Monterey County Broadband Strategic Plan

October 2023

Golden State Finance Authority®

County of Monterey California • 1850 •

TeleworX

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Executive Summary

The Monterey County Broadband Strategic Plan presented herein was commissioned by Golden State Finance Authority (GSFA) and funded through a US Department of Commerce, Economic Development Administration (EDA) grant awarded in August 2022 to GSFA.

The main goal of this project is to formulate a comprehensive countywide broadband strategy to address the broadband connectivity needs of residents, businesses, and anchor institutions while positioning local jurisdictions to pursue and attract broadband investments in the County.

This Broadband Strategic Plan also establishes the data foundation on which to develop state and federal broadband grants or to attract private industry to design and deploy broadband solutions.

The scope of the Broadband Strategic Plan includes the characterization of the broadband environment in the County and the development of network solutions and an associated implementation strategy to improve broadband access and adoption. The specific focus includes:

- A comprehensive broadband needs and market analysis
- A broadband asset inventory.
- Conceptual network designs to inform broadband operating model alternatives.
- Assessment and recommendations of operating models for broadband implementation and strategies for digital inclusion.
- Review of municipal broadband policies

Monterey County is a rural demarcation in California, home to approximately 434,000 residents and encompassing the cities Carmel-by-the-Sea, Del Rey Oaks, Gonzales, Greenfield, City of King, Marina, Monterey, Pacific Grove, Salinas, Sand City, Seaside, and Soledad. The County's population is projected to experience a growth rate of 0.5% per year over the next decade. The Latino community represents 60% of the population in the County. Monterey County has a median household income of $90,987 and a per-capita personal income of $33,786 in 2021. The poverty rate in the County is over the national average, with 13.4 percent of households falling below the federal poverty line.

The main finding of the needs assessment and market analysis is the urgent need to expand and exploit fiber infrastructure within Monterey County. Approximately 97% of the broadband serviceable locations are considered served according to Federal Communications Commission (FCC) data. Of those unserved (3,400 locations), 79% are in unincorporated areas. However, there is an important gap in access to 1 G / 500 Mbps service as 77% of Monterey County locations lack access to this kind of service, including large areas across the cities.

Furthermore, the market analysis revealed that competition in most areas is limited since 45% of locations have access to only one or no provider offering services above 100 Mbps, and only 1% of locations have access to more than one fiber provider.

Public fiber infrastructure that can be leveraged to accelerate the deployment of fiber-based broadband services includes the 44-mile County fiber network and the California Middle Mile Broadband Initiative (MMBI) being built by the California Department of Technology (CDT) which includes 182 miles of planned deployment within Monterey County.

Based on the characterization of the broadband environment in the County, the Broadband Strategic Plan progresses to the development of solutions and strategies to address the identified needs and opportunities. This is accomplished through the identification of attractive areas for broadband deployment (fiber and fixed wireless), referred hereto as "Broadband Opportunity Zones". A conceptual design is developed, and three different operating models are assessed for the implementation and operation of each opportunity zone based on the assessment of available funding sources, financial viability, ongoing initiatives, and potential partners to arrive at a recommended scenario and strategy.

A total of sixty-four (64) broadband opportunity zones (52 for fiber and 12 for FWA) have been identified in Monterey County based on demographics, density, and the competitive environment. The conceptual designs for these opportunity zones result in a total cost estimated at $321 million. This leads to a plan that, if implemented, would result in 0% of unserved locations and an increase of 1G served locations from 23.3% to 84.3%.

Each opportunity zone is assessed against three operating models: 1) a public model led by Golden State Connect Authority (GSCA)[1], 2) a Private ISP Standalone model, and 3) a Public-Private Partnership (PPP) model. The assessment is done through a financial model and the consideration of grant eligibility and potential partners. This results in the selection of an operating model and the identification of key success factors for each opportunity zone.

Once the operating models have been identified, broadband opportunity zones under each model are further categorized based on their feasibility and timeframe for implementation - Phase 1(2023-24), Phase 2 (2025-26), and long-term categories (beyond 2026). Under each category, the focus of the next steps is on the key success factors such as securing grant funds, engagement with potential ISP partners, buildout of the California MMBI, and public contributions to trigger PPPs in areas with sub-standard business cases.

As an integral part of the broadband strategy, broadband policies of the County and certain cities are assessed based on the California Local Permitting Playbook and recommendations are provided to attract and streamline broadband infrastructure deployments. The recommendations focus on improving permitting processes and documentation, enabling access to public assets, implementing dig once policies, enforcing the deployment of conduit for major construction projects, and improving Geographic Information System (GIS) portals with broadband data.

The overall findings and recommendations gathered throughout the project are condensed into an action plan with three workstreams:

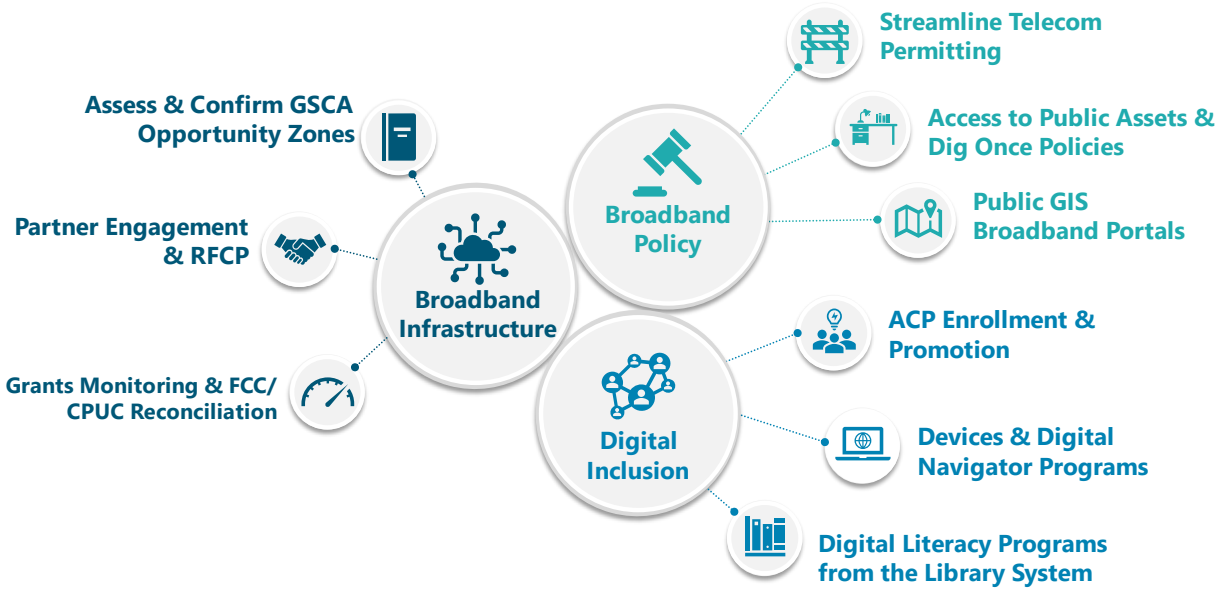
1) **Broadband Infrastructure**. This workstream focuses on the implementation of the recommended scenarios for the identified broadband opportunity zones. Specific tasks include engagement and negotiations with potential partners and the development of a Request for Concept Proposals (RFCP) to further confirm the partner choice and the required public contribution.

2) **Broadband Policies**. Implementation at the municipal level of the recommended policies and best practices, including the streamlining of telecom permitting, access to public assets, dig once policies, and development / improvement of GIS broadband portals.

[1] Golden State Connect Authority is a joint powers authority comprised of 40 rural California counties, including Monterey County that targets to improve access to reliable, affordable high-speed internet in those counties.

3) **Digital Inclusion**. This workstream is centered around coordination and support of existing programs, prioritizing those that address devices and skills gaps. This includes coalition building amongst various stakeholder groups. Key tasks are Affordable Connectivity Program (ACP) enrollment and promotion, implementation of devices and digital navigator programs, and leveraging digital literacy programs from Library System.

The graphic below provides a high-level view of the Action Plan.



1 Introduction

In an era defined by technological progress, broadband emerges as a transformative force, fueling economic growth, civic engagement, and business success. It serves as a gateway to empowerment, ensuring access to a wealth of educational, cultural, and informational resources.

Acknowledging that broadband access, adoption, and training are essential components of digital equity, the state of California has created the California Broadband for All initiative. The California Broadband for All Action Plan[2], developed by the California Broadband Council as instructed by Executive Order N-73-20, is a dynamic strategy aimed at accelerating broadband expansion and adoption in the state of California. The California Broadband for All Action Plan establishes a statewide broadband standard of 100 Mbps download and 20 Mbps upload (100/20) and focuses on ensuring access to high-speed internet, affordable internet services and devices, and digital skills and training.

In alignment with State's efforts, Golden State Finance Authority[3] (GSFA) applied for a grant from the US Department of Commerce, Economic Development Administration (EDA) in September 2021 to develop twenty-seven countywide broadband strategic plans for 28 GSFA member rural counties, including

[2] Broadband for All Cover Letter and Action Plan 2020 (ca.gov)

[3] GSFA is a California Joint Powers Authority with 39 member counties. GSFA structures, develops, and administers programs that create community resiliency through home ownership, community and economic development, and infrastructure investment.

Monterey County. The Grant was awarded in August 2022. TeleworX, LLC, a telecommunications consulting firm with national and international experience in the development of broadband strategies and networks, was selected in December 2022 to develop the Broadband Strategic Plan for Monterey County in response to GSFA's Request for Proposal (RFP) Number CD-22-02.

The Monterey County Broadband Strategic Plan, the subject of this report, has as its primary objective to formulate a comprehensive countywide strategy, addressing the broadband connectivity needs of residents, businesses, and anchor institutions.

The Broadband Strategic Plan empowers County jurisdictions to actively participate in funding programs, enhancing the County's ability to attract strategic broadband investments.

This strategic approach contributes to achieving universal broadband access, positioning the County to capitalize on federal and state funding opportunities, many of which necessitate the presence of broadband strategic plans.

The Broadband Strategic Plan includes the characterization of the broadband environment in the County, addressed in Sections 2 to 4, and the development of network solutions and the associated implementation strategy to improve broadband access and adoption in Sections 5 to 7. The outcomes of the Plan will contribute to bridge the digital divide, creating a more connected, competitive, and equitable County for all residents and businesses.

The balance of this Section provides an overview of the project scope and methodology, the socioeconomic and demographic profile of the County, and a brief analysis of broadband benefits.

1.1 Project Scope & Methodology

This section outlines the scope and methodology applied for the development of the Countywide Broadband Strategic Plan. This methodology encompasses three stages as captured in Figure 1.

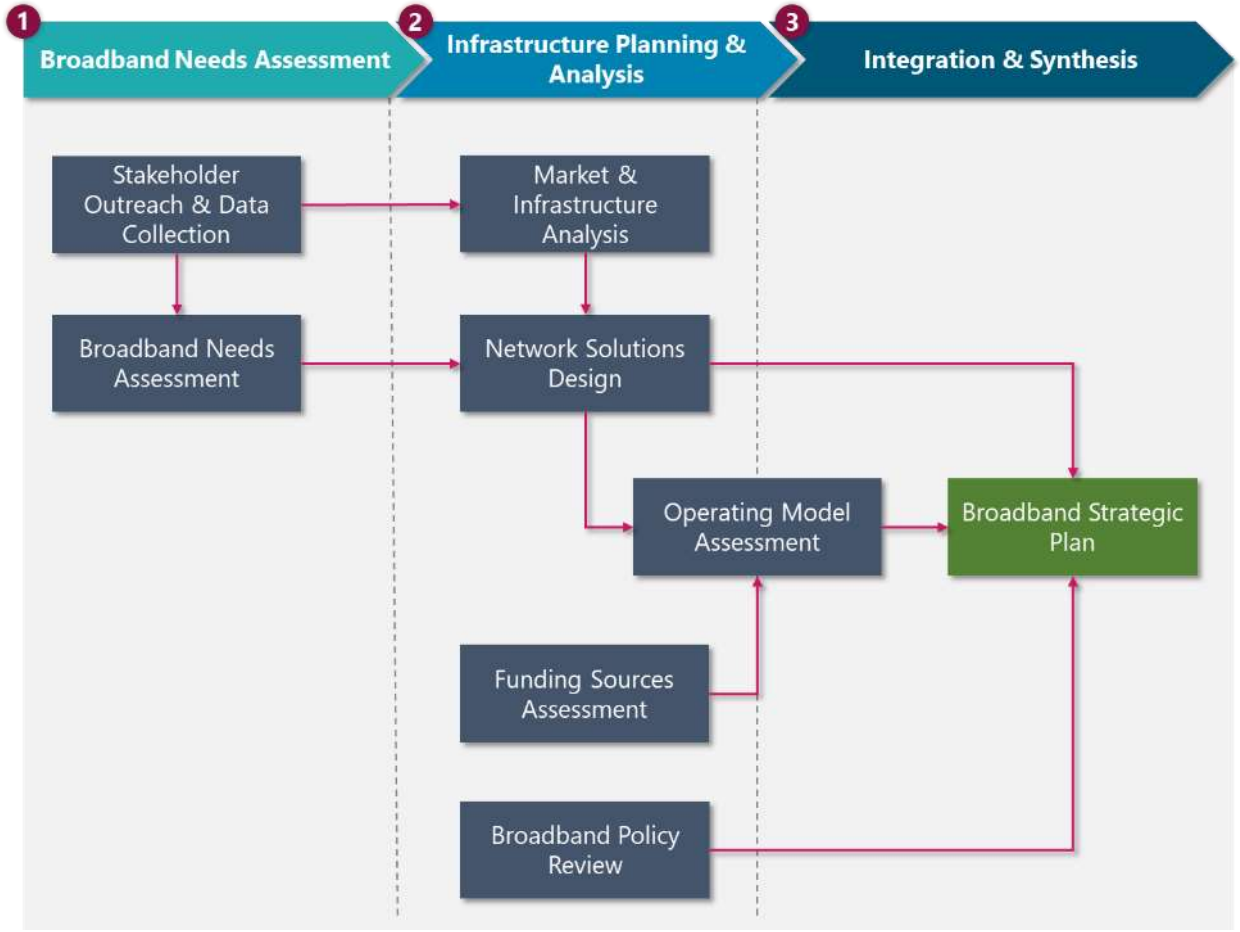


Figure 1. Project Scope and Methodology.

Stage 1: Broadband Needs Assessment

The initial stage is focused on stakeholder engagement, data collection and the identification of broadband needs and challenges. The associated tasks are set forth below:

- **Stakeholder Outreach & Data Collection.** Community outreach is done through a Needs Assessment Survey and a Speed Test Program. Key stakeholders from local governments, community-based organizations (CBOs) and anchor institutions are engaged in 1:1 meetings to capture their points of view, experience, and knowledge regarding the broadband needs in their communities. In parallel, data collection from public sources is performed including data from the Federal Communications Commission (FCC), the California Public Utilities Commission (CPUC), and the Census Bureau, among others. Finally, data from local agencies, including data on existing infrastructure, connectivity needs, and construction projects, is gathered through a data collection guide.
- **Broadband Needs Assessment.** Available data is analyzed to characterize broadband needs of the different sectors (i.e., residential, business, government and anchor institutions) regarding

availability, affordability, performance and digital inclusion. This includes Geographic Information System (GIS) processing of broadband deployment and speed test data, analysis of survey responses, characterization of challenges and opportunities from stakeholder engagement, and the development of the demand and gap analysis.

Stage 2: Infrastructure Planning & Assessment

Stage 2 focuses on the analysis of existing infrastructure, service offerings, and broadband policies, in order to identify attractive areas for deployment, develop network solutions, and provide policy recommendations for local governments in the County:

- **Market & Infrastructure Analysis.** Characterization of the broadband market utilizing data from the FCC, CPUC, speed tests, and the information collected in Stage 1, providing a comprehensive overview of the existing broadband service offerings, and identifying areas without competition. In addition, existing infrastructure is analyzed and documented through a broadband asset inventory. The outcomes of this task are crucial for the development of network solutions.
- **Network Solutions Design.** This task includes the identification of areas that are attractive for broadband deployment based on demographic and market characteristics, including areas suitable for fiber and Fixed Wireless Access (FWA) solutions. For each of these areas, referred to as "broadband opportunity zones" fiber-to-the-premises (FTTP) or FWA conceptual designs are developed along with the associated cost estimates that are a primary input for the assessment of operating models.
- **Funding Sources Assessment.** Evaluation of eligibility criteria, requirements, and timeframes of federal and state funding programs for broadband infrastructure. This assessment seeks to determine the eligibility and likelihood of securing broadband infrastructure funding from state and federal programs for broadband infrastructure deployment for each of the identified broadband opportunity zones.
- **Operating Model Assessment.** Assessment of various operating / business models to find the most feasible path for implementation of each broadband opportunity zone. This includes the evaluation of ongoing initiatives and potential partners, and a financial analysis to identify requirements for sustainability.
- **Broadband Policy Review:** Building on the California Local Permitting Playbook and the National Telecommunications and Information Administration's (NTIA) broadband policies and mechanisms, this component undertakes a comprehensive review of local broadband policies from local jurisdictions, providing recommendations to ensure that municipalities create a broadband friendly environment that contributes to extend and improve broadband infrastructure.

Stage 3: Integration & Synthesis: Broadband Strategic Plan

In Stage 3 findings from the previous phases are analyzed and consolidated into the Broadband Strategic Plan presented herein, including the development of recommendations and integration into a coherent strategy that serves as a roadmap for improved broadband access and digital inclusion that contributes to achieve digital equity within the County.

1.2 County Socioeconomic & Demographic Profile

Before addressing specific broadband benefits, it is important to review the socioeconomic and demographic profile of Monterey County. This provides the necessary context to accurately assess the potential impact of broadband.

Monterey County is a rural community in California, home to approximately 434,000 residents and encompassing the cities Carmel-by-the-Sea, Del Rey Oaks, Gonzales, Greenfield, King City, Marina, Monterey, Pacific Grove, Salinas, Sand City, Seaside, and Soledad. The County has a much higher population compared to its neighboring counties, San Benito, and San Luis Obispo. San Benito is home to about 65,000 while San Luis Obispo has a population of around 283,000 residents. The County's population is projected to experience a growth rate of 0.5% per year over the next decade. Latino community represents 60 percent of the population in the County.

Educational attainment in the county varies, with about 50 percent of adults completing high school but not pursuing further education. In contrast, only 25 percent of adults have obtained a graduate or professional degree. In terms of income, Monterey County has a median household income of $ $90,987 and a per-capita personal income of $33,786 in 2021. The poverty rate in the County is over the national average, with 13.4 percent of households falling below the federal poverty line.

There are approximately 202,833 employed residents in Monterey County. The labor force participation rate for Monterey County is around 71%, which is higher compared to neighboring San Benito County with a rate of 66% and lower compared to San Luis Obispo County with a rate of 83%. In terms of unemployment rates, Monterey County has a rate of 4.4%, while San Benito County has a rate of 4.2%, and San Luis Obispo County has the lowest rate at 2.7%.

As shown in Table 1, out of the 202,833 employees working within the County, the public business sector employs 33,902 individuals, while the private sector employs 168,931 individuals. Beyond the public sector, Agriculture, Tourism (specifically Accommodation and Food Services), Health Care and Retail are prominent sectors in Monterey County. These industries play a vital role in driving the County's economy and providing employment opportunities for its residents. Therefore, the benefit analysis for businesses in Section 4 focuses on these sectors.

Monterey County hosts a variety of employers that contribute to the local workforce. These key entities vary in size and industry, providing job opportunities for residents throughout the region. Some of the largest employers in the County include well-known businesses like Pebble Beach Resorts, Salinas Valley Memorial Hospital, Azcona Harvesting Inc in Greenfield, and Premium Packing Inc in Prunedale. Collectively, these businesses employ thousands of individuals and play a crucial role in sustaining the local economy.

Table 1. Employment by Industry

Sector	Monterey County Jobs (#)	Monterey County Jobs (%)
Agriculture, Forestry, Fishing and Hunting	56,035	27.6%
Public Administration	33,902	16.7%
Accommodation & Food Services	24,103	11.9%
Health Care & Social Assistance	18,288	9.0%
Retail Trade	16,787	8.3%

Professional, Scientific, and Technical Services	14,971	7.4%
Construction	6,635	3.3%
Wholesalers	6,051	3.0%
Transportation, Warehousing, & Utilities	4,865	2.4%
Manufacturing	5,061	2.5%
Educational Services	2,426	1.2%
Other Services, Except Public Administration	5,089	2.5%
Banking, Finance, and Insurance	4,474	2.2%
Arts, Entertainment, & Recreation	2,851	1.4%
Information	994	0.5%
Mining, Quarrying, Oil and Gas Extraction	301	0.1%
Total Employment	**202,833**	**100%**

1.3 Broadband Benefits

Broadband refers to high-speed internet access, meaning that it provides significantly higher speeds than those available through "dial-up" services[4], and allows users to reliably access today's internet services such as e-Learning, remote work, telehealth, video streaming, and gaming. Broadband access can be provided through various technologies, including FTTP, cable, Digital Subscriber Line (DSL), FWA and Satellite. These broadband technologies are described in Annex A.

With broadband, residents gain access to an extensive array of educational, cultural, and informational resources that enrich their lives and expand their horizons. Whether it be engaging in immersive online learning, connecting with loved ones through seamless video communication, or accessing critical healthcare services remotely, broadband empowers residents to thrive in an increasingly interconnected world. Moreover, for individuals with disabilities, broadband becomes a lifeline, enabling assistive technologies, fostering inclusivity, and facilitating independent living, thereby bridging the digital divide, and fostering a more equitable society.

Broadband is essential for businesses and anchor institutions, enabling enhanced productivity and innovation. With high-speed internet access, businesses can leverage digital tools, expand their market reach, and drive economic growth. Anchor institutions like public safety, schools, and government agencies rely on broadband for vital services, communication, and community development.

As part of the countywide Broadband Strategic Plan presented herein, an analysis of broadband benefits was developed to identify the expected benefits that County stakeholders can accrue provided broadband access and adoption is improved throughout the County. Figure 2 summarizes these benefits by stakeholder sector.

[4] https://www.fcc.gov/consumers/guides/getting-broadband-qa

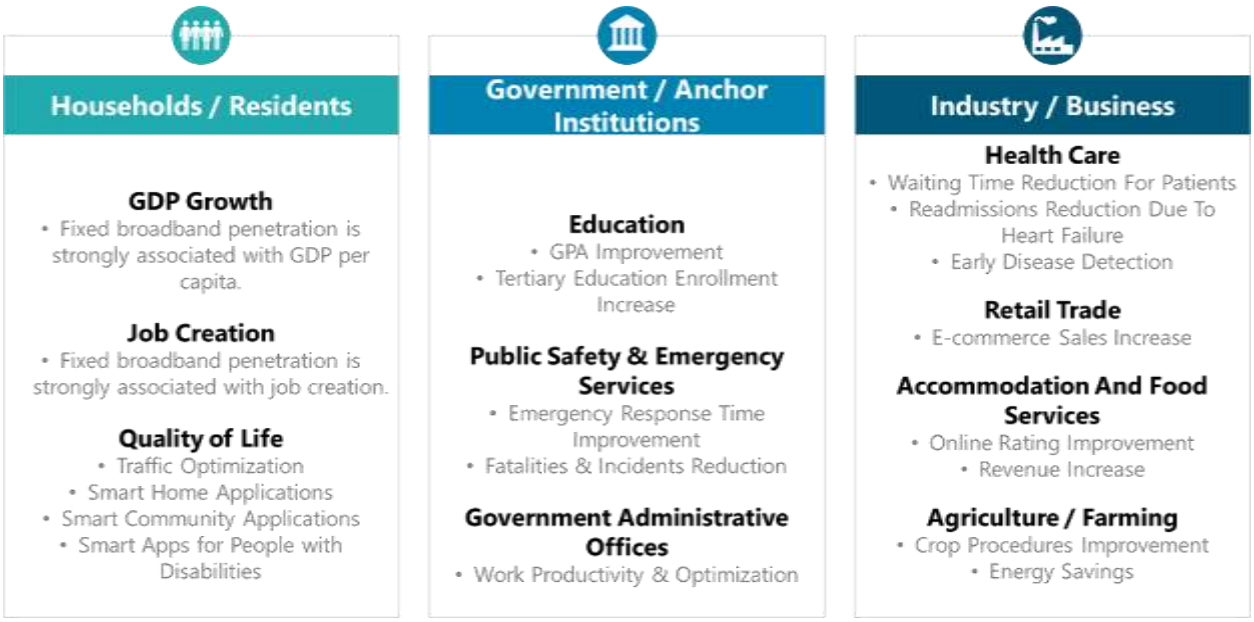


Figure 2. Broadband Benefits Overview.

Benefits for Residents

- ***Gross Domestic Product (GDP) Growth:*** It is estimated that a 10 percent point increase in fixed broadband adoption results in a GDP increase up to 1.5 percent points. Given that Monterey County currently has a broadband adoption rate of 90 percent, there is still potential for further growth. For example, if the County were to achieve a 98[5] percent adoption rate, this would translate into a potential increase of up to 1.2 percent in the County GDP.
- ***Employment Growth*:** By leveraging the power of broadband, individuals can expand their access to a diverse array of employment opportunities, including remote work options. In a hypothetical scenario where Monterey County's broadband adoption rate increases from 92 to 98 percent, the number of unemployed residents (17,400 residents) could be reduced by up to 28%.
- ***Traffic Optimization:*** According to Comprehensive Economic Development Strategy (CEDS) report, a primary concern for the County is the increase in traffic congestion, since during peak morning hours on a typical weekday, California 156 has significant commuter and tourist traffic into Monterey. In the context of Monterey County, the number of employees who can effectively work from home is primarily concentrated in tech companies and related fields. Promoting telework for the 14,900 employees that work in the tech industry could reduce the number of commuters, which would result in traffic congestion reduction and improved air quality[6].
- ***Smart Home Applications:*** Broadband is the essential backbone that fuels the capabilities and functionality of smart home applications that have the potential to enhance the quality of life in various aspects including energy consumption optimization, security, lighting, control and management of smart devices, and entertainment.

[5] California Advanced Services Fund (CASF) broadband adoption and access goal.

[6] The Urban Mobility Report

- ***Smart Applications for People with Disabilities*:** Broadband access is crucial for people with disabilities as it enables them to access telehealth services and contributes to fostering social inclusion through accessible communication technologies. These applications would impact 36,900 people under the age of 65 who live with a disability within the County, according to the U.S Census Bureau.
- ***Smart Community Applications*:** These applications have the potential to enhance the quality of life in various aspects including public Wi-Fi, security, lighting, emergency alerts, and control and management of public transportation.

Benefits for Local Governments and Anchor Institutions

- ***Education:*** According to the Monterey CEDS, the primary educational concern in the County revolves around the lower levels of educational attainment among its residents. It is noted that around 50 percent of adults in the County have completed high school but have not pursued any further formal education, while only 25 percent of adults in the county have attained a graduate or professional degree. Therefore, ensuring broadband access for scholars may play a crucial role in improving academic achievements and enrollment into tertiary education for the 73,640 K-12 students in the County.
- ***Public Safety & Emergency Services*:** A study conducted by the McKinsey Global Institute[7] has demonstrated that the utilization of smart technologies has the potential to reduce emergency response times by 20 to 35 percent. It highlighted the potential of deploying Early Warning Public Alert Systems and Smart Security Systems in reducing fatalities, specifically wildfires, by an estimated 8 to 10 percent. In an effort to deter criminal activity, Monterey County has implemented surveillance cameras with Automated License Plate Reader (ALPR) technology in various public locations. The installation of surveillance cameras serves as a proactive measure to enhance public safety and combat crime in the community.
- ***Government Administrative Services*:** Around 8% of County residents do not have access to the benefits of e-government due to limited broadband connectivity. Broadband would enable these residents to access government information, e-government services, and resources from their homes. The need for physical visits to local offices is reduced, saving time and paperwork. Another benefit is the online payment system, allowing residents to pay bills, fees, and taxes electronically.

Benefits for Industries and Businesses

- ***Healthcare:*** The County is served by four hospitals, where healthcare represents one of the largest workforces in the county, employing over 18,200 individuals. By embracing telehealth and ensuring that residents have access to broadband, hospitals enhance their ability to provide services to people who are not located near the facility. A study conducted by the FCC[8] found that improvement of broadband access to 80-100 percent would reduce diabetes prevalence by 8.5 percent. Therefore, continuous growth in broadband adoption can contribute to changing the trend in the County where 50,300 people live with diabetes.
- ***Agriculture & Farming*:** This sector represents a total of 310 companies and 56,000 employees. Smart Agriculture technologies fueled by broadband for data transmission and processing have the

[7] Smart cities: Digital solutions for a more livable future

[8] Broadband Connectivity: A "Super" Determinant Of Health

potential to increase crop yield by 13 percent[9] and achieve energy savings of up to 8 percent for row crop farmers.

- ***Tourism (Accommodation & Food Services)*:** A key benefit to this sector, integrated by 1,374 companies in Monterey, is that broadband infrastructure enables hotels and restaurants to offer high-speed internet access to their guests, enhancing their overall experience. In fact, a study conducted by the University of Las Palmas in Spain[10] has demonstrated that Wi-Fi access improves online ratings which in consequence increases revenues. The County is planning a tourism initiative to attract visitors to the Regional Wine Corridor. To make the County a desirable destination, widespread broadband access is essential. Broadband connectivity is also crucial for promoting tourist attractions to remote vacation planners and allowing visitors to share their experiences on social media.
- ***Retail Trade*:** For this industry, broadband connectivity would be a critical enabler, facilitating the adoption and implementation of e-commerce for the 2,448 companies dedicated to retail, collectively employing approximately 16,787 people. An equity analyst covering the U.S. internet industry expects e-commerce to reach 27% of retail sales by 2026. This projection suggests that there is a possibility for e-commerce sales in the County to reach $1.5 billion by 2026.

In summary, access to affordable, reliable, high-speed broadband has the power of changing lives, boosting economic development, improving quality of life, and contributing to solving today's social problems. Areas without broadband are at risk of being left behind in terms of education, job opportunities, business growth, healthcare, and full participation in the digital society and economy, impeding progress, equity, and economic development for individuals, institutions, and businesses.

It is therefore crucial to address this issue to achieve digital equity, "a condition in which all individuals and communities have the information technology capacity needed for full participation in our society, democracy, and economy"[11]. The Monterey County Broadband Strategic Plan aims to contribute toward this goal.

[9] Application of Smart Techniques for Crop Production

[10] Improving hotel ratings by offering free Wi-Fi

* Bars, Banquet Halls, Restaurants.

[11] The Digital Equity Act of 2021

2 Needs Assessment

2.1 Broadband Availability

This section analyzes the gaps in broadband service availability in Monterey County, identifying the unserved and underserved areas through inspection of data from the FCC, the CPUC, and speed test data obtained through the speed test program implemented by the County. Unserved and underserved locations are defined as follows:

- **Unserved.** Locations without access to broadband services with speeds of at least 25 Mbps download and 3 Mbps upload.
- **Underserved.** Locations with access to broadband services with speeds equal to or higher than 25/3 Mbps but lower than 100 /20 Mbps.

These definitions align with FCC and CPUC and are directly tied to eligibility criteria in various federal and state broadband funding programs.

Unserved and underserved areas are further analyzed with respect to low-income and disadvantaged communities to identify the areas with the highest need and opportunity for funding.

2.1.1 Unserved and Underserved Area Identification

2.1.1.1 FCC Broadband Data

The FCC, through its Broadband Data Collection (BDC) program requires Internet Service Providers (ISPs) to report, for each serviceable location, information on the technologies available and the maximum advertised download and upload speeds. Serviceable locations across the United States are established through the FCC's Serviceable Locations Fabric, including approximately 120 million locations.

Monterey County obtained access to the FCC Broadband Data Collection dataset in June 2023 to support this project. Table 2 provides the counts and percent of unserved and underserved locations according to the FCC data. As shown, unincorporated areas outside of large communities have the highest

percentages of unserved and underserved locations. In fact, 2,720 out of the 3,436 unserved locations (79%) in the County are located there. In contrast, the rest of the communities reported less than 5% of unserved and underserved locations.

Table 2. Unserved/Underserved Serviceable Locations considering wireline and wireless connectivity.

Community	Total Serviceable Locations	Unserved (<25/3)	Underserved (25/3 to 100/20)	Served (100/20 to 1000 / 500)	1G Served (> 1G / 500 Mbps)
Marina	5,783	74 | 1.3%	0 | 0.0%	4,756 | 82.2%	953 | 16.5%
Salinas	30,375	262 | 0.9%	0 | 0.0%	22,048 | 72.6%	8,065 | 26.6%
Carmel-by-the-Sea	3,098	0 | 0.0%	0 | 0.0%	2,858 | 92.3%	240 | 7.7%
Del Rey Oaks	637	0 | 0.0%	0 | 0.0%	127 | 19.9%	510 | 80.1%
Monterey	8,280	36 | 0.4%	0 | 0.0%	4,105 | 49.6%	4,139 | 50.0%
Pacific Grove	5,974	87 | 1.5%	3 | 0.1%	2,577 | 43.1%	3,307 | 55.4%
Sand City	211	3 | 1.4%	0 | 0.0%	183 | 86.7%	25 | 11.8%
Seaside	8,303	3 | 0.0%	0 | 0.0%	6,387 | 76.9%	1,913 | 23.0%
Gonzales	1,820	30 | 1.6%	0 | 0.0%	1,622 | 89.1%	168 | 9.2%
Soledad	4,080	181 | 4.4%	0 | 0.0%	3,700 | 90.7%	199 | 4.9%
Greenfield	3,390	19 | 0.6%	0 | 0.0%	3,371 | 99.4%	0 | 0.0%
King City	2,775	21 | 0.8%	0 | 0.0%	2,561 | 92.3%	193 | 7.0%
Other Areas in Monterey County	36,449	2,720 | 7.5%	809 | 2.2%	26,759 | 73.4%	6,161 | 16.9%
Total	**111,175**	**3,436 | 3.1%**	**812 | 0.7%**	**81,054 | 72.9%**	**25,873 | 23.3%**

Table 2 also highlights "1G Served" locations, which are those with access to services with speeds equal to or higher than 1 Gbps / 500 Mbps. This is particularly relevant as on July 15, 2022, the FCC launched a "Notice of Inquiry"[12] that proposes to set a national goal of 1 Gbps / 500 Mbps for the future.

Access to 1 Gbps services provides seamless downloads and faster uploads, enables simultaneous use of bandwidth intensive applications, and prepares residents for a connected future.

As shown, 23% of the serviceable locations in the County have access to 1 Gbps services, in contrast to the 73% which are served but do not have access to these speeds.

The heatmaps in Figure 3 to Figure 5 capture the geographic distribution of unserved locations, showing the percentage of unserved locations by census block. Highlights are captured below:

- The cities of Salinas, Monterey, Pacific Grove, Sand City, Carmel by the Sea, Gonzales, and King City appear to be well served with only a few locations unserved or underserved.

[12] https://docs.fcc.gov/public/attachments/DOC-385322A1.pdf

- Marina, Seaside, and Greenfield also have relatively good broadband coverage, but there is still room for improvement as they have less than 30% of locations served with 1Gbps. These cities have the potential for further growth by focusing on meeting the threshold of (> 1G / 500 Mbps).
- In the northern zone (Figure 3) of the County, most census blocks seem to be served. However, there are scattered census blocks in areas such as Prunedale where more than 40% of locations lack access to reliable broadband services.
- The central zone (Figure 5) of the county, particularly the city of Soledad and Pinnacles National Park, has a significant number of census blocks with over 80% of locations lacking broadband service.
- The southern region (Figure 6) of the County presents the greatest challenge, with the majority of census blocks having over 80% of locations without broadband service. This area requires significant efforts to improve broadband coverage.

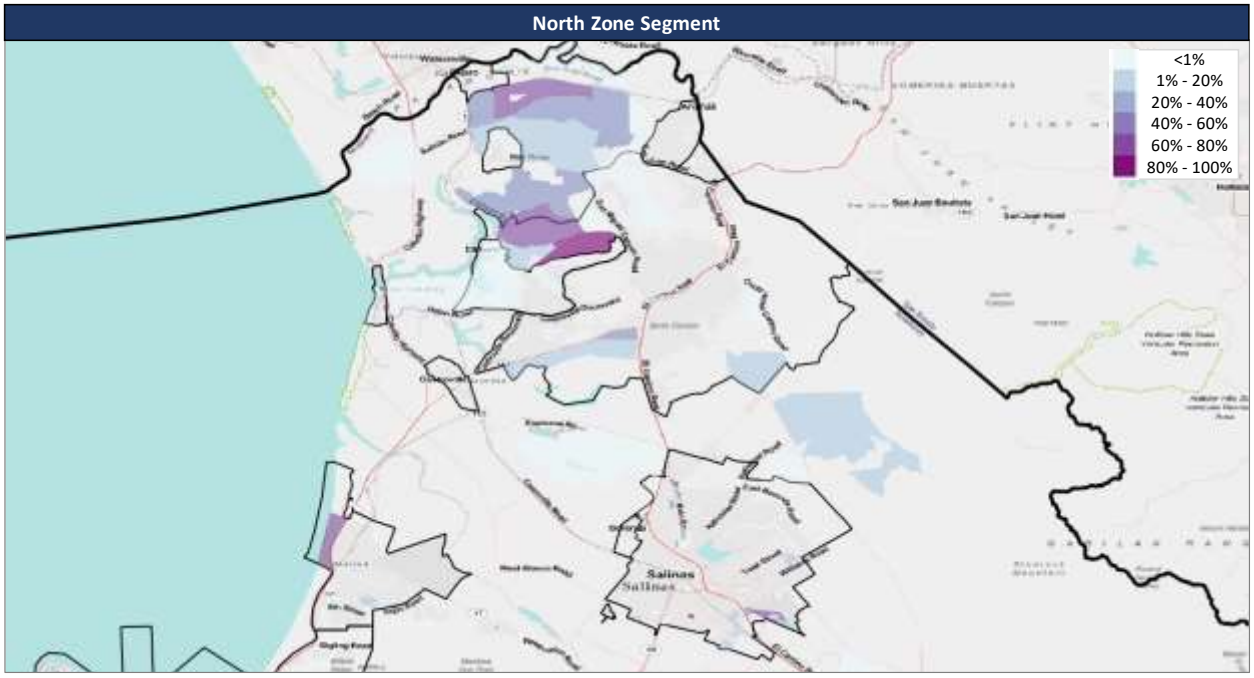


Figure 3. FCC Unserved serviceable locations by census block – North zone area

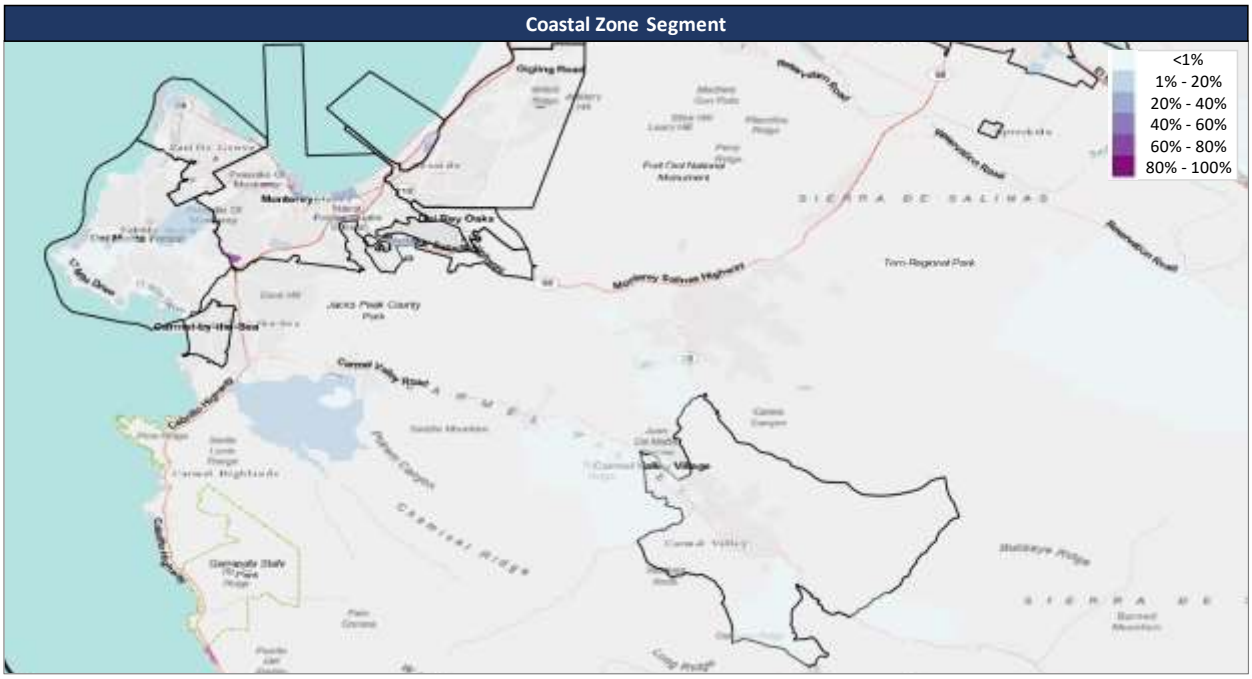


Figure 4. FCC Unserved serviceable locations by census block – Coastal zone area

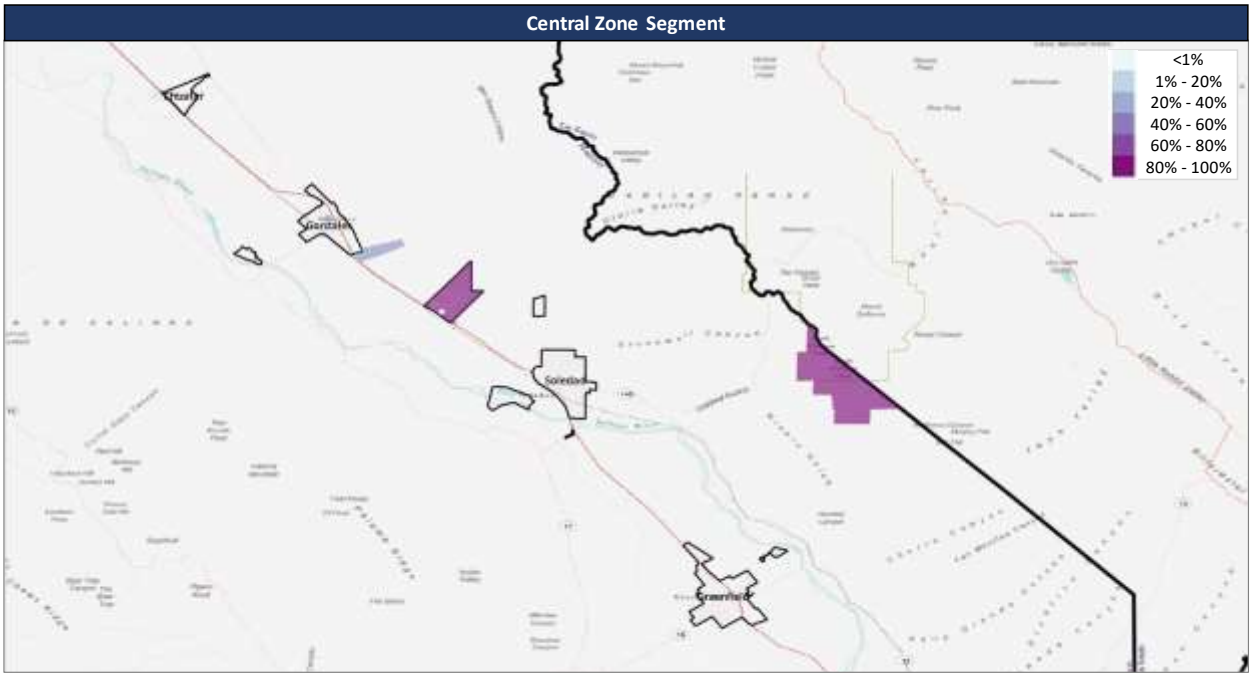


Figure 5. FCC Unserved serviceable locations by census block – Central zone area

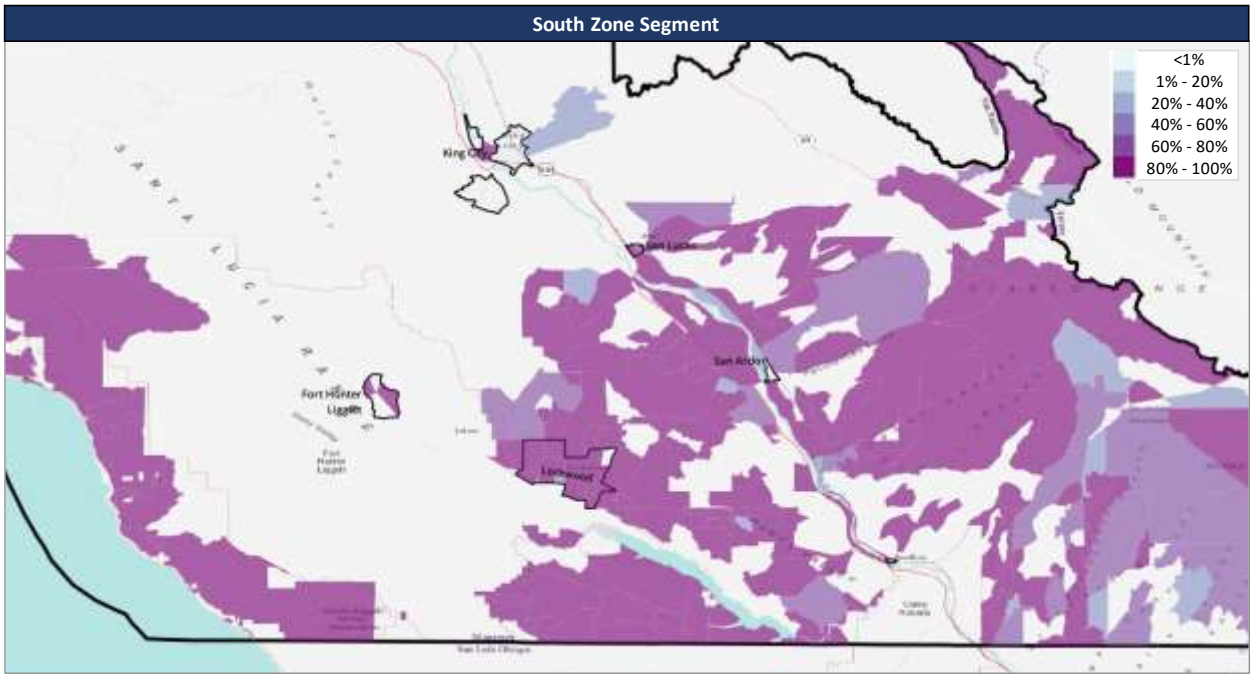


Figure 6. FCC Unserved serviceable locations by census block – South zone area

The same analysis for underserved locations is presented in Figure 7 to Figure 10. As noted, the underserved census blocks are primarily located in north Prunedale, Pacific Grove in the Coastal Zone, and the southeast area. It is also important to note that the underserved locations are less frequent than unserved. This is because most providers that are able to provide 25/3 Mbps services are also providing services above 100/20 Mbps.

