San Benito County Broadband Strategic Plan

October 2023

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Executive Summary

The San Benito 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

San Benito County is a rural demarcation in California, home to approximately 65,000 residents and encompassing the cities of Hollister and San Juan Bautista. The County's population has been steadily growing, with an average increase of around 1,000 residents per year since 2015. Latino community represents 61% of the population in the County. San Benito County has a median household income of $85,810 and a per-capita personal income of $68,870 in 2020. The poverty rate in the County is relatively low, with only 9.3 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 San Benito County. Approximately 95% of the broadband serviceable locations are considered served according to Federal Communications Commission (FCC) data. Of those unserved (860 locations), 80% are in unincorporated areas. However, there is an important gap in access to 1 G / 500 Mbps service as 93.5% of San Benito 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 56% of locations have access to only one or no provider offering services above 100 Mbps, and only 4% of locations have access to fiber providers.

Public fiber infrastructure that can be leveraged to accelerate the deployment of fiber-based broadband services includes the 6.4-mile Hollister City fiber network and the California Middle Mile Broadband Initiative (MMBI) being built by the California Department of Technology (CDT) which includes 88 miles of planned deployment within San Benito 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 nine (9) broadband opportunity zones (3 for fiber and 6 for FWA) have been identified in San Benito County based on demographics, density, and the competitive environment. The conceptual designs for these opportunity zones result in a total cost estimated at $73 million. This leads to a plan that, if implemented, would result in 0% of unserved locations and an increase of 1G served locations from 6.5% to 83%.

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.
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

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

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.
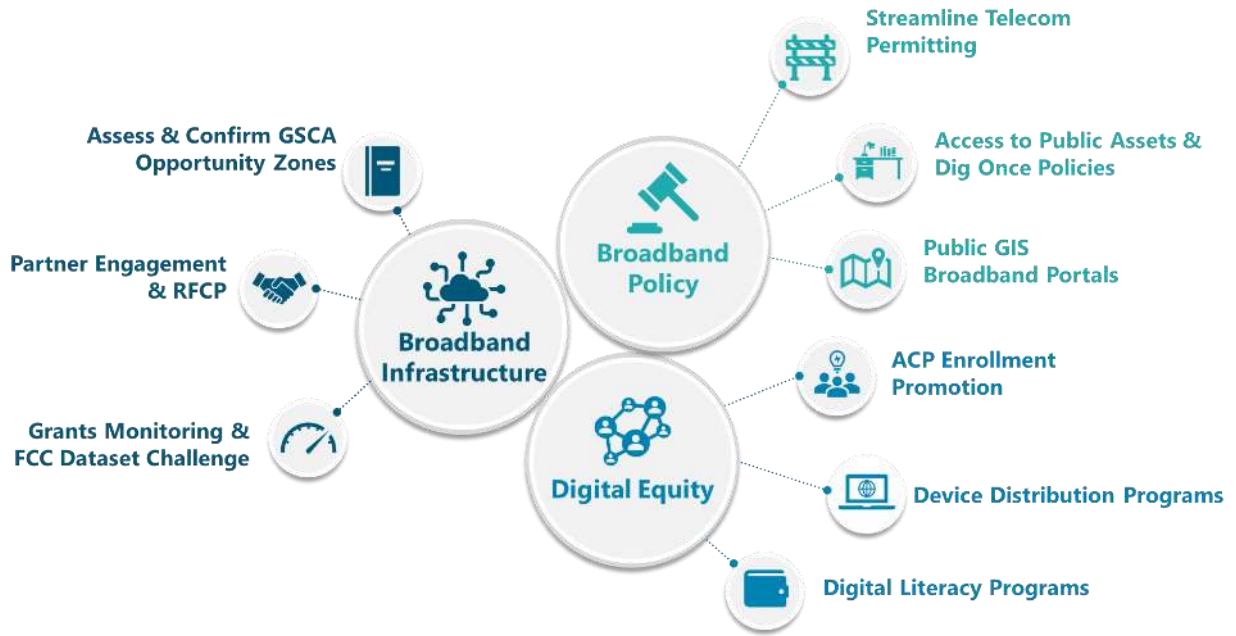
1 Introduction

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, 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 (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 San Benito 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 San Benito County in response to Request for Proposal (RFP) Number CD-22-02.

The San Benito 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. Moreover,

> *The Broadband 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.
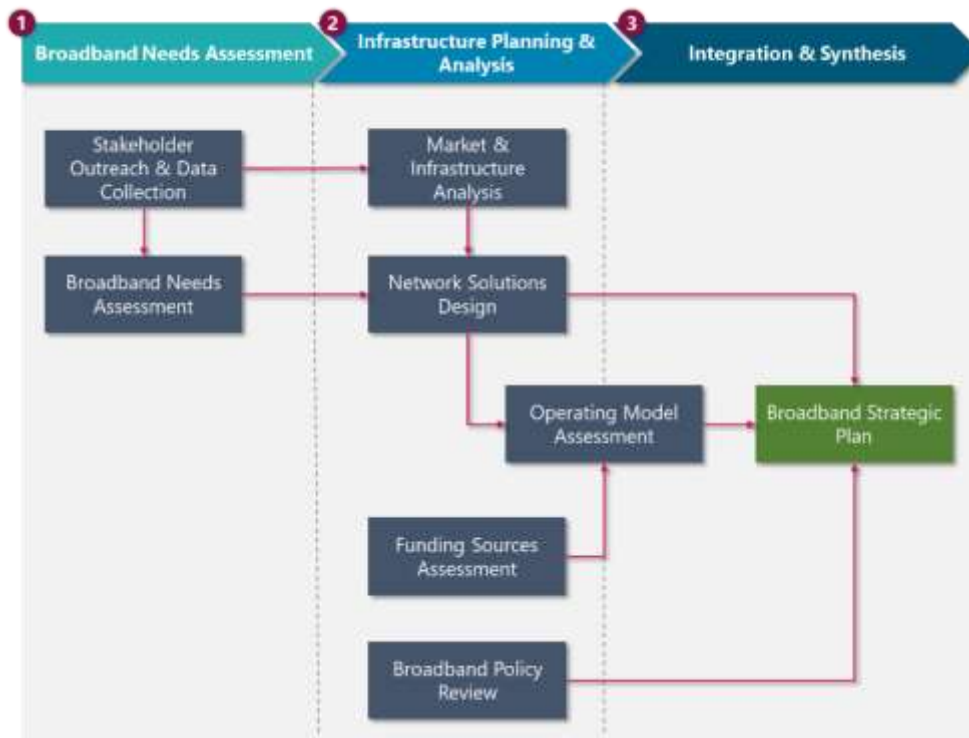
Figure 1. Project Scope and Methodology.

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. 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 San Benito County. This provides the necessary context to accurately assess the potential impact of broadband.

San Benito County is a rural community in California, home to approximately 65,000 residents and encompassing the cities of Hollister and San Juan Bautista. The County has a much smaller population compared to its neighbor, Monterey County, which is home to about 434,000 residents. The County's population has been steadily growing, with an average increase of around 1,000 residents per year since 2015. Latino community represents 61 percent of the population in the County.

Educational attainment in the county varies, with about 41 percent of adults completing high school but not pursuing further education. In contrast, only 5.5 percent of adults have obtained a graduate or professional degree. In terms of income, San Benito County has a median household income of $85,810 and a per-capita personal income of $68,870 in 2020. Therefore, the poverty rate in the County is relatively low, with only 9.3 percent of households falling below the federal poverty line.

There are approximately 30,000 employed residents in San Benito County, with 17,510 individuals working for companies located within the County, and 12,515 commuting outside the County for work, as captured in Table 1. This means that a sizable portion of employed residents, around 42 percent, commute to neighboring counties for work. The labor force participation rate for San Benito County is around 66%, which is lower compared to neighboring Monterey County with a rate of 71% and San Luis Obispo County with a rate of 83%. In terms of unemployment rates, San Benito County has a rate of 4.2%, while Monterey County has a rate of 4.4%, and San Luis Obispo County has the lowest rate at 2.7%.

As shown in Table 1, out of the 17,510 employees working within the County, the public business sector employs 1,610 individuals, while the private sector employs 14,495 individuals. Manufacturing, Agriculture, Construction, Retail, and Tourism (specifically Lodging and Food Services) are prominent sectors in San Benito 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 except for Construction as it has less opportunity to leverage broadband use cases.

There are two key entities that generate jobs in San Benito County: Earthbound Farms in San Juan Bautista, employing around 1,100 individuals, and Hazel Hawkins Hospital in Hollister, which is the largest employer in the City of Hollister with approximately 715 employees.

Table 1 Employment by Industry

Sector	San Benito County Jobs	Out-of-County Jobs	County Residents Employed (# | %)
Manufacturing	3,045	215	3,260 | 10.85%
Agricultural, Forestry & Fishing	1,945	0	1,945 | 6.477%
Construction	1,575	1,495	3,070 | 10.22%
Retail Trade	1,370	1,920	3,290 | 10.95%
Food Services	1,370	260	1,630 | 5.428%
Health Services	1,245	1,885	3,130 | 10.42%
Public Education	1,240	1,020	2,260 | 7.527%
Management & Administrative Services	1,030	280	1,310 | 4.363%
Public Administration	840	375	1,215 | 4.046%
Transportation	780	190	970 | 3.230%
Other Local Government	735	0	735 | 2.447%
Other Services	475	605	1,080 | 3.597%
Wholesale Trade, Warehousing & Storage	345	555	900 | 2.997%
Professional & Technical Services	260	2,000	2,260 | 7.527%
Financial & Insurance	200	380	580 | 1.931%
Mining	180	0	180 | 0.599%
Real Estate Rental & Leasing	160	250	410 | 1.365%
Arts, Entertainment & Recreation	125	365	490 | 1.631%
Private Education	125	0	125 | 0.416%
Federal Government	115	0	115 | 0.383%
Lodging	110	20	130 | 0.432%
State Government	85	0	85 | 0.283%
Waste Management	75	0	75 | 0.249%
Utilities	40	350	390 | 1.298%
Information	40	350	390 | 1.298%
Local Government	0	0	0 | 0%
Total Employment	**17,510**	**12,515**	**30,025**

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[2], 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

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

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.

Households / Residents

GDP Growth
• Fixed broadband penetration is strongly associated with GDP per capita.

Job Creation
• Fixed broadband penetration is strongly associated with job creation.

Quality of Life
• Traffic Optimization
• Smart Home Applications
• Smart Community Applications
• Smart Apps for People with Disabilities

Government / Anchor Institutions

Education
• GPA Improvement
• Tertiary Education Enrollment Increase

Public Safety & Emergency Services
• Emergency Response Time Improvement
• Fatalities & Incidents Reduction

Government Administrative Offices
• Work Productivity & Optimization

Industry / Business

Health Care
• Waiting Time Reduction For Patients
• Readmissions Reduction Due To Heart Failure
• Early Disease Detection

Retail Trade
• E-commerce Sales Increase

Accommodation And Food Services
• Online Rating Improvement
• Revenue Increase

Manufacturing
• Manufacturing Process Improvement

Agriculture / Farming
• Crop Procedures Improvement
• Energy Savings

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 San Benito County currently has a broadband adoption rate of 92 percent, there is still potential for further growth. For example, if the County were to achieve a 98[3] percent adoption rate, this would translate into a potential increase of up to one 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 San Benito County's broadband adoption rate increases from 92 to

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

98 percent, the number of unemployed residents (1,300 residents) could be reduced by up to 24%.

- *Traffic Optimization.* According to Comprehensive Economic Development Strategy (CEDS) report, a primary concern for the County is the increase in traffic congestion, since highways 152, 25, and 156 that connect to Santa Clara and Monterey Counties are highly congested with 16,900 commuters each day. In the context of San Benito County, the number of employees who can effectively work from home is relatively small, primarily concentrated in tech companies and related fields. Promoting telework for the 2,000 employees that work in the tech industry could reduce the number of commuters, which would result in traffic congestion reduction and improved air quality[4].
- *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.
- *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 4,500 people under the age of 65 who live with a disability within the County, according to the United States (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 San Benito CEDS, the primary educational concern in the County revolves around the lower levels of educational attainment among its residents. It is noted that around 41 percent of adults in San Benito County have completed high school but have not pursued any further formal education, while only 5.5 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 11,000 K-12 students in the County.
- *Public Safety & Emergency Services.* A study conducted by the McKinsey Global Institute[5] 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. According to the CEDS, drought conditions prevailing in recent years have led to an increase in the frequency of wildfires. Since 2018, San Benito County has experienced six significant wildfires, resulting in the burning of 3,100 acres of land. The "Airline Fire" alone accounted for 42% of the total acreage burned.
- *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.

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4 [The Urban Mobility Report](#)

5 [Smart cities: Digital solutions for a more livable future](#)

Another benefit is the online payment system, allowing residents to pay bills, fees, and taxes electronically.

Benefits for Industries and Businesses

- *Healthcare.* This sector represents one of the largest workforces in the county, employing over 1,245 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[6] 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 change the trend in the County where 7,000 people live with diabetes.

- *Agriculture & Farming.* This sector represents a total of 62 companies and 1,900 employees. Smart Agriculture technologies fueled by broadband for data transmission and processing have the potential to increase crop yield by 13 percent[7] 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 117 companies in San Benito, 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[8] has demonstrated that Wi-Fi access improves online ratings which in consequence increases revenues. CEDS states that the County is planning a tourism initiative to attract visitors to San Juan Bautista historical district and Pinnacles National Park. 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.

- *Manufacturing.* With 71 companies dedicated to manufacturing employing 3,000 employees, this sector would benefit from broadband deployment as it would enable the implementation of advanced communication and collaboration tools, improving efficiency and facilitating collaboration and decision making.

- *Retail Trade.* For this industry, broadband connectivity would be a critical enabler, facilitating the adoption and implementation of e-commerce for the 246 companies dedicated to retail, collectively employing approximately 1,370 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 $160 million by 2026.

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

[7] Application of Smart Techniques for Crop Production

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

* Bars, Banquet Halls, Restaurants.

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"[9]. The San Benito County Broadband Strategic Plan aims to contribute toward this goal.

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[9] The Digital Equity Act of 2021

2 Needs Assessment

2.1 Broadband Availability

This section analyzes the gaps in broadband service availability in San Benito 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.

The County obtained access to the FCC Broadband Data Collection dataset in March 2023 to support this project. Table 2 provides the counts and percentage of unserved and underserved locations according to the FCC data. As shown, most of the communities in San Benito have a good coverage of broadband

services as almost 95% of locations are above the 100/20 threshold. The city of San Juan Bautista and the community of Aromas lead the list with almost 100% of served locations according to data from FCC.

Most unserved locations are located in unincorporated areas outside of the main communities and they are predominantly located in the southern part of the county.

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)
Aromas	397	1 | 0.3%	0 | 0%	389 | 98.0%	7 | 1.8%
San Juan Bautista	716	1 | 0.1%	0 | 0%	715 | 99.9%	0 | 0%
Hollister	10,728	164 | 1.5%	0 | 0%	9,769 | 91.1%	795 | 7.4%
Ridgemark	1,350	42 | 3.1%	0 | 0%	1,307 | 96.8%	1 | 0.1%
Tres Pinos	182	6 | 3.3%	8 | 4.4%	168 | 92.3%	0 | 0%
Other Un-Inc. Areas in San Benito	5,199	633 | 12.2%	4 | 0.1%	4,159 | 80.0%	403 | 7.8%
Total	**18,572**	**847 | 4.6%**	**12 | 0.1%**	**16,507 | 88.9%**	**1,206 | 6.5%**

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"[10] 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.

As shown, the communities of Aromas and San Juan Bautista and their surrounding areas (Figure 3) have a very low percent of unserved locations, making this area the best served one. Similarly, Hollister and Ridgemark also present a low percentage of unserved locations except for Tres Pinos (Figure 4) where census blocks with 40 to 60% of unserved locations cover almost half of its boundary. Other unserved areas can be found north of Hollister city varying from 40 to 100% unserved locations.

The region with the highest concentrations of unserved locations is the entire southern region (Figure 5). Most unserved locations in all of San Benito County can be found close to Airline Highway and Panoche Road, making it the region most affected by the lack of broadband services.

