or Modification is required by reason of events or circumstances beyond **CVAG**'s reasonable control, **CITY** shall have sole responsibility for costs and expenses relating to any necessary rearrangement, relocation, modification or alteration of any of **CITY**'s fiber optic cable running within such Licensed Conduit and/or other equipment, electronics or lasers installed to light the subject fiber optic cable, or other facilities **CITY** has interconnected to the subject fiber optic cable that may result therefrom. However, if and to the extent that such Relocation or Modification is made at **CVAG**'s discretion or for **CVAG**'s benefit, **CVAG** and **CITY** shall share the costs on a pro-rata basis based upon the number of fibers utilized within the conduit.

3. **CITY** shall splice into the Licensed Fiber only at hubs installed by **CVAG** for CV Sync, or at hubs installed by the **CITY** upon review and approval by **CVAG**. Any hub installed by the **CITY** shall meet the equipment specifications and system architecture for CV Sync hubs and be approved by **CVAG**. Inspection of all work shall be coordinated with and performed by **CVAG**.

4. Any fiber optic cable, equipment, hubs, electronics, lasers, or other network facilities provided by **CITY** shall be installed and maintained in accordance with the requirements and specifications of then current editions of the National Electrical Code (NEC), and the National Electrical Safety Code (NESC), each of which are incorporated by reference in this Agreement. Further, **CITY** and its consultants and contractors shall at all times comply with the applicable rules and regulations of the Occupational Safety and Health Act of 1970 (OSHA), with all applicable state and federal statutes and laws and with all applicable regulations, rules and orders issued by any state or federal agency having jurisdiction thereof, including without limitation the Federal Communications Commission, the California Utilities Board or other applicable regulatory agency.

5. **CVAG** reserves the right to make periodic inspections at any time of any part of **CITY**'s fiber optic cable equipment, electronics, lasers or facilities (including interconnected fiber or copper cable) utilized by **CITY** in conjunction with the subject fiber optic cable for purposes of assuring compliance with the terms and conditions hereof and with applicable laws, rules and regulations as reasonably necessary to prevent or detect interference with or damage to the CV Sync Network or breaches of **CITY**'s obligations hereunder. Except in the case of an emergency, **CVAG** shall give **CITY** 48 hours' notice before carrying out such inspections and **CITY** shall be permitted, but not required, to have a representative present for such inspections. Such inspections shall be conducted at **CVAG**'s expense unless **CVAG** determines that **CITY** is not in compliance with the terms of this Agreement. In such instance, **CITY** shall be responsible for paying **CVAG** for all reasonable costs incurred by **CVAG** in making the inspection. **CITY** agrees that such periodic inspections by **CVAG**, or the failure to do so, shall not relieve **CITY** of any responsibility, obligation or liability whether assumed under this Agreement or otherwise existing.

III. Maintenance

A. **CVAG** shall maintain or arrange for maintenance of all CV Sync Network and facilities interconnected with or comprising a part of the CV Sync Network that are owned by **CVAG**, provided that **CVAG**'s obligation to maintain such facilities shall not in any way extend beyond the term of any other agreement with **CITY** for ROW use or equipment attachments to **CITY**'s facilities and provided further that such obligation shall cease earlier as to any CV Sync Network segments with respect to which **CVAG** and its successors in interests either: (1) lose the necessary attachment and access rights to enable such maintenance; or (2) permanently cease to use such CV Sync Network segments, provided that before removing any such CV Sync Network segment **CVAG** gives **CITY** prior written notice and an opportunity to assume responsibility for maintaining and operating such CV Sync Network segment as provided in Section II.A.

B. **CITY** shall have sole responsibility for maintaining all of its fiber optic cable, equipment, electronics, lasers and other facilities installed in Licensed Conduit or interconnected to the fiber optic cable installed in Licensed Conduit. **CITY** shall maintain its equipment, electronics, lasers and interconnecting fibers and facilities in good repair and in a manner that will not interfere with or degrade the quality or reach of any signal, transmission or telecommunications carried on the CV Sync Network running within the same Licensed Conduit. If **CITY**'s equipment or facilities should cause any type of interference with, or degradation of, any signal, transmission or telecommunications on the CV Sync Network, **CITY** agrees to correct the condition within twenty-four (24) hours for any problem causing a degradation, but not disruption, of any signal, transmission or telecommunications on the CV Sync Network. If **CITY** fails to take such corrective action, **CVAG** may in its sole discretion correct said condition at **CITY**'s expense. **CVAG** shall notify **CITY** in writing prior to performing such work whenever practicable. When **CVAG** reasonably believes, however, that such conditions pose an immediate threat to public safety or interfere with the performance of **CVAG**'s service obligations or pose an immediate threat to the physical integrity of the CV Sync Network or other facilities, **CVAG** may perform such work and/or take such action, including temporary disconnection of **CITY**'s equipment and facilities from the CV Sync Network, that it reasonably deems necessary without first giving written notice to **CITY**. **CITY** shall be responsible for paying **CVAG** for all reasonable costs incurred by **CVAG** in taking such corrective actions if **CVAG** shows that the problem was in fact caused by **CITY**'s equipment or facilities. **CVAG** shall bear the cost of any reconnection or restoration of **CITY**'s equipment or facilities that is made necessary as a result of **CVAG**'s mistaken actions. **CVAG** shall be indemnified by **CITY** for such work in accordance with Section IV below.

IV. Liability and Damages

A. **CITY**, its personnel, agents and contractors shall exercise reasonable caution to avoid damaging the facilities of **CVAG** and shall make an immediate report to **CVAG** of the occurrence of any such damage caused by its personnel, agents or contractors. **CITY** agrees to reimburse **CVAG** for all reasonable costs incurred by **CVAG** for repair or replacement of such facilities damaged by **CITY**, its personnel, agents and contractors.

B. **CITY** shall be liable to **CVAG** for all of its actions or omissions that cause damage to the CV Sync Network, the Access Points and all other facilities and equipment associated with the CV Sync Network or that interfere with, disrupt or degrade the quality or reach of any signal, transmission or telecommunications carried on the CV Sync Network but shall not be liable for any special, indirect or consequential damages arising from **CITY**'s actions or omissions.

C. **CVAG** shall not be liable to **CITY** for any special, indirect or consequential damages arising from any interruption or degradation of **CITY**'s communications carried on fiber optic cable installed within Licensed Conduit.

D. **CITY** shall not be liable to **CVAG** for any special, indirect or consequential damages arising from any interruption or degradation of **CVAG**'s communications carried on fiber optic cable installed within Licensed Conduit.

V. Mutual Indemnification

A. **CITY** hereby agrees to defend and indemnify **CVAG**, its officials, officers, employees, contractors, agents, and authorized volunteers (hereinafter collectively referred to in this paragraph as "**CVAG**"), from any claims, demands, actions, proceedings, damages, liabilities, fines, expenses, and related costs and fees, including attorney's fees, against **CVAG**, arising solely out of the acts or omissions of **CITY** or its officials, officers, employees, contractors, agents, and authorized volunteers arising out of this Agreement. At its sole discretion, **CVAG** may participate at its own expense in the defense of any claim, action or proceeding. **CVAG** shall notify **CITY** promptly of any claim, action or proceeding and cooperate fully in the defense.

B. **CVAG** hereby agrees to defend and indemnify **CITY**, its officials, officers, employees, contractors, agents, and authorized volunteers (hereinafter collectively referred to in this paragraph as **CITY**), from

any claims, demands, actions, proceedings, damages, liabilities, fines, expenses, and related costs and fees, including attorney's fees, against **CITY**, arising solely out of the acts or omissions of **CVAG** or its officials, officers, employees, contractors, agents, and authorized volunteers arising out of this Agreement. At its sole discretion, **CITY** may participate at its own expense in the defense of any claim, action or proceeding. **CITY** shall notify **CVAG** promptly of any claim, action or proceeding and cooperate fully in the defense.

C. **CITY** hereby agrees to defend itself, and **CVAG** hereby agrees to defend itself, from any claim, action or proceeding arising out of the concurrent acts or omissions of **CITY** and **CVAG**. In such cases, **CITY** and **CVAG** agree to retain their own legal counsel, bear their own defense costs and waive their right to seek reimbursement of such costs, except as provided in subsection (E) below.

D. Notwithstanding subsection (C) above, in cases where **CITY** and **CVAG** agree in writing to a joint defense, **CITY** and **CVAG** may appoint joint defense counsel to defend the claim, action or proceeding arising out of the concurrent acts or omissions of **CITY** and **CVAG**. Joint defense counsel shall be selected by mutual agreement of **CITY** and **CVAG**. **CITY** and **CVAG** agree to share costs of such joint defense and any agreed settlement in equal amounts, except as provided in subsection (E) below. **CITY** and **CVAG** further agree that neither party may bind the other to a settlement agreement without the written consent of both **CITY** and **CVAG**.

E. Where a trial verdict or arbitration award allocates or determines the comparative fault of the parties, **CITY** and **CVAG** may seek reimbursement and/or reallocation of defense costs, settlement payments, judgments and awards, consistent with such comparative fault.

F. A Party's obligation to indemnify shall not be restricted to insurance proceeds, if any, received by such Party, its officials, officers, employees, contractors, agents, and authorized volunteers. This section shall survive any expiration or termination of this Agreement.

G. Notwithstanding anything herein to the contrary, **CITY** shall also indemnify **CVAG** against any third-party claims or charges comprising pass-throughs of property taxes imposed upon structures located in the ROW by reason of **CVAG**'s attachments of facilities to such structures or improvements made to such structures in order to accommodate such attachments.

VI. Insurance

A. Throughout the term of this Agreement, **CITY** shall maintain self-insurance or a program of self-insurance for general liability insurance for bodily injury, personal injury, and property damage. Evidence of such coverage shall be provided to **CVAG** the following:
   1. General Liability Coverage. **CITY** shall maintain self-insurance or a program of self-insurance for general liability insurance for bodily injury, personal injury, and property damage. Evidence of such coverage shall be provided to **CVAG**.
   2. Automobile Liability Insurance. **CITY** shall maintain self-insurance or a program of self-insurance covering automobile covering bodily injury and property damage for all activities of District arising out of or in connection with activities or services to be performed under this Agreement. Evidence of such coverage shall be provided to **CVAG**.
   3. Workers' Compensation Insurance. **CITY** shall maintain self-insurance for Workers' Compensation Insurance (Statutory Limits) and Employer's Liability. Evidence of such coverage shall be provided to **CVAG**.

B. Throughout the term of this Agreement, **CITY** shall cause its contractors, including any subcontractors or agents working on their behalf, maintain the following:

   1. Commercial General Liability insurance in an amount not less than $1,000,000 per occurrence, $2,000,000 general aggregate for bodily injury, personal injury and property damage;
   2. Automobile Liability Insurance for bodily injury and property damage including coverage for owned, non-owned and hired vehicles, in an amount not less than $1,000,000 per accident combined single limit, at least as broad as Insurance Services Office Form Number CA 00 01 covering automobile liability, Code 1 (any auto);

3. Workers' compensation in compliance with applicable statutory requirements and Employer's Liability Coverage in an amount not less than $1,000,0000 per accident or disease, Consultant shall submit to Agency, along with the certificate of insurance, a Waiver of Subrogation endorsement in favor of Agency, its officers, agents, employees and volunteers.

C. **CITY** shall provide **CVAG** with Certificates of Insurance evidencing coverage currently in effect prior to commencing access to any Licensed Fiber. All policies are to provide **CVAG** with thirty (30) days prior written notice of cancellation or any material adverse change in conditions. All policies shall name **CVAG** as an additional insured.

VII. Assignment

A. **CITY** may not assign, sub-license or transfer in any manner, in whole or in part, its rights, duties or obligations under this Agreement without the prior written consent of **CVAG**, which shall not be unreasonably withheld.

B. **CVAG** may not assign, sub-license or transfer in any manner, in whole or in part, its rights, duties or obligations under this Agreement without the prior written consent of **CITY**, which shall not be unreasonably withheld.

C. Neither this Agreement nor any term or provision hereof, nor any inclusion by reference shall be construed as being for the benefit of any person or entity not a signatory hereto.

VIII. Termination

The Parties shall have the right to terminate this Agreement and the license granted herein under the following circumstances:

A. **CVAG** may terminate this Agreement (a) upon thirty (30) days written notice with an opportunity to cure within ten (10) days therefrom in the event that **CITY** commits a material breach of this Agreement, becomes subject to any bankruptcy or insolvency proceeding under Federal or state statute or becomes insolvent or becomes subject to direct control by a trustee, receiver or similar authority or uses the Licensed Conduit for any unlawful purpose or (b) upon sixty (60) days written notice in the event that **CVAG** for any reason intends to cease operation or maintenance of the CV Sync Network or any applicable portion thereof, or ceases to have rights to operate or maintain the CV Sync Network or any applicable portion thereof.

B. **CITY** may terminate this agreement upon sixty (60) days written notice.

C. In the event of termination in accordance herewith for any reason, **CITY** shall remove all fiber optic cable, equipment, electronics, lasers and fiber or other facilities installed by **CITY** in the CV Sync Network within sixty (60) days after the effective date of the termination. All costs of any kind arising from removal of **CITY**'s equipment, lasers and fiber or other facilities shall be borne entirely by **CITY.**

IX. General Provisions

A. No waiver of any default or breach by one party hereunder shall be implied from any omission by the other party to take action on account of such default, and no express waiver shall affect any default other than the default specified in the waiver and the waiver shall be operative only for the time and to the extent therein stated. Waivers of any covenant, term, or condition contained herein shall not be construed as a waiver of any subsequent breach of the same covenant, term or condition. The consent or approval by one party to or of any act by the other party shall not be deemed to waive or render unnecessary the consent or approval to or of any subsequent or similar act.

B. This Agreement is made and entered into for the sole protection and benefit of **CVAG** and **CITY** and no third person shall have any right of action under this Agreement.

C. This Agreement is for **CITY** use of Licensed Conduit only for uses as stated herein and nothing herein

shall be construed so as to constitute **CITY** as an owner or a partner or joint venture with **CITY** as to the Project.

D. The parties shall attempt in good faith to resolve any dispute arising out of or relating to this Agreement promptly by negotiations between the parties' authorized representatives. The disputing party shall give the other party written notice of any dispute. Within twenty (20) days after delivery of such notice, the authorized representatives shall meet at a mutually acceptable time and place, and thereafter as often as they reasonably deem necessary to exchange information and to attempt to resolve the dispute. If the matter has not been resolved within thirty (30) days of the first meeting, any party may initiate mediation of the dispute. The mediation shall be facilitated by a mediator that is acceptable to both parties and shall conclude within sixty (60) days of its commencement, unless the parties agree to extend the mediation process beyond such deadline. Upon agreeing on a mediator, the parties shall enter into a written agreement for the mediation services with each party paying a pro rate share of the mediator's fee, if any. Each party shall bear its own legal fees and expenses. If, after good faith efforts to mediate a dispute the parties cannot agree to a resolution of the dispute, any party may pursue whatever legal remedies may be available to it at law or in equity, before a court of competent jurisdiction and with venue in Riverside County. Should litigation arise out of this Agreement for the performance thereof, the court shall award costs and expenses, including reasonable attorney's fees, to the prevailing party.

E. **CITY** and **CVAG** warrant that all aspects of the Project undertaken by them shall be undertaken in compliance with all applicable local, state and federal rules, regulations and laws. **CITY** will execute and deliver to **CVAG** such further documents and do other acts and things as **CVAG** may reasonably request in order to comply fully with all applicable requirements and to effect fully the purposes of this Agreement.

F. **CITY** and **CVAG** and their successors in interest and assigns shall be bound by all the provisions contained in this Agreement.

G. No officer or employee of **CVAG** or **CITY** shall be personally liable to **CITY** or **CVAG** (respectively), in the event of any default or breach by the breaching Party, or for breach of any obligation of the terms of this Agreement.

H. No officer or employee of **CVAG** or **CITY** shall have any personal interest, direct or indirect, in this Agreement; nor shall any such officer or employee participate in any decision relating to this Agreement which effects his or her personal interest or the interest of any corporation, partnership or association in which she or he is, directly or indirectly, interested, in violation of any state, federal or local law.

I. All notices or other communications required or permitted hereunder shall be in writing and shall be either personally delivered (which shall include delivery by means of professional overnight courier service which confirms receipt in writing, such as Federal Express or UPS; sent by telecopier or facsimile machine capable of confirming transmission and receipt; or sent by certified or registered mail, return receipt requested, postage prepaid to the following parties at the following addresses or numbers:

If to **CITY:**Bryan Montgomery

City Manager

City of Indio

100 Civic Center Drive

Indio, CA 92201

Telephone: (760) 391-4000

If to **CVAG**:Tom Kirk

Executive Director

Coachella Valley Association of Governments

74-199 El Paseo, Suite 100

Palm Desert, CA 92260

Telephone: (760) 346-1127

Notices sent in accordance with this paragraph shall be deemed delivered upon the next business day following the: (i) date of delivery as indicated on the written confirmation of delivery (if sent by overnight courier service); (ii) the date of actual receipt (if personally delivered by other means); (iii) date of transmission (if sent by telecopier or facsimile machine); or (iv) the date of delivery as indicated on the return receipt if sent by certified or registered mail, return receipt requested. Notice of change of address shall be given by written notice in the manner detailed in this paragraph.

J. This Agreement and the exhibits herein contain the entire agreement between the Parties and is intended by the parties to completely state the agreement in full.

K. If any term, provision, condition, or covenant of this Agreement, or the application thereof to any party or circumstance, shall to any extent be held invalid or unenforceable, the remainder of the instrument, or the application of such term, provision, condition or covenant to persons or circumstances other than those as to whom or which it is held invalid or unenforceable, shall not be affected thereby and each term and provision of this Agreement shall be valid and enforceable to the fullest extent permitted by law.

L. In the event either party hereto brings an action or proceeding for a declaration of the rights of the parties, for injunctive relief, for an alleged breach or default, or any other action arising out of this Agreement, or the transactions contemplated hereby, the prevailing party in any such action shall be entitled to an award of reasonable attorneys' fees and costs incurred in such action or proceeding, in addition to any other damages or relief awarded, regardless of whether such action proceeds to final judgment.

M. Time is of the essence in this Agreement, and each and every provision hereof in which time is an element.

N. This Agreement and all documents provided for herein shall be governed by and construed in accordance with the laws of the State of California. Any litigation arising from this Agreement shall be adjudicated in the courts of Riverside County, Desert Judicial District, State of California.

O. **CITY** and **CVAG** warrant that the execution, delivery and performance of this Agreement and any and all related documents are duly authorized and do not require the further consent or approval of any body, board or commission or other authority.

P. This Agreement may be executed in one or more counterparts and when a counterpart shall have been signed by each party hereto, each shall be deemed an original, but all of which constitute one and the same instrument. This Agreement may be executed by electronic signatures.

SIGNATURES ON FOLLOWING PAGE(S)

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be executed by their duly authorized representatives on the above referenced date:

ATTEST:

By: _____

Steven Graham, City Attorney

CITY

By: _____

Bryan Montgomery, City Manager

ATTEST:

By: _____

Allen McMillen, Contract Analyst II

CVAG

By: _____

Tom Kirk, Executive Director

IDENTIFICATION OF LICENSED CONDUIT(S)

[To Be Inserted Prior to Agreement Execution]

DESIGN

SUMMARY

Design in the broadband industry can take multiple forms:

- Infrastructure documentation
- High-level design
- Low-level (detail) design

Detail design is utilized when an entity that intends to construct and own the infrastructure develops the plans to be released for construction bids, permitting and financing. The costs to develop low-level design typically include field verification of previous designs, engineering and plan set development. Those costs are usually included in the financing for the construction project.

In this broadband study, CVAG focused on working with member jurisdictions and Internet Service Providers (ISPs) to improve broadband for unserved and underserved locations in the Coachella Valley. Those entities are anticipated to build and own new broadband infrastructure; therefore, they will bear the costs associated with low level design in their construction projects.

In jurisdiction Capital Improvement Projects (CIPs), there are often projects that could include broadband related infrastructure (typically conduit or fiber). The Policy section in this report contains design guidelines and recommendations which provide details for construction.

INFRASTRUCTURE DOCUMENTATION

There were two main infrastructure documentation steps that were necessary to provide the details needed to develop options to improve broadband:

- Jurisdiction CIP plans
- CV Sync (the CVAG program to synchronize municipal traffic signals on regional arterial roadways in the Coachella Valley)

JURISDICTION CIP PLAN DOCUMENTATION

Documenting jurisdiction CIP projects such as roadway reconstruction and underground utility improvement projects that could be leveraged to include broadband infrastructure is important to encourage and coordinate including conduit (and possibly fiber) when it is the least expensive to deploy while a project is being constructed.

The most expensive cost of installing broadband infrastructure is the construction labor and equipment. More details can be found in the High-Level Design and Financial Analysis sections of this report but at a summary level, costs for installation of conduit can be decreased by 75% to 90% (see the Financial Analysis section of this report for potential cost reduction details) when they are added as part of another project. Therefore, documentation of jurisdiction CIP projects that could include broadband and any existing broadband infrastructure they currently own are important to provide opportunity to realize these cost savings.

For this study, the process to document jurisdiction CIP plans began with receiving CIP planning information from each jurisdiction. That data was then entered into the Regional Broadband GIS Map created for the study. Most of the information was address or road related, therefore HR Green drew the routes in, in a way that could include broadband infrastructure, if possible (completing a basic design to show the project routes and boundaries).

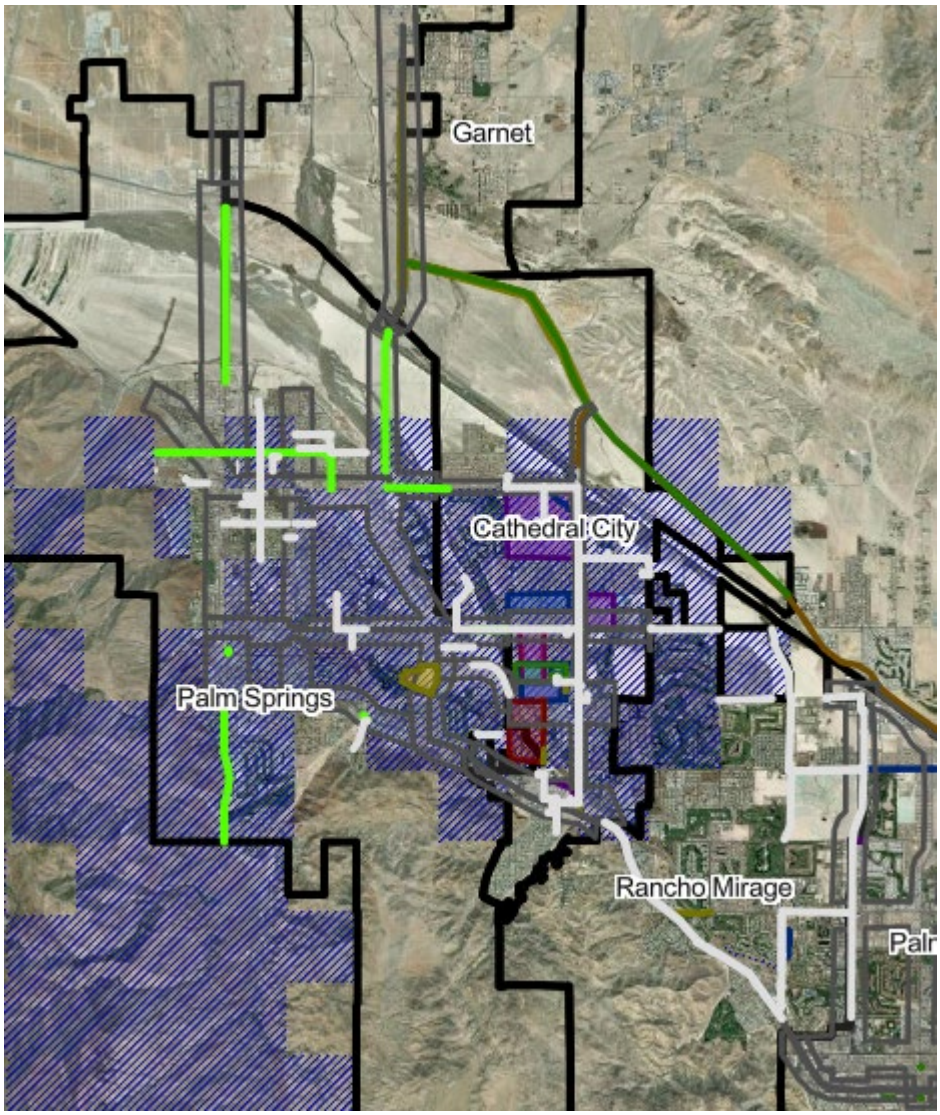


Figure 13 - Example CIP High-Level Design

All jurisdiction CIP project segments were preliminarily designed in GIS with color delineation of projected project start year. Also, each design segment was given attributes to define the jurisdiction and end points (see the inset attribute table below for an example of added attributes).

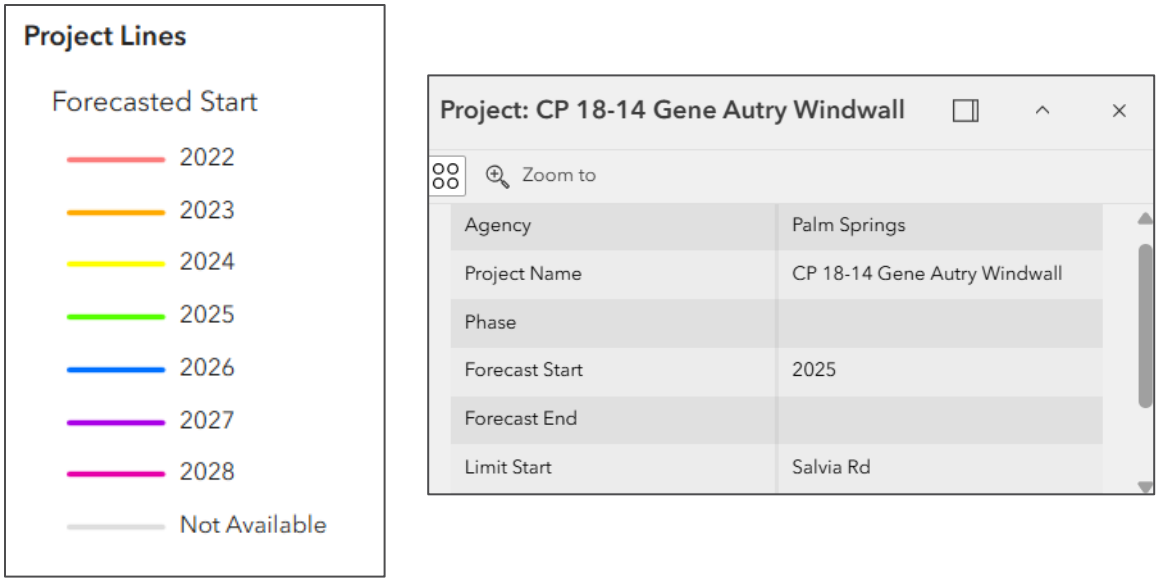


Figure 14 - CIP Project Line Legend and Attributes

The jurisdiction CIP high-level design and detail in Regional Broadband GIS Map is intended to be used for coordination to lower costs to reach unserved and underserved addresses either by jurisdiction or CIP broadband infrastructure. The Governance section of this report provides information regarding options of which a jurisdiction can build, own, operate, provide services, or otherwise partner with private ISPs to implement or expand broadband networks in a community.