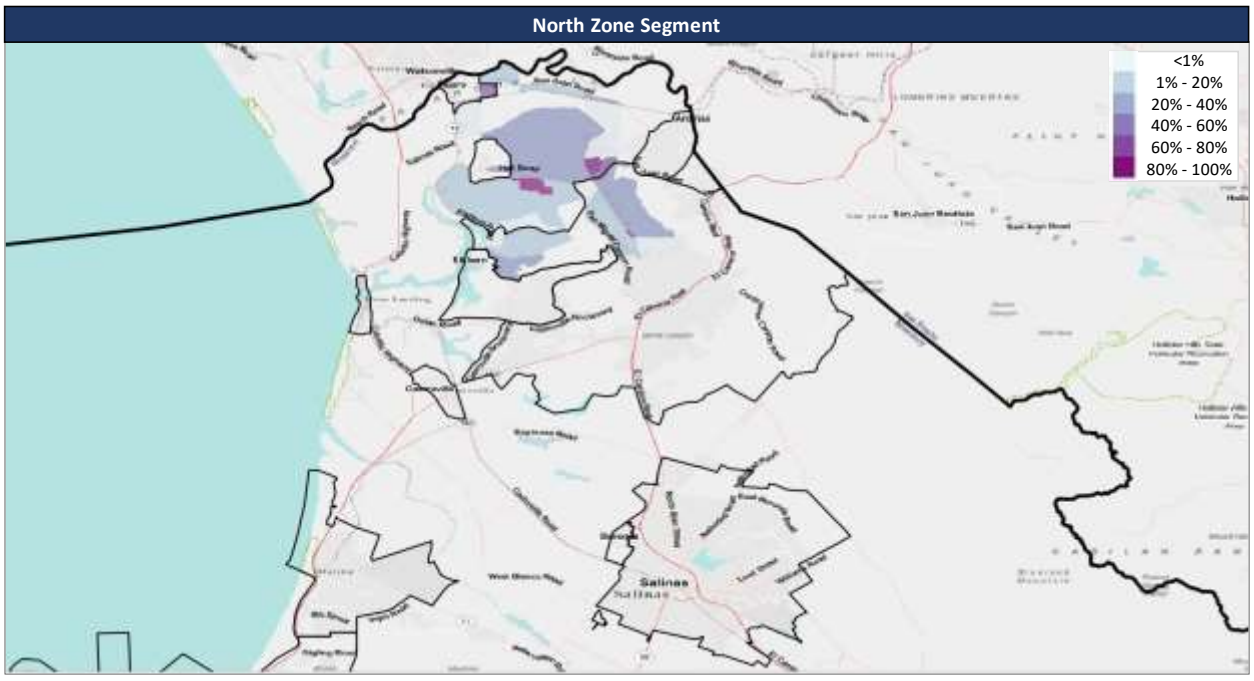


Figure 7. FCC Underserved serviceable locations by census block – North zone area

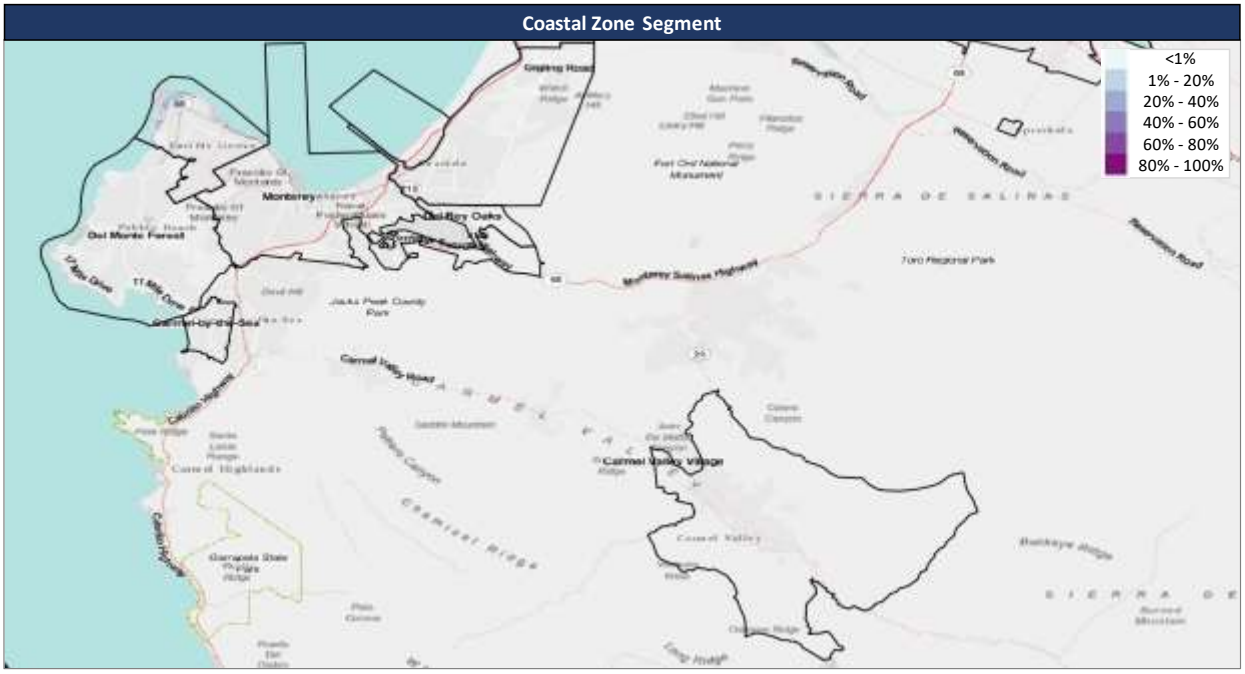


Figure 8. FCC Underserved serviceable locations by census block – Coastal zone area

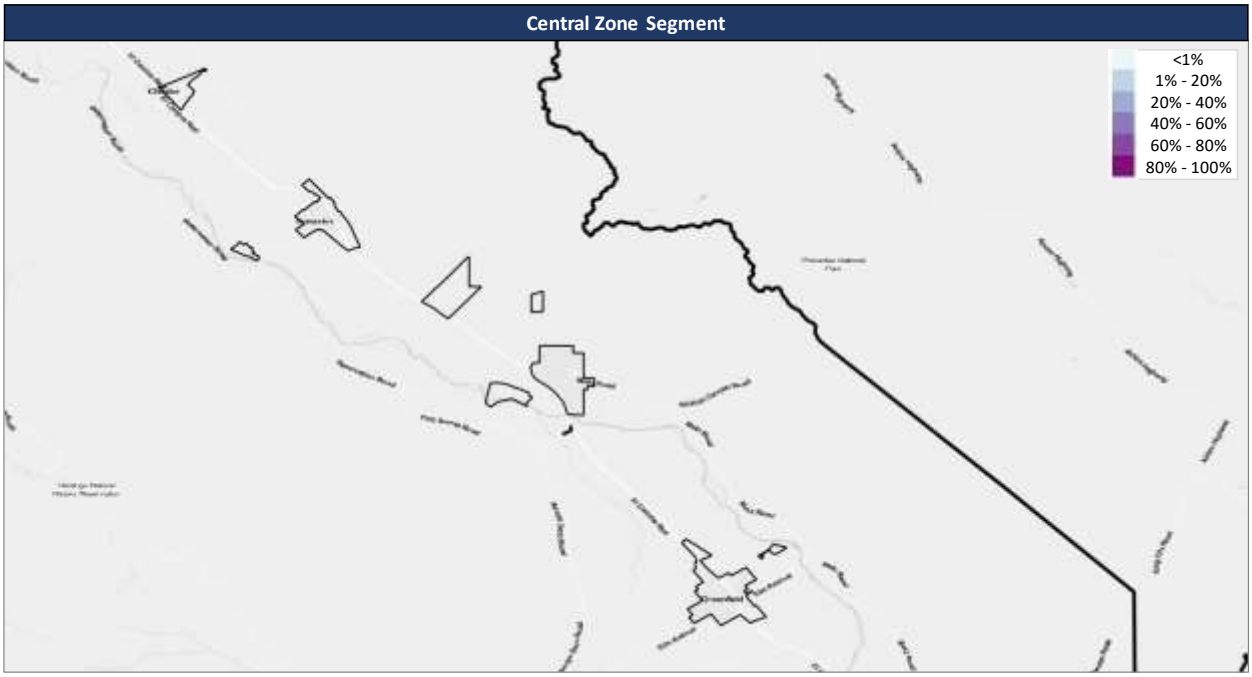


Figure 9. FCC Underserved serviceable locations by census block – Central zone area

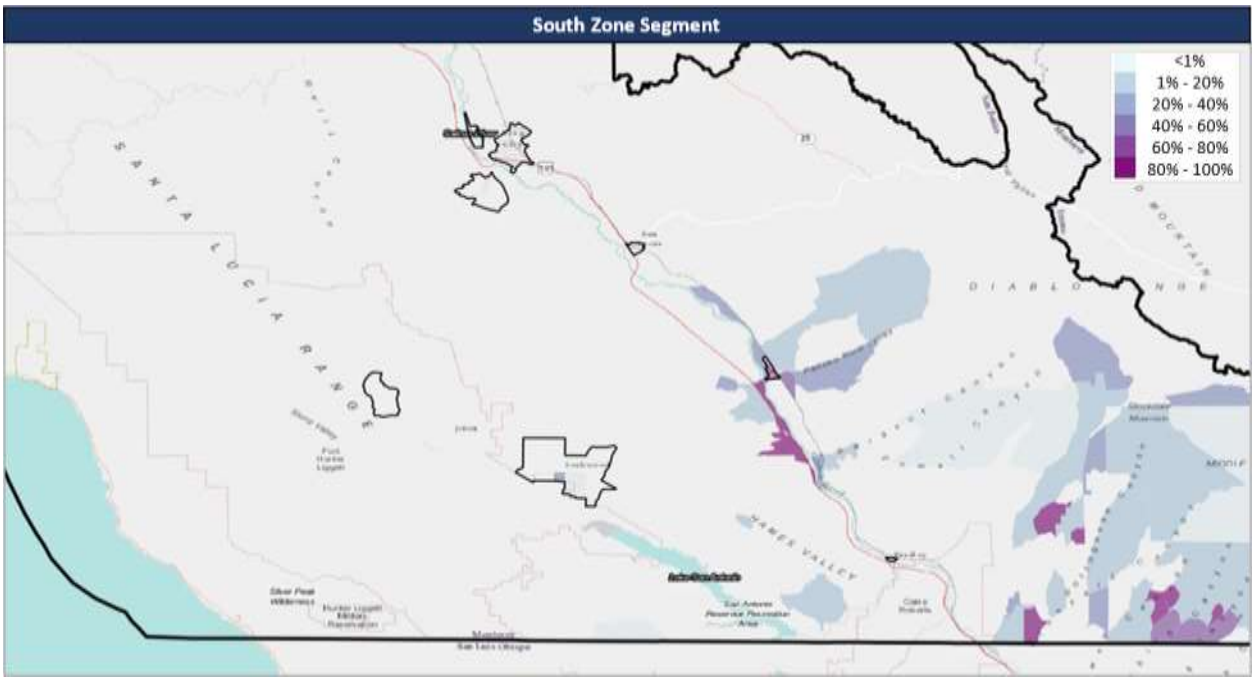


Figure 10. FCC Underserved serviceable locations by census block – South zone area

2.1.1.2 CPUC Broadband Data

The CPUC is responsible for the regulation of telecommunications services in the state of California. In parallel with the FCC, the CPUC collects broadband data from ISPs in California to develop its California Interactive Broadband Map[13]. In addition, the CPUC has also developed the Federal Funding Account (FFA) Public Map[14] to support the analysis and development of applications for the FFA program. For both maps, CPUC provides an associated dataset that includes information on unserved / eligible locations, households, population, income, and socioeconomic indicators at the census block level.

The analysis presented herein uses the latest versions of the California Broadband Map Dataset, published in April 2023, and the Federal Funding Account Public Map Census Block Data published in May 2023.

Since CPUC data does not consider underserved connectivity; locations are characterized as either served or unserved, based on a 25/3 connectivity threshold. Table 3 shows counts of unserved locations for each city in Monterey County and unincorporated areas according to the Federal Funding Account Public Map data.

[13] Broadband Mapping Program (ca.gov)

[14] Federal Funding Account Public Map

Table 3. Unserved locations based on Federal Funding Account Public Map Census Block Data

Community	Households	Unserved Locations	% of Unserved Households (See Note 1)
Marina	7,432	725	10%
Salinas	42,924	1,370	3%
Carmel-by-the-Sea	1,689	52	3%
Del Rey Oaks	693	6	1%
Monterey	12,084	400	3%
Pacific Grove	6,845	201	3%
Sand City	138	12	9%
Seaside	10,248	416	4%
Gonzales	2,055	69	3%
Soledad	4,417	341	8%
Greenfield	4,097	100	2%
King City	3,266	136	4%
Other Areas in Monterey County	34,234	9,967	29%
Total	**130,122**	**13,795**	**11%**

Note 1. The percentage of unserved households is an approximation based on the unserved locations, which may include commercial locations.

Map views of the unserved locations from the Federal Funding Account Public Map are shown in Figure 11 to Figure 14.

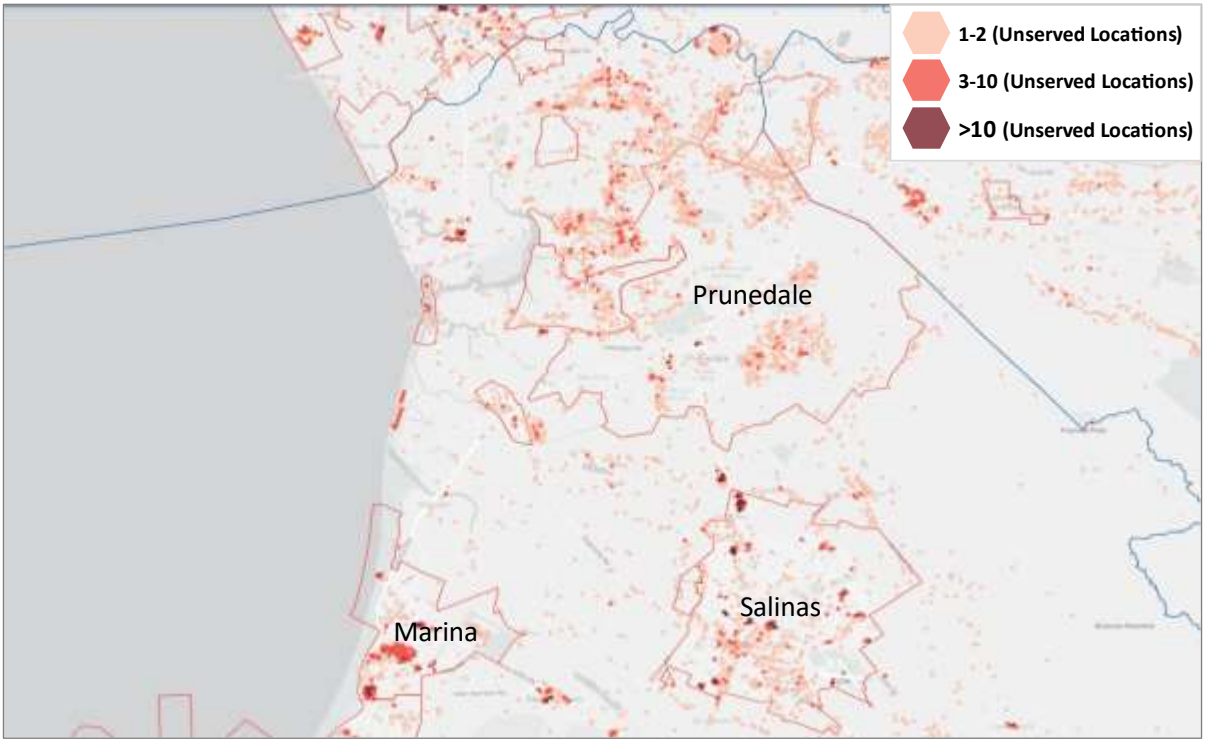


Figure 11. Unserved locations from Federal Funding Account Public Map – North Area.

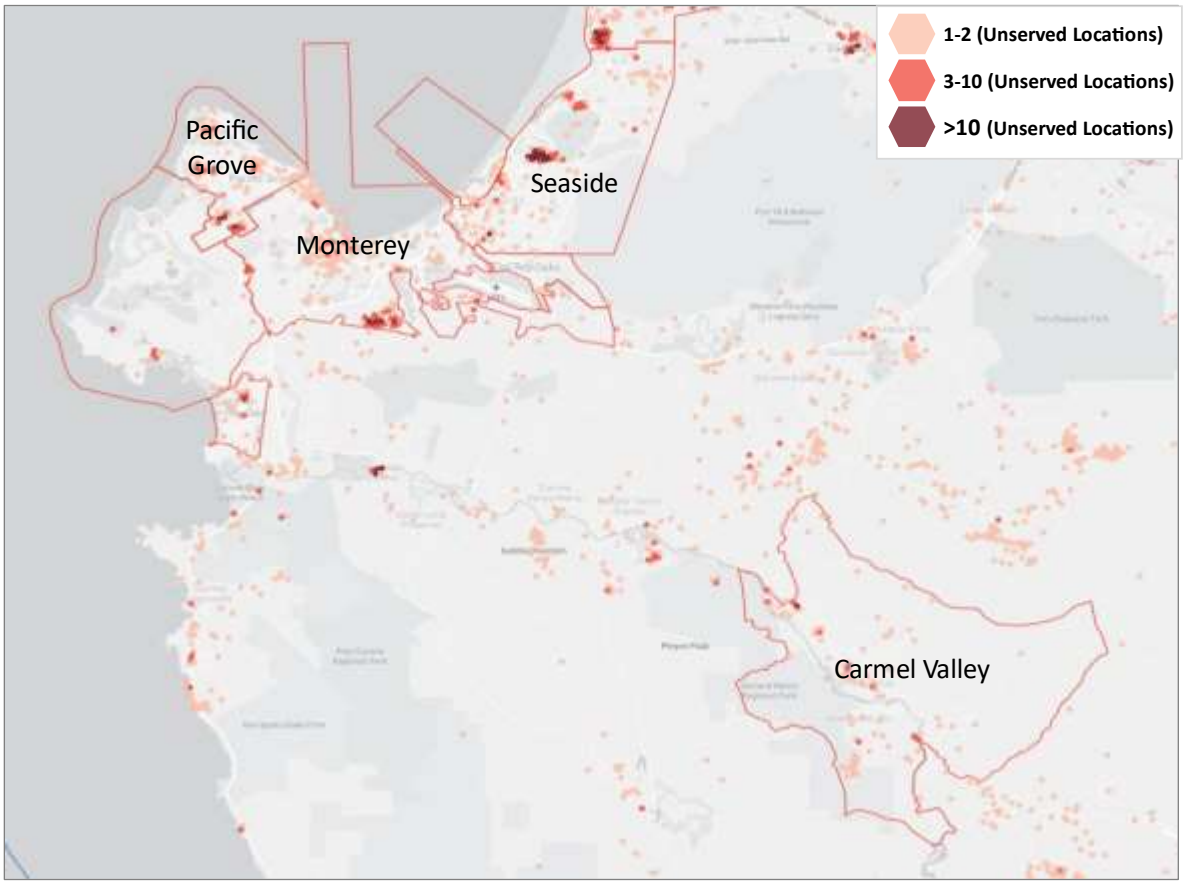


Figure 12. Unserved locations from Federal Funding Account Public Map – Coastal Area.

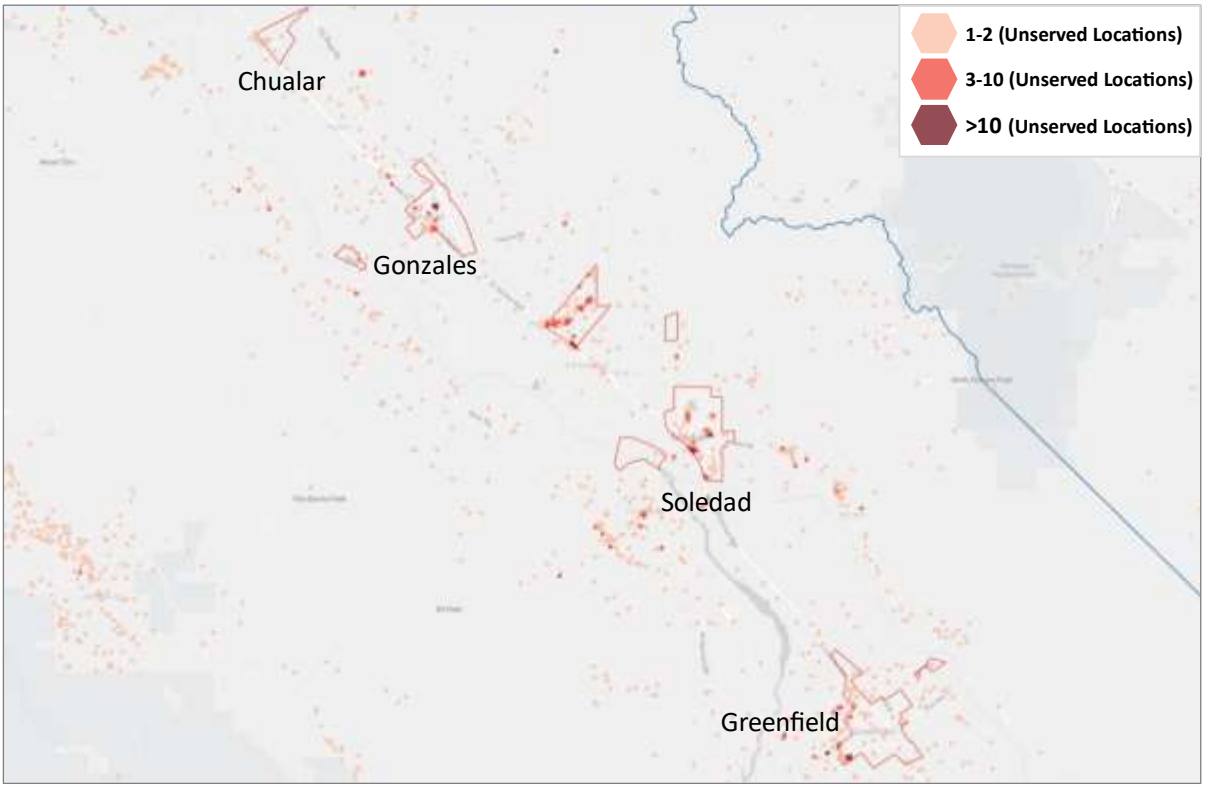


Figure 13. Unserved locations from Federal Funding Account Public Map – Central Area.

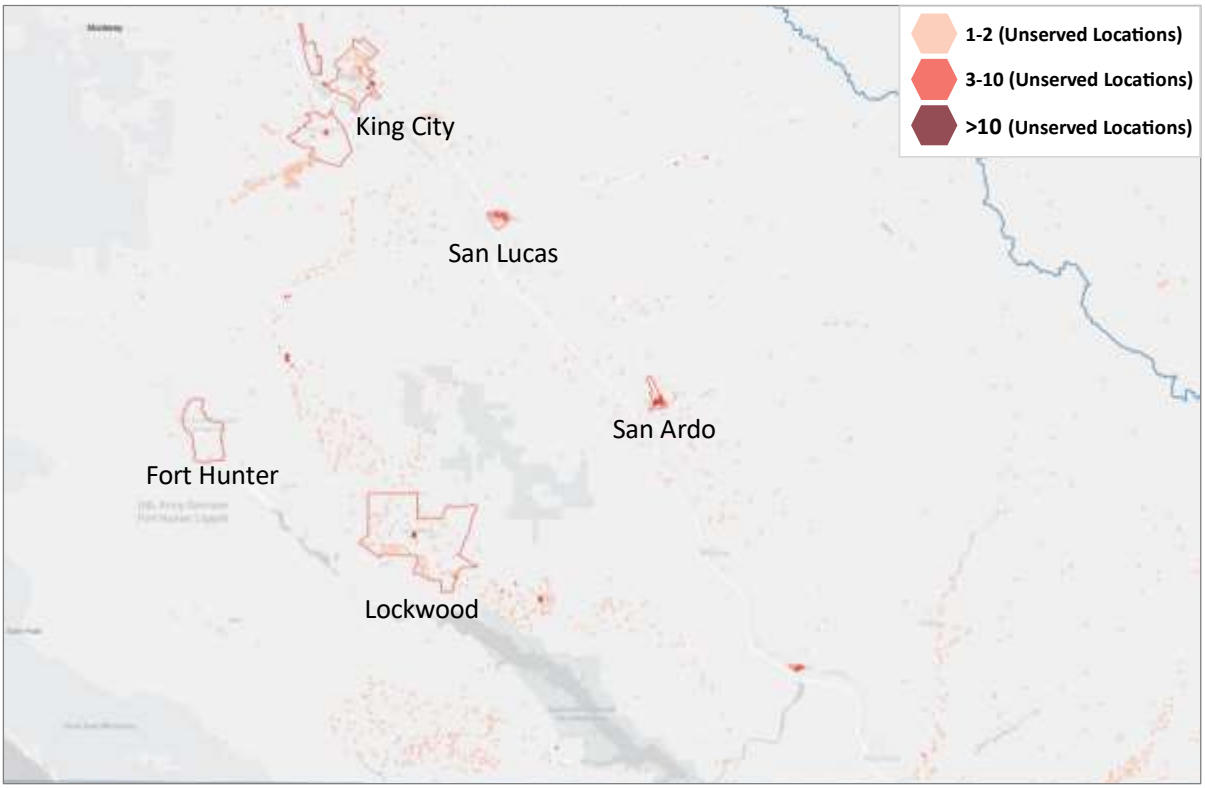


Figure 14. Unserved locations from Federal Funding Account Public Map – South Area.

Through visual inspection of these figures, it is noted that there is a match between CPUC and FCC in the North, Southwest, and the Coastal Zones of Monterey, including areas like Pacific Grove and Pfeiffer Big Sur Park. However, discrepancies can be seen in cities like Salinas, Greenfield, and King City. This means that the Broadband strategy needs to focus on the worst case to ensure that all the communities are served. Furthermore, there is a need for further collaboration and communication between stakeholders, including government entities, ISPs, and community organizations, to ensure accurate and up-to-date information on broadband coverage and availability. Stakeholders need to work together to address the discrepancies and gaps in data.

2.1.1.3 Speed Test Data

Speed test data can be used as a tool to verify and compare the information provided by the FCC, and CPUC. Through it, the communities can gain insight into the broadband service performance. Speed test data from GeoPartners Ltd tools from September 2022 through June 2023 was analyzed to enrich the evaluation of broadband availability and quality of service.

The dataset contains 191 speed tests within the County distributed across 123 locations in 138 census blocks (2% of total). Table 4 indicates that 29% of the tested locations fall below the unserved threshold, with approximately 54% below the underserved threshold. Also, it is important to note that there are no measurements with speeds higher than 1000/500.

Figure 15 and Figure 16 provide GIS views that visualize these results.

Table 4. Speed Test Statistics

Concept	Monterey County
# of Speed Tests	191
# of Locations	123
- Locations < 25/3	36 (29%)
- Locations 25/3 to 100/20	67 (54%)
- Locations 100/20 to 1000/500	20 (16%)
- Locations > 1000/500	0 (0%)
Ping Max	288
Ping Min	0.66
Ping Avg.	19.0667
Jitter Max	147.97
Jitter Min	0.05
Jitter Avg.	8.8531
Timeframe	Jan 2023 - May 2023
ISP Name (# Speed Tests)	AT&T Inc (5) Charter Communications Inc (47) GeoLinks (1) Optimum (3) Ranch Wifi LLC (1)

	Razzolink Inc. (9) Xfinity (68) Other (57)
# Census Blocks w/ Speed Tests	138
# Census Blocks w/o Speed Tests	6,936
% Census Blocks w/ Speed Tests	2%
% Census Blocks w/o Speed Tests	98%

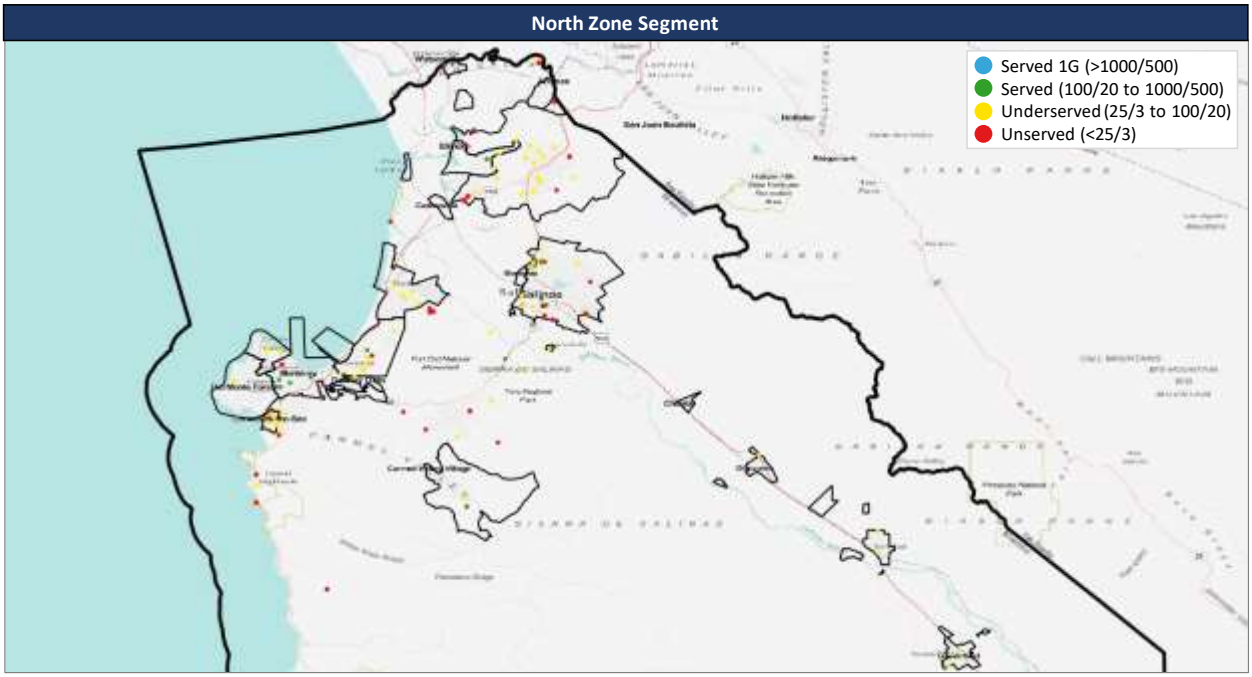


Figure 15. Speed test results – North area.

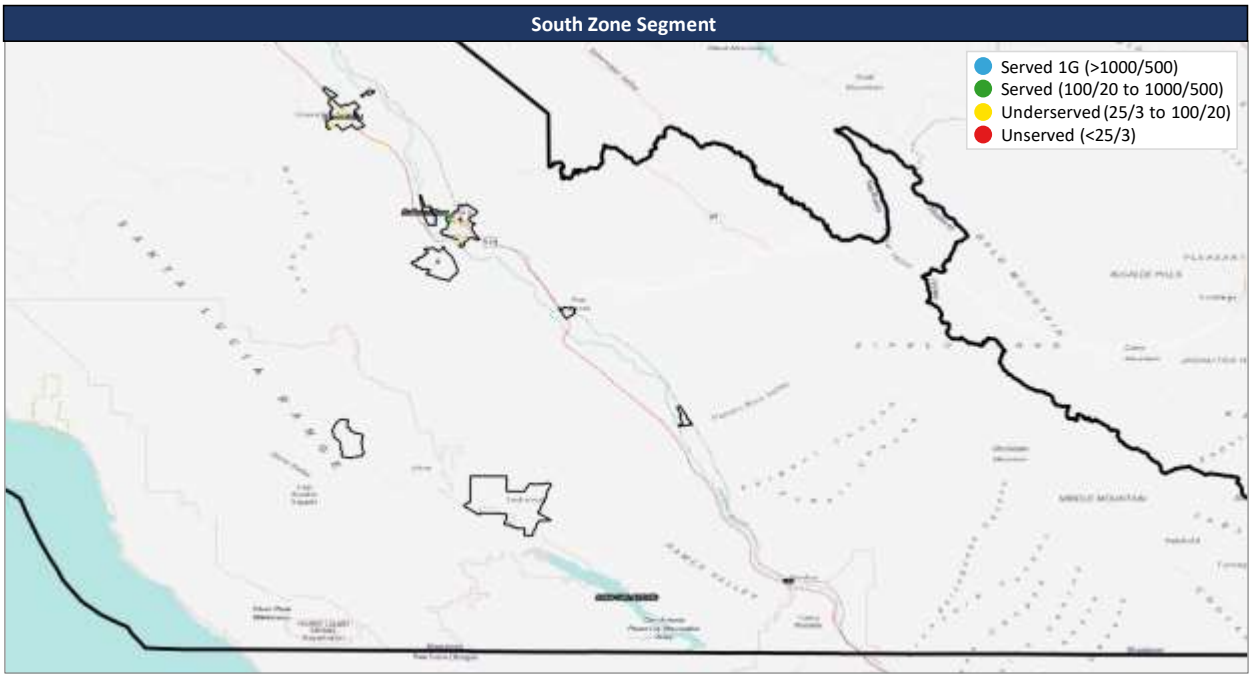


Figure 16. Speed test results – South area.

Most of the speed test measurements are located in the Cities of Salinas, Marina, Seaside, Monterey, and Pacific Grove. For the rest of the communities, a larger sample is required to provide relevant insights into the current broadband performance. In any case, the data is useful to contrast FCC and CPUC data.

The available speed test data shows discrepancies mainly with FCC data since it suggests that there is a higher concentration of unserved and underserved areas within the Cities. In general, unserved locations from CPUC match with the speed test data.

2.1.2 Low-Income and Disadvantaged Communities

Local jurisdictions and funding programs, consider low-income areas and disadvantaged communities as a priority target for broadband deployment projects and funding opportunities since these areas commonly deal with lack of access to affordable broadband services or adequate broadband infrastructure.

The CPUC Federal Funding Account Public Map provides data that captures the location of low-income and disadvantaged communities based on the definitions for this funding program:

- **Low -income areas are** those where the median household income is less than 80 percent of county or state median income, according to the California Department of Finance's 5-year estimates based on the 2016-2020 American Community Survey[15].

[15] https://dof.ca.gov/reports/demographic-reports/american-community-survey/

- **Disadvantaged communities are** those that meet the California Environmental Protection Agency (CalEPA) designation of disadvantaged communities[16]. These are communities that fit under any of the following criteria: (1) census tracts receiving the highest 25 percent of overall scores in CalEnviroScreen 4.0; (2) census tracts lacking overall scores in CalEnviroScreen 4.0 due to data gaps, but receiving the highest 5 percent of CalEnviroScreen 4.0 cumulative pollution burden scores; (3) census tracts identified in the 2017 Disadvantaged Communities (DAC) designation as disadvantaged, regardless of their scores in CalEnviroScreen 4.0; (4) and areas under the control of federally recognized Tribes.

Table 5 captures the number and percent of unserved locations in low-income areas as there are no areas designated as DACs in Monterey County.

As shown in the table below, ~36% of the unserved locations fall within a low-income area. The cities with the highest percentage of unserved locations in low-income areas are Sand city, Gonzales and Marina which shows that there is low interest from ISPs to serve these areas.

Table 5. Unserved locations within low-income areas based on Federal Funding Account Public Map Census Block Data

Community	Unserved locations in low income or DAC areas	% of total unserved locations in low income or DAC areas
Marina	580	80%
Salinas	696	51%
Carmel-by-the-Sea	12	23%
Del Rey Oaks	0	0%
Monterey	125	31%
Pacific Grove	0	0%
Sand City	12	100%
Seaside	68	16%
Gonzales	69	100%
Soledad	138	40%
Greenfield	15	15%
King City	79	58%
Other Areas in Monterey County	3,111	31%
Total	**4,905**	**36%**

Figure 17 to Figure 20 present relevant views from the FFA Public Map that show the overlap of unserved locations and the low-income and disadvantaged communities within the County.

[16] https://calepa.ca.gov/envjustice/ghginvest/

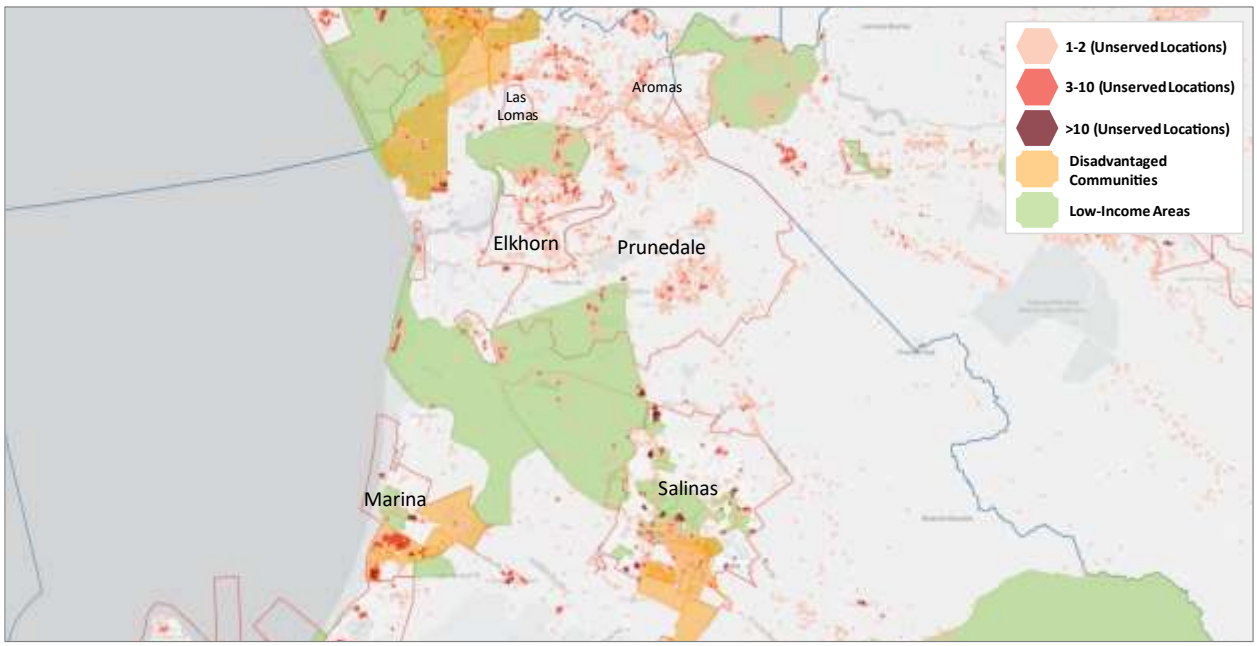


Figure 17. Unserved locations in low-income areas and disadvantaged communities – North area

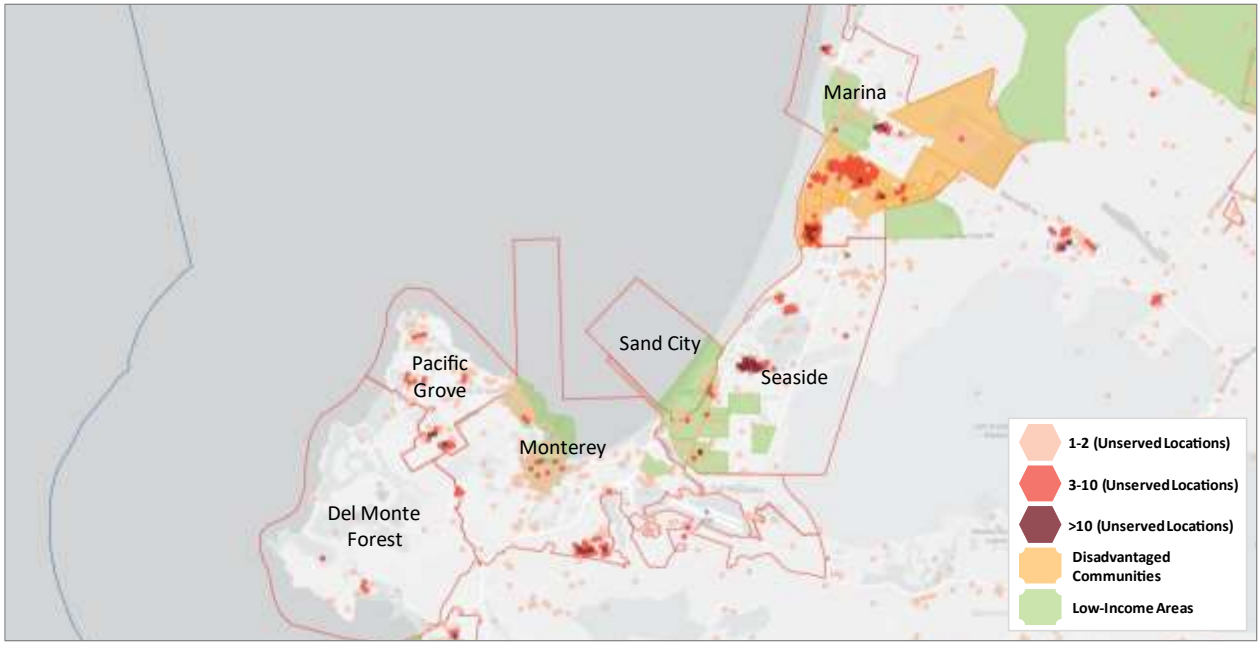


Figure 18. Unserved locations in low-income areas and disadvantaged communities – Coastal area

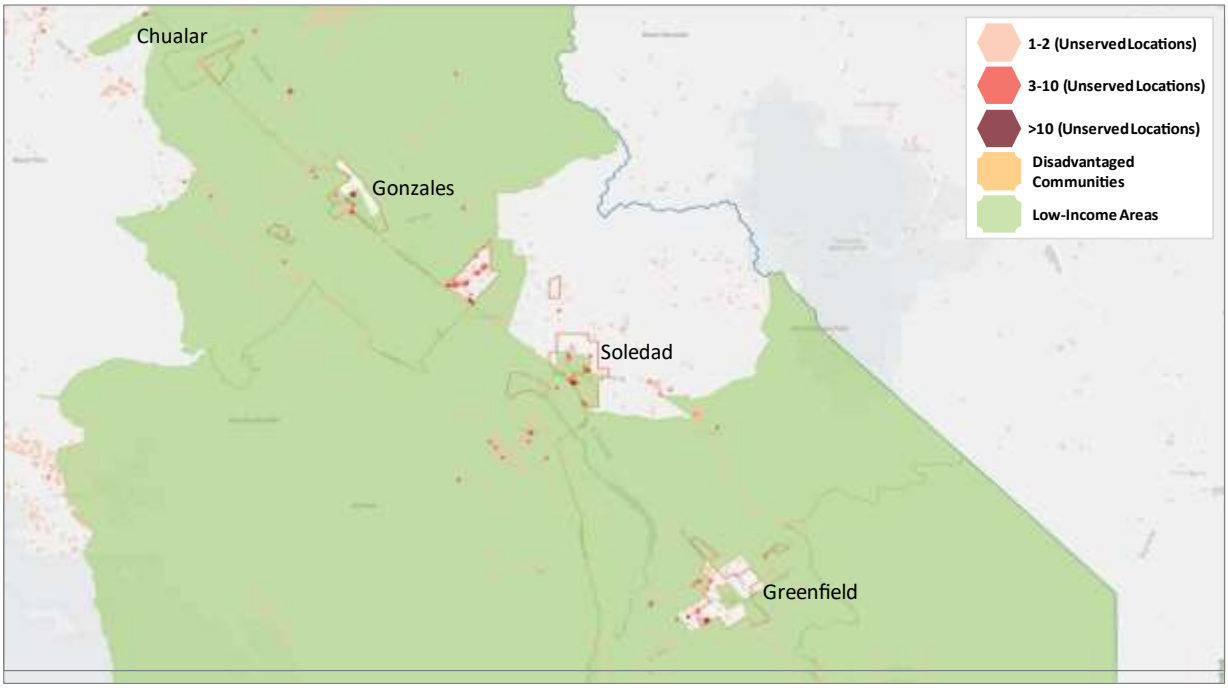


Figure 19. Unserved locations in low-income areas and disadvantaged communities – Central area

Figure 20. Unserved locations in low-income areas and disadvantaged communities – South area

As depicted in the figures above, there are three prominent zones (South Salinas, Marina, and the Pajaro River Mouth area) where unserved locations overlap with low-income areas and/or disadvantaged communities. Additionally, it is worth mentioning that a significant portion of the central region, encompassing cities such as Gonzales, Soledad, Greenfield, and King City, are classified as low-income areas which represents an opportunity to apply for FFA funding.

2.1.3 Businesses and Anchor Institutions

Businesses, and anchor institutions without adequate broadband connectivity face important challenges in their daily operation and are limited on their productivity, efficiency, and overall impact in the market and the community. This section characterizes the status and needs for businesses and anchor institutions within the County regarding broadband availability by analyzing FCC and CPUC data, results from the Business Needs Assessment survey, and insights from meetings with key stakeholders from these two sectors.

Table 6 summarizes the served status of business serviceable locations according to the FCC National Broadband Map dataset. As shown, only in the cities of Salinas, Gonzales and Soledad, more than 70% of business locations are 1G served. Gonzales City in particular, has a privileged position for business connectivity, since 97% of the businesses are 1G served.

There is a clear opportunity to improve business broadband services towards gigabit speeds in Marina, Carmel, Del Rey Oaks, Sand City, Seaside, Greenfield, and King City as more than 80% of businesses are served with speeds less than 1000 / 500.

Access to 1 Gbps services is relevant because it directly impacts the productivity and efficiency of small and medium businesses, supporting multiple users and fostering innovation and economic development.

However, there are still unserved and underserved areas, primarily in the unincorporated areas outside of the main communities which have 9.5% of unserved and 3% of underserved business locations.

Table 6. Served status of business serviceable locations within the County.

Community	Total Businesses	Unserved (<25/3)	Underserved (25/3 to 100/20)	Served (100/20 to 1000 / 500)	1G Served (> 1G / 500 Mbps)
Marina	670	0 | 0.0%	0 | 0.0%	559 | 83.4%	111 | 16.6%
Salinas	1,665	0 | 0.0%	0 | 0.0%	425 | 25.5%	1,240 | 74.5%
Carmel-by-the-Sea	407	0 | 0.0%	0 | 0.0%	391 | 96.1%	16 | 3.9%
Del Rey Oaks	24	0 | 0.0%	0 | 0.0%	24 | 100.0%	0 | 0.0%
Monterey	1,356	0 | 0.0%	0 | 0.0%	870 | 64.2%	486 | 35.8%
Pacific Grove	265	1 | 0.4%	1 | 0.4%	211 | 79.6%	52 | 19.6%
Sand City	137	0 | 0.0%	0 | 0.0%	112 | 81.8%	25 | 18.2%
Seaside	1,324	0 | 0.0%	0 | 0.0%	1,200 | 90.6%	124 | 9.4%
Gonzales	163	0 | 0.0%	0 | 0.0%	5 | 3.1%	158 | 96.9%
Soledad	239	0 | 0.0%	0 | 0.0%	55 | 23.0%	184 | 77.0%
Greenfield	210	0 | 0.0%	0 | 0.0%	210 | 100.0%	0 | 0.0%
King City	312	0 | 0.0%	0 | 0.0%	282 | 90.4%	30 | 9.6%
Other Areas in Monterey County	3,387	321 | 9.5%	102 | 3.0%	2,180 | 64.4%	784 | 23.1%
Total	**10,159**	**322 | 3.2%**	**103 | 1.0%**	**6,524 | 64.2%**	**3,210 | 31.6%**

Results from the Business Needs Assessment survey is in line with the above, as all the respondents reported having internet access in their businesses. Nevertheless, as shown in Figure 21, 71% of the respondents mentioned that they find the service expensive or very expensive.

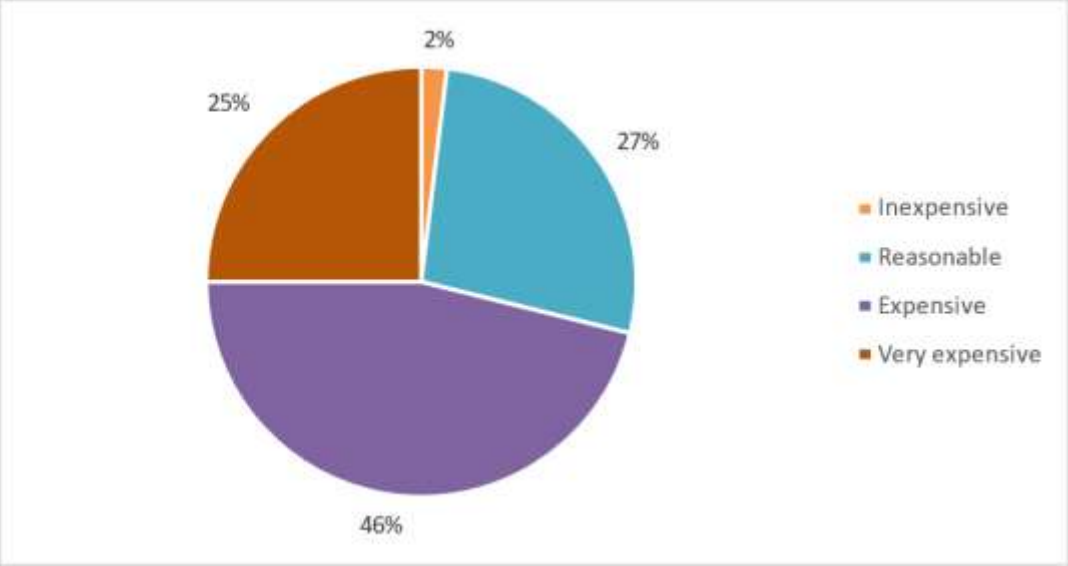


Figure 21. Business Survey: Internet cost

The access technology for those with internet access in their businesses is distributed according to the chart in Figure 22 which shows that the prevailing technologies are fiber and FWA with each technology accounting 50%.

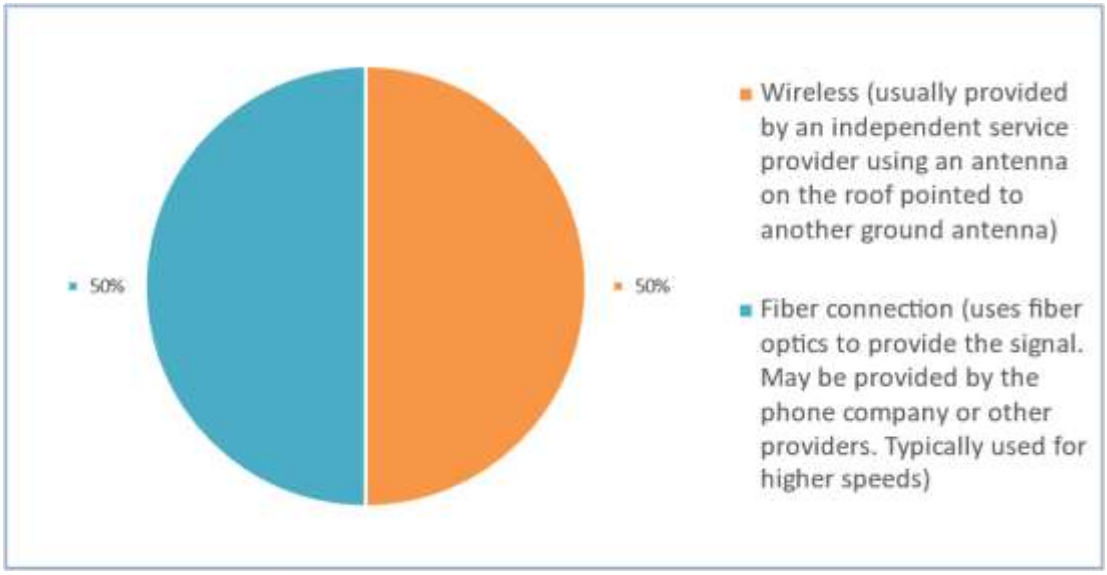


Figure 22. Business Survey: Internet connection technology for businesses.

The majority of business owners convene that their business has an important dependence on the internet. In fact, 100% of the respondents asserted that they cannot run their business without Internet connection, as shown in Figure 23.

Furthermore, Figure 24 shows that business owners consider that having access to Gigabit internet service would have a positive impact on their business, mainly by improving their efficiency with 50% of the respondents selecting this option.

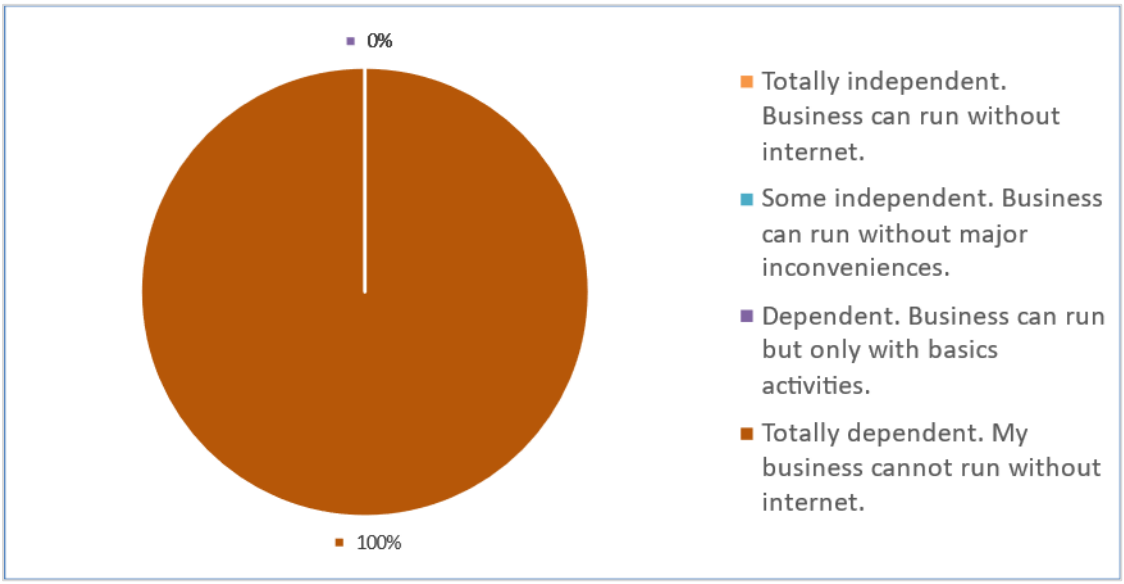


Figure 23. Internet connection dependency according to survey respondents

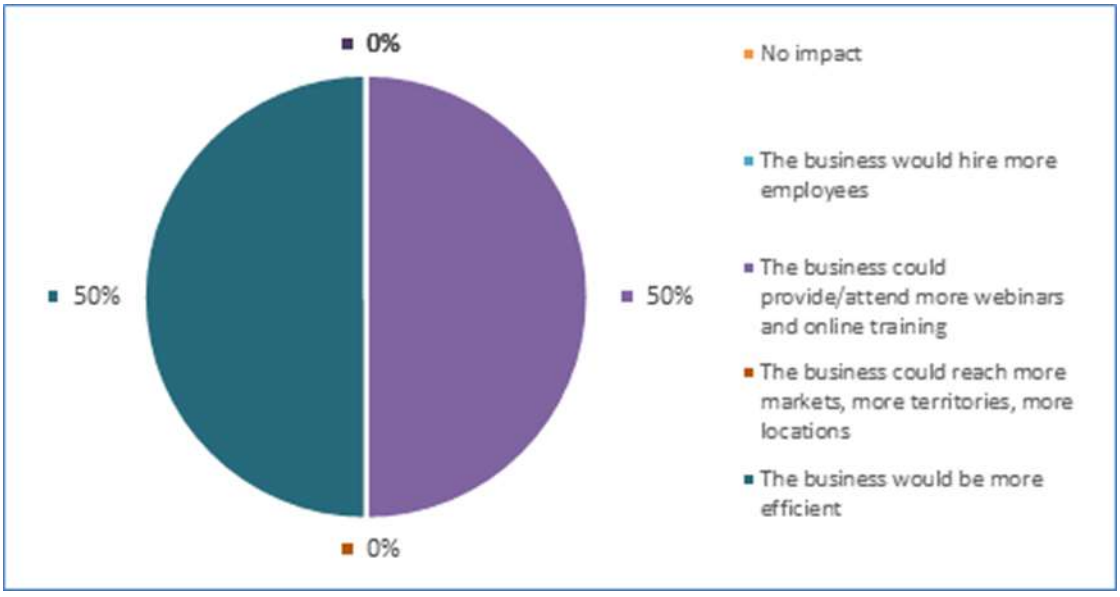


Figure 24. Impact of Gigabit internet service on businesses according to survey respondents

In the case of anchor institutions, the main input for the analysis is the CPUC California Broadband Map dataset. Additionally, data provided by local governments during the data collection process was incorporated to enrich the analysis. Table 7 presents the results of this analysis.

Table 7. Served status of anchor institutions within the County.

Community	Total Anchor Institutions	No Speed Data	Unserved (<25/3)	Underserved (25/3 to 100/20)	Served (100/20 to 1000 / 500)	1G Served (> 1G / 500 Mbps)
Marina	41	3 | 7.3%	2 | 4.9%	1 | 2.4%	29 | 70.7%	6 | 14.6%
Salinas	245	7 | 2.9%	14 | 5.7%	0 | 0.0%	130 | 53.1%	94 | 38.4%
Carmel-by-the-Sea	4	0 | 0.0%	0 | 0.0%	0 | 0.0%	4 | 100.0%	0 | 0.0%
Del Rey Oaks	1	0 | 0.0%	0 | 0.0%	0 | 0.0%	0 | 0.0%	1 | 100.0%
Monterey	101	4 | 4.0%	2 | 2.0%	0 | 0.0%	61 | 60.4%	34 | 33.7%
Pacific Grove	38	0 | 0.0%	2 | 5.3%	0 | 0.0%	17 | 44.7%	19 | 50.0%
Sand City	2	0 | 0.0%	0 | 0.0%	0 | 0.0%	2 | 100.0%	0 | 0.0%
Seaside	55	5 | 9.1%	0 | 0.0%	0 | 0.0%	26 | 47.3%	24 | 43.6%
Gonzales	17	0 | 0.0%	3 | 17.6%	0 | 0.0%	2 | 11.8%	12 | 70.6%
Soledad	41	1 | 2.4%	9 | 22.0%	0 | 0.0%	20 | 48.8%	11 | 26.8%
Greenfield	23	0 | 0.0%	0 | 0.0%	0 | 0.0%	19 | 82.6%	4 | 17.4%
King City	39	1 | 2.6%	0 | 0.0%	0 | 0.0%	27 | 69.2%	11 | 28.2%
Other Areas in Monterey County	226	33 | 14.6%	15 | 6.6%	8 | 3.5%	131 | 58.0%	39 | 17.3%
Total	**833**	**54 | 6.5%**	**47 | 5.6%**	**9 | 1.1%**	**468 | 56.2%**	**255 | 30.6%**

As shown, 6.7% of the anchor institutions are classified as unserved or underserved. Moreover, 10% of them are in unincorporated areas outside of the main communities.