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[10] https://docs.fcc.gov/public/attachments/DOC-385322A1.pdf
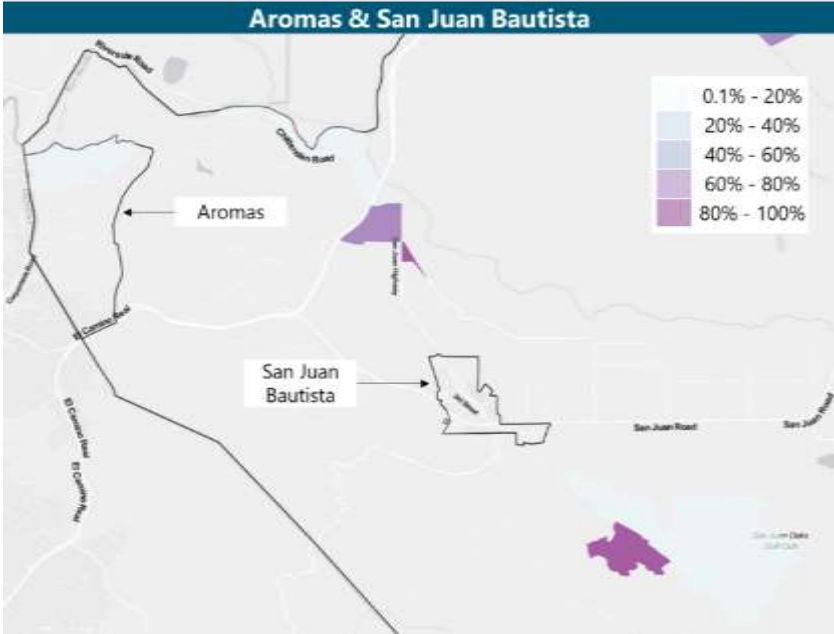
Figure 3. FCC Unserved serviceable locations by census block – Aromas and San Juan Bautista area
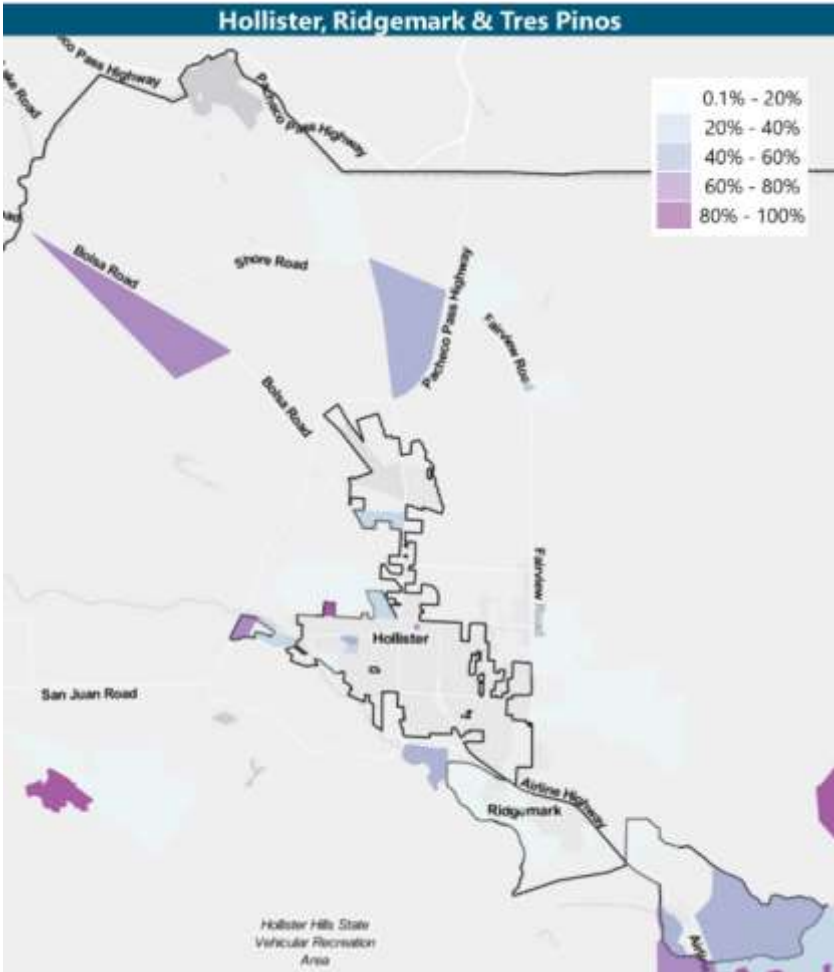
Figure 4. FCC Unserved serviceable locations by census block – Hollister, Ridgemark and Tres Pinos area
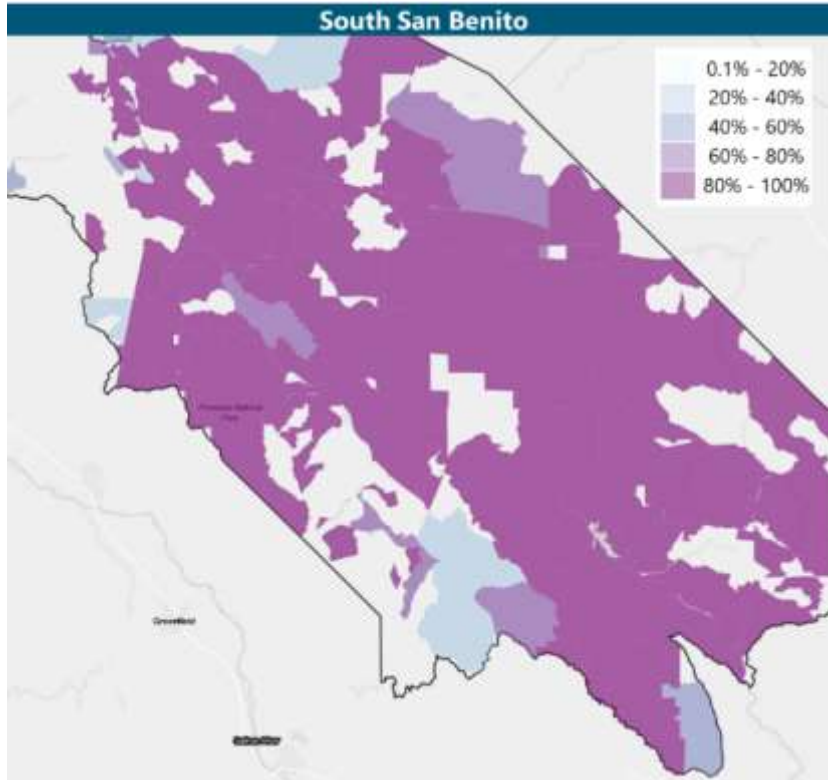
Figure 5. FCC Unserved serviceable locations by census block – South San Benito area

The same analysis for underserved locations is presented in Figure 6 and Figure 7. This analysis reveals that there are not many underserved locations in San Benito, as most of the county is either unserved, served, or 1G served.
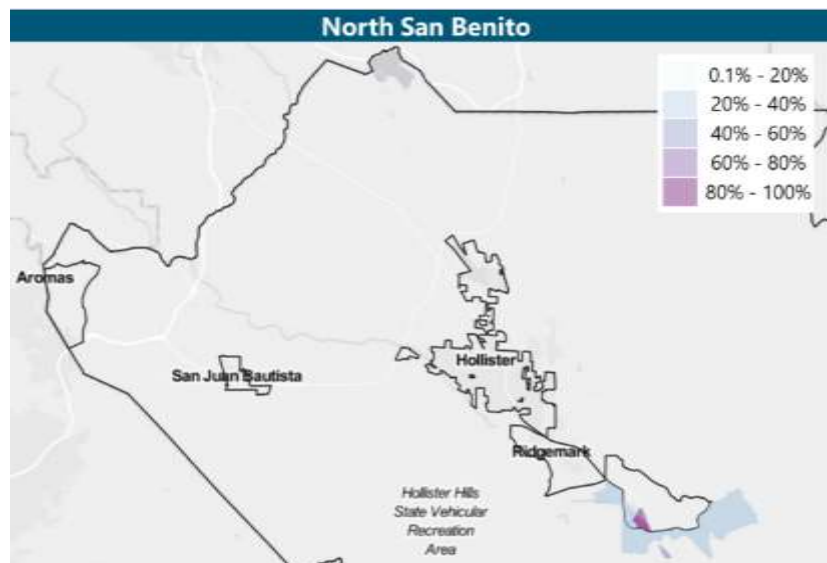
Figure 6. FCC Underserved serviceable locations by census block – North San Benito area
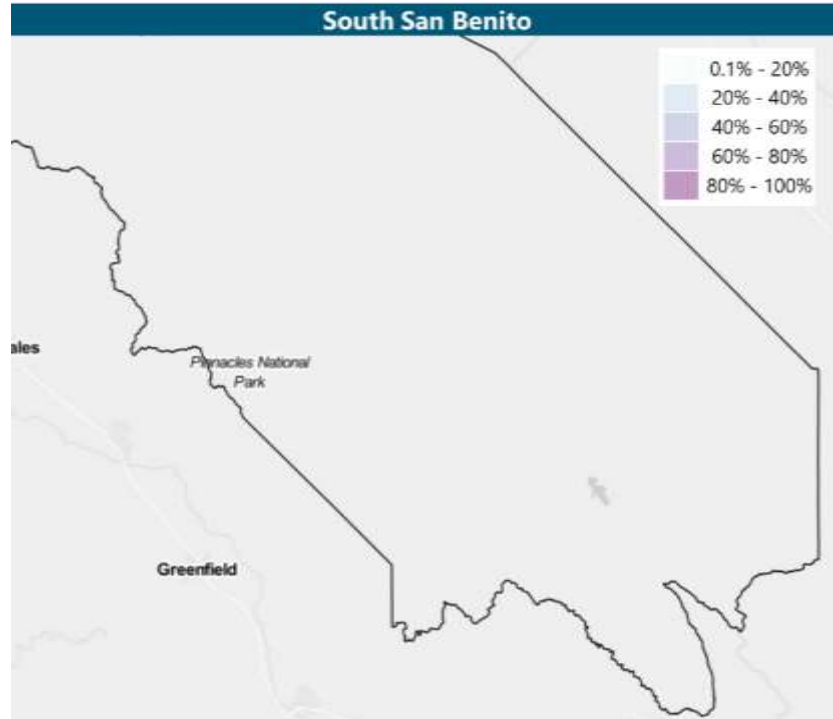
Figure 7. FCC Underserved serviceable locations by census block – South San Benito area

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[11]. In addition, the CPUC has also developed the Federal Funding Account (FFA) Public Map[12] 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 San Benito County, and unincorporated areas according to the Federal Funding Account Public Map data.

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[11] Broadband Mapping Program (ca.gov)

[12] 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
Aromas	461	62	13.4%
San Juan Bautista	790	26	3.3%
Hollister	11981	375	3.1%
Ridgemark	1266	155	12.2%
Tres Pinos	201	17	8.5%
Other Un-Inc. Areas in San Benito	4,735	3,463	73.1%
Total	**19,434**	**4,098**	**21.1%**

Map views of the unserved locations from the Federal Funding Account Public Map are shown in Figure 8 to Figure 10. Through visual inspection of these figures, it can be noted that the CPUC map displays far more unserved locations in northern San Benito County compared to the FCC data. These differences are accentuated in areas outside large communities (Aromas, Ridgemark and Tres Pinos) and the cities of San Juan Bautista and Hollister. In contrast, both CPUC and FCC data are very similar for South County showing a high concentration of unserved locations in the area, specifically around Airline Highway and Panoche Road.

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.
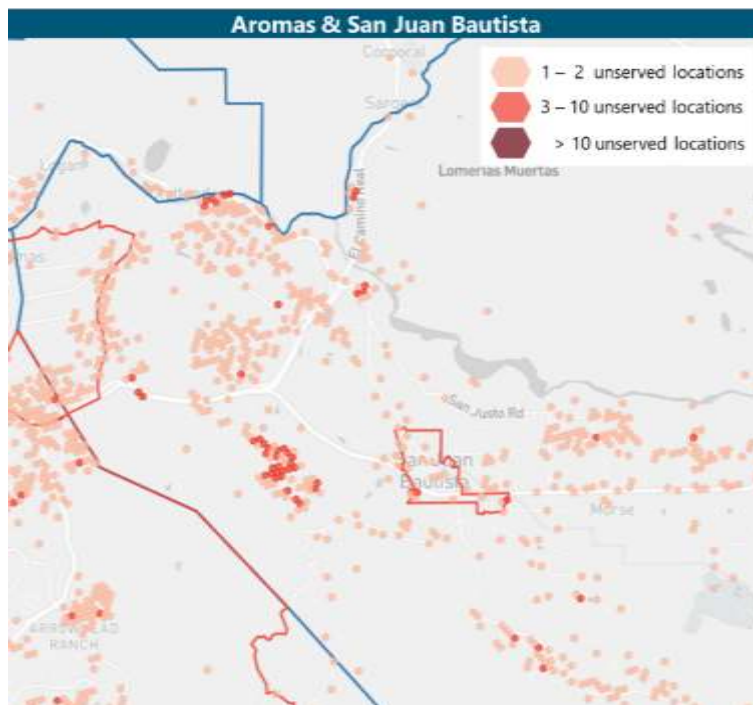
Figure 8. Unserved locations from Federal Funding Account Public Map – Aromas and San Juan Bautista Area.
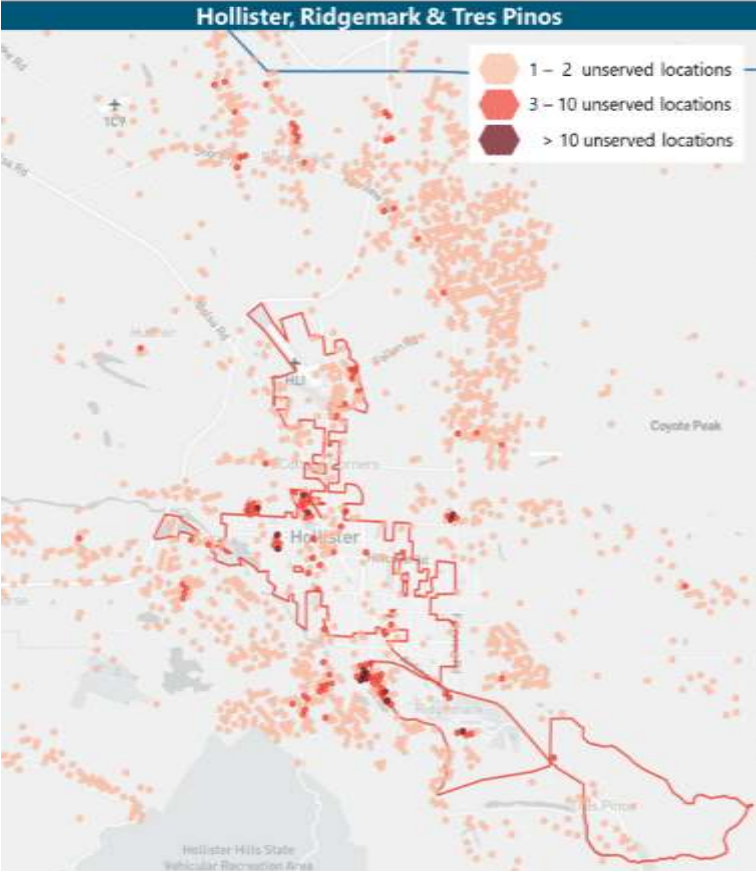
Figure 9. Unserved locations from Federal Funding Account Public Map – Hollister, Ridgemark and Tres Pinos Area
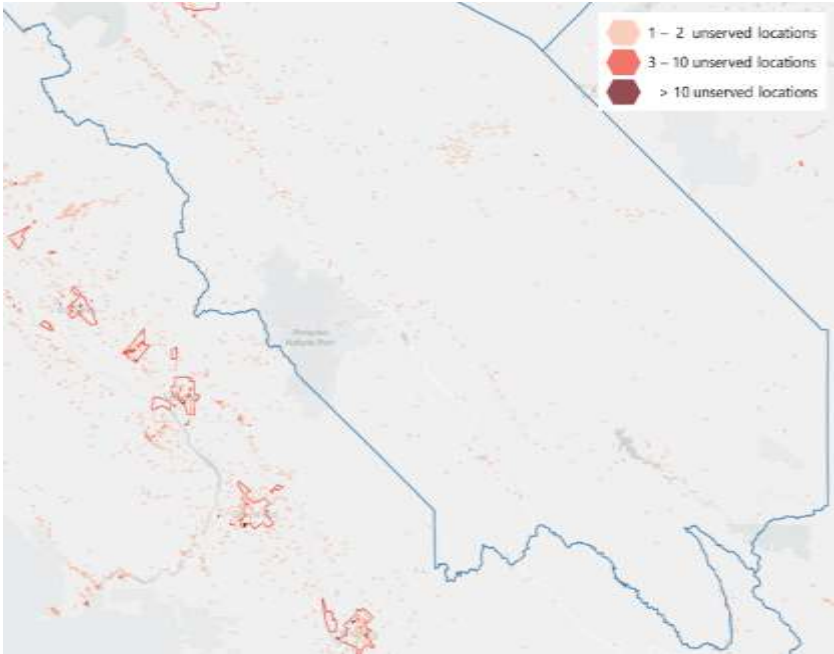
Figure 10. Unserved locations from Federal Funding Account Public Map – South San Benito Area.

2.1.1.3   Speed Test Data

Speed tests provide a method to validate data from FCC and CPUC, enabling communities to gain insight into the broadband service performance.

Speed test data for San Benito County was gathered through the Ookla's Speedtest Intelligence Platform from February 2023 to May 2023. This data was analyzed to derive valuable information about the quality of broadband services in the County.

Ookla's dataset contains 7,926 speed tests performed within the County and distributed across 857 locations and 395 census blocks (28% of total). Table 4 indicates that 15% of the tested locations fall below the unserved threshold, with around 42% below the underserved threshold. Figure 11 to Figure 13 provide GIS views of these results.

Table 4. Speed Test Statistics

Concept	San Benito County (Target Area)
# of Speed Tests	7,926
# of Locations	857
- Locations < 25/3	129 (15.1%)
- Locations 25/3 to 100/20	358 (41.8%)
- Locations 100/20 to 1000/500	369 (43.1%)
- Locations > 1000/500	1 (0.1%)
Ping Max (ms)	1,508
Ping Min (ms)	1
Ping Avg. (ms)	21.4
Jitter Max (ms)	3,808
Jitter Min (ms)	1
Jitter Avg. (ms)	22.6
Timeframe	Feb 2023 - May 2023
ISP Name (# Speed Tests)	Astound Broadband (1) AT&T Internet (2,155) Cal.net (1) Etheric Networks (110) Frontier (447) GeoLinks (16) HughesNet (5) Razzolink (526) Ridge Wireless (42) Sail Internet (16) South Valley Internet (10) Spectrum (4367) T-Mobile (10) Verizon (140)