Projects in CIPs are requested, not clearly defined. They represent a concept to be further defined at the time they develop from general plan to specific projects. Because the CIP projects are conceptual, there is not enough detail to define costs of broadband infrastructure. At the point a CIP project is designed as an actual project, it is recommended a “dig once” evaluation is conducted to see if broadband infrastructure can be added and what the specific costs would be. If placement of broadband infrastructure can be considered, cost savings will be determined by the type of construction and steps used in the CIP project. These basic designs are intended for coordination and collaboration purposes, not financial considerations.

It is recommended the following steps be taken when detailed designs are developed for the construction of each CIP project:

1. Determine if broadband infrastructure (typically conduit) could be included in the project
2. Define who will purchase and install the conduit and their costs for installation
3. Calculate total high-level cost of installation
4. If it is determined adding broadband infrastructure is feasible, conduct detail design of installation
5. Coordinate permitting and construction accordingly.

More details can be found regarding coordination of broadband infrastructure in Right of Way (ROW) construction in the Dig Once information of the Policy section of this report.

All CIP projects that were determined to have the possibility of including broadband infrastructure in all of the jurisdictions were included in The Regional Broadband GIS Map.

CV SYNC INSTRUSTRUCTURE

During the project, it was determined that CV Sync data was stored in two formats: 1. Computer Aided Design (CAD) plans for construction; and 2. As-built construction plans in pdf format to document completed construction. The documentation was complete, but not in a form that would be the most efficient for broadband designs and collaboration for broadband improvements.

HR Green converted CAD and as-built files into GIS data, creating high-level designs of all CV Sync infrastructure in CV Sync Phases I and II. The map below shows CV Sync data points in the Regional Broadband GIS Map.

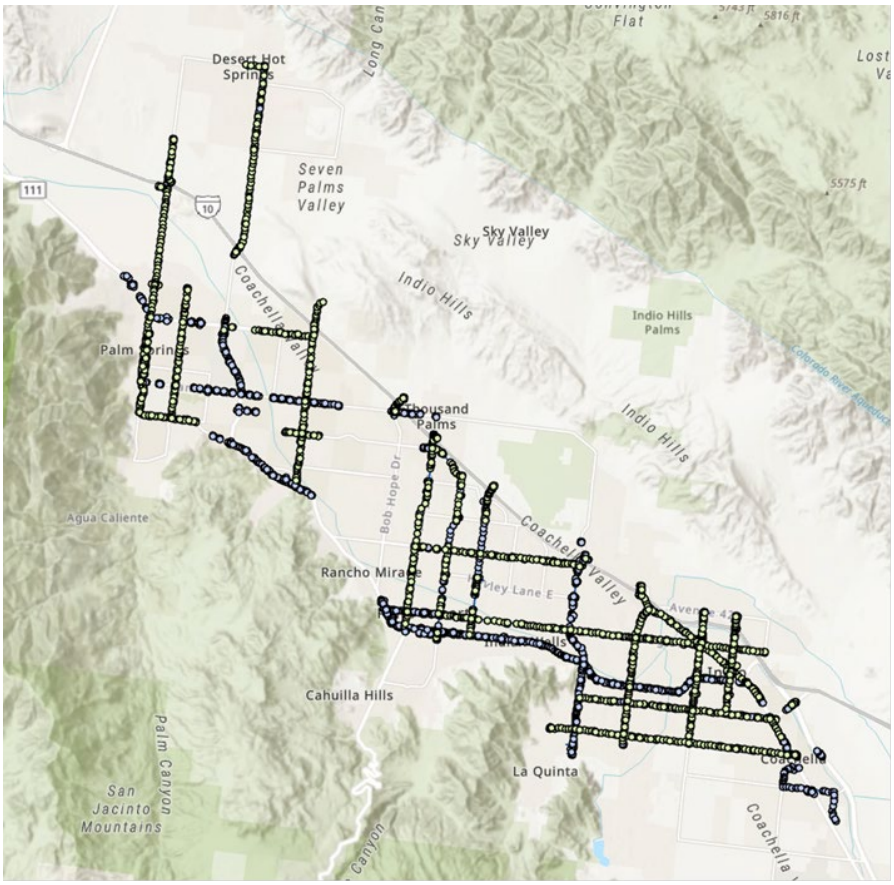


Figure 15 - CV Sync Plans and As-Builts in The Regional Broadband GIS Map

A closer view (below left) shows examples of the details that were included in The Regional Broadband GIS Map. Also, the attributes for the infrastructure were included in this design (right). The attributes show detail that can be used for future collaboration:

- Within which CV Sync project phase the conduit is installed (or is planned to be installed)
- The size of conduit (3”)
- This selected conduit contains a 144-fiber bundle
- The Regional Broadband GIS Map allows up to four attributes to track the presence of other cables within a conduit, such as fiber the jurisdiction might add or fiber an ISP might gain approval from a jurisdiction to install in the conduit
- There are 5.9 available square inches of the original 7 square inches in a 3” conduit. This dimension determines whether there is room for more fiber to be deployed in the conduit. This conduit has a majority of space available, other conduits may not and, over time, conduits could get filled with new fiber – keeping the Regional Broadband GIS Map updated will be necessary to know when specific conduit segments no longer have available space
- Palm Desert owns this conduit



Conduit Status	PH II
Conduit Size_in	3
Conduit Material	HDPE
Conduit Content_1	144F
Conduit Content_2	VAC
Conduit Content_3	VAC
Conduit Content_4	VAC
Room_Left	5.9
Owner	Palm Desert

Whether a jurisdiction intends to utilize the extra capacity in the conduit or work with an ISP that requests using the conduit, these details will be significant in those discussions and plans. It will be important to field-verify current conditions and details regarding the conduit. More information regarding the coordination process can be found in the Phased Implementation Plan section of this report.

HIGH-LEVEL DESIGN

There were two specific high-level designs that were completed (including high-level costs):

- A design that completes a proposed conduit network serving the entire Coachella Valley that could serve both CV Sync and broadband infrastructure. This design is divided into four sections
- Three sample design areas that include unserved and underserved addresses

Detail design and full feasibility are the next typical steps. They are conducted by the entity that builds and owns the network. The costs of those steps are, typically, included in the amount that is financed to build the network.

DESIGNS THAT COMPLETE A CONDUIT NETWORK

The CV Sync program consists of leveraging existing traffic signal conduit owned by jurisdictions and conduit that was installed for the specific purpose of connecting the traffic signal synchronization system. To make it accessible to be leveraged for broadband improvement, this study proposes additional conduit segments that could be installed to complete a valley-wide conduit network connecting between and within all jurisdictions. These can be completed during jurisdiction CIP projects, as stand-alone projects or by ISPs installing private networks.

The initial step for this conduit network design was completed in the Infrastructe Documentation section above (converting CV Sync data to GIS and completing design that includes CV Sync routes and infrastructure attributes). From the CV Sync documentation, a design of connecting segments was completed.

These designs are high-level showing route and high-level costs. They represent typical underground design of three inch conduit and could be used to build broadband infrastructure. If the point is reached to build any segments, HR Green recommends taking the additional steps of field verification of routes, documentation of impediments, then final design. The costs of these steps can be built into the construction costs by the entity that will build and own the infrastructure.

The design was documented in four sections shown in the map below.

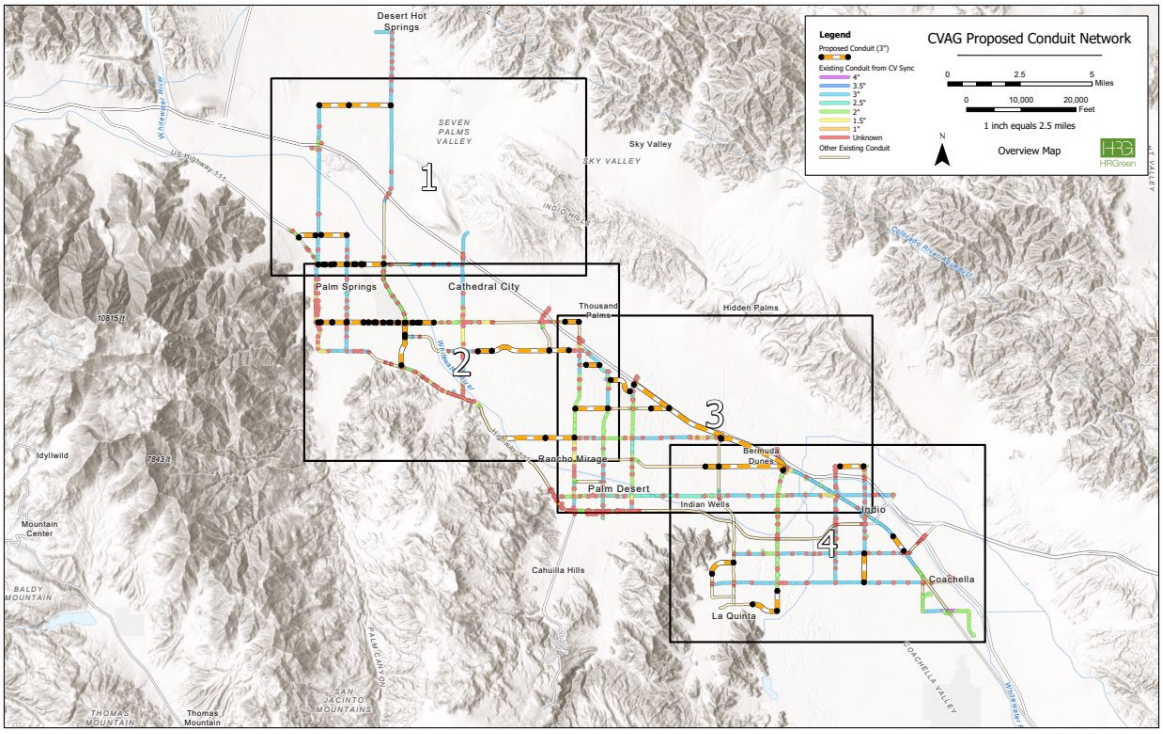


Figure 16 - Four Overview Map Of Conduit Network Design Areas

CONDUIT NETWORK DESIGN AREA ONE

The map below contains the Northwest area of the overview map. The legend shows the orange hashed lines as the designed proposed segments of three-inch conduit. The map also shows existing conduit sizes as documented in the Infrastructure Documentation design described above. Sizes of the existing conduit are differentiated by color and explained in the legend.

The black circles on the ends of the proposed designed conduit indicate the endpoints of a proposed segment. The segments are defined by number, with the number appearing in a circle on the map and detailed in the inset list by corresponding number. The inset list also includes the lineal feet of the segment.

Defining segments and lineal feet per segment are important for usefulness of the design. Segments enable an entity that might install conduit to consider different options and potentially coordinate with different stakeholders for options per segment. Lineal feet is the most efficient method of determining costs until a detailed design is completed.

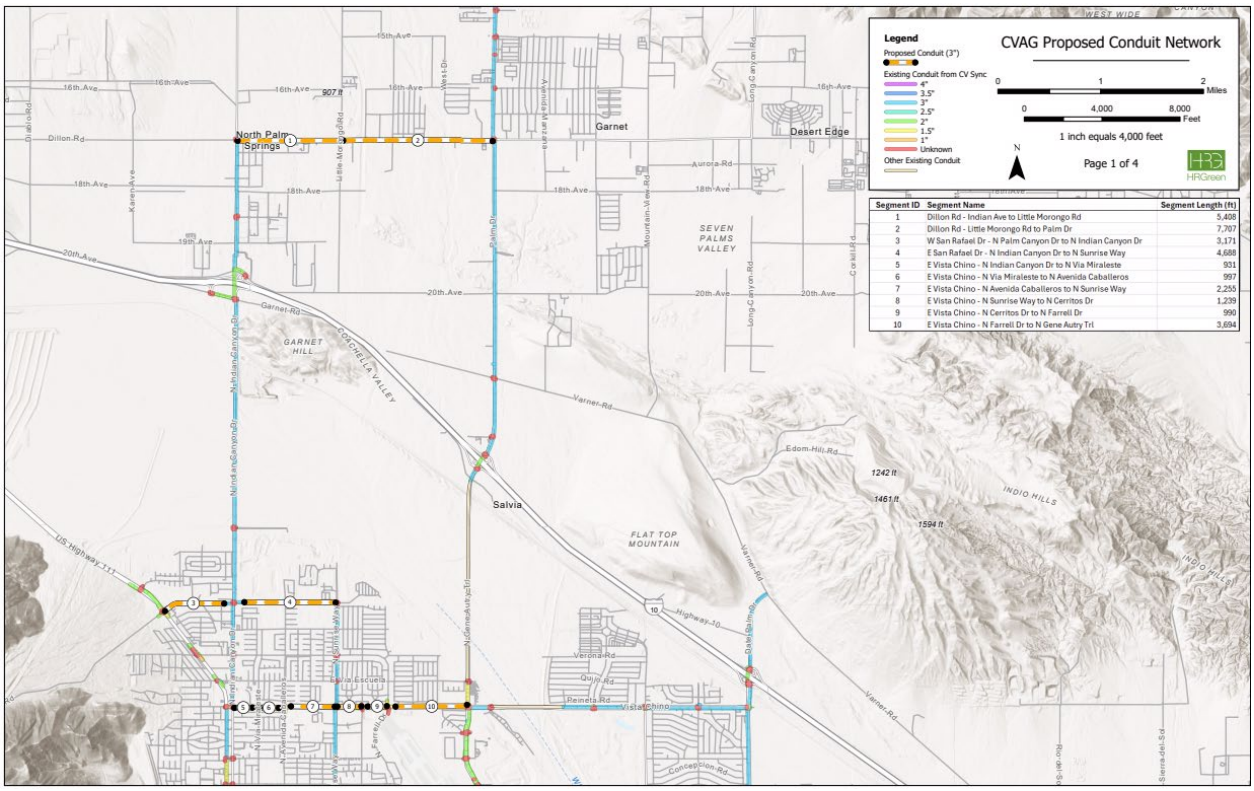
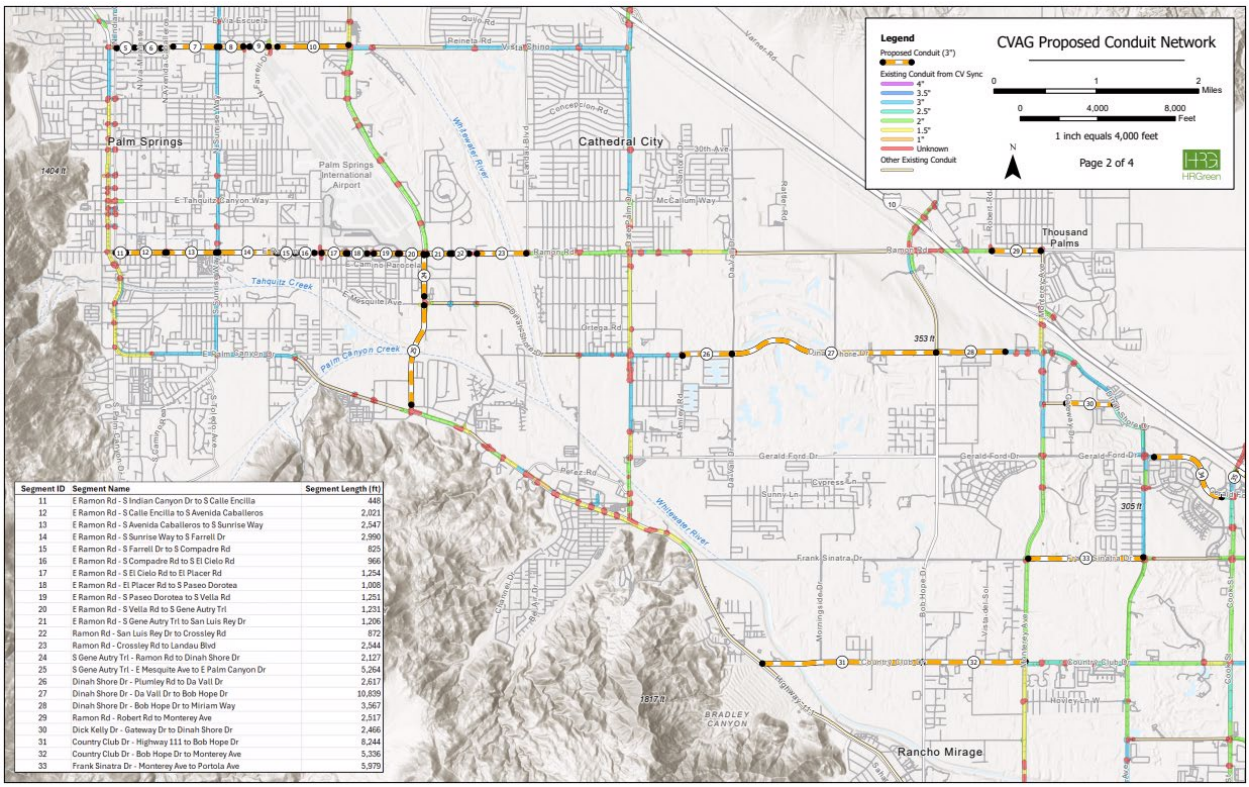


Figure 17 - Conduit Network Area One Detail

CONDUIT NETWORK DESIGN AREA TWO

In Area Two there are more CV Sync conduit segments to tie in than in Area 1. The segment lengths in Area Two are similar to Area one, however there are more segments in Area Two that the network designers determined needed to be connected.

There is an exception in segment 27, which is located along Dina Shore Drive - Da Valle Drive to Bob Hope Drive. It has more lineal feet than many others. Network designers determined there were not infrastructure components within the segment to warrant ending the segment and starting another. This could be changed in the future if other infrastructure or intersections are added within that segment.



Segment ID	Segment Name	Segment Length (ft)
11	E Ramon Rd - S Indian Canyon Dr to S Calle Encilla	448
12	E Ramon Rd - S Calle Encilla to S Avenida Caballeros	2,021
13	E Ramon Rd - S Avenida Caballeros to S Sunrise Way	2,547
14	E Ramon Rd - S Sunrise Way to S Farrell Dr	2,990
15	E Ramon Rd - S Farrell Dr to S Compadre Rd	825
16	E Ramon Rd - S Compadre Rd to S El Cielo Rd	966
17	E Ramon Rd - S El Cielo Rd to El Placer Rd	1,254
18	E Ramon Rd - El Placer Rd to S Paseo Dorotea	1,008
19	E Ramon Rd - S Paseo Dorotea to S Vella Rd	1,251
20	E Ramon Rd - S Vella Rd to S Gene Autry Trl	1,231
21	E Ramon Rd - S Gene Autry Trl to San Luis Rey Dr	1,206
22	Ramon Rd - San Luis Rey Dr to Crossley Rd	672
23	Ramon Rd - Crossley Rd to Landau Blvd	2,544
24	S Gene Autry Trl - Ramon Rd to Dinah Shore Dr	2,127
25	S Gene Autry Trl - E Mesquite Ave to E Palm Canyon Dr	5,264
26	Dinah Shore Dr - Plumley Rd to Da Vall Dr	2,617
27	Dinah Shore Dr - Da Vall Dr to Bob Hope Dr	10,839
28	Dinah Shore Dr - Bob Hope Dr to Miriam Way	3,567
29	Ramon Rd - Robert Rd to Monterey Ave	2,517
30	Dick Kelly Dr - Gateway Dr to Dinah Shore Dr	2,466
31	Country Club Dr - Highway 111 to Bob Hope Dr	8,244
32	Country Club Dr - Bob Hope Dr to Monterey Ave	5,336
33	Frank Sinatra Dr - Monterey Ave to Portola Ave	5,979

Figure 18 - Conduit Network Area Two Detail

CONDUIT NETWORK DESIGN AREA THREE

In Area Three there are more segments that are longer than in the previous two segments. This has a similar explanation to the longer segments detailed in Area Two – there are not as many intersections or other features that would necessitate segment delineation.

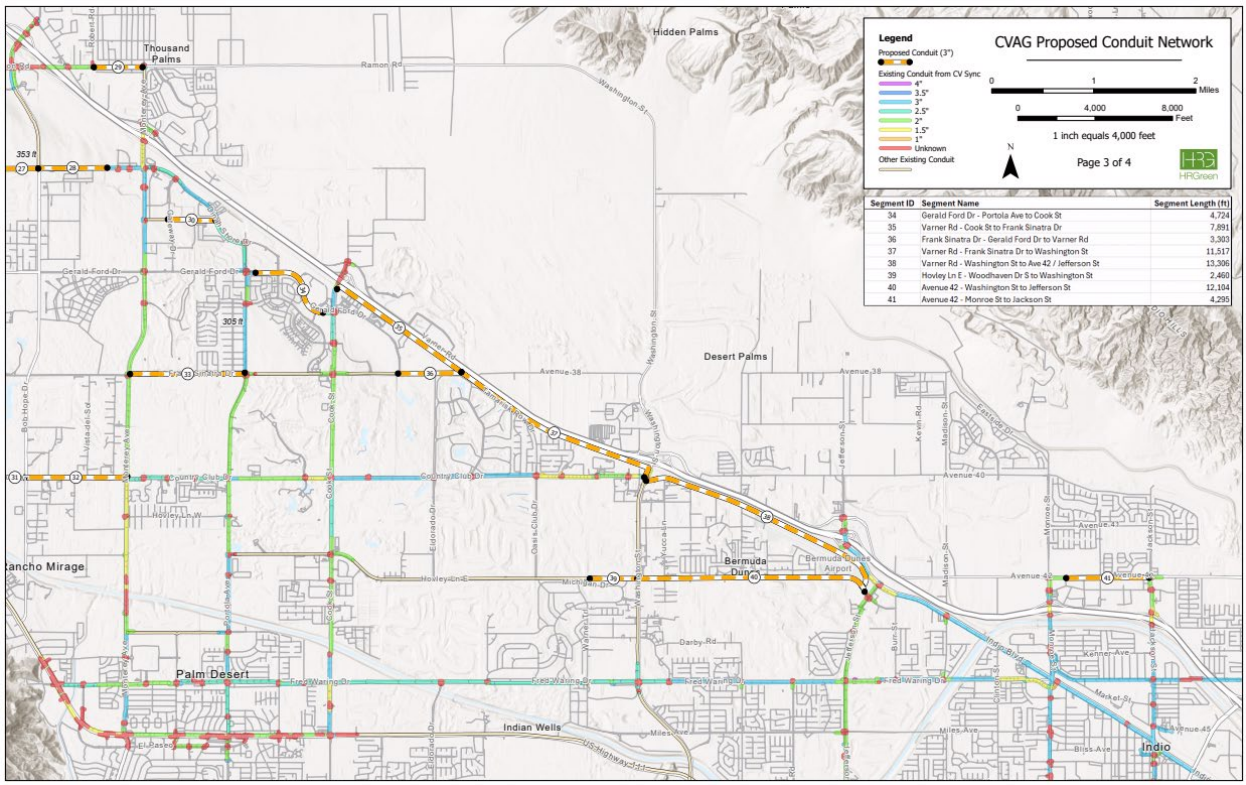


Figure 19 - Conduit Area Three Detail

CONDUIT NETWORK DESIGN AREA FOUR

The final conduit network design section contains five additional design segments.

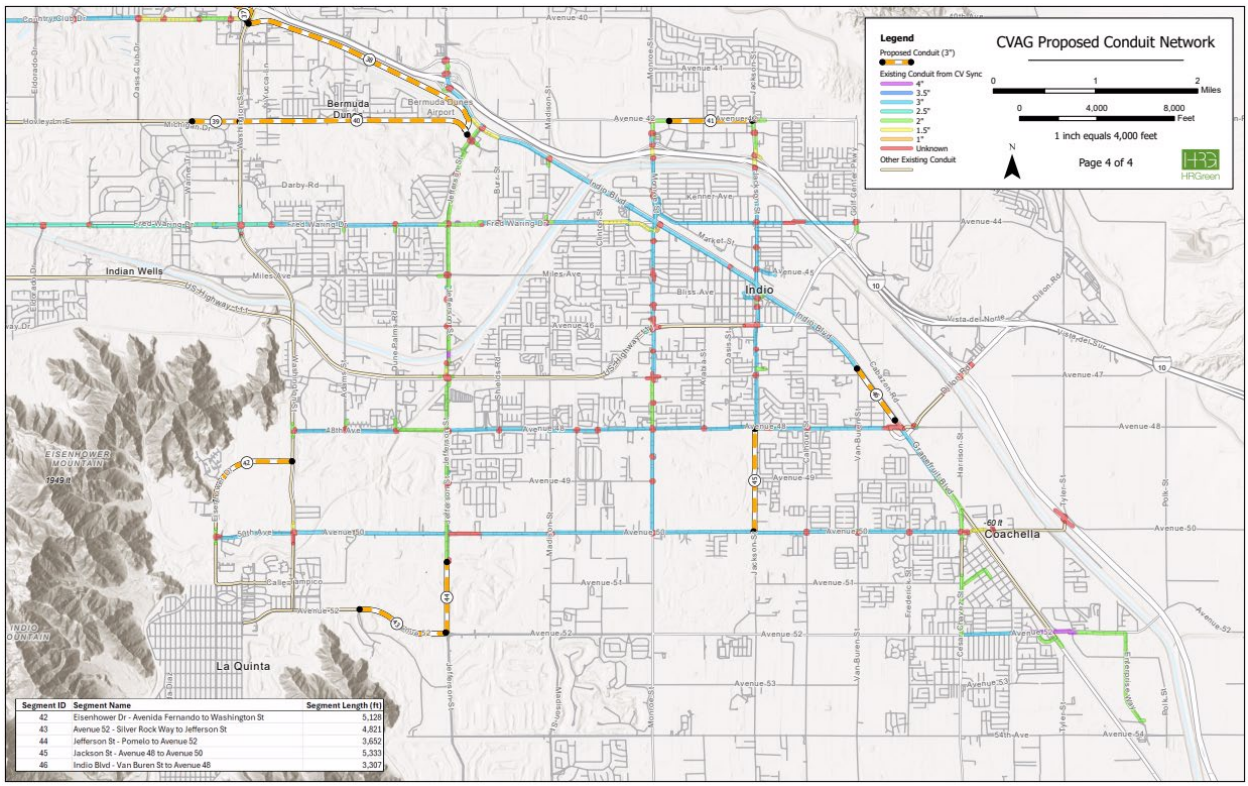


Figure 20 - Conduit Network Area Four Detail

As is shown in the segment detail legend in the lower left corner of the Area Four map, there are a total of 46 segments designed that could be added to complete a more broadband ready conduit network.

The Coachella Valley currently contains broadband infrastructure that could be very useful in improving broadband (either by jurisdictions or working with ISPs). Having available conduit significantly reduces costs of deployment. A more complete conduit network would be a valuable asset that would reduce costs even more and provide more opportunities for collaboration and coordination.

It is important to know where conduit is and where it is not. These maps provide both. When developing CIP project plans, it is important to reference these maps to see if missing conduit could be added. When developing plans for broadband or connectivity infrastructure expansion (jurisdiction or ISP), consulting these maps will help determine costs and cost savings and could be an important resource for detail design.

CONDUIT NETWORK DESIGN COSTING

To define conduit network project estimates, a general cost of $56.49 (refer to the Financial Analysis section of this report for detail regarding costing) per lineal foot can be used.

For example, segment 46 in Area 4 above (Indio Boulevard – Van Buren St. to Avenue 48), there are 3,307 lineal feet of proposed conduit designed.