Figure 25 to Figure 28 show a map view of the connectivity status of known anchor institutions. These views help to further identify the cities of Carmel and Sand City as targets to improve anchor institution connectivity through 1 Gbps or higher speeds.

Del Rey Oaks City has a privileged position regarding anchor institution connectivity since 100% of their anchor institutions have access to 1 Gbps service.

Around one third of the total anchor institutions are classified as 1G Served, meaning that there are still two thirds that can be upgraded to 1 Gbps service.

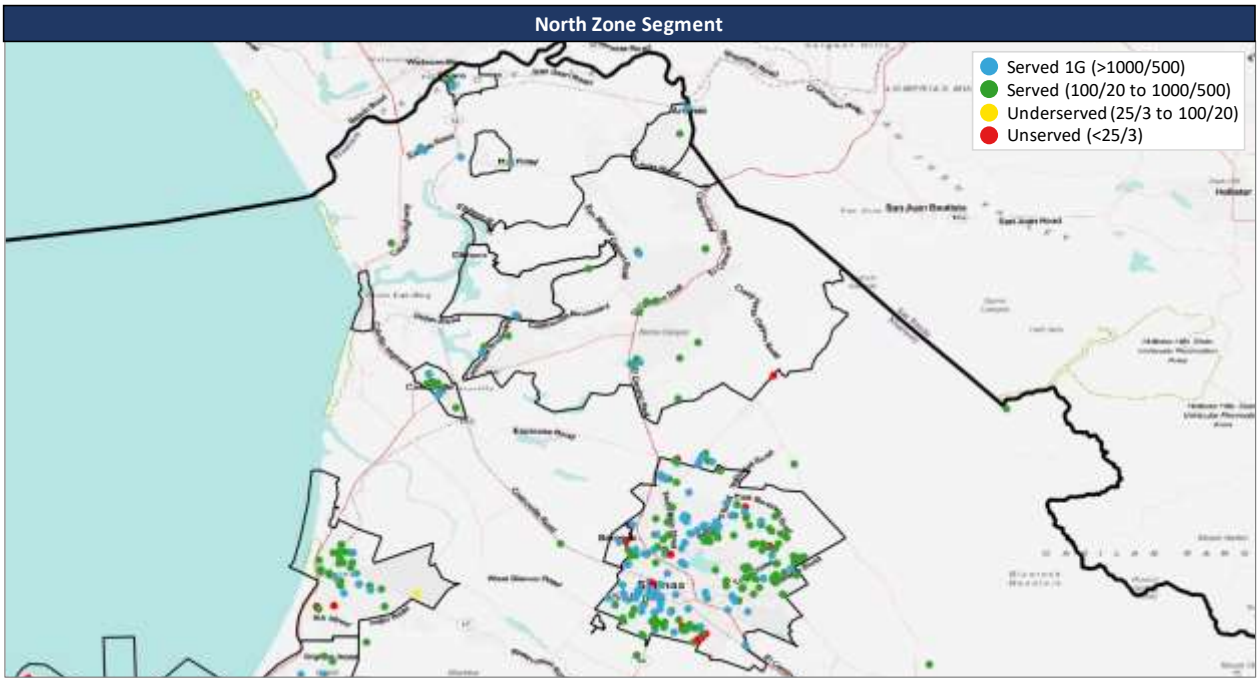


Figure 25. Connectivity status of anchor institutions – North area.

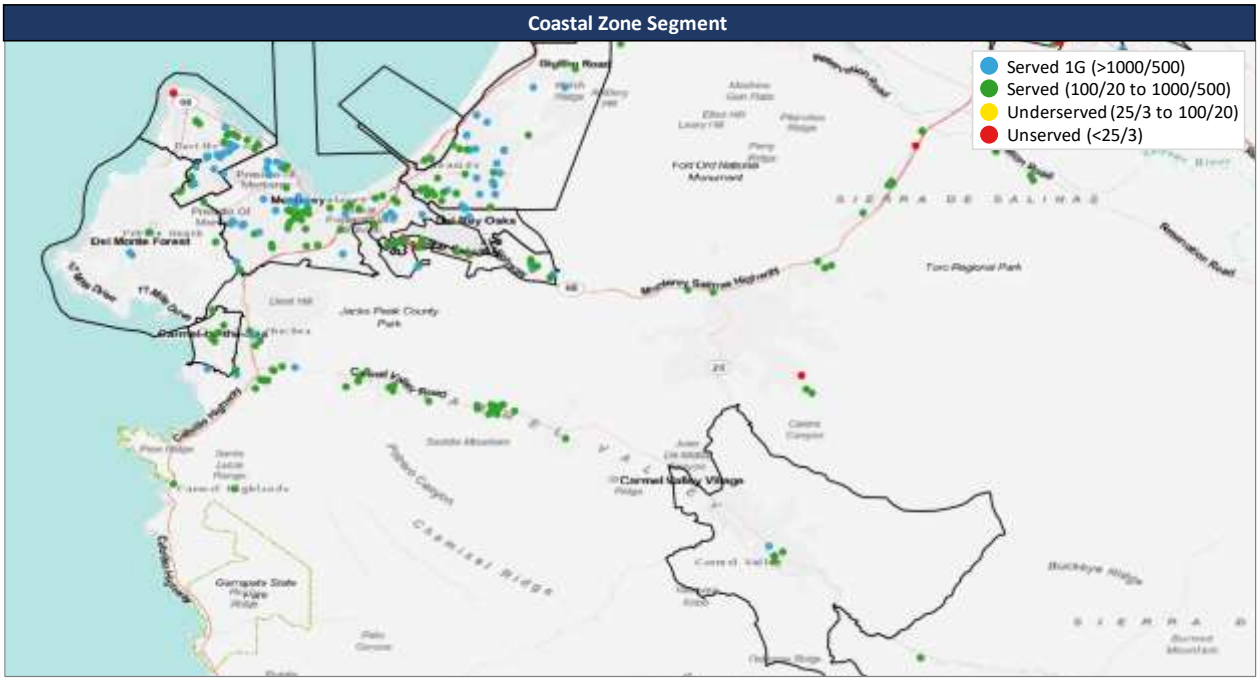


Figure 26. Connectivity status of anchor institutions – Coastal area.

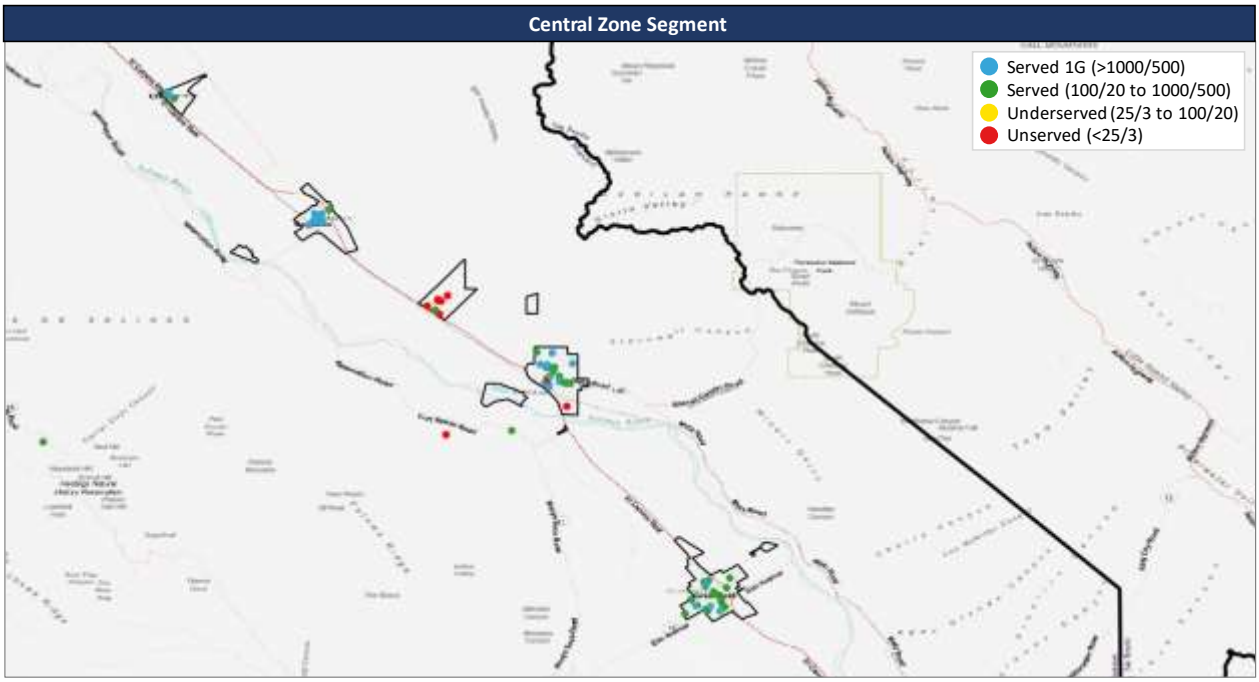


Figure 27. Connectivity status of anchor institutions – Central area.

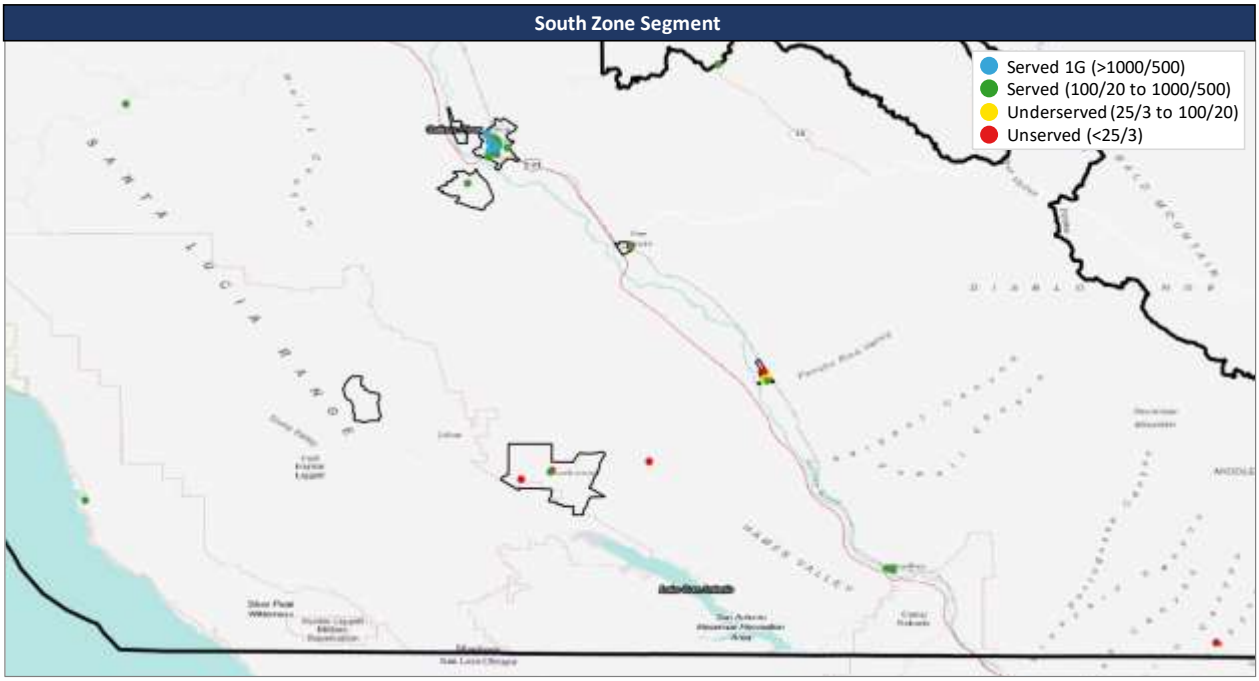


Figure 28. Connectivity status of anchor institutions – South area.

During multiple meetings with key stakeholders in the County, a significant concern that emerged was the limited availability in the southern region. This observation aligns with the findings of the Unserved and Underserved Area Identification analysis conducted in section 2.1.1.

In addition to the lack of access in the southern region, stakeholders have emphasized the significance of affordable broadband access in libraries. They recognize that libraries can serve as strategic anchor institutions in closing the connectivity gap.

Summary: *Monterey County has a low level of serviceable locations classified as unserved or underserved. Unserved locations are located mainly in unincorporated areas of the County outside the largest communities. This situation was confirmed for all scenarios: residential, business and anchor institutions.*

The majority of the serviceable locations in the County are classified as served (>100/20). However, there is still a significant need for 1 Gbps broadband. This is confirmed by speed test data that shows no measurements higher than 1000/500. Importantly, a larger sample of speed tests would be desirable to draw more accurate conclusions.

In light of the discrepancies between the CPUC and the FFA datasets, it is important to consider both sources to provide a more comprehensive picture of broadband needs.

2.2 Service Performance

In addition to identifying unserved and underserved areas, it is important to understand the overall performance of broadband services within the County and how the quality of these services is perceived by the users that do have access to broadband.

Download and upload speeds which have been addressed in Section 2.1.1 are the primary performance components. However, other metrics are also relevant, including latency and reliability:

Latency

Latency is defined as the time it takes for a data packet to travel across a network from one point on the network to another. For example, from a smartphone connected to the broadband router to a video streaming server in a data center. It is usually measured as the round-trip delay.

High latency values impact the quality of internet services in general, but particularly those that have an interactive component, such as voice calls, video conference, or online gaming. For this reason, the California Advanced Services Fund (CASF) Broadband Infrastructure Grant and the Federal Funding Account Grant programs establish a maximum round-trip ping time of 50 milliseconds.

While the latest Measuring Broadband America Fixed Broadband Report[17] by the FCC reports median latencies between 7 ms and 25 ms, the results from the Speed Test program in Monterey County show an average latency of 19 ms that varies between 0.66 and 288 ms. The average latency value is acceptable in comparison to the 50 ms limit established by the CPUC. However, there are values that surpass this limit, potentially indicating areas or periods with high latency.

[17] Twelfth Measuring Broadband America Fixed Broadband Report

Reliability

Reliability can be viewed as the capacity of the service to operate as expected without disruptions. Reliability is key to enabling a high-quality user experience and to promote the use of digital services. A broadband service with frequent outages translates into deep dissatisfaction and user frustration as they cannot trust that they will be able to access their services and applications. Lack of reliability puts at risk many end user use cases, such as telehealth, online banking, and business conferences among others.

When asked about their service features, the respondents expressed that reliability was most important to them, being this option had the highest number of respondents. Business respondents have a preference for reliability over speed, as shown in Figure 29 and Figure 30.

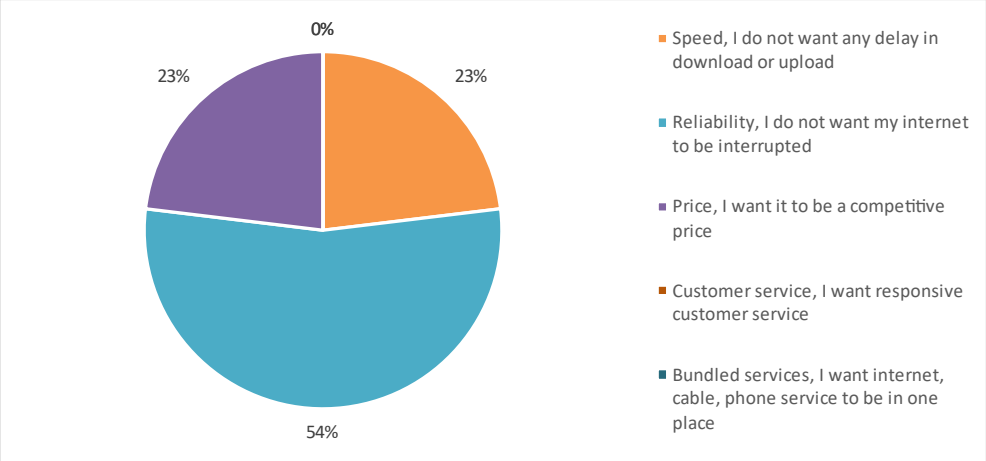


Figure 29. Internet connection reliability perceived by residential respondents.

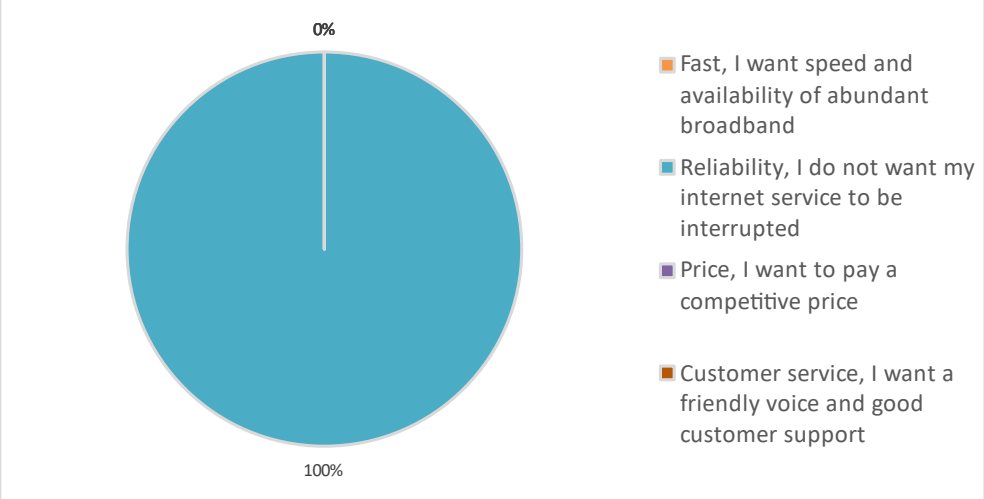


Figure 30. Internet connection reliability perceived by business respondents.

Beyond these metrics, the Needs Assessment Survey provides important insights regarding the perception of broadband services within the County. In this case, 69% of the residential respondents consider that the performance of their service meets their needs (absolutely or for most tasks) and only 27% claim that their performance only meets their requirements for simple tasks or not at all, as shown in Figure 31. Results from the business survey depicted in Figure 32 are similar as 50% of respondents

consider that the performance of their services meets their expectations while 50% think that their service is suitable only for simple tasks.

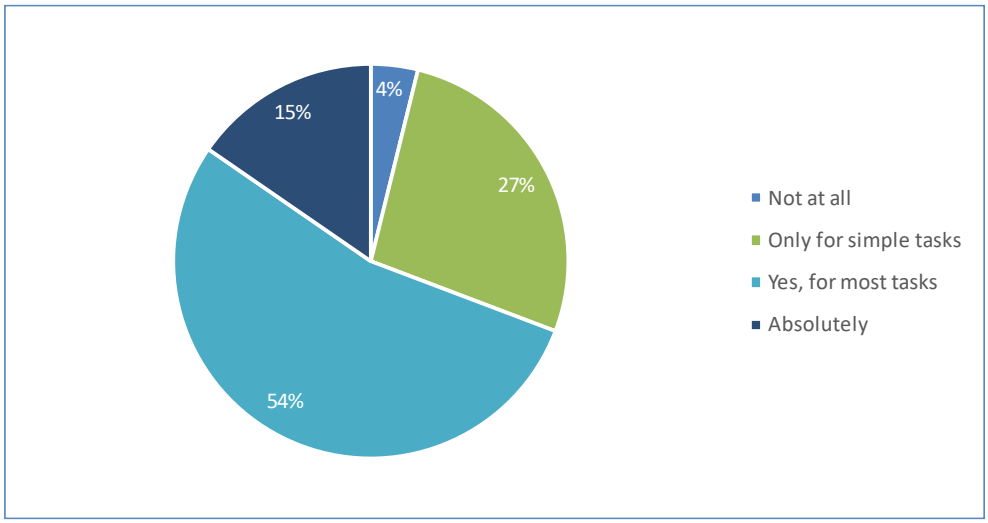


Figure 31. Overall internet service performance satisfaction – residential respondents

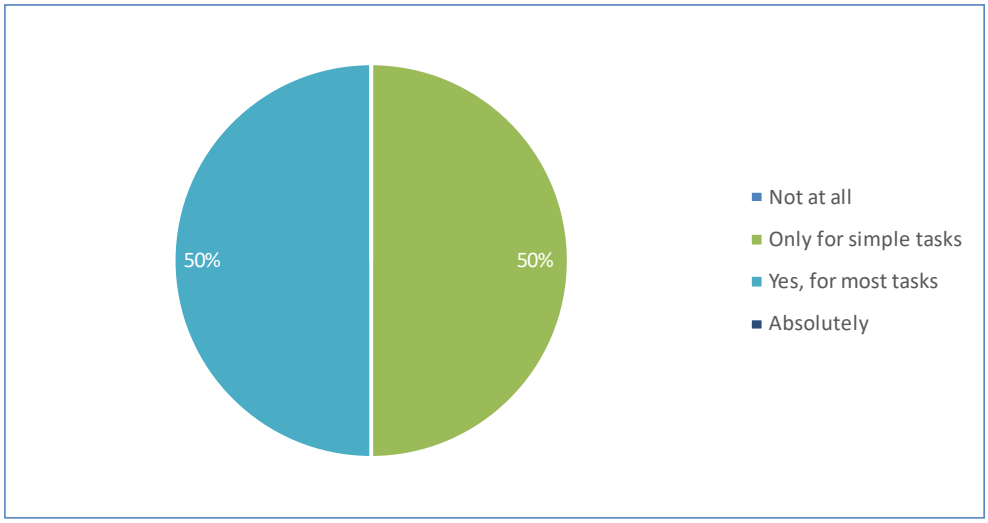


Figure 32. Overall internet service performance satisfaction – business respondents

Through the residential survey, interesting insights about telehealth and learning/remote work were also identified. As illustrated in Figure 33Figure 32, 34% of the respondents do not do telehealth, while 42% would like to have a better connection to leverage telehealth. Furthermore, 18% report that their providers experienced some kind of issue that made it harder for them, evidencing the need for better broadband service in the healthcare sector.

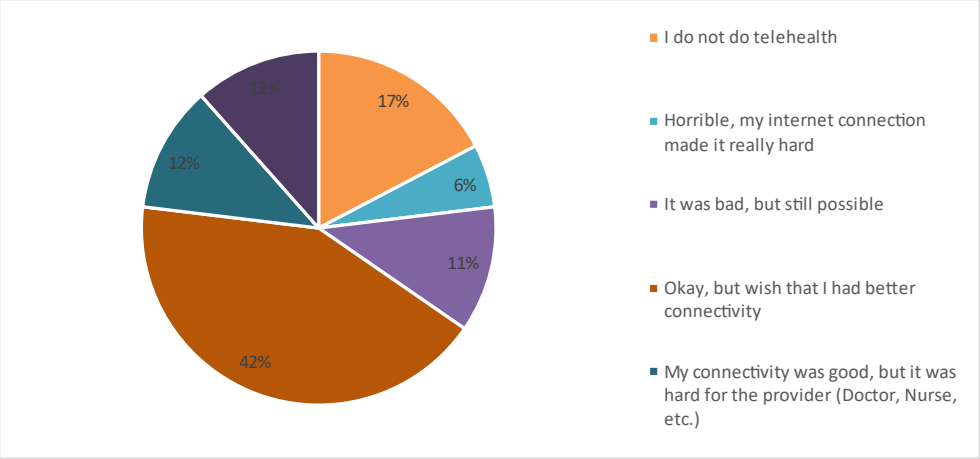


Figure 33. Telehealth experience - residential respondents

Regarding remote learning/work, answers captured in Figure 34 show that only 17% of respondents report their connection as bad or awful in contrast with 44% who report a good or a very good experience. However, 39% would like to have better connectivity.

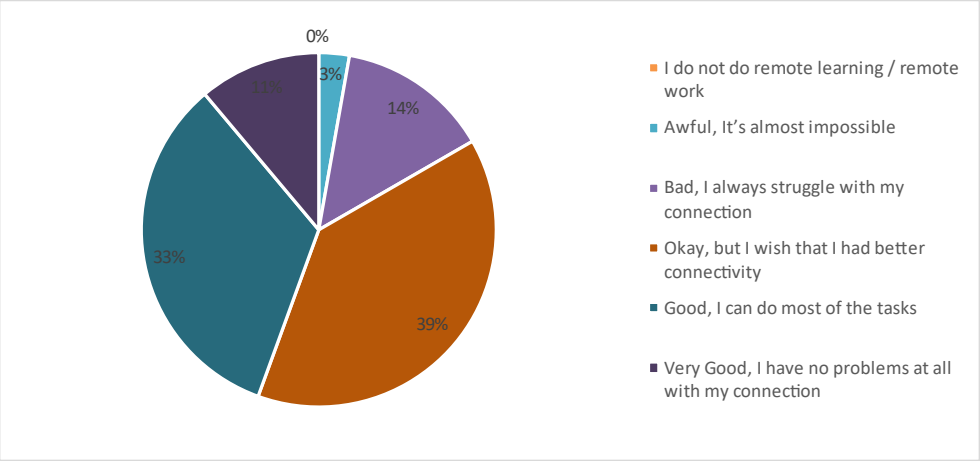


Figure 34. Remote learning / Remote work experience - residential respondents

Despite most of the residential respondents describe as good or very good their service to support telehealth or remote work/learning, there is an important amount who would like to have a better connection. These results are consistent with the service availability analysis, which identified the County as a target for 1G service upgrade.

2.3 Digital Equity

Digital equity is the principle of ensuring that every person has equal access to technology, internet connectivity, and digital skills. It recognizes that today, these resources are essential for full participation in education, employment, and civic life.

Achieving digital equity requires addressing the barriers that contribute to the digital divide, such as limited access to affordable broadband, lack of digital literacy, and disparities in device ownership.

Broadband low adoption rates and lack of access directly impacts quality of life and limits economic, educational, and healthcare opportunities. For that reason, in the 21st century, digital equity is cataloged as a human right. Understanding of the barriers that cause the digital divide helps to implement and develop the right strategies to achieve digital equity.

This section characterizes the status of digital equity regarding three main aspects: broadband affordability, device availability, and digital literacy. Barriers and challenges are identified for each of these aspects based on interviews with key community stakeholders, responses to the Needs Assessment survey, and public data.

2.3.1 Broadband Affordability

Through the Needs Assessment survey was established that 71% of the residential respondents consider that their internet service is expensive or too expensive. Of those, 18% are older than 55 years and 38% are older than 65. Regarding connectivity at home, the survey revealed that only 7% do not have Internet at home. 51% of them claim a lack of providers in their neighborhoods and 25% consider the service too expensive.

The FCC's Affordable Connectivity Program (ACP) aims at improving affordability of broadband services through a $30 subsidy and up to $75 subsidy in Tribal Lands. According to the ACP enrollment tracker from the California Emerging Technology Fund (CETF)[18], there are 61,142 households Monterey County that are eligible for this benefit.

even though the survey revealed that 45% of the respondents are aware of the program. Importantly, 16% of respondents affirm not being eligible for the program or having been rejected for some reason as shown Figure 35.

Regarding the National School Lunch Program, Figure 36 shows that 24% of the respondents do not know if they qualify to receive the program benefits.

As a highlight, the respondents who answered that they are eligible for ACP or National School Lunch Program are mostly women.

[18] California Affordable Connectivity Program Enrollment Tracker (accessed March 2023)

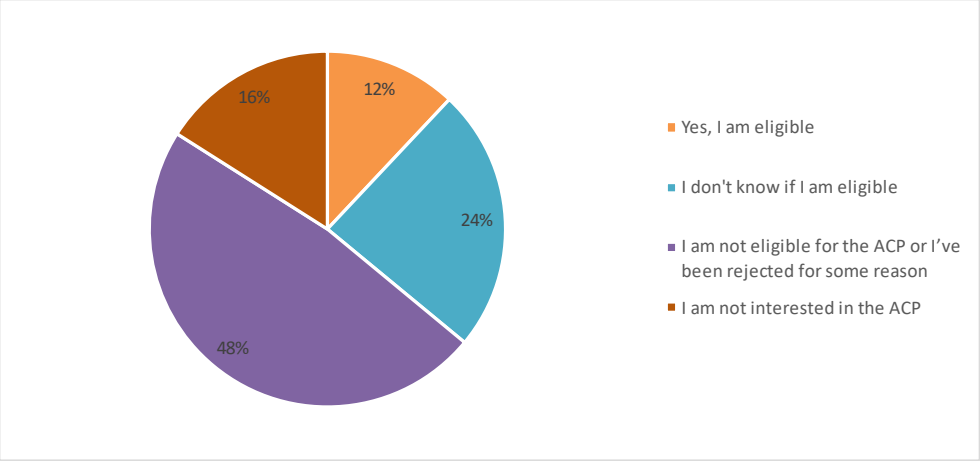


Figure 35. ACP Eligibility awareness

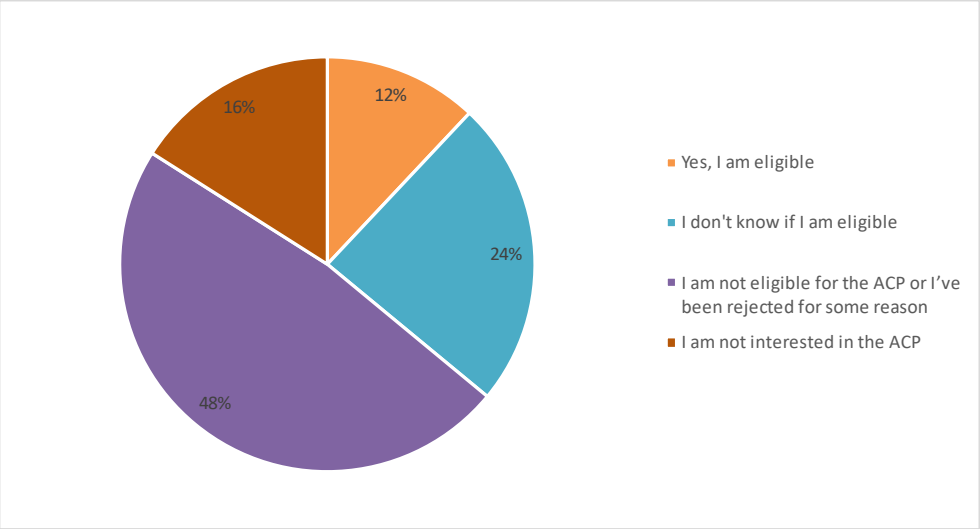


Figure 36. National School Lunch Program Eligibility awareness

The Needs Assessment survey revealed a clear concern regarding the high cost of the internet services. Programs like ACP can help to make access to a high-speed connection more affordable. However, its adoption rate is low (28%), which implies a need to develop strategies and outreach programs to boost enrollment.

As shown in Figure 37, even though 25% of the respondents consider the internet service expensive, only 7% of the respondents do not have internet access at home. The main reasons for not having internet access at home are the high cost of the service and the lack of ISP in their nearby areas.

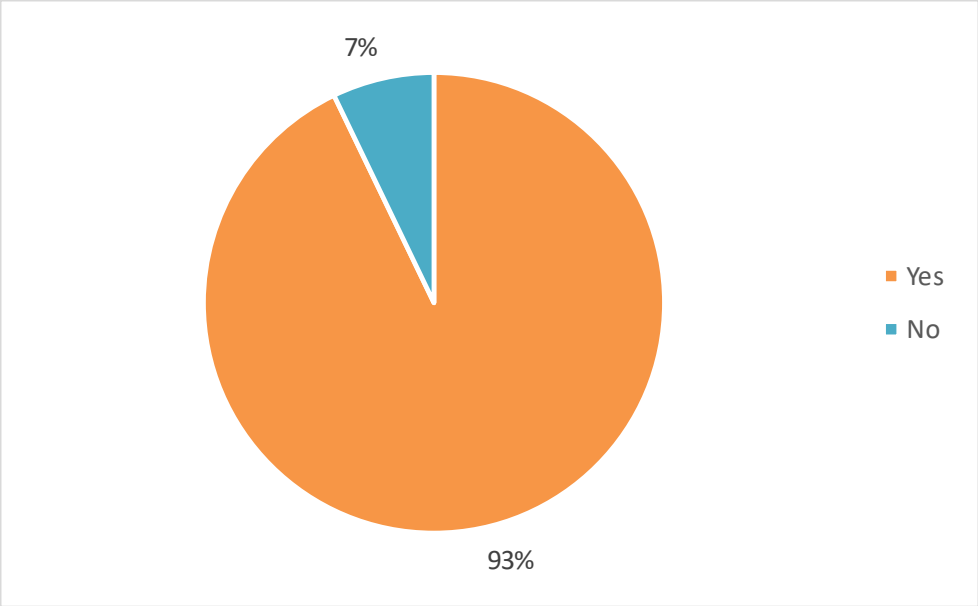


Figure 37. Internet Access at Home

In conclusion, most of the respondents (93%) in Monterey County can afford an internet connection at home. However, this does not mean that all of them have access which meets their expectations or exceeds the 1G service.

2.3.2 Device Availability

Having internet-connected devices at home is essential to make use of broadband services[19]. According to the US Census[20], the percentage of households with at least one computer is 92% for Monterey County.

This data is in alignment with the results from the Needs Assessment Survey, which are depicted in Figure 38. As shown, smartphones and laptops are owned by more than 89% of respondents. In contrast, medical devices and Gaming consoles have the lowest percentages. Furthermore, the Needs Assessment Survey revealed that only 0.3% of the respondents do not own any internet-connected devices.

Importantly, 32% of aging respondents above 55 years old have at least one computer at home and 34% of them have a Smartphone. In contrast, younger respondents between 13 to 54 years old, for which 91% own a laptop or desktop and 89% have a Smartphone.

[19] Smartphones are not considered to be adequate devices for fully accessing the internet.

[20] U.S. Census Bureau, American Community Survey (ACS) and Puerto Rico Community Survey (PRCS), 5-Year Estimates.

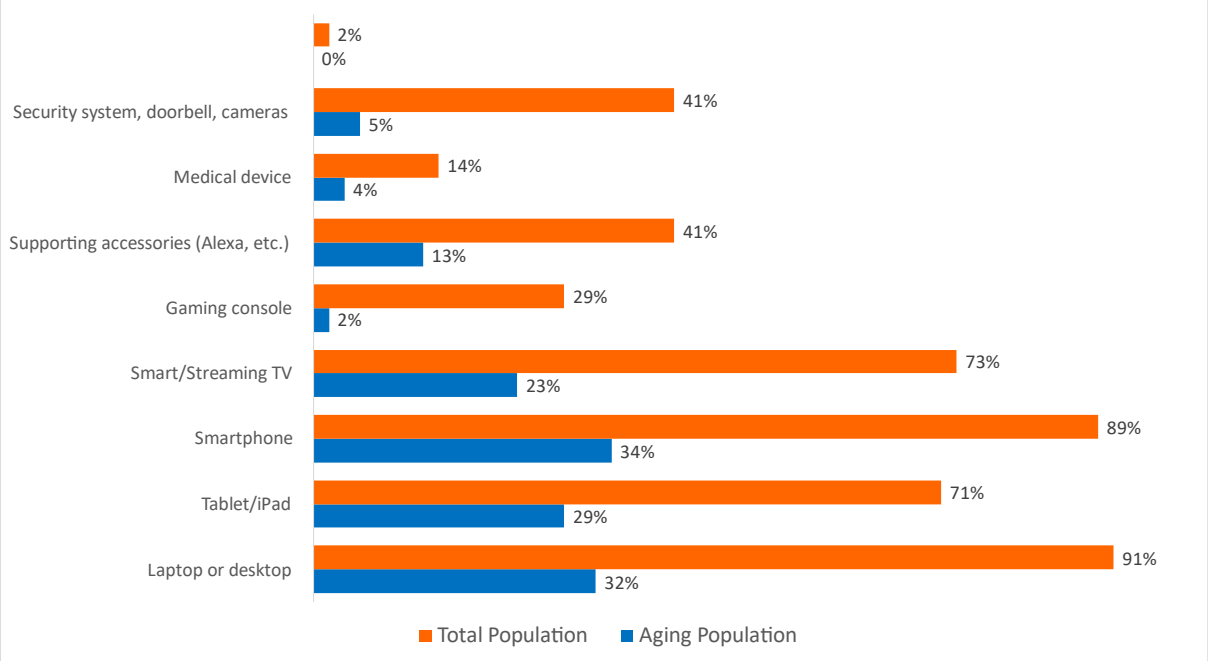


Figure 38. Device availability - Monterey County

Based on the above, it can be concluded that there are important barriers for aging population regarding devices within the County. The existing gap could be closed through programs such as the ACP, which provides one-time discount of up to $100 for a laptop, tablet, or desktop computer.

2.3.3 Digital Literacy

Figure 39 summarizes the digital skills of the respondents to the Needs Assessment Survey. Fundamental internet tasks have the higher levels, including email communication (93%), finding places (91%), and electronic banking (80%).

On the other hand, eCommerce has one of the lowest percentages (52%). Increasing this percentage may represent an opportunity for the Monterey residents to use the internet as a tool to support any type of business, improving Digital Equity.

The survey reveals a significant difference in Digital Literacy between the Aging population and the Total population. Population segments reported not to have the same Digital Skills. The most notable difference was in the percentage of Aging people with Finding Places ability (30%), which was lower than the percentage of the total population (91%).

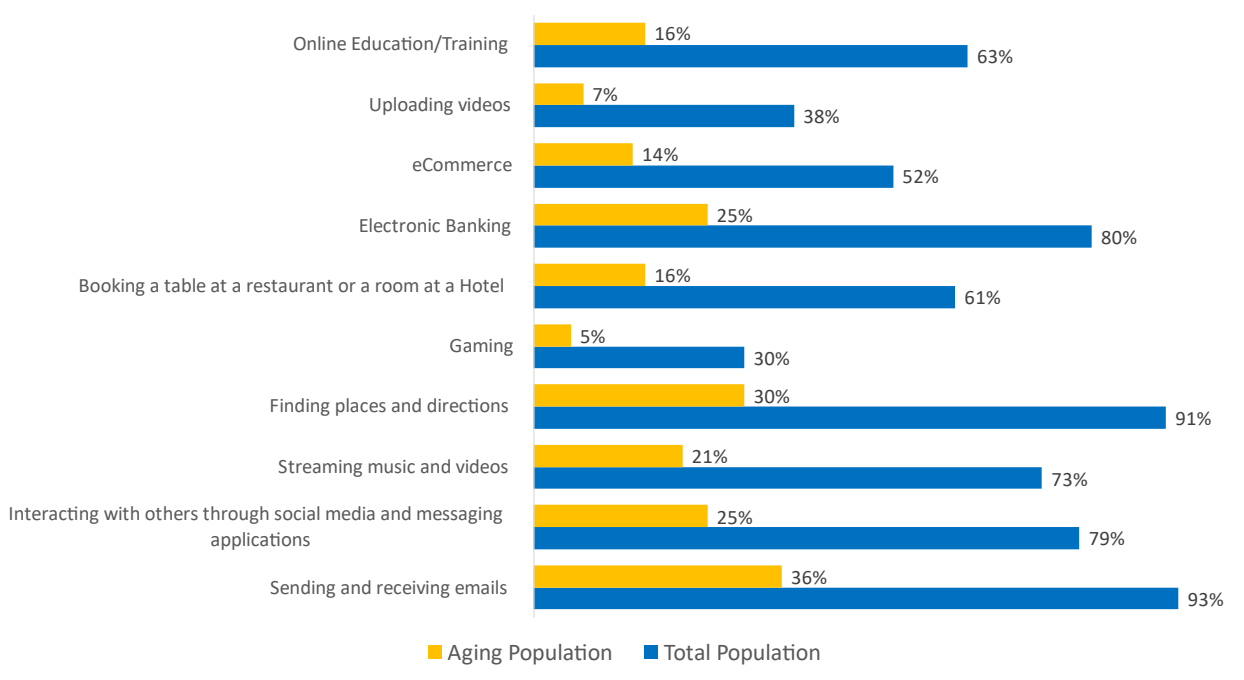


Figure 39. Digital Skills

To broadly enhance digital literacy across the county, the library network would benefit from an increased number of staff members or specially trained volunteers solely dedicated to serving as digital navigators and providing digital literacy training. This would enable them to effectively educate individuals on how to navigate the digital landscape. Additionally, it is crucial to ensure that these resources are available in multiple languages to cater to the diverse linguistic needs of the community. By expanding the library network's capacity in terms of staff and resources, they can play a vital role in equipping individuals with the necessary skills to bridge the digital divide.

2.4 Key Takeaways

- Approximately 97% of Monterey County locations are served, according to FCC data, and 99% of these have access to speeds exceeding 100/20 Mbps. A significant 76.7% of locations in Monterey County lack access to 1G/500 Mbps service, even in well-served areas like Marina, Salinas, Carmel by the Sea, Monterey, Sand City, Seaside, Gonzales, Soledad, Greenfield, and King City.
- In unincorporated areas, 79% of unserved locations exist, with over half of these (51%) located in the remote regions of South County.
- Satisfaction with service performance is low, with only: only 25% are satisfied. Meanwhile, a significant 71% reported issues with telehealth and 38% with remote learning. On the positive side, the average latency of 19ms is below the 50ms CPUC limit, although 6% experienced latency beyond this, impacting time-critical applications.
- A quarter of users (25%) consider their internet connection unreliable, while half (50%) prioritize reliability as the most crucial service characteristic.

Figure 40 and Figure 41 provide a graphical view of the main findings from the needs assessment.

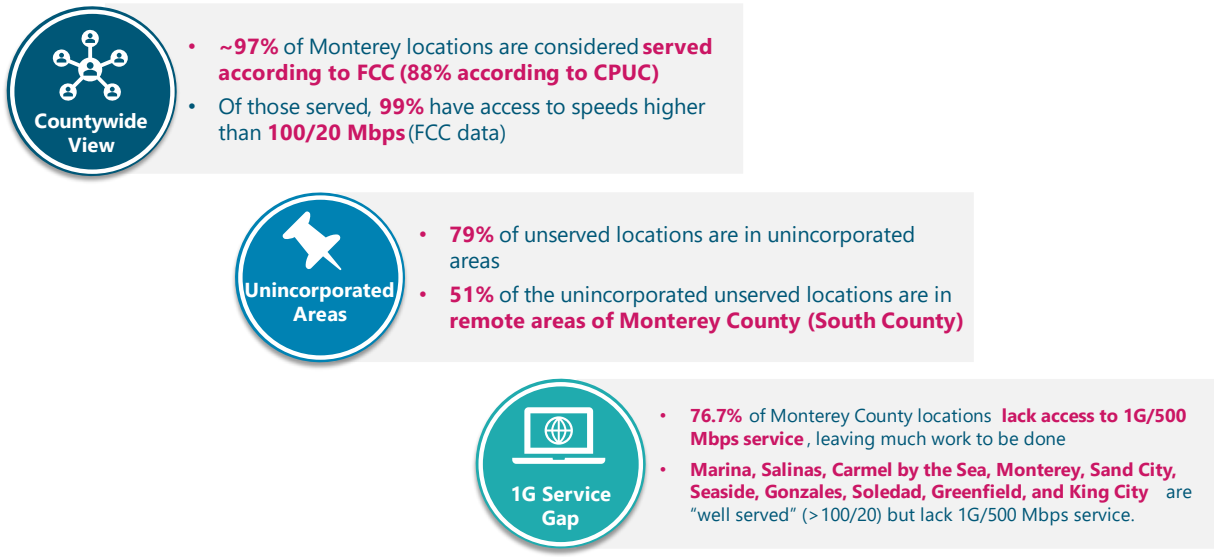


Figure 40. Monterey Service Availability: Key Takeaways

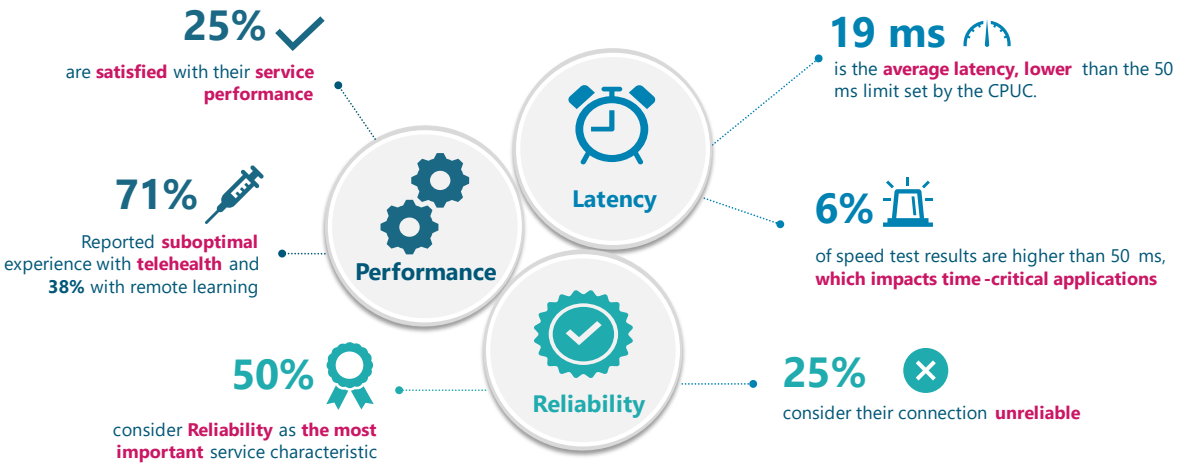


Figure 41. Monterey Service Performance: Key Takeaways

3 Market Analysis

This section characterizes the broadband market in the County, by assessing the current broadband service providers and their offerings, along with their market presence. This enables a deep understanding of the broadband landscape in the County that is necessary to develop effective solutions to address identified gaps.

3.1 Broadband Service Offerings

Broadband service offerings in Monterey County were analyzed in two steps. First, broadband service providers were identified through inspection of the FCC National Broadband Map, desktop research, and results from the speed test program. Then, for each service provider, further research was conducted, including official provider websites and online tools based on provider and user-reported data.

The main aspects analyzed for each provider were available service offerings, broadband technology, speeds, monthly price, and service area. Table 8 summarizes the findings of the analysis for residential services.

Table 8. Residential Broadband Service Offerings.

Service Provider	Broadband Technology	Download / Upload Speeds (Mbps)	Monthly Fee (USD)	Service Area
Wireline Providers				
AT&T	Fiber | Copper	1000	$80.00	• Monterey, Del Monte Forest, Pacific Grove, Sand City, Seaside,

		500	$65.00	Marina, Del Rey Oaks, Salinas (full) • Prunedale, Las Lomas, Aromas, Spreckels (partial)
		300	$55.00	
Charter (Spectrum)	Cable	1000	$89.99	• King City, Greenfield, Soledad, Gonzales, Prunedale, Chualar (partial)
		500	$69.99	
		300	$49.99	
Xfinity (Comcast)	Cable	1200/20	$80	• The primary active areas include Monterey, Del Monte Forest, Carmel Valley, Pacific Grove, Sand City, Seaside, Marina, Del Rey Oaks, and Salinas (full). • Lack of presence in central and southern cities such as Gonzales, Soledad, and Greenfield. There is only partial presence in King City.
		1000/20	$75	
		800/20	$65	
		400/10	$45	
		200/10	$25	
		75/10	$20	
Wireless Providers				
AT&T	Unlicensed FWA	1000	$80.00	• Monterey, Del Monte Forest, Pacific Grove, Sand City, Seaside, Marina, Del Rey Oaks, Salinas (full) • Prunedale, Las Lomas, Aromas, Spreckels (partial)
		500	$65.00	
		300	$55.00	
Razzolink	Licensed FWA	100	$59.95	• Monterey, Pacific Grove, Carmel by the Sea, Del Rey Oaks, Gonzales, Greenfield, Marina, Sand City, Seaside, Soledad, King City, Salinas (full)
		10	Unknown	
Surfnet Communications	Unlicensed FWA	50/10	$119.96	• Elkhorn (full)
		15/4	$79.96	
		10/3	$55.96	
Cruzio Internet	Unlicensed FWA	Up to 100 Mbps	$44.95	• Pajaro (full)
T-Mobile	Licensed FWA	Up to 100/20	Starting at $50/month	• Monterey, Pacific Grove, Carmel by the Sea, Del Rey Oaks, Gonzales, Greenfield, Marina, Sand City, Seaside, Soledad, King City, Salinas (full)
Verizon	Licensed FWA	Up to 1000/10	$70.00	• Monterey, Greenfield, Soledad, Carmel by the Sea, Salinas (full)
		Up to 300/10	$50.00	
Note: Single quantity service speed refers to the download speed.				

According to Table 8, Salinas, Monterey, Pacific Grove, Marina, Seaside, and Sand City are the cities with the highest number of ISPs. There are several wireless providers in the County, from small providers like RazzoLink to mobile operators offering FWA service like T-Mobile and AT&T. FWA is the most common technology implemented by broadband providers, with six wireless providers in the County. However, only one of them provides services above 100/20 Mbps, and none of the wireless providers offers services above 1 Gbps.

The majority of the wireline providers in the County offer 100/20 and 1000/500 services and have coverage in most of the cities. AT&T, the main incumbent, provides services in all the cities.

In terms of pricing, Comcast offers services equal or higher to 100/20 for a price below the average price in California of $34.66 [21]per month. The cheapest 100 Mbps service is offered by Comcast for $25.00 per month. In contrast, wireless providers have higher prices and lower speeds mainly due to technology limitations and the cost of operation in remote areas. For example, Surfnet offers a 10/3 service for $55.96.

In the case of business service offerings, the results are captured in Table 9.

Table 9. Business Broadband Service Offerings.

Service Provider	Type of Service (Note 2)	Download / Upload Speeds (Mbps)	Monthly Fee (USD)	Service Area
Wireline Providers				
AT&T	HSI	5000 2000 1000	$395.00 $225.00 $160.00	See Table 8
Charter (Spectrum)	HSI	1000 600 300	$164.99 $99.99 $49.99	See Table 8
Xfinity (Comcast)	HSI	1250 750 500 250 100 50	$349.99 $249.99 $179.99 $119.99 $79.99 $49.99	See Table 8
Wireless Providers				
AT&T	HSI	100	$100.00	See Table 8

[21] https://docs.fcc.gov/public/attachments/DA-22-1338A1.pdf

		50 25	$80.00 $70.00	
Razzolink	HSI	100 35	Unknown Unknown	See Table 8
Surfnet Communications	DIA	100/20 40/20	$349.95 $239.95	See Table 8
Cruzio Internet	DIA	1000	$499.00	See Table 8
T-Mobile	HSI	Up to 182	Starting at $50/month	See Table 8
Verizon	HSI	940 500 200	$249.00 $129.00 $69.00	See Table 8
Note 1: Single quantity service speed refers to the download speed. Note 2: Type of service is either High Speed Internet (HSI), which is a best-effort offering, or Direct Internet Access (DIA) which accounts for a enterprise based service with a tight service level agreement (SLA).				

The Cities of Salinas, Monterey, Pacific Grove, Marina, Seaside, and Sand City have a rich offering of business services. However, service offerings for the rest of the County are limited. Business plans above 1 Gbps are only offered by wireline providers with prices above the average for HSI, which is $150 per month. In addition, wireless providers offer plans with limited speeds and higher prices.

3.2 Service Provider Choice

Another important metric to characterize the broadband market is the number and type of available service providers by census block, particularly those with fiber service offerings, since this is an indicator of the level of competition.

According to the Benton Institute for Broadband & Society, a served area with limited provider options typically result in higher prices and limited choices for end users.

The FCC National Broadband Map Dataset was used to perform this analysis, considering providers that offer services with speeds of at least 100 Mbps download, 20 Mbps upload. The results in Table 10 show that 34% of the Census blocks in Monterey County are not served by any ISP. The Cities of Marina, Monterey Sand City, and the unincorporated areas reported the highest percentage of census blocks without ISPs providing services above 100/20. There are several census blocks in the southern, central, coastal, and unincorporated areas with limited ISP coverage or only one ISP serving the area. These results indicate that there is a significant gap in terms of broadband market competition in the County.

Table 10. Service Provider Choice based on census block level data.