	XFINITY (80)
# Census Blocks w/ Speed Tests	395
# Census Blocks w/o Speed Tests	1001
% Census Blocks w/ Speed Tests	28%
% Census Blocks w/o Speed Tests	72%
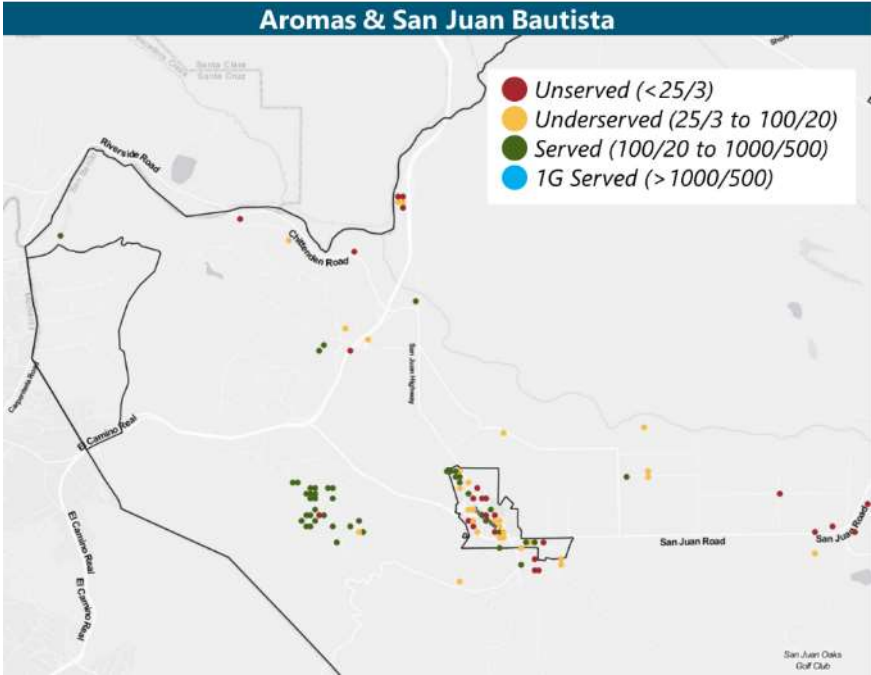
Figure 11. Speed test results – Aromas and San Juan Bautista area.
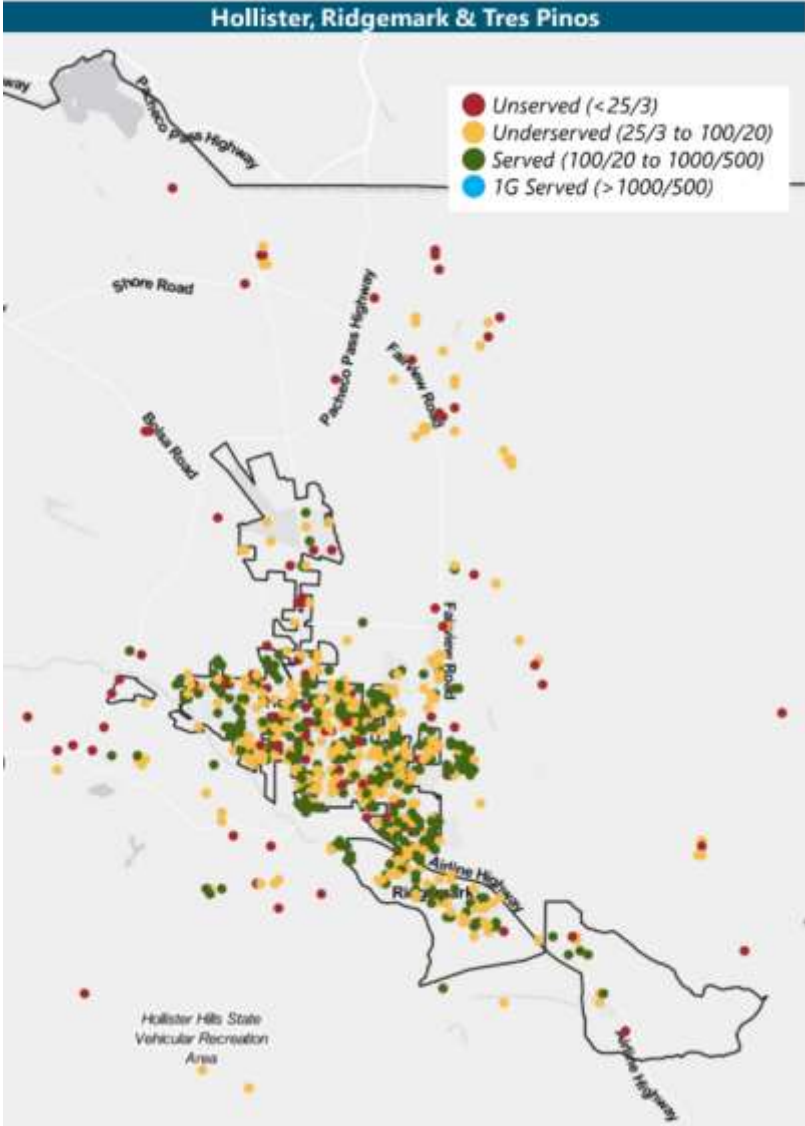
Figure 12. Speed test results – Hollister, Ridgemark and Tres Pinos area.
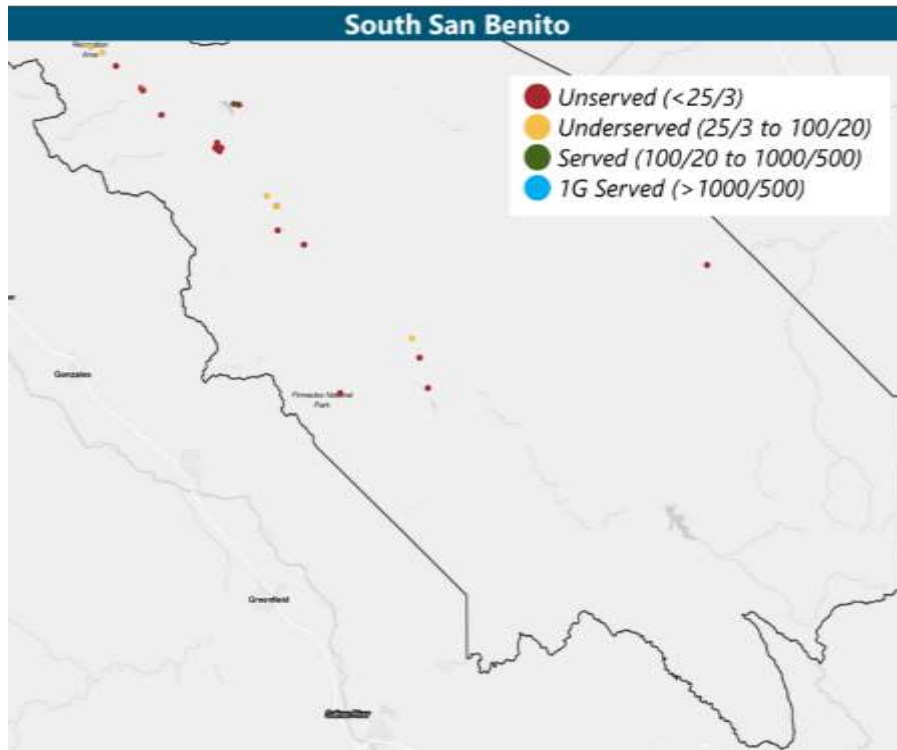
Figure 13. Speed test results – South San Benito area

The speed test results enable a comparative analysis with FCC and CPUC data. For the northern area of the County, both agencies overestimate the serviceable status, however, speed test data reveals that this is not the level of service that users are receiving. Discrepancies with FCC/CPUC data and speed test measurements can be due to poor service or residents not buying the highest speeds available in their area.

In the case of the south of the County, as expected, speed test data matches with FCC and CPUC with all the measurements from speed test classified as unserved or underserved.

2.1.2 Low-Income and Disadvantaged Communities

Local jurisdictions, funding programs, and initiatives tend to target low-income areas and disadvantaged communities for broadband deployment projects and funding opportunities. These communities often lack access to affordable broadband services or adequate broadband infrastructure and should be prioritized to improve the connectivity status of the County and reduce the digital equity gap.

The CPUC Federal Funding Account Public Map provides data that captures the location of low-income and disadvantaged communities (DACs) 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[13].

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

- DACs are those that meet the California Environmental Protection Agency's (CalEPA) designation of disadvantaged communities[14]. 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 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 communities. This data shows 20% of the unserved locations are in a low-income area, most of which are located in unincorporated areas. While San Juan Bautista doesn't have many unserved locations, more than half of them are within low-income areas. The San Benito County has the peculiarity of not having disadvantaged community areas (DACs), thus all locations are within a low-income area.

Table 5. Unserved locations based on Federal Funding Account Public Map Census Block Data

Community	Unserved locations in low-income areas	Unserved locations in DACs	Unserved locations in low-income or DAC areas	% of total unserved locations in low-income or DAC areas
Aromas	0	0	0	0.0%
San Juan Bautista	15	0	15	57.7%
Hollister	19	0	19	5.1%
Ridgemark	0	0	0	0.0%
Tres Pinos	0	0	0	0.0%
Other Un-Inc. Areas in San Benito	804	0	804	23.2%
Total	**838**	**0**	**838**	**20.4%**

Figure 14 to Figure 16 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.

All low-income areas in San Benito are located in the northern region of the county near to Aromas and the cities of San Juan Bautista and Hollister. Although these areas do not represent a significant portion of the total area of the County, they gather a significant number of unserved locations.

There is a great opportunity to provide broadband service to these areas in need thanks to their proximity to larger communities like Aromas and Hollister.

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[14] https://calepa.ca.gov/envjustice/ghginvest/
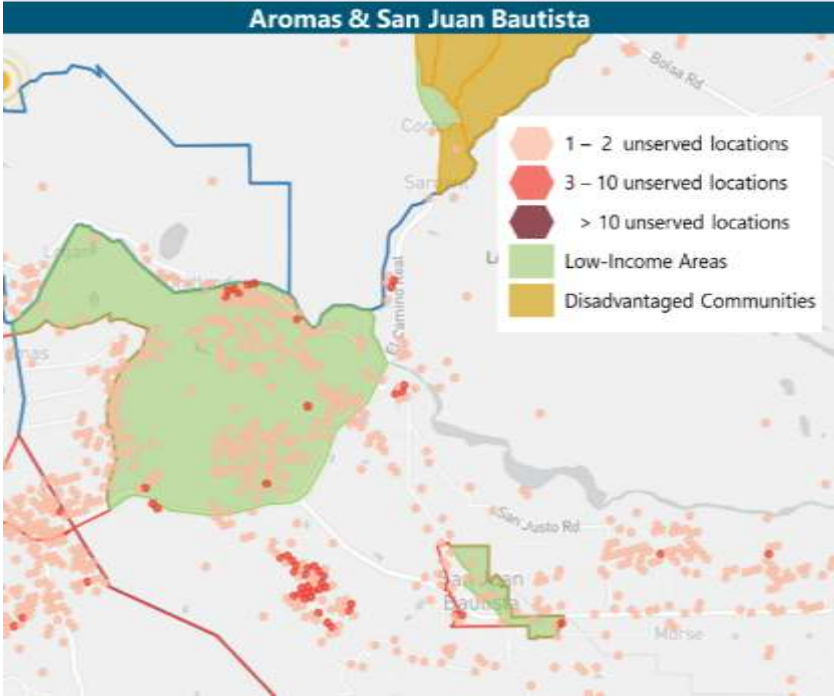
Figure 14. Unserved locations in low-income areas and disadvantaged communities – Aromas and San Juan Bautista area
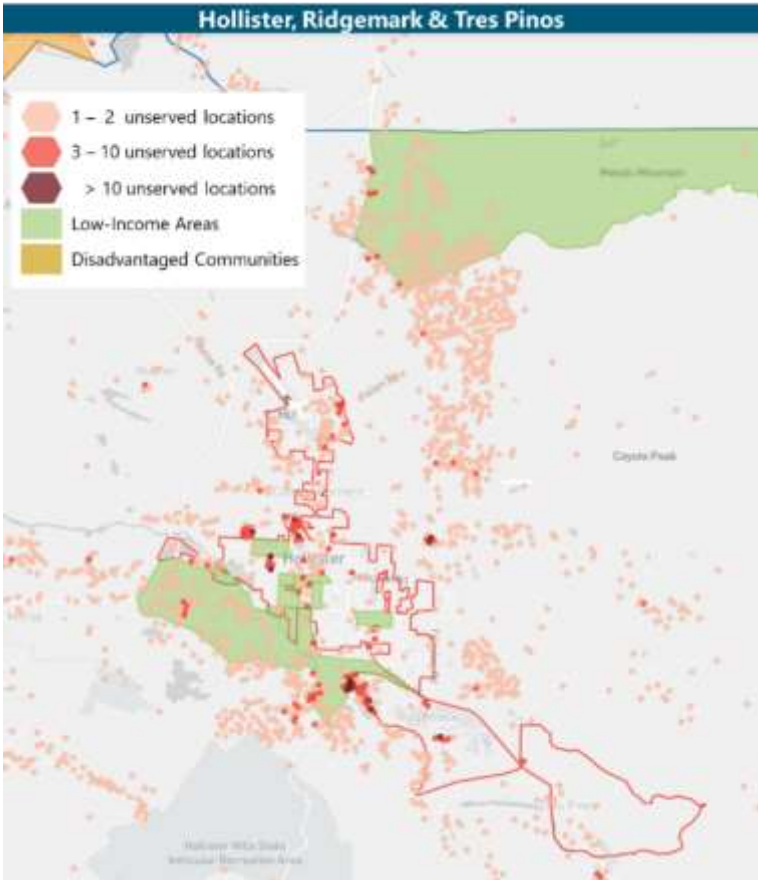
Figure 15. Unserved locations in low-income areas and disadvantaged communities – Hollister, Ridgemark and Tres Pinos area
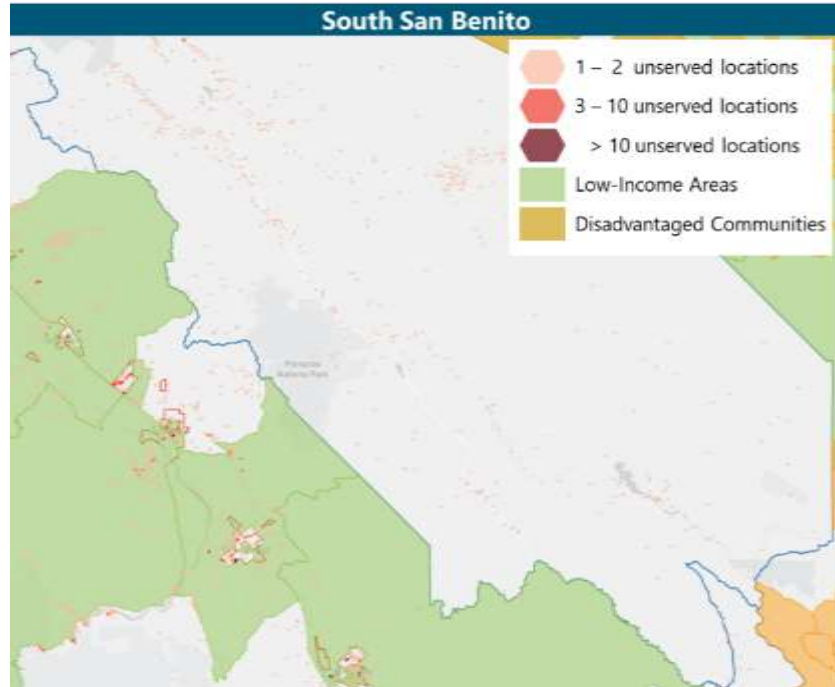
Figure 16. Unserved locations in low-income areas and disadvantaged communities – South San Benito area

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 current status and needs for businesses and anchor institutions within the County regarding broadband availability by analyzing FCC and CPUC data, and insights from meetings with key stakeholders from these two sectors.

> *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.*

Table 6 summarizes the served status of business serviceable locations according to the FCC National Broadband Map dataset. The data shows that almost 86% of total businesses are served, most of them located within the larger communities (except for Aromas). However, only a 5.9% of all business in San Benito have access to 1 Gbps services. Furthermore, 13.9% of the business in San Benito lack access to broadband services. Most of the unserved business locations are outside large communities and in the southern region of the County.

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)
Aromas	11	0 | 0%	0 | 0%	7 | 63.6%	4 | 36.4%

San Juan Bautista	83	0 | 0%	0 | 0%	83 | 100%	0 | 0%
Hollister	479	0 | 0%	0 | 0%	458 | 95.6%	21 | 4.4%
Ridgemark	15	0 | 0%	0 | 0%	15 | 100%	0 | 0%
Tres Pinos	21	1 | 4.8%	2 | 9.5%	18 | 85.7%	0 | 0%
Other Un-Inc. Areas in San Benito	892	208 | 23.3%	2 | 0.2%	618 | 69.3%	64 | 7.2%
Total	**1,501**	**209 | 13.9%**	**4 | 0.3%**	**1199 | 79.9%**	**89 | 5.9%**

Service availability analysis for anchor institutions was performed through the CPUC California Broadband Map dataset, the FCC Broadband Map dataset, and input directly received from local governments through the data collection process. Table 7 presents the results of this analysis. An overall of 12 (10.6%) out of 114 institutions have an unserved or underserved status. However, roughly 22 anchor institutions (19%) are 1G served, which reflects a real need for 1 Gbps services for this segment.

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

Community	Total Anchor Institutions	Unserved (<25/3)	Underserved (25/3 to 100/20)	Served (100/20 to 1000 / 500)	1G Served (> 1G / 500 Mbps)
Aromas	2	0 | 0%	0 | 0%	2 | 100%	0 | 0%
San Juan Bautista	5	0 | 0%	0 | 0%	5 | 100%	0 | 0%
Hollister	64	0 | 0%	0 | 0%	49 | 76.6%	15 | 23.4%
Ridgemark	1	0 | 0%	0 | 0%	0 | 0%	1 | 100%
Tres Pinos	1	0 | 0%	0 | 0%	0 | 0%	1 | 100%
Other Un-Inc. Areas in San Benito	41	10 | 24.4%	2 | 4.9%	24 | 58.5%	5 | 12.2%
Total	**114**	**10 | 8.8%**	**2 | 1.8%**	**80 | 70.2%**	**22 | 19.3%**

Figure 17 to Figure 19 show a map view of the connectivity status of known anchor institutions. This view helps to further as most anchor institutions are concentrated in Hollister City, having acceptable connectivity status. However, most schools and the Hazel Hawkins Hospital remain unserved in this area.

There is still a need to increase the percentage of 1 Gbps services for these institutions to guarantee future expansions and support new applications and services. The number of institutions severed with 1G services can be expanded if they are connected to the Hollister Fiber network (analyzed in section 4.2). In contrast, only 8 of the anchor institutions in the southern area are served.

Around 20% of the total anchor institutions are classified as 1G Served, meaning there are still 80% that can be upgraded to 1 Gbps.

Figure 17. Connectivity status of anchor institutions – Aromas and San Juan Bautista area.
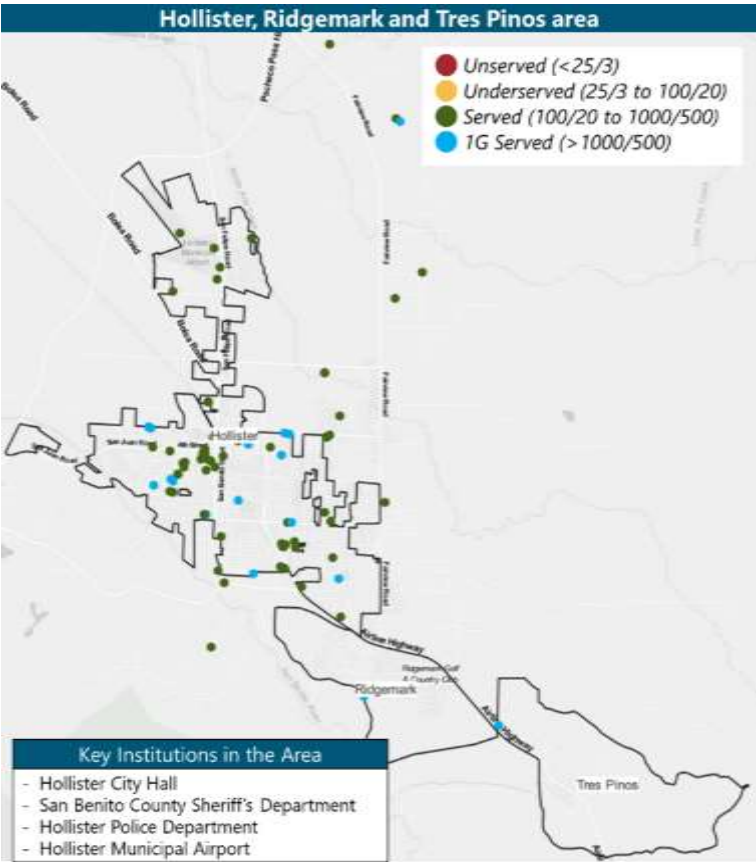
Figure 18. Connectivity status of anchor institutions – Hollister, Ridgemark and Tres Pinos area.
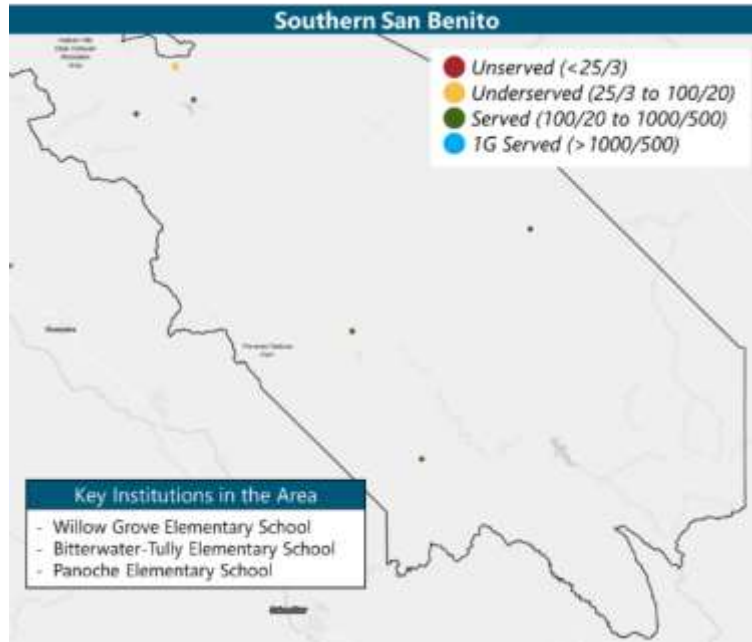
Figure 19. Connectivity status of anchor institutions – South San Benito area.