Therefore, for a project budget number, if this was new construction and not part of another project, an anticipated cost to install 3,307 lineal feet of three-inch conduit would be: $186,812.43.

However, as is detailed in the Financial Analysis section of this report, the expected costs to install this conduit as part of another project could be within a range of: $4,927.43 - $46,298.

When an entity (jurisdiction or ISP) makes the decision to build a segment(s), detail designs could be completed. It is also possible the designs could be used depending on permitting requirements per jurisdiction. If these designs are used, costs would need to be clarified and field verification would need to be completed to confirm the route (often done during construction).

NETWORK DESIGNS IN AREAS OF NEED

After having identified broadband concerns in the CVAG area (more information can be found in the Gap Analysis deliverable) and defined conduit paths to reach areas with broadband gaps (one solution being the conduit network in the previous section), the next step is to define specific ways to improve broadband to the addresses identified as being unserved or underserved.

Typically, unserved and underserved addresses have not been adequately connected for identifiable reasons. If serving those addresses made financial sense, the market would have already reached them.

The most common reason potential customers do not have adequate service is the cost to deploy infrastructure. In urban areas with a high density of addresses, it usually makes financial sense for private ISPs to make investment in the network to connect those customers. When addresses are far apart or there are other impediments that make infrastructure deployment cost more, it can be difficult for an ISP to make a profit on their investment in a reasonable timeframe.

There can be multiple options to reach those addresses (fiber (installed aerially on poles or underground), cable, fixed wireless, etc.). The most reliable and with the greatest capacity for future needs is buried fiber. It is also, typically, the most expensive. With conduit lowering costs for deploying fiber, this technology could be feasible in many parts of the Coachella Valley.

From the Gap Analysis, HR Green identified three areas with unserved and underserved addresses to perform HLDs. These HLDs provide representative costs that can be used to understand infrastructure costs in the Coachella Valley. As networks are explored in those areas, if buried fiber continues to have costs that are too high to be feasible (by jurisdictions or ISPs - whichever decides to own the new infrastructure), other technologies can be explored.

As can be seen in the following HLDs, the costs vary greatly in the different identified areas. Area 1, Cabinet C has a high-level cost of just over $1,000 per passing (each address the network goes past). Area 3, Cabinet D has a cost per passing of over $15,000.

Such a wide variance can be attributed to two factors: The number of addresses in the HLD and how far apart the addresses are. These numbers show how dramatically these variables impact costs.

Typically, an ISP looks for a cost per passing that is under $2,000 (and probably closer to $1,000) for infrastructure investment to make sense. Even with lower costs per passing, there are still key variables. One significant factor is how close their existing network is - or at least a middle mile connection (the infrastructure (usually fiber) that connects the network to existing network or to the outside internet). Other factors that can add to costs of infrastructure can be local government policies and permit procedures, environmental factors, etc.

In the HLDs in this report, the average cost per passing is approximately $5,000. This points out why they are unserved or underserved addresses. There is likely a combination of rurality leading to not enough addresses

and the addresses being too far apart to provide an adequate return on investment.

The intent of developing these HLDs is to help formulate options to improve the service to the unserved and underserved addresses. Knowing locations, layout options and costs can help with developing a plan. Basically, there are three options:

- The community deploy infrastructure – if a community has the financial means and political will to build infrastructure, they can build and own the network, provide middle mile, etc. The “Governance” deliverable provides options for government involvement
- ISP infrastructure investment – knowing the costs in these HDLs can help the community discuss with ISPs ways to help the ISPs overcome the reasons why they have not already built the infrastructure to these addresses
- Grants – the main intent for most broadband grants is to change the math by lowering the costs of deployment, making the return make better financial sense

SAMPLE AREAS

Three specific areas of clusters of unserved and underserved addresses were selected for designs.

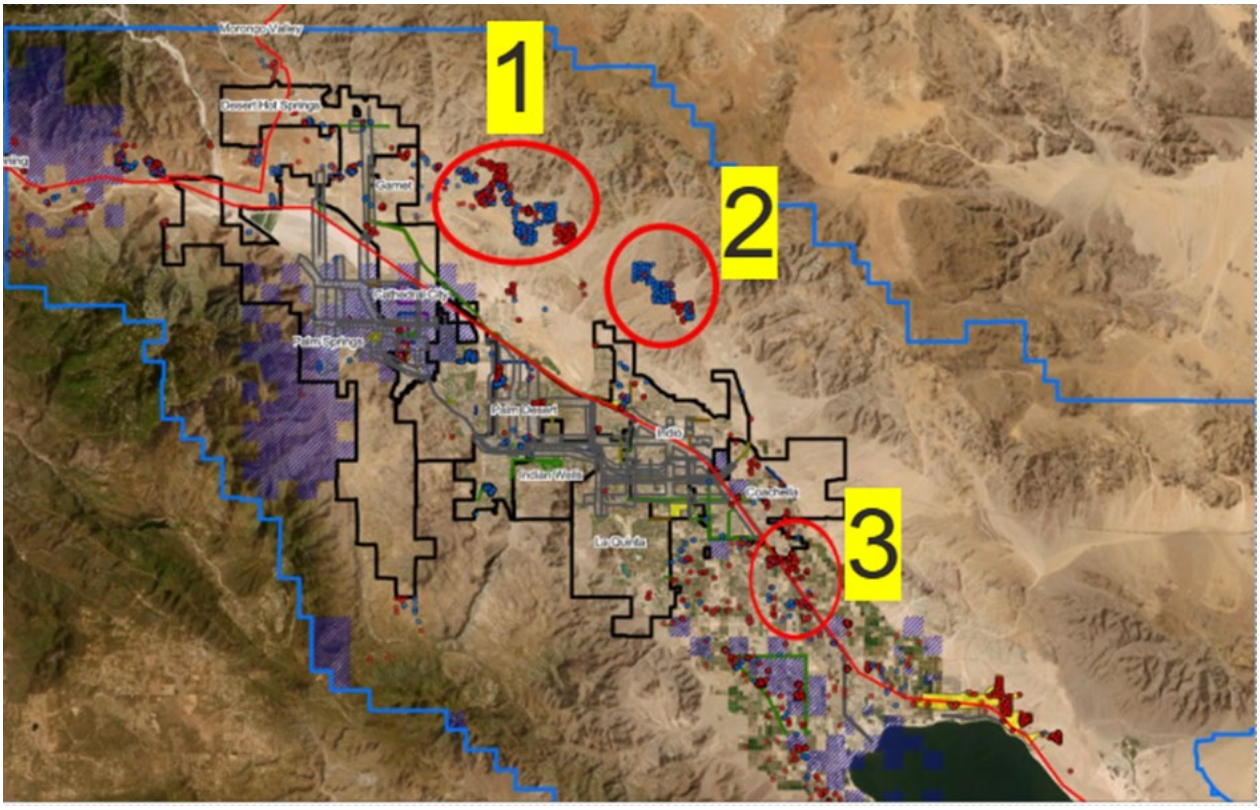


Figure 21 - HLD Design Areas

These were selected utilizing the criteria below:

- Containing a significant number of unserved and underserved addresses
- Highest concentration of unserved and underserved addresses in this study area
- They represent different conditions:
  - Proximity to existing networks
  - Clusters of addresses of unserved and underserved addresses
  - Urban vs rural displaying the differences in distance from other addresses and existing networks and how far apart addresses are (both factors impacting costs)
  - High-level designs can be used to benefit a jurisdiction or ISP intending to pursue grants or perform detailed designs

The high-level designs include the following assumptions:

- All fiber is buried underground
- The architecture is designed in a passive optical network managed by equipment on both ends of the fiber
- The design is organized into specific numbers of addresses within the area, based on distances and numbers of addresses (this is necessary to maintain a realistic number of addresses in areas, which impacts costs in how the design is required to be done)

- Connection to middle mile is not taken into account in these designs (if middle mile is not close, there could be significant costs to connect these networks to other networks or to the outside internet). Middle mile is not considered because it is not known what middle mile is closest (MMBI, middle mile companies, ISPs with networks in the area, etc.)
- These designs do not include the equipment on the ends of the network (in the central equipment location and in the addresses. This cannot be calculated at this point because ISPs have existing equipment for their existing networks. If a jurisdiction or new ISP builds a network they will have to allow for the costs of this equipment (which is included in the construction costs). Also, operations costs (for example the people to operate and maintain the network) and debt service costs are not included because ISPs typically have operations and maintenance paid for in their existing network and debt service varies greatly based on what is financed. These costs are usually included in the costs that are financed to build infrastructure

HIGH-LEVEL DESIGN (HLD) AREA ONE

HLD Area #1 in the map in Figure 4 has been broken out into the following cabinets (also referred to as service boundaries). The red dots are unserved or underserved addresses.

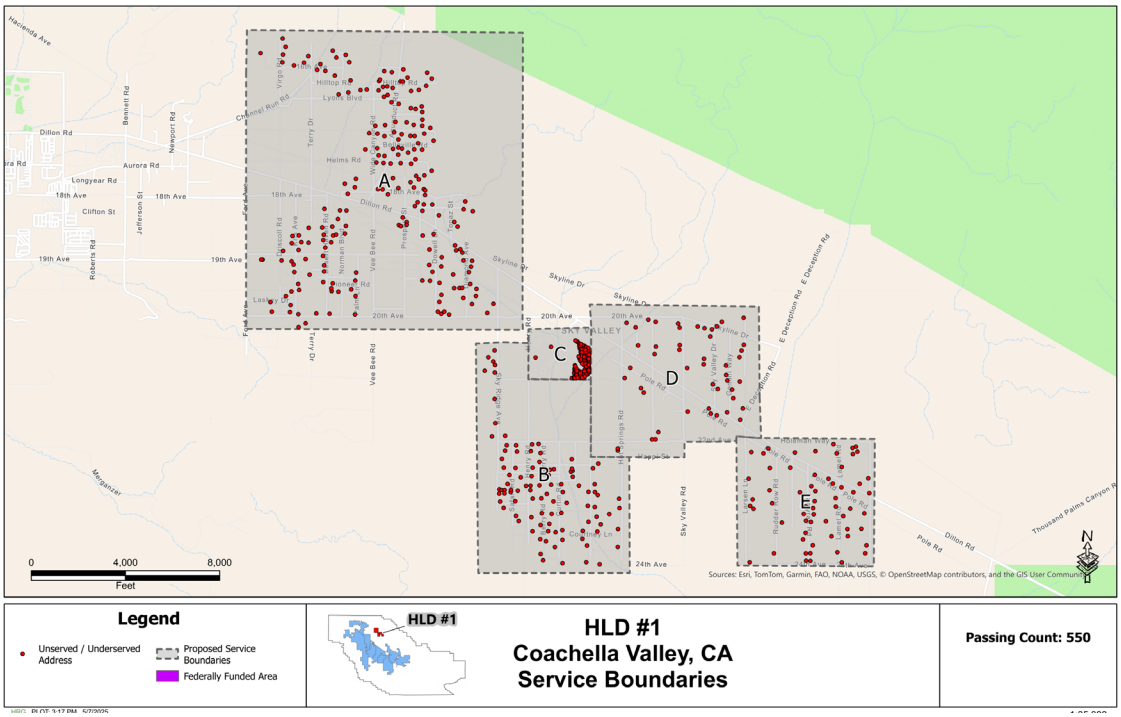
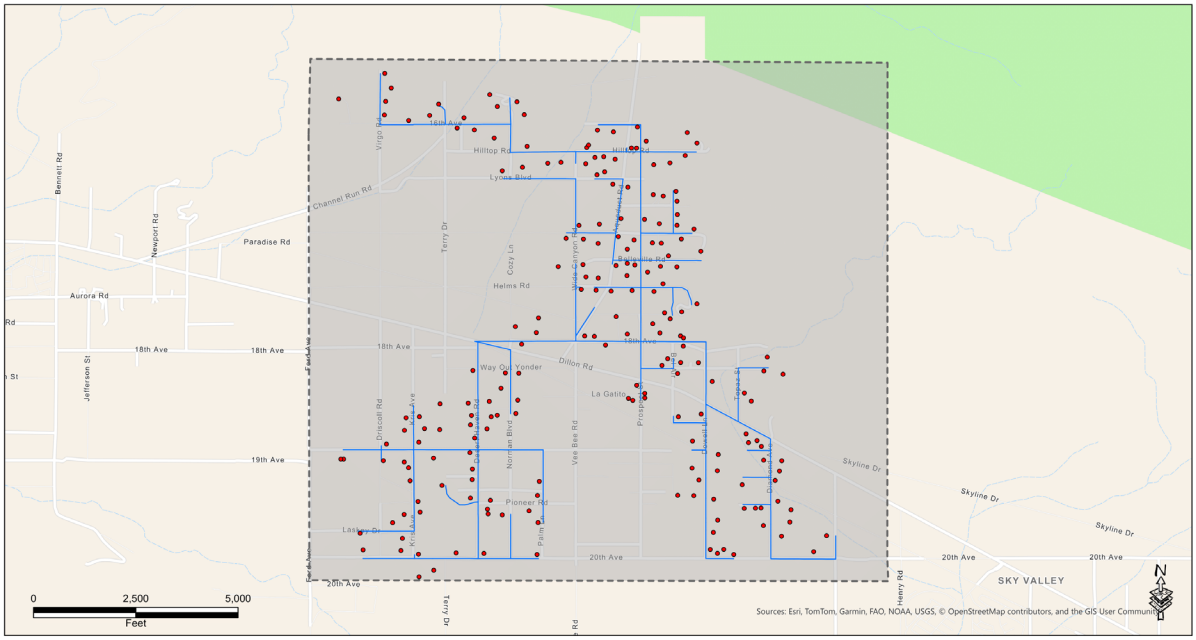


Figure 22 – HLD Area One

Service Boundary A

The map below shows an HLD network for Area 1 Service Boundary A. The blue line is the Outside Plant (OSP) fiber network. OSP refers to the fiber and splicing that are required for a network (without the operating equipment), which are typically located along roadways. The red dots are unserved or underserved addresses (as identified in the legend). The legend also identifies that there are 207 passings (addresses) and the cost for just the OSP is $5,588.41 per passing or $1,156,801.50 for this build. That does not include some important costs, which are identified in the full spreadsheet after the map and summary costs.



Engineering	95,251
Materials	210,038
Construction - AER	-
Construction - UG	851,513
Total Cost	$ 1,156,801.60

Figure 23 - Area # 1 Service Boundary A Map And Summary Costs

The full breakout of high-level design costs is below. This spreadsheet includes OSP material costs and construction labor to build it. This does include the costs of the conduit, fiber, handholes and the labor to install them, which make up the majority of the network build costs. There are smaller, less expensive components that are too numerous to list and are left out because they do not have a substantial impact on total costs.

It is important to note the information at the bottom of the spreadsheet. There are significant costs which are intentionally not included in these numbers. The reason they are not, because depending on who will build the network, the costs might or might not be incurred. For example, if an ISP deploys the infrastructure, they would likely be able to connect it to their existing network access equipment, thus not incurring that expense. If a community decided to build the network and did not have equipment (which they would probably not unless they were already operating a fiber network), they would have to purchase it. Also, this does not include costs of operating the network – this is solely for outside plant infrastructure and construction costs.

Also, “drops” are not included in this list of costs and that can be a significant number. Drops are the fiber that runs from the OSP network (the blue line) to the building (house, business, apartment, etc.). The reason they are not part of these numbers is they are not usually installed until the customer at the address signs an agreement for service. Therefore, it is not possible to know the true cost until it is known who is signing up for service. However, this can be a significant cost in the project, so it would need to be accounted for in the detailed design.

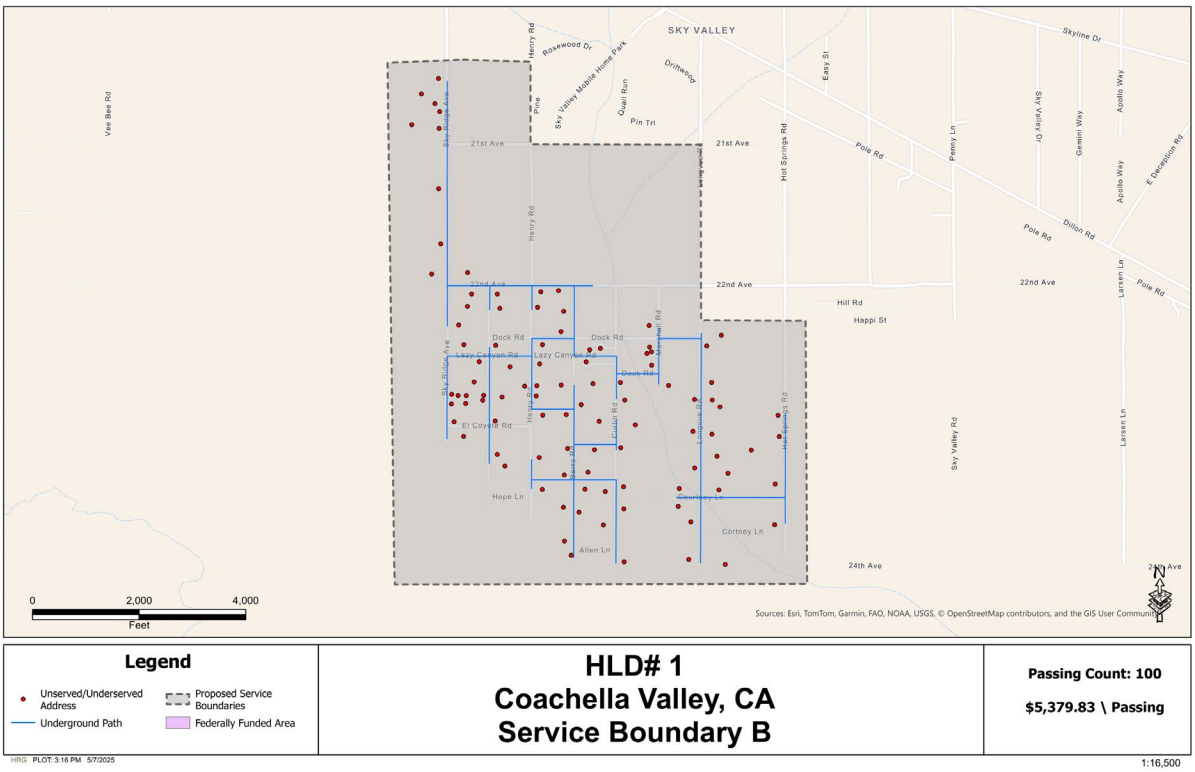
There is a typical process that is followed in building a broadband network. The beginning point is the HLD and it is done from a desktop perspective (not field verified). If a project is moving forward, the HLD is used for field verification, then a detailed design is completed from the field verification notes. If a community desired to build their own network, the HLDs developed for the Broadband Study could be used. Typically, if an ISP is going to do a build, they do their own HLD, field verification and detail design. However, the HLDs provided in this study can be used as a starting point for an ISP implementing a broadband network privately or in conjunction with a jurisdiction through a public-private partnership.

Many jurisdictions accept HLDs as permit plans. The HLDs in this study are full networks and could be used for that step. However, HR Green does not recommend using these documents for those purposes. Field verification, then revised design is the most accurate for permitting and construction.

Group - Summ	Group	Id	Description	Unit	Quantity	Unit Cost	Total Cost
Engineering	Cables	3	Traffic Control (No Drops)	feet	42,146	$ 0.70	$ 29,502.29
Engineering	Cable installation - Underground	NO-ENG	Underground Engineering - Underground Route Design	feet	79,598	$ 0.80	$ 63,678.69
Construction -UG	Cable installation - Underground	NO-ENG	Underground Engineering - Underground Permitting	feet	79,598	$ 0.35	$ 27,859.42
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 2" duct &	feet	159	$ 13.00	$ 2,069.56
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 1.25" duct	feet	1,035	$ 12.00	$ 12,417.34
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 1.25" duct	feet	11,940	$ 11.25	$ 134,322.23
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 2" ducts	feet	1,433	$ 11.25	$ 16,118.67
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 1.25" duct	feet	3,025	$ 10.00	$ 30,247.38
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 2" duct	feet	11,940	$ 8.75	$ 104,472.84
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 1.25" duct	feet	50,067	$ 8.25	$ 413,055.77
Construction -UG	Cable installation - Underground	BH8058	Underground Construction - Install #12 TRACER WIRE GREEN S	feet	79,598	$ 0.14	$ 11,143.77
Construction -UG	Cable installation - Underground	NO-CON	CABLE PULLING (MSTs)	feet	36,148	$ 1.20	$ 43,378.03
Construction -UG	Cable installation - Underground	NO-CON	CABLE PULLING (1 cable)	feet	15,586	$ 1.00	$ 15,586.35
Construction -UG	Cable installation - Underground	NO-CON	PMO (Underground)	feet	79,598	$ 0.48	$ 38,207.21
Construction -UG	Miscellaneous	45	Underground Construction - Provide and place fiber markers	count	5	$ 30.00	$ 150.00
Construction -UG	Cable installation - Underground	76	OTDR End to End Test of Fiber Cable	count	228	$ 20.00	$ 4,554.00
Materials	Cables	F5154	Aerial / Underground Material -Provide 48-ct fiber cable	feet	35,492	$ 0.45	$ 15,971.18
Materials	Cables	F5152	Aerial / Underground Material -Provide 96-ct fiber cable	feet	2,731	$ 0.84	$ 2,293.71
Materials	Cables	F5180	Aerial / Underground Material -Provide 144-ct fiber cable	feet	1,321	$ 0.99	$ 1,308.13
Materials	Cables	F5259	Aerial / Underground Material -Provide 216-ct fiber cable	feet	2,603	$ 1.36	$ 3,539.62
Materials	Terminals, cabinets, splitters	F5282	Provide and Place 432 Cabinet	count	1	$ 8,590.32	$ 8,590.32
Materials	Terminals, cabinets, splitters	F5156	1x32 DISTRIBUTION FIBER SPLITTER	count	7	$ 941.22	$ 6,588.54
Materials	Terminals, cabinets, splitters	F5144	Provide and Place (Raychem B) UG Splice Closure	count	31	$ 421.58	$ 13,068.98
Materials	Terminals, cabinets, splitters	F5079	Provide and Place (Raychem D) UG Splice Closure	count	2	$ 529.39	$ 1,058.78
Materials	Pedestals, flowerpots, pits, vaults e	C4073	Underground Construction - Provide and SET 35x15x17 DOGHO	count	26	$ 985.87	$ 25,632.62
Materials	Pedestals, flowerpots, pits, vaults e	C4082	Underground Construction - PROVIDE AND PLACE PEDESTAL 1	count	199	$ 229.17	$ 45,547.54
Materials	Pedestals, flowerpots, pits, vaults e	BH8132	Underground Construction - PROVIDE AND PLACE 17x30x24 Ya	count	32	$ 610.94	$ 19,427.89
Materials	Pedestals, flowerpots, pits, vaults e	BH8054	Underground Construction - PROVIDE AND PLACE 24x36x30 HA	count	26	$ 854.29	$ 22,211.54
Materials	Pedestals, flowerpots, pits, vaults e	BH8134	Underground Construction - PROVIDE AND PLACE 30x48x36 M	count	2	$ 1,736.63	$ 3,473.26
Materials	Pedestals, flowerpots, pits, vaults e	BH8134	Underground Construction - PROVIDE AND PLACE 30x48x36 M	count	1	$ 1,736.63	$ 1,736.63
Materials	Slackloops	F5154	Underground Construction -Underground Slack Loop 48Ct Fibe	feet	1,950	$ 0.45	$ 877.50
Materials	Slackloops	F5152	Underground Construction -Underground Slack Loop 96Ct Fibe	feet	300	$ 0.84	$ 252.00
Materials	Slackloops	F5180	Underground Construction -Underground Slack Loop 144Ct Fit	feet	75	$ 0.99	$ 74.25
Materials	Slackloops	F5259	Underground Construction -Underground Slack Loop 216Ct Fit	feet	150	$ 1.36	$ 204.00
Materials	Connectorized drop hubs	F5232	2 PORT MST 100' DIELECTRIC	count	14	$ 65.99	$ 923.86
Materials	Connectorized drop hubs	F5233	2 PORT MST 250' DIELECTRIC	count	11	$ 90.72	$ 997.92
Materials	Connectorized drop hubs	F5234	2 PORT MST 500' DIELECTRIC	count	31	$ 143.05	$ 4,434.55
Materials	Connectorized drop hubs	F5235	2 PORT MST 750' DIELECTRIC	count	21	$ 181.45	$ 3,810.45
Materials	Connectorized drop hubs	F5236	2 PORT MST 1000' DIELECTRIC	count	30	$ 218.55	$ 6,556.50
Materials	Connectorized drop hubs	F5237	2 PORT MST 1500' DIELECTRIC	count	49	$ 398.41	$ 19,522.09
Materials	Connectorized drop hubs	F5255	4 PORT MST 100' DIELECTRIC	count	2	$ 82.79	$ 165.58
Materials	Connectorized drop hubs	F5240	4 PORT MST 750' DIELECTRIC	count	1	$ 202.51	$ 202.51
Materials	Connectorized drop hubs	F5241	4 PORT MST 1000' DIELECTRIC	count	1	$ 241.38	$ 241.38
Materials	Connectorized drop hubs	F5250	4 PORT MST 1500' DIELECTRIC	count	4	$ 331.68	$ 1,326.72
Materials	Cables - Drops	51	DROP Footage (avg per drop amount/# passings)	feet		$ 2.06	$ -
Miscellaneous	Special Permits			count		$ 3,000.00	$ -
Miscellaneous	Middle Mile Connection			feet			$ -
Miscellaneous	Central Office			bid			$ -
Miscellaneous	Network Access Equipment			bid	-		$ -
Miscellaneous	Shelters			count			$ -
Miscellaneous	Contingency			count			$ -
					-		
						Total:	$ 1,156,801.60

Figure 24 - Area # 1 Service Boundary A Labor And Material OSP Costs

Service Boundary B



Engineering	44,785
Materials	104,356
Construction - AER	-
Construction - UG	388,842
Total Cost	$ 537,983.30