	ISPs by Community based on Census Blocks			
Community	**3+ ISPs**	**2 ISPs**	**1 ISP**	**No ISP**
Marina	41 | 20.7%	71 | 35.9%	30 | 15.2%	56 | 28.3%
Salinas	442 | 39.4%	609 | 54.2%	10 | 0.9%	62 | 5.5%
Carmel-by-the-Sea	26 | 13.8%	159 | 84.1%	0 | 0.0%	4 | 2.1%
Del Rey Oaks	13 | 76.5%	3 | 17.6%	0 | 0.0%	1 | 5.9%
Monterey	289 | 50.0%	159 | 27.5%	10 | 1.7%	120 | 20.8%
Pacific Grove	29 | 6.0%	275 | 56.6%	153 | 31.5%	29 | 6.0%
Sand City	2 | 7.4%	13 | 48.1%	2 | 7.4%	10 | 37.0%
Seaside	169 | 43.4%	167 | 42.9%	10 | 2.6%	43 | 11.1%
Gonzales	16 | 16.7%	62 | 64.6%	1 | 1.0%	17 | 17.7%
Soledad	16 | 9.6%	129 | 77.2%	2 | 1.2%	20 | 12.0%
Greenfield	0 | 0.0%	123 | 77.4%	5 | 3.1%	31 | 19.5%
King City	11 | 6.6%	118 | 71.1%	6 | 3.6%	31 | 18.7%
Other Areas in Monterey County	169 | 4.9%	746 | 21.4%	579 | 16.6%	1,985 | 57.0%
Total	**1,223 | 17.3%**	**2,634 | 37.2%**	**808 | 11.4%**	**2,409 | 34.0%**

Figure 42 to Figure 45 provide a geographical view of the number of fiber service providers available throughout the County. Where no fiber provider is available, the census block is colored based on the technology available: cable, copper, or Fixed Wireless Access.

As shown, FWA, cable, and copper are the prevailing technologies. However, fiber coverage is relatively limited, with only 20% of the census blocks (1,468 blocks) being served with fiber.

The areas with two or more providers are primarily located in Salinas, Monterey, and Pacific Grove. These cities have a significant amount of fiber coverage, providing residents with multiple options for broadband service.

On the other hand, unincorporated areas in the County have the highest number of census blocks served by FWA. Additionally, there are several blocks located in unincorporated areas without a single ISP. The southern part of the County is particularly affected, with virtually no ISPs available in those areas.

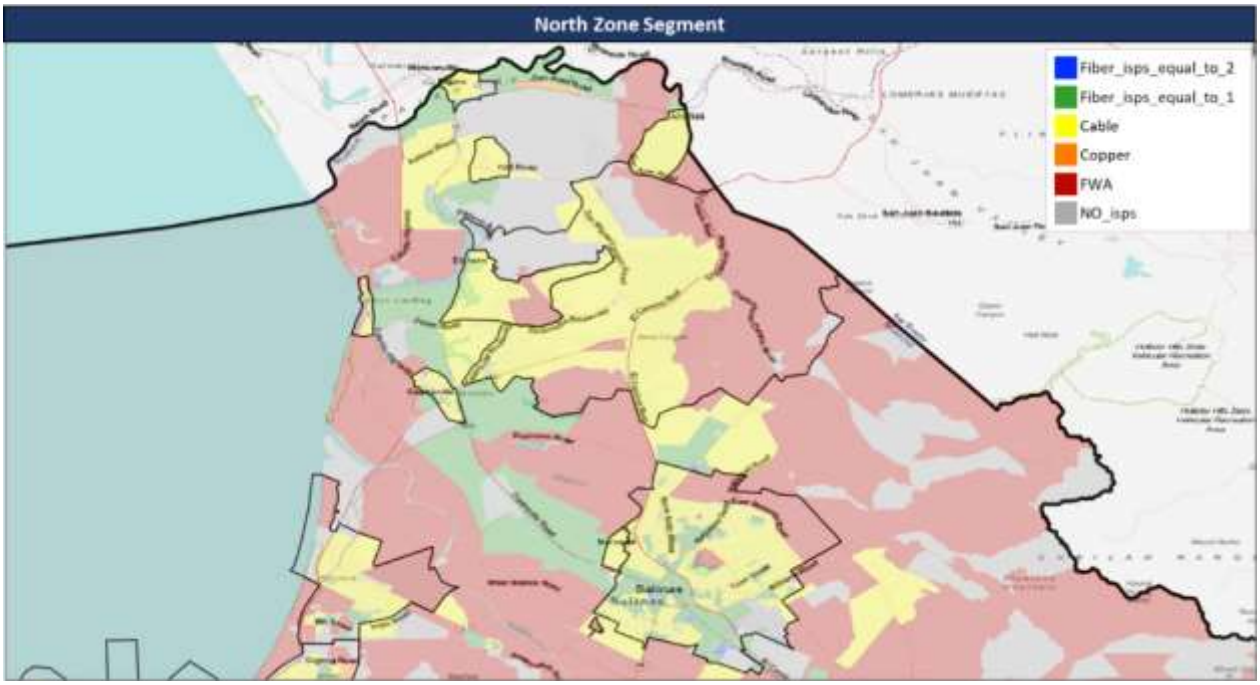


Figure 42. Number of ISP options offering broadband service > 100/20 by Census Block. – North Zone

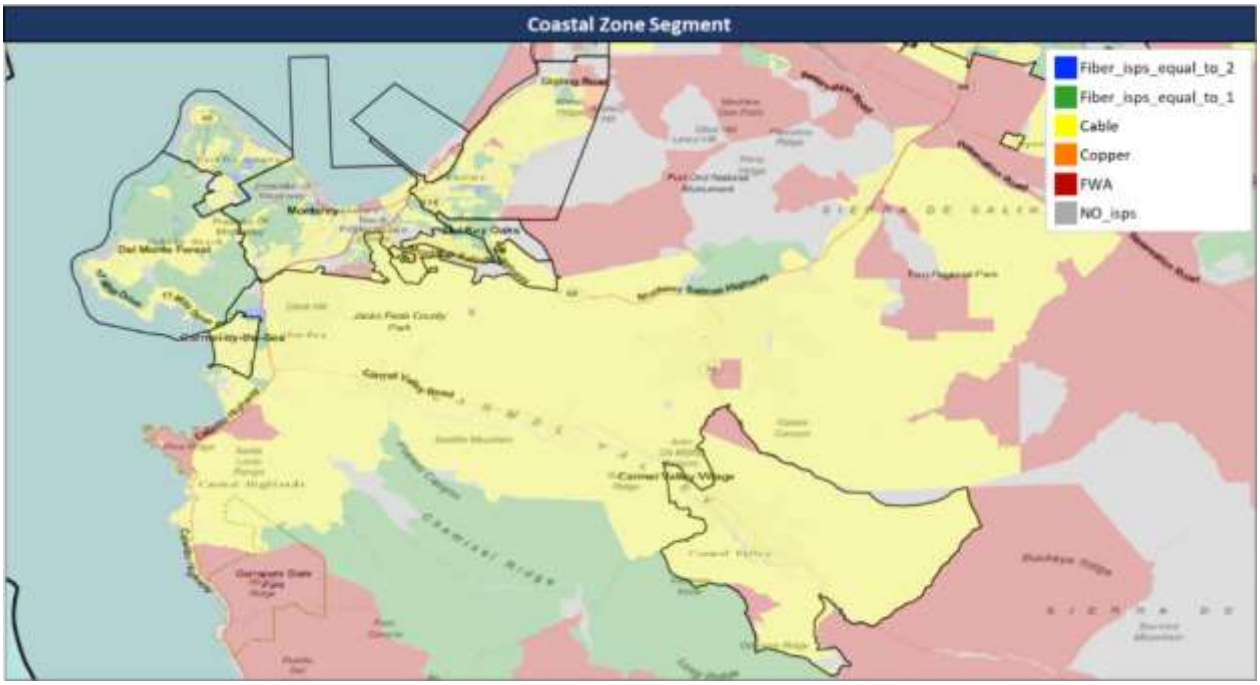


Figure 43. Number of ISP options offering broadband service > 100/20 by Census Block. – Coastal Zone

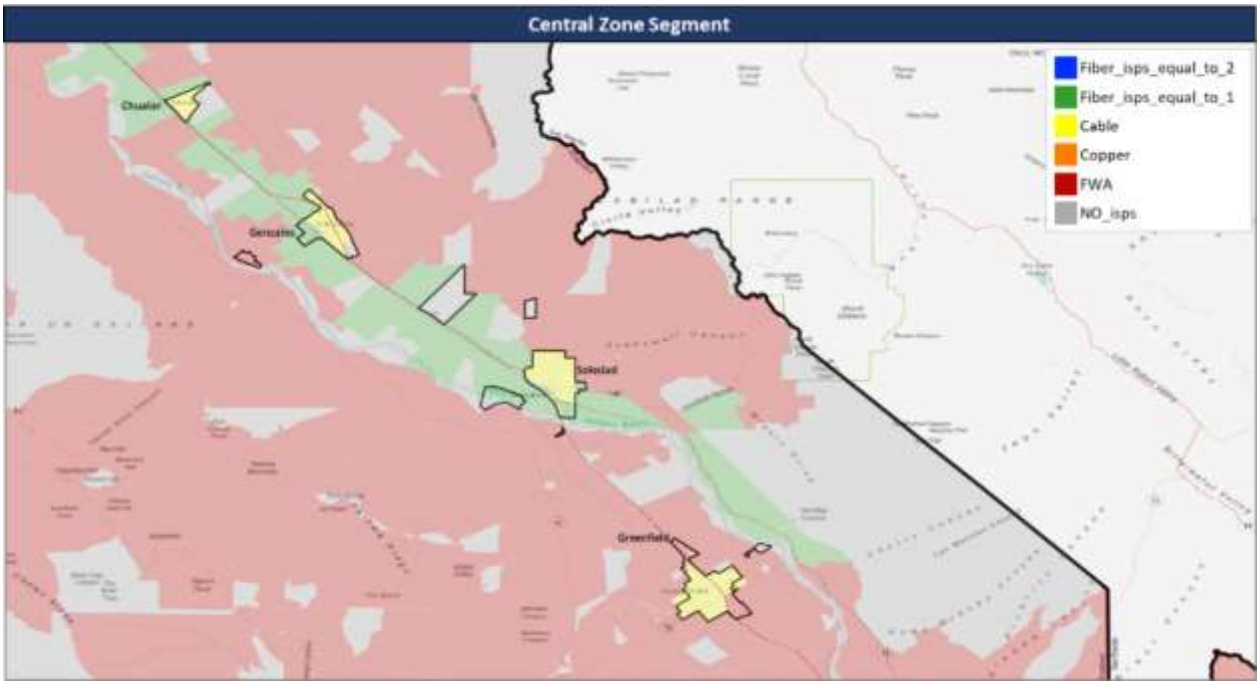


Figure 44. Number of ISP options offering broadband service > 100/20 by Census Block. – Central Zone

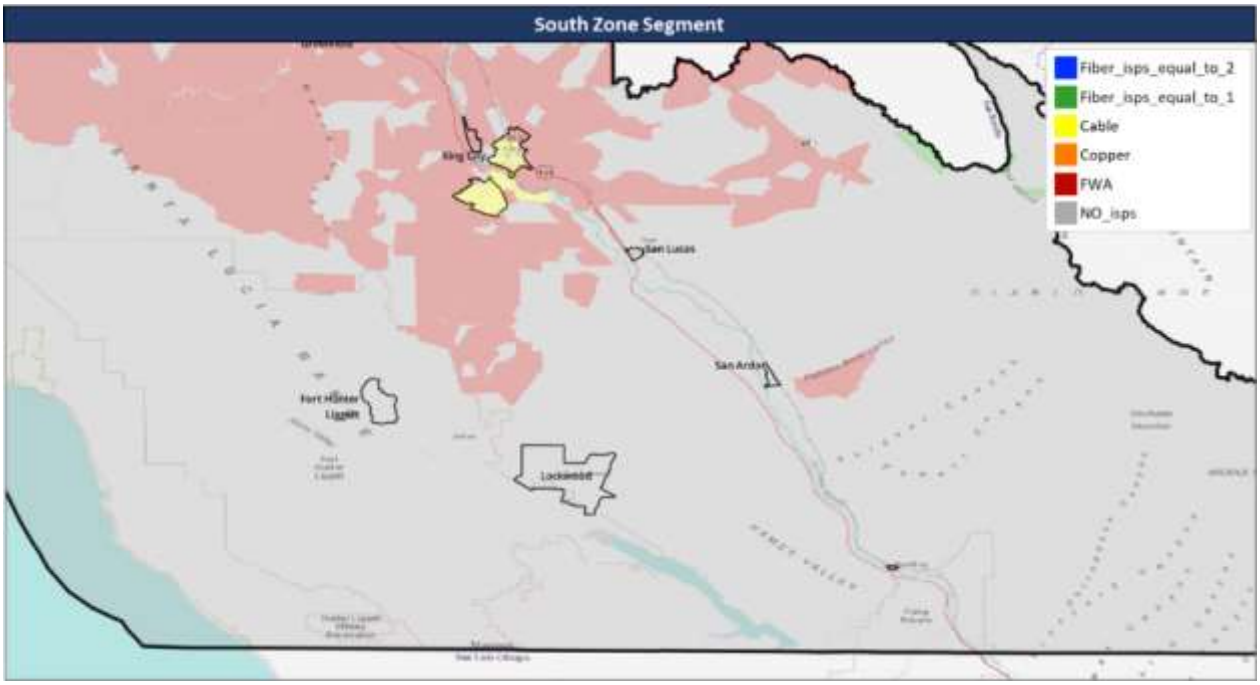


Figure 45. Number of ISP options offering broadband service > 100/20 by Census Block. – South Zone

The results above are complemented with Speed Test data. As shown in Table 11,Figure 34, and Figure 35, Charter Communications and Comcast (Xfinity) are the predominant service provider in the County with 60% of the measurements.

Additionally, the Needs Assessment Survey respondents confirm this trend with 13% of respondents being served by Charter and 27% by Comcast.

Table 11. Speed test distribution by ISP.

ISP	Total Speed Tests	Unserved (<25/3)	Underserved (25/3 to 100/20)	Served (100/20 to 1000 / 500)	1G Served (> 1000/ 500)
AT&T Inc	5	5	0	0	0
Charter Communications Inc	47	4	37	6	0
GeoLinks	1	0	1	0	0
Optimum	3	0	2	1	0
Ranch Wifi LLC	1	1	0	0	0
Razzolink Inc.	9	9	0	0	0
Xfinity	68	11	28	29	0
Other	57	25	23	9	0
Total	**191**	**55**	**91**	**45**	**0**

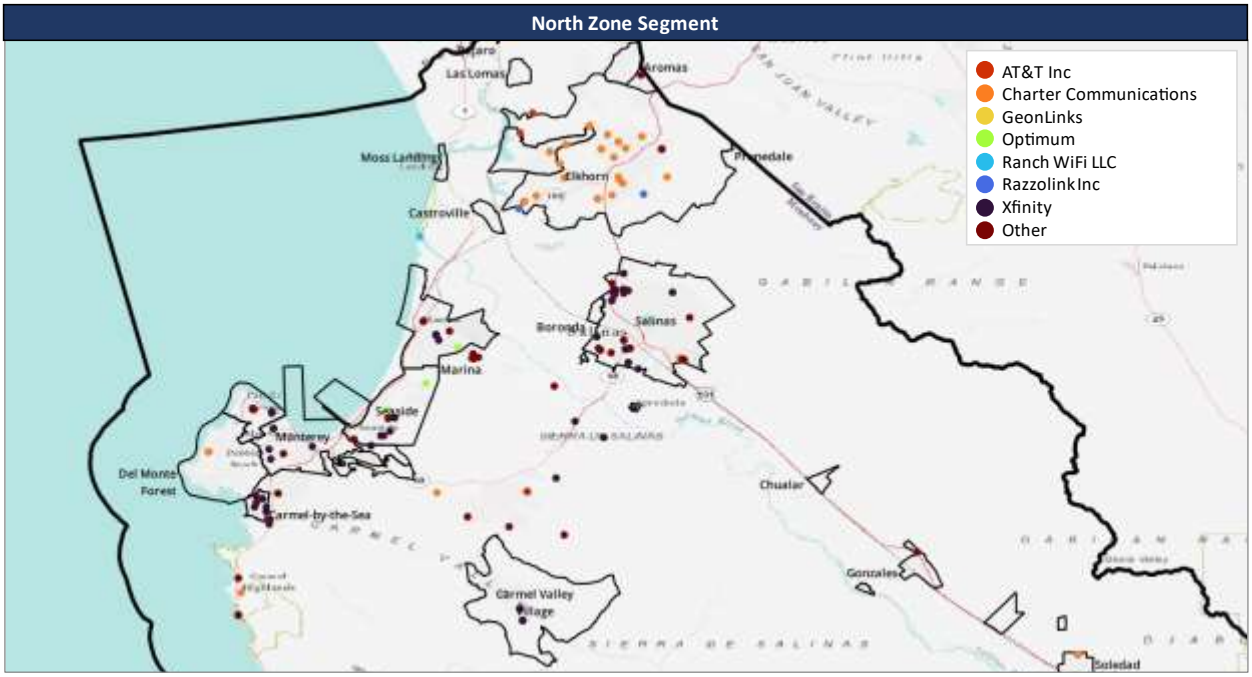


Figure 46. Speed test distribution by ISP – North Zone

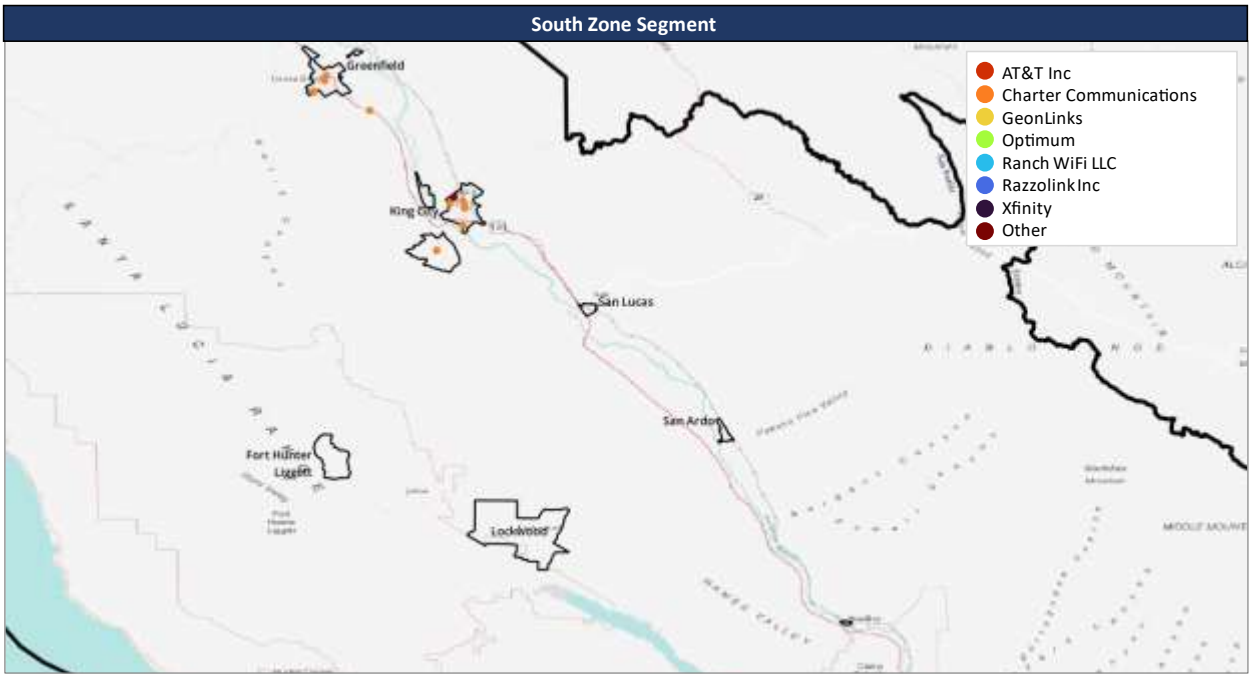


Figure 47. Speed test distribution by ISP – South Zone

Monterey County has a limited choice of broadband services outside the cities, and to some extent within the cities too. This results in several areas with a de facto monopoly that impacts the community as they are at risk of getting subpar service, high prices, and insufficient investment from broadband providers.

3.3 Key Takeaways

- Monterey County's broadband market presents a diverse landscape, with various service providers offering both wireline and wireless solutions. The County's analysis of residential broadband service offerings reveals that wireline providers include AT&T, Charter Communications (Spectrum), and Comcast (Xfinity). These providers offer a range of competitive services, spanning from 100/20 to 1000/500 Mbps, at relatively affordable monthly rates. Comcast, in particular, stands out for its pricing, with services above 100/20 Mbps available at prices below the California average.
- Wireless broadband providers in Monterey County boasts a variety of providers, including AT&T, Razzolink, Surfnet Communications, Cruzio Internet, T-Mobile, and Verizon. Despite the choice, these providers often struggle with higher prices and lower speeds due to the challenges of offering wireless services in remote areas. Surfnet Communications, for example, provides a 10/3 service for $55.96, highlighting the price limitations in these regions.
- When examining business service offerings, a slightly different picture emerges. Providers like AT&T, Charter Communications, and Comcast offer HSI and DIA services with speeds ranging from 100 Mbps to 5000 Mbps. These high-speed business plans come at a cost, with prices exceeding the average HSI pricing of $150 per month.

4 Broadband Asset Inventory

An up-to-date and reliable Asset Inventory provides a holistic view of the existing infrastructure and allows the identification of potential infrastructure that can be leveraged for broadband deployment, lowering the cost to expand broadband to unserved and underserved areas.

An Asset Inventory GIS Package which is a compendium of files documenting the broadband assets across the County, was developed by collecting data from public data sources and from local agencies through the Data Collection Guide, including County staff from the Information Technology (IT), Public Works, Administrative Services and Planning Departments.

An overview of the existing and planned infrastructure documented in the inventory is provided below:

4.1 Public Buildings & Facilities

In Monterey County, there are 113 facilities controlled by local governments, as shown in Figure 36 and Figure 37. There are 833 anchor institutions distributed across the County, 607 in the cities and 226 in unincorporated areas, including schools, healthcare facilities, and public safety facilities, among others.

Even when these assets are considered as “broadband serviceable locations”, they also can host network equipment, reducing the need for communication central offices and remote huts.

Table 12. Facilities connectivity status

Community	Total County-owned Facilities	On-Net Facilities	Off-Net Facilities
Marina	7	7	0
Salinas	33	33	0
Carmel-by-the-Sea	1	1	0
Del Rey Oaks	1	1	0
Monterey	6	6	0
Pacific Grove	2	2	0
Sand City	1	1	0
Seaside	9	8	1
Gonzales	2	2	0
Soledad	3	3	0
Greenfield	2	2	0
King City	6	6	0
Other Areas in Monterey County	40	32	5
Total	**113**	**104 | 92%**	**6 | 5%**

Table 12 summarizes the connectivity status of these facilities. Facilities and anchor institutions connected to the city private fiber network are classified as On-Net. Otherwise, they are considered as Off-Net. Salinas City has the highest rate of On-Net facilities, which is expected since it owns a large fiber network. The data reveals that the majority of the facilities are already on-net, meaning they are connected to the City or County network infrastructure. These on-net facilities can serve as Points of Presence (PoPs) to extend connectivity to areas that have connectivity needs.

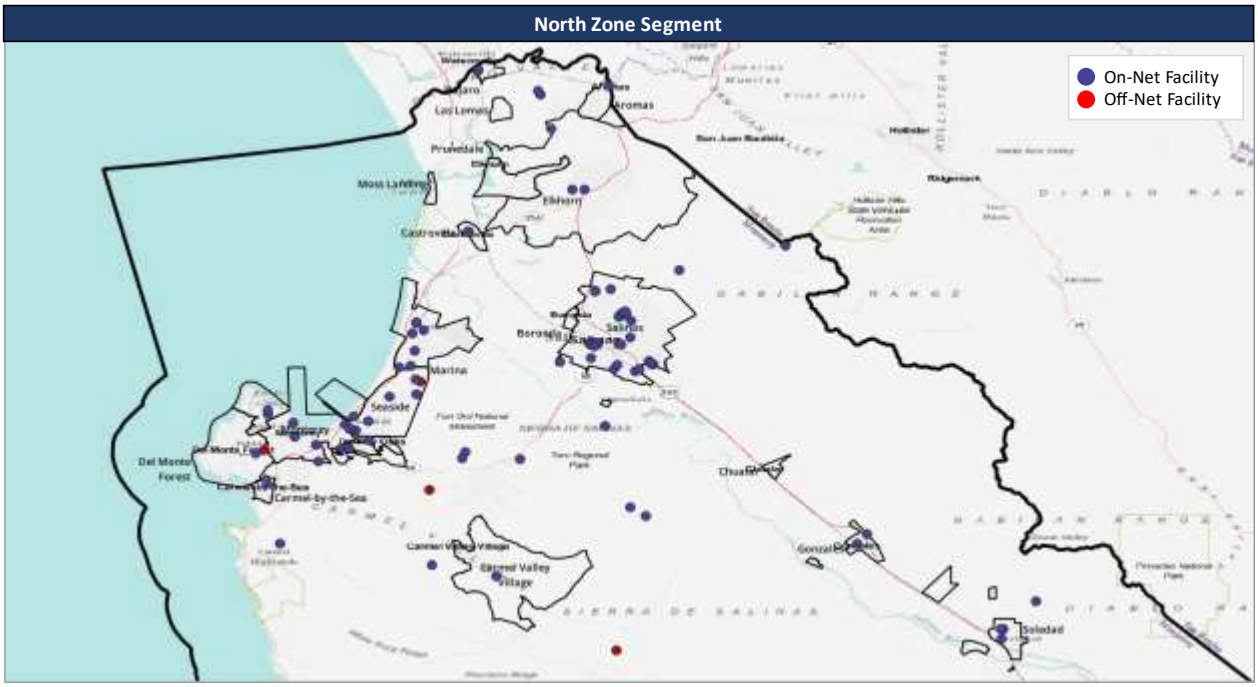


Figure 48. On Net/Off Net Facilities -- North zone

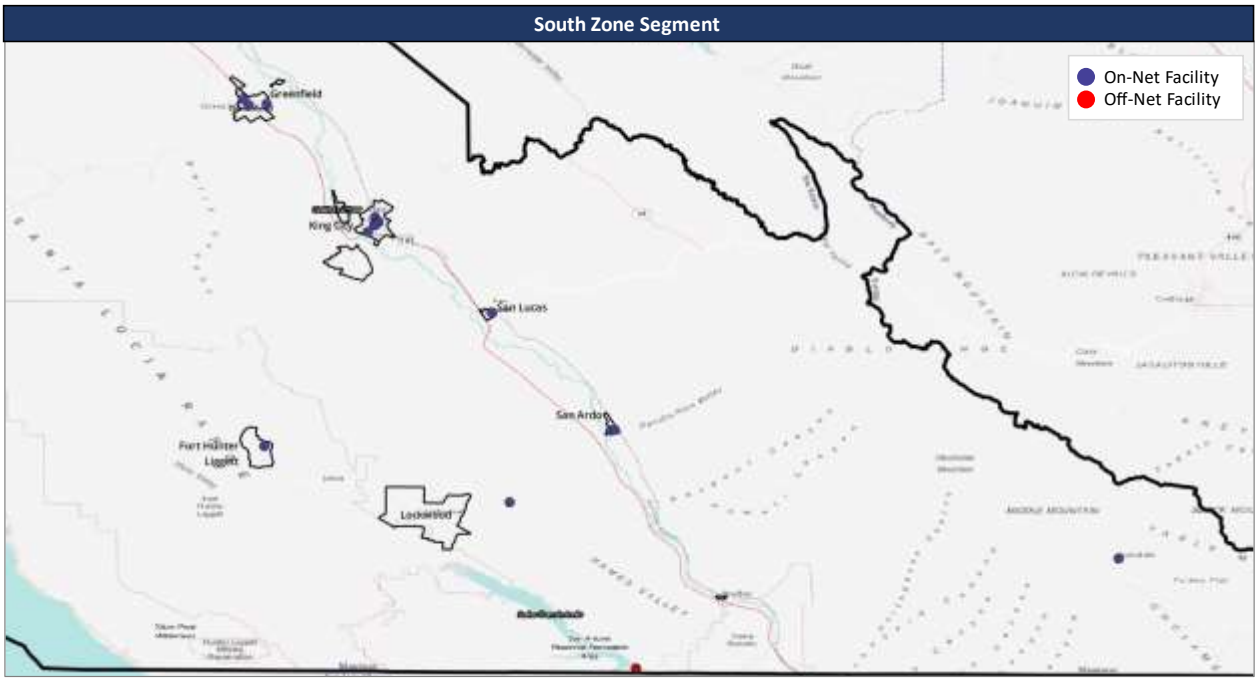


Figure 49. On Net/Off Net Facilities -- South zone

4.2 Fiber & Conduit Infrastructure

The data described in this section was provided by Monterey County during the Data Collection process.

Monterey County-owned fiber infrastructure

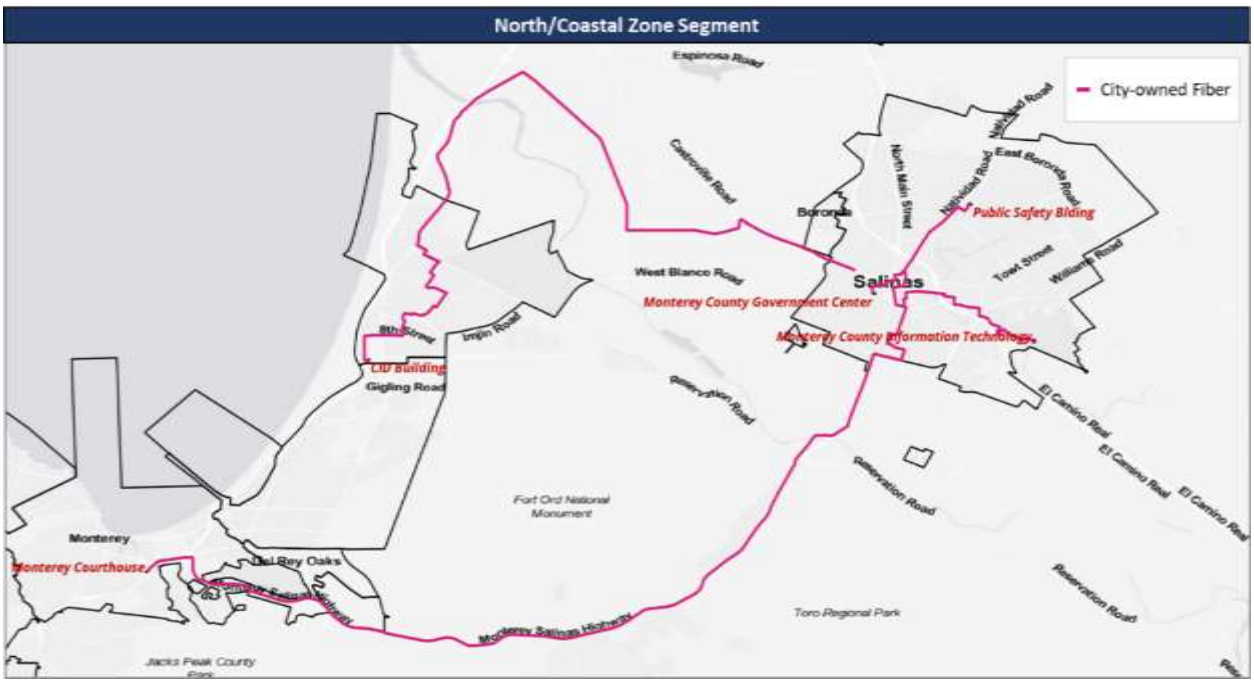


Figure 50. City-owned Fiber

As shown in Figure 50, the fiber is utilized to establish connectivity between facilities located in Marina, Monterey, and Salinas. It is worth noting that the fiber infrastructure is primarily utilized by the public safety and justice departments, highlighting its importance in supporting critical operations and communication within these sectors.

Figure 51 shows the existing County-owned fiber infrastructure, including poles (106), splices cases (69), manholes (54) and laterals primarily located in the cities of Monterey, Marina, and Salinas. This infrastructure can serve as a foundation for laying fiber optic cables and expanding broadband connectivity throughout the County.

shows the existing fiber routes owned by the County which adds up to 44 miles of fiber. The fiber infrastructure is primarily used to connect five key facilities: the Criminal Investigation Command in Marina, the Monterey Courthouse in Monterey city, the County Government Center, County Information Technology, and Public Safety Building in Salinas.

Table 13. City-owned Fiber Length

Community	Total County Facilities Connected	Total Length [km]
Marina	1	26
Monterey	1	30.6
Salinas	3	13.9
Total	**5**	**70.5**

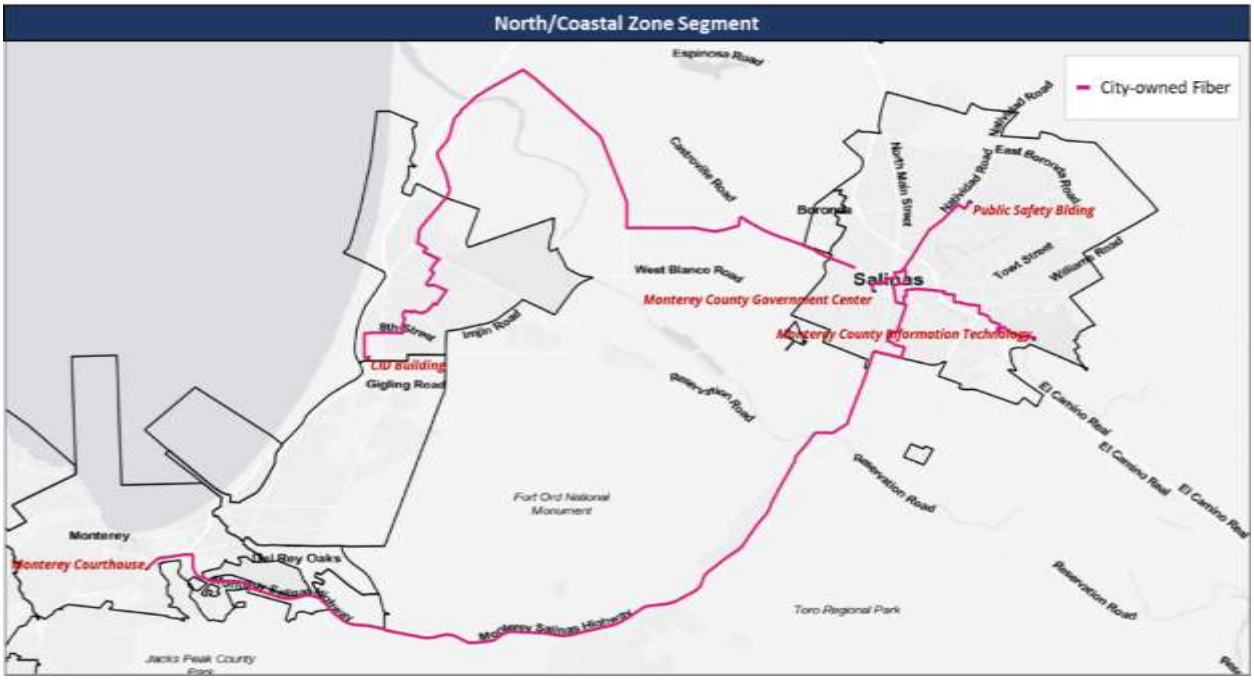


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Figure 51. Existing Fiber Infrastructure

By leveraging the existing utility infrastructure, broadband providers can reduce the cost and time required for deployment, enabling faster and more efficient broadband expansion.

It is crucial to emphasize the need for completing an inventory of existing fiber infrastructure, as answers from multiple cities were not received to complete the present report. In addition, The County representatives have confirmed that there aren't any projects for the deployment of new city-owned fiber infrastructure.

4.2.1 California Middle Mile

The California Middle Mile Broadband Initiative (MMBI) also known as GoldenStateNet[22] (GSN) is the middle mile open-access network consisting of 10,000 route miles that is a central component of SB-156, currently under construction with a $3.87 billion budget allocated for the buildout.

This middle mile network will ensure better and more connectivity throughout the State of California and improve the economics of last mile networks, particularly in rural areas.

On the 21st of July, California Department of Technology (CDT) announced a two-phase approach for the construction of the MMBI, with Phase 1 consisting of 8,300 miles and Phase 2 of 1,700 miles of middle mile fiber. The main distinction between the two phases is that Phase 1 has already been funded while funding for Phase 2 has not. Figure 52 shows the fiber route for the two phases within Monterey County, which comprises a total of 181 miles, 153 in Phase 1 and 28 in Phase 2. In Phase 1, the route follows the existing railroad that extends from Watsonville in Santa Cruz County to San Luis Obispo County. This route crosses several cities in Monterey County, including Salinas, Gonzales, Soledad, Greenfield, and King City. Additionally, Phase 1 offers two distinct routes into San Benito County. The first route involves following the existing railroad from Pajaro to Aromas in the northern area of the County, while the second route follows Spence Rd and Old Stage Rd near Salinas.

[22] https://goldenstatenet.org/ (accessed March 2023)

Phase 2 extends the Middle Mile network, connecting to Phase 1 in Castroville. From there, it follows Cabrillo Hwy, enabling access to the coastal zone, which includes cities such as Marina, Seaside, Sand City, Del Rey Oaks, Monterey, and Pacific Grove. Additionally, under Phase 2, a branch is proposed to connect the Monterey Regional Airport via Monterey-Salinas Hwy.

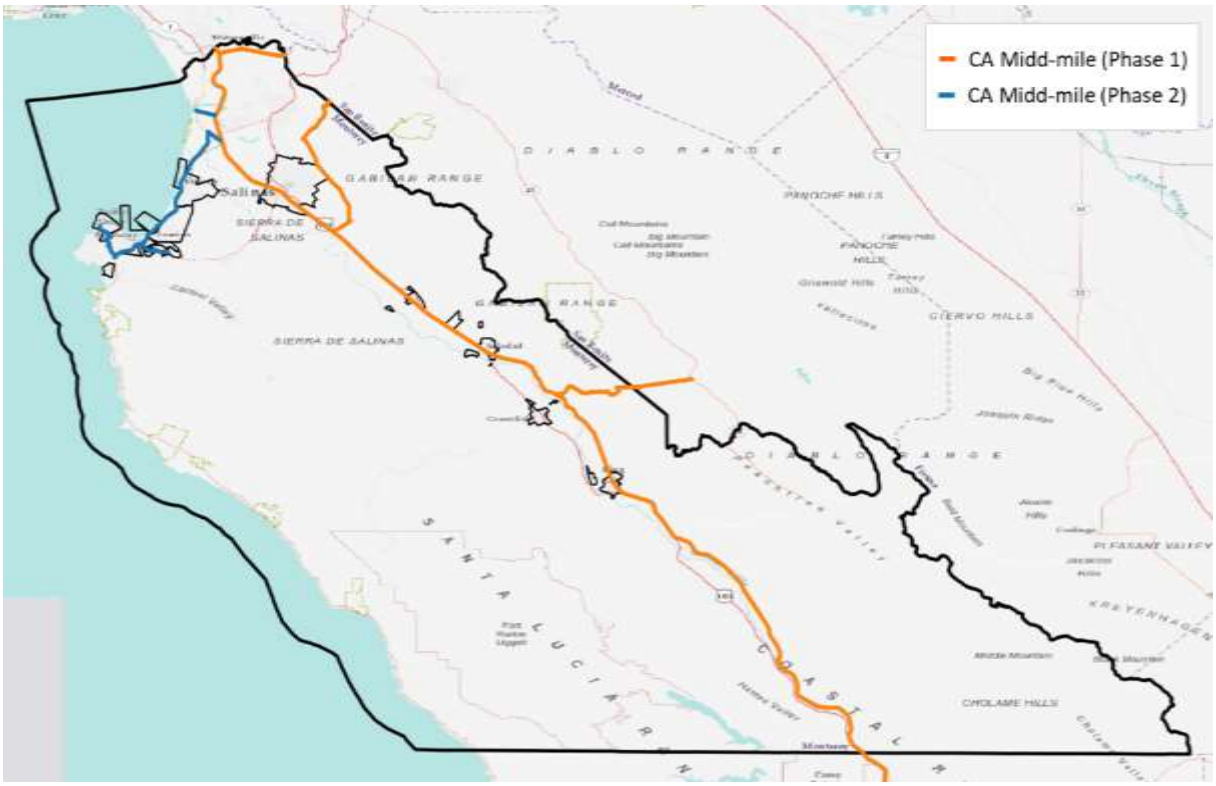


Figure 52. California MMBI July 21st Phased Approach.

On September 15th, CDT announced the commitment to build the full 10,000 miles on the MMBI design and the elimination of the phased approach. The middle mile construction commenced in October 2022 in the San Diego area and there is a statutory requirement to complete the entire network by end of December 2026.

While CDT has deprecated the notion of phases for the buildout of the California MMBI, the terms Phase 1 and Phase 2 CDT route are used throughout this report to distinguish the portion of the MMBI that has already been funded (Phase 1) from that one that has not (Phase 2).

GoldenStateNet could be key to simplify and speed up the development of last-mile access for Monterey County. However, this will depend on the timing of its construction and the establishment of potential synergies with ISP partners and other initiatives within the County.

4.3 Capital Improvement Program Projects

The Five-Year Capital Improvement Plan (CIP) is focused on identifying facilities and infrastructure improvements. Monterey County has a total of 19 CIP infrastructure projects. Infrastructure projects can be leveraged for broadband deployments, particularly those that involve road construction, street major repairs, and pipeline maintenance, replacement, or deployment.

Roads or street infrastructure projects provide an opportunity to deploy fiber conduit alongside the major arterials and corridors. By integrating fiber optic cables or conduits during the construction phase, the business case for broadband deployment is greatly improved. Bridge replacements projects should also be leveraged for fiber or conduit deployment.

Table 14 contains examples of CIP projects with potential to include fiber lines or conduits.

Table 14. CIP in Monterey County

Name	Type	Funding Status	Project Phase
Nacimiento Lake Drive Bridge No. 449	Bridges	Fully Funded	Design/Planning
Davis Road Bridge Replacement and Road Widening	Bridges	Fully Funded	Design/Planning
Robinson Canyon Rd Bridge Scour Repair	Bridges	Fully Funded	Design/Planning
Gonzales River Bridge Replacement Project	Bridges	Fully Funded	Design/Planning
Hartnell Road Bridge Replacement	Bridges	Fully Funded	Design/Planning
Johnson Road Bridge Replacement	Bridges	Fully Funded	Design/Planning
Laguna Seca Track Resurfacing	Roads	Fully Funded	Design/Planning
Laureles Grade Rd and Carmel Valley Rd Roundabout	Roads	Fully Funded	Design/Planning
Rogge Road Intersection Improvements	Roads	Fully Funded	Design/Planning
Gloria, Iverson & Johnson Cyn Rd. Rehabilitation	Roads	First Year Funded	Design/Planning
Alisal Rd. Rehab - Salinas Limits to Hartnell Rd	Roads	Fully Funded	Design/Planning
Viejo Road - Shoulder and Asphalt Repair	Roads	Fully Funded	Design/Planning
Countywide Striping Program - Contracted Year 1	Roads	Fully Funded	Design/Planning
Old Stage Rd Rehabilitation - Alisal to Esperanza	Roads	Fully Funded	Design/Planning
Blackie Road Extension	Roads	Fully Funded	Design/Planning
Palo Colorado MP 4.0 to MP 7.8 Emergency	Roads	Fully Funded	Design/Planning
Nacimiento-Fergusson Rd Overlay	Roads	Fully Funded	Design/Planning
Blackie Rd Overlay - Commercial Pkwy 2.8mi E	Roads	Fully Funded	Design/Planning
San Miguel Canyon Rd/Castroville Blvd Roundabout	Roads	Fully Funded	Design/Planning

Figure 53 shows the location of 5 CIP Projects focused on bridge replacements. It is important to notice that the replacements are in the northern zone of the County.

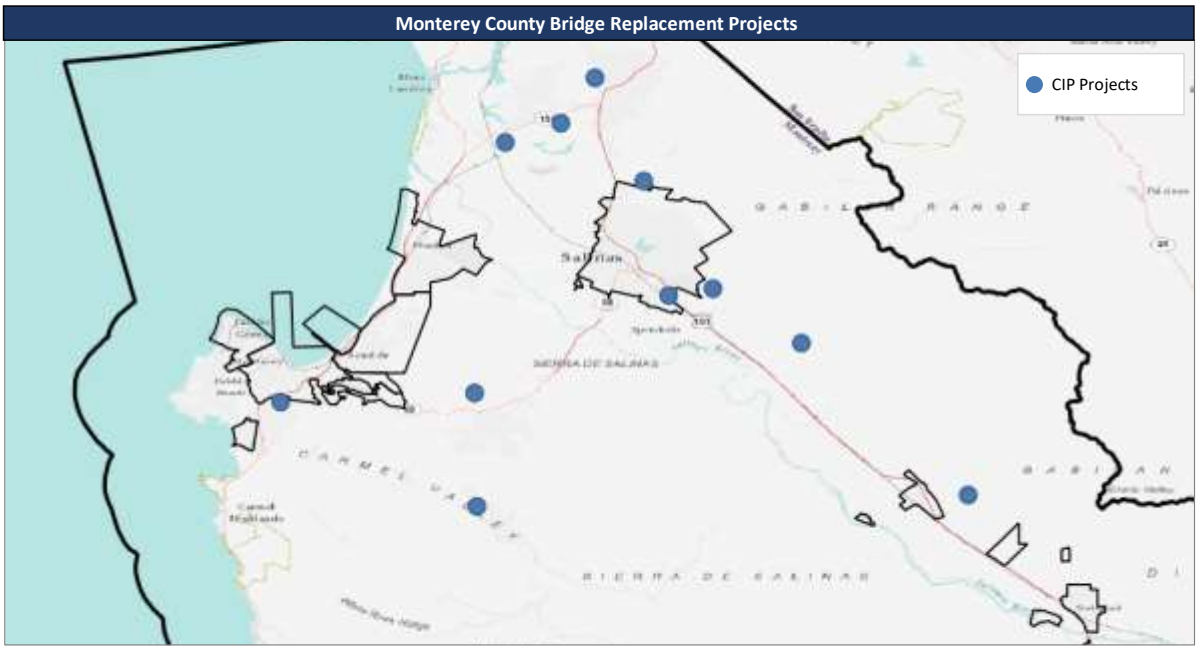


Figure 53. Monterey County Bridge Replacement Projects

5 Analysis of Network Solutions

The broadband landscape in Monterey County has been meticulously characterized in Sections 2 through 4, delving into aspects such as broadband service availability, performance, affordability, digital literacy, and service offerings, identifying needs, opportunities, and assets.

This section represents an inflection point as Sections 5 to 7 encompass the development of solutions and strategies to address the identified needs and opportunities, according to the process illustrated in Figure 54. The previous sections focus on data compilation and analysis, while Sections 5 to 7 leverage this compiled data to craft a broadband strategy.

Figure 54. Countywide Broadband Strategy Stepwise Process.

- **Identify Broadband Opportunity Zones.** Identification of areas that represent opportunities for broadband deployment due to existing need or lack of competition, based on location density,

existing service level and potential revenues. This includes areas suitable for fiber and FWA networks.

- **Develop Conceptual Designs.** Creation of a fiber or FWA conceptual design for each broadband opportunity zone, leveraging existing infrastructure and the California MMBI whenever possible. Based on conceptual designs, cost estimates are obtained and provided as input for the financial analysis.
- **Assess Operating Models.** Operating models are evaluated for each opportunity zone based on the assessment of available funding sources, financial viability, and potential partners to arrive at a recommended scenario and strategy.

Section 5 covers the first two steps of the process above, including the identification of fiber and FWA broadband opportunity zones and the development of conceptual designs and associated cost estimates. Section 6 addresses the assessment of operating models. Lastly, Section 7 integrates the implementation strategy and recommendations into a coherent action plan to achieve the objectives set forth as part of this project.

5.1 Broadband Opportunity Zones

The analysis in the previous sections revealed that 3.1% of locations in Monterey County are unserved according to FCC data and 12.4% according to CPUC data. The majority of unserved locations are in isolated areas outside of the incorporated communities. Furthermore, in areas that are served (> 100/20), there is limited access to 1 Gbps / 500 Mbps services as only 23.3% of locations in the County are 1G served. In addition, there is a limited choice of broadband services throughout the County, resulting in several areas with a de facto monopoly.

To address the identified issues, the concept of Broadband Opportunity Zones is introduced. Broadband Opportunity Zones are those areas that are attractive for broadband deployment. These areas contain sufficient density to ensure cost-effective deployment and a market environment lacking intense competition often referred to as a "virtual monopoly." These conditions will attract new fiber-based or FWA-based entrants, reducing the amount of unserved and underserved locations in the County and increasing access to 1G services and market competition.

Broadband opportunity zones are identified through clustering algorithms and GIS analysis. First, Fiber Opportunity Zones are defined algorithmically based on the following criteria:

a) Maximum of 1 fiber ISP with service area < 60%
b) Location density > 500 locations per square mile

For each fiber opportunity zone, the potential revenue is estimated based on the number of unserved, underserved, served, and 1G served locations using FCC data.

FWA opportunity zones are determined for the remaining areas, according to the following criteria:

a) Unserved and underserved locations with fiber availability < 60%
b) Location density > 40 locations per square mile

For each FWA opportunity zone, the potential revenue is estimated based on the number of unserved and underserved locations.

52 fiber opportunity zones and 12 FWA opportunity zones were identified based on the process above. Table 15 and Table 16 capture the main attributes for fiber and FWA opportunity zones, respectively.