💡 *Summary*

The southern region of the county is the most affected by the lack of broadband services, being almost completely unserved. This situation is true for both the residential and business segments. Another focus of attention should be put on the northern region of the County where low-income areas have an important concentration of unserved locations.

Regarding served locations, speed test measurements reveal that there are large concentrations of underserved and even unserved locations in the northern region (contrary to CPUC and FCC data). This situation is accentuated in San Juan Bautista, Hollister, and Ridgemark where there is a greater number of unserved locations compared to what is reported by federal and state agencies.

We can conclude that even when the business segments and anchor institutions are well covered (compared to the residential segment) there is still a compelling need for 1 Gbps broadband services for these segments. These conclusions were obtained from official data. However, in order to have a snapshot closer to the reality of the county, it would be convenient to have greater participation in the Business Needs Assessment Survey.

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 component. 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 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[15] by the FCC reports median latencies between 7 ms and 25 ms, the results from the Speed Test program in San Benito County show an average latency of 21.4 ms. Moreover, 94% of the measurements reported latencies lower than 50 ms which are optimal to enable a good quality of service for delay-sensitive services like video and voice calls.

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 of these services, such as telehealth, online banking, and business conferences among others.

This is clearly recognized by the San Benito County community as 55% of the residential respondents to the Needs Assessment Survey selected reliability as the most important feature of their internet service, being this the option with the highest number of responses.

However, the perception of internet service reliability falls behind as 41% of respondents think their service is very unreliable compared to the 36% that claim to have a very reliable or somewhat reliable service as shown in Figure 20.

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[15] [Twelfth Measuring Broadband America Fixed Broadband Report](#)

How reliable do you find your internet connection?
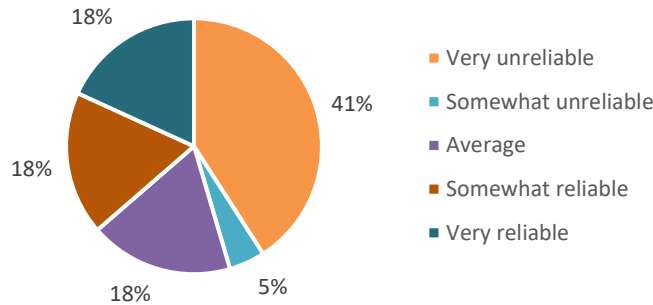
Figure 20. Internet connection reliability perceived by residential users.

Beyond these metrics, the Needs Assessment Survey provides insights regarding the perception of the performance of broadband services within the County. Figure 21 shows that 68% of residential respondents with internet at home consider that the performance of their service meets their needs (absolutely or for most tasks) while 32% consider that the performance only meets their requirements for simple tasks or not at all.

Does your internet performance meet your needs?
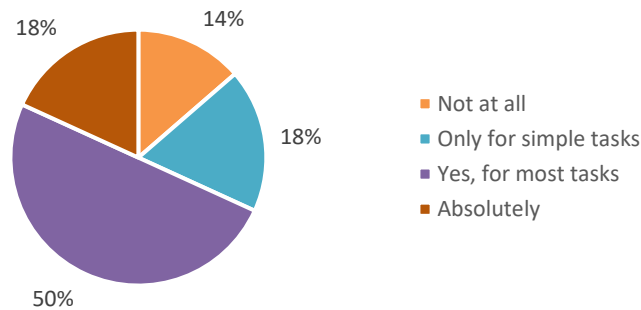
Figure 21. Overall residential internet service performance satisfaction.

Perception of performance for telehealth and remote learning / remote work was also captured through the residential survey. In the case of telehealth, only 18% respondents reported no issues with connectivity, in contrast to the 22% that complained about their service due to bad internet connection. 100 percent of survey respondents said they do remote learning / work, 44% of which claim to have good or very good experience and only 13% present some kind of issue due to bad internet connection. In general, existing broadband services are enough for most of the population's daily activities, however, there's still room for improvement, mostly in terms of service reliability and higher speeds.

2.3 Digital Equity

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.

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

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

The Needs Assessment Survey revealed that 68% of respondents with internet at home consider their service to be expensive or too expensive with 50% of them being older than 65. Of those who do not have internet access at home, 83% is because there is no internet in the area and the rest (17%) claim that the service is 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)[16], there are 7,723 households in San Benito that are eligible for this benefit.

According to ACP Enrollment Tracker, only 31.2% of eligible households have enrolled in the program, This low number of enrolled households can be due to the lack of awareness of the ACP program since 83% of survey respondents without internet access answered that they have not heard about it. The low number of enrolled households can also be explained by the fact that most people consider reliability and internet speed far more important that price as shown in Figure 22

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

What is most important to you regarding your internet service?

- 4%
- 9%
- 32%
- 55%

Legend:
- Speed, I do not want any delay in download or upload
- Reliability, I do not want my internet to be interrupted
- Price, I want it to be a competitive price
- Bundled services, I want internet, cable, phone service to be in one place
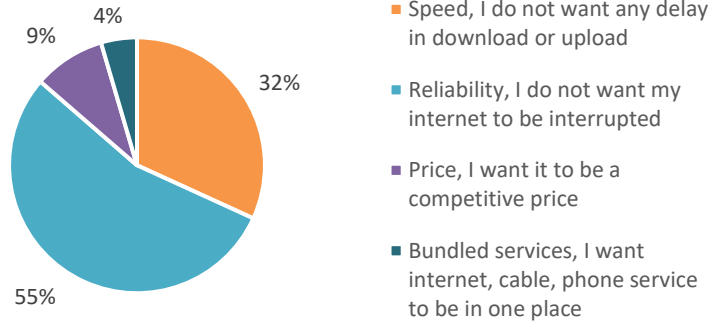
Figure 22. Internet service priorities for residential users

In conclusion, the need to develop consistent outreach through partnerships is necessary to increase the percentage of ACP enrollment, expanding the access to more and better broadband services should be a priority in San Benito.

2.3.2 Device Availability

Having internet-connected devices at home is essential to make use of broadband services[17]. According to the Census[18], the percentage of households in San Benito with at least one computer is 96%. This is consistent with the survey where 97% of people answered having a computer at home.

The high number of people who have tablets, pads or similar devices is notable among the aging sector of the population. The reason for this may be that the Aging & Disability Resource Connection of San Benito County distributed (starting in 2022[19]) free iPads to people over 60, individuals living with a disability, and family caregivers. This program was sponsored by the California Department on Aging and aims to reduce isolation among these groups and provide them with better access to resources and information.

Figure 23 summarizes the access to internet-connected devices of the respondents to the Needs Assessment Survey.

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

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

[19] Program aims to bridge the digital divide among three community groups
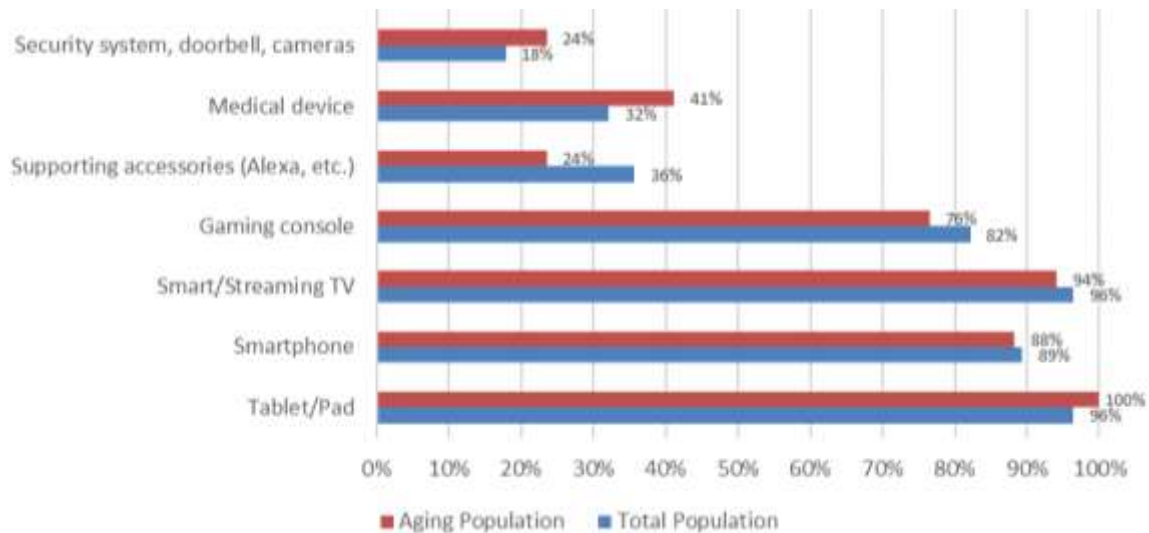
Figure 23. Internet-connected devices accessibility in San Benito.

During the State Digital Equity Planning event, held in Monterey County and included San Benito County participants, it was noted that seniors and aging population are mostly isolated (regarding digital services). This issue is being attended through the free iPad program by the California Department on Aging. In addition, the San Benito County Free Library provides, apart from the Chromebook and hotspots check out, several free of charge Tech Tutorials for the Community. Some of these tutorials are computing basics (for inexperienced people) and tutorials for online applications such as email services, streaming and social media applications and Zoom tutorials for online events and webinars.

Based on the above, there doesn't seem to be important barriers regarding devices among the general population in San Benito. Existing programs such as Loaves Fishes and Computers offering device distributions and the ACP's single device discount of up to $100 for a laptop, tablet, or desktop computer can help the fraction of the community that still don't have access to a computer at home.

2.3.3 Digital Literacy

The survey reveals that, on average, 93% of the population can perform essential internet activities such as sending/receiving emails, finding places and directions, or doing electronic banking.

They start struggling with social media and eCommerce applications. The adoption of ecommerce applications would represent not only an improvement in the economy of cities, but it can also improve the lifestyle of the aging population.

In addition, 36% of aging respondents spend much of their internet data on Telehealth and remote learning/wok applications, thus having the potential to be instructed in different digital skill areas.

It is recommended to promote the participation of people in the Needs Assessment Survey to gain a wider perspective of the general needs in the San Benito County.

2.4 Key Takeaways

1. There are ~860 locations according to FCC data and ~4,000 locations according to CPUC data within San Benito County that are either unserved or underserved. This represents between 5% and 21% of the total serviceable locations in the County.

2. Most of the unserved locations are in the southern region of the County while underserved locations (20% of which are low-income communities) can be found outside major communities in the Northern region. These locations (special the ones in the southern region) should be prioritized for broadband access.

3. Approximately 16,500 locations are served but without access to 1 Gbps services, representing almost 90% of the total locations in the County. These locations should be upgraded to maximize broadband benefits.

4. 94% of speed test measurements achieve latency levels below 50 ms, meaning that delay-sensitive services like video and voice calls are well supported by those connections. However, 55% of survey respondents said that they found their current service to be unreliable.

Figure 24 and Figure 25 provide a graphical view of the main findings from the needs assessment.

Countywide View
- 95% of San Benito locations are considered **served according to FCC (79% according to CPUC)**
- Of those served, **99.9%** have access to speeds higher than **100/20 Mbps** (FCC data)

Unincorporated Areas
- 80% of unserved locations are in unincorporated areas
- **Aromas, Ridgemark, and Tres Pinos** are "well served" (>100/20) but lack 1G/500 Mbps service
- 93% of the unincorporated unserved locations are in **remote areas of San Benito County**

1G Service Gap
- 93.5% of SB County locations **lack access to 1G/500 Mbps service**, leaving much work to be done

Figure 24. San Benito Service Availability key takeaways.

68% ✓ are **satisfied** with their **service performance**

82% Reported **suboptimal** experience with **telehealth** and **56%** with remote learning

55% consider **Reliability** as **the most important** service characteristic

21 ms is the **average latency, lower** than the 50 ms limit set by the CPUC.

6% of speed test results are higher than 50 ms, **which impacts time-critical applications**

46% ✕ consider their connection **unreliable**

Performance — Latency — Reliability

Figure 25. San Benito Service Performance key takeaways.

3 Market Analysis

3.1 Broadband Service Offerings

Broadband service offerings in San Benito County were analyzed in two steps. First, broadband service providers were identified through inspection of the FCC National Broadband Map, secondary 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				
Charter Communications (Spectrum)	Fiber | Cable	1000 500 300	$89.99 $69.99 $49.99	• Aromas, San Juan Bautista, Hollister, Ridgemark, and Tres Pinos (full)
AT&T	Fiber	1000 500 300	$80 $65 $55	• Hollister, Ridgemark (Partial) • San Juan Bautista, Tres Pinos (partial) • Aromas (marginal)
Pinnacles Telephone Co.	Fiber | Copper	100 50 10 (Copper)	$200 $92 $75	• Coverage in the southern region of the county.
Wireless Providers				
T-Mobile	Licensed FWA	Up to 100/20	Starting at $30/month	• Ridgemark (full) • Aromas, Hollister (partial)

				• San Juan Bautista, Tres Pinos (marginal)
Verizon	Licensed FWA	1000 300	$70 $50	• Ridgemark (full) • Aromas, Hollister (partial) • San Juan Bautista, Tres Pinos (isolated)
Razzolink	Unlicensed FWA	From 35 to 100 Mbps	Starting at $59.95/month	• Aromas, San Juan Bautista (full) • Hollister, Ridgemark, Tres Pinos (partial)
Hankins	Unlicensed FWA	100 500 25 10	Starting at $100/month	• Hollister, Ridgemark, Tres Pinos (full) • Aromas, San Juan Bautista (marginal)
Ridge Wireless	Unlicensed FWA	50 40 20 10 7.5 5	$848.99 $679.99 $339.9 $169.99 $149.99 $99.99	• San Juan Bautista, Hollister, Ridgemark, Tres Pinos (full) • Aromas (isolated)
South Valley Internet	Unlicensed FWA	50 8	Starting at $160/month	• San Juan Bautista (full) • Aromas, Hollister, Ridgemark, and Tres Pinos (isolated)
Note: Single quantity service speed refers to the download speed.				

Through inspection of these results, it can be seen that most service offerings are available in Hollister, while the regions of Aromas and South County have a limited number of service offerings.

Among the ISPs that serve San Benito County, only four of them provide speeds of 100 Mbps (two with fiber and one with FWA) and only two offerings of 1 Gbps services with fiber technology.

Pinnacles Telephone is the only one of them that reaches the south region of the county. Without Pinnacles Telephone this whole region would be completely dependent on satellite service for broadband access.

Fiber technology is only present in the north region of San Benito County, with two ISPs offering it. They also have competitive rates considering that the weighted average price in California for 100/20 services is $78.41 and $105.29 for services above 1000/500[20].

In contrast, FWA technology is the most prevalent and has the greatest presence in San Benito. Like fiber ISPs, most FWA ISPs offer their services at prices that are competitive according to FCC data and, on average, 20% lower than fiber prices.

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

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[20] FCC 2023 Urban Rate Survey, Posting of Data, and Minimum Usage Allowance

Table 9. Business Broadband Service Offerings.

Service Provider	Type of Service (Note 2)	Download / Upload Speeds (Mbps)	Monthly Fee (USD)	Service Area
Wireline Providers				
Charter Communications (Spectrum)	High speed internet (HIS)	1000 600 300	$164.99 $99.99 $49.99	• San Juan Bautista, Hollister, Ridgemark Aromas, Tres Pinos (marginal)
AT&T	HSI	5,000 2,000 1,000	$395.00 $225.00 $160.00	• Hollister, Ridgemark (full) • Aromas, San Juan Bautista, Tres Pinos (marginal)
Wireless Providers				
Razzolink	HSI	From 35 to 100 Mbps	Unknown	• Aromas, San Juan Bautista, Hollister, and Ridgemark (full) • Tres Pinos (partial)
Hankins	HSI	100 500 25 10	Starting at $100/month	• Hollister, Ridgemark (full) • San Juan Bautista (partial) • Aromas, Tres Pinos (marginal)
T-Mobile	HSI	Up to 182	Starting at $50/month	• Hollister, Ridgemark (partial) • Aromas, San Juan Bautista, Tres Pinos (marginal)
Etheric Networks	DIA	Up to 400	Unknown	• Aromas, San Juan Bautista, Hollister (full) • Ridgemark, Tres Pinos (marginal)
Ridge Wireless	HSI	50 40 20 10 7.5 5	$848.99 $679.99 $339.9 $169.99 $149.99 $99.99	• San Juan Bautista, Hollister, Ridgemark, Tres Pinos (full) • Aromas (marginal)
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 an enterprise based service with a tight service level agreement (SLA).				

As shown in Table 9, broadband offers are limited for businesses in San Benito County. Even in Hollister, there are only a few service offerings with speeds over 1 Gbps, leaving few choices for high-speed internet. This gap in the availability of 1 Gbps services indicates an opportunity in the business market segment.

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 Benton Institute for Broadband & Socitey, 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 40% (601 housing units, 1827 people) of San Benito census blocks do not have 100/20 broadband service from any ISP. Most of this population is in the southern region of the County. Additionally, 16% of the census blocks are served by a single provider, leaving their population with no option to choose from.