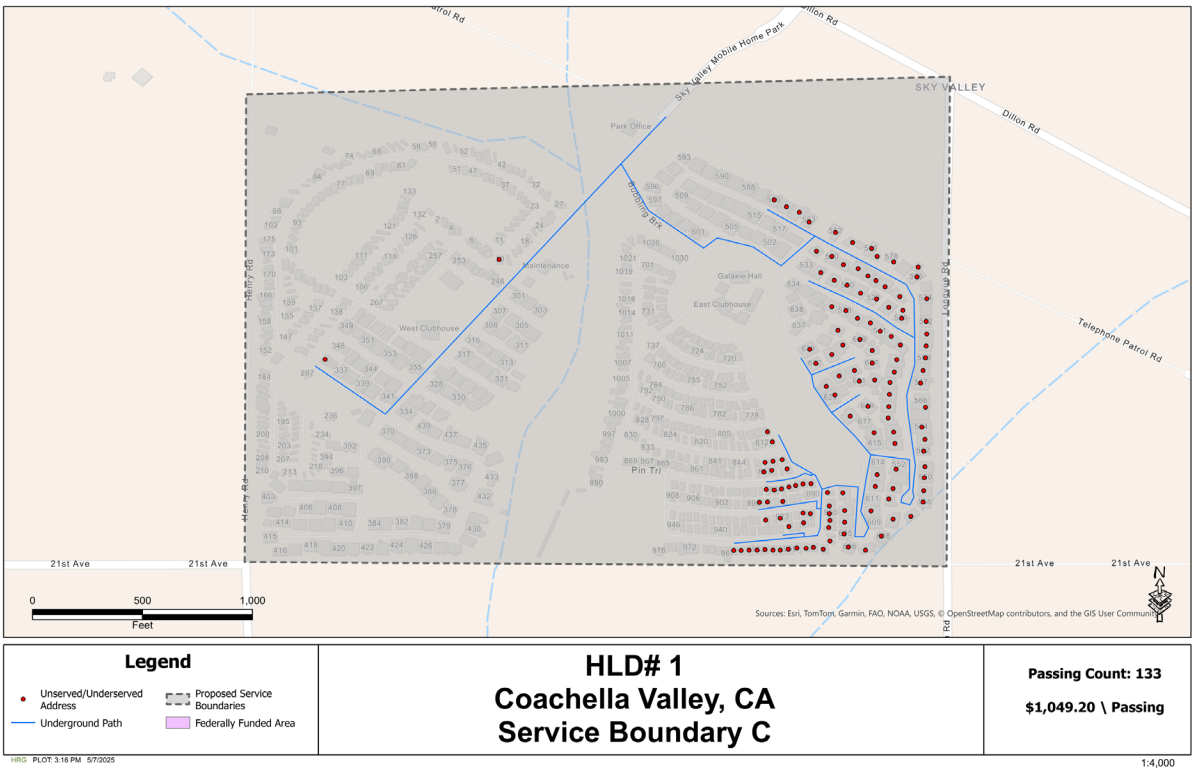
Passings	100
Cost Per Passing	$ 5,379.83

Figure 25 - Area # 1 Service Boundary B
Map And Summary Costs

Group - Summary	Group	Id	Description	Unit	Quantity	Unit Cost	Total Cost
Engineering	Cables	3	Traffic Control (No Drops)	feet	20,975	$ 0.70	$ 14,682.64
Materials	Cables	F5154	Aerial / Underground Material -Provide 48-ct fiber cable	feet	19,707	$ 0.45	$ 8,868.15
Materials	Cables	F5152	Aerial / Underground Material -Provide 96-ct fiber cable	feet	1,268	$ 0.84	$ 1,065.29
Materials	Cables	51	DROP Footage (avg per drop amount/# passings)	feet		$ 2.06	$ -
Engineering	Cable installation - Underground	NO-ENG	Underground Engineering - Underground Route Design	feet	36,444	$ 0.80	$ 29,155.02
Construction -UG	Cable installation - Underground	NO-ENG	Underground Engineering - Underground Permitting	feet	36,444	$ 0.35	$ 12,755.32
Engineering	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 2" du	feet	73	$ 13.00	$ 947.54
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 1.25"	feet	474	$ 12.00	$ 5,685.23
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 1.25"	feet	5,467	$ 11.25	$ 61,498.86
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 2" du	feet	656	$ 11.25	$ 7,379.86
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 1.25"	feet	1,385	$ 10.00	$ 13,848.63
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 2" du	feet	5,467	$ 8.75	$ 47,832.45
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 1.25"	feet	22,923	$ 8.25	$189,115.84
Construction -UG	Cable installation - Underground	BH8058	Underground Construction - Install #12 TRACER WIRE GRE	feet	36,444	$ 0.14	$ 5,102.13
Construction -UG	Cable installation - Underground	NO-CON	CABLE PULLING (MSTs)	feet	14,815	$ 1.20	$ 17,777.41
Construction -UG	Cable installation - Underground	NO-CON	CABLE PULLING (1 cable)	feet	7,699	$ 1.00	$ 7,699.27
Construction -UG	Cable installation - Underground	NO-CON	CABLE PULLING (2 cables)	feet	283	$ 1.50	$ 423.92
Construction -UG	Cable installation - Underground	NO-CON	PMO (Underground)	feet	36,444	$ 0.48	$ 17,493.01
Construction -UG	Miscellaneous	45	Underground Construction - Provide and place fiber mark	count	1	$ 30.00	$ 30.00
Materials	Terminals, cabinets, splitters	F5282	Provide and Place 432 Cabinet	count	1	$ 8,590.32	$ 8,590.32
Materials	Terminals, cabinets, splitters	F5156	1x32 DISTRIBUTION FIBER SPLITTER	count	4	$ 941.22	$ 3,764.88
Materials	Terminals, cabinets, splitters	F5144	Provide and Place (Raychem B) UG Splice Closure	count	14	$ 421.58	$ 5,902.12
Materials	Pedestals, flowerpots, pits, vaults	C4073	Underground Construction - Provide and SET 35x15x17 DC	count	14	$ 985.87	$ 13,802.18
Materials	Pedestals, flowerpots, pits, vaults	C4082	Underground Construction - PROVIDE AND PLACE PEDEST	count	94	$ 229.17	$ 21,484.69
Materials	Pedestals, flowerpots, pits, vaults	BH8132	Underground Construction - PROVIDE AND PLACE 17x30x	count	15	$ 610.94	$ 9,164.10
Materials	Pedestals, flowerpots, pits, vaults	BH8054	Underground Construction - PROVIDE AND PLACE 24x36x	count	14	$ 854.29	$ 11,960.06
Materials	Pedestals, flowerpots, pits, vaults	BH8134	Underground Construction - PROVIDE AND PLACE 30x48x	count	1	$ 1,736.63	$ 1,736.63
Materials	Slackloops	F5154	Underground Construction -Underground Slack Loop 48Cl	feet	975	$ 0.45	$ 438.75
Materials	Slackloops	F5152	Underground Construction -Underground Slack Loop 96Cl	feet	75	$ 0.84	$ 63.00
Construction -UG	Cable installation - Underground	76	OTDR End to End Test of Fiber Cable	count	110	$ 20.00	$ 2,200.00
Materials	Connectorized drop hubs	F5232	2 PORT MST 100' DIELECTRIC	count	1	$ 65.99	$ 65.99
Materials	Connectorized drop hubs	F5233	2 PORT MST 250' DIELECTRIC	count	10	$ 90.72	$ 907.20
Materials	Connectorized drop hubs	F5234	2 PORT MST 500' DIELECTRIC	count	13	$ 143.05	$ 1,859.65
Materials	Connectorized drop hubs	F5235	2 PORT MST 750' DIELECTRIC	count	10	$ 181.45	$ 1,814.50
Materials	Connectorized drop hubs	F5236	2 PORT MST 1000' DIELECTRIC	count	13	$ 218.55	$ 2,841.15
Materials	Connectorized drop hubs	F5237	2 PORT MST 1500' DIELECTRIC	count	23	$ 398.41	$ 9,163.43
Materials	Connectorized drop hubs	F5255	4 PORT MST 100' DIELECTRIC	count	1	$ 82.79	$ 82.79
Materials	Connectorized drop hubs	F5238	4 PORT MST 250' DIELECTRIC	count	1	$ 112.51	$ 112.51
Materials	Connectorized drop hubs	F5240	4 PORT MST 750' DIELECTRIC	count	1	$ 202.51	$ 202.51
Materials	Connectorized drop hubs	F5250	4 PORT MST 1500' DIELECTRIC	count	1	$ 331.68	$ 331.68
Materials	Connectorized drop hubs	F5260	6 PORT MST 250' DIELECTRIC	count	1	$ 134.59	$ 134.59
Miscellaneous	Special Permits			count		$ 3,000.00	$ -
Miscellaneous	Middle Mile Connection			feet			$ -
Miscellaneous	Central Office			bid			$ -
Miscellaneous	Network Access Equipment			bid			$ -
Miscellaneous	Shelters			count			$ -
Miscellaneous	Contingency			count			$ -
						Total:	$537,983.30

Figure 26 - Area # 1 Service Boundary B Labor And Material OSP Costs

Service Boundary C



Engineering	9,802
Materials	35,912
Construction - AER	-
Construction - UG	93,829
Total Cost	$ 139,543.42

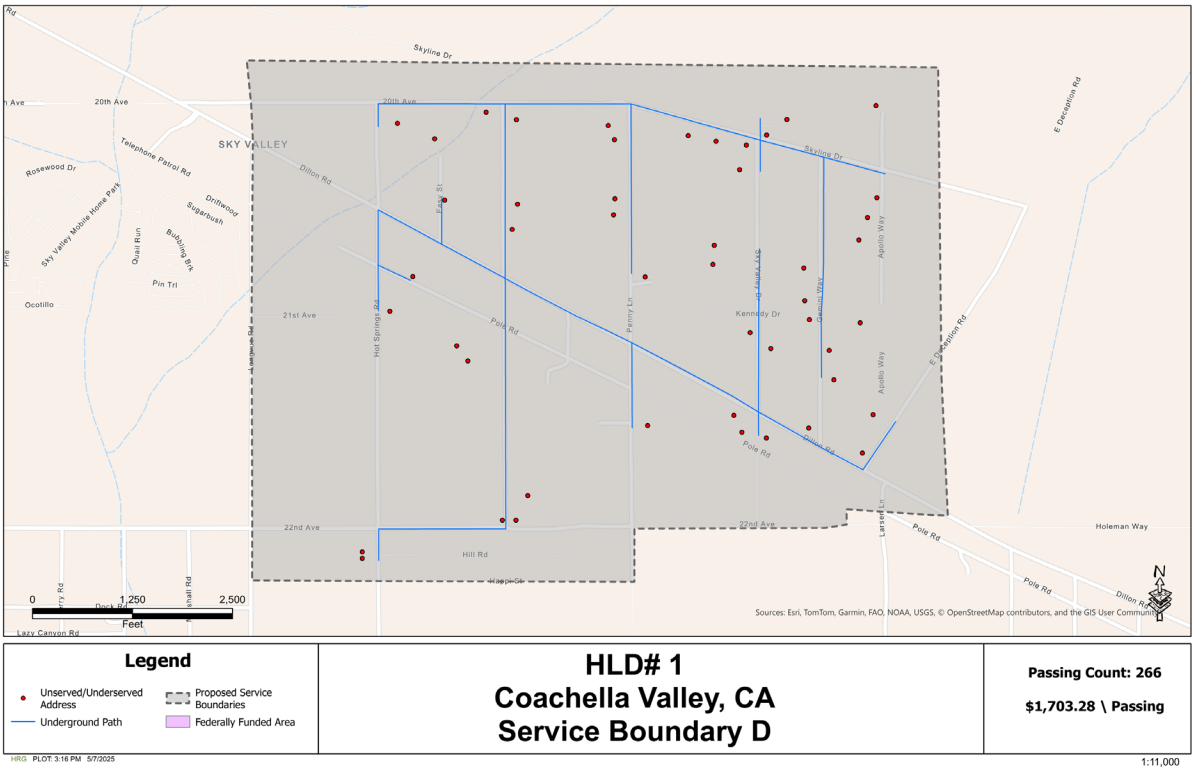
Passings	133
Cost Per Passing	$ 1,049.20

Figure 27 - Area # 1 Service Boundary C
Map And Summary Costs

Group - Summary	Group	Id	Description	Unit	Quantity	Unit Cost	Total Cost
Engineering	Cables	3	Traffic Control (No Drops)	feet	3,857	$ 0.70	$ 2,700.13
Materials	Cables	F5154	Aerial / Underground Material -Provide 48-ct fiber cable	feet	645	$ 0.45	$ 290.36
Materials	Cables	F5152	Aerial / Underground Material -Provide 96-ct fiber cable	feet	1,251	$ 0.84	$ 1,050.87
Materials	Cables	F5180	Aerial / Underground Material -Provide 144-ct fiber cable	feet	1,961	$ 0.99	$ 1,941.44
Materials	Cables	51	DROP Footage (avg per drop amount/# passings)	feet		$ 2.06	$ -
Engineering	Cable installation - Underground	NO-ENG	Underground Engineering - Underground Route Design	feet	8,598	$ 0.80	$ 6,878.47
Construction -UG	Cable installation - Underground	NO-ENG	Underground Engineering - Underground Permitting	feet	8,598	$ 0.35	$ 3,009.33
Engineering	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 2" du	feet	17	$ 13.00	$ 223.55
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 1.25"	feet	112	$ 12.00	$ 1,341.30
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 1.25"	feet	1,290	$ 11.25	$ 14,509.28
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 2" du	feet	155	$ 11.25	$ 1,741.11
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 1.25"	feet	327	$ 10.00	$ 3,267.28
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 2" du	feet	1,290	$ 8.75	$ 11,285.00
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 1.25"	feet	5,408	$ 8.25	$ 44,617.65
Construction -UG	Cable installation - Underground	BH8058	Underground Construction - Install #12 TRACER WIRE GRE	feet	8,598	$ 0.14	$ 1,203.73
Construction -UG	Cable installation - Underground	NO-CON	CABLE PULLING (MSTs)	feet	2,912	$ 1.20	$ 3,494.16
Construction -UG	Cable installation - Underground	NO-CON	CABLE PULLING (1 cable)	feet	1,872	$ 1.00	$ 1,872.43
Construction -UG	Cable installation - Underground	NO-CON	CABLE PULLING (2 cables)	feet	270	$ 1.50	$ 404.92
Construction -UG	Cable installation - Underground	NO-CON	PMO (Underground)	feet	8,598	$ 0.48	$ 4,127.08
Construction -UG	Miscellaneous	45	Underground Construction - Provide and place fiber mark	count	1	$ 30.00	$ 30.00
Materials	Terminals, cabinets, splitters	F5282	Provide and Place 432 Cabinet	count	1	$ 8,590.32	$ 8,590.32
Materials	Terminals, cabinets, splitters	F5156	1x32 DISTRIBUTION FIBER SPLITTER	count	5	$ 941.22	$ 4,706.10
Materials	Terminals, cabinets, splitters	F5144	Provide and Place (Raychem B) UG Splice Closure	count	3	$ 421.58	$ 1,264.74
Materials	Pedestals, flowerpots, pits, vaults	C4073	Underground Construction - Provide and SET 35x15x17 DC	count	1	$ 985.87	$ 985.87
Materials	Pedestals, flowerpots, pits, vaults	C4082	Underground Construction - PROVIDE AND PLACE PEDEST	count	26	$ 229.17	$ 6,015.71
Materials	Pedestals, flowerpots, pits, vaults	BH8132	Underground Construction - PROVIDE AND PLACE 17x30x	count	4	$ 610.94	$ 2,565.95
Materials	Pedestals, flowerpots, pits, vaults	BH8054	Underground Construction - PROVIDE AND PLACE 24x36x	count	1	$ 854.29	$ 854.29
Materials	Pedestals, flowerpots, pits, vaults	BH8134	Underground Construction - PROVIDE AND PLACE 30x48x	count	1	$ 1,736.63	$ 1,736.63
Materials	Slackloops	F5154	Underground Construction -Underground Slack Loop 48Ct	feet	75	$ 0.45	$ 33.75
Materials	Slackloops	F5152	Underground Construction -Underground Slack Loop 96Ct	feet	75	$ 0.84	$ 63.00
Materials	Slackloops	F5180	Underground Construction -Underground Slack Loop 144C	feet	75	$ 0.99	$ 74.25
Construction -UG	Cable installation - Underground	76	OTDR End to End Test of Fiber Cable	count	146	$ 20.00	$ 2,926.00
Materials	Connectorized drop hubs	F5232	2 PORT MST 100' DIELECTRIC	count	1	$ 65.99	$ 65.99
Materials	Connectorized drop hubs	F5234	2 PORT MST 500' DIELECTRIC	count	2	$ 143.05	$ 286.10
Materials	Connectorized drop hubs	F5237	2 PORT MST 1500' DIELECTRIC	count	1	$ 398.41	$ 398.41
Materials	Connectorized drop hubs	F5239	4 PORT MST 500' DIELECTRIC	count	1	$ 165.20	$ 165.20
Materials	Connectorized drop hubs	F5240	4 PORT MST 750' DIELECTRIC	count	1	$ 202.51	$ 202.51
Materials	Connectorized drop hubs	F5241	4 PORT MST 1000' DIELECTRIC	count	1	$ 241.38	$ 241.38
Materials	Connectorized drop hubs	F5242	6 PORT MST 500' DIELECTRIC	count	1	$ 184.33	$ 184.33
Materials	Connectorized drop hubs	F5243	6 PORT MST 750' DIELECTRIC	count	2	$ 300.38	$ 600.76
Materials	Connectorized drop hubs	F5244	6 PORT MST 1000' DIELECTRIC	count	3	$ 264.41	$ 793.23
Materials	Connectorized drop hubs	F5256	6 PORT MST 1500' DIELECTRIC	count	1	$ 376.82	$ 376.82
Materials	Connectorized drop hubs	MST-UG8-100	8 PORT MST 100' DIELECTRIC	count	1	$ 150.00	$ 150.00
Materials	Connectorized drop hubs	F5245	8 PORT MST 250' DIELECTRIC	count	1	$ 166.22	$ 166.22
Materials	Connectorized drop hubs	F5246	8 PORT MST 500' DIELECTRIC	count	1	$ 226.30	$ 226.30
Materials	Connectorized drop hubs	F5322	8 PORT MST 750' DIELECTRIC	count	2	$ 255.93	$ 511.86
Materials	Connectorized drop hubs	F5265	12 PORT MST 500' DIELECTRIC	count	2	$ 292.48	$ 584.96
Materials	Connectorized drop hubs	F5247	12 PORT MST 1000' DIELECTRIC	count	2	$ 392.32	$ 784.64
Miscellaneous	Special Permits			count		$ 3,000.00	$ -
Miscellaneous	Middle Mile Connection			feet			$ -
Miscellaneous	Central Office			bid			$ -
Miscellaneous	Network Access Equipment			bid			$ -
Miscellaneous	Shelters			count			$ -
Miscellaneous	Contingency			count			$ -
						Total:	$ 139,543.42

Figure 28 - Area # 1 Service Boundary C Labor And Material OSP Costs

Service Boundary D



Engineering	37,277
Materials	80,593
Construction - AER	-
Construction - UG	335,204
Total Cost	$ 453,073.46

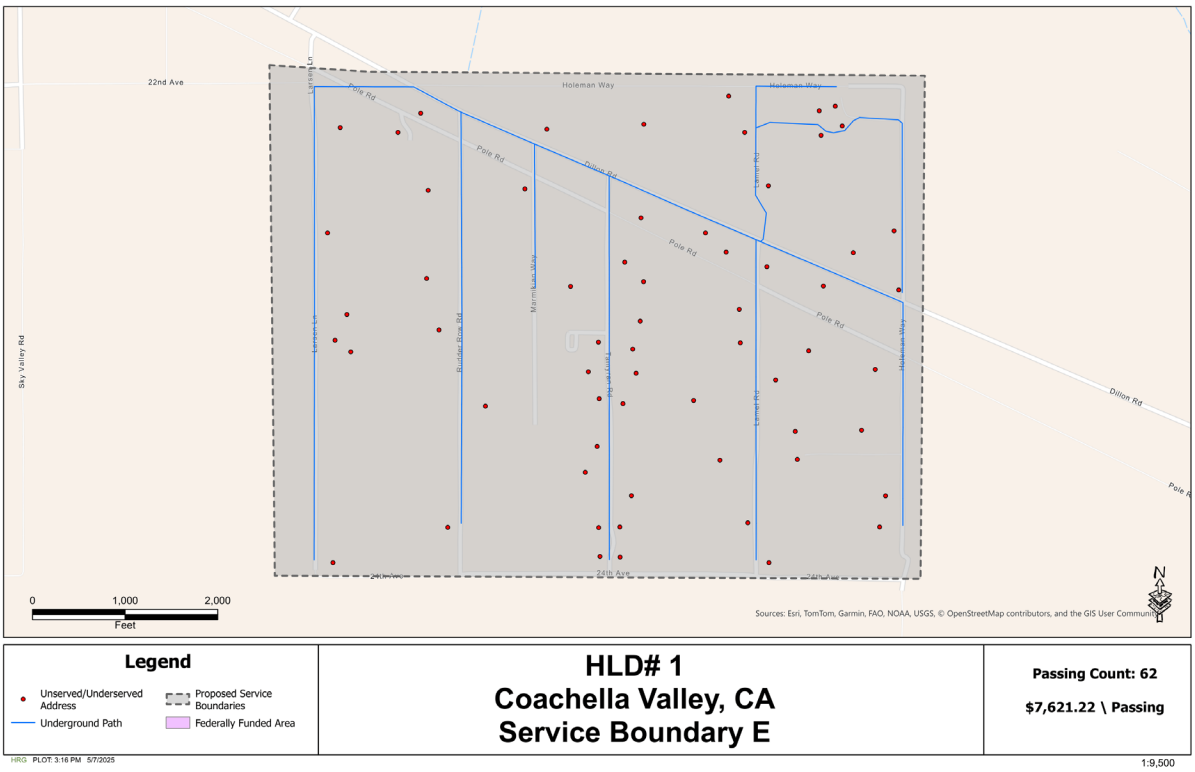
Passings	48
Cost Per Passing	$ 9,439.03

Figure 29 - Area # 1 Service Boundary D
Map And Summary Costs

Group - Summary	Group	Id	Description	Unit	Quantity	Unit Cost	Total Cost
Engineering	Cables	3	Traffic Control (No Drops)	feet	17,294	$ 0.70	$ 12,106.00
Materials	Cables	F5154	Aerial / Underground Material -Provide 48-ct fiber cable	feet	9,287	$ 0.45	$ 4,179.11
Materials	Cables	F5152	Aerial / Underground Material -Provide 96-ct fiber cable	feet	4,812	$ 0.84	$ 4,042.48
Materials	Cables	F5180	Aerial / Underground Material -Provide 144-ct fiber cabl	feet	1,307	$ 0.99	$ 1,293.65
Materials	Cables	F5259	Aerial / Underground Material -Provide 216-ct fiber cabl	feet	1,888	$ 1.36	$ 2,567.91
Materials	Cables	51	DROP Footage (avg per drop amount/# passings)	feet		$ 2.06	$ -
Engineering	Cable installation - Underground	NO-ENG	Underground Engineering - Underground Route Design	feet	30,473	$ 0.80	$ 24,378.57
Construction -UG	Cable installation - Underground	NO-ENG	Underground Engineering - Underground Permitting	feet	30,473	$ 0.35	$ 10,665.63
Engineering	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 2" du	feet	61	$ 13.00	$ 792.30
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 1.25"	feet	396	$ 12.00	$ 4,753.82
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 1.25"	feet	4,571	$ 11.25	$ 51,423.55
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 2" du	feet	549	$ 11.25	$ 6,170.83
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 1.25"	feet	1,158	$ 10.00	$ 11,579.82
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 2" du	feet	4,571	$ 8.75	$ 39,996.10
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 1.25"	feet	19,168	$ 8.25	$158,133.14
Construction -UG	Cable installation - Underground	BH8058	Underground Construction - Install #12 TRACER WIRE GRE	feet	30,473	$ 0.14	$ 4,266.25
Construction -UG	Cable installation - Underground	NO-CON	CABLE PULLING (MSTs)	feet	13,570	$ 1.20	$ 16,283.65
Construction -UG	Cable installation - Underground	NO-CON	CABLE PULLING (1 cable)	feet	11,242	$ 1.00	$ 11,242.05
Construction -UG	Cable installation - Underground	NO-CON	PMO (Underground)	feet	30,473	$ 0.48	$ 14,627.14
Construction -UG	Miscellaneous	45	Underground Construction - Provide and place fiber marl	count	7	$ 30.00	$ 210.00
Materials	Terminals, cabinets, splitters	F5282	Provide and Place 432 Cabinet	count	1	$ 8,590.32	$ 8,590.32
Materials	Terminals, cabinets, splitters	F5156	1x32 DISTRIBUTION FIBER SPLITTER	count	9	$ 941.22	$ 8,470.98
Materials	Terminals, cabinets, splitters	F5144	Provide and Place (Raychem B) UG Splice Closure	count	12	$ 421.58	$ 5,058.96
Materials	Terminals, cabinets, splitters	F5079	Provide and Place (Raychem D) UG Splice Closure	count	1	$ 529.39	$ 529.39
Materials	Pedestals, flowerpots, pits, vaults	C4073	Underground Construction - Provide and SET 35x15x17 D(	count	8	$ 985.87	$ 7,886.96
Materials	Pedestals, flowerpots, pits, vaults	C4082	Underground Construction - PROVIDE AND PLACE PEDEST	count	49	$ 229.17	$ 11,172.04
Materials	Pedestals, flowerpots, pits, vaults	BH8132	Underground Construction - PROVIDE AND PLACE 17x30x	count	8	$ 610.94	$ 4,765.33
Materials	Pedestals, flowerpots, pits, vaults	BH8054	Underground Construction - PROVIDE AND PLACE 24x36x	count	8	$ 854.29	$ 6,834.32
Materials	Pedestals, flowerpots, pits, vaults	BH8134	Underground Construction - PROVIDE AND PLACE 30x48x	count	1	$ 1,736.63	$ 1,736.63
Materials	Pedestals, flowerpots, pits, vaults	BH8134	Underground Construction - PROVIDE AND PLACE 30x48x	count	1	$ 1,736.63	$ 1,736.63
Materials	Slackloops	F5154	Underground Construction -Underground Slack Loop 48C	feet	600	$ 0.45	$ 270.00
Materials	Slackloops	F5152	Underground Construction -Underground Slack Loop 96C	feet	225	$ 0.84	$ 189.00
Materials	Slackloops	F5180	Underground Construction -Underground Slack Loop 144(	feet	75	$ 0.99	$ 74.25
Materials	Slackloops	F5259	Underground Construction -Underground Slack Loop 216(	feet	75	$ 1.36	$ 102.00
Construction -UG	Cable installation - Underground	76	OTDR End to End Test of Fiber Cable	count	293	$ 20.00	$ 5,852.00
Materials	Connectorized drop hubs	F5239	4 PORT MST 500' DIELECTRIC	count	2	$ 165.20	$ 330.40
Materials	Connectorized drop hubs	F5241	4 PORT MST 1000' DIELECTRIC	count	1	$ 241.38	$ 241.38
Materials	Connectorized drop hubs	F5250	4 PORT MST 1500' DIELECTRIC	count	3	$ 331.68	$ 995.04
Materials	Connectorized drop hubs	F5301	6 PORT MST 100' DIELECTRIC	count	4	$ 124.05	$ 496.20
Materials	Connectorized drop hubs	F5260	6 PORT MST 250' DIELECTRIC	count	5	$ 134.59	$ 672.95
Materials	Connectorized drop hubs	F5242	6 PORT MST 500' DIELECTRIC	count	8	$ 184.33	$ 1,474.64
Materials	Connectorized drop hubs	F5243	6 PORT MST 750' DIELECTRIC	count	3	$ 300.38	$ 901.14
Materials	Connectorized drop hubs	F5244	6 PORT MST 1000' DIELECTRIC	count	2	$ 264.41	$ 528.82
Materials	Connectorized drop hubs	F5256	6 PORT MST 1500' DIELECTRIC	count	9	$ 376.82	$ 3,391.38
Materials	Connectorized drop hubs	F5261	8 PORT MST 1500' DIELECTRIC	count	1	$ 401.19	$ 401.19
Materials	Connectorized drop hubs	MST-UG12-100	12 PORT MST 100' DIELECTRIC	count	1	$ 200.00	$ 200.00
Materials	Connectorized drop hubs	F5265	12 PORT MST 500' DIELECTRIC	count	2	$ 292.48	$ 584.96
Materials	Connectorized drop hubs	F5247	12 PORT MST 1000' DIELECTRIC	count	1	$ 392.32	$ 392.32
Materials	Connectorized drop hubs	F5262	12 PORT MST 1500' DIELECTRIC	count	1	$ 482.21	$ 482.21
Miscellaneous	Special Permits			count		$ 3,000.00	$ -
Miscellaneous	Middle Mile Connection			feet			$ -
Miscellaneous	Central Office			bid			$ -
Miscellaneous	Network Access Equipment			bid			$ -
Miscellaneous	Shelters			count			$ -
Miscellaneous	Contingency			count			$ -
						Total:	$453,073.46