Table 15. Fiber Opportunity Zones

Cluster ID	Cluster Name	Area w/ Fiber [%]	Serviceable Location Density [locations/sq mile]	Addressable Market [locations]	Unserved & Underserved Locations FCC	Unserved Locations CPUC
K	Greenfield	0%	1,461	3,392	48 | 1.4%	155 | 4.5%
AJ	Carmel Valley Village	0%	475	1,578	31 | 2.0%	112 | 7.1%
V	Quail Meadows	0%	717	769	41 | 5.3%	21 | 6.7%
BA	Serra Village	0%	848	744	1 | 0.1%	11 | 1.5%
AS	Carmel Valley Golf Club	0%	438	700	24 | 3.4%	12 | 5.0%
W	Buena Vista Middle School	0%	910	594	0 | 0.0%	0 | 0.0%
AL	Prune Tree Center	0%	466	552	2 | 0.4%	26 | 12.8%
AD	Pine Canyon	0%	1,436	533	0 | 0.0%	71 | 12.6%
AF	Carmel Highlands	0%	488	478	0 | 0.0%	20 | 6.3%
AA	Prunedale Elementary School	0%	501	330	0 | 0.0%	1 | 0.9%
M	River Run Rd	0%	1,417	329	0 | 0.0%	0 | 0.0%
AC	Langley Canyon Rd	0%	495	325	0 | 0.0%	3 | 0.8%
Y	Ambler Park	0%	893	319	1 | 0.3%	4 | 1.7%
AW	Crazy Horse Club	0%	659	316	0 | 0.0%	3 | 1.4%
L	Indian Spring Park	0%	636	300	0 | 0.0%	4 | 1.0%
S	Spreckels	0%	2,262	269	0 | 0.0%	1 | 0.4%
AI	Corral Country Club	0%	506	263	0 | 0.0%	16 | 7.0%
AE	Carmel Valley High School	0%	461	251	0 | 0.0%	1 | 0.7%
AX	West Prunedale	0%	1,387	240	0 | 0.0%	0 | 0.0%
F	Moro Rd	0%	496	228	0 | 0.0%	3 | 1.1%
AT	Pond Derosa Lane	0%	500	220	0 | 0.0%	0 | 0.0%
AV	Elkhorn	0%	400	171	0 | 0.0%	580 | 69.8%

AM	Arrow Transportation Company	0%	1,868	135	0 | 0.0%	134 | 100.0%
AO	San Ardo	0%	1,038	132	132 | 100.0%	147 | 100.0%
J	Cachagua Creek	0%	713	109	45 | 41.3%	296 | 94.3%
AU	San Lucas	0%	909	87	87 | 100.0%	89 | 100.0%
AH	White Rock Lake	0%	1,071	81	0 | 0.0%	97 | 90.7%
AG	Jolon Rd	0%	1,200	57	57 | 100.0%	117 | 100.0%
AP	Soledad Prison Rd	0%	967	55	55 | 100.0%	43 | 100.0%
T	Valley Oaks Mobile Park	0%	4,058	41	41 | 100.0%	17 | 100.0%
AN	Pajaro River	0%	1,365	40	0 | 0.0%	30 | 7.8%
AR	Pajaro Valley Golf Club	2%	512	211	0 | 0.0%	14 | 5.8%
D	Charter Oak Blvd	4%	1,281	922	0 | 0.0%	0 | 0.0%
G	Las Lomas	5%	774	570	4 | 0.7%	0 | 0.0%
AQ	Aromas	5%	580	233	0 | 0.0%	1 | 1.6%
H	Soledad	6%	1,861	3,887	20 | 0.5%	166 | 4.3%
I	King City	8%	1,291	2,750	36 | 1.3%	75 | 2.8%
N	Gonzales	9%	1,407	1,822	48 | 2.6%	89 | 4.8%
U	Sillman Rd	9%	1,112	45	43 | 95.6%	27 | 100.0%
Q	North Seaside	12%	696	930	3 | 0.3%	55 | 6.3%
E	Castroville	13%	1,868	1,205	1 | 0.1%	40 | 3.3%
AB	Chualar	14%	1,436	200	0 | 0.0%	4 | 2.7%
AK	Carmel by the Sea	15%	1,137	4,967	2 | 0.0%	88 | 1.8%
R	Marina	17%	1,029	5,752	74 | 1.3%	692 | 12.0%
O	Del Monte Ave	17%	3,429	394	0 | 0.0%	6 | 1.6%
C	South Seaside	22%	1,653	8,434	4 | 0.0%	381 | 4.0%
Z	Salinas	23%	1,440	28,965	254 | 0.9%	1,367 | 4.7%
P	Del Monte Golf Club	24%	826	1,396	4 | 0.3%	191 | 9.0%
X	Pajaro	29%	946	354	3 | 0.8%	13 | 3.6%
B	West Monterey	34%	1,045	3,449	12 | 0.3%	111 | 3.2%
A	Pacific Grove	57%	1,331	6,757	44 | 0.7%	146 | 2.2%
AZ	Padre Lane	58%	538	146	12 | 8.2%	1 | 0.6%
Total				**87,027**	**1,129 | 1.3%**	**5,481 | 6.3%**

Table 16. FWA Opportunity Zones

Cluster ID	Cluster Name	Area w/ Fiber [%]	Serviceable Location Density [locations/sq mile]	Addressable Market [locations]	Unserved & Underserved Locations FCC	Unserved Locations CPUC
3	Bald Mountain	0%	8	3,449	40 | 1.2%	14 | 100.0%
11	Pfeiffer Big Sur State Park	0%	28	298	297 | 99.7%	264 | 100.0%
6	Lockwood	0%	9	297	295 | 99.3%	345 | 100.0%
5	Bryson	0%	11	139	139 | 100.0%	125 | 100.0%
10	Soledad Correctional Facility	0%	86	87	83 | 95.4%	95 | 100.0%
4	Ranchito Canyon	0%	12	83	83 | 100.0%	68 | 100.0%
13	Parkfield	0%	10	53	53 | 100.0%	26 | 100.0%
12	Blackie Rd	0%	228	50	49 | 98.0%	63 | 41.4%
8	Indian Valley Rd	0%	10	37	37 | 100.0%	34 | 100.0%
9	Julia Pfeiffer State Park	0%	17	31	31 | 100.0%	29 | 100.0%
7	Cabrillo Hwy	0%	54	29	29 | 100.0%	25 | 100.0%
2	North Prunedale	3%	68	1,599	1,127 | 70.5%	1,320 | 82.5%
Total				**6,152**	**2,263 | 36.8%**	**2,408 | 39.1%**

Findings regarding the fiber opportunity zones are set forth below:

- For most of the fiber opportunity zones, fiber service offerings are available in less than 20% of the serviceable locations, with only seven of them above this threshold, confirming the opportunity for a new fiber entrant.
- In general, the percentage of unserved locations is low, which means that the main problem in the opportunity zone is market competition and lack of 1G services.
- The cities that are part of the South Salinas Valley Broadband Authority (SSVBA[23]), i.e., Salinas, Soledad, Gonzales, King City and Greenfield, are included as fiber opportunity zones. In addition, the cities of Pacific Grove, Marina, and Carmel by the Sea are also considered.
- While approximately one half of the fiber opportunity zones present a location density higher than 1,000 locations per square mile, most of the broadband opportunity zones have an addressable market of less than 1,000 locations, representing a potential challenge as ISPs are

[23] SSVBA will deploy open-access municipal broadband across Soledad, Gonzales, Greenfield, King City, and unincorporated D3 Monterey County.

usually interested in larger markets. This can be addressed through engagement and negotiations with ISPs where the municipality offers a friendly environment for deployment.

In the case of FWA opportunity zones the following observations can be made:

- In contrast to the fiber opportunity zones, FWA opportunity zones have in general a higher percentage of unserved locations.
- The addressable market for 10 of the 12 FWA opportunity zones (83%) consists of less than 300 locations. The FWA solution can address these areas in a cost-effective manner.
- The location density threshold was relaxed for some opportunity zones in order to capture as many unserved locations as possible, resulting in 8 zones below the 40 locations / sq mile.

Figure 55 to Figure 61 show map views of the identified opportunity zones.

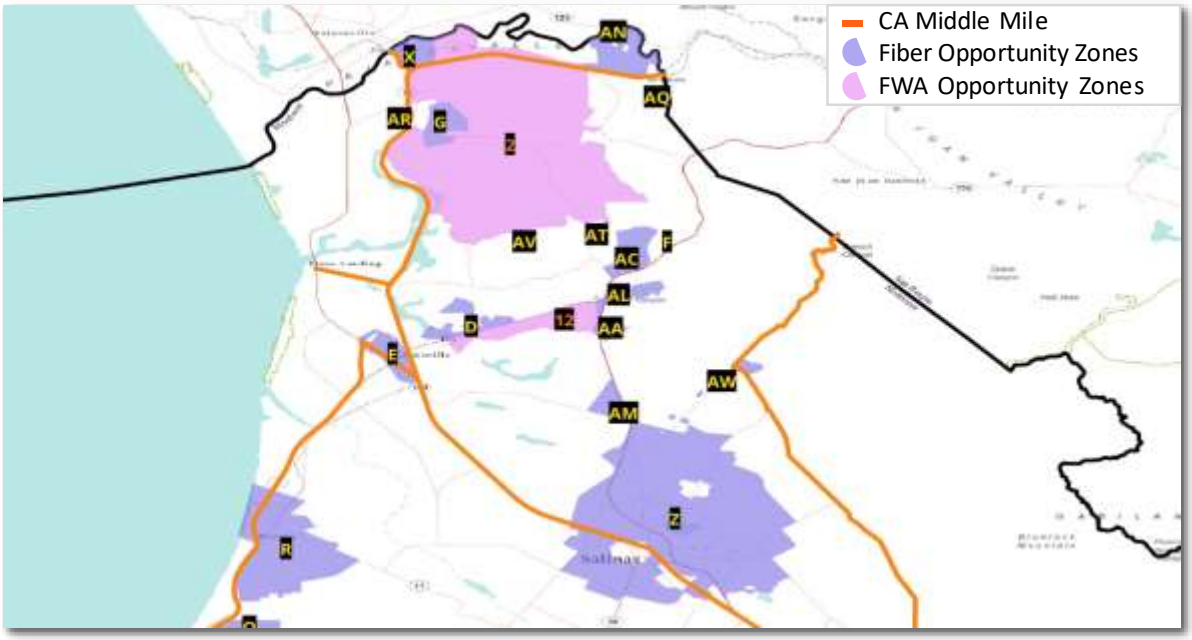


Figure 55. Broadband Opportunity Zones -- North Zone

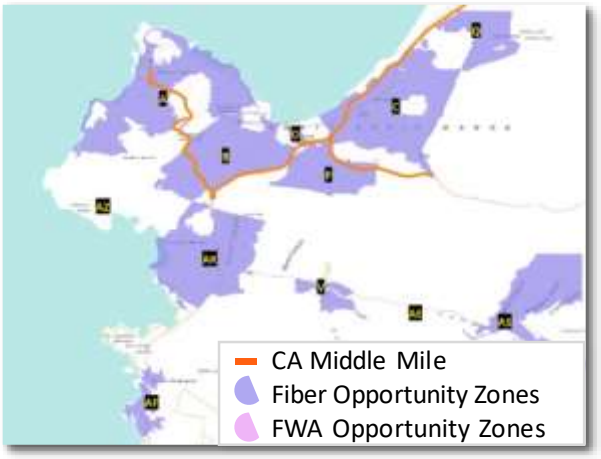


Figure 56. Broadband Opportunity Zones -- Coastal Zone

Figure 57. Broadband Opportunity Zones -- Regional Park Zone

Figure 58. Broadband Opportunity Zones -- Mill Creek Zone

Figure 59. Broadband Opportunity Zones -- Southern Zone 1

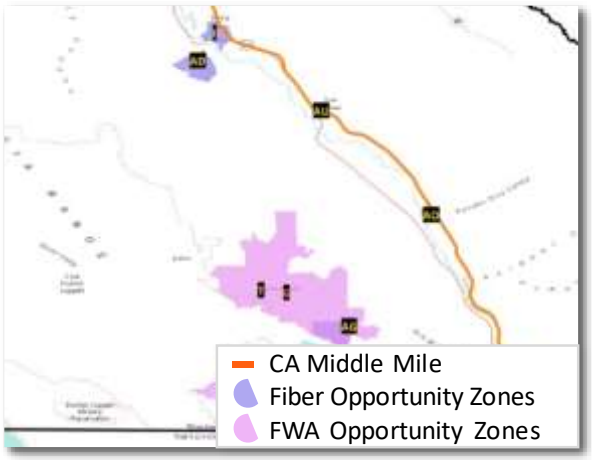


Figure 60. Broadband Opportunity Zones -- Central Zone

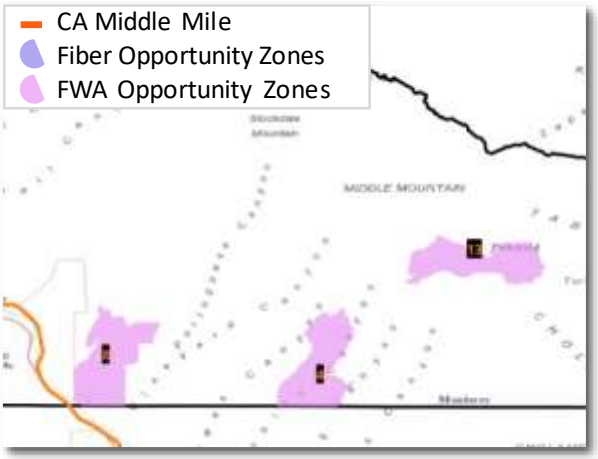


Figure 61. Broadband Opportunity Zones --Southern Zone 2

As depicted in the figures above, the Northern Zone, Coastal Zone, Regional Park Zone, and Central Zone host the majority of Fiber Opportunity Zones. Importantly, most of the fiber opportunity zones are in close proximity to the California MMBI, enabling last-mile providers to enter the market without investing in middle mile infrastructure.

In contrast, FWA opportunity zones are concentrated in remote areas of the County characterized by mountainous and challenging terrain which represents a bigger challenge.

5.2 Conceptual Designs & Cost Estimates

Once the broadband opportunity zones have been identified, it is necessary to develop conceptual network designs and derive the associated cost estimates for each opportunity zone. Cost estimates are provided as inputs for the financial analysis and the assessment of the implementation strategy. The process, assumptions, and outcomes of the development of fiber and FWA conceptual designs and cost estimates are the subject of this section while Section **Error! Reference source not found.** addresses the implementation strategy and the associated financial analysis.

It is important to note that the conceptual designs and associated cost estimates presented herein have inherent limitations as they are developed as "generic" designs that consider a greenfield deployment and the use of the California MMBI for middle mile connectivity. This means that the cost estimate for an ISP operating in the area may be lower as they can leverage its existing last-mile and middle mile infrastructure.

5.2.1 Fiber Opportunity Zones

Conceptual designs for fiber opportunity zones are based on XGS Passive Optical Network (PON) technology. XGS-PON offers a symmetric line rate of ~10 Gbps which is shared among multiple users through optical splitters. This technology ensures symmetrical download and upload speeds of at least 1 Gbps per subscriber. The associated network architecture is illustrated in Figure 62. Further details of this technology can be found in Annex A.

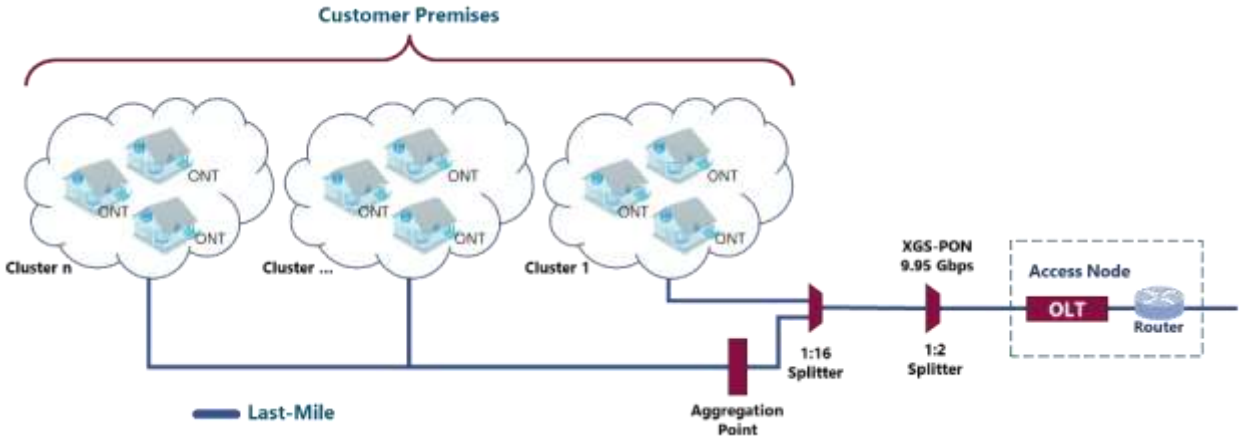


Figure 62. FTTP Network Architecture is based on XGS-PON.

Figure 63 captures the process to develop fiber conceptual designs.

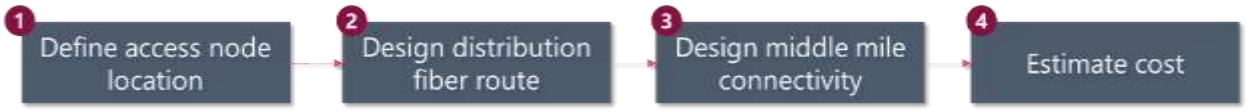


Figure 63. Fiber conceptual design process.

As shown, the first step of the process is defining the location of the access node. This is the facility where network equipment is installed, including the Optical Line Terminal (OLT) which is the piece of equipment that connects directly to the customer premises and aggregates traffic from subscribers. The access node location is selected from existing facilities owned by the local government or anchor institutions to ensure that the maximum distance between any given subscriber and the OLT is below 12 miles.

Then, the distribution fiber route is designed based on existing roads and ensuring that fiber drops are no longer than 650 ft. For middle mile connectivity, a fiber connection is considered between the OLT and the California MMBI or, if available, existing middle mile infrastructure owned by the local governments. Figure 64 shows a sample fiber design corresponding to Salinas opportunity zone.

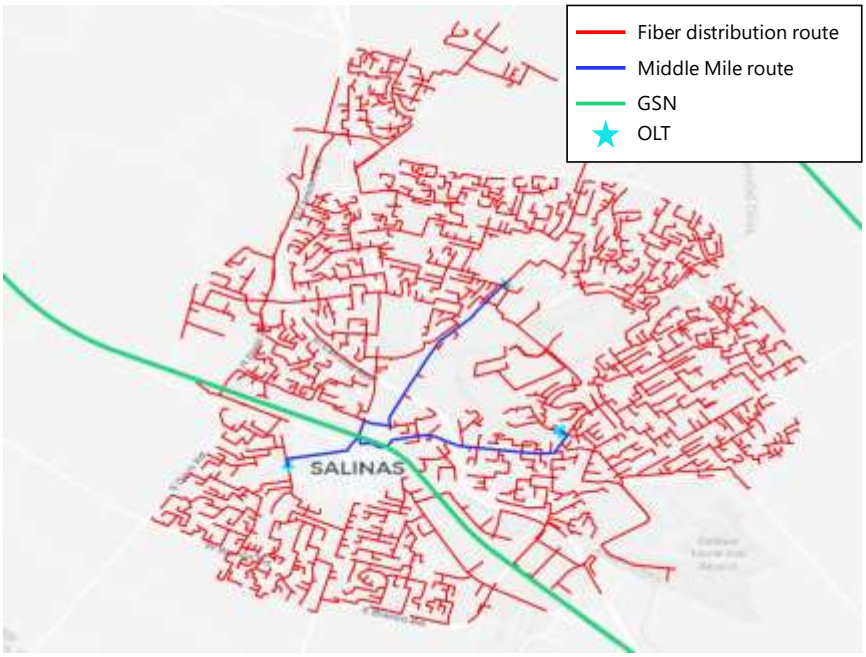


Figure 64. Fiber Design for the Salinas Opportunity Zone.

Finally, the cost to deploy each opportunity zone is estimated including pre-construction engineering and permitting, fiber construction, network equipment, and middle mile connection costs. These cost estimates assume prevailing wages and that, on average, fiber infrastructure will be 70% underground and 30% overhead.

The cost analysis for fiber deployment in Monterey County's opportunity zones reveals a substantial financial commitment, with an average cost of approximately $3,700 per location. The total projected cost for implementing fiber infrastructure across all the zones is estimated at a significant $325,316,635 underscoring the scale of investment required.

Table 17 captures the key cost drivers and estimates for the fiber opportunity zones. It highlights that 83% of the overall estimated costs are allocated to the construction of distribution routes,

encompassing both underground and aerial deployment. This underscores the pivotal role of robust infrastructure development in achieving widespread broadband access. As a complex and special case within the opportunity zones, Salinas alone embodies a significant portion of these costs.

Table 17. Fiber opportunity zones cost estimates.

Opportunity Zone	New Construction Last-mile Route Length [miles]	New Construction Middle-mile Route Length [miles]	Pre-Construction Cost [$]	Fiber construction Cost [$]	Network Equipment Cost [$]	Middle Mile Construction Cost [$]	Total Cost [$]
Pacific Grove	43.5	0.0	527,601	16,092,179	350,700	0	**16,970,480**
West Monterey	30.1	0.0	364,874	11,250,512	233,800	0	**11,849,186**
South Seaside	53.9	0.0	652,620	19,823,688	350,700	0	**20,827,008**
Charter Oak Blvd	11.0	1.2	132,579	4,152,832	116,900	459,471	**4,861,781**
Castroville	8.3	0.0	100,984	3,201,625	116,900	0	**3,419,509**
Moro Rd	6.7	2.0	80,805	2,605,337	116,900	728,585	**3,531,628**
Las Lomas	8.5	1.5	102,762	3,256,885	116,900	564,277	**4,040,823**
Soledad	26.4	0.0	319,195	9,706,186	233,800	0	**10,259,182**
King City	17.3	0.0	210,227	6,442,624	116,900	0	**6,769,751**
Cachagua Creek	1.3	10.6	16,359	663,815	116,900	3,967,818	**4,764,892**
Greenfield	26.5	3.2	321,320	9,772,244	233,800	1,181,622	**11,508,985**
Indian Spring Park	5.9	0.0	71,199	2,306,655	116,900	6,997	**2,501,751**
River Run Rd	2.2	2.0	26,345	974,291	116,900	737,035	**1,854,571**
Gonzales	15.1	0.0	183,127	5,631,152	116,900	0	**5,931,179**
Del Monte Ave	8.4	0.3	101,772	3,226,125	116,900	120,656	**3,565,453**
Del Monte Golf Club	16.7	0.0	204,595	6,224,901	116,900	0	**6,546,396**
North Seaside	12.3	0.8	148,845	4,627,483	116,900	293,632	**5,186,861**
Marina	42.4	0.0	529,667	15,799,559	233,800	0	**16,563,026**
Spreckels	1.6	2.3	20,153	781,770	116,900	872,297	**1,791,120**
Valley Oaks Mobile Park	0.3	6.4	4,039	311,889	116,900	2,384,742	**2,817,570**
Sillman Rd	0.7	0.0	7,861	430,694	116,900	0	**555,455**
Quail Meadows	7.3	3.6	88,576	2,815,832	116,900	1,332,894	**4,354,202**
Buena Vista Middle School	6.3	1.0	75,932	2,453,829	116,900	388,584	**3,035,246**
Pajaro	3.5	0.0	42,460	1,444,232	116,900	0	**1,603,591**
Ambler Park	4.4	3.5	52,788	1,765,355	116,900	1,319,998	**3,255,042**
Salinas	182.6	0.0	2,211,589	66,676,247	1,169,000	0	**70,056,836**
Prunedale Elementary School	7.4	3.4	90,182	2,865,789	116,900	1,255,652	**4,328,524**
Chualar	1.5	0.0	18,652	735,128	116,900	0	**870,681**

Langley Canyon Rd	7.0	0.5	84,239	2,712,095	116,900	170,864	**3,084,098**
Pine Canyon	4.1	2.8	49,779	1,671,783	116,900	1,056,257	**2,894,718**
Carmel Valley High School	4.9	2.4	59,494	1,973,848	116,900	898,823	**3,049,066**
Carmel Highlands	10.3	3.4	124,073	3,888,397	116,900	1,258,599	**5,387,969**
Jolon Rd	0.7	11.7	7,966	433,972	116,900	4,353,445	**4,912,283**
White Rock Lake	0.8	9.5	9,090	468,903	116,900	3,552,763	**4,147,656**
Corral Country Club	5.2	1.2	63,269	2,060,112	116,900	443,711	**2,683,993**
Carmel Valley Village	26.6	5.4	322,539	9,996,460	116,900	2,016,398	**12,452,297**
Carmel by the Sea	35.7	1.1	432,122	13,248,029	233,800	405,218	**14,319,169**
Prune Tree Center	11.0	2.1	132,246	4,142,495	116,900	770,299	**5,161,940**
Arrow Transportation Company	1.4	4.9	17,806	708,804	116,900	1,817,652	**2,661,162**
Pajaro River	0.1	1.8	1,556	234,680	116,900	653,674	**1,006,810**
San Ardo	1.2	0.0	14,942	619,779	116,900	0	**751,621**
Soledad Prison Rd	1.1	0.0	13,459	573,665	116,900	0	**704,024**
Aromas	4.3	0.0	52,322	1,750,870	116,900	0	**1,920,092**
Pajaro Valley Golf Club	5.3	0.0	64,370	2,094,334	116,900	0	**2,275,604**
Carmel Valley Golf Club	11.8	2.2	143,133	4,636,186	116,900	834,686	**5,730,905**
Pond Derosa Lane	5.8	0.5	70,259	2,277,448	116,900	184,005	**2,648,612**
San Lucas	1.5	0.0	17,937	712,879	116,900	0	**847,716**
Elkhorn	4.1	2.6	49,261	1,655,700	116,900	975,756	**2,797,618**
Crazy Horse Club	4.8	0.0	57,740	1,919,313	116,900	0	**2,093,953**
West Prunedale	2.2	1.2	26,529	980,013	116,900	432,708	**1,556,150**
Padre Lane	3.6	2.9	43,812	1,486,281	116,900	1,071,779	**2,718,772**
Serra Village	9.6	4.8	118,739	3,862,011	116,900	1,792,029	**5,889,679**
Total	**715.1**	**102.6**	**8,683,789**	**270,146,918**	**8,183,000**	**38,302,929**	**325,316,635**

5.2.2 FWA Opportunity Zones

In the case of FWA opportunity zones, the conceptual design considers the use of 5G base stations using Citizens Broadband Radio Service (CBRS) 3.5 GHz spectrum. The Radio Access Network (RAN) sites are

located on rooftops or towers that will cover the surrounding locations. The associated network architecture is shown in Figure 65.

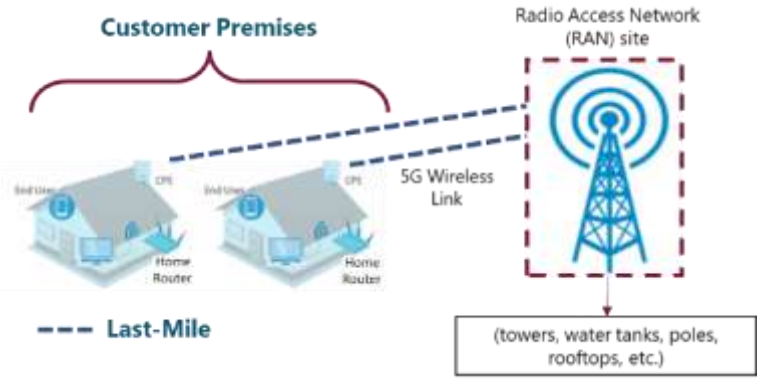


Figure 65. FWA Network Architecture.

The process to develop the conceptual design for each of the FWA opportunity zones is illustrated in Figure 66.

Figure 66. FWA conceptual design process.

First, the number of RAN sites required is obtained based on the expected number of subscribers in the opportunity zone, and the capacity of the standard site configuration. The standard site configuration consists of three sectors, each one implemented through a 40 W 64T64R 5G radio. Through this configuration it is possible to serve 180 locations with 100 Mbps symmetric speeds or 300 locations with 100 Mbps downstream and 20 Mbps upstream. The 100/20 service is considered in cases where the deployment of a second site can be avoided by using this configuration.

For each site, a location is selected considering rooftops of local government facilities, existing towers, or the deployment of a new tower where existing infrastructure is not available or suitable. Coverage plots are generated are analyzed for the selected site. This can include several iterations to select the site that ensures adequate coverage of the FWA opportunity zone. Then, middle mile connectivity is designed considering a fiber connection to the California MMBI or a microwave link to a connected location.

Finally, the cost for each FWA opportunity zone is estimated, including site / tower construction, network equipment, customer installations, and middle mile connection costs.

The cost analysis for the Fixed Wireless Access (FWA) opportunity zones provides essential insights into the financial implications of extending broadband infrastructure within these areas their main components are captured in Table 18. Notably, the cost per location for FWA deployment is estimated at approximately $11,482. When considering the total cost for implementing FWA infrastructure across all opportunity zones, which amounts to $70,639,599, we gain a comprehensive view of the significant financial commitment entailed in bridging the digital divide. It is important to highlight that the high cost of middle-mile routes is concentrated in the opportunity zones located in remote areas of the coastal and southern regions of the County, emphasizing the unique challenges and expenses associated with these zones.

Table 18. Monterey FWA opportunity zones cost estimates.

Opportunity Zone	Number of sites	Site Construction cost [$]	Network Equipment cost [$]	Customer Installation cost [$]	Middle Mile Connection cost [$]	Total Cost [$]
North Prunedale	8	628,150	1,662,445	929,390	630,000	**3,849,985**
Bald Mountain	4	925,000	391,164	26,950	5,085,000	**6,428,114**
Ranchito Canyon	3	110,850	293,373	63,910	4,725,000	**5,193,133**
Bryson	5	1,156,250	488,954	70,070	4,860,000	**6,575,274**
Lockwood	2	332,550	880,118	159,390	6,030,000	**7,402,058**
Cabrillo Hwy	2	73,900	195,582	20,020	2,430,000	**2,719,502**
Indian Valley Rd	3	693,750	293,373	22,330	2,520,000	**3,529,453**
Julia Pfeiffer State Park	2	462,500	195,582	18,480	3,195,000	**3,871,562**
Soledad Correctional Facility	1	36,950	97,791	59,290	225,000	**419,031**
Pfeiffer Big Sur State Park	2	258,650	684,536	166,320	22,005,000	**23,114,506**
Blackie Rd	1	36,950	97,791	36,960	1,800,000	**1,971,701**
Parkfield	2	73,900	195,582	30,800	5,265,000	**5,565,282**
Total	**56**	**4,789,400**	**5,476,289**	**1,603,910**	**58,770,000**	**70,639,599**

6 Implementation Strategy

6.1 Operating Models & Assessment Methodology

The identification of broadband opportunity zones and the development of conceptual designs and cost estimates in Section 5 constitutes the answer to “what” is needed in Monterey County to expand and improve broadband infrastructure. Section 6 seeks to find the “how” to implement these solutions from a financial and operational point of view.

The assessment of various operating / business models is required to find the most feasible path for implementation of each broadband opportunity zone. By assessing these options, tailored strategies can be defined to attract partners or enhance the chances of getting funds.

The operating models considered for evaluation throughout this Section are summarized in Figure 67 and described below.

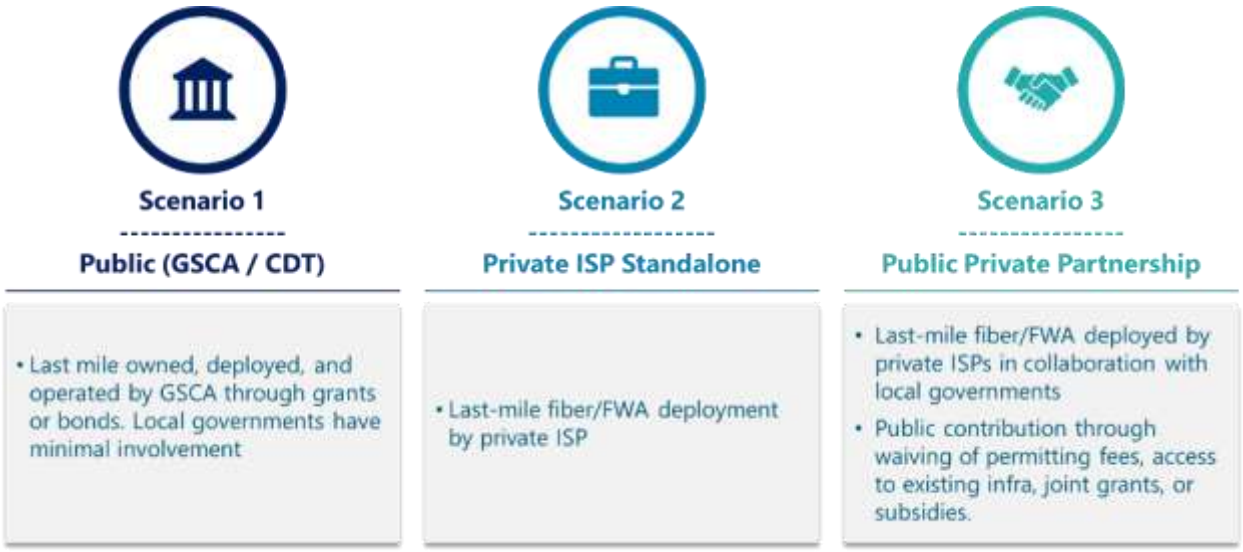


Figure 67. Operating Models

Public (GSCA / CDT)

The last-mile network is owned, deployed, and operated by Golden State Connect Authority (GSCA)[24], a joint powers authority of 39 member counties, including Monterey County. GSCA is actively involved in last-mile deployments to increase access to reliable, affordable high-speed internet for all rural Californians. Local governments are expected to provide a location and real estate for telecom huts, a single Point of Contact (PoC) for permitting, and support to verify feasibility and identify potential issues with the projected deployments.

Under this model, the main source of funding will come from federal and state grants. However, bonds can also be considered for high-density areas with lack of competition.

Middle mile connectivity is provided by CDT via the California MMBI. Where the MMBI is not present, joint grants between CDT and GSCA can be leveraged to deploy this infrastructure.

In general, this model is well suited for opportunity zones with a high location density, that are grant eligible and are in close proximity to the California MMBI fiber route.

Private ISP Standalone

A private ISP owns, deploys, and operates the last-mile network, potentially leveraging its existing infrastructure. Middle mile connectivity can be based on ISP infrastructure, or it can leverage the California MMBI network. Funding can come from the ISP financing sources or from federal and state grants, but in this case, grants do not consider collaboration with local governments.

This model is applicable to opportunity zones with a positive business case for the private ISP with or without grants.

Public Private Partnership

The last-mile network is deployed by a private ISP in collaboration with local governments and commonly operated by the private ISP. The level of collaboration from the local government can vary

[24] https://goldenstateconnect.org/

from simple inducements such as waiving of permitting fees and granting free access to public infrastructure to partnering for grants or providing direct funding for joint deployments.

This model usually requires funding from federal and state grants in addition to private funds. Opportunity zones in remote areas with challenging business cases are most likely to use this model.

Sections 6.2 to 6.5 focus on the assessment of operating models for the opportunity zones and the identification of the recommended scenarios according to the process depicted in **Error! Reference source not found.**.

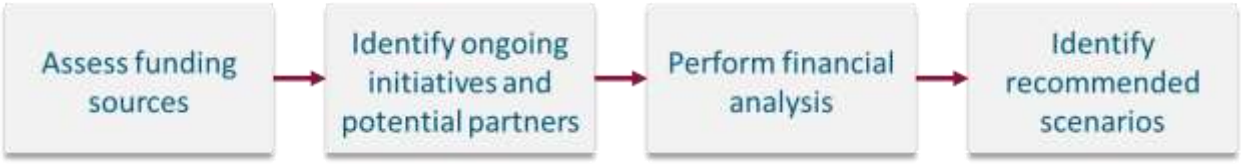


Figure 68. Operating Model Assessment Process.

Finally, Section 6.6 presents an analysis of broadband policies from local jurisdictions in the County and provides recommendations to implement broadband-friendly policies that contribute to incentivize broadband investment and streamline deployments.

6.2 Funding Sources Analysis

Identifying public funding sources is crucial to enable the deployment of broadband infrastructure in challenging areas. These projects require extensive capital investment making it difficult to ensure a sustainable business case without additional funding.

Multiple programs related to broadband have been created by state and federal entities in response to the urgent need to close the digital divide. Most of these programs can be traced back to the following legislation:

1. **Senate Bill 156:** Governor Newsom signed Senate Bill 156 (SB-156) that allocates $6 billion for expanding broadband infrastructure and access in California. Most relevant programs emerging from this senate bill focus on deploying Middle-mile and Last-mile networks across the state.
2. **Bipartisan Infrastructure Law:** In November 2021, President Joe Biden signed the Infrastructure Investment and Jobs Act (IIJA) or Bipartisan Infrastructure Law (BIL) to support internet expansion, access, and use nationwide. The BIL provides a total of $65 billion for the following areas:
    - Planning activities and studies for the development of Internet expansion projects.
    - Network infrastructure deployment for high-speed Internet Activities to increase Internet access and meaningful use of high-speed internet.
    - This includes digital literacy, skills training, telehealth, and remote learning.

    Of particular importance is the Broadband Equity, Adoption, and Deployment (BEAD) Program emanates from the BIL providing an overall $42 billion for infrastructure deployment for the

states and US territories. In June, California[25] was announced to receive $1.8 million of BEAD funds that will be shared among broadband projects in the state.

Figure 69 displays a map with federal and state funding programs that emanate from the legislation above, including broadband infrastructure and digital equity programs.

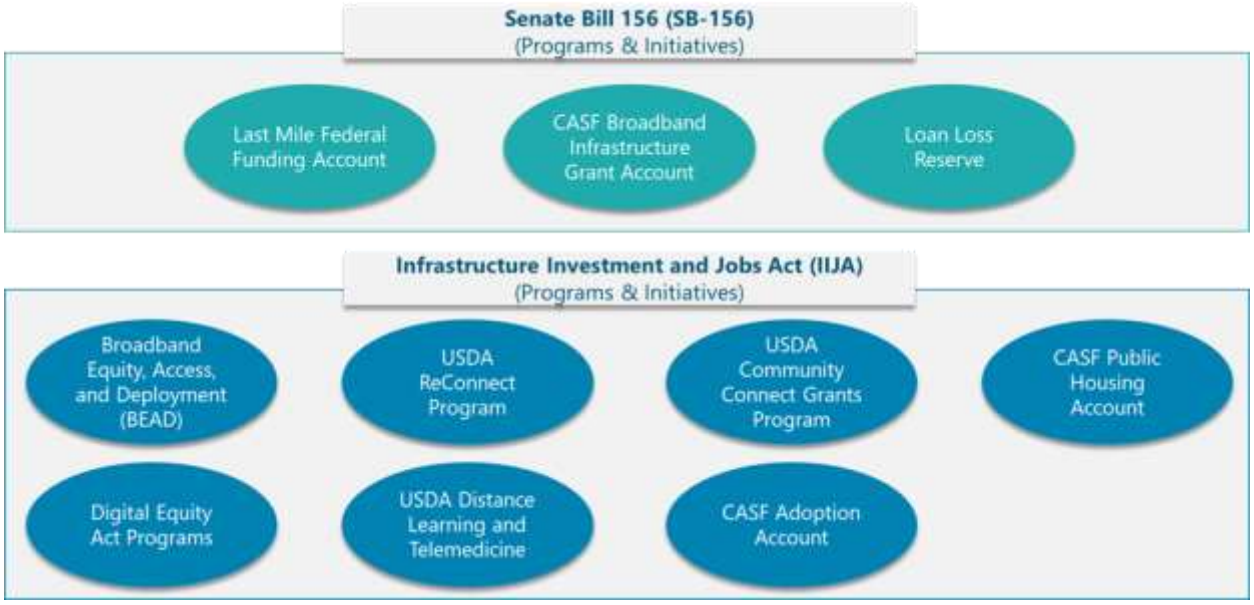


Figure 69. Federal and state broadband funding programs.

Each program targets slightly different objectives and incorporates different eligibility criteria, requirements, and timelines. Table 19 provides a high-level overview that serves as a reference to evaluate the suitability of these programs for the identified broadband opportunity zones.

[25] https://broadbandusa.ntia.doc.gov/news/latest-news/biden-harris-administration-announces-state-allocations-4245-billion-high-speed

Table 19. State and Federal Funding Programs summary.

Entity	Funding Program	Application Timelines	Eligible Criteria	Maximum Grant Amount per project
Infrastructure Programs				
CPUC	**Last Mile Federal Funding Account** $2 B	September 29, 2023 (every six months)	• Unserved / underserved locations • **Wired** technologies that offer 100 / 100 service • Matching is recommended	$25,000,000 See Note 1
	CASF Broadband Infrastructure Grant Account $150 M	October 1, 2023	• Unserved locations • Wired or wireless technologies that offer 100 / 20 service • Priority to inaccessible and low-income areas	$25,000,000 See Note 1
	CASF Broadband Public Housing Account $15 M	Jan 1, 2024 July 1, 2024	• Low-income communities without broadband access. • Projects proposing free broadband service.	$150,000 See Note 1
	Loan Loss Reserve Fund $750 M	Rolling basis	• Unserved and underserved areas • Demonstration of financial, technical, and operational expertise. • Wired or wireless technologies that offer 100 / 100 service	20% of total amount of the project
NTIA	**Broadband Equity, Access, and Deployment** $42 B	2024-2025	To be confirmed by the State of California	
USDA	**Community Connect Grant Program** $79 M	To Be Determined (TBD) See Note 2	• Unserved rural areas (<25/3 service) • Local governments and incorporated organizations willing to provide broadband for community oriented connectivity See Note 3	$5,000,000
Digital Equity Programs				
CPUC	**CASF Adoption Account** $20 M	Jan 1, 2024 July 1, 2024	• Local governments, institutions, and non-profit/community-based organizations willing to increase access and digital inclusion.	$40,000
USDA	**ReConnect Loan and Grant Program** $350 M	TBD See Note 2	• Unserved eligible See Note 4 rural areas (at least 50% of households without access to 25/3)	$25,000,000
	Distance Learning and Telemedicine (DLT) Grant Program $64 M	TBD See Note 2	• Education or health organizations that provide their services through telecommunications facilities.	$1,000,000

			• Rural areas with populations below 20,000 habitants.	
US DOT	**SMART Grants Program** $100 M	October 10, 2023	• Public sector agencies willing to conduct smart community projects to improve transportation efficiency and safety	$2,000,000
Note 1: Maximum amount to get a ministerial review. Greater amount will get through a resolution process. Note 2: The most recent rounds of Community Connect and ReConnect Grants have been closed but it is expected that additional rounds will be announced in the future. Note 3: Economic growth, education, health care, and public safety. Note 4: According to program guidelines.				

For each broadband opportunity zone, eligibility and likelihood of broadband infrastructure programs were evaluated, identifying the potential funding sources that can be considered for each opportunity zone. The detailed results of this evaluation are captured in Annex C and Table 20 summarizes eligibility and number of opportunity zones per funding program in Monterey County.

Table 20. Funding Program Eligibility Summary.

Technology	FFA	CASF	ReConnect	BEAD	EDA	Not Eligible
Fiber	10	14	0	5	1	22
FWA	0	11	1	0	0	0

Notably, not all the identified opportunity zones within Monterey County are eligible for grant funding. It's essential to recognize that certain zones may face eligibility challenges due to low location density or a lack of unserved/underserved serviceable locations, which could limit their chances of receiving grants.

The total grant funding required to fully address the connectivity gaps in these opportunity zones is estimated at $116.5 million. However, the availability of funding is a significant challenge, with grant pools being limited. For instance, the 2023 FFA grant program allocates only $10.4 million for Monterey County, which falls far short of the estimated costs within the SSVBA area, totaling approximately $29 million. This highlights the pressing need for strategic allocation of available funds to maximize impact.

The County has applied for last-mile FFA funding for the cities and low-income and disadvantaged unserved communities within the SSVBA area. In total, there are 12 opportunity zones that should be considered as candidates for applying for this funding.

Within Monterey County, several active CASF applications demonstrate ongoing efforts to enhance broadband access. LCB Communication has applied for a CASF Grant to build a hybrid network capable of delivering high-speed services to both fiber and wireless subscribers. Cruzio is seeking a CASF Grant to deploy high-speed connectivity to numerous previously underserved locations in several counties. Surfnet Communications has applied for a CASF Grant to provide broadband access to eligible locations

across multiple counties. As these applications progress, they contribute to the broader initiative of improving connectivity in the region.

6.3 Ongoing initiatives and potential partners

The broadband environment is continuously changing. Therefore, the implementation strategy for broadband opportunity zones must take into account ongoing broadband projects and infrastructure initiatives within the broadband opportunity zones or in close proximity. Awareness of the ongoing initiatives is crucial to identify partners, optimize resources and infrastructure from public agencies, avoid duplication of funds and streamline deployment.

Ongoing initiatives that are relevant include, but are not limited, to the following:

- **Pending or awarded grants**: Grant applications for the deployment of broadband infrastructure in the County, whether they have been awarded or awaiting a decision from the funding agency. This includes grant applications submitted to CPUC, FCC, USDA, and others under various programs.
- **ISP Projects**: Known plans or initiatives from the ISPs to deploy or expand broadband infrastructure based on discussions and agreements between local jurisdictions and the ISP.
- **Public Broadband Infrastructure Plans**: Projects from the local governments that involve the deployment or expansion of broadband infrastructure including conduit and /or fiber.

In addition, CIP Projects from the Cities and the County that involve road construction or major reparations and pipeline replacement or deployment can be leveraged to deploy broadband infrastructure. These projects may represent an important cost reduction and simplification of broadband permitting.

Table 21 presents the ongoing initiatives identified within the County:

Table 21. On-going Initiatives

Initiative Name	Description	Related Opportunity Zones
SSVBA	The South Salinas Valley Broadband Authority (SSVBA) is a five-municipality JPA that was formed in May of 2022. The goal of the SSVBA is to deploy open-access municipal broadband across Soledad, Gonzales, Greenfield, King City, and unincorporated D3 Monterey County.	10 (FTTH) | 7 (FWA)
Crown Castle Leasing	To connect the south side of the county, the SSVBA proposes the lease of strands (4 or more) on the existing portion of the Connected Central Coast fiber route from the City of Santa Cruz to Soledad.	13 (FTTH) | 3 (FWA)
Underline	Underline has active agreements with the City of Salinas to deploy an Open Access Network and Small Cells at various city locations	1 (FTTH)
Kimler-Horn	Kimley-Horn has an active agreement with the City of Salinas to develop the City Broadband Strategic Plan	1 (FTTH)

	and to design the Alisal Neighborhood Broadband Fiber Network	
Garlic-LCB	LCB Communication requests a CASF Grant to build a hybrid network (Fiber/FWA). LCB's Hybrid network will be capable of providing up to 5Gbps symmetrical service to fiber subscribers and up to 600Mbps down by 100Mbps up to wireless subscribers.	3 (FTTH) | 1 (FWA)
Cruzio Internet	LCB Internet request a CASF Grant to deploy multi-hundred Mbps last mile connectivity to 2565 unserved locations in San Mateo, Santa Cruz, Santa Clara, and Monterey Counties that are currently able to receive less than 25 Mbps download and 3 Mbps upload. There are 1125 serviceable anchor institutions within the project area.	7 (FTTH) | 2 (FWA)
Surfnet Communications	Surfnet Communications request a CASF Grant to provide high-speed, low cost, and reliable broadband to 542 eligible locations distributed into Monterey, Santa Cruz, San Luis Obispo, and Santa Clara Counties.	1 (FWA)
GSCA - FFA Application (See Note 1)	GSCA will deploy and operate an open access, last mile, municipal, fiber network in low-income areas within the SSVBA region. GSCA has requested $17 million to cover 749 unserved locations and plans to interconnect its last-mile network with the CA Middle Mile network.	5 (FTTH)
AT&T - FFA Application (See Note 1)	AT&T is requesting $37 million to deploy a 10Gbps FTTH Network, covering 5,752 unserved locations. Their aim is to encompass the cities of Carmel by the Sea, Del Rey Oaks, Seaside, Marina, Sand City, Monterey, Salinas, Greenfield, Gonzales, King City, Pacific Grove, and unincorporated areas in the northern, coastal, and southern zones of the County. AT&T does not intend to interconnect its last-mile network with the CA Middle Mile.	45 (FTTH)
Comcast - FFA Application (See Note 1)	Comcast will build a fiber network capable of symmetrical service of at least 1 gigabit, serving unserved and underserved communities in the Project Area. This Project will provide service for approximately 542 unserved locations. Comcast will leverage compatible and available facilities to support the Project, relying on existing utility poles in rights-of-way for aerial installation where attachments are permitted by the pole owner. Open access requirements do not apply because Comcast only seeks FFA funds for last mile infrastructure and does not intend to interconnect with the open access statewide Middle Mile Network.	8 (FTTH)

LCB - FFA Application (See Note 1)	LCB Communications LLC (LCB) is proposing to build a hybrid network consisting of Middle-Mile and Last Mile fiber and fixed Wireless. To complete this project, it is essential that LCB build middle mile infrastructure. LCB is looking to serve 580 households with Fiber to the Home (FTTH). LCB will also run Fiber to the Premise (FTTP) to 2 Anchor institutions and 3 businesses.	1 (FTTH) | 1 (FWA)
Surfnet - FFA Application (See Note 1)	The project will interconnect with middle-mile infrastructure. Internet backhaul will be achieved through existing network or new carrier connections, using an "active" headend for service distribution. Cabinets, either existing or new, will house backhaul routers. The project utilizes Passive Optical Networking (PON), a power-efficient technology with minimal visual impact due to its small 1/2" cables. PON can deliver up to 10Gbps speeds.	1 (FTTH)
Note 1: The areas comprising active FFA projects are shown in Figure 70.		

AT&T brings good news for the County. As previously mentioned in Section 3, AT&T, as the incumbent provider, still offers DSL services in most of their locations. Now, AT&T is requesting $37 million to deploy a 10Gbps FTTH Network.

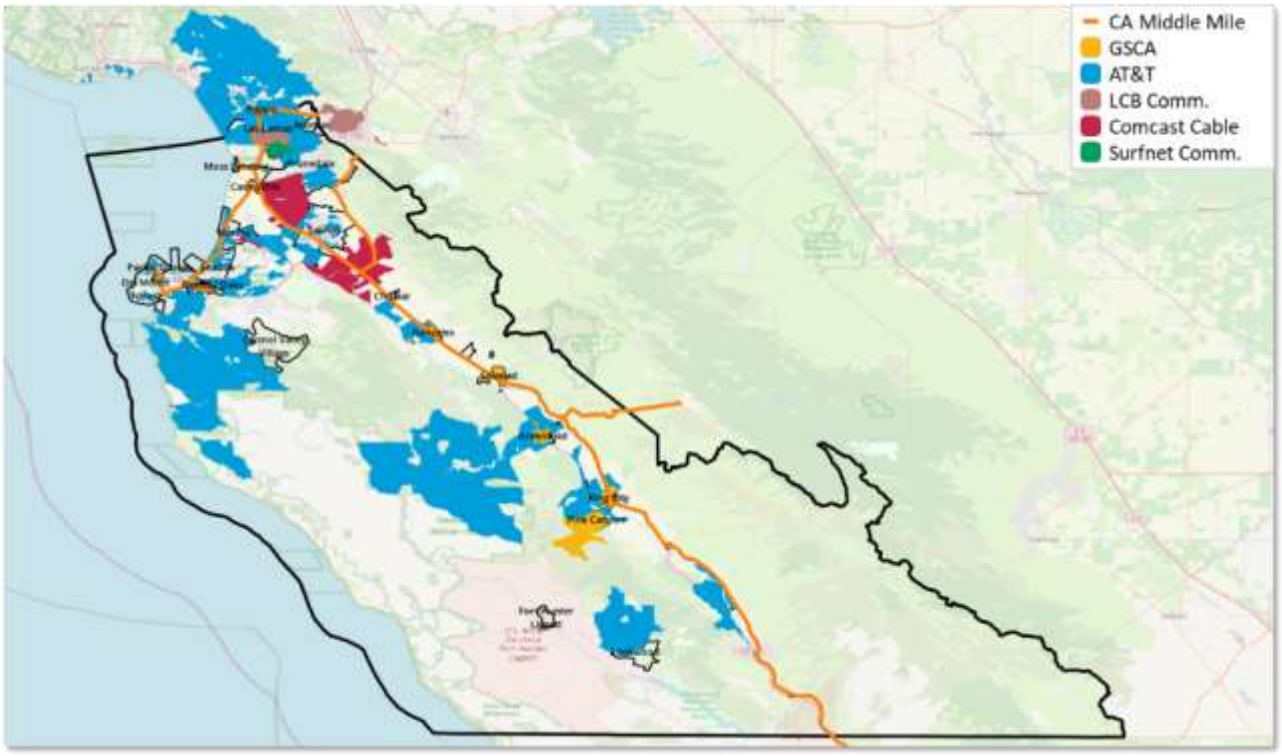


Figure 70. FFA Projects Mapping

Implementation of broadband projects in the target opportunity zones requires the identification of the right partners and these ongoing initiatives are an indication of potential partners. For example, the Golden State Connect Authority (GSCA), GSCA will use Last-Mile FFA grants to serve all the low-income and disadvantaged communities within the SSVBA area. They could potentially partner for 9 Fiber opportunity zones, potentially covering 510 unserved locations.

Potential partners for each broadband opportunity zone were identified based on the following:

1) If there is an ongoing initiative within the opportunity zone, the entity that leads that ongoing initiative is selected as the main partner.
2) GSCA is considered a potential partner for opportunity zones that are proximal to the California MMBI network, are grant eligible, and have a high location density (> 700 locations per square mile).
3) Where #1 and #2 above are not applicable, ISPs are considered as potential partners based on their existing level of service and technology within or near to the opportunity zone. ISPs with existing fiber last-mile service in nearby areas are ranked first, then ISPs serving the broadband opportunity zone with DSL or cable technologies.

The potential partners for each opportunity zone are presented in Table 22. AT&T, GSCA, Cruzio and T-Mobile are the key potential partners with the most substantial impact on addressing opportunity zones.

- **Cruzio Internet:** Cruzio is actively involved in providing last-mile connectivity in multiple areas in the northern zone of the County. They might serve as a partner for 7 Fiber opportunity zones and 1 FWA Opportunity zone.

- **AT&T Inc:** AT&T operates infrastructure including fiber, FWA, and copper across various areas of the County. They could be considered a potential partner, especially in areas where middle-mile infrastructure is not yet established, and the construction costs for fiber are prohibitively high.
- **T-Mobile:** T-Mobile plays a crucial role in providing Fixed Wireless Access (FWA) services in the mountainous and challenging zones located in the southern and coastal regions of Monterey County

Table 22. Potential Partners

Potential Partner	Technology	Number of Opportunity Zones	Unserved Locations CPUC	% of Unserved Locations CPUC
AT&T	Fiber	17	1,051	1%
GSCA (Phase 1)	Fiber	9	808	5%
Cruzio	Fiber	7	857	1%
Garlic	Fiber	7	628	1%
GSCA (Phase 2)	Fiber	6	662	2%
Comcast	Fiber	2	4	0%
Underline	Fiber	1	1,367	0%
Vast	Fiber	1	13	0%
Astound	Fiber	1	88	0%
Underline	Fiber	1	3	0%
T-Mobile	FWA	6	673	6%
GeoLinks	FWA	2	54	2%
Verizon	FWA	1	1,320	1%
Wilson Creek Communication	FWA	1	34	1%
Cruzio	FWA	1	63	0%
RazzoLink	FWA	1	264	1%
Total		**64**	**7,889**	**22%**

6.4 Financial Modeling

A high-level financial model was developed to assess the business case for each broadband opportunity zone. The model allows switching between operating models and adjusting grant amounts. Based on demographics from each opportunity zone and the operating model under analysis, a pro forma and summary metrics are generated.