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

Community	Census Blocks			
	3+ ISPs	2 ISPs	1 ISP	No ISP
Aromas	0	0%	6	50%	1	8%	5	42%
San Juan Bautista	0	0%	47	85%	1	2%	7	13%
Hollister	100	19%	341	64%	4	1%	87	16%
Ridgemark	6	19%	21	66%	2	6%	3	9%
Tres Pinos	0	0%	0	0%	13	65%	7	35%
Other Un-Inc. Areas in San Benito	10	1%	77	10%	207	28%	450	60%
Total	**116	8%**	**492	35%**	**228	16%**	**559	40%**

Figure 26 to Figure 28 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.
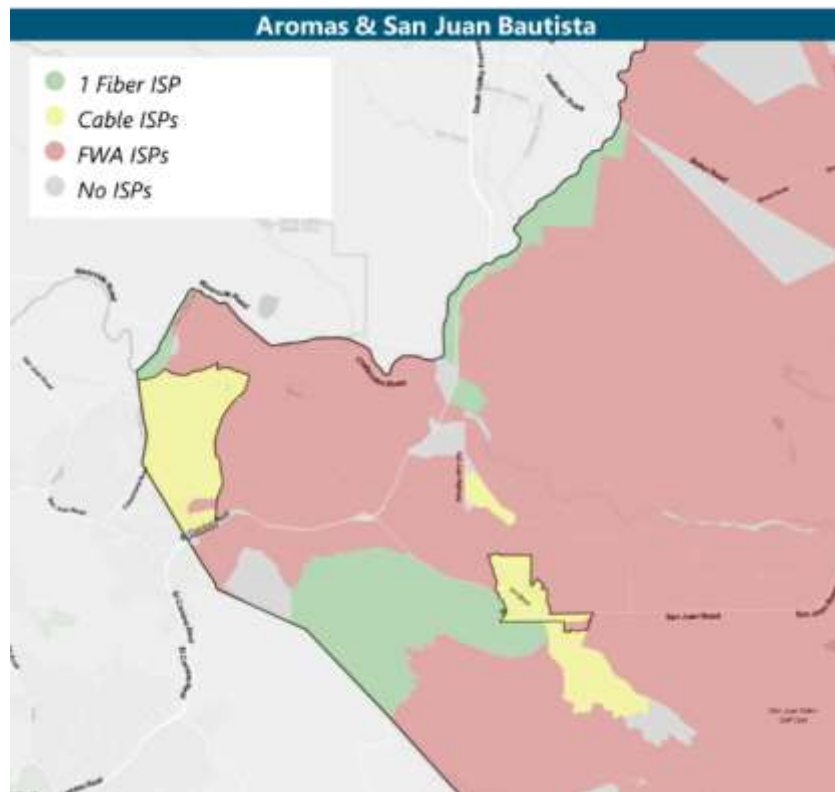
Figure 26. Number of ISP options offering broadband service > 100/20 by Census Block in Aromas and San Juan Bautista Area.
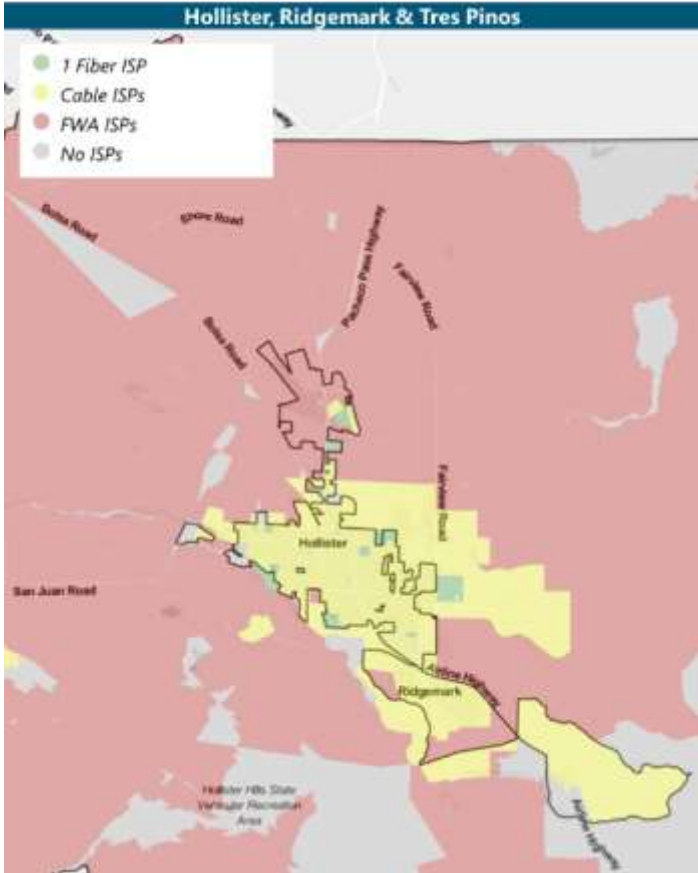
Figure 27. Number of ISP options offering broadband service > 100/20 by Census Block in Hollister, Ridgemark and Tres Pinos.
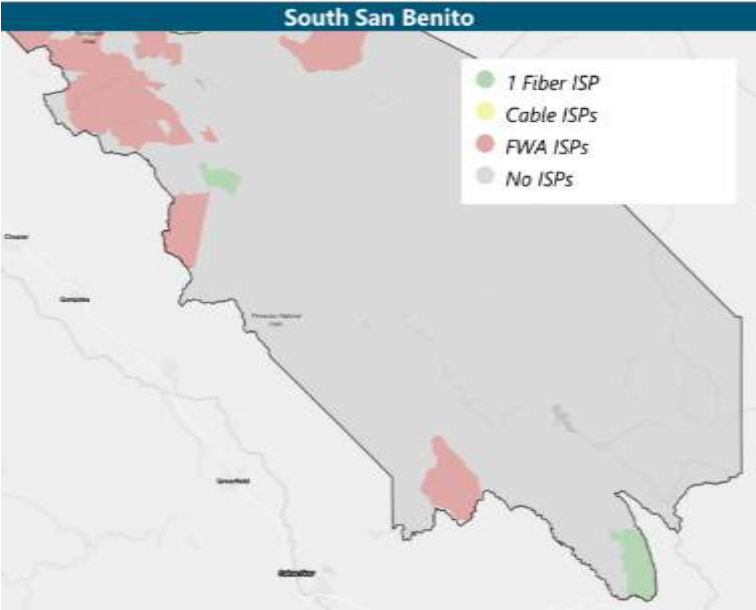
Figure 28. Number of ISP options offering broadband service > 100/20 by Census Block in Southern San Benito

The results above are complemented with the results from the Speed Test Program in Table 11.

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)
Astound Broadband	1 | 0.01%	0	0	1	0
AT&T Internet	**2,155 | 27%**	405	686	1,064	0
Cal.net	1 | 0.01%	0	0	1	0
Etheric Networks	110 | 1.4%	18	79	13	0
Frontier	447 | 6%	102	92	213	40
GeoLinks	16 | 0.2%	12	4	0	0
HughesNet	5 | 0.06%	5	0	0	0
Razzolink	526 | 7%	273	248	5	0
Ridge Wireless	42 | 0.5%	12	25	5	0
Sail Internet	16 | 0.2%	0	2	14	0
South Valley Internet	10 | 0.1%	6	3	1	0
Charter Communications	**4,367 | 55%**	331	1,953	2,083	0
T-Mobile	10 | 0.1%	8	2	0	0
Verizon	140 | 2%	66	73	1	0
XFINITY	80 | 1%	6	17	57	0
Total	**7926**	**1244 | 16%**	**3184 | 40%**	**3458 | 44%**	**40 | 1 %**

Speed tests data show that 55% of the measurements were done with a Charter connection and 27% with AT&T. This analysis suggests that certain areas of the county might be under a monopoly or duopoly.

However, most of the measurements are located in Hollister and San Jaun Bautista cities, which proves the low broadband access in the rest of the County, especially in the southern region. These results are illustrated in Figure 29 to Figure 31.
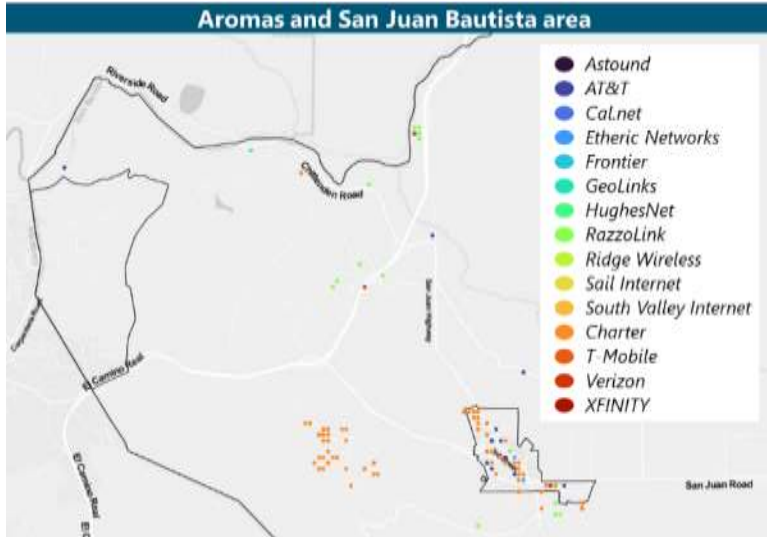
Figure 29. Speed test distribution in Aromas and San Juan Bautista area by ISP
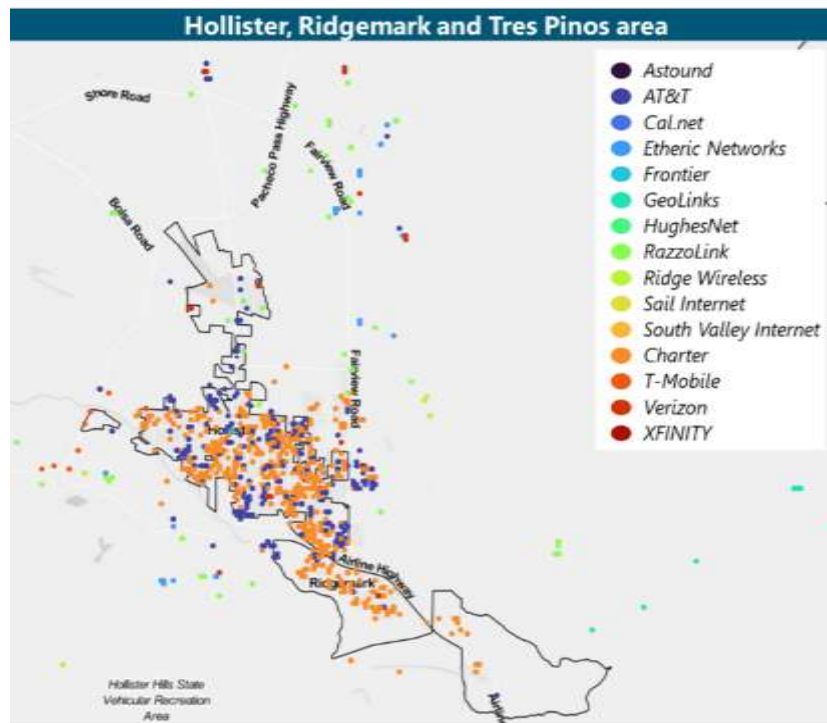
Figure 30. Speed test distribution in Hollister, Ridgemark and Tres Pinos by ISP
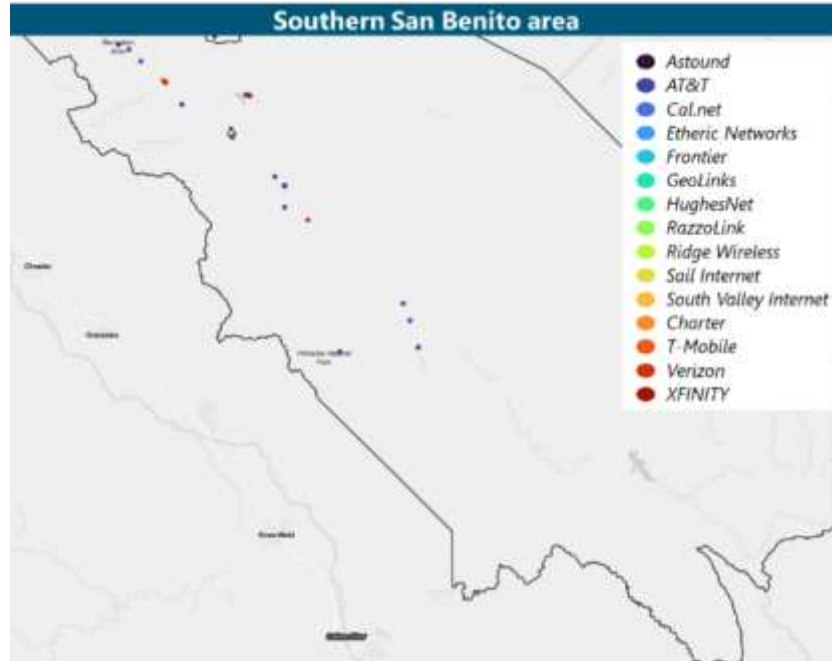
Figure 31. Speed test distribution in Southern San Benito by ISP

The FCC data set and speed test measurements show that, despite having many ISPs in the County (more than in nearby counties), the number of service offerings in a given area is limited. This is further confirmed through speed test data, which shows that most measurements (82%) belong to only two providers, indicating a lack of competition in San Benito County, holding back ISP investment and innovation in the County.

3.3 Key Takeaways

1. There are only three ISPs in San Benito offering fiber internet services. Three of them operate in the northern region of the county. The third one focuses its operations in the southern (rural) areas.

2. 43% of the locations with internet have access to 2 or more ISPs, however only ~4% have fiber connection, 15% have FWA and 41% have cable connection.

3. The outcomes of the analysis performed in this section suggest a lack of fiber offerings in the county, leaving the population with lower speed options, especially in the southern region where they have to rely on satellite services.

4. 82% of speed tests measurements were done with a Charter connection (55%) or with an AT&T connection (27%), suggesting that certain areas of the county might be under a monopoly or duopoly.

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 City and County staff from the Information Technology (IT), Public Works, and Planning Departments.

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

4.1 Public Buildings & Facilities

As shown in Figure 32 and Figure 33 there are 59 facilities and anchor institutions that are key for San Benito stakeholders and were shared as part of the data collection process. Other facilities and anchor institutions were analyzed in section 2.1.3.

These 59 facilities comprise 35 facilities controlled by local government agencies and 24 anchor institutions, 19 in the cities, and 5 in unincorporated areas. Anchor institutions include 22 schools, the Hazel Hawkins Hospital, and the County Medical Therapy Unit.
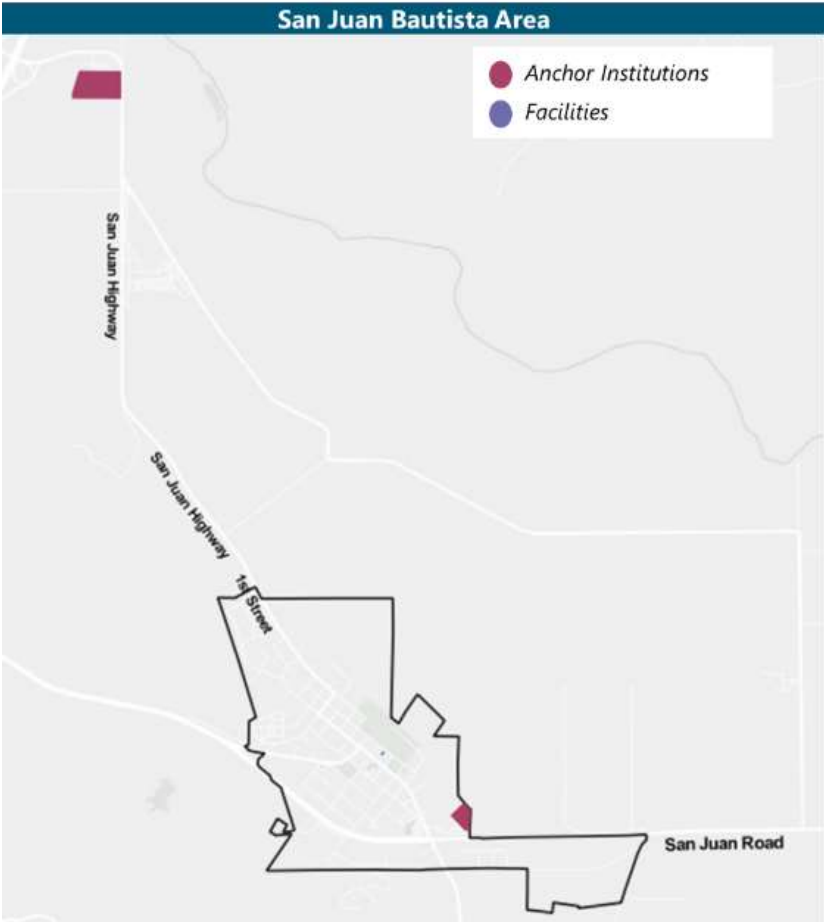
Figure 32. San Benito Government Facilities and Anchor Institutions – San Juan Bautista area.
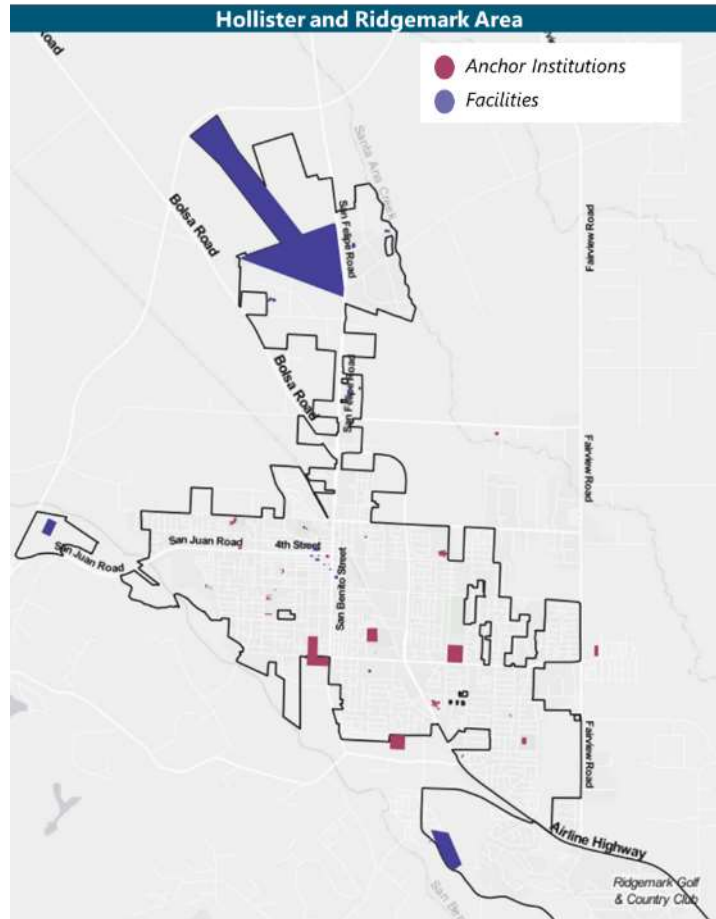
Figure 33. San Benito Government Facilities and Anchor Institutions – Hollister and Ridgemark area.

These assets are not only "broadband serviceable locations" but also can host network equipment, reducing the need for communication central offices and remote huts for broadband.

Table 12 summarizes the connectivity status of key San Benito facilities, based on whether they are connected to the City / County fiber network. Connected facilities/anchor institutions can be leveraged as network assets while unconnected facilities should be considered as priority targets in the Broadband Strategy.