Figure 30 - Area # 1 Service Boundary D Labor And Material OSP Costs

Service Boundary E



Engineering	41,736
Materials	83,214
Construction - AER	-
Construction - UG	347,565
Total Cost	$ 472,515.59

Passings	62
Cost Per Passing	$ 7,621.22

Figure 31 - Area # 1 Service Boundary E
Map And Summary Costs

Group - Summary	Group	Id	Description	Unit	Quantity	Unit Cost	Total Cost
Engineering	Cables	3	Traffic Control (No Drops)	feet	21,193	$ 0.70	$ 14,834.84
Materials	Cables	F5154	Aerial / Underground Material -Provide 48-ct fiber cable	feet	21,193	$ 0.45	$ 9,536.68
Materials	Cables	51	DROP Footage (avg per drop amount/# passings)	feet		$ 2.06	$ -
Engineering	Cable installation - Underground	NO-ENG	Underground Engineering - Underground Route Design	feet	32,568	$ 0.80	$ 26,054.68
Construction -UG	Cable installation - Underground	NO-ENG	Underground Engineering - Underground Permitting	feet	32,568	$ 0.35	$ 11,398.92
Engineering	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 2" du	feet	65	$ 13.00	$ 846.78
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 1.25"	feet	423	$ 12.00	$ 5,080.66
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 1.25"	feet	4,885	$ 11.25	$ 54,959.10
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 2" du	feet	586	$ 11.25	$ 6,595.09
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 1.25"	feet	1,238	$ 10.00	$ 12,375.97
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 2" du	feet	4,885	$ 8.75	$ 42,745.96
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 1.25"	feet	20,485	$ 8.25	$169,005.32
Construction -UG	Cable installation - Underground	BH8058	Underground Construction - Install #12 TRACER WIRE GRE	feet	32,568	$ 0.14	$ 4,559.57
Construction -UG	Cable installation - Underground	NO-CON	CABLE PULLING (MSTs)	feet	11,376	$ 1.20	$ 13,650.87
Construction -UG	Cable installation - Underground	NO-CON	CABLE PULLING (1 cable)	feet	10,017	$ 1.00	$ 10,016.65
Construction -UG	Cable installation - Underground	NO-CON	PMO (Underground)	feet	32,568	$ 0.48	$ 15,632.81
Construction -UG	Miscellaneous	45	Underground Construction - Provide and place fiber mark	count	6	$ 30.00	$ 180.00
Materials	Terminals, cabinets, splitters	F5282	Provide and Place 432 Cabinet	count	1	$ 8,590.32	$ 8,590.32
Materials	Terminals, cabinets, splitters	F5156	1x32 DISTRIBUTION FIBER SPLITTER	count	2	$ 941.22	$ 1,882.44
Materials	Terminals, cabinets, splitters	F5144	Provide and Place (Raychem B) UG Splice Closure	count	16	$ 421.58	$ 6,745.28
Materials	Pedestals, flowerpots, pits, vaults	C4073	Underground Construction - Provide and SET 35x15x17 DC	count	13	$ 985.87	$ 12,816.31
Materials	Pedestals, flowerpots, pits, vaults	C4082	Underground Construction - PROVIDE AND PLACE PEDEST	count	60	$ 229.17	$ 13,750.20
Materials	Pedestals, flowerpots, pits, vaults	BH8132	Underground Construction - PROVIDE AND PLACE 17x30x	count	10	$ 610.94	$ 5,865.02
Materials	Pedestals, flowerpots, pits, vaults	BH8054	Underground Construction - PROVIDE AND PLACE 24x36x	count	13	$ 854.29	$ 11,105.77
Materials	Pedestals, flowerpots, pits, vaults	BH8134	Underground Construction - PROVIDE AND PLACE 30x48x	count	1	$ 1,736.63	$ 1,736.63
Materials	Slackloops	F5154	Underground Construction -Underground Slack Loop 48Ct	feet	1,200	$ 0.45	$ 540.00
Construction -UG	Cable installation - Underground	76	OTDR End to End Test of Fiber Cable	count	68	$ 20.00	$ 1,364.00
Materials	Connectorized drop hubs	F5232	2 PORT MST 100' DIELECTRIC	count	8	$ 65.99	$ 527.92
Materials	Connectorized drop hubs	F5233	2 PORT MST 250' DIELECTRIC	count	5	$ 90.72	$ 453.60
Materials	Connectorized drop hubs	F5234	2 PORT MST 500' DIELECTRIC	count	11	$ 143.05	$ 1,573.55
Materials	Connectorized drop hubs	F5235	2 PORT MST 750' DIELECTRIC	count	4	$ 181.45	$ 725.80
Materials	Connectorized drop hubs	F5236	2 PORT MST 1000' DIELECTRIC	count	10	$ 218.55	$ 2,185.50
Materials	Connectorized drop hubs	F5237	2 PORT MST 1500' DIELECTRIC	count	13	$ 398.41	$ 5,179.33
Miscellaneous	Special Permits			count		$ 3,000.00	$ -
Miscellaneous	Middle Mile Connection			feet			$ -
Miscellaneous	Central Office			bid			$ -
Miscellaneous	Network Access Equipment			bid			$ -
Miscellaneous	Shelters			count			$ -
Miscellaneous	Contingency			count			$ -
						Total:	$472,515.59

Figure 32 - Area # 1 Service Boundary E Labor And Material OSP Costs

HLD Area #2

From the original three areas, the following three service boundaries (cabinets) were defined (boundaries A, B and C).

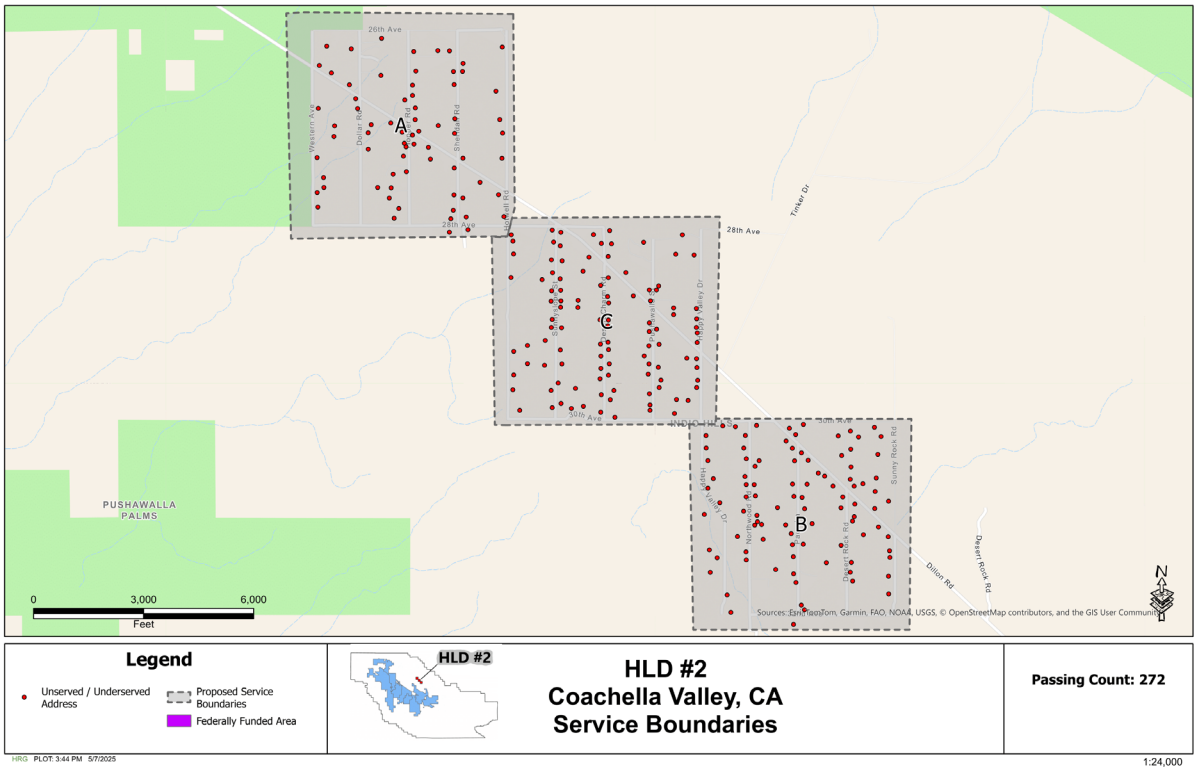


Figure 33 - Service Boundaries in Area # 2

Service Boundary A

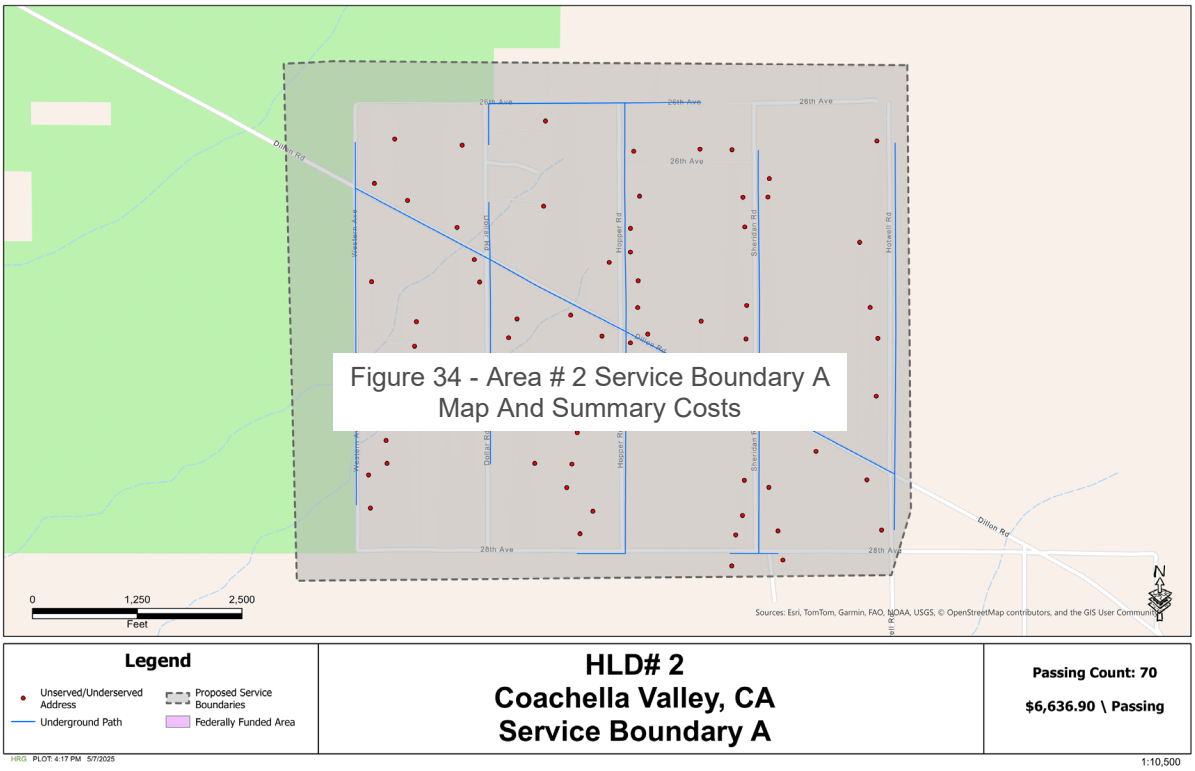


Figure 34 - Area # 2 Service Boundary A Map And Summary Costs

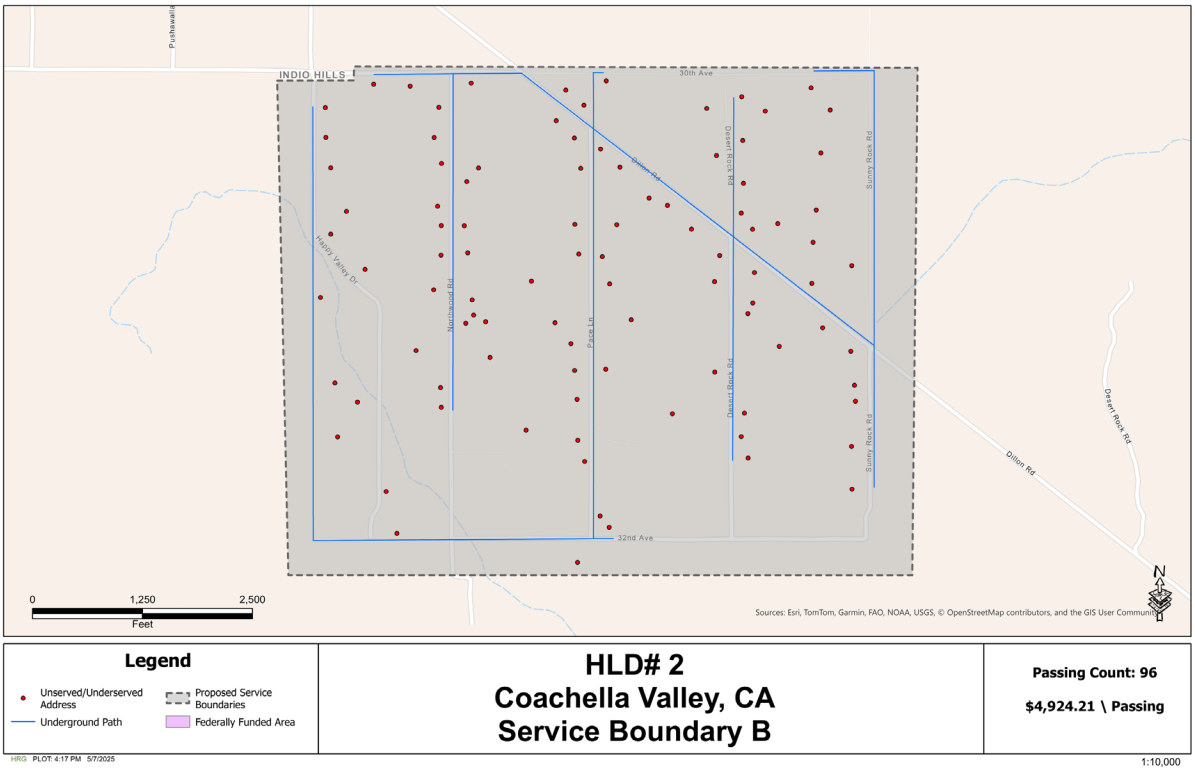
Engineering	40,534
Materials	84,867
Construction - AER	-
Construction - UG	339,182
Total Cost	$ 464,582.95

Passings	70
Cost Per Passing	$ 6,636.90

Group - Summary	Group	Id	Description	Unit	Quantity	Unit Cost	Total Cost
Engineering	Cables	3	Traffic Control (No Drops)	feet	20,111	$ 0.70	$ 14,077.47
Materials	Cables	F5154	Aerial / Underground Material -Provide 48-ct fiber cable	feet	19,917	$ 0.45	$ 8,962.46
Materials	Cables	F5152	Aerial / Underground Material -Provide 96-ct fiber cable	feet	194	$ 0.84	$ 163.05
Materials	Cables	51	DROP Footage (avg per drop amount/# passings)	feet		$ 2.06	$ -
Engineering	Cable installation - Underground	NO-ENG	Underground Engineering - Underground Route Design	feet	32,030	$ 0.80	$ 25,623.79
Construction -UG	Cable installation - Underground	NO-ENG	Underground Engineering - Underground Permitting	feet	32,030	$ 0.35	$ 11,210.41
Engineering	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 2" du	feet	64	$ 13.00	$ 832.77
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 1.25"	feet	416	$ 12.00	$ 4,996.64
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 1.25"	feet	4,804	$ 11.25	$ 54,050.17
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 2" du	feet	577	$ 11.25	$ 6,486.02
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 1.25"	feet	1,217	$ 10.00	$ 12,171.30
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 2" du	feet	4,804	$ 8.75	$ 42,039.02
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 1.25"	feet	20,147	$ 8.25	$166,210.29
Construction -UG	Cable installation - Underground	BH8058	Underground Construction - Install #12 TRACER WIRE GRE	feet	32,030	$ 0.14	$ 4,484.16
Construction -UG	Cable installation - Underground	NO-CON	CABLE PULLING (MSTs)	feet	11,633	$ 1.20	$ 13,960.19
Construction -UG	Cable installation - Underground	NO-CON	CABLE PULLING (1 cable)	feet	6,539	$ 1.00	$ 6,539.30
Construction -UG	Cable installation - Underground	NO-CON	PMO (Underground)	feet	32,030	$ 0.48	$ 15,374.27
Construction -UG	Miscellaneous	45	Underground Construction - Provide and place fiber mark	count	4	$ 30.00	$ 120.00
Materials	Terminals, cabinets, splitters	F5282	Provide and Place 432 Cabinet	count	1	$ 8,590.32	$ 8,590.32
Materials	Terminals, cabinets, splitters	F5156	1x32 DISTRIBUTION FIBER SPLITTER	count	3	$ 941.22	$ 2,823.66
Materials	Terminals, cabinets, splitters	F5144	Provide and Place (Raychem B) UG Splice Closure	count	13	$ 421.58	$ 5,480.54
Materials	Pedestals, flowerpots, pits, vaults	C4073	Underground Construction - Provide and SET 35x15x17 DC	count	11	$ 985.87	$ 10,844.57
Materials	Pedestals, flowerpots, pits, vaults	C4082	Underground Construction - PROVIDE AND PLACE PEDEST	count	74	$ 229.17	$ 16,901.29
Materials	Pedestals, flowerpots, pits, vaults	BH8132	Underground Construction - PROVIDE AND PLACE 17x30x	count	12	$ 610.94	$ 7,209.09
Materials	Pedestals, flowerpots, pits, vaults	BH8054	Underground Construction - PROVIDE AND PLACE 24x36x	count	11	$ 854.29	$ 9,397.19
Materials	Pedestals, flowerpots, pits, vaults	BH8134	Underground Construction - PROVIDE AND PLACE 30x48x	count	1	$ 1,736.63	$ 1,736.63
Materials	Slackloops	F5154	Underground Construction -Underground Slack Loop 48Cl	feet	900	$ 0.45	$ 405.00
Materials	Slackloops	F5152	Underground Construction -Underground Slack Loop 96Cl	feet	75	$ 0.84	$ 63.00
Construction -UG	Cable installation - Underground	76	OTDR End to End Test of Fiber Cable	count	77	$ 20.00	$ 1,540.00
Materials	Connectorized drop hubs	F5232	2 PORT MST 100' DIELECTRIC	count	8	$ 65.99	$ 527.92
Materials	Connectorized drop hubs	F5233	2 PORT MST 250' DIELECTRIC	count	5	$ 90.72	$ 453.60
Materials	Connectorized drop hubs	F5234	2 PORT MST 500' DIELECTRIC	count	15	$ 143.05	$ 2,145.75
Materials	Connectorized drop hubs	F5235	2 PORT MST 750' DIELECTRIC	count	9	$ 181.45	$ 1,633.05
Materials	Connectorized drop hubs	F5236	2 PORT MST 1000' DIELECTRIC	count	10	$ 218.55	$ 2,185.50
Materials	Connectorized drop hubs	F5237	2 PORT MST 1500' DIELECTRIC	count	13	$ 398.41	$ 5,179.33
Materials	Connectorized drop hubs	F5239	4 PORT MST 500' DIELECTRIC	count	1	$ 165.20	$ 165.20
Miscellaneous	Special Permits			count		$ 3,000.00	$ -
Miscellaneous	Middle Mile Connection			feet			$ -
Miscellaneous	Central Office			bid			$ -
Miscellaneous	Network Access Equipment			bid			$ -
Miscellaneous	Shelters			count			$ -
Miscellaneous	Contingency			count			$ -
						Total:	$464,582.95

Figure 35 - Area # 2 Service Boundary A Labor And Material OSP Costs

Service Boundary B



Engineering	41,853
Materials	91,685
Construction - AER	-
Construction - UG	339,186
Total Cost	$ 472,724.06

Passings	96
Cost Per Passing	$ 4,924.21

Figure 36 - Area # 2 Service Boundary B
Labor And Material OSP Costs

Group - Summary	Group	Id	Description	Unit	Quantity	Unit Cost	Total Cost
Engineering	Cables	3	Traffic Control (No Drops)	feet	21,746	$ 0.70	$ 15,222.42
Materials	Cables	F5154	Aerial / Underground Material -Provide 48-ct fiber cable	feet	21,650	$ 0.45	$ 9,742.36
Materials	Cables	F5152	Aerial / Underground Material -Provide 96-ct fiber cable	feet	97	$ 0.84	$ 81.17
Materials	Cables	51	DROP Footage (avg per drop amount/# passings)	feet		$ 2.06	$ -
Engineering	Cable installation - Underground	NO-ENG	Underground Engineering - Underground Route Design	feet	32,241	$ 0.80	$ 25,792.59
Construction -UG	Cable installation - Underground	NO-ENG	Underground Engineering - Underground Permitting	feet	32,241	$ 0.35	$ 11,284.26
Engineering	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 2" du	feet	64	$ 13.00	$ 838.26
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 1.25"	feet	419	$ 12.00	$ 5,029.56
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 1.25"	feet	4,836	$ 11.25	$ 54,406.24
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 2" du	feet	580	$ 11.25	$ 6,528.75
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 1.25"	feet	1,225	$ 10.00	$ 12,251.48
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 2" du	feet	4,836	$ 8.75	$ 42,315.97
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 1.25"	feet	20,279	$ 8.25	$ 167,305.25
Construction -UG	Cable installation - Underground	BH8058	Underground Construction - Install #12 TRACER WIRE GRE	feet	32,241	$ 0.14	$ 4,513.70
Construction -UG	Cable installation - Underground	NO-CON	CABLE PULLING (MSTs)	feet	10,005	$ 1.20	$ 12,005.89
Construction -UG	Cable installation - Underground	NO-CON	CABLE PULLING (1 cable)	feet	5,927	$ 1.00	$ 5,927.14
Construction -UG	Cable installation - Underground	NO-CON	PMO (Underground)	feet	32,241	$ 0.48	$ 15,475.55
Construction -UG	Miscellaneous	45	Underground Construction - Provide and place fiber mark	count	1	$ 30.00	$ 30.00
Materials	Terminals, cabinets, splitters	F5282	Provide and Place 432 Cabinet	count	1	$ 8,590.32	$ 8,590.32
Materials	Terminals, cabinets, splitters	F5156	1x32 DISTRIBUTION FIBER SPLITTER	count	3	$ 941.22	$ 2,823.66
Materials	Terminals, cabinets, splitters	F5144	Provide and Place (Raychem B) UG Splice Closure	count	12	$ 421.58	$ 5,058.96
Materials	Pedestals, flowerpots, pits, vaults	C4073	Underground Construction - Provide and SET 35x15x17 DC	count	9	$ 985.87	$ 8,872.83
Materials	Pedestals, flowerpots, pits, vaults	C4082	Underground Construction - PROVIDE AND PLACE PEDEST	count	91	$ 229.17	$ 20,911.76
Materials	Pedestals, flowerpots, pits, vaults	BH8132	Underground Construction - PROVIDE AND PLACE 17x30x	count	15	$ 610.94	$ 8,919.72
Materials	Pedestals, flowerpots, pits, vaults	BH8054	Underground Construction - PROVIDE AND PLACE 24x36x	count	9	$ 854.29	$ 7,688.61
Materials	Pedestals, flowerpots, pits, vaults	BH8134	Underground Construction - PROVIDE AND PLACE 30x48x	count	1	$ 1,736.63	$ 1,736.63
Materials	Slackloops	F5154	Underground Construction -Underground Slack Loop 48Ct	feet	825	$ 0.45	$ 371.25
Materials	Slackloops	F5152	Underground Construction -Underground Slack Loop 96Ct	feet	75	$ 0.84	$ 63.00
Construction -UG	Cable installation - Underground	76	OTDR End to End Test of Fiber Cable	count	106	$ 20.00	$ 2,112.00
Materials	Connectorized drop hubs	F5232	2 PORT MST 100' DIELECTRIC	count	8	$ 65.99	$ 527.92
Materials	Connectorized drop hubs	F5233	2 PORT MST 250' DIELECTRIC	count	4	$ 90.72	$ 362.88
Materials	Connectorized drop hubs	F5234	2 PORT MST 500' DIELECTRIC	count	19	$ 143.05	$ 2,717.95
Materials	Connectorized drop hubs	F5235	2 PORT MST 750' DIELECTRIC	count	7	$ 181.45	$ 1,270.15
Materials	Connectorized drop hubs	F5236	2 PORT MST 1000' DIELECTRIC	count	15	$ 218.55	$ 3,278.25
Materials	Connectorized drop hubs	F5237	2 PORT MST 1500' DIELECTRIC	count	20	$ 398.41	$ 7,968.20
Materials	Connectorized drop hubs	F5239	4 PORT MST 500' DIELECTRIC	count	1	$ 165.20	$ 165.20
Materials	Connectorized drop hubs	F5240	4 PORT MST 750' DIELECTRIC	count	1	$ 202.51	$ 202.51
Materials	Connectorized drop hubs	F5250	4 PORT MST 1500' DIELECTRIC	count	1	$ 331.68	$ 331.68
Miscellaneous	Special Permits			count		$ 3,000.00	$ -
Miscellaneous	Middle Mile Connection			feet			$ -
Miscellaneous	Central Office			bid			$ -
Miscellaneous	Network Access Equipment			bid			$ -
Miscellaneous	Shelters			count			$ -
Miscellaneous	Contingency			count			$ -
						Total:	$472,724.06