This high-level financial model provides a 10-year view based on Earnings Before Interest and Taxes (EBIT), considering the following assumptions:

- Hurdle rate of 12%
- Revenue model based on residential and business services considering take-rate forecasts captured in Table 23 with a three-year ramp-up period.

Table 23. Residential and Business Broadband Service Take Rate.

	Unserved	Underserved	Served	1G Served
Residential take rate (steady state)	90%	40%	30%	21%
Business take rate (steady state)	97%	30%	21%	12%

- Incremental operating costs alone are considered based on the assumption that the public or private provider deploying the network will have ongoing operations in the region. Costs are adjusted according to the selected operating model.
- Capex is based on the cost estimates from Section 5.2.

Figure 71 shows a sample output of the financial model for the Soledad opportunity zone, under the Public (GSCA/CDT) operating model.

	Year 1	Year 2	Year 3	Year 10
Total Revenue	$ 183,804	$ 366,336	$ 548,868	$ 732,036
Variable Costs	$ 9,190	$ 18,317	$ 27,443	$ 36,602
Contribution Margin	$ 174,614	$ 348,019	$ 521,425	$ 695,434
Fixed Costs	$ 112,186	$ 112,186	$ 112,186	$ 112,186
Net Margin	$ 62,428	$ 235,833	$ 409,239	$ 583,248
CAPEX	$ 10,259,182	$ -	$ -	$ -
Free Cash Flow	$ (10,196,754)	$ 235,833	$ 409,239	$ 583,248
Grants	$ 6,000,000			
Net Cash Flow	$ (4,196,754)	$ 235,833	$ 409,239	$ 583,248
Acummulated Cash Flow	$ (4,196,754)	$ (3,960,921)	$ (3,551,682)	$ 531,055
Payback Period	Year 10			
Breakeven Point	Year 1			
NPV	$ (1,537,973)			

Figure 71. Soledad Opportunity Zone Financial Pro Forma.

The financial model was leveraged to iterate through various scenarios for each opportunity zone considering the potential partners identified in Section 6.3. This results in the selection of the preferred model and partner for implementation. Details of the selected model are included in the Opportunity Zone Summary in Annex C, while the recommended scenarios are discussed in the following section.

6.5 Recommended Scenarios

Based on the analysis of funding sources, the assessment of ongoing initiatives and potential partners, and the associated financial modeling addressed in Sections 6.2 to 6.4, the optimal operating model for each of the 64 broadband opportunity zones in Monterey County was identified.

Table 24 summarizes the results by operating model. As shown, the Fiber Public Private Partnership (PPP) operating model is recommended for most fiber opportunity zones, encompassing 34 opportunity zones and 64,000 locations of which 500 are unserved. The GSCA model follows with 17 opportunity zones and 22,700 locations of which 616 are unserved.

In the case of FWA opportunity zones the FWA PPP model is predominant with 4 opportunity zones and 3,500 total locations. These results emphasize the importance of the collaboration of private ISPs and municipalities to expand broadband infrastructure in Monterey County.

Table 24. Recommended Scenarios Summary

Operating Models	Opportunity Zones	Unserved and Underserved Locations (FCC)	Unserved Locations (CPUC)	Total Locations	Key Success Factor
GSCA	17	616	1,475	22,709 | 20.4%	FFA award to GSCA
Fiber ISP Standalone	1	0	580	171 | 0.2%	ISP Engagement & Grant Funding
FWA ISP Standalone	8	2,126	2,306	2,606 | 2.3%	ISP Engagement & Grant Funding
Fiber PPP	34	513	3,426	64,147 | 57.7%	ISP Inducements, GSN extensions
FWA PPP	4	137	102	3,546 | 3.2%	ISP Inducements, GSN extensions
Total	**64**	**3,392**	**7,889**	**93,179 | 83.8%**	

The Key Success Factor column in Table 24 identifies the enabler(s) for deployment, indicating that this is the main aspect that should be addressed by municipalities and local stakeholders to trigger or accelerate deployments in the broadband opportunity zones.

In the case of the GSCA operating model, the key success factor is securing FFA grants, although other grants can also be considered. GSCA in collaboration with SSVBA has submitted FFA applications for the cities of Soledad, Gonzales, Greenfield, and King City along with other communities within the SSVBA target area.

For Fiber/FWA ISP Standalone models the primary key success factor is engagement with the potential ISP partners to make them turn their attention to these areas. In addition, obtaining grant funding is also an important enabler which will improve the business case for the ISPs. Potential funding can come from BEAD or CASF programs, and in the case of FWA ReConnect and Community Connect programs can also be considered.

Finally, the implementation of opportunity zones under the Fiber/FWA PPP models requires inducements for ISPs to ensure sustainability of the business case for the ISP partner, and in a number of cases, the buildout of extensions to the California MMBI network to provide robust middle mile connectivity.

Once the operating models have been identified, broadband opportunity zones under each model were further categorized based on their feasibility and timeframe for implementation according to the framework in Table 25.

Table 25. Broadband Opportunity Zone Implementation Categories

	Phase 1 (2023-2024)	Phase 2 (2025-2026)	Long-Term (post-2026)
GSCA	• High density (>700 locs/sq mi) • GSN proximity (< 1 mile and CDT Phase 1) • FFA eligible/Within SSVBA Area	• High density (> 700 locs / sq mile) • GSN proximity (< 10 miles) • Grant eligible	• Heavy Middle Mile investment • Within SSVBA Area

Fiber ISP Standalone	• Positive biz case with or without grants • Net Present Value (NPV) > $1M w/Grant	• Positive biz case with NPV > $100k with or without grants • Grant lower than $5 M	• Biz case barely positive (< $100k) with or without grants
FWA ISP Standalone	• Pending CASF application • Positive business case (NPV > $100k)	• < 100 locations • Breakeven biz case with or without grants (NPV < $100k)	N/A
Fiber PPP	• Negative business case (low subsidy) • Marginal biz case that requires subsidies lower than $1,000,000, characterized by high density and existence of virtual monopolies. OR ongoing PPP implementation	• Negative business case (medium subsidy) • Negative business case without grants that requires grant higher than $5,000,000 or is not grant eligible and requires other forms of public subsidies.	• Significant middle mile investment required
FWA PPP	• Ongoing Public Private Partnership	• <100 locations • Grant eligible • Negative biz case	• Significantly away from the GSN, requiring heavy middle mile investment

The resulting categorization of fiber and FWA opportunity zones is displayed in Figure 72 and Figure 73, respectively.

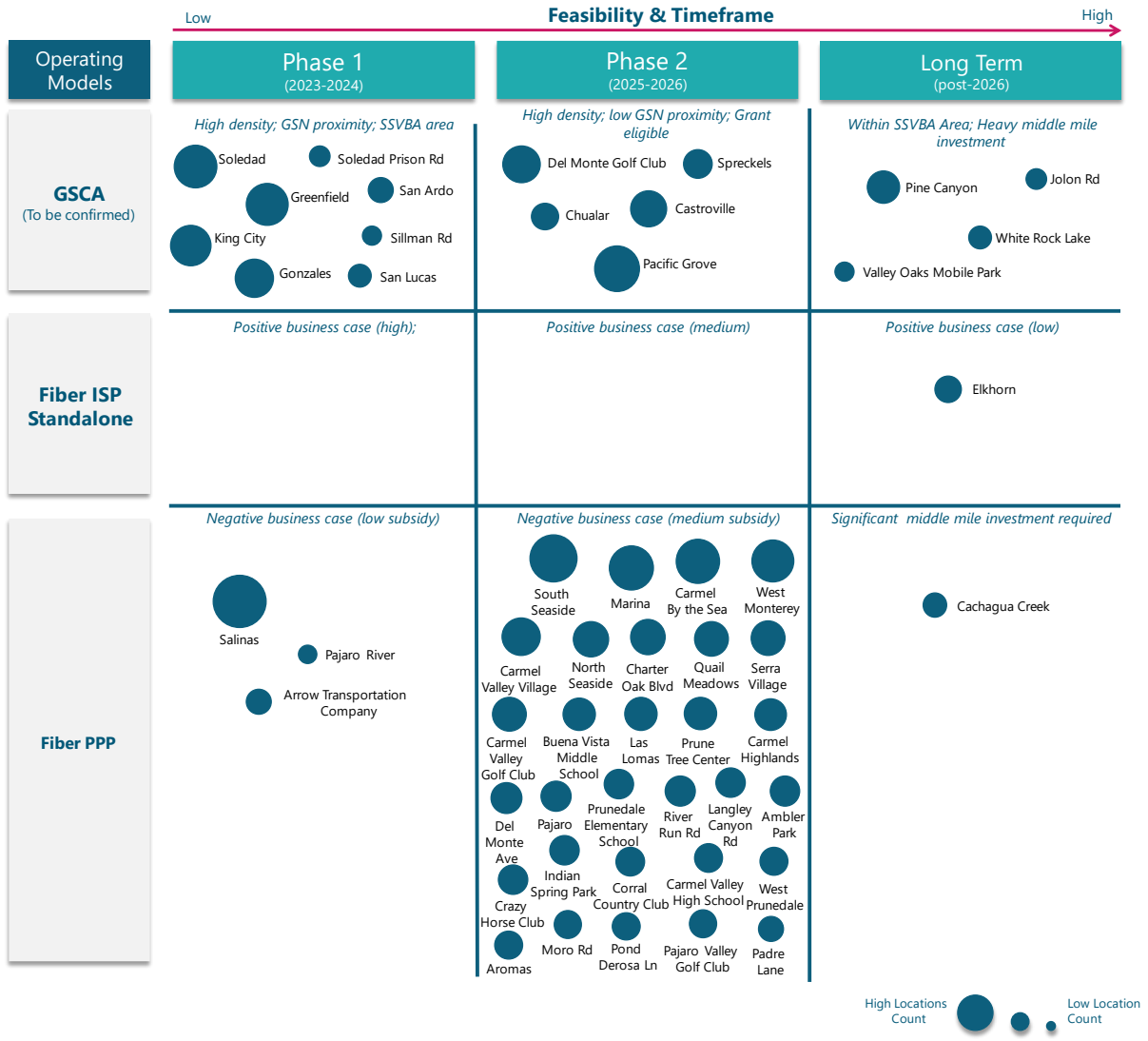


Figure 72. Fiber Opportunity Zones Characterization

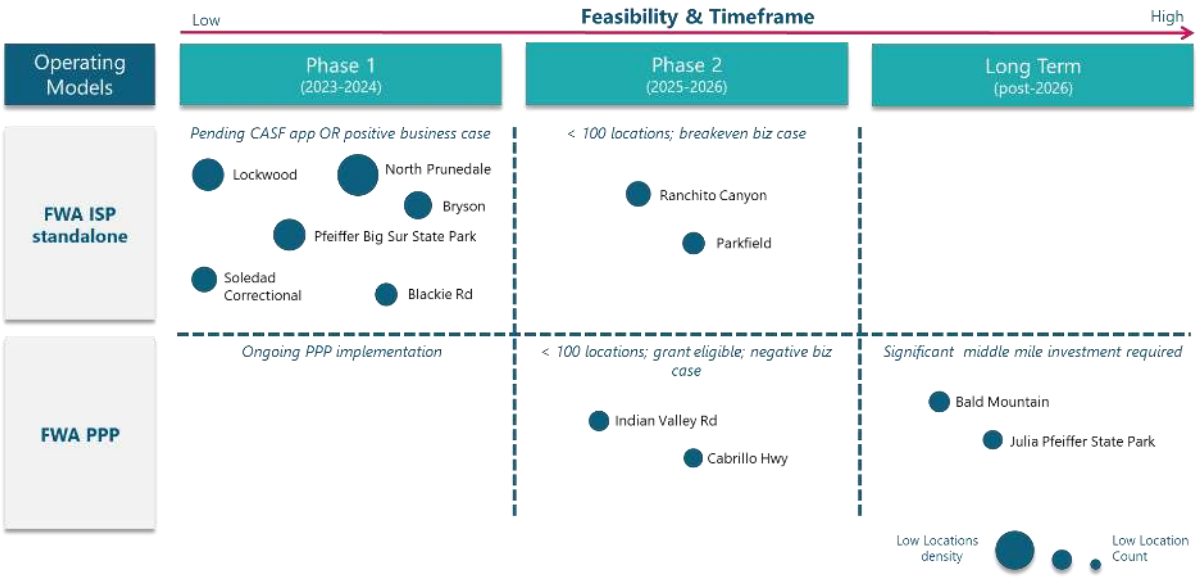


Figure 73. FWA Opportunity Zones Characterization.

Based on the analysis of the above categorization, the following observations can be made:

- **GSCA Phase 1:** In this category, there are 8 opportunity zones, collectively serving 12,170 srviceable locations. These zones are primarily eligible for Last-mile FFA grants, making them promising candidates for broadband expansion. They are characterized by their high density, proximity to the GSN, and location within the SSVBA area. The operating model of choice is Public GSCA, suggesting that these zones are ready for significant broadband infrastructure development.
- **GSCA Phase 2 & Long Term:** This category encompasses a diverse set of 9 opportunity zones, collectively catering to 10,539 serviceable locations. The eligibility for grants extends to CASF, BEAD, and FFA. Some of these zones fall within the SSVBA area, while others require heavy middle mile investments. This diversity implies the need for tailored strategies. The complexity of this category requires a more flexible approach to broadband deployment.
- **Fiber ISP Standalone**: This category poses a distinct challenge as it involves high investments, which is why there is only one opportunity zone within this category – Elkhorn. Elkhorn focuses on last-mile fiber deployment by a private ISP, making it a unique case within Monterey County. Considering the active CASF application in proximity by Garlic-LCB, they may serve as a potential partner for this endeavor. The high investment requirements contribute to the scarcity of opportunity zones in this standalone fiber category, emphasizing the need for careful planning and resource allocation.
- **Fiber PPP Phase 1 and Phase 2:** The majority of the broadband opportunity zones, 34 of them, are designated under the Fiber PPP model. These zones require different levels of subsidies and/or middle mile investments to ensure sustainability of the associated business case. Several opportunity zones under this model are situated near the coastal area, encompassing key cities such as Seaside, Marina, Carmel by the Sea, and Monterey. These opportunity zones have great potential, but their realization hinges on the completion of Phase 2 of the California MMBI network that will connect the city of Salinas to the Monterey Coastal zone.

- **FWA ISP Standalone:** Within this category, we find a set of two opportunity zones, which together have the capacity to address the connectivity needs of 136 currently unserved locations, covering 100% of these areas. Grant eligibility extends to CASF, BEAD, and ReConnect, further enhancing the potential for these zones. Both zones have a positive business case. In both cases, T-Mobile emerges as the promising partner to extend broadband services to these zones.
- **FWA and Fiber PPP:** This category comprises 4 opportunity zones, serving 137 locations. Eligibility for grants encompasses CASF and BEAD. For instance, Pfeiffer Big Sur State Park, a remote opportunity zone located within the coastal zone of Big Sur, this opportunity zone faces unique challenges. With a combination of mountainous and coastal terrain, it currently relies on FWA and satellite technologies for service. This zone is part of a chain of broadband opportunity zones, including Julia Pfeiffer State Park and Cabrillo Hwy, offering a chance for broadband expansion.

The details for each opportunity zone are provided in Annex C. This Annex is intended to create awareness among local stakeholders of the status of the individual opportunity zones and to convey the recommended strategy for broadband infrastructure deployment.

6.5.1 Key Takeaways

The recommended scenarios for the 64 broadband opportunity zones seek to improve the County's broadband access and market competition by increasing the number of 1G served locations and eliminating the number of unserved locations. Figure 74 provides a comparison between current broadband service availability and the target state. As shown, the target state takes unserved locations to 0% (currently at 3.1%) and increases 1G served locations from 23.3% to 84.3%.

	Current	Target
1G Served	25,873 (23.3%)	93,688 (84.3%)
Served	81,054 (72.9%)	16,633 (14.9%)
Underserved	812 (0.7%)	854 (0.76%)
Unserved	3,436 (3.1%)	0 (0%)
	111,175	

Figure 74. Current and Target Broadband Availability.

Highlights from the recommendations to achieve the target state are set forth below:

1) **Total Grant Amount:** The total grant funding required to implement the target opportunity zones is $117.5 M. This financial support is required for 52 Fiber and 12 FWA opportunity zones. It is important to note that this amount exceeds the expected funding in the next couple of years, therefore, careful prioritization of areas must be made, and additional funding approaches should be explored, such as municipal bonds, special taxes, and leveraging of CIP projects to reduce the cost of broadband deployment.
2) **Existing Infrastructure Solutions**: Thirteen broadband opportunity zones are proposed to utilize the California MMBI network for middle mile connectivity. Additionally, three projects will capitalize on the County's existing Fiber Infrastructure. This approach helps minimize costs and improve deployment efficiency.
3) **Middle Mile Investment**: In specific regions like Salinas Valley, Cachagua Valley, and Carmel Valley, additional investment in middle mile infrastructure is required. This investment is crucial to enable last-mile broadband projects in these areas.
4) **Satellite Connectivity:** Satellite is the recommended solution for 790 unserved locations in remote and challenging areas that are not part of a broadband opportunity zone. Satellite offerings with speeds exceeding 25/3 Mbps are available in the County with prices ranging from $50 to $125 per month.

6.6 Broadband Policy Review & Recommendations

Broadband policies are used to regulate the construction and leasing of telecommunications infrastructure. The evaluation of these policies is critical to assess the level of "readiness" or "friendliness" to attract broadband investments.

Broadband readiness is a critical aspect in today's environment as broadband needs throughout the country are exploding and service providers will look to prioritize investments based on attractive markets that can be deployed efficiently.

The California Local Permitting Playbook[26] and NTIA's Best Practices[27] establish guidelines to incentivize and streamline the deployment of broadband infrastructure. These guidelines were integrated into the evaluation framework presented in Figure 75.

Category	Assessment Criteria

Construction standards	• Construction standards for aerial and underground fiber network and conduit deployment available online. Standards should include
	  • Right-of-way diagrams
	  • Typical location of utilities
	  • Utility trench construction and pavement restoration guidelines

Permitting process Documentation	• Special permit dedicated for Telecommunications projects (e.g., fiber deployment, tower construction, network upgrades). • Complete permitting process and manual available online.
Differentiation between major and minor broadband projects	• Methodology to classify projects between major and minor broadband permits. • Identification between projects on public and private property.
Batch permitting process	• Single permit request for a project that would otherwise require multiple permit applications.
Leasing of public assets	• Mechanisms and fees for the leasing of public assets (e.g., fiber or conduit, exiting utilities). • Impartial leasing mechanisms open to all providers. • Public infrastructure inventory available for ISPs, subcontractors and privet users.
New Assets Policies	• Policies for the installation of new infrastructure (e.g., fiber conduit) during major city/town/highway renovations. • Policies for the construction of additional pathways and cable pathways during new construction or major building renovations. • "Dig Once" policy of new underground fiber deployments.

Public GIS datasets	• Organized geographic database with government owned infrastructure.
	  • Underground / Aerial fiber distribution and available conduits
	  • Manholes and handholes
	  • Tower and poles
	  • Water underground infrastructure
	• Geographic data base publicly available online.

Figure 75. Broadband policy assessment framework.

[26] https://broadbandforall.cdt.ca.gov/wp-content/uploads/sites/19/2022/09/California-Local-Jurisdiction-Permitting-Playbook-1.pdf

[27] https://broadbandusa.ntia.gov/sites/default/files/2023-03/Permitting_Best_Practices_Case_Studies.pdf

Broadband policies established by the County of Monterey and the cities of Salinas, and King[28] were evaluated based on this framework. Key findings and recommendations resulting from this assessment are captured below:

Key Findings:

- **Construction Standards:**
  - Construction standards for aerial and underground fiber network and conduit deployment are accessible online for the City of Salinas and King City, but not for the County.
  - Salinas City has relatively more accessible and updated standards, but it still lacks specific timelines.
  - King City has dated standards and an unclear permitting process.
  - Monterey County lacks modern construction standards, making it challenging for broadband deployment projects. All areas need improvements in transparency, standards accessibility, and clarity in permitting processes.
- **Permitting Process Documentation:**
  - The link to the permitting manual for the County is not working. The main permitting page provides general instructions and resources only.
  - Online documentation for Salinas City only includes checklists.
  - King City lacks online permitting resources.
- **Differentiation between Major and Minor Broadband Projects:**
  - There is no clear methodology to classify broadband projects between major and minor permits in any of the local jurisdictions being evaluated.
- **Batch Permitting Process:**
  - Salinas City and King City have a permitting process that allows a single permit request for projects that would otherwise require multiple permit applications. This has not been implemented by the County of Monterey.
- **Leasing of Public Assets:**
  - The County of Monterey defines mechanisms and fees for the leasing of public assets.
  - Salinas City has not published mechanisms and fees for the leasing of public assets.
  - For King City leasing mechanisms are available online, specifically Facility Rentals. Leasing mechanisms are open to all providers and are impartial.
- **New Assets Policies:**
  - In long-term plans but not yet a policy in place, the County considers a "Dig Once" policy for new underground fiber deployments.

[28] Only the cities that responded to the Data Collection requests were included as part of this evaluation.

- Salinas City has policies in place to require the installation of additional cable pathways inside new construction or major building renovations.
- Salinas City has implemented a "Dig Once" policy for new underground fiber deployments under the Salinas Municipal Code and encroachment permit checklist.
- King City does not have policies or plans in place for new assets policies, such as those related to conduit installation, additional pathways, or a "Dig Once" policy.

- **Public GIS Datasets:**
  - The County maintains organized geographic databases with government-owned infrastructure, including County-owned buildings, on-net locations, poles, manholes, laterals, hubs, and fiber rings. This database is not available online; it needs to be requested from the IT department.
  - Salinas City and King City also have certain geographic data available but not in online format, often in Portable Document Format (PDF) format.
  - None of the local jurisdictions under evaluation provides GIS data including all the datasets considered within the evaluation framework.

Recommendations:

1) The County of Monterey should develop and update construction standards for aerial and underground fiber network and conduit deployment. Once ready, these documents should be uploaded and made accessible online. This will ensure transparency, adherence to industry best practices, and ease of use for both government and private entities involved in broadband deployment.
2) Salinas City should restore and maintain its permitting manual online, including detailed end-to-end deployment permitting processes, requirements, application forms, construction standards, workflows, and fee lists. This will provide clarity and contribute to streamlining the permitting process for broadband projects.
3) All the local jurisdictions under this evaluation (Monterey County, Salinas City, and King City) should consider implementing a methodology to classify broadband projects between major and minor permits. This differentiation will avoid unnecessary delays for simple permits and enable Public Works departments to focus on major projects.
4) Salinas City and King City should implement batch permitting processes that allow a single permit request for projects that would otherwise require multiple permit applications. This approach streamlines the process and reduces administrative burdens for applicants.
5) Each municipality, including the County of Monterey, Salinas City, and King City, should prioritize the conversion of government-owned infrastructure GIS datasets into an accessible online format. This effort should include data on buildings, poles, manholes, hubs, and fiber rings. By making these datasets available online, the municipalities can significantly improve the transparency and accessibility of critical infrastructure information, benefiting ISPs, subcontractors, and private users involved in broadband expansion projects.

Figure 76 summarizes the assessment of broadband policies and the associated recommendations.

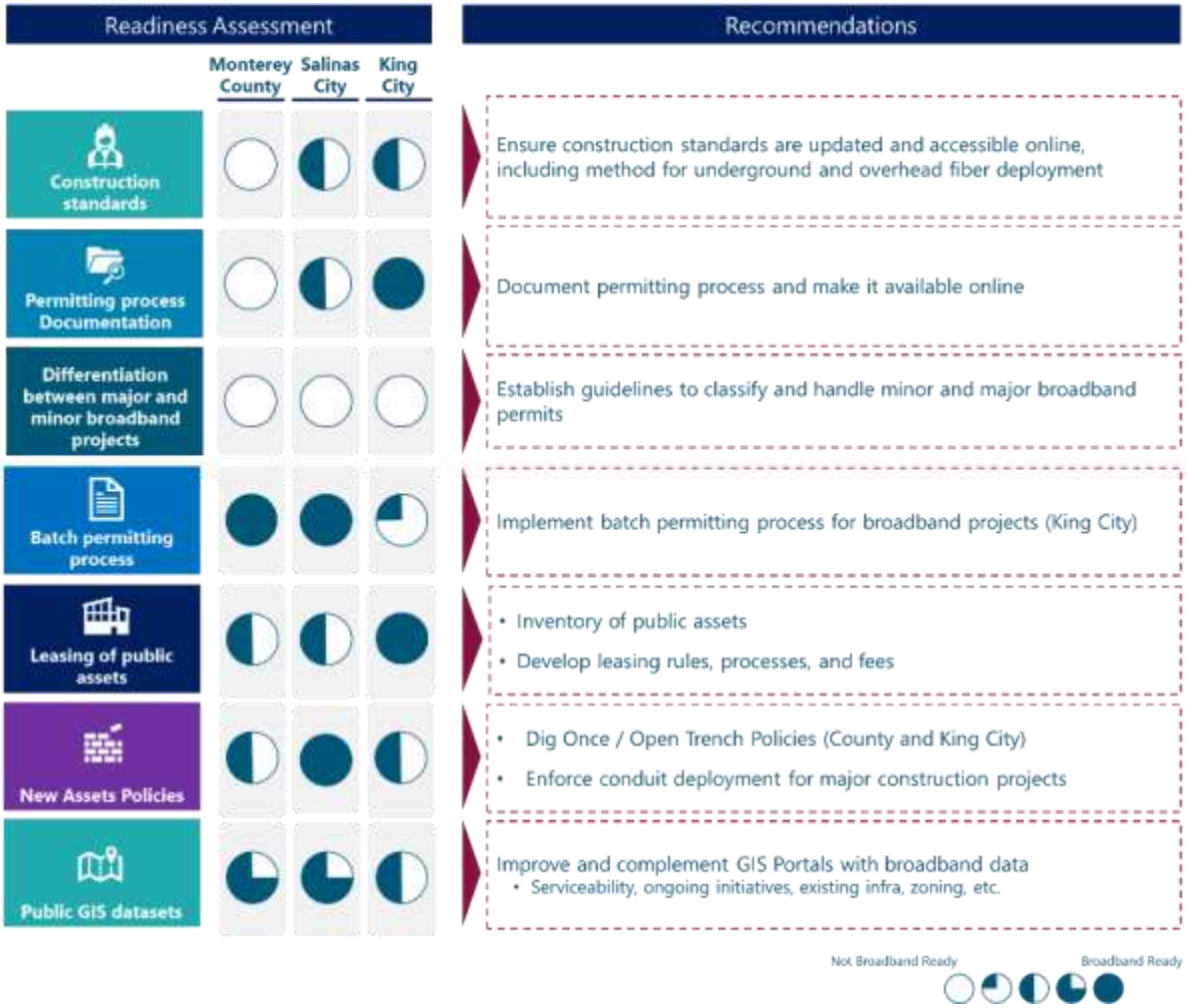


Figure 76. Broadband Policy Review Summary.

7 Action Plan

The findings and recommendations captured throughout the analysis presented herein are integrated into an action plan.

The action plan strives not only to address the connectivity gap in unserved and underserved areas but to improve and extend the existing broadband infrastructure and service offerings through extensive deployment of fiber, contributing to digital equity and preparing Monterey County to accrue economic and social broadband benefits in today's connected world.

The foundation of the Action Plan comprises the three strategic pillars displayed in Figure 77.

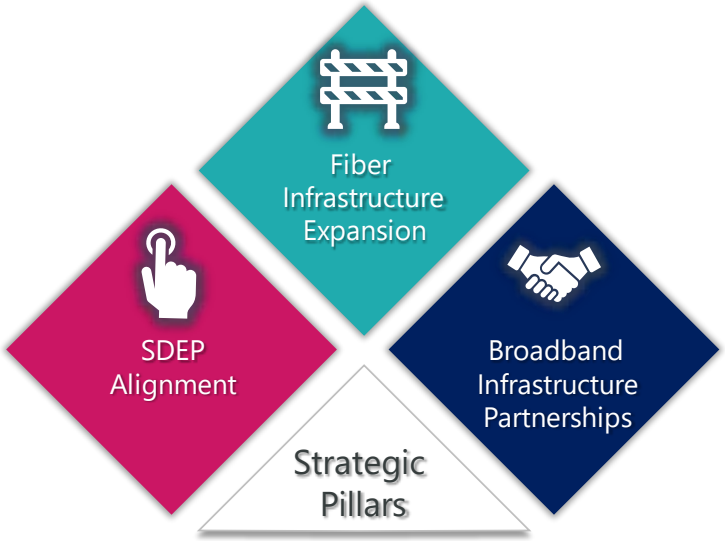


Figure 77. Strategic Pillars.

- **Fiber Infrastructure Expansion.** Extending fiber across the entire County is of paramount importance. Fiber is the backbone of modern connectivity, delivering not just speed, but also reliability, stability, and the capacity to support the growing demands of education, business, healthcare, and daily life.

  The fact that 77% of Monterey County locations lack access to 1G/500 Mbps service evidences the need to improve and extend the outside plant infrastructure in the County through extensive deployment of middle mile and last mile fiber infrastructure.

- **Broadband Infrastructure Partnerships**. The assessment of operating models and recommended scenarios for the target broadband opportunity zones points out that collaboration between private ISPs and public agencies is required. Private ISPs are under stress to compete in various markets and make profitable investments across the country. Areas that offer a positive business case and a broadband friendly environment will be prioritized.

  Conversely, municipalities lack the resources and staff to operate broadband networks, but they have the ability to improve the ISP business case through various inducements and to streamline broadband deployment through friendly policies. Therefore, building partnerships for the deployment of broadband infrastructure is a crucial element of the overall strategy and action plan.

- **Statewide Digital Equity Plan (SDEP) Alignment.** The SDEP being developed by CDT is the first step toward securing funding for the State from the NTIA Digital Equity Capacity Grant and Digital Equity Competitive Grant. The SDEP outlines the path to achieving digital equity for all Californians and it provides a clear roadmap for addressing the diverse needs of the communities and ensuring that equitable broadband access becomes a reality. Aligning County's strategy with the SDEP facilitates coordination with state-level initiatives and access to funding opportunities for local agencies.

Based on these strategic pillars, three workstreams have been defined to accomplish the goals and objectives of the Broadband Strategic Plan: 1) Broadband Infrastructure, 2) Broadband Policies, 3) Digital Inclusion. Figure 78 captures this workstreams and the main tasks that comprise the action plan.

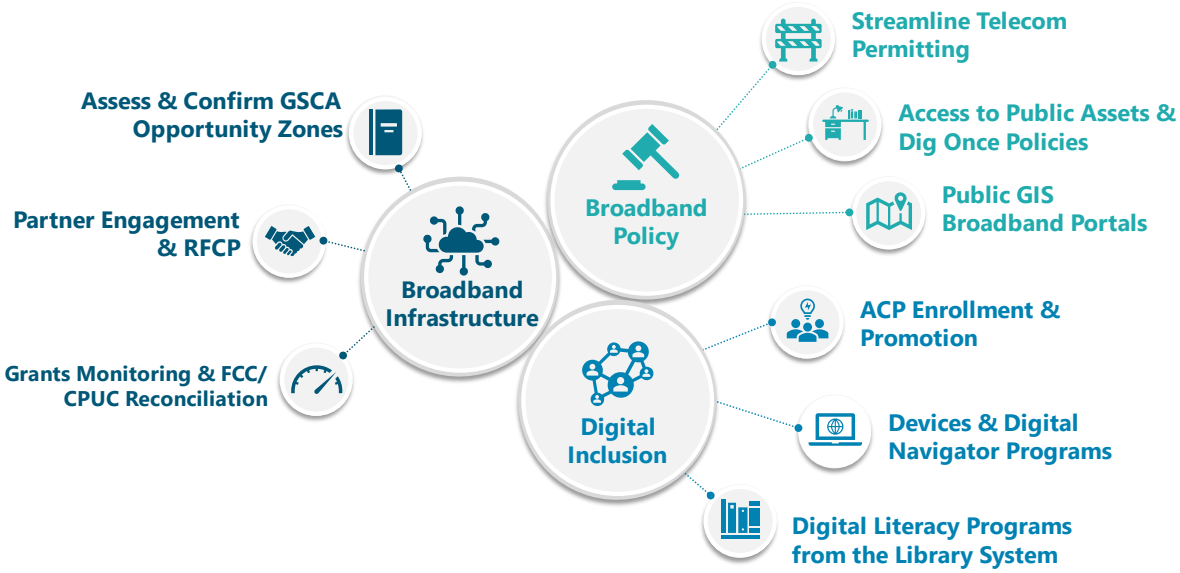


Figure 78. High Level Action Plan.

7.1 Broadband Infrastructure:

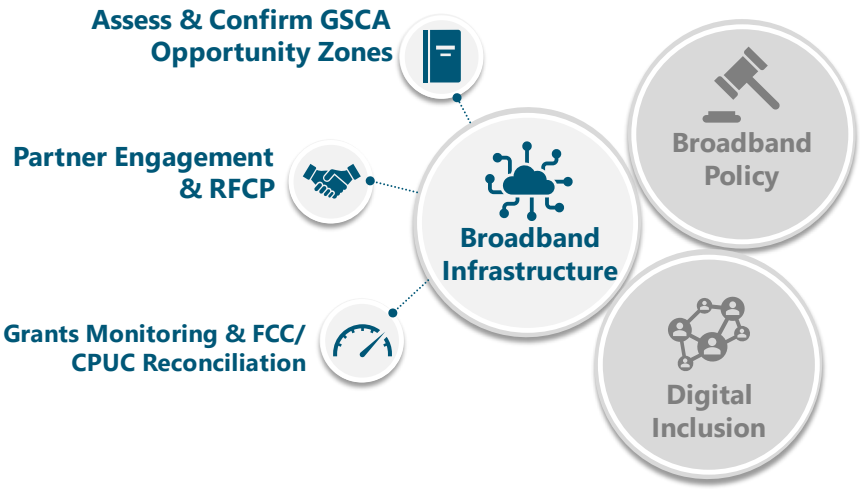


Figure 79. Broadband Infrastructure Workstream.

This workstream captures the activities related to the deployment of broadband infrastructure.

- **Assess & Confirm GSCA Opportunity Zones**: GSCA has already applied for FFA Grant funding in the SSVBA area. In addition, discussion, and confirmation of GSCA's plans for other opportunity zones under Phase 2 or long-term is important to make any course corrections for the opportunity zones that are left out.
- **Partner Engagement & Request for Concept Proposals (RFCP)**: Local jurisdictions must engage with the identified partners to review and discuss their points of view regarding the opportunity zones under the Private ISP standalone and PPP scenarios. Depending on the response from potential partners, an RFCP should be issued to trigger formal conversations and negotiations with interested stakeholders to deploy these opportunity zones.
- **Grant Monitoring & FCC/CPUC Reconciliation:** This includes regular monitoring of Broadband Infrastructure funding programs and the progress of those projects that have been funded in order to provide the required support to applicants within the County. It is also recommended to pursue challenge mechanisms at both the CPUC and FCC levels to ensure funding aligns with precise and accurate data and reduce the discrepancies between the two data sources.

7.2 Broadband Policies:

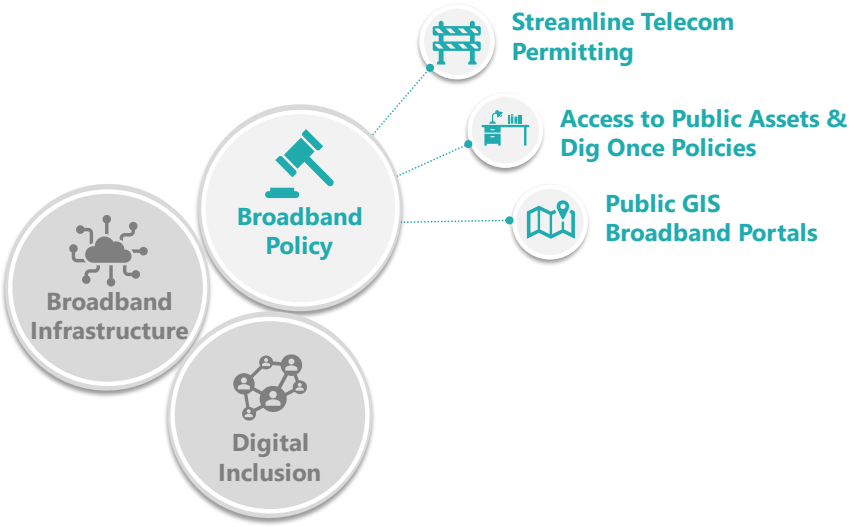


Figure 80. Action Plan -- Broadband Policies

Activities under this workstream are oriented toward creating a more broadband friendly environment that accelerates and attracts broadband infrastructure deployment projects. These activities are further described below:

- **Streamline Telecom Permitting:** The County should consider streamlining its permitting process for telecom projects by implementing the recommendations in Section 6.6. This includes simplifying application processes, expediting approval timelines and enabling batch permitting. A more efficient permitting system would encourage and facilitate the rapid deployment of broadband infrastructure while ensuring that all regulatory requirements are met.
- **Access to Public Assets & Dig Once Policies:** To promote cost-effective broadband deployment, local jurisdiction in the County should adopt policies that facilitate access to public assets and encourage "Dig Once" practices. By doing so, the County can minimize broadband buildout costs, reduce disruptions caused by frequent digging, and enhance overall efficiency in deploying broadband infrastructure. This approach also supports the coordinated placement of telecommunications conduits during public works projects, significantly reducing future deployment costs and disruptions.
- **Public GIS Broadband Portals:** Local jurisdictions should establish and/or update public GIS broadband portals. These portals should provide detailed data on broadband serviceability, ongoing initiatives, existing infrastructure, broadband opportunity zones, and other broadband-related data. Such publicly available resources enhance transparency and empower stakeholders, including local communities, businesses, and service providers, to make informed decisions about broadband planning and expansion.

7.3 Digital Inclusion

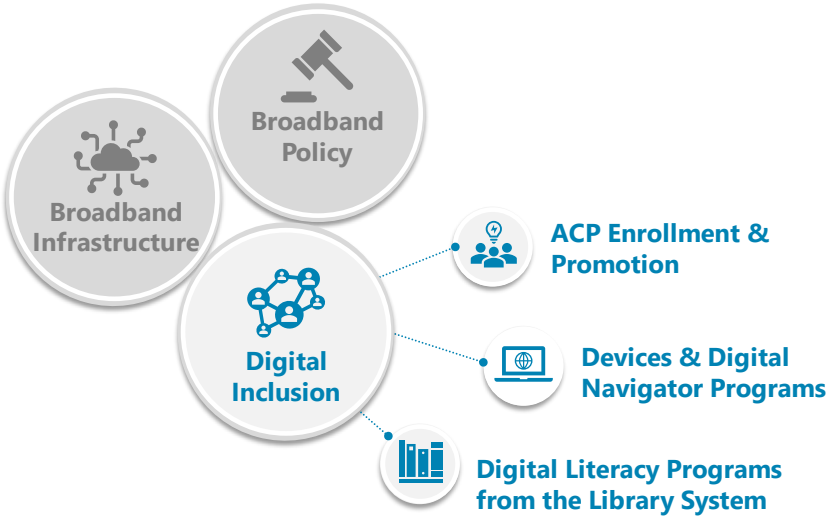


Figure 81. Action Plan -- Digital Inclusion

The plan for Digital Inclusion is centered around coordination and support of existing programs, prioritizing those that address devices and skills gaps. The most efficient and effective way to close the digital divide is through coalition building amongst public sector agencies, community-based organizations, education, and private sector stakeholders. The benefit of the coalition is the ability to fully identify and assess the gaps between available programs and those in the community who will benefit from affordable access programs, devices, and necessary training to achieve digital literacy and is in alignment with California's Broadband for All initiative.

- **ACP Enrollment & Promotion:** To foster digital inclusion, the County should intensify its efforts to promote enrollment in the ACP. The ACP serves as a vital resource for financially disadvantaged residents, providing them with affordable access to the internet. Collaborating with local partners and community organizations to create targeted awareness campaigns is crucial. These campaigns should not only inform eligible residents about the ACP but also emphasize its potential to improve their lives through affordable connectivity.
- **Devices & Digital Navigator Programs:** To address the digital divide, the County should consider implementing initiatives to provide computers and hotspots to underserved communities. In addition to distributing devices, organizing computer literacy workshops and digital navigator programs can empower residents to effectively use digital tools and the internet. Collaborating with trusted partners, such as Loaves Fishes and Computers and Monterey County's Alliance on Aging, can help in reaching out to senior citizens and other vulnerable populations who may benefit from these resources. An excellent example of this type of partnership was the 2023 agreement between Hartnell College and Loaves Fishes and Computers that focused on providing basic digital literacy skills, career exploration and digital safety tools and resources. This approach is crucial in ensuring that all residents have access to essential devices and the knowledge needed to navigate the digital landscape effectively.
- **Digital Literacy Programs from Library System:** Recognizing the critical role that libraries play in promoting digital literacy, the County should allocate additional resources to enhance the library network's capacity for providing digital literacy training. This includes expanding the library staff to accommodate the growing demand for digital literacy programs. Moreover, it's essential to

ensure that these programs are accessible to all residents, including those with diverse language needs. Developing multilingual resources and offering a variety of digital literacy workshops can make these programs more inclusive and tailored to the community's diverse needs.

Appendix A – Broadband Technical Briefing

Broadband Concept and Architecture

Broadband refers to telecommunications technologies that provide high-speed internet connections to end users including households, businesses, and anchor institutions.

Broadband connectivity provides users with access to advanced digital services such as telehealth, e-learning, remote working, videoconferencing, interactive gaming, and pervasive video monitoring. The FCC has defined the minimum download speeds required for adequate performance of typical online activities, which are displayed in Table 26.

Table 26. FCC's Broadband Speed Guide

Activity	Minimum download speeds (Mbps)
General Browsing and Email	1
Voice over Internet Protocol (VoIP) Calls	Less than 0.5
E-learning	5 - 25
Telecommuting	5 - 25
File Downloading	10
Social Media	1
Streaming High Definition (HD) Video	5 - 8
Streaming Ultra HD 4K Video	25
Standard Personal Video Call (e.g., Skype)	1
HD Personal Video Call (e.g., Skype)	1.5
HD Video Teleconferencing	6

It is noteworthy that the available connection bandwidth for a broadband connection is distributed among all services that are simultaneously being utilized. Therefore, a broadband connection must have sufficient bandwidth to accommodate a range of services at the same time.

ISPs are the companies that provide broadband connectivity to the global Internet network. To acquire the services of an ISP, a physical link must be established between the customer premise and the ISP's Point-of-Presence (PoP).

The broadband network is subdivided into distinct segments, each of which manages a larger number of connections and data volumes. These segments are referred to as the "last mile/access network", "middle mile", and "backbone" or "first mile". Figure 82 displays these network segments.

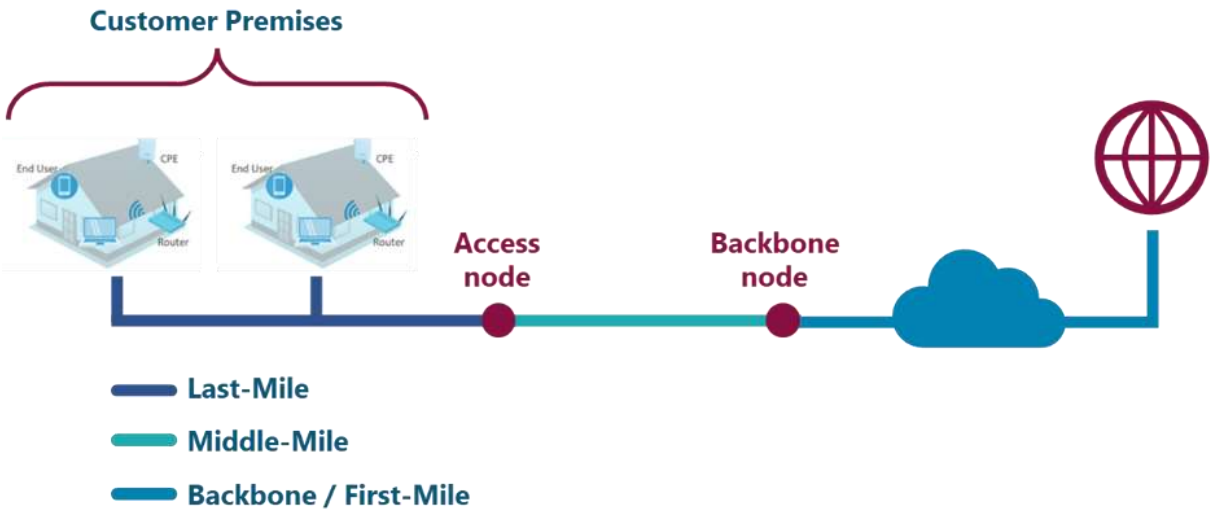


Figure 82. High-level broadband network architecture.

Customer Premises

A "customer premise" refers to a specific location where users access and utilize the internet. This may include residential homes, businesses, enterprises, or community anchor institutions. Premises are also referred to as "broadband serviceable locations".

The internet connection provided by the ISP is terminated at a device known as the Customer Premises Equipment (CPE). The CPE facilitates local connections for users to access the internet, usually with a network cable or Wi-Fi connection.

Last Mile

The last mile segment of the network is situated in closest proximity to the customer and is responsible for establishing connections between individual customer premises and an access node. Each access node consolidates connections from numerous customer premises.

In comparison to other segments of the network, the last mile segment offers the lowest bandwidth. Nonetheless, it has sufficient capacity to accommodate the bandwidth requirements of a specific number of customers. The cost of the last mile segment can be quite significant and is subject to variations based on the density of households in the area.

The selection of a particular technology for the implementation of the last mile segment will depend on several factors, including bandwidth requirements, economic considerations, and geodemographic conditions. Some of the currently available technologies for implementation of this segment include:

- Digital Subscriber Line (DSL)
- Data Over Cable Service Interface Specifications (DOCSIS)
- Fiber-to-the-Home (FTTH)
- Fixed Wireless Access (FWA)
- Satellite

Middle Mile

The Middle Mile segment of the network encompasses the connections established between each access node and an aggregation node. The primary function of each aggregation node is to group the connections of multiple neighborhoods or small towns. It serves as an intermediate layer between the last mile segment which connects customer premises to access nodes and the backbone segment which carries traffic between aggregation nodes and the internet.

Typically, fiber optic technology is used to implement the middle mile segment due to its high bandwidth capacity. However, there are cases where deploying fiber infrastructure is not a viable option and wireless microwave links may be utilized as a more cost-effective alternative. For example, this may be the case when an access node is in a remote area or when the cost of fiber construction is prohibitively expensive due to the nature of the terrain.

Backbone

The backbone segment refers to a high-capacity network that provides interconnections between various ISP's PoPs and to local and remote data centers. The primary function of the backbone is to aggregate traffic from several large geographic regions, such as medium to large cities or major towns. As a result, the backbone links require a much higher bandwidth capacity than middle mile links since they transport a massive amount of data.

Given the bandwidth requirements of the backbone segment, it can only be effectively implemented using fiber optic technology, which provides the necessary high-speed data transmission capacity. The backbone segment plays a crucial role in the broadband infrastructure as it enables efficient transport of data over long distances, facilitating the interconnection between global internet networks.

Broadband Technologies

Although fiber optic technologies are widely used in the middle mile and backbone segments of broadband networks, a variety of broadband technologies are available for implementation in the last mile / access network segment. Thus, it is crucial to evaluate each technology and its characteristics, such as reliability, cost, reach, and bandwidth. The following section describes the most relevant technologies.

Digital Subscriber Line

DSL technology provides broadband services over existing telephone copper lines. A DSL modem serves as the CPE and the access node is implemented through a DSL Access Multiplexer (DSLAM) which is typically located at the local telephony exchange building.

DSL speeds are dependent on the distance between the customer location and the access node, with speeds ranging from a few hundred Mbps at distances less than 300 feet to 20-30 Mbps at distances greater than 0.5 miles. Longer distances, beyond several miles, may impede the use of this technology in the last mile section of the network.

Broadband networks that use existing copper wires usually require low investment as they reuse existing infrastructure. However, these infrastructures are old and prone to failure, especially in long cable runs.

Figure 83 below depicts the high-level architecture for DSL technology.

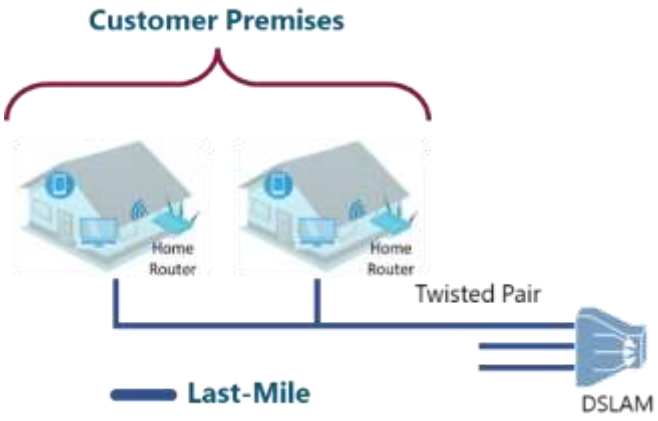


Figure 83. DSL high-level architecture

Data Over Cable Service Interface Specifications

DOCSIS technology allows cable providers to offer high-speed internet service to their customers over their existing coaxial cable infrastructure, which was originally designed for delivering cable TV signals. With DOCSIS, cable providers can leverage the existing network infrastructure to deliver internet speeds that can rival those of traditional DSL or some fiber-optic connections.

In the DOCSIS architecture the CPE is referred to as cable modem, and the access node as the Cable Modem Termination System (CMTS).

As in the case of twisted pairs, coaxial cables have a low cost and deployment effort since most of the cabling infrastructure is already in place and minimum upgrades (like user equipment and intermediate amplifiers) are required.

DOCSIS enables data speeds up to 1 Gbps and more with a maximum distance of 5 miles and good cable conditions. With this technology, the coaxial cable is shared with various subscribers, and so is the bandwidth, which is distributed between the subscribers making simultaneous use of the network. Figure 84 shows the associated architecture.

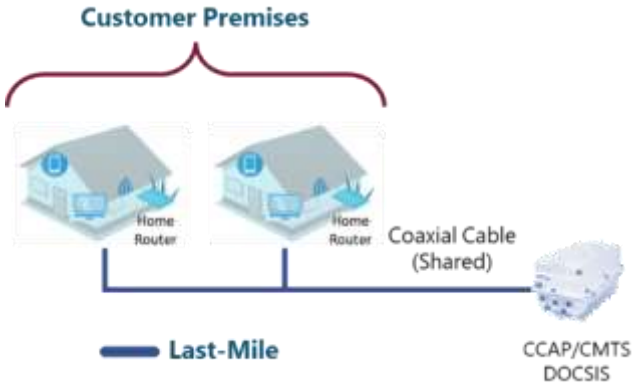


Figure 84. DOCSIS high-level architecture

Fiber-to-the Home

FTTH is a type of access network that employs fiber optic cables to connect many individual subscribers to the access node. Typically, FTTH is implemented through a PON where the fiber cable emerging from the access node is "split" to reach multiple subscribers who will share the available bandwidth. The CPE in this architecture is referred to as an Optical Network Terminal (ONT), while the access node is known as an OLT.

Fiber optic cables are very thin cables (the size of a human hair) made of glass that transport data in the form of light pulses, which are immune to electric or magnetic interference. Fiber optic systems enable bandwidths from hundreds of Mbps to hundreds or even thousands of Gbps and transmission over long distances. Importantly, distance and speed will depend on the transmission technology being used, that can be upgraded without modifying the fiber infrastructure. Thus, fiber installed today can achieve higher bandwidths by upgrading the equipment, ensuring a future-proof network.

One popular FTTH standards is XGS-PON. XGS-PON is a 10-Gigabit-capable symmetric optical network that can deliver downstream and upstream line rates of 9.95328 Gbit/s per OLT optical port, shared by up to 64, 128, or 256 subscribers through fiber “splits”. Additionally, an XGS-PON network supports a physical distance of up to 12.4 miles between OLT at the access node and ONTs at customer locations.

The costs associated with fiber networks are typically the highest when they require the construction of new infrastructure. Although the initial cost might seem high, the deployment of fiber provides robust future-proof networks with high reliability and extremely high bandwidth.

Deployments of FTTH can achieve symmetrical connections at the customer premises of up to 1000 Mbps downlink and 1000 Mbps uplink. Moreover, FTTH can be deployed by leveraging existing civil infrastructures such as electric poles and utility holes, which significantly reduces the capital expenditure (CAPEX).

The high-level architecture of a FTTH access network is presented in Figure 85 below.