These facilities include the Hazel Hawkins Hospital, 95% of schools and 67% of the county buildings.

Table 12. San Benito key County Facilities connectivity status.

Facility Type	Location Name	Connected
Facility		
City of Hollister Building	Hollister City Hall	Yes
	Hollister Fire Station 1	Yes
	Hollister Fire Station 2	No
	Hollister Fire Station 3	Yes
	Veterans Services Office	Yes
	Hollister PD	Yes
	Hollister Animal Care Services	No

	Hollister Administrative Services	Yes
	Hollister Airport	Yes
	Hollister Code Enforcement	Yes
	Hollister Community Center	Yes
	Hollister Community Services Department	Yes
	Hollister Community Services Department - Streets / Fleet	Yes
	Hollister Water Reclamation Facility Operations	No
Communication Tower	Water Tanks/Communication Tower #1	Yes
Communication Tower	Water Tanks/Communication Tower #2	Yes
Council of Governments	Council of Governments	No
County Building	San Benito County District Attorney	No
	San Benito County Administration Office	No
	San Benito County Office Emergency Services	Yes
	San Benito County I.T.	No
	San Benito County Health & Human Services	Yes
	San Benito County S.O. - RMA	Yes
	San Benito County Office of Agriculture	No
	San Benito County Jail	Yes
	San Benito County Assessor-Elections-Tax-GIS	No
	San Benito County Behavioral Health	No
	San Benito County Public Health - Environmental Health	No
	San Benito County Juvenile Hall	Yes
	University of California Cooperative Extension	No
	San Benito County CSWD Community Services & Work Force Development	No
	Migrant Center	No
San Juan Bautista Building	Hollister Fire Station 4	No
State Building	San Benito County Superior Court	No
N/A	The Esperanza Center	No
Anchor Institutions		
Hospital	Hazel Hawkins Hospital	No
Private	CMTU County Medical Therapy Unit	No
Schools	San Benito Health Foundation & Clinic	No
	Spring Grove Elementary School	No
	Hollister SDA Christian School	No
	Marguerite Maze Middle School	No

	San Andreas Continuation School/ Pinnacles Community School	No
	Sacred Heart School	No
	R.O. Hardin Elementary School	No
	Hollister High School	No
	Hollister 2	No
	Sunny Slope Elementary School	No
	Rancho San Justo Middle School	No
	Ladd Lane Elementary School	No
	Calvary Christian School	No
	Rancho Santana School	No
	Cerra Vista Elementary School	No
	Cienega Elementary School	No
	Tres Pinos Elementary School	No
	Southside Elementary School	No
	San Juan Elementary School	No
	Calaveras Elementary School	No
	Anzar High School	No
	Gavilan College	Yes

A notable fact is that the San Benito County has an overall of 38 parks, and about 15 of them (located within the Hollister City) were suggested to provide public WiFi in the most recent Local Agency Technical Assistance (LATA) grant submission. The proposed parks are shown in Figure 34.
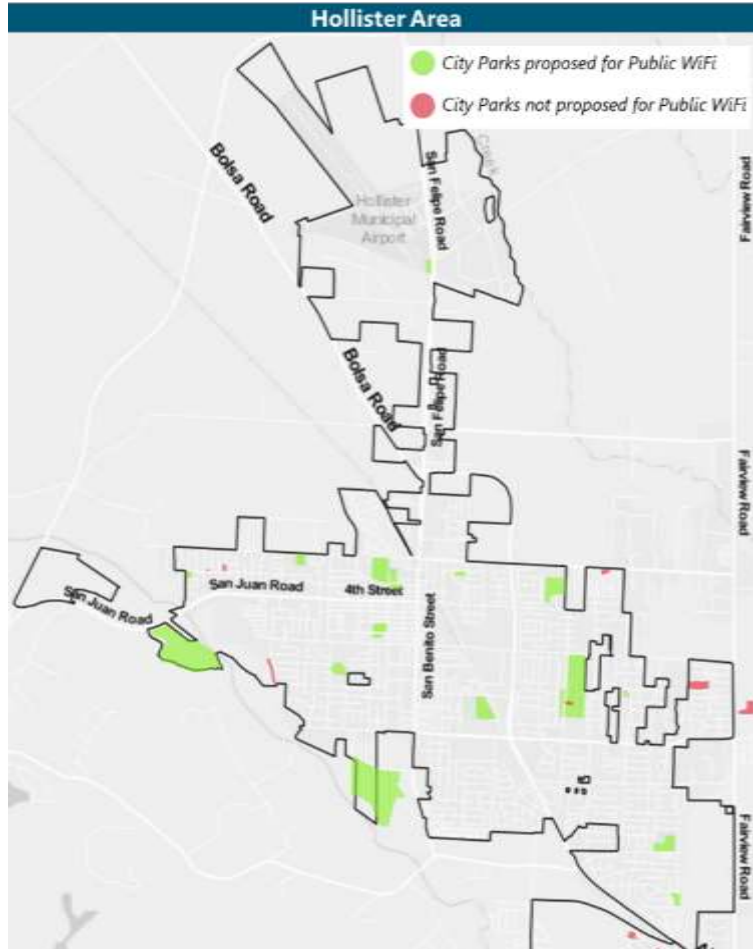
Figure 34. Hollister City proposed parks for public WiFi.

4.2 Fiber & Conduit Infrastructure

Fiber infrastructure in San Benito County is concentrated in the cities of Hollister and San Juan Bautista and are described below.

Hollister City fiber

The primary fiber route is shown in Figure 35. It runs from the Hollister Police Department to the Hollister Community Services Department with a length of approximately 6.4 miles, connecting the facilities shown in Table 12. This infrastructure is jointly owned and maintained by the San Benito County and the City of Hollister.

Figure 35. Hollister City Fiber Network.

The following are projects to expand this fiber route.

1. Fiber extension (~ 1.8 miles.) from Hollister Community Services Department to Hollister Wastewater Treatment Plant (WWTP) (Figure 36)

Figure 36. Hollister Fiber extension to Hollister Treatment Plant.

2. Fiber extension (~ 4 miles) from Hollister City Hall to Hollister Fire Station 2, San Benito County Public Works, and Migrant Camps in Ridgemark (Figure 37).
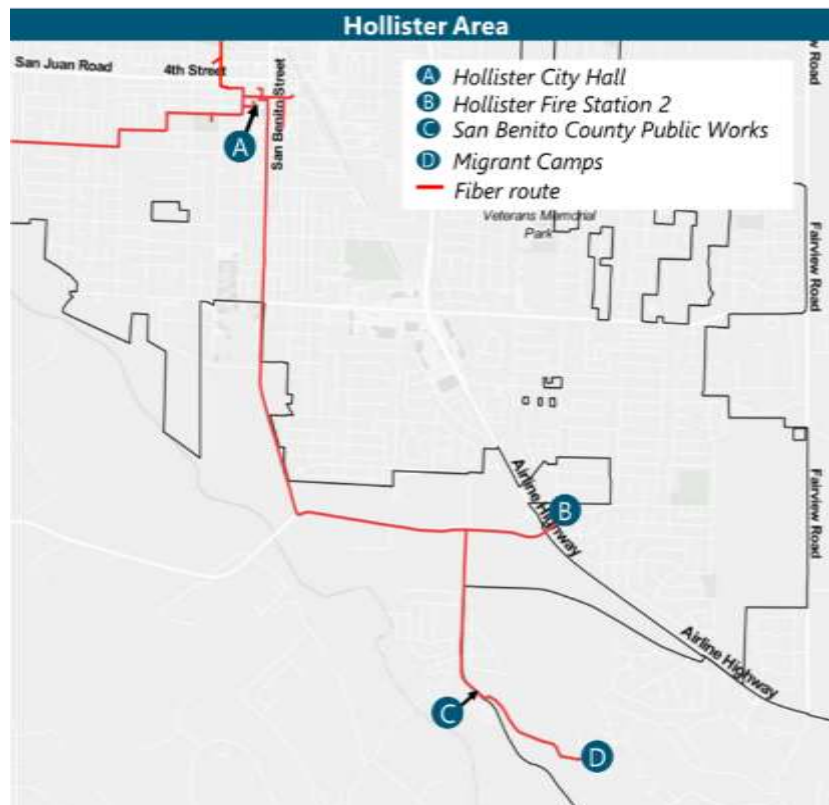
Figure 37. Hollister Fiber extension to Fire Station 2 and Migrant Camps.

Hollister fiber route has the potential to serve schools and facilities that remain offline through further expansion. This route is also the main axis of the project to provide Public WiFi in the City parks.

San Juan Bautista fiber

The San Juan Bautista fiber route is shown in Figure 38. The route enters through Highway 156, then follows through The Alameda street traveling through town north towards Gilroy on the San Juan Highway.

Figure 38. San Juan Bautista Fiber route.

Although the route traverses the City of San Juan Bautista, it does not serve the residents in the area. This has opened an opportunity for ISP to offer broadband services in this area leveraging this infrastructure.

4.2.1 California Middle Mile

The California Middle Mile Broadband Initiative (MMBI) also known as GoldenStateNet[21] is the middle mile open-access network consisting of 10,000 route miles that is a central component of Senate Bill 156 (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 39 show the fiber route for San Benito County, which comprises a total of 88 miles, all of it in Phase 1.

The route runs across the CA-25 highway from the south and continues for about 42 miles util it reaches the unincorporated areas of Tres Pinos and Ridgemark and the City of Hollister. The southern segment

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

of the route turns to the southwest at the Bitterwater Road (which then turns into King City road) and leaves the County.

In the North, the route splits at the County's northern region. It goes along Bolsa Road on one side and the Pacheco Pass Highway on the other creating a ring outside the County boundaries and coming back to San Benito through El Camino Real Road. The route then turns south through San Juan Bautista Highway then Prescott Road to surround San Juan Bautista City and exit the County through Salinas Road. Finally, a secondary route follows the rail line that runs north of the City of Aromas, going by the Aromas Community's northern part.

Figure 39. GoldenStateNet – Current Design for San Benito County.

The 88 miles of the California MMBI can play an important role in developing last-mile access for San Benito County, especially for the southern locations next to the CA-25 highway and areas in the north of the county that currently have little access to fiber.

4.3 Utility Infrastructure

The Hollister and San Juan Bautista Cities are building a 7 mile High Density Polyethylene (HDPE) water pipe between Hollister WWTP and San Juan Bautista WWTP as depicted in Figure 40.
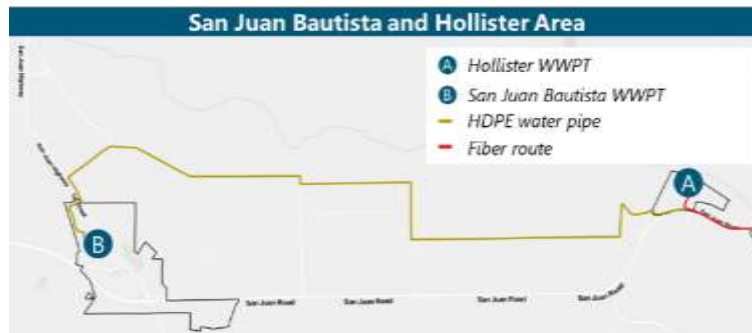
Figure 40. HDPE water pipe route between Hollister and San Juan Bautista.

In addition, Figure 41 depicts proposed pipelines to be constructed (in the next 5 years) in the surroundings of the Ridgemark and Tres Pinos communities.
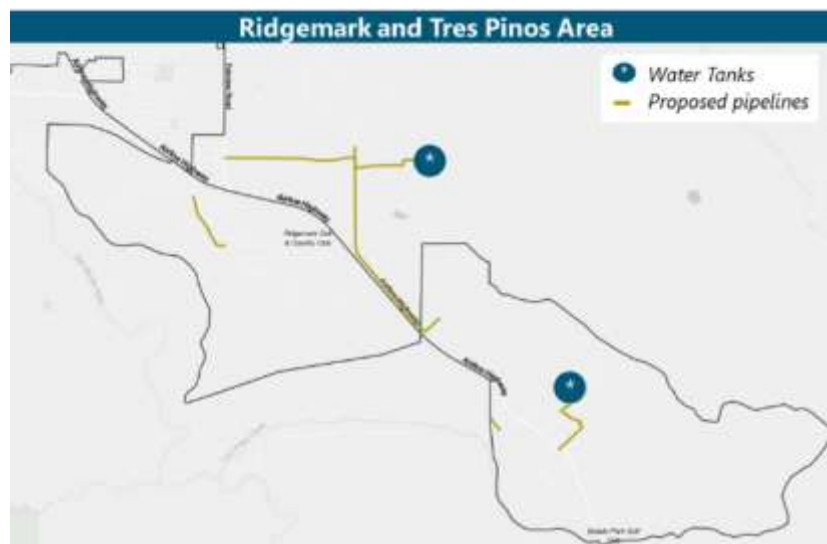
Figure 41. Proposed pipelines in Ridgemark and Tres Pinos.

It is recommended, for such infrastructure building, to install fiber conduits that could be useful to extend Hollister's fiber network to San Juan Bautista City and to the Ridgemark and Tres Pinos Communities. The installation of fiber is not currently considered but additional funding or partnerships are required to leverage these construction projects for conduit and/or fiber deployment.

4.4 Capital Investment Program Projects

The Five-Year Capital Investment Program (CIP) is focused on identifying facilities and infrastructure improvements. San Benito County has several road projects throughout the County that can be leveraged for broadband deployment. These constructions are primarily located in North County and select areas of South County, as shown in Figure 42 and Figure 43, respectively.
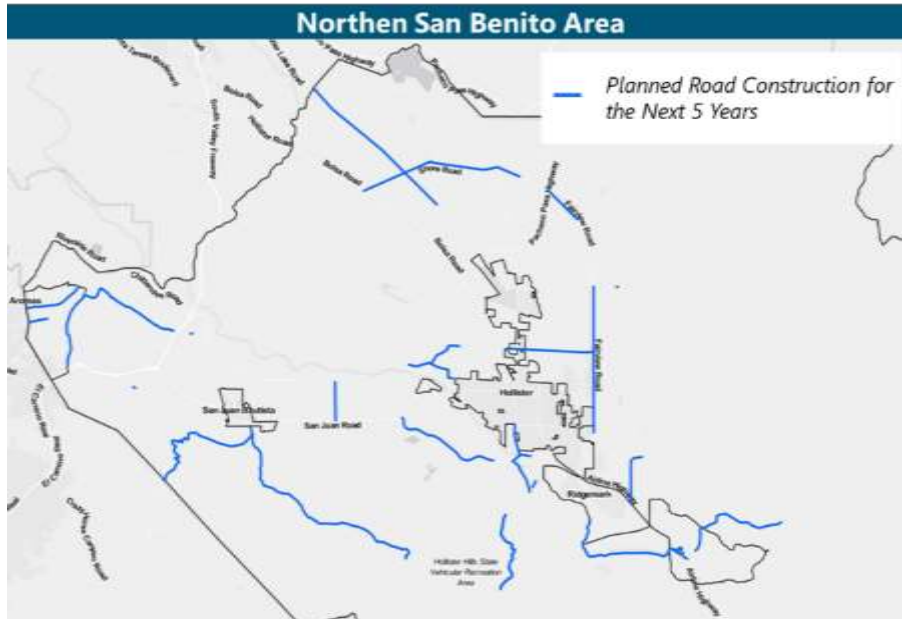
Figure 42. Planned Road Construction in Northen San Benito for the Next 5 Years.

Figure 43. Planned Road Construction in Southern San Benito for the Next 5 Years.

The construction of these roads in North San Benito offers the opportunity to extend Hollister fiber network and the GoldenStateNet to serve locations outside of the major communities by installing fiber conduit together with construction activities. Thus, the coverage can be extended to unserved and underserved locations while saving time (e.g., for the obtention of permits) and money (e.g., by digging only once). The extension of the GoldenStateNet should be done through an agreement with the State of California.

Figure 44 displays the planned roads together with Hollister fiber network and the California MMBI in northern San Benito. As shown in the figure, several planned roads intersect with both networks, which can be leveraged to extend and expedite the buildout of these networks.
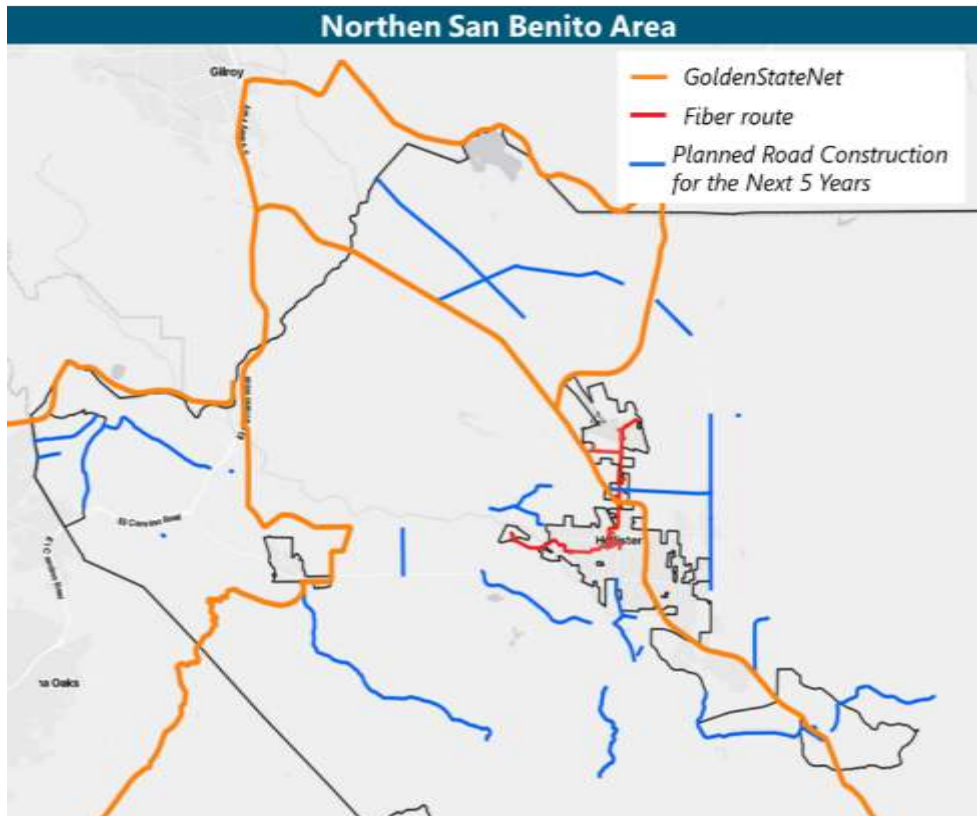
Figure 44. GoldenStateNet, Hollister fiber network, and Planned Road Construction for the Next 5 Years in Northen San Benito.

Finally, an especially important project is the one related to the improvement of Highway 25 between San Benito County and Santa Clara County (north of San Benito). This project involves the expansion (and possibly, redesign) of the highway to four lanes to improve safety and reduce traffic. This expansion/redesign also provides the opportunity for the deployment of fiber conduits that can be leveraged by broadband providers to serve underserved/sufficient locations in the North County region.