Figure 37 - Area # 2 Service Boundary B Labor And Material OSP Costs

Service Boundary C

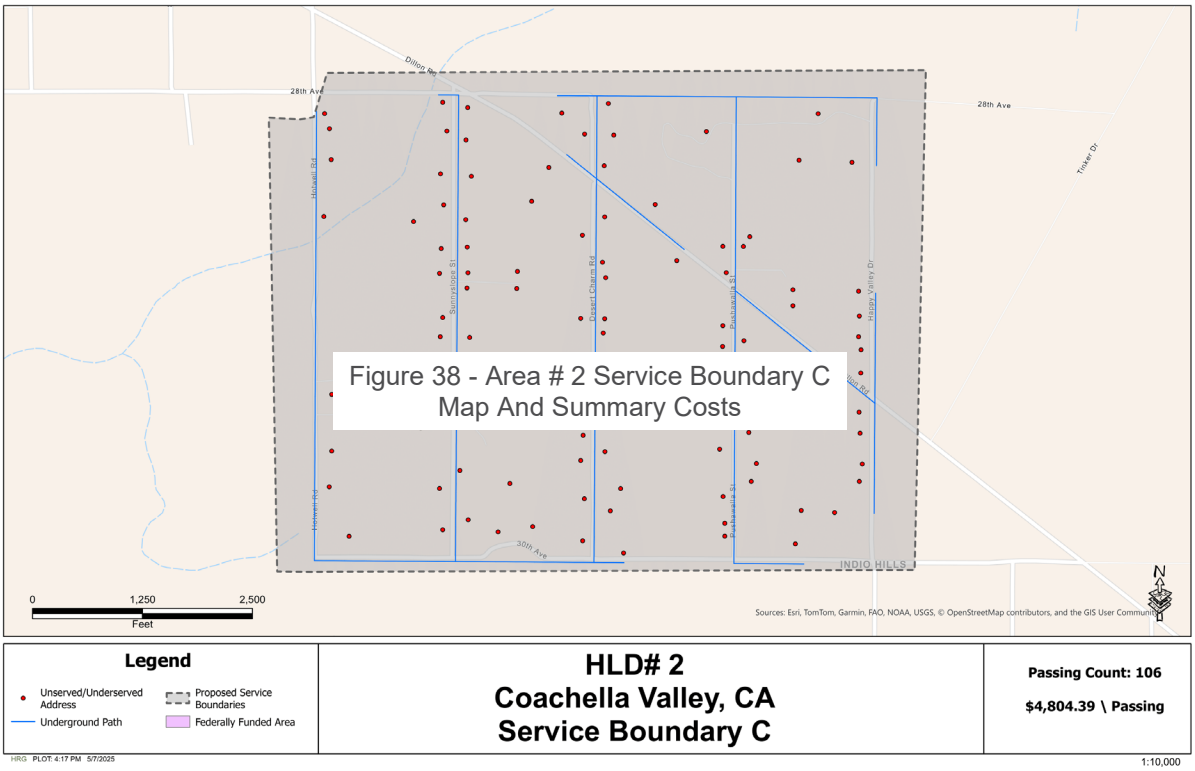


Figure 38 - Area # 2 Service Boundary C Map And Summary Costs

Engineering	44,886
Materials	100,237
Construction - AER	-
Construction - UG	364,142
Total Cost	$ 509,265.15

Passings	106
Cost Per Passing	$ 4,804.39

Group - Summary	Group	Id	Description	Unit	Quantity	Unit Cost	Total Cost
Engineering	Cables	3	Traffic Control (No Drops)	feet	23,578	$ 0.70	$ 16,504.40
Materials	Cables	F5154	Aerial / Underground Material -Provide 48-ct fiber cable	feet	20,683	$ 0.45	$ 9,307.16
Materials	Cables	F5152	Aerial / Underground Material -Provide 96-ct fiber cable	feet	2,895	$ 0.84	$ 2,431.91
Materials	Cables	51	DROP Footage (avg per drop amount/# passings)	feet		$ 2.06	$ -
Engineering	Cable installation - Underground	NO-ENG	Underground Engineering - Underground Route Design	feet	34,360	$ 0.80	$ 27,487.94
Construction -UG	Cable installation - Underground	NO-ENG	Underground Engineering - Underground Permitting	feet	34,360	$ 0.35	$ 12,025.97
Engineering	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 2" du	feet	69	$ 13.00	$ 893.36
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 1.25"	feet	447	$ 12.00	$ 5,360.15
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 1.25"	feet	5,154	$ 11.25	$ 57,982.38
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 2" du	feet	618	$ 11.25	$ 6,957.89
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 1.25"	feet	1,306	$ 10.00	$ 13,056.77
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 2" du	feet	5,154	$ 8.75	$ 45,097.40
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 1.25"	feet	21,612	$ 8.25	$ 178,302.25
Construction -UG	Cable installation - Underground	BH8058	Underground Construction - Install #12 TRACER WIRE GRE	feet	34,360	$ 0.14	$ 4,810.39
Construction -UG	Cable installation - Underground	NO-CON	CABLE PULLING (MSTs)	feet	10,492	$ 1.20	$ 12,590.43
Construction -UG	Cable installation - Underground	NO-CON	CABLE PULLING (1 cable)	feet	9,014	$ 1.00	$ 9,014.04
Construction -UG	Cable installation - Underground	NO-CON	PMO (Underground)	feet	34,360	$ 0.48	$ 16,492.76
Construction -UG	Miscellaneous	45	Underground Construction - Provide and place fiber mar	count	4	$ 30.00	$ 120.00
Materials	Terminals, cabinets, splitters	F5282	Provide and Place 432 Cabinet	count	1	$ 8,590.32	$ 8,590.32
Materials	Terminals, cabinets, splitters	F5156	1x32 DISTRIBUTION FIBER SPLITTER	count	4	$ 941.22	$ 3,764.88
Materials	Terminals, cabinets, splitters	F5144	Provide and Place (Raychem B) UG Splice Closure	count	13	$ 421.58	$ 5,480.54
Materials	Pedestals, flowerpots, pits, vaults	C4073	Underground Construction - Provide and SET 35x15x17 D	count	11	$ 985.87	$ 10,844.57
Materials	Pedestals, flowerpots, pits, vaults	C4082	Underground Construction - PROVIDE AND PLACE PEDEST	count	95	$ 229.17	$ 21,771.15
Materials	Pedestals, flowerpots, pits, vaults	BH8132	Underground Construction - PROVIDE AND PLACE 17x30x	count	15	$ 610.94	$ 9,286.29
Materials	Pedestals, flowerpots, pits, vaults	BH8054	Underground Construction - PROVIDE AND PLACE 24x36x	count	11	$ 854.29	$ 9,397.19
Materials	Pedestals, flowerpots, pits, vaults	BH8134	Underground Construction - PROVIDE AND PLACE 30x48x	count	1	$ 1,736.63	$ 1,736.63
Materials	Slackloops	F5154	Underground Construction -Underground Slack Loop 48C	feet	900	$ 0.45	$ 405.00
Materials	Slackloops	F5152	Underground Construction -Underground Slack Loop 96C	feet	75	$ 0.84	$ 63.00
Construction -UG	Cable installation - Underground	76	OTDR End to End Test of Fiber Cable	count	117	$ 20.00	$ 2,332.00
Materials	Connectorized drop hubs	F5232	2 PORT MST 100' DIELECTRIC	count	9	$ 65.99	$ 593.91
Materials	Connectorized drop hubs	F5233	2 PORT MST 250' DIELECTRIC	count	3	$ 90.72	$ 272.16
Materials	Connectorized drop hubs	F5234	2 PORT MST 500' DIELECTRIC	count	17	$ 143.05	$ 2,431.85
Materials	Connectorized drop hubs	F5235	2 PORT MST 750' DIELECTRIC	count	13	$ 181.45	$ 2,358.85
Materials	Connectorized drop hubs	F5236	2 PORT MST 1000' DIELECTRIC	count	12	$ 218.55	$ 2,622.60
Materials	Connectorized drop hubs	F5237	2 PORT MST 1500' DIELECTRIC	count	21	$ 398.41	$ 8,366.61
Materials	Connectorized drop hubs	F5255	4 PORT MST 100' DIELECTRIC	count	1	$ 82.79	$ 82.79
Materials	Connectorized drop hubs	F5239	4 PORT MST 500' DIELECTRIC	count	1	$ 165.20	$ 165.20
Materials	Connectorized drop hubs	F5244	6 PORT MST 1000' DIELECTRIC	count	1	$ 264.41	$ 264.41
Miscellaneous	Special Permits			count		$ 3,000.00	$ -
Miscellaneous	Middle Mile Connection			feet			$ -
Miscellaneous	Central Office			bid			$ -
Miscellaneous	Network Access Equipment			bid			$ -
Miscellaneous	Shelters			count			$ -
Miscellaneous	Contingency			count			$ -
						Total:	$ 509,265.15

Figure 39 - Area # 2 Service Boundary C Labor And Material OSP Costs

HLD Area #3

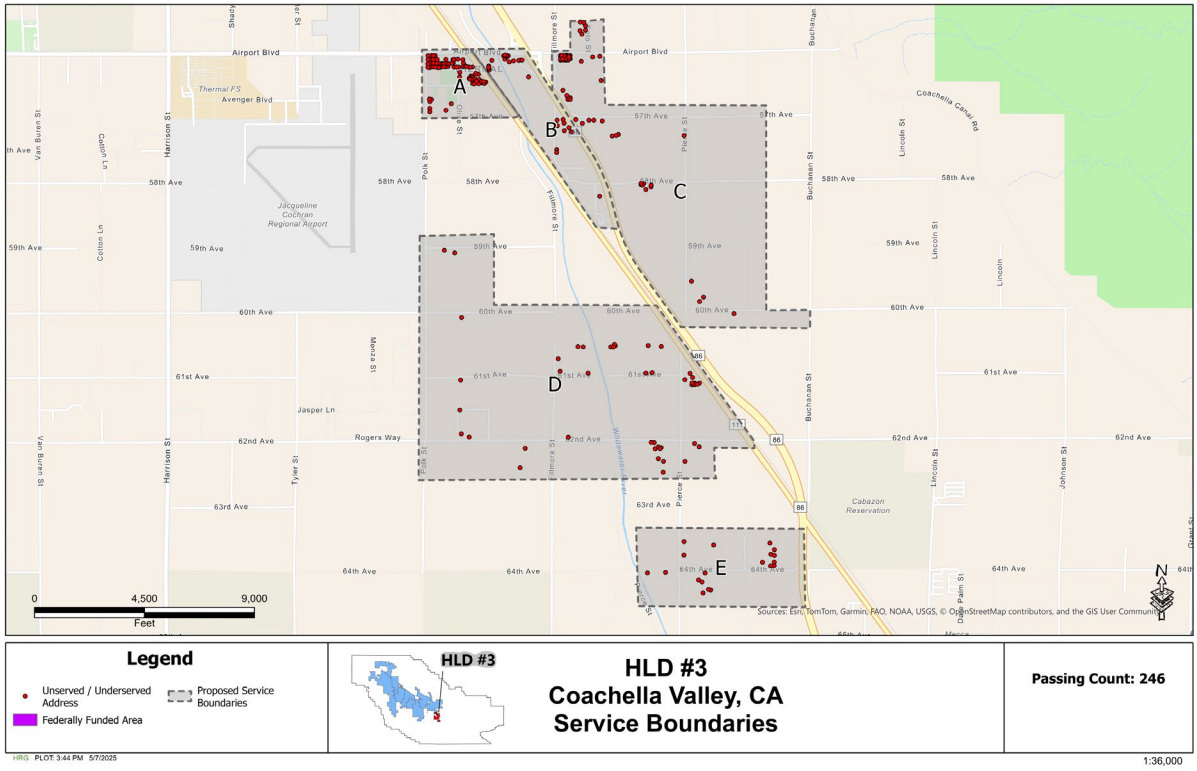
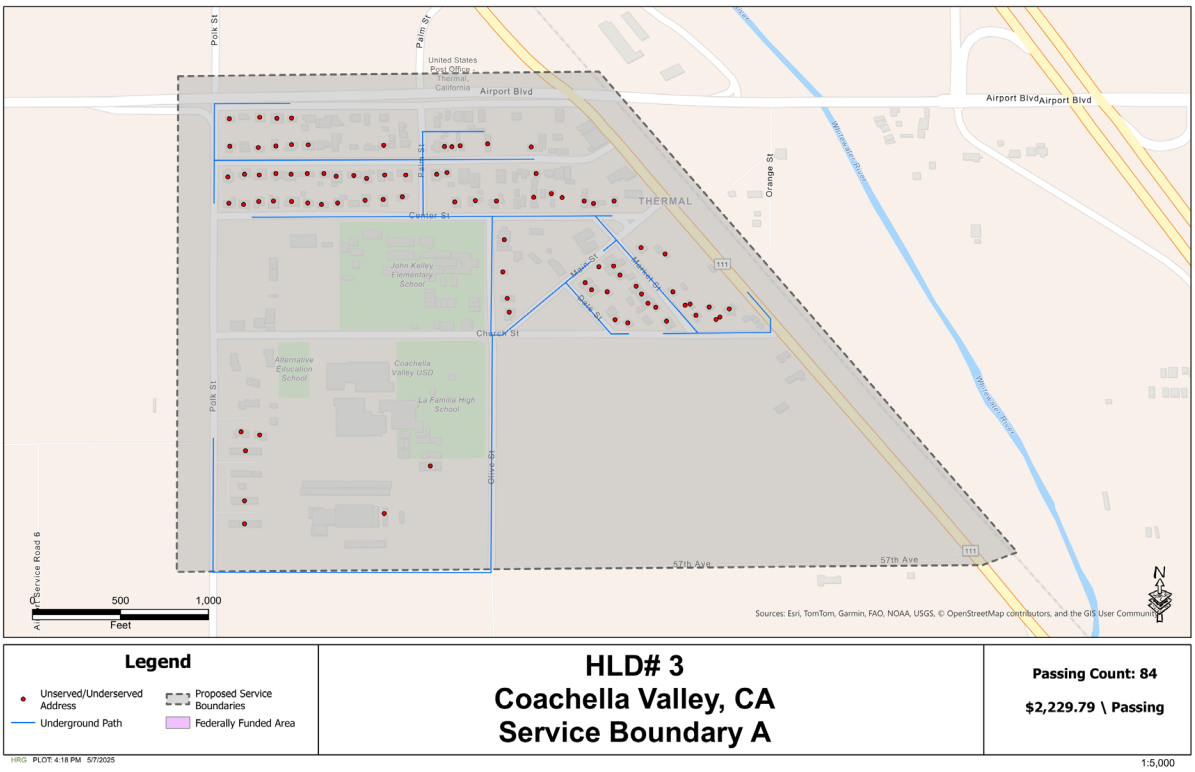


Figure 40 - Service Boundaries in Area # 3

Service Boundary A



Engineering	12,607
Materials	48,043
Construction - AER	-
Construction - UG	126,652
Total Cost	$ 187,302.72

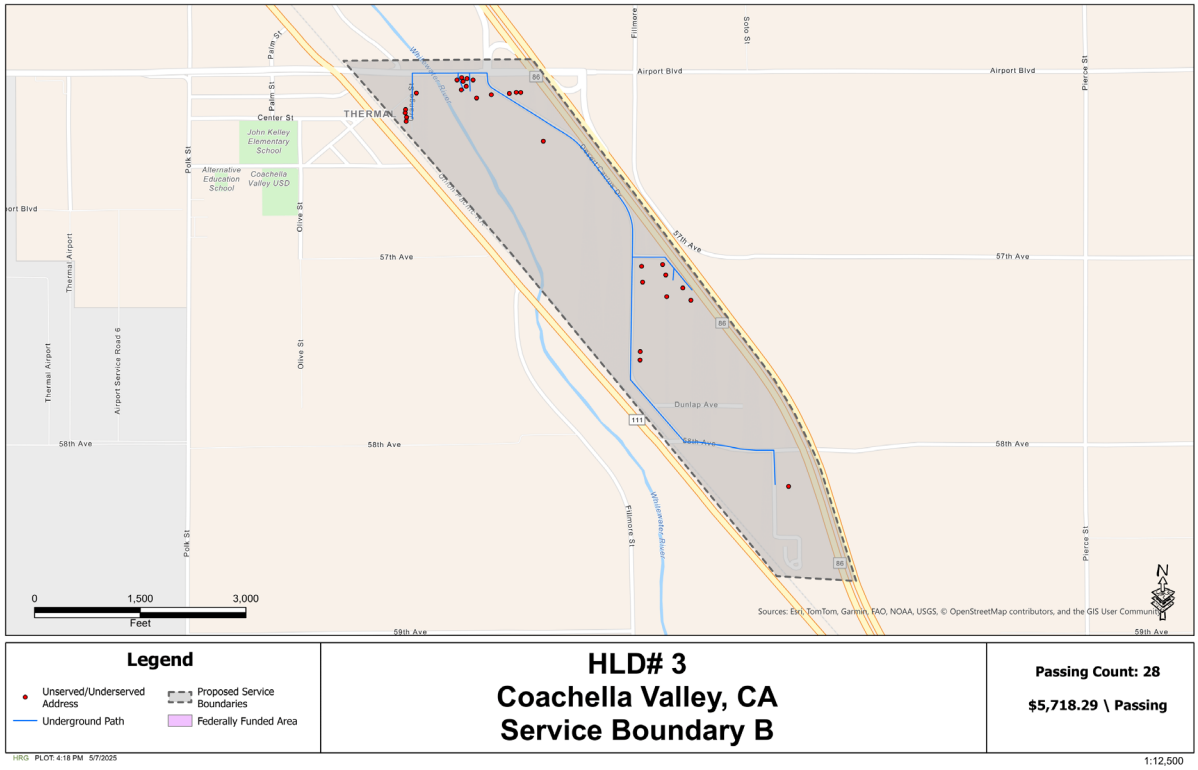
Passings	84
Cost Per Passing	$ 2,229.79

Figure 41 - Area # 3 Service Boundary A
Map And Summary Costs

Group - Summary	Group	Id	Description	Unit	Quantity	Unit Cost	Total Cost
Engineering	Cables	3	Traffic Control (No Drops)	feet	4,114	$ 0.70	$ 2,879.89
Materials	Cables	F5154	Aerial / Underground Material -Provide 48-ct fiber cable	feet	3,386	$ 0.45	$ 1,523.92
Materials	Cables	F5152	Aerial / Underground Material -Provide 96-ct fiber cable	feet	728	$ 0.84	$ 611.23
Materials	Cables	51	DROP Footage (avg per drop amount/# passings)	feet	-	$ 2.06	$ -
Engineering	Cable installation - Underground	NO-ENG	Underground Engineering - Underground Route Design	feet	11,777	$ 0.80	$ 9,421.35
Construction -UG	Cable installation - Underground	NO-ENG	Underground Engineering - Underground Permitting	feet	11,777	$ 0.35	$ 4,121.84
Engineering	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 2" du	feet	24	$ 13.00	$ 306.19
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 1.25"	feet	153	$ 12.00	$ 1,837.16
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 1.25"	feet	1,767	$ 11.25	$ 19,873.16
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 2" du	feet	212	$ 11.25	$ 2,384.78
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 1.25"	feet	448	$ 10.00	$ 4,475.14
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 2" du	feet	1,767	$ 8.75	$ 15,456.90
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 1.25"	feet	7,408	$ 8.25	$ 61,112.17
Construction -UG	Cable installation - Underground	BH8058	Underground Construction - Install #12 TRACER WIRE GRE	feet	11,777	$ 0.14	$ 1,648.74
Construction -UG	Cable installation - Underground	NO-CON	CABLE PULLING (MSTs)	feet	5,426	$ 1.20	$ 6,511.53
Construction -UG	Cable installation - Underground	NO-CON	CABLE PULLING (1 cable)	feet	1,700	$ 1.00	$ 1,699.71
Construction -UG	Cable installation - Underground	NO-CON	PMO (Underground)	feet	11,777	$ 0.48	$ 5,652.81
Construction -UG	Miscellaneous	45	Underground Construction - Provide and place fiber mark	count	1	$ 30.00	$ 30.00
Materials	Terminals, cabinets, splitters	F5282	Provide and Place 432 Cabinet	count	1	$ 8,590.32	$ 8,590.32
Materials	Terminals, cabinets, splitters	F5156	1x32 DISTRIBUTION FIBER SPLITTER	count	3	$ 941.22	$ 2,823.66
Materials	Terminals, cabinets, splitters	F5144	Provide and Place (Raychem B) UG Splice Closure	count	6	$ 421.58	$ 2,529.48
Materials	Pedestals, flowerpots, pits, vaults	C4073	Underground Construction - Provide and SET 35x15x17 DC	count	5	$ 985.87	$ 4,929.35
Materials	Pedestals, flowerpots, pits, vaults	C4082	Underground Construction - PROVIDE AND PLACE PEDEST	count	43	$ 229.17	$ 9,739.73
Materials	Pedestals, flowerpots, pits, vaults	BH8132	Underground Construction - PROVIDE AND PLACE 17x30x	count	7	$ 610.94	$ 4,154.39
Materials	Pedestals, flowerpots, pits, vaults	BH8054	Underground Construction - PROVIDE AND PLACE 24x36x	count	5	$ 854.29	$ 4,271.45
Materials	Pedestals, flowerpots, pits, vaults	BH8134	Underground Construction - PROVIDE AND PLACE 30x48x	count	1	$ 1,736.63	$ 1,736.63
Materials	Slackloops	F5154	Underground Construction -Underground Slack Loop 48Ct	feet	225	$ 0.45	$ 101.25
Materials	Slackloops	F5152	Underground Construction -Underground Slack Loop 96Ct	feet	225	$ 0.84	$ 189.00
Construction -UG	Cable installation - Underground	76	OTDR End to End Test of Fiber Cable	count	92	$ 20.00	$ 1,848.00
Materials	Connectorized drop hubs	F5232	2 PORT MST 100' DIELECTRIC	count	3	$ 65.99	$ 197.97
Materials	Connectorized drop hubs	F5233	2 PORT MST 250' DIELECTRIC	count	4	$ 90.72	$ 362.88
Materials	Connectorized drop hubs	F5234	2 PORT MST 500' DIELECTRIC	count	1	$ 143.05	$ 143.05
Materials	Connectorized drop hubs	F5235	2 PORT MST 750' DIELECTRIC	count	4	$ 181.45	$ 725.80
Materials	Connectorized drop hubs	F5236	2 PORT MST 1000' DIELECTRIC	count	5	$ 218.55	$ 1,092.75
Materials	Connectorized drop hubs	F5237	2 PORT MST 1500' DIELECTRIC	count	3	$ 398.41	$ 1,195.23
Materials	Connectorized drop hubs	F5255	4 PORT MST 100' DIELECTRIC	count	1	$ 82.79	$ 82.79
Materials	Connectorized drop hubs	F5238	4 PORT MST 250' DIELECTRIC	count	2	$ 112.51	$ 225.02
Materials	Connectorized drop hubs	F5239	4 PORT MST 500' DIELECTRIC	count	2	$ 165.20	$ 330.40
Materials	Connectorized drop hubs	F5240	4 PORT MST 750' DIELECTRIC	count	2	$ 202.51	$ 405.02
Materials	Connectorized drop hubs	F5241	4 PORT MST 1000' DIELECTRIC	count	1	$ 241.38	$ 241.38
Materials	Connectorized drop hubs	F5250	4 PORT MST 1500' DIELECTRIC	count	3	$ 331.68	$ 995.04
Materials	Connectorized drop hubs	F5260	6 PORT MST 250' DIELECTRIC	count	1	$ 134.59	$ 134.59
Materials	Connectorized drop hubs	F5242	6 PORT MST 500' DIELECTRIC	count	1	$ 184.33	$ 184.33
Materials	Connectorized drop hubs	F5243	6 PORT MST 750' DIELECTRIC	count	1	$ 300.38	$ 300.38
Materials	Connectorized drop hubs	F5246	8 PORT MST 500' DIELECTRIC	count	1	$ 226.30	$ 226.30
Miscellaneous	Special Permits			count		$ 3,000.00	$ -
Miscellaneous	Middle Mile Connection			feet			$ -
Miscellaneous	Central Office			bid			$ -
Miscellaneous	Network Access Equipment			bid			$ -
Miscellaneous	Shelters			count			$ -
Miscellaneous	Contingency			count			$ -
						Total:	$187,302.72

Figure 42 - Area # 3 Service Boundary A Labor And Material OSP Costs

Service Boundary B



Engineering	13,343
Materials	30,472
Construction - AER	-
Construction - UG	116,297
Total Cost	$ 160,112.17

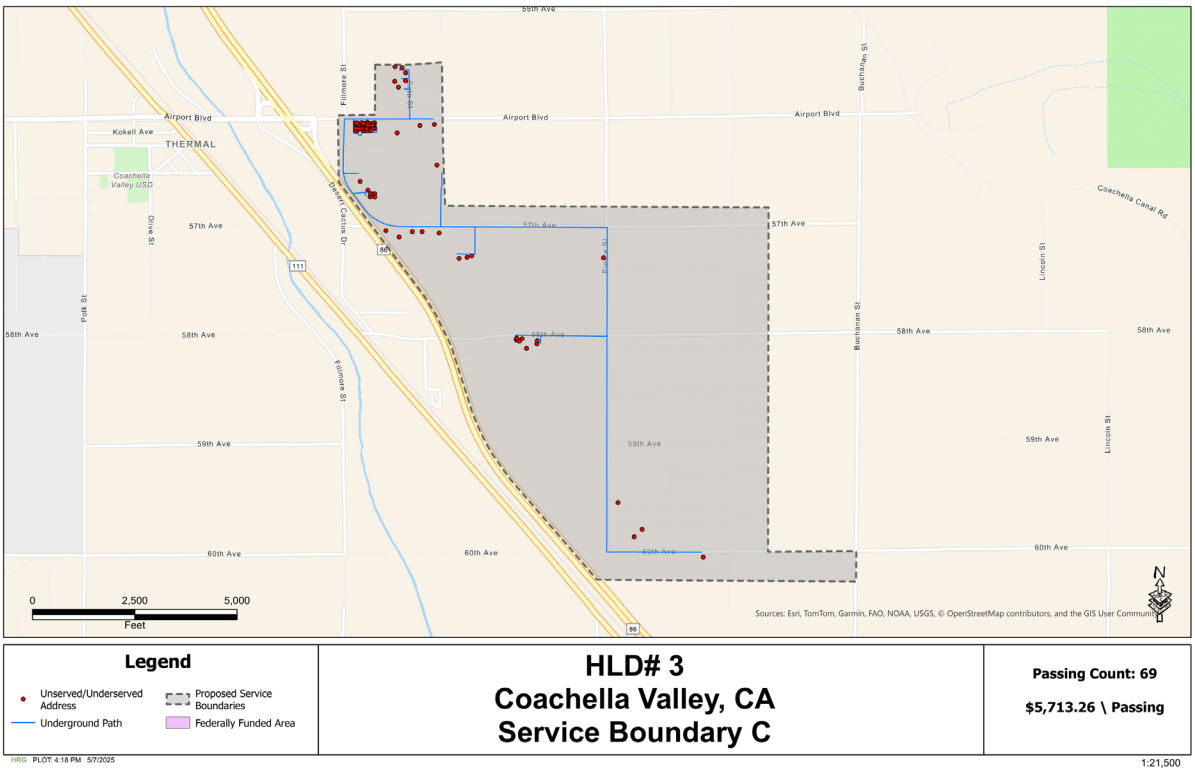
Passings	28
Cost Per Passing	$ 5,718.29

Figure 43 - Area # 3 Service Boundary B
Map And Summary Costs

Group - Summary	Group	Id	Description	Unit	Quantity	Unit Cost	Total Cost
Engineering	Cables	3	Traffic Control (No Drops)	feet	6,273	$ 0.70	$ 4,391.07
Materials	Cables	F5154	Aerial / Underground Material -Provide 48-ct fiber cable	feet	6,273	$ 0.45	$ 2,822.83
Materials	Cables	51	DROP Footage (avg per drop amount/# passings)	feet	-	$ 2.06	$ -
Engineering	Cable installation - Underground	NO-ENG	Underground Engineering - Underground Route Design	feet	10,838	$ 0.80	$ 8,670.05
Construction -UG	Cable installation - Underground	NO-ENG	Underground Engineering - Underground Permitting	feet	10,838	$ 0.35	$ 3,793.15
Engineering	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 2" du	feet	22	$ 13.00	$ 281.78
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 1.25"	feet	141	$ 12.00	$ 1,690.66
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 1.25"	feet	1,626	$ 11.25	$ 18,288.39
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 2" du	feet	195	$ 11.25	$ 2,194.61
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 1.25"	feet	412	$ 10.00	$ 4,118.27
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 2" du	feet	1,626	$ 8.75	$ 14,224.30
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 1.25"	feet	6,817	$ 8.25	$ 56,238.82
Construction -UG	Cable installation - Underground	BH8058	Underground Construction - Install #12 TRACER WIRE GRE	feet	10,838	$ 0.14	$ 1,517.26
Construction -UG	Cable installation - Underground	NO-CON	CABLE PULLING (MSTs)	feet	3,953	$ 1.20	$ 4,743.62
Construction -UG	Cable installation - Underground	NO-CON	CABLE PULLING (1 cable)	feet	3,580	$ 1.00	$ 3,580.23
Construction -UG	Cable installation - Underground	NO-CON	PMO (Underground)	feet	10,838	$ 0.48	$ 5,202.03
Construction -UG	Miscellaneous	45	Underground Construction - Provide and place fiber mark	count	3	$ 30.00	$ 90.00
Materials	Terminals, cabinets, splitters	F5282	Provide and Place 432 Cabinet	count	1	$ 8,590.32	$ 8,590.32
Materials	Terminals, cabinets, splitters	F5156	1x32 DISTRIBUTION FIBER SPLITTER	count	1	$ 941.22	$ 941.22
Materials	Terminals, cabinets, splitters	F5144	Provide and Place (Raychem B) UG Splice Closure	count	3	$ 421.58	$ 1,264.74
Materials	Pedestals, flowerpots, pits, vaults	C4073	Underground Construction - Provide and SET 35x15x17 DC	count	3	$ 985.87	$ 2,957.61
Materials	Pedestals, flowerpots, pits, vaults	C4082	Underground Construction - PROVIDE AND PLACE PEDEST	count	18	$ 229.17	$ 4,010.48
Materials	Pedestals, flowerpots, pits, vaults	BH8132	Underground Construction - PROVIDE AND PLACE 17x30x	count	3	$ 610.94	$ 1,710.63
Materials	Pedestals, flowerpots, pits, vaults	BH8054	Underground Construction - PROVIDE AND PLACE 24x36x	count	3	$ 854.29	$ 2,562.87
Materials	Pedestals, flowerpots, pits, vaults	BH8134	Underground Construction - PROVIDE AND PLACE 30x48x	count	1	$ 1,736.63	$ 1,736.63
Materials	Slackloops	F5154	Underground Construction -Underground Slack Loop 48Ct	feet	225	$ 0.45	$ 101.25
Construction -UG	Cable installation - Underground	76	OTDR End to End Test of Fiber Cable	count	31	$ 20.00	$ 616.00
Materials	Connectorized drop hubs	F5232	2 PORT MST 100' DIELECTRIC	count	1	$ 65.99	$ 65.99
Materials	Connectorized drop hubs	F5233	2 PORT MST 250' DIELECTRIC	count	1	$ 90.72	$ 90.72
Materials	Connectorized drop hubs	F5234	2 PORT MST 500' DIELECTRIC	count	1	$ 143.05	$ 143.05
Materials	Connectorized drop hubs	F5236	2 PORT MST 1000' DIELECTRIC	count	1	$ 218.55	$ 218.55
Materials	Connectorized drop hubs	F5237	2 PORT MST 1500' DIELECTRIC	count	6	$ 398.41	$ 2,390.46
Materials	Connectorized drop hubs	F5239	4 PORT MST 500' DIELECTRIC	count	2	$ 165.20	$ 330.40
Materials	Connectorized drop hubs	F5240	4 PORT MST 750' DIELECTRIC	count	1	$ 202.51	$ 202.51
Materials	Connectorized drop hubs	F5250	4 PORT MST 1500' DIELECTRIC	count	1	$ 331.68	$ 331.68
Miscellaneous	Special Permits			count		$ 3,000.00	$ -
Miscellaneous	Middle Mile Connection			feet			$ -
Miscellaneous	Central Office			bid			$ -
Miscellaneous	Network Access Equipment			bid			$ -
Miscellaneous	Shelters			count			$ -
Miscellaneous	Contingency			count			$ -
						Total:	$160,112.17