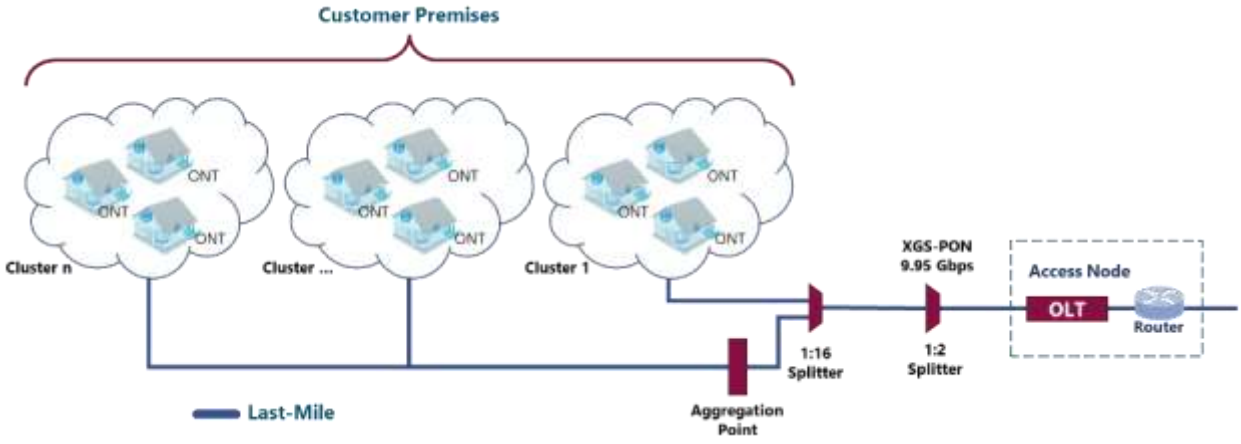


Figure 85. FTTH high-level architecture

Fixed Wireless Access

FWA technology distributes broadband services to customer premises via wireless signals. Various techniques can be utilized to implement FWA, including Time-Division Multiple Access (TDMA), and more recently, 4G and 5G technologies. FWA services are typically provided by ISP or Mobile Network Operators (MNOs).

More recently, the FCC has reallocated the use of 3.5GHz spectrum known as CBRS spectrum for use by private and public entities under various licensing regimes. This is an increasingly viable solution for rural communities.

In FWA, wireless signals are transmitted from antennas positioned atop high towers or buildings and received using CPEs located outside the customer's building.

The bandwidth capacity of FWA depends on the wireless technology being used. For instance, 4G technology can meet 25 Mbps/3 Mbps per subscriber, while 5G technology can provide services of 100 Mbps/20 Mbps or higher. Wireless propagation can be affected by weather conditions, which can interfere or attenuate the signal.

FWA is commonly considered a suitable alternative to FTTH when fiber deployment is too costly or when there are geographic constraints such as challenging terrain.

Figure 86 illustrates the high-level architecture for FWA technology.

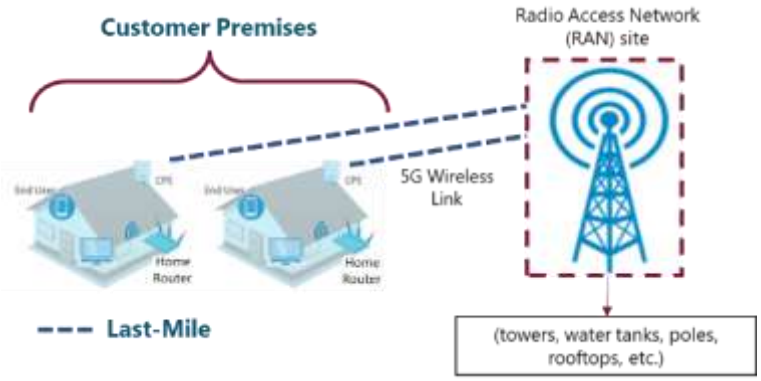


Figure 86. FWA high-level architecture

Satellite

Satellite broadband is an alternative wireless technology that enables high-speed bi-directional internet connections through communications satellites. The quality, speed, and cost of satellite connections vary depending on the type of satellites and their orbits. Low Earth Orbit (LEO) satellites, situated between 200 and 2,000 kilometers above the earth, provide high speeds at reasonable costs by using a constellation of satellites which is constantly changing in the sky. Geostationary satellites in contrast are positioned at altitudes of about 36,000 km which allows them to maintain the same position with respect to the Earth surface.

In satellite broadband, the CPE consists of a Very Small Aperture Terminal (VSAT) equipped with a flat (LEO) or parabolic (geostationary) antenna to establish a connection with the satellite, and a home router. The satellite relays the connection to the satellite hub, which links directly to a backbone node or ISP PoP.

Satellite links are sensitive to weather conditions, as it can affect the signal attenuation between the VSAT terminal and the satellites. This is especially important in the case of geostationary satellites due to the much longer link length.

Satellite systems are typically used in remote areas where neither fiber nor microwave links are viable, such as ranches, farms, or isolated homes. Costs associated with satellite services can be high, and the typical speeds offered are in the range of 25/3 Mbps for typical LEO systems.

The high-level network architecture for Satellite technology is captured in Figure 87.

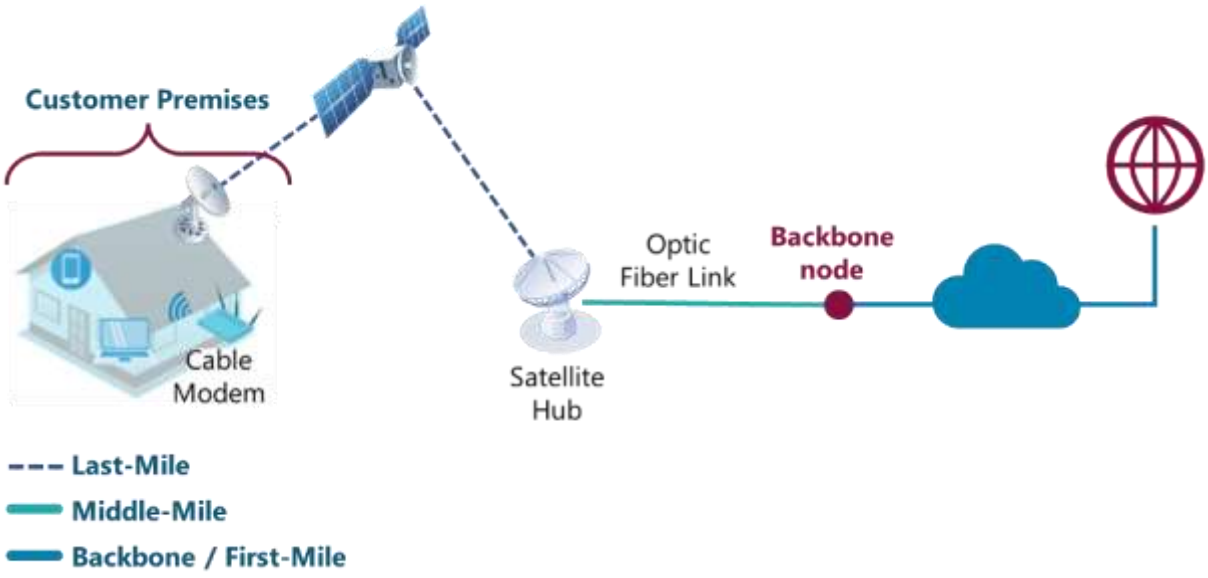


Figure 87. Satellite system high-level architecture

As a summary, Table 27 provides a comparison of the last-mile technologies described in this section.

Table 27. Last-Mile technology comparison

Last Mile Technology	Cost	Speeds	Reliability	Deployment Complexity
DSL	Low	• Low speeds • Decreases with the length of the copper line	High	Low
DOCSIS	Low	• Medium to high speeds • Decreases with the number simultaneous users	High	Low
FTTH	High	• Extremely high speeds/bandwidth • Easily upgraded to achieve faster speeds	High	High
FWA	Medium-high	• High speeds. • Signal strength decreases with distance, reducing data speed	High	Medium
Satellite	High (operating cost)	• Medium speeds • Regular user experience due to high signal delay	Low to medium	Low (considering satellites are in place)

Appendix B – Broadband Demand Analysis

The current and forecasted bandwidth demand by market segment has been characterized through a broadband demand analysis. The market segments included in the analysis are residential, business, and anchor institutions and local government.

The analysis starts by estimating demand on a per-subscriber basis. Then, based on penetration forecasts, the aggregated bandwidth requirements for the cities of Carmel, Del Rey Oaks, Gonzales, Greenfield, King City, Marina, Monterey, Pacific Grove, Salinas Sand City, Seaside, Soledad, the unincorporated areas, and the overall County are obtained with a five-year view.

Per Subscriber Demand Characterization

Residential users

The bandwidth required by residential users is directly proportional to the number of inhabitants (household size) and internet devices per household. The calculation of the required bandwidth assumes the worst scenario. That is, every person and every device are online at the same time.

Each household member is assumed to require a bandwidth of 25 Mbps. This accounts for the activities that have the highest bandwidth demand and, in general, are executed one at a time for each user. These activities are remote working, e-learning, and high-definition video steaming. All of them require 25 Mbps of bandwidth according to the FCC[29].

In addition to the bandwidth required by each household member, *Table 28* displays the typical bandwidth requirements by device category, and the average number of devices per household. The average number and type of devices for each household is estimated based on the results from the Needs Assessment Survey.

Table 28. Internet device categories and bandwidth requirements

Device Category	Bandwidth per Category (Mbps)	# Devices per Category
Smart/Streaming TV	25	1
Gaming console	10	0.3
Smartphones	10	1 per household inhabitant
Medical Device	10	0.096
Security system, doorbell, cameras	10	0.46

[29] Broadband Speed Guide

Table 29 displays the average household size for Monterey cities and unincorporated areas and their corresponding residential bandwidth.

Table 29. Monterey areas average household size and required residential bandwidth.

County Areas	Average Household Size*	Residential Bandwidth (Mbps)
Carmel-by-the-Sea	2.00	103.60
Del Rey Oaks	3.00	138.60
Gonzales	3.76	165.20
Greenfield	4.58	193.90
King City	4.15	178.85
Marina	2.72	128.80
Monterey	2.14	108.50
Pacific Grove	2.21	110.95
Salinas	3.76	165.20
Sand City	1.98	102.90
Seaside	3.05	140.35
Soledad	4.53	192.15
Unincorporated Areas	3.04	140.00

A key takeaway from this analysis is that residential broadband service offerings at Monterey must be at least 200 Mbps (downlink) to guarantee acceptable internet performance at home.

Business Users

The required bandwidth for business can be estimated based on the number of employees. Average bandwidth requirements for various business sizes are listed in Table 30

Table 30. Business Size categories and bandwidth requirements.

Business Size Category (# of employees)	Bandwidth per Category (Mbps)
1 – 9	100
10 – 49	300
50 – 99	1000 (1 Gbps)
> 100	10,000 (10 Gbps)

These ranges are used as the base of the aggregated demand analysis for the business segment.

Anchor Institutions and Government Facilities

Finally, all anchor institutions are assumed to require 1 Gbps bandwidth.

Monterey County Aggregated Demand

The aggregated bandwidth for the next five years is forecasted for each segment.

Residential Segment

For the residential segment, forecasting is based on the expected broadband adoption rate (the percentage of potential residential customers / households that will subscribe to a broadband service). According to the California Broadband for All Action Plan[30], the maximum adoption rate in California is 97% and it corresponds to households with an income higher than $100,000 a year. For this analysis, it is assumed that the County will be able to achieve this adoption rate in Year 5. Therefore, penetration values for Year 1-4 are interpolated based on current adoption rate and the expected penetration in Year 5.

Subscriber forecast is then obtained by multiplying the number of households by the adoption rate, resulting in the numbers presented in Table 31.

Table 31. Monterey Residential Subscriber 5-year forecast.

		Subscribers				
County Areas	**Household Count***	2023	2024	2025	2026	2027
Carmel-by-the-Sea	**3,363**	3,191	3,209	3,227	3,244	3,262
Del Rey Oaks	**768**	742	743	743	744	745
Gonzales	**2,330**	2,141	2,171	2,201	2,230	2,260
Greenfield	**4,519**	3,886	4,011	4,135	4,259	4,383
King City	**3,975**	3,466	3,564	3,661	3,758	3,856
Marina	**9,059**	8,072	8,250	8,429	8,608	8,787
Monterey	**16,618**	15,322	15,521	15,721	15,920	16,119
Pacific Grove	**8,752**	8,148	8,233	8,319	8,404	8,489
Salinas	**48,162**	43,876	44,586	45,296	46,007	46,717
Sand City	**463**	407	417	428	438	449
Seaside	**12,539**	11,448	11,627	11,805	11,984	12,163
Soledad	**4,989**	4,375	4,491	4,607	4,723	4,839
Unincorporated Areas	**45,604**	41,272	42,013	42,754	43,495	44,236

* - US Census
** - Based on the current broadband adoption rate (US census)
*** - Based on California Adoption Rate (97%) for persons with income >100$k per year (California Broadband for All Action Plan)

[30] https://broadbandcouncil.ca.gov/wp-content/uploads/sites/68/2020/12/BB4All-Action-Plan-Final.pdf

Aggregated residential demand is then obtained as the product of the residential subscriber bandwidth (Table 29) and the number of subscribers for each year (Table 31). Table 32 presents the results.

Table 32. Monterey Aggregated Residential Demand.

	Total Residential Bandwidth (Gbps)*				
County Areas	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**
Carmel-by-the-Sea	33.06	33.25	33.43	33.61	33.80
Del Rey Oaks	10.28	10.29	10.30	10.31	10.33
Gonzales	35.37	35.87	36.36	36.85	37.34
Greenfield	75.36	77.77	80.18	82.59	85.00
King City	61.99	63.74	65.48	67.22	68.96
Marina	103.96	106.27	108.57	110.88	113.18
Monterey	166.25	168.41	170.57	172.74	174.90
Pacific Grove	90.41	91.35	92.30	93.25	94.19
Salinas	724.84	736.57	748.31	760.05	771.78
Sand City	4.18	4.29	4.40	4.51	4.62
Seaside	160.68	163.19	165.69	168.20	170.71
Soledad	84.07	86.30	88.53	90.76	92.99
Unincorporated Areas	577.82	588.19	598.57	608.94	619.32
TOTAL	**2,128.28**	**2,165.48**	**2,202.69**	**2,239.90**	**2,277.11**

* - Computed with an oversubscription factor of 10.

Business Segment

In the case of business users, fixed broadband adoption is assumed to be 99% starting on Year 1. However, a constant annual bandwidth growth of 23% is assumed for the 5-year forecast. Table 33 shows the number of businesses in each Monterey City and unincorporated areas[31] and their required bandwidth on Year 1 based on previous assumptions. Table 34 summarizes the aggregated demand for the business segment by applying the 23% growth factor and an oversubscription factor of 5.

Table 33. Monterey's number of businesses by City and Unincorporated areas and required bandwidth.

County Areas	Number of Businesses	Business Bandwidth (Gbps)
Carmel-by-the-Sea	20	0.63
Del Rey Oaks	79	2.51
Gonzales	55	1.33
Greenfield	175	7.21
King City	302	18.12
Marina	576	20.22
Monterey	2,932	164.20
Pacific Grove	783	26.79

[31] California Community & Place Based Data Tool

Salinas	4,444	288.68
Sand City	180	7.23
Seaside	815	41.36
Soledad	234	9.58
Unincorporated Areas	4,304	487.97
Total	**14,899**	**1,075.83**
* - Computed with an oversubscription factor of 5.		

Table 34. Monterey Aggregated Business Demand.

	Total Business Bandwidth (Gbps)*				
County Areas	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**
Carmel-by-the-Sea	0.63	0.78	0.96	1.18	1.45
Del Rey Oaks	2.51	3.09	3.80	4.68	5.76
Gonzales	1.33	1.63	2.01	2.47	3.04
Greenfield	7.21	8.86	10.90	13.41	16.50
King City	18.12	22.28	27.41	33.71	41.47
Marina	20.22	24.87	30.58	37.62	46.27
Monterey	164.20	201.97	248.42	305.56	375.84
Pacific Grove	26.79	32.95	40.53	49.85	61.32
Salinas	288.68	355.08	436.75	537.20	660.76
Sand City	7.23	8.89	10.93	13.45	16.54
Seaside	41.36	50.88	62.58	76.97	94.67
Soledad	9.58	11.79	14.50	17.83	21.93
Unincorporated Areas	487.97	600.20	738.25	908.05	1,116.90
TOTAL	**1,075.83**	**1,323.27**	**1,627.63**	**2,001.98**	**2,462.44**
* - Computed with an oversubscription factor of 5.					

Anchor institutions and government use the same assumptions used for the Business segment. Table 35 shows the number of anchor institutions in each Monterey city and unincorporated areas[32] and their required bandwidth. Table 36 summarizes the aggregated residential demand.

Table 35. Monterey's number of Anchor institutions and government by City and Unincorporated areas and required bandwidth.

County Areas	Number of Institutions	Institutions Bandwidth (Gbps)*
Carmel-by-the-Sea	4	0.8
Del Rey Oaks	1	0.2
Gonzales	17	3.4
Greenfield	23	4.6
King City	39	7.7
Marina	41	8.1
Monterey	101	20.0
Pacific Grove	38	7.5
Salinas	245	48.5

[32] The number of anchor institutions and government facilities is based on the anchor institution layer from CPUC, and direct input from the Cities and the County

Sand City	2	0.4
Seaside	55	10.9
Soledad	41	8.1
Unincorporated Areas	226	44.7
Total	**833**	**164.9**
* - Computed with an oversubscription factor of 5.		

Table 36. Monterey Aggregated Anchor Institutions and Government Demand.

	Total Institutions Bandwidth (Gbps)				
County Areas	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**
Carmel-by-the-Sea	0.8	0.97	1.20	1.47	1.81
Del Rey Oaks	0.2	0.24	0.30	0.37	0.45
Gonzales	3.4	4.14	5.09	6.26	7.70
Greenfield	4.6	5.60	6.89	8.47	10.42
King City	7.7	9.50	11.68	14.37	17.67
Marina	8.1	9.99	12.28	15.11	18.58
Monterey	20.0	24.60	30.25	37.21	45.77
Pacific Grove	7.5	9.25	11.38	14.00	17.22
Salinas	48.5	59.67	73.39	90.27	111.03
Sand City	0.4	0.49	0.60	0.74	0.91
Seaside	10.9	13.39	16.48	20.26	24.93
Soledad	8.1	9.99	12.28	15.11	18.58
Unincorporated Areas	44.7	55.04	67.70	83.27	102.42

By adding the aggregated demand from all market segments, the overall 5-year demand for each city and unincorporated areas can be obtained. These results are summarized in Table 37.

Table 37. Monterey's Cities and Unincorporated areas aggregated demand.

	Aggregated Bandwidth (Gbps)				
County Area	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**
Carmel-by-the-Sea	34.49	35.00	35.59	36.27	37.06
Del Rey Oaks	13.00	13.63	14.41	15.36	16.53
Gonzales	40.07	41.64	43.46	45.58	48.08
Greenfield	87.12	92.23	97.97	104.47	111.92
King City	87.83	95.52	104.57	115.30	128.10
Marina	132.30	141.12	151.44	163.60	178.03
Monterey	350.45	394.98	449.25	515.51	596.51
Pacific Grove	124.72	133.56	144.21	157.10	172.73
Salinas	1,062.03	1,151.32	1,258.45	1,387.52	1,543.57
Sand City	11.81	13.67	15.94	18.70	22.07
Seaside	212.93	227.46	244.75	265.44	290.31
Soledad	101.77	108.08	115.31	123.70	133.50
Unincorporated Areas	1,110.53	1,243.43	1,404.52	1,600.26	1,838.64
Aggregated Demand	**3,369.04**	**3,691.63**	**4,079.85**	**4,548.80**	**5,117.06**

Table 38 summarizes the aggregated demand by market segment and Monterey's Total Demand.

Table 38. Aggregated Demand by segment and Monterey total demand.

	Total Aggregated Bandwidth (Gbps)				
Market Segment	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**
Total Residential	2,128.28	2,165.48	2,202.69	2,239.90	2,277.11
Total Business	1,075.83	1,323.27	1,627.63	2,001.98	2,462.44
Total Institutions	164.93	202.87	249.53	306.92	377.51
Monterey Aggregated Demand	**3,369.04**	**3,691.63**	**4,079.85**	**4,548.80**	**5,117.06**

Figure depicts the contribution of each market segment to the overall Monterey aggregated demand.

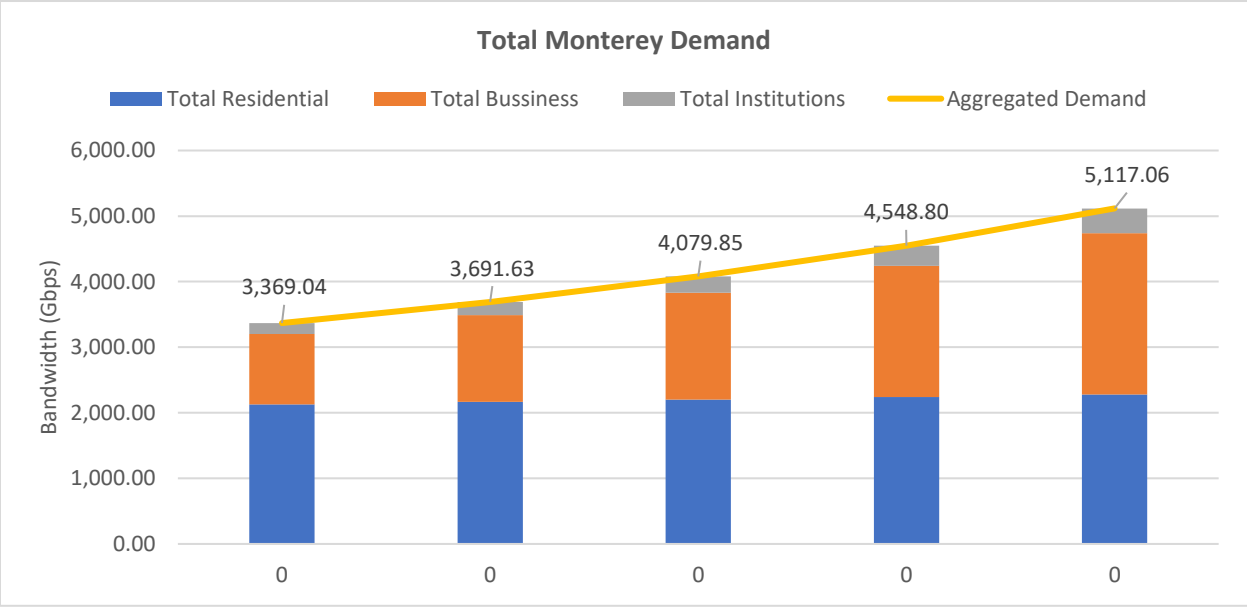


Figure 88. Monterey Aggregated Demand by Segment.

The following conclusions and takeaways can be obtained as a result of the Broadband Demand Analysis:

- The residential service offering in Monterey County should be at least 200 Mbps (downlink) in all cities and unincorporated areas.
- Middle mile networks in the County should offer an aggregated capacity of 6 Gbps, allowing adequate bandwidth for the cities: 1.2 Tbps for Marina and Salinas, 750 Gbps for the coastal cities of Monterey, Pacific Grove, Sand City, Seaside, Carmel by the Sea, and Del Rey Oaks, 230 Gbps for Gonzales, Greenfield, and Soledad, 1.2 Tbps for King City, and 1.1 Tbps for the unincorporated areas of the County.

Aggregated Monterey Demand will scale beyond 5.1 Tbps in a 5-year period. However, this capacity will be distributed among various ISPs.

Appendix C – Opportunity Zones Summary

Fiber Opportunity Zones

Pacific Grove [Cluster ID: A]

Indicators of Need

	Total Locations	Unserved / Underserved
FCC:	6,757	44
CPUC:	6,501	146

Fiber Availability [%]	Location Density [locations/sq mile]
57%	1,331

Grant Eligibility
CASF | BEAD

Target Area

Existing Broadband Infrastructure & Ongoing Initiatives

Existing Infrastructure	NA
On-going Initiatives	NA
Distance to CMMBI [miles]	0.0

Recommended Solution & Financial Metrics

Operating Model	GSCA
Primary Partner	GSCA
Alternative Partner	AT&T
Grant(s)	CASF
Timeframe	Phase 2

Total CAPEX	$	16,970,479.80
Grant Amount	$	5,086,800.00
Year-10 Revenue	$	1,029,684.00
NPV	$	-8,097,305.39

KEY SUCESS FACTORS

To ensure a positive business case is dependent on securing grant funding of at least $8 million
The feasibility of broadband expansion relies on the successful implementation and expansion of the California Middle Mile network.

West Monterey [Cluster ID: B]

Indicators of Need

	Total Locations	Unserved / Underserved
FCC:	3,449	12
CPUC:	3,438	111

Fiber Availability [%]	Location Density [locations/sq mile]
34%	1,045

Grant Eligibility
CASF | BEAD

Target Area

Existing Broadband Infrastructure & Ongoing Initiatives

Existing Infrastructure	NA
On-going Initiatives	NA
Distance to CMMBI [miles]	0.0

Recommended Solution & Financial Metrics

Operating Model	Fiber PPP
Primary Partner	AT&T
Alternative Partner	Astound
Grant(s)	NA
Timeframe	Phase 2

Total CAPEX	$	11,849,186.48
Grant Amount	$	-
Year-10 Revenue	$	723,780.00
NPV	$	-6,551,733.73

KEY SUCESS FACTORS

The expansion of the existing AT&T fiber network, which could reduce capital expenditure (Capex).
Requieres engagement with ISPs is required to facilitate network deployment.

South Seaside [Cluster ID: C]

Indicators of Need

	Total Locations	Unserved / Underserved
FCC:	8,434	4
CPUC:	9,642	381

Fiber Availability [%]	Location Density [locations/sq mile]
22%	1,653

Grant Eligibility
CASF | BEAD

Target Area

Existing Broadband Infrastructure & Ongoing Initiatives

Existing Infrastructure	NA
On-going Initiatives	NA
Distance to CMMBI [miles]	0.0

Recommended Solution & Financial Metrics

Operating Model	Fiber PPP
Primary Partner	AT&T
Alternative Partner	Comcast
Grant(s)	BEAD
Timeframe	Phase 2

Total CAPEX	$	20,827,007.90
Grant Amount	$	1,300,000.00
Year-10 Revenue	$	1,867,680.00
NPV	$	-12,761,224.83

KEY SUCESS FACTORS

The proposed model assumes the expansion of the existing AT&T or Comcast network, which could reduce capital expenditure (Capex).
Consider FFA grants as inducements for the unserved and potential permit streamlining.

Charter Oak Blvd [Cluster ID: D]

Indicators of Need

	Total Locations	Unserved / Underserved
FCC:	922	0
CPUC:	634	0

Fiber Availability [%]	Location Density [locations/sq mile]
4%	1,281

Grant Eligibility
NA

Target Area

Existing Broadband Infrastructure & Ongoing Initiatives

Existing Infrastructure	NA
On-going Initiatives	Cruzio request CASF funding to deploy last/middle mile
Distance to CMMBI [miles]	1.2

Recommended Solution & Financial Metrics

Operating Model	Fiber PPP
Primary Partner	Cruzio
Alternative Partner	Underline | Charter
Grant(s)	CASF
Timeframe	Phase 2

Total CAPEX	$	4,861,781.13
Grant Amount	$	-
Year-10 Revenue	$	213,900.00
NPV	$	-3,069,992.60

KEY SUCESS FACTORS

Successful inclusion of the Opportunity Zone within the Cruzio CASF Application.
Collaborate closely with Cruzio to understand the exact expansion requirements and potential investment commitments.
Work with local regulatory authorities to streamline the permitting process.
Evaluate the practicality and benefits of micro-trenching for the expansion in this area.

Castroville [Cluster ID: E]

Indicators of Need

	Total Locations	Unserved / Underserved
FCC:	1,205	1
CPUC:	1,203	40

Fiber Availability [%]	Location Density [locations/sq mile]
13%	1,868

Grant Eligibility
FFA / BEAD

Target Area

Existing Broadband Infrastructure & Ongoing Initiatives

Existing Infrastructure	County Fiber Ring
On-going Initiatives	Cruzio request CASF funding to deploy last/middle mile
Distance to CMMBI [miles]	0.0

Recommended Solution & Financial Metrics

Operating Model	GSCA
Primary Partner	GSCA
Alternative Partner	Vast
Grant(s)	BEAD
Timeframe	Phase 2

Total CAPEX	$	3,419,509.44
Grant Amount	$	2,000,000.00
Year-10 Revenue	$	218,784.00
NPV	$	-607,777.48

KEY SUCESS FACTORS

To ensure a positive business case is dependent on securing grant funding of at least $2.6 million

Moro Rd [Cluster ID: F]

Indicators of Need

	Total Locations	Unserved / Underserved
FCC:	228	0
CPUC:	265	3

Fiber Availability [%]	Location Density [locations/sq mile]
0%	496

Grant Eligibility
CASF | BEAD

Target Area

Existing Broadband Infrastructure & Ongoing Initiatives

Existing Infrastructure	NA
On-going Initiatives	NA
Distance to CMMBI [miles]	2.0

Recommended Solution & Financial Metrics

Operating Model	Fiber PPP
Primary Partner	AT&T
Alternative Partner	Charter
Grant(s)	NA
Timeframe	Phase 2

Total CAPEX	$	3,531,627.85
Grant Amount	$	-
Year-10 Revenue	$	53,040.00
NPV	$	-2,636,901.89

KEY SUCESS FACTORS

Requiere effective coordination with other Opportunity Zones to optimize middle-mile infrastructure.

Las Lomas [Cluster ID: G]

Indicators of Need

	Total Locations	Unserved / Underserved
FCC:	570	4
CPUC:	544	0

Fiber Availability [%]	Location Density [locations/sq mile]
5%	774

Grant Eligibility
NA

Target Area

Existing Broadband Infrastructure & Ongoing Initiatives

Existing Infrastructure	NA
On-going Initiatives	SSVBA wants to lease Crown Castle middle mile network | Cruzio request CASF funding to deploy last/middle mile | Garlic request CASF funding to deploy last/middle mile
Distance to CMMBI [miles]	1.5

Recommended Solution & Financial Metrics

Operating Model	Fiber PPP
Primary Partner	Garlic
Alternative Partner	Cruzio
Grant(s)	NA
Timeframe	Phase 2

Total CAPEX	$	4,040,823.47
Grant Amount	$	-
Year-10 Revenue	$	134,340.00
NPV	$	-2,728,140.38

KEY SUCESS FACTORS

Successful inclusion of the Opportunity Zone within the Garlic CASF Application.
Collaborate closely with Garlic to understand the exact expansion requirements and potential investment commitments.

Soledad [Cluster ID: H]

Indicators of Need

	Total Locations	Unserved / Underserved
FCC:	3,887	20
CPUC:	3,876	166

Fiber Availability [%]	Location Density [locations/sq mile]
6%	1,861

Grant Eligibility
FFA

Target Area

Existing Broadband Infrastructure & Ongoing Initiatives

Existing Infrastructure	NA
On-going Initiatives	SSVBA wants to lease Crown Castle middle mile network | SSVBA will deploy open-access broadband across Soledad, Gonzales, Greenfield, King City, and unic. D3
Distance to CMMBI [miles]	0.0

Recommended Solution & Financial Metrics

Operating Model	GSCA
Primary Partner	GSCA
Alternative Partner	Vast
Grant(s)	FFA
Timeframe	Phase 1

Total CAPEX	$	10,259,181.56
Grant Amount	$	6,000,000.00
Year-10 Revenue	$	732,036.00
NPV	$	-1,537,973.40

KEY SUCESS FACTORS

Requieres successful award of the FFA Grant for the SSVBA Area
Work closely with the South Salinas Valley Broadband Authority (SSVBA) to align strategies and efforts in securing the grant

King City [Cluster ID: I]

Indicators of Need

	Total Locations	Unserved / Underserved
FCC:	2,750	36
CPUC:	2,656	75

Fiber Availability [%]	Location Density [locations/sq mile]
8%	1,291

Grant Eligibility
FFA

Target Area

Existing Broadband Infrastructure & Ongoing Initiatives

Existing Infrastructure	NA
On-going Initiatives	SSVBA will deploy open-access broadband across Soledad, Gonzales, Greenfield, King City, and unic. D3
Distance to CMMBI [miles]	0.0

Recommended Solution & Financial Metrics

Operating Model	GSCA
Primary Partner	GSCA
Alternative Partner	Astound
Grant(s)	FFA
Timeframe	Phase 1

Total CAPEX	$	6,769,751.23
Grant Amount	$	3,500,000.00
Year-10 Revenue	$	507,528.00
NPV	$	-1,383,501.46

KEY SUCESS FACTORS

Requieres successful award of the FFA Grant for the SSVBA Area
Work closely with the South Salinas Valley Broadband Authority (SSVBA) to align strategies and efforts in securing the grant

Cachagua Creek [Cluster ID: J]

Indicators of Need

	Total Locations	Unserved / Underserved
FCC:	109	45
CPUC:	314	296

Fiber Availability [%]	Location Density [locations/sq mile]
0%	713

Grant Eligibility
CASF | BEAD

Target Area

Existing Broadband Infrastructure & Ongoing Initiatives

Existing Infrastructure	NA
On-going Initiatives	NA
Distance to CMMBI [miles]	10.6

Recommended Solution & Financial Metrics

Operating Model	Fiber PPP
Primary Partner	AT&T
Alternative Partner	GSCA
Grant(s)	BEAD
Timeframe	Long Term

Total CAPEX	$	797,073.24
Grant Amount	$	797,073.24
Year-10 Revenue	$	46,800.00
NPV	$	59,893.81

KEY SUCESS FACTORS

Feasible only if CA Middle Mile is extended.
The feasibility of broadband expansion relies on the successful implementation and expansion of the California Middle Mile network.

Greenfield [Cluster ID: K]

Indicators of Need

	Total Locations	Unserved / Underserved
FCC:	3,392	48
CPUC:	3,450	155

Fiber Availability [%]	Location Density [locations/sq mile]
0%	1,461

Grant Eligibility
FFA

Target Area

Existing Broadband Infrastructure & Ongoing Initiatives

Existing Infrastructure	NA
On-going Initiatives	NA
Distance to CMMBI [miles]	3.2

Recommended Solution & Financial Metrics

Operating Model	GSCA
Primary Partner	GSCA
Alternative Partner	Vast
Grant(s)	FFA
Timeframe	Phase 1

Total CAPEX	$	11,508,985.20
Grant Amount	$	7,500,000.00
Year-10 Revenue	$	631,548.00
NPV	$	-1,661,055.73

KEY SUCESS FACTORS

Requieres successful award of the FFA Grant for the SSVBA Area
Work closely with the South Salinas Valley Broadband Authority (SSVBA) to align strategies and efforts in securing the grant

Indian Spring Park [Cluster ID: L]

Indicators of Need

	Total Locations	Unserved / Underserved
FCC:	300	0
CPUC:	386	4

Fiber Availability [%]	Location Density [locations/sq mile]
0%	636

Grant Eligibility
CASF | BEAD

Target Area

Existing Broadband Infrastructure & Ongoing Initiatives

Existing Infrastructure	NA
On-going Initiatives	NA
Distance to CMMBI [miles]	0.0

Recommended Solution & Financial Metrics

Operating Model	Fiber PPP
Primary Partner	Comcast
Alternative Partner	0
Grant(s)	NA
Timeframe	Phase 2

Total CAPEX	$	2,501,751.15
Grant Amount	$	-
Year-10 Revenue	$	71,160.00
NPV	$	-1,774,652.10

KEY SUCESS FACTORS

The feasibility of broadband expansion relies on the successful implementation and expansion of the California Middle Mile network or MW Backhaul deployment

River Run Rd [Cluster ID: M]

Indicators of Need

	Total Locations	Unserved / Underserved
FCC:	329	0
CPUC:	160	0

Fiber Availability [%]	Location Density [locations/sq mile]
0%	1,417

Grant Eligibility
NA

Target Area

Existing Broadband Infrastructure & Ongoing Initiatives

Existing Infrastructure	NA
On-going Initiatives	NA
Distance to CMMBI [miles]	2.0

Recommended Solution & Financial Metrics

Operating Model	Fiber PPP
Primary Partner	AT&T
Alternative Partner	Comcast
Grant(s)	NA
Timeframe	Phase 2

Total CAPEX	$	1,117,535.62
Grant Amount	$	-
Year-10 Revenue	$	78,960.00
NPV	$	-681,923.34

KEY SUCESS FACTORS

The expansion of the existing AT&T fiber network, which could reduce capital expenditure (Capex).
Requieres engagement with ISPs is required to facilitate network deployment.

Gonzales [Cluster ID: N]

Indicators of Need

	Total Locations	Unserved / Underserved
FCC:	1,822	48
CPUC:	1,840	89

Fiber Availability [%]	Location Density [locations/sq mile]
9%	1,407

Grant Eligibility
FFA

Target Area

Existing Broadband Infrastructure & Ongoing Initiatives

Existing Infrastructure	NA
On-going Initiatives	SSVBA wants to lease Crown Castle middle mile network | SSVBA will deploy open-access broadband across Soledad, Gonzales, Greenfield, King City, and unic. D3
Distance to CMMBI [miles]	0.0

Recommended Solution & Financial Metrics

Operating Model	GSCA
Primary Partner	GSCA
Alternative Partner	Vast
Grant(s)	FFA
Timeframe	Phase 1

Total CAPEX	$	5,931,178.62
Grant Amount	$	3,700,000.00
Year-10 Revenue	$	351,072.00
NPV	$	-923,883.16

KEY SUCESS FACTORS

Requieres successful award of the FFA Grant for the SSVBA Area
Work closely with the South Salinas Valley Broadband Authority (SSVBA) to align strategies and efforts in securing the grant

Del Monte Ave [Cluster ID: O]

Indicators of Need

	Total Locations	Unserved / Underserved
FCC:	394	0
CPUC:	373	6

Fiber Availability [%]	Location Density [locations/sq mile]
17%	3,429

Grant Eligibility
CASF | BEAD

Target Area

Existing Broadband Infrastructure & Ongoing Initiatives

Existing Infrastructure	County Fiber Ring
On-going Initiatives	NA
Distance to CMMBI [miles]	0.3

Recommended Solution & Financial Metrics

Operating Model	Fiber PPP
Primary Partner	AT&T
Alternative Partner	GSCA | Comcast
Grant(s)	NA
Timeframe	Phase 2

Total CAPEX	$	3,565,453.22
Grant Amount	$	-
Year-10 Revenue	$	93,240.00
NPV	$	-2,506,842.44

KEY SUCESS FACTORS

The expansion of the existing AT&T fiber network, which could reduce capital expenditure (Capex).
Requieres engagement with ISPs is required to facilitate network deployment.

Del Monte Golf Club [Cluster ID: P]

Indicators of Need

	Total Locations	Unserved / Underserved
FCC:	1,396	4
CPUC:	2,130	191

Fiber Availability [%]	Location Density [locations/sq mile]
24%	826

Grant Eligibility
CASF | BEAD

Target Area

Existing Broadband Infrastructure & Ongoing Initiatives

Existing Infrastructure	County Fiber Ring
On-going Initiatives	NA
Distance to CMMBI [miles]	0.0

Recommended Solution & Financial Metrics

Operating Model	GSCA
Primary Partner	GSCA
Alternative Partner	AT&T
Grant(s)	CASF
Timeframe	Phase 2

Total CAPEX	$	6,546,396.48
Grant Amount	$	6,546,396.48
Year-10 Revenue	$	254,400.00
NPV	$	944,922.81

KEY SUCESS FACTORS

The feasibility of broadband expansion relies on the successful implementation and expansion of the California Middle Mile network

North Seaside [Cluster ID: Q]

Indicators of Need

	Total Locations	Unserved / Underserved
FCC:	930	3
CPUC:	871	55

Fiber Availability [%]	Location Density [locations/sq mile]
12%	696

Grant Eligibility
CASF | BEAD

Target Area

Existing Broadband Infrastructure & Ongoing Initiatives

Existing Infrastructure	County Fiber Ring
On-going Initiatives	NA
Distance to CMMBI [miles]	0.8

Recommended Solution & Financial Metrics

Operating Model	Fiber PPP
Primary Partner	AT&T
Alternative Partner	Comcast | Optimum
Grant(s)	CASF
Timeframe	Phase 2

Total CAPEX	$	5,186,860.75
Grant Amount	$	1,358,500.00
Year-10 Revenue	$	213,720.00
NPV	$	-3,162,696.97

KEY SUCESS FACTORS

The expansion of the existing AT&T fiber network, which could reduce capital expenditure (Capex).
Requieres engagement with ISPs is required to facilitate network deployment.

Marina [Cluster ID: R]

Indicators of Need

	Total Locations	Unserved / Underserved
FCC:	5,752	74
CPUC:	5,750	692

Fiber Availability [%]	Location Density [locations/sq mile]
17%	1,029

Grant Eligibility
CASF | BEAD

Target Area

Existing Broadband Infrastructure & Ongoing Initiatives

Existing Infrastructure	County Fiber Ring
On-going Initiatives	Cruzio request CASF funding to deploy last/middle mile
Distance to CMMBI [miles]	0.0

Recommended Solution & Financial Metrics

Operating Model	Fiber PPP
Primary Partner	Cruzio
Alternative Partner	AT&T | Astound
Grant(s)	CASF
Timeframe	Phase 2

Total CAPEX	$	16,563,025.78
Grant Amount	$	8,400,000.00
Year-10 Revenue	$	1,307,640.00
NPV	$	-3,468,675.82

KEY SUCESS FACTORS

Successful inclusion of the Opportunity Zone within the Cruzio CASF Application.
Collaborate closely with Cruzio to understand the exact expansion requirements and potential investment commitments.

Spreckels [Cluster ID: S]

Indicators of Need

	Total Locations	Unserved / Underserved
FCC:	269	0
CPUC:	267	1

Fiber Availability [%]	Location Density [locations/sq mile]
0%	2,262

Grant Eligibility
CASF | BEAD

Target Area

Existing Broadband Infrastructure & Ongoing Initiatives

Existing Infrastructure	NA
On-going Initiatives	SSVBA will deploy open-access broadband across Soledad, Gonzales, Greenfield, King City, and unic. D3
Distance to CMMBI [miles]	2.3

Recommended Solution & Financial Metrics

Operating Model	GSCA
Primary Partner	GSCA
Alternative Partner	AT&T
Grant(s)	NA
Timeframe	Phase 2

Total CAPEX	$	918,822.62
Grant Amount	$	-
Year-10 Revenue	$	50,880.00
NPV	$	-728,555.54

KEY SUCESS FACTORS

The feasibility of broadband expansion relies on the successful implementation and expansion of the California Middle Mile network

Valley Oaks Mobile Park [Cluster ID: T]

Indicators of Need

	Total Locations	Unserved / Underserved
FCC:	41	41
CPUC:	17	17

Fiber Availability [%]	Location Density [locations/sq mile]
0%	4,058

Grant Eligibility
FFA

Target Area

Existing Broadband Infrastructure & Ongoing Initiatives

Existing Infrastructure	NA
On-going Initiatives	SSVBA will deploy open-access broadband across Soledad, Gonzales, Greenfield, King City, and unic. D3
Distance to CMMBI [miles]	6.4

Recommended Solution & Financial Metrics

Operating Model	GSCA
Primary Partner	GSCA
Alternative Partner	T-Mobile
Grant(s)	FFA
Timeframe	Long Term

Total CAPEX	$	432,828.35
Grant Amount	$	433,000.00
Year-10 Revenue	$	23,532.00
NPV	$	91,205.26

KEY SUCESS FACTORS

Feasible only if CA Middle Mile is extended or through MW Backhaul.
Requieres Long GSN Middle-mile extensions to serve various clusters.

Sillman Rd [Cluster ID: U]

Indicators of Need

	Total Locations	Unserved / Underserved
FCC:	45	43
CPUC:	27	27

Fiber Availability [%]	Location Density [locations/sq mile]
9%	1,112

Grant Eligibility
FFA

Target Area

Existing Broadband Infrastructure & Ongoing Initiatives

Existing Infrastructure	NA
On-going Initiatives	SSVBA wants to lease Crown Castle middle mile network | SSVBA will deploy open-access broadband across Soledad, Gonzales, Greenfield, King City, and unic. D3
Distance to CMMBI [miles]	0.0

Recommended Solution & Financial Metrics

Operating Model	GSCA
Primary Partner	GSCA
Alternative Partner	Vast
Grant(s)	FFA
Timeframe	Phase 1

Total CAPEX	$	555,454.97
Grant Amount	$	555,454.97
Year-10 Revenue	$	26,076.00
NPV	$	100,798.12

KEY SUCESS FACTORS

Feasible only if CA Middle Mile is extended or through MW Backhaul.
Requieres GSN Middle-mile extensions to serve various clusters.

Quail Meadows [Cluster ID: V]

Indicators of Need

	Total Locations	Unserved / Underserved
FCC:	769	41
CPUC:	314	21

Fiber Availability [%]	Location Density [locations/sq mile]
0%	717

Grant Eligibility
CASF | BEAD

Target Area

Existing Broadband Infrastructure & Ongoing Initiatives

Existing Infrastructure	NA
On-going Initiatives	NA
Distance to CMMBI [miles]	3.6

Recommended Solution & Financial Metrics

Operating Model	Fiber PPP
Primary Partner	AT&T
Alternative Partner	GSCA
Grant(s)	CASF
Timeframe	Phase 2

Total CAPEX	$	4,354,201.69
Grant Amount	$	3,300,000.00
Year-10 Revenue	$	199,860.00
NPV	$	-432,348.41

KEY SUCESS FACTORS

The expansion of the existing AT&T fiber network, which could reduce capital expenditure (Capex).
Requieres engagement with ISPs is required to facilitate network deployment.

Buena Vista Middle School [Cluster ID: W]

Indicators of Need

	Total Locations	Unserved / Underserved
FCC:	594	0
CPUC:	205	0

Fiber Availability [%]	Location Density [locations/sq mile]
0%	910

Grant Eligibility
NA

Target Area

Existing Broadband Infrastructure & Ongoing Initiatives

Existing Infrastructure	NA
On-going Initiatives	NA
Distance to CMMBI [miles]	1.0

Recommended Solution & Financial Metrics

Operating Model	Fiber PPP
Primary Partner	Comcast
Alternative Partner	AT&T
Grant(s)	NA
Timeframe	Phase 2

Total CAPEX	$	3,035,245.52
Grant Amount	$	-
Year-10 Revenue	$	140,580.00
NPV	$	-1,932,447.17

KEY SUCESS FACTORS

The upgrade of the existing Comcast network, which could reduce capital expenditure (Capex). Requieres engagement with ISPs is required to facilitate network deployment.

Pajaro [Cluster ID: X]

Indicators of Need

	Total Locations	Unserved / Underserved
FCC:	354	3
CPUC:	364	13

Fiber Availability [%]	Location Density [locations/sq mile]
29%	946

Grant Eligibility
CASF | BEAD

Target Area

Existing Broadband Infrastructure & Ongoing Initiatives

Existing Infrastructure	NA
On-going Initiatives	SSVBA wants to lease Crown Castle middle mile network | Cruzio request CASF funding to deploy last/middle mile | Garlic request CASF funding to deploy last/middle mile
Distance to CMMBI [miles]	0.0

Recommended Solution & Financial Metrics

Operating Model	Fiber PPP
Primary Partner	Vast
Alternative Partner	Garlic | Cruzio
Grant(s)	CASF
Timeframe	Phase 2

Total CAPEX	$	1,603,591.40
Grant Amount	$	-
Year-10 Revenue	$	79,200.00
NPV	$	-1,050,006.58

KEY SUCESS FACTORS

The expansion of the existing Vast fiber network, which could reduce capital expenditure (Capex).
Requieres engagement with ISPs is required to facilitate network deployment.

Ambler Park [Cluster ID: Y]

Indicators of Need

	Total Locations	Unserved / Underserved
FCC:	319	1
CPUC:	234	4

Fiber Availability [%]	Location Density [locations/sq mile]
0%	893

Grant Eligibility
CASF | BEAD

Target Area

Existing Broadband Infrastructure & Ongoing Initiatives

Existing Infrastructure	County Fiber Ring
On-going Initiatives	NA
Distance to CMMBI [miles]	3.5

Recommended Solution & Financial Metrics

Operating Model	Fiber PPP
Primary Partner	AT&T
Alternative Partner	Comcast
Grant(s)	NA
Timeframe	Phase 2

Total CAPEX	$	3,255,041.90
Grant Amount	$	-
Year-10 Revenue	$	74,880.00
NPV	$	-2,344,386.69

KEY SUCESS FACTORS

Needs to find the right incentive for the incumbent to deploy the network.
Requieres Long GSN Middle-mile extensions to serve various clusters.

Salinas [Cluster ID: Z]

Indicators of Need

	Total Locations	Unserved / Underserved
FCC:	28,965	254
CPUC:	28,851	1,367

Fiber Availability [%]	Location Density [locations/sq mile]
23%	1,440

Grant Eligibility
CASF | BEAD | EDA

Target Area

Existing Broadband Infrastructure & Ongoing Initiatives

Existing Infrastructure	County Fiber Ring
On-going Initiatives	SSVBA wants to lease Crown Castle middle mile network | Underline has an active agreement with Salinas City to deploy an open-access network | Kimley-Horn has an active agreement to develop the Broadband Strategic Plan for Salinas City | Cruzio request CASF funding to deploy last/middle mile
Distance to CMMBI [miles]	0.0

Recommended Solution & Financial Metrics

Operating Model	Fiber PPP
Primary Partner	Underline
Alternative Partner	Astound | Vast
Grant(s)	EDA
Timeframe	Phase 2

Total CAPEX	$	70,056,836.45
Grant Amount	$	28,600,000.00
Year-10 Revenue	$	6,495,300.00
NPV	$	-17,768,202.98

KEY SUCESS FACTORS

Agreement between Underline and the City already in place.
Key requirement is to streamline permitt processes and to enable micro-trenching.

Prunedale Elementary School [Cluster ID: AA]

Indicators of Need

	Total Locations	Unserved / Underserved
FCC:	330	0
CPUC:	108	1

Fiber Availability [%]	Location Density [locations/sq mile]
0%	501

Grant Eligibility
CASF | BEAD

Target Area

Existing Broadband Infrastructure & Ongoing Initiatives

Existing Infrastructure	NA
On-going Initiatives	Cruzio request CASF funding to deploy last/middle mile
Distance to CMMBI [miles]	3.4

Recommended Solution & Financial Metrics

Operating Model	Fiber PPP
Primary Partner	Cruzio
Alternative Partner	Charter | AT&T
Grant(s)	CASF
Timeframe	Phase 2

Total CAPEX	$	4,328,523.58
Grant Amount	$	-
Year-10 Revenue	$	78,360.00
NPV	$	-3,154,594.08

KEY SUCESS FACTORS

Successful inclusion of the Opportunity Zone within the Cruzio CASF Application.
Collaborate closely with Cruzio to understand the exact expansion requirements and potential investment commitments.

Chualar [Cluster ID: AB]

Indicators of Need

	Total Locations	Unserved / Underserved
FCC:	200	0
CPUC:	146	4

Fiber Availability [%]	Location Density [locations/sq mile]
14%	1,436

Grant Eligibility
CASF | BEAD

Target Area

Existing Broadband Infrastructure & Ongoing Initiatives

Existing Infrastructure	NA
On-going Initiatives	SSVBA wants to lease Crown Castle middle mile network| SSVBA will deploy open-access broadband across Soledad, Gonzales, Greenfield, King City, and unic. D3 | Cruzio request CASF funding to deploy last/middle mile
Distance to CMMBI [miles]	0.0

Recommended Solution & Financial Metrics

Operating Model	GSCA
Primary Partner	GSCA
Alternative Partner	Vast | Cruzio
Grant(s)	NA
Timeframe	Phase 2

Total CAPEX	$	870,680.70
Grant Amount	$	-
Year-10 Revenue	$	35,616.00
NPV	$	-737,366.37

KEY SUCESS FACTORS

Feasible only if CA Middle Mile is extended or through MW Backhaul.
Requieres Long GSN Middle-mile extensions to serve various clusters.

Langley Canyon Rd [Cluster ID: AC]

Indicators of Need

	Total Locations	Unserved / Underserved
FCC:	325	0
CPUC:	370	3

Fiber Availability [%]	Location Density [locations/sq mile]
0%	495

Grant Eligibility
CASF | BEAD

Target Area

Existing Broadband Infrastructure & Ongoing Initiatives

Existing Infrastructure	NA
On-going Initiatives	Garlic request CASF funding to deploy last/middle mile
Distance to CMMBI [miles]	0.5

Recommended Solution & Financial Metrics

Operating Model	Fiber PPP
Primary Partner	Garlic
Alternative Partner	Cruzio
Grant(s)	NA
Timeframe	Phase 2

Total CAPEX	$	3,084,098.02
Grant Amount	$	-
Year-10 Revenue	$	77,580.00
NPV	$	-2,199,852.50

KEY SUCESS FACTORS

Successful inclusion of the Opportunity Zone within the Garlic CASF Application.
Collaborate closely with Garlic to understand the exact expansion requirements and potential investment commitments.