5 Analysis of Network Solutions

The broadband landscape in San Benito County has been meticulously characterized in Sections 2 through 4, delving into aspects such as 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 45. The previous sections focus on data compilation and analysis, while Sections 5 to 7 leverage this compiled data to craft a broadband strategy.

Figure 45. 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 CMMBI whenever possible. Based on conceptual designs, cost estimates are obtained and provided as input for the financial analysis.
- **Assess Operating Models:** An operating model is established 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 4.6% of locations in San Benito County are unserved according to FCC data and 21.1% according to CPUC data. The majority of unserved locations are located in the southern region of the County. Furthermore, in areas that are served (> 100/20), there is virtually no access to 1 Gbps / 500 Mbps services as only 6.5% 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 Zone 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) Locations 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) Locations 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.

17 fiber opportunity zones and 11 FWA opportunity zones were identified based on the process above. Table 13 and Table 14 capture the main attributes for fiber and FWA opportunity zones, respectively.

Table 13 Fiber Opportunity Zones

ID	Name	Area w/fiber [%]	Serviceable Location Density [locations/sq mile]	Addressable Market [locations]	Unserved & Underserved Locations FCC	Unserved Locations CPUC
A	San Juan Bautista	0%	527.2	761	1|0.1%	28|4%
B	Hollister	7%	682.8	14,268	320|2.2%	908|6%
C	Aromas	2%	266.9	351	1|0.3%	58|15%

Table 14 FWA Opportunity Zones

FWA Opportunity Zones						
ID	Name	Area w/fiber [%]	Serviceable Location Density [locations/sq mile]	Addressable Market [locations]	Unserved & Underserved Locations FCC	Unserved Locations CPUC
A	South Tres Pinos	0%	46.7	139	43|30.9%	27|27%
B	Paicines	0%	8.7	25	24|96%	57|100%
C	Southern Cluster	0%	7.1	58	58|100%	31|100%
D	Scheid Vineyards	0%	6.7	28	23|82.1%	37|97%
E	Willow Creek	0%	6.6	24	24|100%	17|100%
F	Hernandez Reservoir	0%	5.2	28	28|100%	26|100%

According to Table 13 and Table 14, the following observations can be made:

- The area with fiber in the fiber opportunity zones is in less than 10%, confirming the opportunity for a new fiber entrant.
- The percentage of unserved locations in fiber opportunity zones is low, which means that the main problem in the opportunity zone is market competition and lack of 1G services. In contrast, half of the FWA opportunity zones have 100% of unserved locations, and two above 82% According to CPUC data all the FWA opportunity zones are completely unserved.

- Fiber opportunity zones include the cities of Aromas, San Juan Bautista, and Hollister. FWA opportunity zones correspond to smaller unincorporated communities located in the southern region of the County.
- Fiber opportunity zones present location density lower than 1,000 locations per square mile, two of them have an addressable market of less than 1,000 locations, representing a potential challenge as ISPs are usually interested in larger markets. This can be addressed through engagement and negotiations with ISPs where the municipality offers a friendly environment for deployment.
- The addressable market for all the FWA opportunity zones consists of less than 150 locations. The FWA solution can address these areas in a cost-effective manner.
- The location density threshold was relaxed for FWA opportunity zones in order to capture as many unserved locations as possible, resulting in 5 zones below the 10 locations / sq mile.

Figure 46 to Figure 48 show map views of the identified opportunity zones.
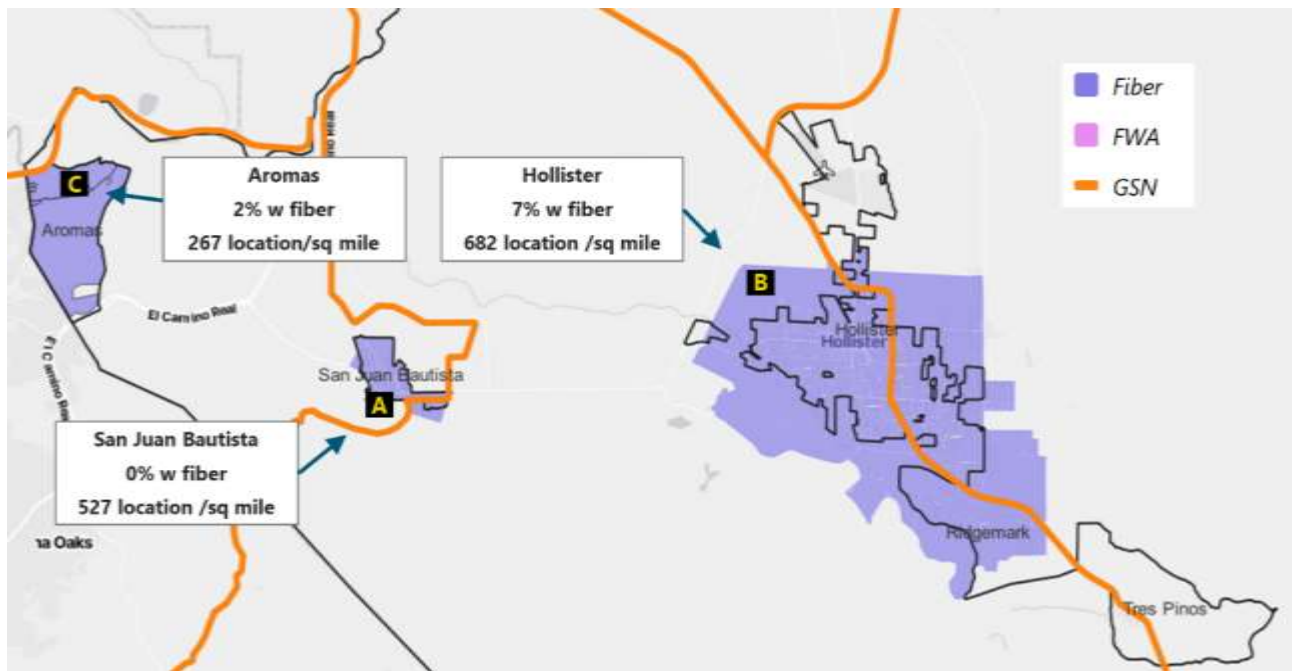
Figure 46. Fiber Opportunity Zones
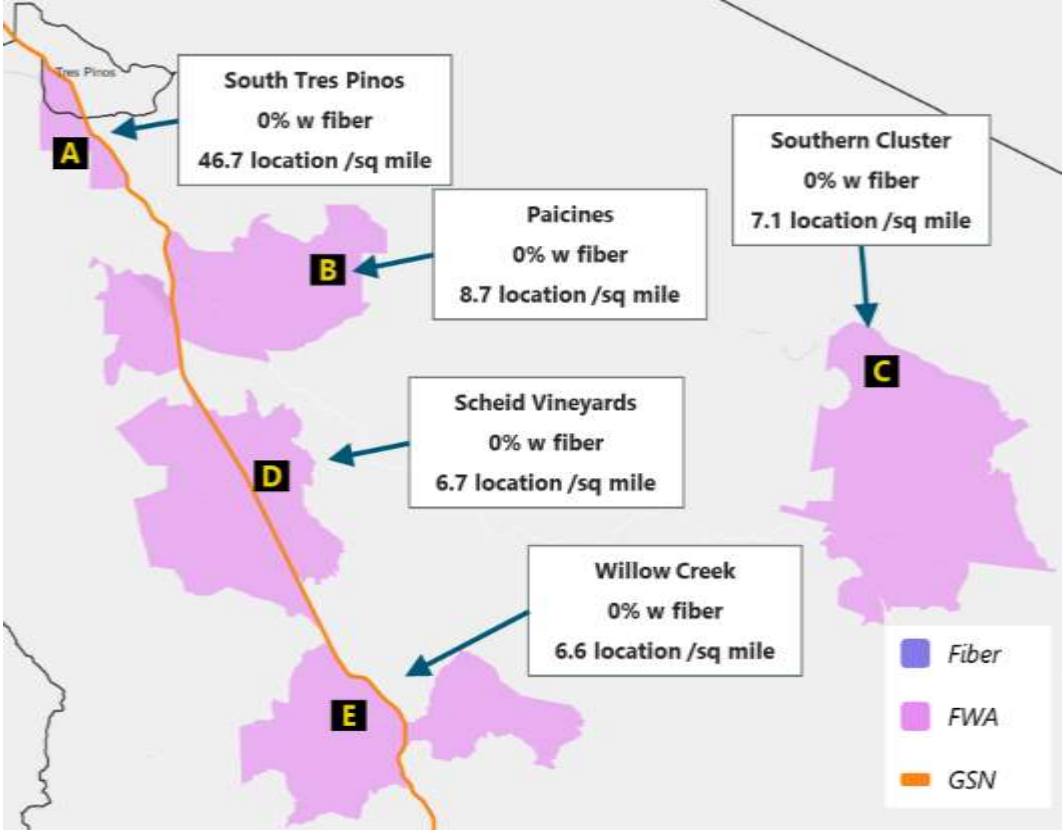
Figure 47 FWA Opportunity Zones – South Area
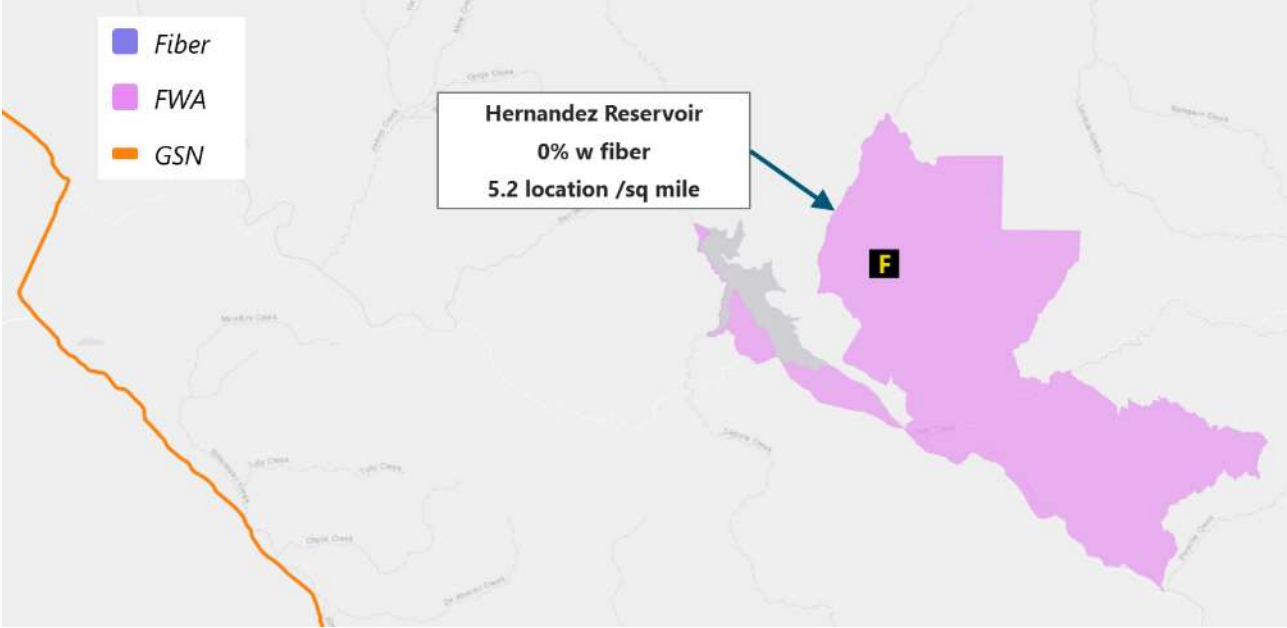
Figure 48 Opportunity Zones - Southeast Area

As shown in these figures, fiber opportunity zones are located close to population centers including the two cities. Importantly the three of them are proximal to the California MMBI, enabling last mile providers to enter the market without investing in middle mile infrastructure.

In contrast, FWA opportunity zones are far from the cities and some of them, far from the California MMBI, indicating that their deployment will represent a bigger challenge in terms of middle mile connectivity. A joint analysis of these areas should be made to enable extensions to the California MMBI to address clusters of opportunity zones.

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 6 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 49. Further details of this technology can be found in Annex A.
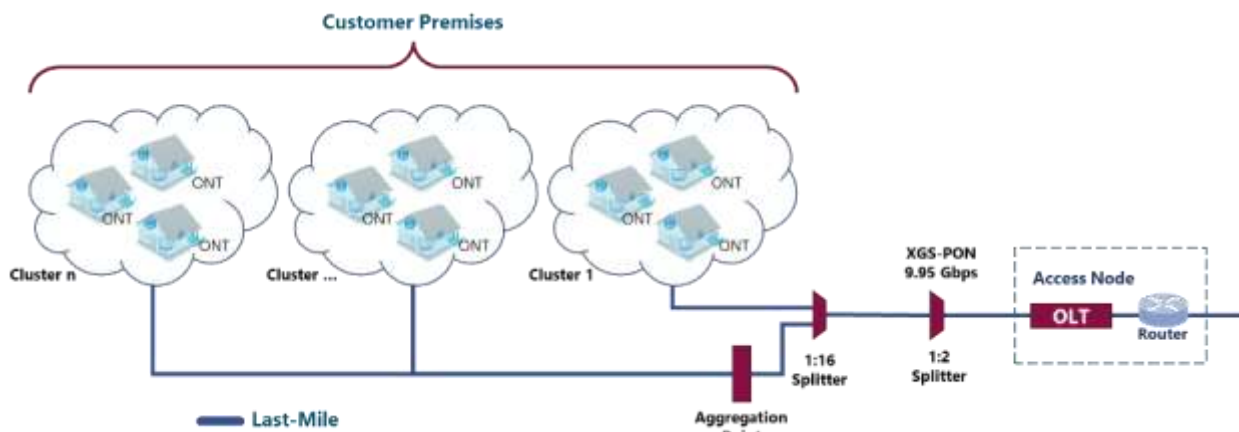
Figure 49. FTTP Network Architecture based on XGS-PON.

Figure 50 captures the process to develop fiber conceptual designs.

Figure 50. 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 51 shows a sample fiber design corresponding to the Aromas opportunity zone.
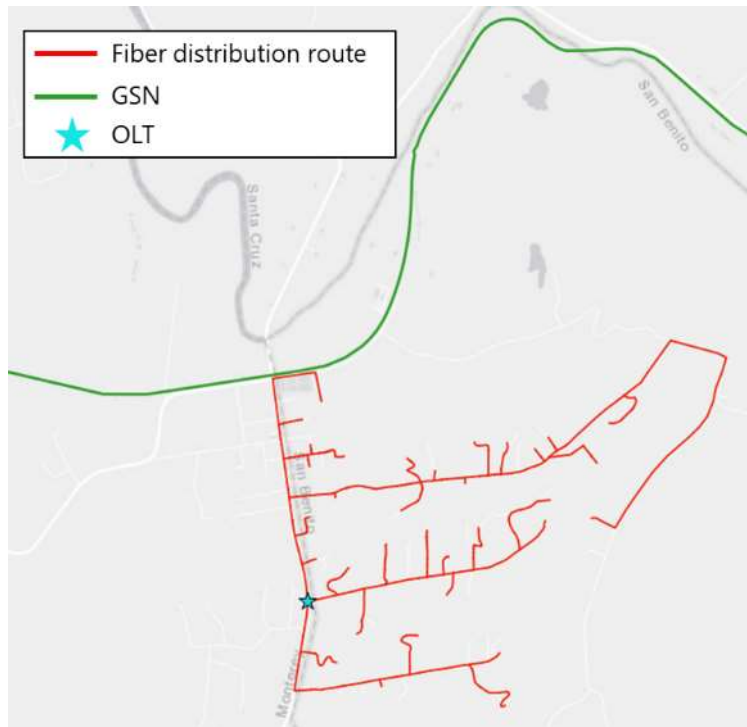
Figure 51. Fiber Design for Aromas opportunity zone.

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.

Table 15 captures the key cost drivers and estimates for the fiber opportunity zones. 92%of the overall estimated costs are due to the construction of the distribution routes, which involve underground and aerial deployment.

The cost analysis for fiber deployment in San Benito County's opportunity zones reveals a substantial financial commitment, with an average cost of approximately $3,500 per location. The total projected cost for implementing fiber infrastructure across all the zones is estimated at $54 million. The Hollister opportunity zone aims to serve the highest number of locations of all opportunity zones (14,268) but requires the highest investment (83% of the estimated total cost of the fiber opportunity zones).

Table 15. Fiber opportunity zones cost estimates.

Opportunity Zone	New Construction Route Length	Existing Construction Route Length	Pre-Construction cost	Fiber construction cost	Network Equipment cost	Middle Mile Construction Cost	Total Cost
Aromas	9.7 miles	0	$117,952	$3,698,083	$116,900	$225,000	**$4,157,936**
San Juan Bautista	7.6 miles	0	$92,202	$2,928,583	$116,900	$198,000	**$3,335,686**
Hollister	118.8 miles	6.36 miles	$1,459,911	$43,416,222	$467,600	N/A	**$45,343,733**
Total	**136.1 miles ft**	**6.36 miles**	**$1,670,065**	**$50,042,888**	**$701,400**	**$1,638,000**	**$54,052,354**

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 52.
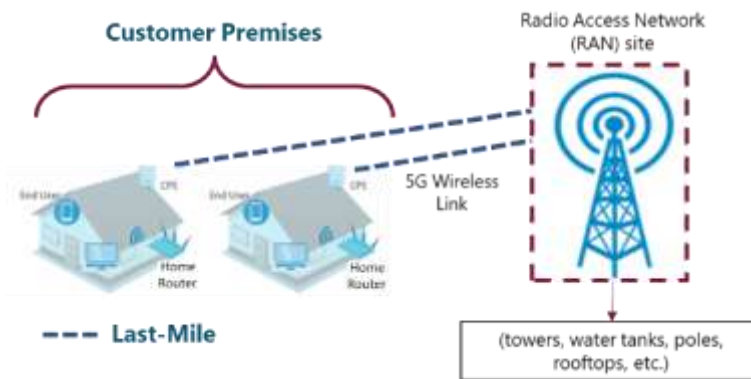
Figure 52. FWA Network Architecture.

The process to develop the conceptual design for each of the FWA opportunity zones is illustrated in Figure 53.
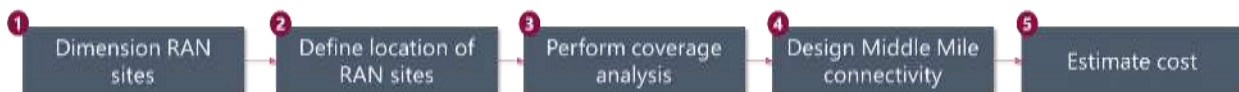
Figure 53. FWA conceptual design process.

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 estimates for the FWA opportunity zones and their main components are captured in Table 16.