Figure 44 - Area # 3 Service Boundary B Labor And Material OSP Costs

Service Boundary C



Engineering	35,141
Materials	58,059
Construction - AER	-
Construction - UG	301,016
Total Cost	$ 394,215.27

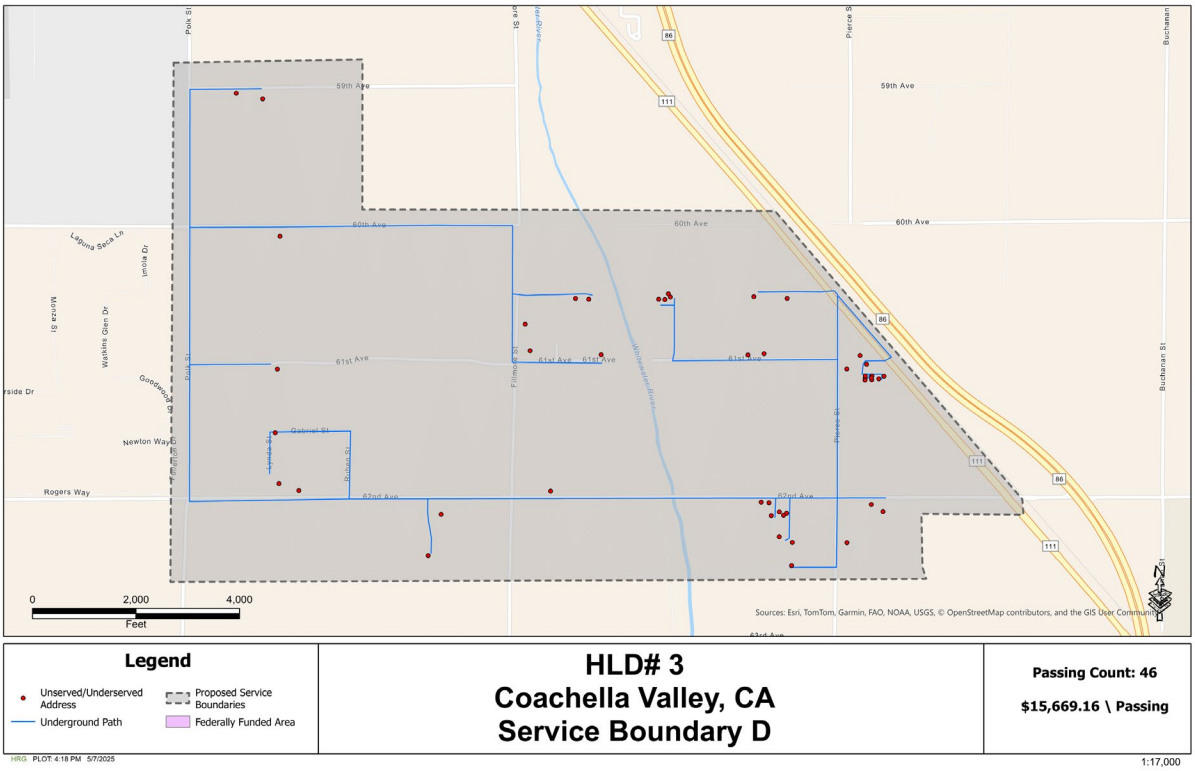
Passings	69
Cost Per Passing	$ 5,713.26

Figure 45 - Area 3 Service Boundary C
Map And Summary Costs

Group - Summary	Group	Id	Description	Unit	Quantity	Unit Cost	Total Cost
Engineering	Cables	3	Traffic Control (No Drops)	feet	17,592	$ 0.70	$ 12,314.71
Materials	Cables	F5154	Aerial / Underground Material -Provide 48-ct fiber cable	feet	16,715	$ 0.45	$ 7,521.95
Materials	Cables	F5152	Aerial / Underground Material -Provide 96-ct fiber cable	feet	877	$ 0.84	$ 736.67
Materials	Cables	51	DROP Footage (avg per drop amount/# passings)	feet	-	$ 2.06	$ -
Engineering	Cable installation - Underground	NO-ENG	Underground Engineering - Underground Route Design	feet	27,634	$ 0.80	$ 22,107.53
Construction -UG	Cable installation - Underground	NO-ENG	Underground Engineering - Underground Permitting	feet	27,634	$ 0.35	$ 9,672.04
Engineering	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 2" du	feet	55	$ 13.00	$ 718.49
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 1.25"	feet	359	$ 12.00	$ 4,310.97
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 1.25"	feet	4,145	$ 11.25	$ 46,633.06
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 2" du	feet	497	$ 11.25	$ 5,595.97
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 1.25"	feet	1,050	$ 10.00	$ 10,501.08
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 2" du	feet	4,145	$ 8.75	$ 36,270.16
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 1.25"	feet	17,382	$ 8.25	$ 143,401.84
Construction -UG	Cable installation - Underground	BH8058	Underground Construction - Install #12 TRACER WIRE GRE	feet	27,634	$ 0.14	$ 3,868.82
Construction -UG	Cable installation - Underground	NO-CON	CABLE PULLING (MSTs)	feet	8,801	$ 1.20	$ 10,561.15
Construction -UG	Cable installation - Underground	NO-CON	CABLE PULLING (1 cable)	feet	15,058	$ 1.00	$ 15,058.44
Construction -UG	Cable installation - Underground	NO-CON	PMO (Underground)	feet	27,634	$ 0.48	$ 13,264.52
Construction -UG	Miscellaneous	45	Underground Construction - Provide and place fiber mark	count	12	$ 30.00	$ 360.00
Materials	Terminals, cabinets, splitters	F5282	Provide and Place 432 Cabinet	count	1	$ 8,590.32	$ 8,590.32
Materials	Terminals, cabinets, splitters	F5156	1x32 DISTRIBUTION FIBER SPLITTER	count	3	$ 941.22	$ 2,823.66
Materials	Terminals, cabinets, splitters	F5144	Provide and Place (Raychem B) UG Splice Closure	count	9	$ 421.58	$ 3,794.22
Materials	Pedestals, flowerpots, pits, vaults	C4073	Underground Construction - Provide and SET 35x15x17 DC	count	7	$ 985.87	$ 6,901.09
Materials	Pedestals, flowerpots, pits, vaults	C4082	Underground Construction - PROVIDE AND PLACE PEDEST	count	38	$ 229.17	$ 8,593.88
Materials	Pedestals, flowerpots, pits, vaults	BH8132	Underground Construction - PROVIDE AND PLACE 17x30x	count	6	$ 610.94	$ 3,665.64
Materials	Pedestals, flowerpots, pits, vaults	BH8054	Underground Construction - PROVIDE AND PLACE 24x36x	count	7	$ 854.29	$ 5,980.03
Materials	Pedestals, flowerpots, pits, vaults	BH8134	Underground Construction - PROVIDE AND PLACE 30x48x	count	1	$ 1,736.63	$ 1,736.63
Materials	Slackloops	F5154	Underground Construction -Underground Slack Loop 48Ct	feet	600	$ 0.45	$ 270.00
Materials	Slackloops	F5152	Underground Construction -Underground Slack Loop 96Ct	feet	75	$ 0.84	$ 63.00
Construction -UG	Cable installation - Underground	76	OTDR End to End Test of Fiber Cable	count	76	$ 20.00	$ 1,518.00
Materials	Connectorized drop hubs	F5232	2 PORT MST 100' DIELECTRIC	count	2	$ 65.99	$ 131.98
Materials	Connectorized drop hubs	F5233	2 PORT MST 250' DIELECTRIC	count	4	$ 90.72	$ 362.88
Materials	Connectorized drop hubs	F5234	2 PORT MST 500' DIELECTRIC	count	4	$ 143.05	$ 572.20
Materials	Connectorized drop hubs	F5235	2 PORT MST 750' DIELECTRIC	count	3	$ 181.45	$ 544.35
Materials	Connectorized drop hubs	F5236	2 PORT MST 1000' DIELECTRIC	count	5	$ 218.55	$ 1,092.75
Materials	Connectorized drop hubs	F5237	2 PORT MST 1500' DIELECTRIC	count	7	$ 398.41	$ 2,788.87
Materials	Connectorized drop hubs	F5239	4 PORT MST 500' DIELECTRIC	count	1	$ 165.20	$ 165.20
Materials	Connectorized drop hubs	F5250	4 PORT MST 1500' DIELECTRIC	count	2	$ 331.68	$ 663.36
Materials	Connectorized drop hubs	F5260	6 PORT MST 250' DIELECTRIC	count	1	$ 134.59	$ 134.59
Materials	Connectorized drop hubs	F5256	6 PORT MST 1500' DIELECTRIC	count	1	$ 376.82	$ 376.82
Materials	Connectorized drop hubs	F5322	8 PORT MST 750' DIELECTRIC	count	1	$ 255.93	$ 255.93
Materials	Connectorized drop hubs	F5265	12 PORT MST 500' DIELECTRIC	count	1	$ 292.48	$ 292.48
Miscellaneous	Special Permits			count		$ 3,000.00	$ -
Miscellaneous	Middle Mile Connection			feet			$ -
Miscellaneous	Central Office			bid			$ -
Miscellaneous	Network Access Equipment			bid			$ -
Miscellaneous	Shelters			count			$ -
Miscellaneous	Contingency			count			$ -
						Total:	$ 394,215.27

Figure 46 - Area # 3 Service Boundary C Labor And Material OSP Costs

Service Boundary D



Engineering	68,037
Materials	85,311
Construction - AER	-
Construction - UG	567,434
Total Cost	$ 720,781.24

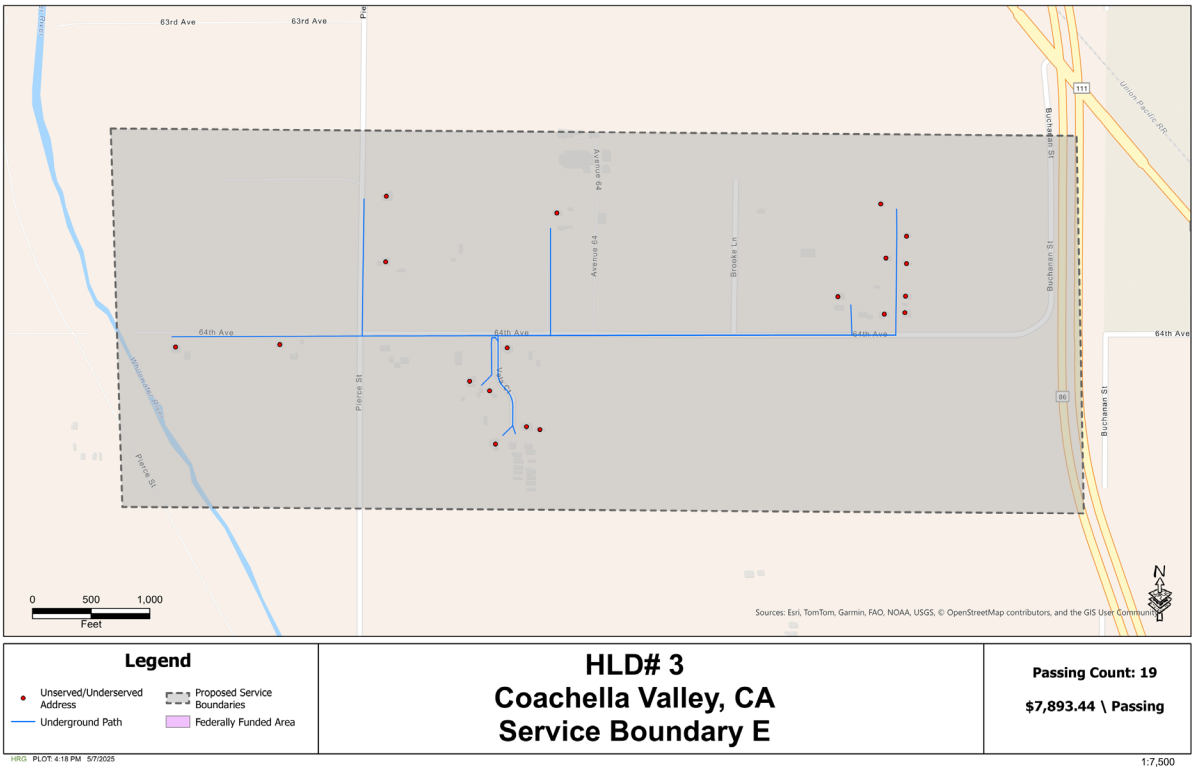
Passings	46
Cost Per Passing	$ 15,669.16

Figure 47 - Area # 3 Service Boundary D
Map And Summary Costs

Group - Summary	Group	Id	Description	Unit	Quantity	Unit Cost	Total Cost
Engineering	Cables	3	Traffic Control (No Drops)	feet	35,950	$ 0.70	$ 25,164.81
Materials	Cables	F5154	Aerial / Underground Material -Provide 48-ct fiber cable	feet	35,950	$ 0.45	$ 16,177.38
Materials	Cables	51	DROP Footage (avg per drop amount/# passings)	feet		$ 2.06	$ -
Engineering	Cable installation - Underground	NO-ENG	Underground Engineering - Underground Route Design	feet	51,903	$ 0.80	$ 41,522.51
Construction -UG	Cable installation - Underground	NO-ENG	Underground Engineering - Underground Permitting	feet	51,903	$ 0.35	$ 18,166.10
Engineering	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 2" du	feet	104	$ 13.00	$ 1,349.48
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 1.25"	feet	675	$ 12.00	$ 8,096.89
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 1.25"	feet	7,785	$ 11.25	$ 87,586.54
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 2" du	feet	934	$ 11.25	$ 10,510.38
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 1.25"	feet	1,972	$ 10.00	$ 19,723.19
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 2" du	feet	7,785	$ 8.75	$ 68,122.86
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 1.25"	feet	32,647	$ 8.25	$ 269,338.34
Construction -UG	Cable installation - Underground	BH8058	Underground Construction - Install #12 TRACER WIRE GRE	feet	51,903	$ 0.14	$ 7,266.44
Construction -UG	Cable installation - Underground	NO-CON	CABLE PULLING (MSTs)	feet	15,325	$ 1.20	$ 18,390.13
Construction -UG	Cable installation - Underground	NO-CON	CABLE PULLING (1 cable)	feet	33,497	$ 1.00	$ 33,497.26
Construction -UG	Cable installation - Underground	NO-CON	PMO (Underground)	feet	51,903	$ 0.48	$ 24,913.50
Construction -UG	Miscellaneous	45	Underground Construction - Provide and place fiber mark	count	27	$ 30.00	$ 810.00
Materials	Terminals, cabinets, splitters	F5282	Provide and Place 432 Cabinet	count	1	$ 8,590.32	$ 8,590.32
Materials	Terminals, cabinets, splitters	F5156	1x32 DISTRIBUTION FIBER SPLITTER	count	2	$ 941.22	$ 1,882.44
Materials	Terminals, cabinets, splitters	F5144	Provide and Place (Raychem B) UG Splice Closure	count	18	$ 421.58	$ 7,588.44
Materials	Pedestals, flowerpots, pits, vaults	C4073	Underground Construction - Provide and SET 35x15x17 DC	count	15	$ 985.87	$ 14,788.05
Materials	Pedestals, flowerpots, pits, vaults	C4082	Underground Construction - PROVIDE AND PLACE PEDEST	count	38	$ 229.17	$ 8,593.88
Materials	Pedestals, flowerpots, pits, vaults	BH8132	Underground Construction - PROVIDE AND PLACE 17x30x	count	6	$ 610.94	$ 3,665.64
Materials	Pedestals, flowerpots, pits, vaults	BH8054	Underground Construction - PROVIDE AND PLACE 24x36x	count	15	$ 854.29	$ 12,814.35
Materials	Pedestals, flowerpots, pits, vaults	BH8134	Underground Construction - PROVIDE AND PLACE 30x48x	count	1	$ 1,736.63	$ 1,736.63
Materials	Slackloops	F5154	Underground Construction -Underground Slack Loop 48Ct	feet	1,350	$ 0.45	$ 607.50
Construction -UG	Cable installation - Underground	76	OTDR End to End Test of Fiber Cable	count	51	$ 20.00	$ 1,012.00
Materials	Connectorized drop hubs	F5232	2 PORT MST 100' DIELECTRIC	count	3	$ 65.99	$ 197.97
Materials	Connectorized drop hubs	F5233	2 PORT MST 250' DIELECTRIC	count	2	$ 90.72	$ 181.44
Materials	Connectorized drop hubs	F5234	2 PORT MST 500' DIELECTRIC	count	5	$ 143.05	$ 715.25
Materials	Connectorized drop hubs	F5235	2 PORT MST 750' DIELECTRIC	count	3	$ 181.45	$ 544.35
Materials	Connectorized drop hubs	F5236	2 PORT MST 1000' DIELECTRIC	count	4	$ 218.55	$ 874.20
Materials	Connectorized drop hubs	F5237	2 PORT MST 1500' DIELECTRIC	count	15	$ 398.41	$ 5,976.15
Materials	Connectorized drop hubs	F5256	6 PORT MST 1500' DIELECTRIC	count	1	$ 376.82	$ 376.82
Miscellaneous	Special Permits			count		$ 3,000.00	$ -
Miscellaneous	Middle Mile Connection			feet			$ -
Miscellaneous	Central Office			bid			$ -
Miscellaneous	Network Access Equipment			bid			$ -
Miscellaneous	Shelters			count			$ -
Miscellaneous	Contingency			count			$ -
						Total:	$ 720,781.24

Figure 48 - Area # 3 Service Boundary D Labor And Material OSP Costs

Service Boundary E



Engineering	10,571
Materials	28,843
Construction - AER	-
Construction - UG	110,561
Total Cost	$ 149,975.27

Passings	19
Cost Per Passing	$ 7,893.44

Figure 49 - Area # 3 Service Boundary E
Map And Summary Costs

Group - Summary	Group	Id	Description	Unit	Quantity	Unit Cost	Total Cost
Engineering	Cables	3	Traffic Control (No Drops)	feet	3,293	$ 0.70	$ 2,304.77
Materials	Cables	F5154	Aerial / Underground Material -Provide 48-ct fiber cable	feet	3,293	$ 0.45	$ 1,481.64
Materials	Cables	51	DROP Footage (avg per drop amount/# passings)	feet		$ 2.06	$ -
Engineering	Cable installation - Underground	NO-ENG	Underground Engineering - Underground Route Design	feet	10,007	$ 0.80	$ 8,005.98
Construction -UG	Cable installation - Underground	NO-ENG	Underground Engineering - Underground Permitting	feet	10,007	$ 0.35	$ 3,502.61
Engineering	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 2" du	feet	20	$ 13.00	$ 260.19
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 1.25"	feet	130	$ 12.00	$ 1,561.17
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 1.25"	feet	1,501	$ 11.25	$ 16,887.60
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 2" du	feet	180	$ 11.25	$ 2,026.51
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (2) 1.25"	feet	380	$ 10.00	$ 3,802.84
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 2" du	feet	1,501	$ 8.75	$ 13,134.80
Construction -UG	Cable installation - Underground	NO-CON	Underground Construction - DIRECTIONAL BORE (1) 1.25"	feet	6,295	$ 8.25	$ 51,931.26
Construction -UG	Cable installation - Underground	BH8058	Underground Construction - Install #12 TRACER WIRE GRE	feet	10,007	$ 0.14	$ 1,401.05
Construction -UG	Cable installation - Underground	NO-CON	CABLE PULLING (MSTs)	feet	6,450	$ 1.20	$ 7,739.41
Construction -UG	Cable installation - Underground	NO-CON	CABLE PULLING (1 cable)	feet	3,293	$ 1.00	$ 3,292.54
Construction -UG	Cable installation - Underground	NO-CON	PMO (Underground)	feet	10,007	$ 0.48	$ 4,803.59
Construction -UG	Miscellaneous	45	Underground Construction - Provide and place fiber mark	count	2	$ 30.00	$ 60.00
Materials	Terminals, cabinets, splitters	F5282	Provide and Place 432 Cabinet	count	1	$ 8,590.32	$ 8,590.32
Materials	Terminals, cabinets, splitters	F5156	1x32 DISTRIBUTION FIBER SPLITTER	count	1	$ 941.22	$ 941.22
Materials	Terminals, cabinets, splitters	F5144	Provide and Place (Raychem B) UG Splice Closure	count	3	$ 421.58	$ 1,264.74
Materials	Pedestals, flowerpots, pits, vaults	C4073	Underground Construction - Provide and SET 35x15x17 DC	count	3	$ 985.87	$ 2,957.61
Materials	Pedestals, flowerpots, pits, vaults	C4082	Underground Construction - PROVIDE AND PLACE PEDEST	count	18	$ 229.17	$ 4,010.48
Materials	Pedestals, flowerpots, pits, vaults	BH8132	Underground Construction - PROVIDE AND PLACE 17x30x	count	3	$ 610.94	$ 1,710.63
Materials	Pedestals, flowerpots, pits, vaults	BH8054	Underground Construction - PROVIDE AND PLACE 24x36x	count	3	$ 854.29	$ 2,562.87
Materials	Pedestals, flowerpots, pits, vaults	BH8134	Underground Construction - PROVIDE AND PLACE 30x48x	count	1	$ 1,736.63	$ 1,736.63
Materials	Slackloops	F5154	Underground Construction -Underground Slack Loop 48Ct	feet	225	$ 0.45	$ 101.25
Construction -UG	Cable installation - Underground	76	OTDR End to End Test of Fiber Cable	count	21	$ 20.00	$ 418.00
Materials	Connectorized drop hubs	F5233	2 PORT MST 250' DIELECTRIC	count	1	$ 90.72	$ 90.72
Materials	Connectorized drop hubs	F5234	2 PORT MST 500' DIELECTRIC	count	1	$ 143.05	$ 143.05
Materials	Connectorized drop hubs	F5235	2 PORT MST 750' DIELECTRIC	count	2	$ 181.45	$ 362.90
Materials	Connectorized drop hubs	F5236	2 PORT MST 1000' DIELECTRIC	count	5	$ 218.55	$ 1,092.75
Materials	Connectorized drop hubs	F5237	2 PORT MST 1500' DIELECTRIC	count	4	$ 398.41	$ 1,593.64
Materials	Connectorized drop hubs	F5240	4 PORT MST 750' DIELECTRIC	count	1	$ 202.51	$ 202.51
Miscellaneous	Special Permits			count		$ 3,000.00	$ -
Miscellaneous	Middle Mile Connection			feet			$ -
Miscellaneous	Central Office			bid			$ -
Miscellaneous	Network Access Equipment			bid			$ -
Miscellaneous	Shelters			count			$ -
Miscellaneous	Contingency			count			$ -
						Total:	$149,975.27

Figure 50 - Area # 3 Service Boundary E Labor And Material OSP Costs

DESIGN AND PERMIT STANDARDS

As part of this project, standardized design guidelines were drawn from what sources – list them all - and are provided for use by jurisdictions.

The following standards and technical specifications are applicable to the design, installation, and testing of fiber optic cable and interconnect components:

- TIA/EIA-598-C: Optical Fiber Cable Color Coding
- TIA-568: Commercial Building Telecommunications Cabling Standard
- ITU-T G.652: Characteristics of a Single-Mode Optical Fiber and Cable
- ANSI/TIA-942: Telecommunications Infrastructure Standard for Data Centers
- IEEE 802.3: Ethernet Standards
- ISO/IEC 11801: Generic Cabling for Customer Premises

Technical Specifications:

1.2.4 Color Code

Color coding for optical fibers, buffer tubes, and ribbons shall comply with TIA/EIA-598-C standards. The color code shall be used consistently throughout the installation for easy identification and maintenance.