Pine Canyon [Cluster ID: AD]

Indicators of Need

	Total Locations	Unserved / Underserved
FCC:	533	0
CPUC:	564	71

Fiber Availability [%]	Location Density [locations/sq mile]
0%	1,436

Grant Eligibility
CASF | BEAD

Target Area

Existing Broadband Infrastructure & Ongoing Initiatives

Existing Infrastructure	NA
On-going Initiatives	SSVBA will deploy open-access broadband across Soledad, Gonzales, Greenfield, King City, and unic. D3
Distance to CMMBI [miles]	2.8

Recommended Solution & Financial Metrics

Operating Model	GSCA
Primary Partner	GSCA
Alternative Partner	AT&T | Charter
Grant(s)	BEAD
Timeframe	Long Term

Total CAPEX	$	2,894,718.23
Grant Amount	$	2,300,000.00
Year-10 Revenue	$	101,760.00
NPV	$	-216,355.79

KEY SUCESS FACTORS

Feasible only if CA Middle Mile is extended or through MW Backhaul.
Work closely with the South Salinas Valley Broadband Authority (SSVBA) to align strategies and efforts.

Carmel Valley High School [Cluster ID: AE]

Indicators of Need

	Total Locations	Unserved / Underserved
FCC:	251	0
CPUC:	134	1

Fiber Availability [%]	Location Density [locations/sq mile]
0%	461

Grant Eligibility
CASF | BEAD

Target Area

Existing Broadband Infrastructure & Ongoing Initiatives

Existing Infrastructure	NA
On-going Initiatives	NA
Distance to CMMBI [miles]	2.4

Recommended Solution & Financial Metrics

Operating Model	Fiber PPP
Primary Partner	AT&T
Alternative Partner	Comcast
Grant(s)	NA
Timeframe	Phase 2

Total CAPEX	$	3,049,065.51
Grant Amount	$	-
Year-10 Revenue	$	47,940.00
NPV	$	-2,281,627.28

KEY SUCESS FACTORS

The expansion of the existing AT&T fiber network, which could reduce capital expenditure (Capex).
Requieres engagement with ISPs is required to facilitate network deployment.

Carmel Highlands [Cluster ID: AF]

Indicators of Need

	Total Locations	Unserved / Underserved
FCC:	478	0
CPUC:	319	20

Fiber Availability [%]	Location Density [locations/sq mile]
0%	488

Grant Eligibility
CASF | BEAD

Target Area

Existing Broadband Infrastructure & Ongoing Initiatives

Existing Infrastructure	NA
On-going Initiatives	NA
Distance to CMMBI [miles]	3.4

Recommended Solution & Financial Metrics

Operating Model	Fiber PPP
Primary Partner	AT&T
Alternative Partner	Charter
Grant(s)	NA
Timeframe	Phase 2

Total CAPEX	$	5,387,968.89
Grant Amount	$	-
Year-10 Revenue	$	112,680.00
NPV	$	-3,844,299.70

KEY SUCESS FACTORS

The expansion of the existing AT&T fiber network, which could reduce capital expenditure (Capex).
Requieres engagement with ISPs is required to facilitate network deployment.

Jolon Rd [Cluster ID: AG]

Indicators of Need

	Total Locations	Unserved / Underserved
FCC:	57	57
CPUC:	117	117

Fiber Availability [%]	Location Density [locations/sq mile]
0%	1,200

Grant Eligibility
CASF | BEAD

Target Area

Existing Broadband Infrastructure & Ongoing Initiatives

Existing Infrastructure	NA
On-going Initiatives	SSVBA will deploy open-access broadband across Soledad, Gonzales, Greenfield, King City, and unic. D3
Distance to CMMBI [miles]	11.7

Recommended Solution & Financial Metrics

Operating Model	GSCA
Primary Partner	GSCA
Alternative Partner	T-Mobile
Grant(s)	FFA
Timeframe	Long Term

Total CAPEX	$	558,837.69
Grant Amount	$	558,837.69
Year-10 Revenue	$	33,072.00
NPV	$	126,774.37

KEY SUCESS FACTORS

Feasible only if CA Middle Mile is extended or through MW Backhaul.
Requieres Long GSN Middle-mile extensions to serve various clusters.

White Rock Lake [Cluster ID: AH]

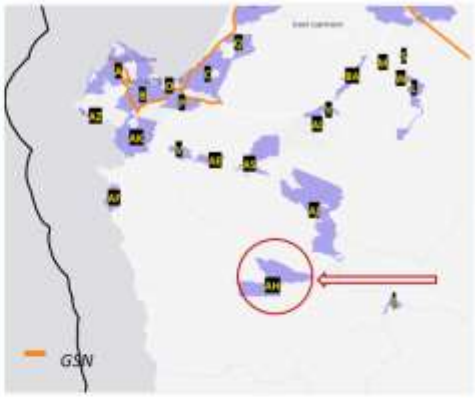
Indicators of Need

	Total Locations	Unserved / Underserved
FCC:	81	0
CPUC:	107	97

Fiber Availability [%]	Location Density [locations/sq mile]
0%	1,071

Grant Eligibility
CASF | BEAD

Target Area



Existing Broadband Infrastructure & Ongoing Initiatives

Existing Infrastructure	NA
On-going Initiatives	NA
Distance to CMMBI [miles]	9.5

Recommended Solution & Financial Metrics

Operating Model	GSCA
Primary Partner	GSCA
Alternative Partner	RazzoLink
Grant(s)	BEAD
Timeframe	Long Term

Total CAPEX	$	594,892.97
Grant Amount	$	594,892.97
Year-10 Revenue	$	11,448.00
NPV	$	41,932.40

KEY SUCESS FACTORS

Feasible only if CA Middle Mile is extended or through MW Backhaul.
Requieres Long GSN Middle-mile extensions to serve various clusters.

Corral Country Club [Cluster ID: AI]

Indicators of Need

	Total Locations	Unserved / Underserved
FCC:	263	0
CPUC:	228	16

Fiber Availability [%]	Location Density [locations/sq mile]
0%	506

Grant Eligibility
CASF | BEAD

Target Area

Existing Broadband Infrastructure & Ongoing Initiatives

Existing Infrastructure	County Fiber Ring
On-going Initiatives	NA
Distance to CMMBI [miles]	1.2

Recommended Solution & Financial Metrics

Operating Model	Fiber PPP
Primary Partner	AT&T
Alternative Partner	Comcast
Grant(s)	NA
Timeframe	Phase 2

Total CAPEX	$	2,683,992.65
Grant Amount	$	-
Year-10 Revenue	$	61,620.00
NPV	$	-1,952,694.17

KEY SUCESS FACTORS

Needs to find the right incentive for the incumbent to deploy the network.

Carmel Valley Village [Cluster ID: AJ]

Indicators of Need

	Total Locations	Unserved / Underserved
FCC:	1,578	31
CPUC:	1,580	112

Fiber Availability [%]	Location Density [locations/sq mile]
0%	475

Grant Eligibility
CASF | BEAD

Target Area

Existing Broadband Infrastructure & Ongoing Initiatives

Existing Infrastructure	County Fiber Ring
On-going Initiatives	NA
Distance to CMMBI [miles]	5.4

Recommended Solution & Financial Metrics

Operating Model	Fiber PPP
Primary Partner	AT&T
Alternative Partner	Comcast
Grant(s)	CASF
Timeframe	Phase 2

Total CAPEX	$	12,452,296.97
Grant Amount	$	10,000,000.00
Year-10 Revenue	$	422,820.00
NPV	$	-984,208.34

KEY SUCESS FACTORS

Needs to find the right incentive for the incumbent to deploy the network.

Carmel by the Sea [Cluster ID: AK]

Indicators of Need

	Total Locations	Unserved / Underserved
FCC:	4,967	2
CPUC:	4,862	88

Fiber Availability [%]	Location Density [locations/sq mile]
15%	1,137

Grant Eligibility
CASF | BEAD

Target Area

Existing Broadband Infrastructure & Ongoing Initiatives

Existing Infrastructure	NA
On-going Initiatives	NA
Distance to CMMBI [miles]	1.1

Recommended Solution & Financial Metrics

Operating Model	Fiber PPP
Primary Partner	Astound
Alternative Partner	AT&T
Grant(s)	NA
Timeframe	Phase 2

Total CAPEX	$	14,319,168.59
Grant Amount	$	-
Year-10 Revenue	$	1,138,440.00
NPV	$	-6,935,384.69

KEY SUCESS FACTORS

Needs to find the right incentive for the incumbent to deploy the network.

Prune Tree Center [Cluster ID: AL]

Indicators of Need

	Total Locations	Unserved / Underserved
FCC:	552	2
CPUC:	203	26

Fiber Availability [%]	Location Density [locations/sq mile]
0%	466

Grant Eligibility
CASF | BEAD

Target Area

Existing Broadband Infrastructure & Ongoing Initiatives

Existing Infrastructure	NA
On-going Initiatives	Cruzio request CASF funding to deploy last/middle mile
Distance to CMMBI [miles]	2.1

Recommended Solution & Financial Metrics

Operating Model	Fiber PPP
Primary Partner	Cruzio
Alternative Partner	GSCA
Grant(s)	CASF
Timeframe	Phase 2

Total CAPEX	$	5,161,940.08
Grant Amount	$	4,500,000.00
Year-10 Revenue	$	136,380.00
NPV	$	-271,070.80

KEY SUCESS FACTORS

High risk in getting the grant, also needs middle mile extensions to serve various clusters.

Arrow Transportation Company [Cluster ID: AM]

Indicators of Need

	Total Locations	Unserved / Underserved
FCC:	135	0
CPUC:	134	134

Fiber Availability [%]	Location Density [locations/sq mile]
0%	1,868

Grant Eligibility
CASF | BEAD

Target Area

Existing Broadband Infrastructure & Ongoing Initiatives

Existing Infrastructure	County Fiber Ring
On-going Initiatives	NA
Distance to CMMBI [miles]	4.9

Recommended Solution & Financial Metrics

Operating Model	Fiber PPP
Primary Partner	Cruzio
Alternative Partner	Underline
Grant(s)	CASF
Timeframe	Phase 1

Total CAPEX	$	843,510.15
Grant Amount	$	800,000.00
Year-10 Revenue	$	35,040.00
NPV	$	-26,550.90

KEY SUCESS FACTORS

Successful inclusion of the Opportunity Zone within the Cruzio CASF Application.
Collaborate closely with Cruzio to understand the exact expansion requirements and potential investment commitments.

Pajaro River [Cluster ID: AN]

Indicators of Need

	Total Locations	Unserved / Underserved
FCC:	40	0
CPUC:	387	30

Fiber Availability [%]	Location Density [locations/sq mile]
0%	1,365

Grant Eligibility
CASF | BEAD

Target Area

Existing Broadband Infrastructure & Ongoing Initiatives

Existing Infrastructure	NA
On-going Initiatives	Garlic request CASF funding to deploy last/middle mile
Distance to CMMBI [miles]	1.8

Recommended Solution & Financial Metrics

Operating Model	Fiber PPP
Primary Partner	Garlic
Alternative Partner	Vast | GSCA
Grant(s)	CASF
Timeframe	Phase 1

Total CAPEX	$	1,006,809.62
Grant Amount	$	1,006,809.62
Year-10 Revenue	$	15,660.00
NPV	$	-48,073.90

KEY SUCESS FACTORS

Successful inclusion of the Opportunity Zone within the Garlic CASF Application.
Collaborate closely with Garlic to understand the exact expansion requirements and potential investment commitments.

San Ardo [Cluster ID: AO]

Indicators of Need

	Total Locations	Unserved / Underserved
FCC:	132	132
CPUC:	147	147

Fiber Availability [%]	Location Density [locations/sq mile]
0%	1,038

Grant Eligibility
FFA

Target Area

Existing Broadband Infrastructure & Ongoing Initiatives

Existing Infrastructure	NA
On-going Initiatives	SSVBA will deploy open-access broadband across Soledad, Gonzales, Greenfield, King City, and unic. D3
Distance to CMMBI [miles]	0.0

Recommended Solution & Financial Metrics

Operating Model	GSCA
Primary Partner	GSCA
Alternative Partner	AT&T
Grant(s)	FFA
Timeframe	Phase 1

Total CAPEX	$	751,621.31
Grant Amount	$	751,621.31
Year-10 Revenue	$	31,800.00
NPV	$	120,070.31

KEY SUCESS FACTORS

Requieres successful award of the FFA Grant for the SSVBA Area
Work closely with the South Salinas Valley Broadband Authority (SSVBA) to align strategies and efforts in securing the grant

Soledad Prison Rd [Cluster ID: AP]

Indicators of Need

	Total Locations	Unserved / Underserved
FCC:	55	55
CPUC:	43	43

Fiber Availability [%]	Location Density [locations/sq mile]
0%	967

Grant Eligibility
FFA

Target Area

Existing Broadband Infrastructure & Ongoing Initiatives

Existing Infrastructure	NA
On-going Initiatives	SSVBA wants to lease Crown Castle middle mile network | SSVBA will deploy open-access broadband across Soledad, Gonzales, Greenfield, King City, and unic. D3
Distance to CMMBI [miles]	0.0

Recommended Solution & Financial Metrics

Operating Model	GSCA
Primary Partner	GSCA
Alternative Partner	Vast
Grant(s)	FFA
Timeframe	Phase 1

Total CAPEX	$	704,023.72
Grant Amount	$	704,023.72
Year-10 Revenue	$	31,800.00
NPV	$	122,435.05

KEY SUCESS FACTORS

Requieres successful award of the FFA Grant for the SSVBA Area
Work closely with the South Salinas Valley Broadband Authority (SSVBA) to align strategies and efforts in securing the grant

Aromas [Cluster ID: AQ]

Indicators of Need

	Total Locations	Unserved / Underserved
FCC:	233	0
CPUC:	63	1

Fiber Availability [%]	Location Density [locations/sq mile]
5%	580

Grant Eligibility
CASF | BEAD

Target Area

Existing Broadband Infrastructure & Ongoing Initiatives

Existing Infrastructure	NA
On-going Initiatives	Garlic request CASF funding to deploy last/middle mile
Distance to CMMBI [miles]	0.0

Recommended Solution & Financial Metrics

Operating Model	Fiber PPP
Primary Partner	Garlic
Alternative Partner	Vast
Grant(s)	CASF
Timeframe	Phase 2

Total CAPEX	$	1,920,092.38
Grant Amount	$	-
Year-10 Revenue	$	54,000.00
NPV	$	-1,390,561.36

KEY SUCESS FACTORS

Successful inclusion of the Opportunity Zone within the Garlic CASF Application.
Collaborate closely with Garlic to understand the exact expansion requirements and potential investment commitments.

Pajaro Valley Golf Club [Cluster ID: AR]

Indicators of Need

	Total Locations	Unserved / Underserved
FCC:	211	0
CPUC:	241	14

Fiber Availability [%]	Location Density [locations/sq mile]
2%	512

Grant Eligibility
CASF | BEAD

Target Area

Existing Broadband Infrastructure & Ongoing Initiatives

Existing Infrastructure	NA
On-going Initiatives	SSVBA wants to lease Crown Castle middle mile network | Cruzio request CASF funding to deploy last/middle mile | Garlic request CASF funding to deploy last/middle mile
Distance to CMMBI [miles]	0.0

Recommended Solution & Financial Metrics

Operating Model	Fiber PPP
Primary Partner	Garlic
Alternative Partner	Cruzio | Vast
Grant(s)	NA
Timeframe	Phase 2

Total CAPEX	$	2,275,603.89
Grant Amount	$	-
Year-10 Revenue	$	50,880.00
NPV	$	-1,674,739.27

KEY SUCESS FACTORS

Successful inclusion of the Opportunity Zone within the Garlic CASF Application.
Collaborate closely with Garlic to understand the exact expansion requirements and potential investment commitments.

Carmel Valley Golf Club [Cluster ID: AS]

Indicators of Need

	Total Locations	Unserved / Underserved
FCC:	700	24
CPUC:	242	12

Fiber Availability [%]	Location Density [locations/sq mile]
0%	438

Grant Eligibility
CASF | BEAD

Target Area

Existing Broadband Infrastructure & Ongoing Initiatives

Existing Infrastructure	NA
On-going Initiatives	NA
Distance to CMMBI [miles]	2.2

Recommended Solution & Financial Metrics

Operating Model	Fiber PPP
Primary Partner	AT&T
Alternative Partner	Comcast
Grant(s)	NA
Timeframe	Phase 2

Total CAPEX	$	5,730,904.86
Grant Amount	$	-
Year-10 Revenue	$	199,860.00
NPV	$	-3,769,909.51

KEY SUCESS FACTORS

Needs to find the right incentive for the incumbent to deploy the network.
Requieres Long GSN Middle-mile extensions to serve various clusters.

Pond Derosa Lane [Cluster ID: AT]

Indicators of Need

	Total Locations	Unserved / Underserved
FCC:	220	0
CPUC:	46	0

Fiber Availability [%]	Location Density [locations/sq mile]
0%	500

Grant Eligibility
NA

Target Area

Existing Broadband Infrastructure & Ongoing Initiatives

Existing Infrastructure	NA
On-going Initiatives	SSVBA wants to lease Crown Castle middle mile network | Garlic request CASF funding to deploy last/middle mile | Surfnet request CASF funding to deploy last/middle mile
Distance to CMMBI [miles]	0.5

Recommended Solution & Financial Metrics

Operating Model	Fiber PPP
Primary Partner	Garlic
Alternative Partner	Surfnet
Grant(s)	NA
Timeframe	Phase 2

Total CAPEX	$	2,648,612.40
Grant Amount	$	-
Year-10 Revenue	$	53,220.00
NPV	$	-1,953,340.32

KEY SUCESS FACTORS

Needs to find the right incentive for the incumbent to deploy the network.
Requieres Long GSN Middle-mile extensions to serve various clusters.

San Lucas [Cluster ID: AU]

Indicators of Need

	Total Locations	Unserved / Underserved
FCC:	87	87
CPUC:	89	89

Fiber Availability [%]	Location Density [locations/sq mile]
0%	909

Grant Eligibility
FFA

Target Area

Existing Broadband Infrastructure & Ongoing Initiatives

Existing Infrastructure	NA
On-going Initiatives	SSVBA will deploy open-access broadband across Soledad, Gonzales, Greenfield, King City, and unic. D3
Distance to CMMBI [miles]	0.0

Recommended Solution & Financial Metrics

Operating Model	GSCA
Primary Partner	GSCA
Alternative Partner	Charter
Grant(s)	FFA
Timeframe	Phase 1

Total CAPEX	$	847,715.77
Grant Amount	$	847,715.77
Year-10 Revenue	$	49,608.00
NPV	$	190,720.91

KEY SUCESS FACTORS

Requieres successful award of the FFA Grant for the SSVBA Area
Work closely with the South Salinas Valley Broadband Authority (SSVBA) to align strategies and efforts in securing the grant

Elkhorn [Cluster ID: AV]

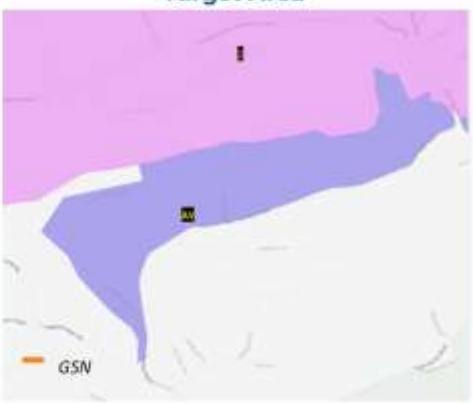
Indicators of Need

	Total Locations	Unserved / Underserved
FCC:	171	0
CPUC:	831	580

Fiber Availability [%]	Location Density [locations/sq mile]
0%	400

Grant Eligibility
CASF | BEAD | FFA

Target Area



Existing Broadband Infrastructure & Ongoing Initiatives

Existing Infrastructure	NA
On-going Initiatives	SSVBA wants to lease Crown Castle middle mile network | Garlic request CASF funding to deploy last/middle mile
Distance to CMMBI [miles]	2.6

Recommended Solution & Financial Metrics

Operating Model	Fiber ISP Standalone
Primary Partner	Garlic
Alternative Partner	Surfnet | GSCA
Grant(s)	CASF
Timeframe	Long Term

Total CAPEX	$	1,821,861.57
Grant Amount	$	1,821,861.57
Year-10 Revenue	$	40,560.00
NPV	$	34,206.54

KEY SUCESS FACTORS

Successful inclusion of the Opportunity Zone within the Garlic CASF Application.
Collaborate closely with Garlic to understand the exact expansion requirements and potential investment commitments.

Crazy Horse Club [Cluster ID: AW]

Indicators of Need

	Total Locations	Unserved / Underserved
FCC:	316	0
CPUC:	208	3

Fiber Availability [%]	Location Density [locations/sq mile]
0%	659

Grant Eligibility
CASF | BEAD

Target Area

Existing Broadband Infrastructure & Ongoing Initiatives

Existing Infrastructure	NA
On-going Initiatives	NA
Distance to CMMBI [miles]	0.0

Recommended Solution & Financial Metrics

Operating Model	Fiber PPP
Primary Partner	Underline
Alternative Partner	AT&T
Grant(s)	NA
Timeframe	Phase 2

Total CAPEX	$	2,093,953.16
Grant Amount	$	-
Year-10 Revenue	$	75,060.00
NPV	$	-1,447,021.13

KEY SUCESS FACTORS

The expansion of the existing fiber network, which could reduce capital expenditure (Capex). Requieres engagement with ISPs is required to facilitate network deployment.

West Prunedale [Cluster ID: AX]

Indicators of Need

	Total Locations	Unserved / Underserved
FCC:	240	0
CPUC:	230	0

Fiber Availability [%]	Location Density [locations/sq mile]
0%	1,387

Grant Eligibility
NA

Target Area

Existing Broadband Infrastructure & Ongoing Initiatives

Existing Infrastructure	NA
On-going Initiatives	SSVBA wants to lease Crown Castle middle mile network | Cruzio request CASF funding to deploy last/middle mile
Distance to CMMBI [miles]	1.2

Recommended Solution & Financial Metrics

Operating Model	Fiber PPP
Primary Partner	Cruzio
Alternative Partner	Charter
Grant(s)	NA
Timeframe	Phase 2

Total CAPEX	$	1,556,150.40
Grant Amount	$	-
Year-10 Revenue	$	56,160.00
NPV	$	-1,105,938.18

KEY SUCESS FACTORS

Successful inclusion of the Opportunity Zone within the Cruzio CASF Application.
Collaborate closely with Cruzio to understand the exact expansion requirements and potential investment commitments.

Padre Lane [Cluster ID: AZ]

Indicators of Need

	Total Locations	Unserved / Underserved
FCC:	146	12
CPUC:	173	1

Fiber Availability [%]	Location Density [locations/sq mile]
58%	538

Grant Eligibility
CASF | BEAD

Target Area

Existing Broadband Infrastructure & Ongoing Initiatives

Existing Infrastructure	NA
On-going Initiatives	NA
Distance to CMMBI [miles]	2.9

Recommended Solution & Financial Metrics

Operating Model	Fiber PPP
Primary Partner	AT&T
Alternative Partner	GSCA
Grant(s)	NA
Timeframe	Phase 2

Total CAPEX	$	2,718,771.89
Grant Amount	$	-
Year-10 Revenue	$	47,940.00
NPV	$	-2,016,957.46

KEY SUCESS FACTORS

Needs to find the right incentive for the incumbent to deploy the network.
Requieres Long GSN Middle-mile extensions to serve various clusters.

Serra Village [Cluster ID: BA]

Indicators of Need

	Total Locations	Unserved / Underserved
FCC:	744	1
CPUC:	742	11

Fiber Availability [%]	Location Density [locations/sq mile]
0%	848

Grant Eligibility
CASF | BEAD

Target Area

Existing Broadband Infrastructure & Ongoing Initiatives

Existing Infrastructure	County Fiber Ring
On-going Initiatives	NA
Distance to CMMBI [miles]	4.8

Recommended Solution & Financial Metrics

Operating Model	Fiber PPP
Primary Partner	AT&T
Alternative Partner	Comcast
Grant(s)	NA
Timeframe	Phase 2

Total CAPEX	$	5,889,679.23
Grant Amount	$	-
Year-10 Revenue	$	176,820.00
NPV	$	-3,995,933.77

KEY SUCESS FACTORS

Needs to find the right incentive for the incumbent to deploy the network.
Requieres Long GSN Middle-mile extensions to serve various clusters.

FWA Opportunity Zones

North Prunedale [Cluster ID: 2]

Indicators of Need

	Total Locations	Unserved / Underserved
FCC:	1,599	1,127
CPUC:	1,600	1,320

Fiber Availability [%]	Location Density [locations/sq mile]
3%	68

Grant Eligibility
CASF | BEAD

Target Area

Existing Broadband Infrastructure & Ongoing Initiatives

Existing Infrastructure	NA
On-going Initiatives	SSVBA wants to lease Crown Castle middle mile network
Distance to CMMBI [miles]	1.4

Recommended Solution & Financial Metrics

Operating Model	FWA ISP Standalone
Primary Partner	Verizon
Alternative Partner	Garlic
Grant(s)	CASF
Timeframe	Phase 1

Total CAPEX	$	3,849,984.96
Grant Amount	$	3,849,984.96
Year-10 Revenue	$	591,300.00
NPV	$	2,342,186.38

KEY SUCESS FACTORS

The expansion of the existing FWA network, which could reduce capital expenditure (Capex). Requieres engagement with ISPs to facilitate network deployment.

Bald Mountain [Cluster ID: 3]

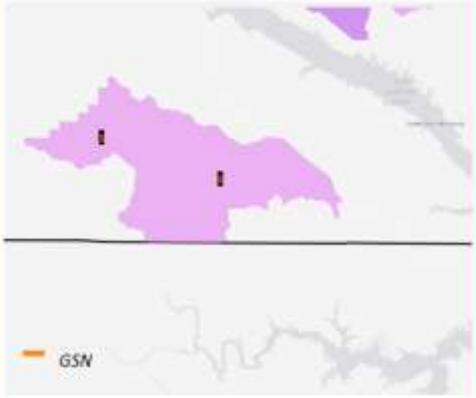
Indicators of Need

	Total Locations	Unserved / Underserved
FCC:	3,449	40
CPUC:	14	14

Fiber Availability [%]	Location Density [locations/sq mile]
0%	8

Grant Eligibility
CASF | BEAD | ReConnect

Target Area



Existing Broadband Infrastructure & Ongoing Initiatives

Existing Infrastructure	NA
On-going Initiatives	SSVBA will deploy open-access broadband across Soledad, Gonzales, Greenfield, King City, and unic. D3
Distance to CMMBI [miles]	11.3

Recommended Solution & Financial Metrics

Operating Model	FWA PPP
Primary Partner	T-Mobile
Alternative Partner	AT&T
Grant(s)	CASF
Timeframe	Long Term

Total CAPEX	$	1,343,113.52
Grant Amount	$	1,343,113.52
Year-10 Revenue	$	28,800.00
NPV	$	-29,553.85

KEY SUCESS FACTORS

The expansion of the existing FWA network, which could reduce capital expenditure (Capex).
Requieres engagement with ISPs to facilitate network deployment.
Requieres Long GSN Middle-mile extensions to serve various clusters.

Ranchito Canyon [Cluster ID: 4]

Indicators of Need

	Total Locations	Unserved / Underserved
FCC:	83	83
CPUC:	68	68

Fiber Availability [%]	Location Density [locations/sq mile]
0%	12

Grant Eligibility
CASF | BEAD | ReConnect

Target Area

Existing Broadband Infrastructure & Ongoing Initiatives

Existing Infrastructure	NA
On-going Initiatives	SSVBA will deploy open-access broadband across Soledad, Gonzales, Greenfield, King City, and unic. D3
Distance to CMMBI [miles]	10.5

Recommended Solution & Financial Metrics

Operating Model	FWA ISP Standalone
Primary Partner	T-Mobile
Alternative Partner	Wilson Creek Communication
Grant(s)	CASF
Timeframe	Phase 2

Total CAPEX	$	468,132.64
Grant Amount	$	468,132.64
Year-10 Revenue	$	41,400.00
NPV	$	24,197.79

KEY SUCESS FACTORS

Requieres Long GSN Middle-mile extensions or MW Bakchaul to serve various clusters.

Bryson [Cluster ID: 5]

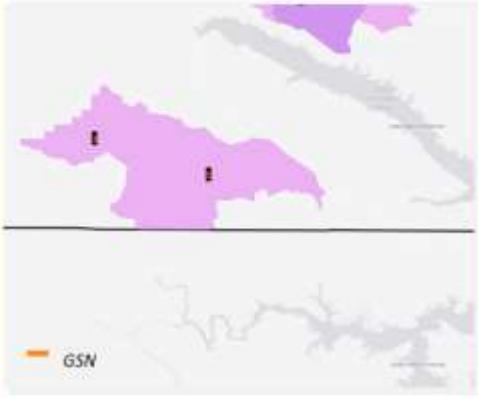
Indicators of Need

	Total Locations	Unserved / Underserved
FCC:	139	139
CPUC:	125	125

Fiber Availability [%]	Location Density [locations/sq mile]
0%	11

Grant Eligibility
CASF | BEAD | ReConnect

Target Area



Existing Broadband Infrastructure & Ongoing Initiatives

Existing Infrastructure	NA
On-going Initiatives	SSVBA will deploy open-access broadband across Soledad, Gonzales, Greenfield, King City, and unic. D3
Distance to CMMBI [miles]	10.8

Recommended Solution & Financial Metrics

Operating Model	FWA ISP Standalone
Primary Partner	T-Mobile
Alternative Partner	Verizon
Grant(s)	CASF
Timeframe	Phase 1

Total CAPEX	$	1,715,274.40
Grant Amount	$	1,715,274.40
Year-10 Revenue	$	110,700.00
NPV	$	322,726.08

KEY SUCESS FACTORS

Requieres Long GSN Middle-mile extensions or MW Bakchaul to serve various clusters.

Lockwood [Cluster ID: 6]

Indicators of Need

	Total Locations	Unserved / Underserved
FCC:	297	295
CPUC:	345	345

Fiber Availability [%]	Location Density [locations/sq mile]
0%	9

Grant Eligibility
CASF | BEAD | ReConnect

Target Area

Existing Broadband Infrastructure & Ongoing Initiatives

Existing Infrastructure	NA
On-going Initiatives	SSVBA will deploy open-access broadband across Soledad, Gonzales, Greenfield, King City, and unic. D3
Distance to CMMBI [miles]	13.4

Recommended Solution & Financial Metrics

Operating Model	FWA ISP Standalone
Primary Partner	T-Mobile
Alternative Partner	Verizon
Grant(s)	CASF
Timeframe	Phase 1

Total CAPEX	$	1,372,057.92
Grant Amount	$	1,372,057.92
Year-10 Revenue	$	257,400.00
NPV	$	946,455.21

KEY SUCESS FACTORS

Requieres Long GSN Middle-mile extensions or MW Bakchaul to serve various clusters.

Indian Valley Rd [Cluster ID: 8]

Indicators of Need

	Total Locations	Unserved / Underserved
FCC:	37	37
CPUC:	34	34

Fiber Availability [%]	Location Density [locations/sq mile]
0%	10

Grant Eligibility
CASF | BEAD | ReConnect

Target Area

Existing Broadband Infrastructure & Ongoing Initiatives

Existing Infrastructure	NA
On-going Initiatives	SSVBA will deploy open-access broadband across Soledad, Gonzales, Greenfield, King City, and unic. D3
Distance to CMMBI [miles]	5.6

Recommended Solution & Financial Metrics

Operating Model	FWA PPP
Primary Partner	Wilson Creek Communication
Alternative Partner	T-Mobile (FWA)
Grant(s)	CASF
Timeframe	Phase 2

Total CAPEX	$	1,009,452.64
Grant Amount	$	1,009,452.64
Year-10 Revenue	$	26,100.00
NPV	$	-38,445.90

KEY SUCESS FACTORS

Needs to find the right incentive for the incumbent to deploy the network.
Requieres GSN Middle-mile extensions to serve various clusters.

Julia Pfeiffer State Park [Cluster ID: 9]

Indicators of Need

	Total Locations	Unserved / Underserved
FCC:	31	31
CPUC:	29	29

Fiber Availability [%]	Location Density [locations/sq mile]
0%	17

Grant Eligibility
CASF | BEAD | ReConnect

Target Area

Existing Broadband Infrastructure & Ongoing Initiatives

Existing Infrastructure	NA
On-going Initiatives	NA
Distance to CMMBI [miles]	7.1

Recommended Solution & Financial Metrics

Operating Model	FWA PPP
Primary Partner	GeoLinks
Alternative Partner	Verizon
Grant(s)	CASF
Timeframe	Long Term

Total CAPEX	$	676,561.76
Grant Amount	$	676,561.76
Year-10 Revenue	$	22,500.00
NPV	$	-55,200.18

KEY SUCESS FACTORS

The expansion of the existing FWA network, which could reduce capital expenditure (Capex).
Requieres engagement with ISPs to facilitate network deployment.
Requieres Long GSN Middle-mile extensions to serve various clusters.

Soledad Correctional Facility [Cluster ID: 10]

Indicators of Need

	Total Locations	Unserved / Underserved
FCC:	87	83
CPUC:	95	95

Fiber Availability [%]	Location Density [locations/sq mile]
0%	86

Grant Eligibility
CASF | BEAD | ReConnect

Target Area

Existing Broadband Infrastructure & Ongoing Initiatives

Existing Infrastructure	NA
On-going Initiatives	SSVBA will deploy open-access broadband across Soledad, Gonzales, Greenfield, King City, and unic. D3
Distance to CMMBI [miles]	0.5

Recommended Solution & Financial Metrics

Operating Model	FWA ISP Standalone
Primary Partner	T-Mobile
Alternative Partner	RazzoLink
Grant(s)	CASF
Timeframe	Phase 1

Total CAPEX	$	419,030.88
Grant Amount	$	419,030.88
Year-10 Revenue	$	61,200.00
NPV	$	111,087.25

KEY SUCESS FACTORS

The expansion of the existing FWA network, which could reduce capital expenditure (Capex). Requieres engagement with ISPs to facilitate network deployment.

Pfeiffer Big Sur State Park [Cluster ID: 11]

Indicators of Need

	Total Locations	Unserved / Underserved
FCC:	298	297
CPUC:	264	264

Fiber Availability [%]	Location Density [locations/sq mile]
0%	28

Grant Eligibility
CASF | BEAD | ReConnect

Target Area

Existing Broadband Infrastructure & Ongoing Initiatives

Existing Infrastructure	NA
On-going Initiatives	NA
Distance to CMMBI [miles]	48.9

Recommended Solution & Financial Metrics

Operating Model	FWA ISP Standalone
Primary Partner	RazzoLink
Alternative Partner	Verizon | GeoLinks
Grant(s)	ReConnect
Timeframe	Phase 1

Total CAPEX	$	1,109,506.16
Grant Amount	$	1,109,506.16
Year-10 Revenue	$	252,000.00
NPV	$	924,309.93

KEY SUCESS FACTORS

Requieres Long GSN Middle-mile extensions or MW Bakchaul to serve various clusters.

Blackie Rd [Cluster ID: 12]

Indicators of Need

	Total Locations	Unserved / Underserved
FCC:	50	49
CPUC:	152	63

Fiber Availability [%]	Location Density [locations/sq mile]
0%	228

Grant Eligibility
CASF | BEAD | ReConnect

Target Area

Existing Broadband Infrastructure & Ongoing Initiatives

Existing Infrastructure	NA
On-going Initiatives	SSVBA wants to lease Crown Castle middle mile network
Distance to CMMBI [miles]	4.0

Recommended Solution & Financial Metrics

Operating Model	FWA ISP Standalone
Primary Partner	Cruzio
Alternative Partner	RazzoLink
Grant(s)	CASF
Timeframe	Phase 1

Total CAPEX	$	1,971,700.88
Grant Amount	$	1,971,700.88
Year-10 Revenue	$	75,600.00
NPV	$	174,237.87

KEY SUCESS FACTORS

Successful inclusion of the Opportunity Zone within the Cruzio CASF Application.
Collaborate closely with Cruzio to understand the exact expansion requirements and potential investment commitments.

Parkfield [Cluster ID: 13]

Indicators of Need

	Total Locations	Unserved / Underserved
FCC:	53	53
CPUC:	26	26

Fiber Availability [%]	Location Density [locations/sq mile]
0%	10

Grant Eligibility
CASF | BEAD | ReConnect

Target Area

Existing Broadband Infrastructure & Ongoing Initiatives

Existing Infrastructure	NA
On-going Initiatives	SSVBA will deploy open-access broadband across Soledad, Gonzales, Greenfield, King City, and unic. D3
Distance to CMMBI [miles]	11.7

Recommended Solution & Financial Metrics

Operating Model	FWA ISP Standalone
Primary Partner	T-Mobile
Alternative Partner	Outback Internet
Grant(s)	CASF
Timeframe	Phase 2

Total CAPEX	$	300,281.76
Grant Amount	$	300,281.76
Year-10 Revenue	$	47,700.00
NPV	$	54,363.72

KEY SUCESS FACTORS

Requieres Long GSN Middle-mile extensions or MW Bakchaul to serve various clusters.

Appendix D – Smart Community Applications

Smart community applications are implemented through Internet of Things (IoT) devices and technologies which leverage broadband infrastructure and services to transmit and process data, enabling remote control through computing platforms. Smart Community applications aim to enhance quality of life and well-being of residents and visitors, improving public services, such as security, education, transportation, energy, and environmental management.

The scope of work of the Broadband Strategic Plan as defined in GSFA's RFP includes the analysis of potential Smart Community applications. These applications are required to maximize the benefits of expanded broadband access from a public sector point of view.

This section seeks to identify relevant Smart Community applications that can be expanded or implemented by local jurisdictions within the County, providing an overview of the technical architecture, ongoing implementation, infrastructure requirements and implementation requirements.

There is a wide variety of Smart Community applications currently in the market and in order to understand those that would be more impactful and viable, inputs from local jurisdictions and residents were obtained through the Data Collection process and the Needs Assessment Survey with respect to the applications listed in Figure 89.

Figure 89. Smart Community applications summary.

Outcomes of the Data Collection from County and City staff point to the following applications as the most relevant based on status of current implementations or level of interest reported:

- **Public Wi-Fi:** The County is actively collaborating with broadband providers, county libraries, and local government to prioritize the development and expansion of digital and Wi-Fi hotspots.

- **Smart Public Transportation:** Monterey-Salinas Transit (MST) is introducing a groundbreaking contactless payment system on its buses.
- **EV Charging Stations:** There is an ongoing project to install EV charging stations at various County facilities.
- **Smart Surveillance:** The County is planning to Install new security camera system in the interior and exterior of the Monterey County Youth Center.

In the case of the Needs Assessment Survey, respondents were asked to establish the level of importance of each application. The applications with the highest percentage of respondents that consider them "very important" are listed in Table 39.

Table 39. Survey respondents' perception of Smart Community applications.

Smart Community Application	% of respondents that find the application as very important
Public Wi-Fi	71%
Emergency Alert Enhancement	67%
Zero Emissions Vehicle Charging Stations	45%
Smart surveillance	41%
Smart Public Transportation	38%

Considering the inputs above, the main applications that the County should consider for implementation (or expansion) are Public Wi-Fi, Smart Public Transportation, EV Charging Stations and Smart Surveillance. These applications are further analyzed in the following sections.

Public Wi-Fi

The Public Wi-Fi application provides free Wi-Fi access in public areas, allowing people free internet access. The application is composed by Wi-Fi access points distributed across the service area and connected to the City Network as shown in Figure 90. Locations where Public Wi-Fi can be deployed are open public venues (e.g., parks), libraries, schools, and shopping malls. Each location where Public Wi-Fi is to be deployed should provide up to 2.5 Gbps bandwidth to each access point to support 280 simultaneous connected devices.

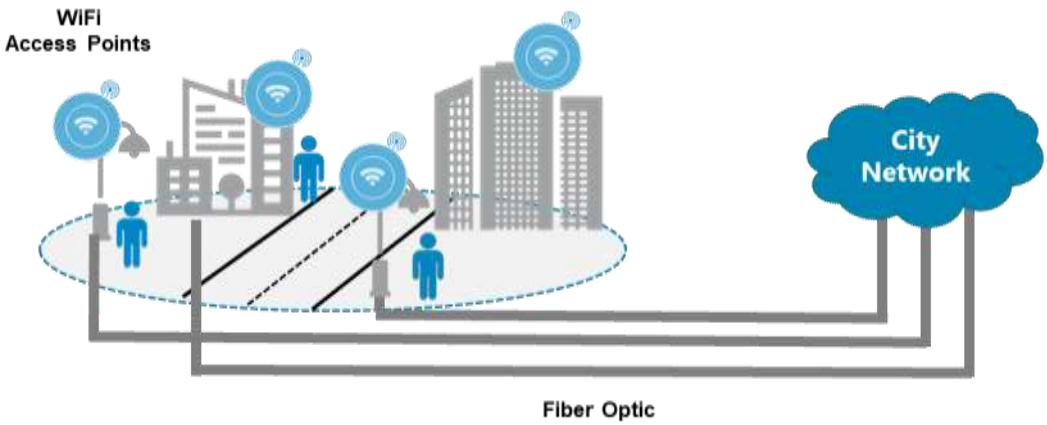


Figure 90. High-level architecture of the Public Wi-Fi application

The identification and preparation of assets and infrastructure (e.g., lampposts) for the installation of access points is a key step prior to the implementation of the Public Wi-Fi application. The city /

municipality should also define an operating model such as a partnership with mobile operators for the Wi-Fi network. Finally, the implementation of security protocols is also key for user and city protection.

Smart Public Transportation

Smart Public Transportation refers to a set of applications aimed at enhancing and optimizing public transportation services. This technology leverages various data sources, including sensors, Global Positioning System (GPS), and real-time data, to improve the efficiency, safety, and accessibility of public transportation networks. It encompasses features such as real-time tracking of vehicles, predictive maintenance for transit fleets, dynamic routing for buses and trains, and the integration of electronic payment systems, making commuting more convenient for passengers and improving the overall quality of public transportation services.

The high-level architecture for this application is shown in Figure 91. Key elements from the architecture are GPS tracking devices, sensor systems, passenger information systems, and electronic payment solutions which are located in buses, public transportation hubs, and bus stops to guarantee its optimum operation.

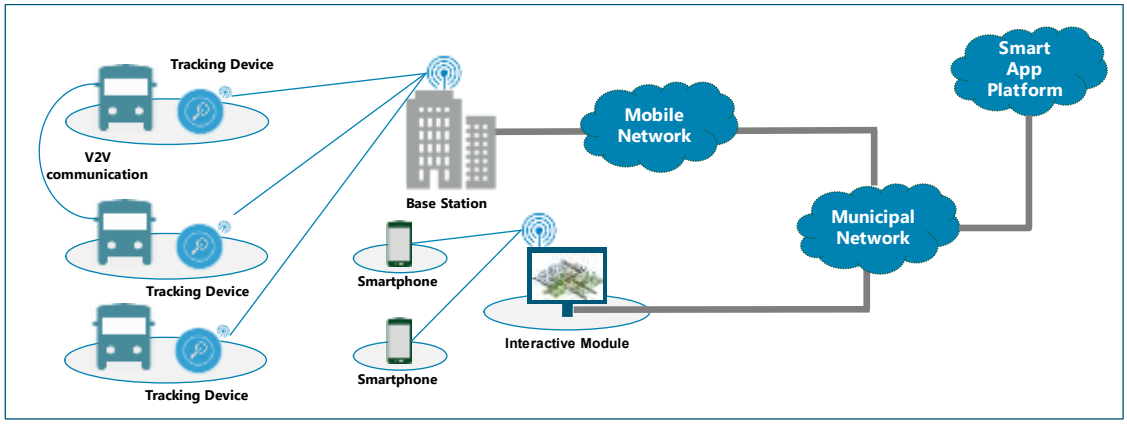


Figure 91. High-level architecture of the Smart Public Transportation application.

Additionally, Smart Public Transportation solutions often include applications for emergency alerts and crisis management to ensure the safety and well-being of commuters in various situations. Overall, Smart Public Transportation seeks to create a seamless and intelligent public transit experience that benefits both passengers and transportation authorities.

For instance, Monterey-Salinas Transit (MST) leveraging broadband connectivity has enabled the implementation of innovative solutions to enhance public transportation services. MST is revolutionizing its bus services by implementing a contactless payment system, demonstrating the County's dedication to enhancing the convenience and accessibility of public transportation. This forward-looking application qualifies for potential consideration under the SMART Grant program administered by the US Department of Transportation.

Zero Emissions Vehicle (ZEV) Charging Infrastructure

A ZEV Charging Infrastructure comprises 1) a mobile application that helps users to find, access, and use zero-emission vehicle (ZEV) charging stations and 2) ZEV charging stations to charge the battery of electric or hybrid vehicles. The charging stations can be installed together with Smart Grid systems. The high-level architecture for this application is shown in Figure 92.

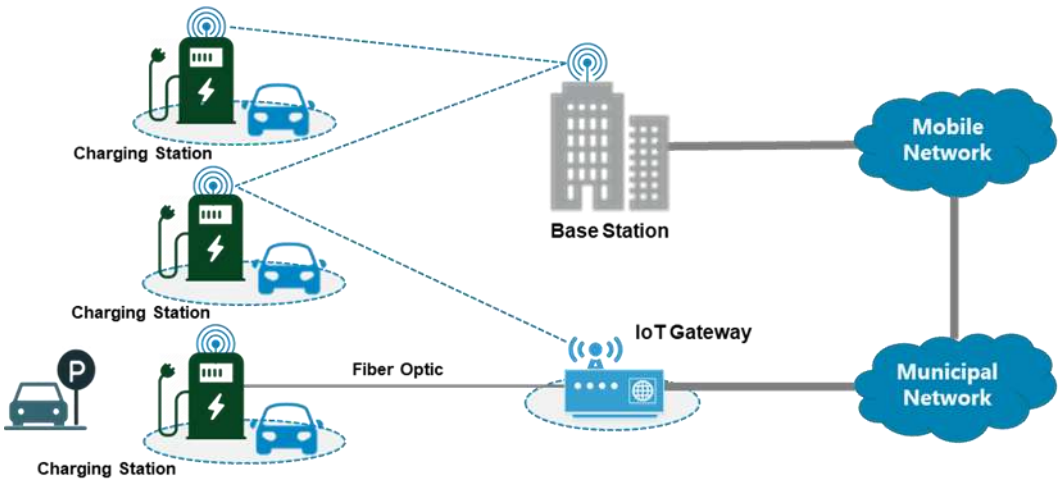


Figure 92. High-level architecture of the ZEV Charging Infrastructure

By using ZEV Charging Infrastructure, users can enjoy affordability, and reliability when charging their ZEVs. It also boosts their confidence in buying ZEVs, which helps the environment by cutting down greenhouse gas emissions and air pollution from transportation.

Importantly, this application can be considered for a Strengthening Mobility and Revolutionizing Transportation (SMART) Grant from the US Department of Transportation.

Smart Surveillance

This smart application is focused on monitoring public areas through automatic video analysis. Smart surveillance systems can perform various tasks, such as detecting and tracking objects, recognizing faces and gestures, identifying actions and behaviors to alert authorities when something unusual or suspicious happens. Smart surveillance helps authorities to react faster to potential threats and reduce the emergency response time. In fact, 24/7 surveillance video monitoring has been proven to reduce criminality.

Smart surveillance can be implemented on public roads and streets and public places like parks, libraries, and government buildings. Its implementation requires installing cameras at adequate observation points, locations for edge infrastructure, and a dedicated monitoring center. The high-level architecture of this application is shown in Figure 93.

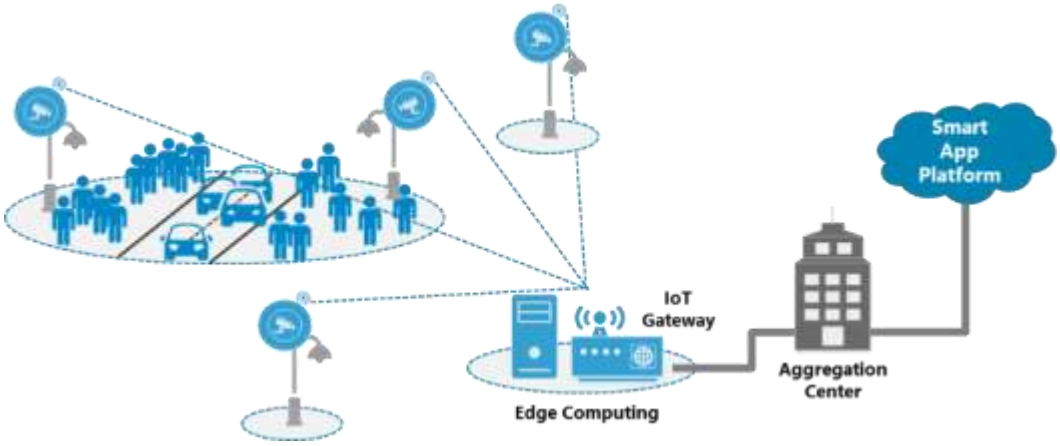


Figure 93. High-level architecture of Smart Surveillance

As mentioned in Section 1.3, Smart Surveillance could reduce 30% to 40% [33]criminal incidents such as assault, robbery, burglary and auto theft. Also, the Emergency Service Response Times could be reduced by 20% to 35%.[34]

[33] https://statetechmagazine.com/article/2022/01/evolving-technologies-can-enhance-emergency-responses-smart-cities#:~:text=A%20McKinsey%20report%20found%20that,by%2030%20to%2040%20percent.

[34] https://www.mckinsey.com/capabilities/operations/our-insights/smart-cities-digital-solutions-for-a-more-livable-future

Acronyms

ACP	Affordable Connectivity Program
ACS	American Community Survey
ALPR	Automated License Plate Reader
BDC	Broadband Data Collection
BEAD	Broadband Equity, Adoption, and Deployment
BIL	Bipartisan Infrastructure Law
CalEPA	California Environmental Protection Agency
CAPEX	Capital Expenditure
CASF	California Advanced Services Fund
CBO	Community-based Organization
CBRS	Citizens Broadband Radio Service
CCAP	Converged Cable Access Platforms
CDP	Census Designated Place
CDT	California Department of Technology
CEDS	Comprehensive Economic Development Strategy
CETF	California Emerging Technology Fund
CIP	Capital Improvement Plan
CMTS	Cable Modem Termination System
CPE	Customer Premises Equipment
CPUC	California Public Utilities Commission
DAC	Disadvantaged Communities
DIA	Direct Internet Access
DLT	Distance Learning and Telemedicine
DOCSIS	Data Over Cable Service Interface Specifications
DOT	Department of Transportation
DSL	Digital Subscriber Line
DSLAM	Digital Subscriber Line Access Multiplexer
EBIT	Earnings Before Interest and Taxes
EDA	Economic Development Administration
FCC	Federal Communications Commission
FFA	Federal Funding Account
FTTH	Fiber-to-the-Home
FTTP	Fiber-to-the-Premise
FWA	Fixed Wireless Access
GDP	Gross Domestic Product
GIS	Geographic Information System

GPA	Grade Point Average
GPS	Global Positioning System
GSCA	Golden State Connect Authority
GSFA	Golden State Finance Authority
GSN	GoldenStateNet
HD	High Definition
HSI	High Speed Internet
IIJA	Infrastructure Investment and Jobs Act
IoT	Internet of Things
ISP	Internet Service Provider
IT	Information Technology
LATA	Local Agency Technical Assistance
LEO	Low Earth Orbit
MMBI	Middle Mile Broadband Initiative
MNO	Mobile Network Operator
MP	Mile Post
MST	Monterey-Salinas Transit
NPV	Net Present Value
NTIA	National Telecommunications and Information Administration
OLT	Optical Line Terminal
ONT	Optical Network Terminal
PDF	Portable Document Format
PoC	Point of Contact
PON	Passive Optical Network
PoP	Point-of-Presence
PPP	Public Private Partnership
RAN	Radio Access Network
RFCP	Request for Concept Proposals
RFP	Request for Proposal
SDEP	Statewide Digital Equity Plan
SLA	Service Level Agreement
SMART	Strengthening Mobility and Revolutionizing Transportation
SSVBA	South Salinas Valley Broadband Authority
TBD	To Be Determined
TDMA	Time-Division Multiple Access
US	United States
USDA	United States Department of Agriculture
VoIP	Voice over Internet Protocol
VSAT	Very Small Aperture Terminal
ZEV	Zero-Emission Vehicle