1.2.10 Conduits

Conduits shall be used to protect fiber optic cables in underground and outdoor installations. Conduits shall be made of PVC or HDPE and comply with industry standards for strength and durability.

1.2.11 Pull Boxes

Pull boxes shall be installed at regular intervals along the conduit path to facilitate cable installation and maintenance. Pull boxes shall be sized appropriately and provide adequate space for cable storage and splicing and shall be verified by a 3rd Party Nationally Recognized Independent Testing Laboratory as meeting all test provisions of ANSI/SCTE 77 2007 Specification for Underground Enclosure Integrity, minimum Tier 15 rating.

1.2.12 Manholes

Manholes shall be used in underground installations to provide access to fiber optic cables for maintenance and splicing. Manholes shall be constructed in accordance with local standards and provide adequate space for technicians to work safely and shall consist of a pre-cast concrete, minimum 4-foot square vault with a base and cast-iron frame ring and cover. The manhole shall be designed to provide a pre-cast conduit entrance depth of 3 feet. Each manhole, frame and cover shall conform to AASHTO HS20-44. Each Manhole shall be equipped with a removable ladder that is engineered to support 300 pounds. The ladder support shall be permanently fixed to the manhole.

1.5.3 Conduit Installation

Conduits shall be installed in accordance with industry standards and local regulations. Proper techniques shall be used to ensure the conduits provide adequate protection for the fiber optic cables.

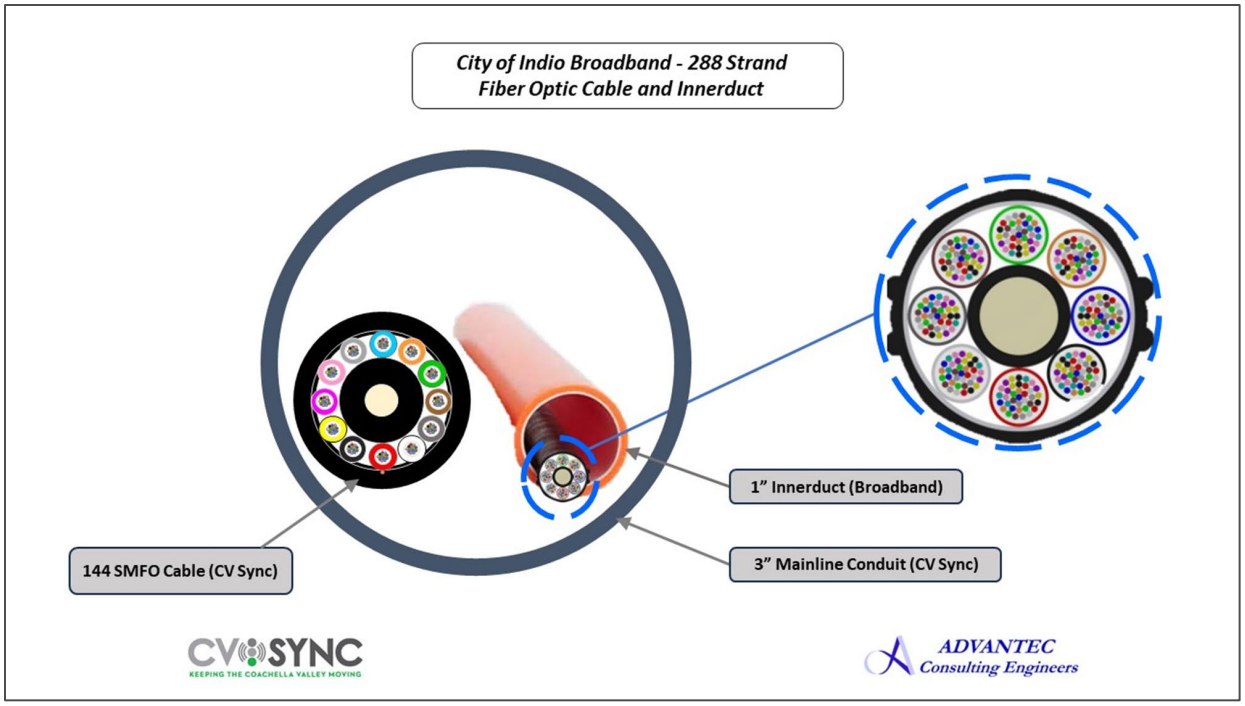


Figure 51 - Conduit With Innerduct Representation

1.5.4 Hand Hole / Pull Box and Manhole Installation

Hand holes, pull boxes, and manholes shall be installed in a neat and workmanlike manner and in accordance with industry standards and local regulations. Proper techniques shall be used to ensure these structures provide adequate access and protection for the fiber optic cables. Conduits shall enter the hand hole/pull box from beneath the hand hole/pull box at a 45 degree slope or less. Conduits can also enter through the bottom quarter of the hand hole/pull box sidewall. If penetrating through the sidewall, the diameter of the hole shall match the outer diameter of the conduit being installed. The outer hole shall be sealed with an approved duct seal. A coarse aggregate drain of as a minimum 18" clean stone or gravel conforming to the dimensions shown on the plan details shall be provided.

Hand holes/pull boxes shall be set flush with the sidewalk, pavement, or 1" above the surface of the ground unless otherwise shown on the plans. Unless noted otherwise, all excavated areas to be restored to natural contours. Do not dispose of spoils in mapped floodplains or wetlands.

Compaction shall be no less than 90% (95% in areas under existing/future pavement) of the maximum standard proctor density. Compaction and compaction testing shall be incidental.

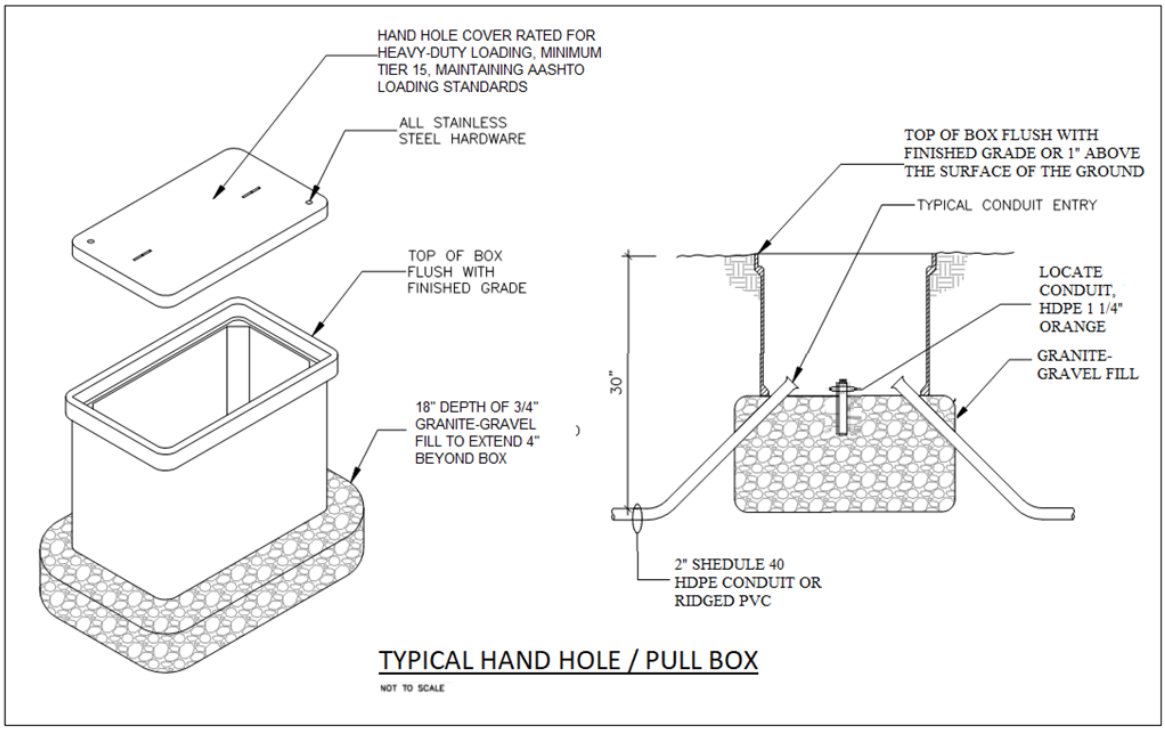


Figure 52 - Typical Handhole Design

2.1.1 Directional Boring vs Open-Cut Trenching

Directional boring shall be used in areas where open-cut trenching is not feasible or would cause significant disruption. Open-cut trenching is only suitable for areas with minimal surface obstructions and where restoration is manageable.

2.1.2 Use of HDPE in Bored Segments

Unless otherwise specified, grey colored 3” Schedule 80 High-Density Polyethylene (HDPE) conduit shall be used in directional boring segments. All new conduit shall include a #8 bare bond wire and pull tape

2.1.3 Avoidance of Pavement Cuts

Pavement cuts should be avoided whenever possible to minimize disruption and restoration costs.

2.4.1 Clearance Requirements for Buried Telecommunications Conduit

According to CPUC General Order 128, Rule 31.4, which governs underground utility construction, the following clearances shall be maintained:

2.4.2 From Water, Gas, and Other Foreign Substructures

- Independently Installed:
  - Parallel Installation: Minimum 12 inches of horizontal clearance
  - Crossing Installation: Minimum 6 inches of vertical clearance
- Concurrently Installed:
  - Same clearances as above, but less separation may be allowed by mutual agreement

2.4.3 From Other Telecommunications (Communication Systems)

- Independently Installed:
  - Minimum separation of:
    - 3 inches of concrete, or

- 4 inches of brick masonry, or
- 12 inches of earth

- Concurrently Installed:
  - Less separation may be allowed by mutual agreement

2.4.4 Depth Requirements

Minimum 24 inches

2.5 Backfill Materials and Compaction

Use appropriate backfill materials to protect the conduit and ensure proper compaction. Compaction should be performed in layers to prevent settling and maintain the integrity of the trench.

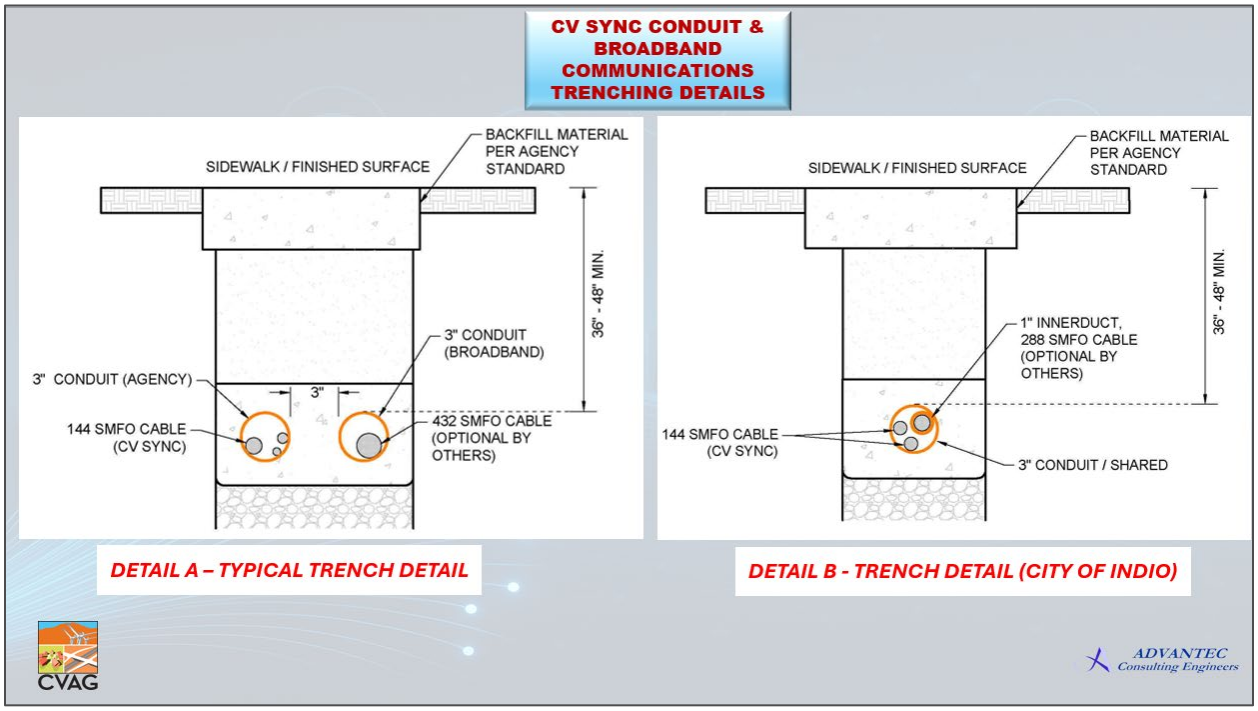


Figure 53 - Typical Trench Detail With Backfill And Compaction

2.6 Surface Restoration to Local Standards

Restore the surface to its original condition or better, following local standards and regulations. Ensure proper sealing and finishing to prevent future damage and maintain aesthetics.

3.1 Conduit Type

All conduits shall be Schedule 80 in the diameters, quantities and colors as shown on the project detail sheet and shall be compliant with all ASTM and Telcordia/ Bellcore GR-356- CORE requirements. All HDPE conduits shall be factory lubricated, low friction, high-density conduit constructed of virgin high-density polyethylene resin. Conduit shall be capable of being coiled on reels in continuous lengths, transported, stored outdoors, and subsequently uncoiled for installation, without affecting its properties or performance. PVC conduit shall be certified by the manufacturer as meeting ANSI/UL 6 and 651. The manufacturer shall be ISO 9000 compliant.

3.2 Conduit Size

Default conduit shall be grey colored schedule 80 3” HDPE conduit. However, conduit size may also be selected based on the number and size of fiber optic cables required by the project, and forecasted future

expansion needs for a given cable path, accounting as well for spare capacity in both dark fiber and duct space. Project planning shall ensure the conduit has sufficient capacity to accommodate the cables without excessive bending or crowding and that the appropriate amount of spare capacity is included in the engineered design

3.3 Minimum Burial Depth and Cover

Per the CALTRANS standards for depth requirements and clearances to other underground utilities, the minimum depth shall be 24” unless otherwise noted by the permitting authority with jurisdiction of the ROW or in special circumstances such as microtrenched segments.

3.4 Conduit Installation

Design engineering shall adhere to manufacturer specifications, within the bounds of constructability, to ensure conduit is installed correctly and in straight runs with minimal bends, to reduce stress on the fiber optic cables. Contractor shall be responsible for adhering to standard industry installation techniques and procedures and those outlined by the manufacturer recommendations.

DOCUMENT APPENDICES

GLOSSARY OF TERMS

Access – Availability of infrastructure that can deliver service to a potential customer. If any broadband technology is present and capable of providing a connection at a given location, that location is considered to have access.

Access Point – Device that allows wireless devices to communicate with a wired network using Wi-Fi or related standards. Sometimes referred to as AP, Wireless Access Point, or WAP. Access points contain both a radio and a wired network connection, and relay communications between the two.

Adoption – Customer's decision to purchase broadband services that are already available at their location. Access refers to the presence of broadband infrastructure capable of delivering service. Adoption describes whether individuals choose to utilize that service. Individuals may choose not to utilize available broadband services for reasons such as cost, language barriers, lack of digital literacy, or limited understanding of the technology.

ADSL (Asymmetrical Digital Subscriber Line) – Form of Internet Service communications technology that delivers constantly accessible data transmissions over copper telephone lines. ADSL is a widely used type of DSL service that has download speeds between 2 and 6 Mbps and upload speeds up to 512 Kbps.

Asymmetrical Bandwidth – Connection in which the maximum transfer rate is different for download and upload speeds.

ATM (Asynchronous Transfer Mode) – Transmission method where information is re-structured into cells. It is asynchronous since the recurrence of cells from an individual user is not necessarily periodic.

Backbone/network backbone – Generic term in telecommunications referring to the central part of a network that interconnects all sites and carries most of the network's traffic. Smaller networks connect to the backbone through aggregation points using additional circuits and network devices such as routers.

Backhaul – Fiber that carries aggregated user data from the network's central office to internet connection points located at carrier hotels.

Bandwidth/high bandwidth – Transmission capacity of an electronic pathway such as a communications circuit. Network bandwidth refers to how much data can move across the network within a specified amount of time and is typically expressed in bits per second (bps). Examples of measurements include kbps, Mbps, or Gbps. The term "high bandwidth" is relative and depends on current standards and the specific context. Generally, it refers to bandwidth levels that are at the upper end, or above what is normally available, at a given location.

Bits vs. Bytes – Bits are the smallest unit of data. Bits are used to measure how fast data moves across a network. Bytes, consisting of eight bits, are used to measure the size or volume of data.

Broadband – Marketing term that refers to high bandwidth Internet access. Traditionally, broadband meant "any bandwidth greater than dial up." Broadband data transmission is digital, enabling text, images, audio, and other data to be carried as "bits". In the context of this project, broadband refers to providing Internet connectivity at much higher bandwidth levels that have been available or affordable to most agencies. The FCC, in 2015, defines residential broadband as a service providing downloads above 25 Mbps--speeds below this threshold would not qualify as "broadband."

Burstable – Feature that allows a network connection to exceed its specified speed up to a defined maximum capacity for a period of time.

Burst Speed – Method which momentarily allots additional bandwidth to consumer services for a short period of time.

Capacity/high capacity – Complex measurement of the maximum amount of data that may be transferred between network locations over a network, also known as throughput. "High" is relative to current norms and measured in bits per second (bps).

CBRS (Citizens Broadband Radio Service) – Wireless network capable of 4G and 5G connectivity that can be segmented to carry different applications such as internet, public works related applications, public safety communications, and other municipal or enterprise services.

Central Office – Telecommunication company's facility where consumer phone lines and broadband connections terminate and interface with the provider's network equipment. The central office houses infrastructure that connects customers to one another within the same office or to other central offices regionally, nationally, and globally.

Co-location – The practice of placing information technology hardware and resources in a shared, common facility. In this context, an organization's networking hardware is housed off-site and co-located alongside equipment from other organizations, typically within a commercial data center or a service provider facility.

Commercial networks/carriers (providers) – Any entity engaged in the business of providing telecommunications services that are regulated by the Federal Communications Commission or other governmental bodies. These are generally for-profit companies.

Community Anchor Institutions – Schools, libraries, medical and healthcare providers, public safety entities, institutes of higher education and other community support organizations that provide outreach, access, equipment and support services to facilitate greater use of broadband service by the entire population and local governments.

Community Needs Assessment – Evaluation that identifies gaps, barriers, or deficiencies within a community that prevents it from achieving its broadband related goals.

Dark Fiber – Fiber that is in place but not currently used for broadband services.

Digital Divide – According to the National Digital Inclusion Alliance (NDIA) the Digital Divide can be defined as: "…the gap between those who have affordable access, skills, and support to effectively engage online and those who do not. As technology constantly evolves, the digital divide prevents equal participation and opportunity in all parts of life, disproportionately affecting people of color, Indigenous peoples, households with low incomes, people with disabilities, people in rural areas, and older adults." The NDIA refers to the Digital Divide as the problem, Digital Equity as the goal, and Digital Inclusion as the Work.

Digital Equity – According to the NDIA Digital Equity can be defined as: "…a condition in which all individuals and communities have the information technology capacity needed for full participation in our society, democracy, and economy. Digital equity is necessary for civic and cultural participation, employment, lifelong learning, and access to essential services." The NDIA refers to the Digital Divide as the problem, Digital Equity as the goal, and Digital Inclusion as the Work.

Digital Inclusion – According to the NDIA, Digital Inclusion refers to: …the activities necessary to ensure that all individuals and communities, including the most disadvantaged, have access to and use of Information and Communication Technologies (ICTs). This includes five elements: 1. Affordable, robust broadband internet service; 2. Internet-enabled devices that meet the needs of the user; 3. Access to digital literacy training; 4. Quality technical support; and 5. Applications and online content designed to enable and encourage self-sufficiency, participation, and collaboration. The NDIA refers to the Digital Divide as the problem, Digital Equity as the goal, and Digital Inclusion as the Work.

Digital Literacy – Ability to leverage current technologies, such as smartphones and laptops, and Internet access to perform research, create content, and interact with the world.

Digital Skills – Skills related to operating digital devices or taking advantage of digital resources.

DOCSIS (Data Over Cable System Interface Specification) – International telecommunications standards for cable signaling data and spectrum sharing.

Digital Subscriber Line (DSL) – Family of technologies that are used to provide Internet access by transmitting digital data over telephone lines. It may be either symmetric (same bandwidth in both directions), or asymmetric (different bandwidth in each direction). The service may be implemented simultaneously over the same lines used to provide voice service.

eGovernment Services – Government's use of web-based and information technology resources to connect with citizens and provide online services and resources

Fiber/fiber-optic cable – Flexible hair-thin glass or plastic strand that is capable of transmitting large amounts of data at high transfer rates such as pulses or waves of light.

Fiber to the Home or Fiber to the Premises (FTTH or FTTPP) – Delivery and connection of fiber optics directly to a home or building.

Fixed Wireless Broadband Access – Use of wireless devices/systems in connecting two fixed locations, such as offices or homes. The connection occurs through the air, rather than through fiber, resulting in a less expensive alternative to a fiber connection.

Federal Communications Commission (FCC) – Federal agency responsible for regulating interstate communications by radio, television, wire, satellite, and cable. The FCC also participates in international communications standards of coordination and policy development.

FCC 477 – As part of the requirements to be a telecommunications utility, service providers are required to regularly submit specific information about the telecommunications services they provide. This information includes details like what census blocks within which they provide service, what speeds they offer, what technology they use, etc.

Grant – Legal instrument reflecting a relationship between a government agency and a recipient. The main purpose of the relationship is to dispense money or resources in order to accomplish a public purpose. No substantial involvement is anticipated by the government agency during the completion of the activity.

Internet Service Provider (ISP) – Communications carrier that provides access to the Internet. ISPs are not necessarily directly connected via an Internet exchange; they may acquire connectivity from another ISP.

Interconnection – Linking of numerous telecommunications networks to exchange user traffic.

Last mile connection – Final leg of a network to the customer, generally from the provider's last POP to the customer.

Lit Fiber – Active fiber optic cable capable of transmitting data.

LMDS (Local Multipoint Distribution Service) – Wireless broadband service that uses microwave signals to render communications service – voice, data, Internet – to customers within the last mile.

Loan – Financing of money or property in exchange for payment of the principal amount plus interest.

Local Area Network (LAN) – Computer network that interconnects computers within a limited area such as a building or small group of adjacent buildings.

Long Term Evolution (LTE) – Standard for wireless communication of high-speed data for mobile phones and data terminals. A 4G wireless broadband technology that provides speeds up to 100 Mbps download and 30 Mbps upload.

Market Assessment – Review of FCC provider reported data. Private providers are required to report certain details of their coverage in FCC Form 477. The Market Assessment is an HR Green Report of Findings with an analysis of data from FCC and third-party reporting organizations.

Megabits per second – see "Bandwidth" and "Throughput."

Middle Mile – At a high level, networks are comprised of middle mile and last mile. The middle mile is the connection between a local network, also called a "last mile" connection, and the backbone internet network.

Network Infrastructure – Hardware and software components of a network that provide network connectivity and allow the network to function.

Node -- Connection point that can receive, create, store, or send data along a network.

Open Access Network – Networks that offer wholesale access to network infrastructure or services provided on fair and reasonable terms with some degree of transparency and nondiscrimination.

Overbuild – Construction of a new network in an area where incumbent providers or existing technologies are already present.

Point of Prescence – Particular place or facility where local Internet service providers connect to other

networks. Distance from the point of presence can affect service availability and pricing.

Point-to-Point – Microwave broadband application that requires line-of-sight from a transmission point to an end point. Depending on equipment and usage, the technology is less expensive to install and can provide good service.

Population Density – Classified as either urban, rural or remote. For the eligibility of grants and loans, Rural Utility Services defines rural in two ways: any area not within a city or town with population exceeding 20,000 or an urbanized area adjacent to a city greater than 50,000 and any area not within boundaries of any city, village, or borough with population exceeding 5,000. Rural is an area defined as either unincorporated or a community with a population of less than 5,000. Remote is an area with population density fewer than one person per twenty acres.

Public Computer Center (PCC) – Facility that is open to the public and provides broadband access, education, support and training relevant to community needs. PCC locations include, but are not limited to, community colleges, libraries, schools, youth center, employment service centers, Native American chapter houses, community center, senior centers, assistive technology centers for people with disabilities, community health centers and center in public housing developments that provide broadband access to the general public or specific vulnerable populations, such as low-income, unemployed, older adults, children, minorities and people with disabilities.

Rights-of-Way (ROW) – Legal rights to pass through property owned by another. ROWs are frequently used to secure access to land for digging trenches, deploying fiber, constructing towers and deploying equipment on existing towers and utility poles.

Service Area – Entire area within which a service provider either offers or intends to offer broadband service.

SDSL (Symmetrical DSL) – Technology that permits the transfer of data over copper telephone lines. The transmission bandwidth for uploads and downloads is equal.

SONET (Synchronous Optical Network) – American National Standard Institute standard for simultaneous transmission of data over optical fiber.

Spectrum – Conceptual tool used to organize and map the physical phenomena of electromagnetic waves. These waves propagate through space at different radio frequencies, and the set of all possible frequencies is the electromagnetic spectrum.

Tax Increment Financing – Public financing method through which future property tax increases can be diverted to subsidize community development and improvement projects.

Tier 1 Internet Network – Network of internet providers that form a superhighway that allows users access to every other network on the internet.

Tier 2 Internet Network – Network of smaller internet providers that allow users to reach parts of the Internet but still rely on purchasing IP transit from Tier 1 providers.

Telemedicine – Use of high-speed, high-capacity internet to support long-distance healthcare services. Enables remote clinical care, patient and provider education, and enhanced healthcare administration.

Terrestrial Broadband Infrastructure – Broadband infrastructure that is anchored to permanent land-based structures such as fiber, cable, DSL and fixed wireless equipment.

Throughput – Rate of data transmission per unit time; see “Capacity/High Capacity”. The most common throughput measurements include:

- Kilobits per second (Kbps) – transmission rate; 1,000 bits per second. 1,000 kbps = 1 Mbps. Kilo is the unit prefix for 103.
- Megabits per second (Mbps) – data transmission rate; 1,000,000 bits per second. 1,000 Mbps = 1 Gbps. Mega is the unit prefix for 106.
- Gigabits per second (Gbps) – data transmission rate; 1,000,000,000 bits per second. 1 Gbps = 1,000 Mbps or 1,000,000 kbps. Giga is the unit prefix for 109.

VoIP (Voice over Internet Protocol) – Technology that allows users to send and receive voice calls using an internet connection instead of a phone line.

Wired or Wireless infrastructure – Wired infrastructure is an infrastructure that uses a physical line to run directly to the premises such as fiber, cable, or DSL. Wireless infrastructure delivers service without a physical line to the premises such as point-to-point wireless, radio-frequency links, and other over-the-air transmission methods.

Wi-Fi (Wireless Fidelity) – Local area wireless technology that allows an electronic device to participate in computer network using specific wireless frequencies and protocols. Current standards use the 2.4 GHz and 5 GHz unlicensed industrial, scientific, and medical radio bands. Sometimes referred to as Wireless LAN or WLAN.

WiMAX – Wireless technology through which wireless Internet access is provided with a significantly larger range than regular Wi-Fi. WiMAX can provide broadband services up to 30 miles.

WISP – ISP that provides broadband services using a wireless network

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