The cost analysis for the FWA opportunity zones reflects the sever lack of broadband in the area and the commitments that should be taken to serve these locations. The average cost per location for the South Tres Pinos, Paicines, Scheid Vineyards and Willow Creek opportunity zones is ~$6,000. This average scales up to $203,000 for the Southern Cluster and the Hernandez Reservoir opportunity zones. This gap is because the cost for the middle mile for the later opportunity zones represents a higher percentage compared to the first ones (95% for both Southern Cluster and Hernadez Reservoir).

In fact, the middle mile cost for the Southern Cluster and the Hernandez Reservoir opportunity zones represents 45% of the overall total cost.

Table 16. 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
South Tres Pinos	1	$36,950	$97,791	$152,900	$37,800	**$325,441**
Paicines	1	$36,950	$97,791	$27,500	$9,000	**$171,241**
Scheid Vineyards	1	$36,950	$97,791	$30,800	$135,000	**$300,541**
Willow Creek	1	$36,950	$97,791	$26,400	$319,500	**$480,641**
Southern Cluster	1	$231,250	$97,791	$63,800	$9,189,000	**$9,581,841**
Hernandez Reservoir	1	$231,250	$97,791	$30,800	$7,625,253	**$7,985,093**
Total	**6**	**$610,300**	**$586,745**	**$332,200**	**$17,315,553**	**$18,844,798**

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 San Benito 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 54 and described below.

Figure 54 Operating Models

Public (GSCA / CDT)

The last-mile network is owned, deployed, and operated by Golden State Connect Authority (GSCA)[22], a joint powers authority of 39 member counties, including San Benito 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 California 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 CMMBI 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.

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

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[22] https://goldenstateconnect.org/

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 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 Figure 55 .
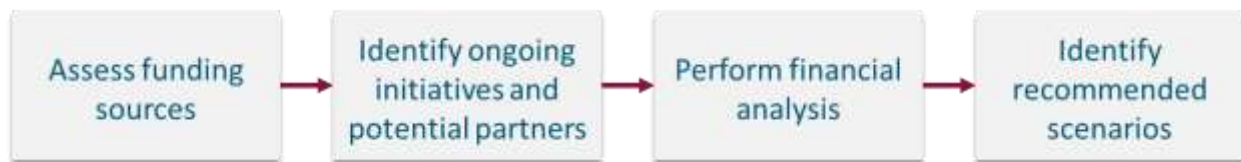
Figure 55 Assess Operating Models

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, considering that 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 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[23] was announced to receive $1.8 million of BEAD funds that will be shared among broadband projects in the state.

Figure 56 displays a map with federal and state funding programs that emanate from the legislation above, including broadband infrastructure and digital equity programs.
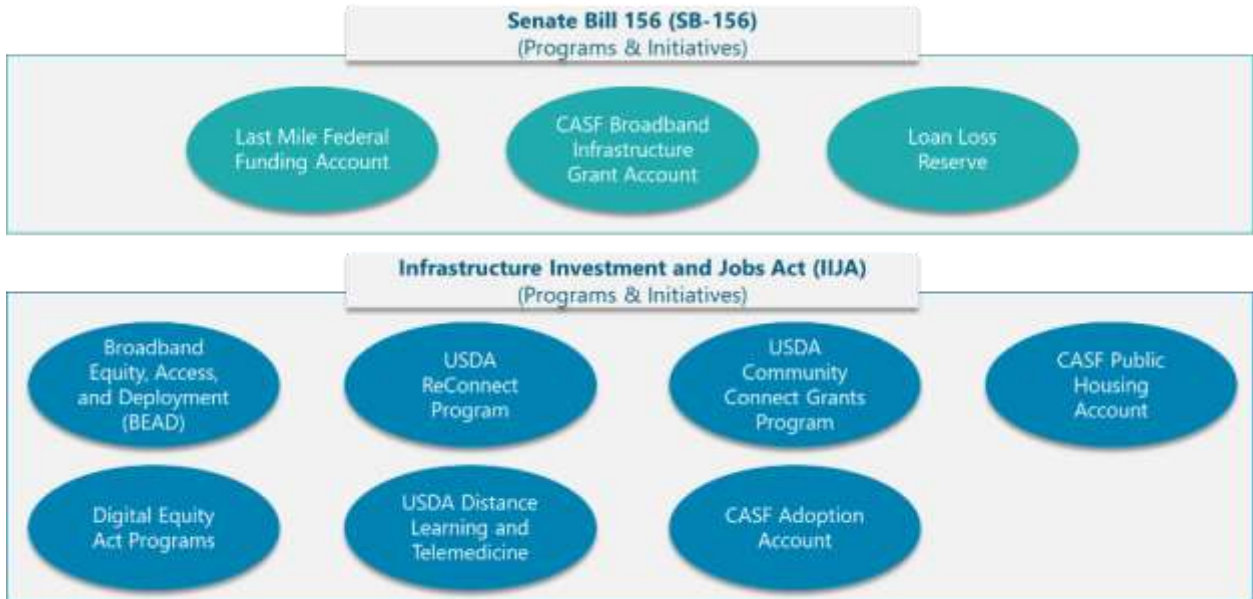
Figure 56. Federal and state broadband funding programs.

Each program targets slightly different objectives and incorporates different eligibility criteria, requirements, and timelines. Table 17 provides a high-level overview that serves as a reference to evaluate the suitability of these programs.

Table 17. 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	Jan 1, 2024 July 1, 2024	• Low-income communities without broadband access.	$150,000 [See Note 1]

	Account **$15 M**		• Projects proposing free broadband service.	
	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 See Note 3	**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 4	$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 5 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. • Rural areas with populations below 20,000 habitants.	$1,000,000
US DOT	**SMART (Strengthening Mobility and Revolutionizing Transportation) 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: United States Department of Agriculture.
Note 4: Economic growth, education, health care, and public safety.
Note 5: 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. Table 18 summarizes funding eligibility of opportunity zones in San Benito County.

Table 18. Summary of Opportunity Zones per Funding Program

Funding Program	FFA	CASF	ReConnect	BEAD	EDA
Aromas	✓				
San Juan Bautista		✓			✓
Hollister	✓				
South Tres Pinos		✓		✓	
Paicines		✓		✓	
Scheid Vineyards		✓		✓	
Willow Creek			✓	✓	
Southern Cluster			✓	✓	
Hernandez Reservoir			✓	✓	

All the identified opportunity zones within San Benito County are eligible for at least one grant program. The grant selection mostly depends on the number of unserved locations in the zone, the required funding, and existing ISPs to partner with.

> *The required funding for the opportunity zones in San Benito County is $17.2 million. It is important to note that funding grant pools are limited. For instance, the pool for the 2023 FFA program allocates only $10.4 million for San Benito County. Achieving the rest of the $6.8 million should be possible through future grant programs. This highlights the pressing need for strategic allocation of available funds to maximize impact.*

Finally, seven of the nine opportunity zones are eligible to apply for at least one funding program. In fact, four opportunities zones have already been considered for a CASF application: Aromas, San Juan Bautista, South Tres Pinos and Paicines. Further details are provided in the following section.

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.

Below the ongoing initiatives identified within the County are described.

Pending or awarded grants

- In June 2023 LCB Communications jointly with Garlic.com received a $1,770,748 CASF grant to build a fiber and FWA hybrid network to cover Aromas, San Juan Bautista, and some areas of the southern region. This project is looking to serve 1128 households, 2 anchor institutions and 3 business with Fiber-to-the-Home (FTTH) and 63 families with FWA. The project is looking to serve 1128 households, 2 anchor institutions and 3 business with FTTH and 63 families with FWA. The network will be capable of providing up to 5Gbps symmetrical service to fiber subscribers and up to 600 Mbps down by 100 Mbps up to wireless subscribers.
- Recently, the CPUC announced that 4 applications for the FFA grant program were submitted for San Benito County in the latest window (September 29th). The entities/ISPs behind these applications are the GSCA, AT&T and Hankins Information Technology. Together, these applications are requesting ~$42.5 million to serve up to 3,250 unserved locations in the County. Collectively, these applications aim to cover Aromas, the unincorporated areas surrounding the cities of San Juan Bautista and Hollister and some areas at the south of Tres Pinos. The opportunity zones that would be served through these applications are: Aromas (fiber), South Tres Pinos (FWA) and Paicines (FWA).

ISP Projects

- Aromas and San Juan Bautista have partnered with Garlic.com and Balanced Access to leverage on San Juan Bautista existing fiber (see Figure 38) and provide broadband access to the Aromas-San Juan Bautista unified school District. The "Aromas – San Juan project" will provide broadband service to students in need who live under the Aromas-San Juan Unified School District purview. The project will serve approximately 1,060 unserved students from both cities and unincorporated land areas within the Tri-County area of West San Benito, North Monterey, and East Santa Cruz Counties.
- The City of San Juan Bautista has also partnered with Etheric Networks to leverage the City fiber infrastructure and provide wireless internet to City residents using the Water Tower site. Etheric will deploy FWA antennas at the Water Tank to provide broadband FWA internet.

Public Broadband Infrastructure Plans

- The City of Hollister, through a special CASF grant, was funded to deploy a fiber extension towards the Migrant Camps located at Ridgemark.

- Aromas and the City of San Juan Bautista are planning a $5.8 million fiber deployment to be funded by the local Rotary club and by a grant program. This project will benefit unserved areas that surround these areas.

> *Implementation of broadband projects in the target opportunity zone requires the identification of the right partners and these ongoing initiatives are an indication of potential partners. For example, Garlic.com has demonstrated interest in the area, even achieving an important CASF grant that will help to provide broadband to a significant part of San Bentio County has expressed its intent to deploy, operate and own last mile networks (through grants) to serve low-income and disadvantaged communities in San Benito County.*

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 identified partners are presented below:

- **Golden State Connect (GSCA)** is the recommended partner for two of the three fiber opportunity zones (Aromas and Hollister) thanks to their proximity to the GoldenStateNet Network (GSN). These zones will potentially cover 95 unserved locations (out of 14,619 total locations).
- **Garlic.com** together with LCB Communications have applied for a CASF grant to serve some areas of the San Bentio County with FTTH and FWA solutions. This application can serve 1 Fiber Opportunity Zone (San Juan Bautista) and 3 FWA Opportunity Zones (South Tres Pinos, Paicines and Scheid Vineyards) covering up to 90 unserved locations (out of 953 total locations).
- **Pinnacles Telephone Co.** is a cable and fiber ISP with presence in the southern region of the County and can potentially serve the Willow Creek FWA Opportunity Zone and serving the 24 (unserved) locations in the area.
- **Razzolink** is a wireless ISP with presence in the northern region of the County and therefore it is a potential partner to serve the Southern Cluster and the Hernandez Reservoir opportunity zones which are located in extremely remote locations.

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 19 with a three-year ramp-up period.

Table 19. 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 57 shows a sample output of the financial model for the Aromas opportunity zone, under the GSCA operating model.

	Year 1	Year 2	Year 3	Year 4	Year 10
Total Revenue	$ 22,020	$ 42,300	$ 62,580	$ 82,860	$ 82,860
Variable Costs	$ 2,202	$ 4,230	$ 6,258	$ 8,286	$ 8,286
Contribution Margin	$ 19,818	$ 38,070	$ 56,322	$ 74,574	$ 74,574
Fixed Costs	$ 28,217	$ 28,217	$ 28,217	$ 28,217	$ 28,217
Net Margin	$ (8,399)	$ 9,854	$ 28,106	$ 46,358	$ 46,358
CAPEX	$ 4,157,936	$ -	$ -	$ -	$ -
Free Cash Flow	$ (4,166,334)	$ 9,854	$ 28,106	$ 46,358	$ 46,358
Grants	$ 4,157,936				
Net Cash Flow	$ (8,399)	$ 9,854	$ 28,106	$ 46,358	$ 46,358
Acummulated Cash Flow	$ (8,399)	$ 1,455	$ 29,561	$ 75,918	$ 354,063
Payback Period	Year 2				
Breakeven Point	Year 2				
NPV	$ 191,463				

Figure 57. Aromas 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 results for 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 9 broadband opportunity zones in San Benito County was identified.

Table 20 summarizes the results by operating model. As shown, GSCA model is proposed for only two opportunity zones but addresses the largest number of locations and unserved locations. In contrast, the FWA ISP Standalone model is proposed for 4 opportunity zones serving only 114 locations.

Table 20. Recommended Scenarios Summary

Operating Models	Opportunity Zones	Unserved and Underserved Locations (FCC)	Unserved Locations (CPUC)	Total Locations	Key Success Factor
GSCA	2	321	966	14,619 | 93%	FFA award to GSCA
Fiber ISP Standalone	1	1	28	761 | 5%	CASF Grant Award to Garlic
FWA ISP Standalone	4	114	112	216 | 1.4%	ISP Engagement & Grant Funding
FWA Public Private Partnership (PPP)	2	86	83	86 | 0.6%	ISP Inducements, GSN extensions
Total	**9**	**552**	**1,189**	**15,682**	

> *Key Success Factor column in Table 20 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.

The fiber Opportunity zones under the fiber ISP standalone model is San Juan Bautista and the potential ISP to partner with is Garlic. The key success factor for this scenario y the award of the CASF grant submitted by Garlic in this area. In the scenario where the CASF grant is not awarded, an EDA grant could be pursuit in collaboration with AT&T with a PPP model.

In a similar situation are the FWA opportunity zones under the FWA ISP standalone model (South Tres Pinos, Paicines and Scheid Vineyards) which also fall under the Garlic CASF application, thus share the same success factor as the San Juan Bautista opportunity zone. However, their success factor also relies on their proximity to the GSN. In the scenario where the CASF grant is not awarded, these zones can partner with an ISP in the area (e.g., Pinnacles Telephone Co) with a PPP model.

Finally, the Fiber PPP model is proposed for the opportunity zones which are in remote areas of the southern region (Southern Cluster and Hernadez Reservoir) away from the GSN. Their success factor relies on ISP Inducements and applying for last mile and middle mile grants.

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 21.

Table 21. Broadband Opportunity Zone Implementation Categories.

	Phase 1 (2023-2024)	Phase 2 (2025-2026)	Long-Term (post-2026)
GSCA	• High density (> 700 locs / sq mile) • GSN proximity (< 1 mile in Phase 1) • FFA eligible	• High density (> 700 locs / sq mile) • GSN proximity (< 10 mile or in Phase 2) • Grant eligible	• Heavy Middle Mile investment
Fiber ISP Standalone	• Positive biz case with or w/o Grants • •Net Present Value (NPV) > $1M w/Grant	• Positive biz case with NPV > $100k with or w/o 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
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 58.
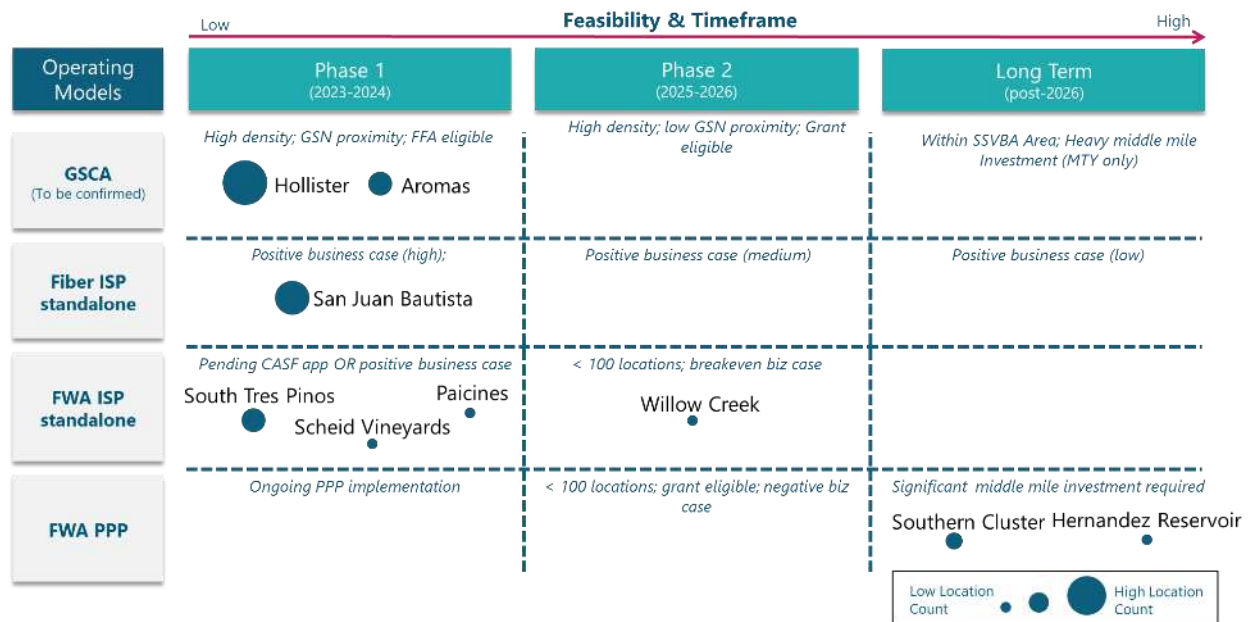
Figure 58. San Benito Opportunity Zones Characterization.

Garlic has already applied for a CASF grant for the FWA ISP standalone opportunity zones, making them suitable for Phase 1. These opportunities zones (except for Scheid Vineyards) also achieve positive business cases. All Fiber opportunity zones can also be considered in Phase 1 thanks to their positive business case. Similarly, the Willow Creek FWA opportunity zone achieves a positive business case, but it presents a low location density, making it suitable for Phase 2.

Finally, the FWA PPP opportunity zones are considered as long term due to the high middle mile investment that is required to reach these areas from the GSN.

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

- **GSCA Phase 1:** Aromas and Hollister opportunity zones are in this category and collectively serve 14,619 locations. These zones are primarily eligible for Last-mile FFA grants, making them promising candidates for broadband expansion. They are characterized by their proximity to the GSN. The operating model of choice is Public GSCA, suggesting that these zones are ready for significant broadband infrastructure development.
- **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 – San Juan Bautista. San Juan Bautista focuses on last-mile fiber deployment by a private ISP. The Garlic CASF application can (if awarded) address this opportunity zone serving up to 761 total locations, thus making Garlic a potential partner.
- **FWA ISP Standalone phase 1:** Three opportunity zones are in this category: South Tres Pinos, Paicines and Scheid Vineyards. The Garlic CASF application can (if awarded) benefit this opportunity zone by serving 89 unserved locations (out of 192 total locations), thus making Garlic a potential partner for these zones.
- **FWA ISP Standalone phase 2:** A single opportunity zone is in this category is Willow Creek due to its low location density (6.6 locs/sq mile), breakeven business case and suitable for a ReConnect grant. This zone will serve an overall of 24 (unserved) locations.
- **FWA PPP:** This category comprises 2 opportunity zones, serving 52 locations (all of them unserved). Eligibility for grants encompasses ReConnect grants since these zones require heavy middle mile as they are away from the GSN and in a mountainous area.

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 9 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 59 provides a comparison between current broadband service availability and the target state. As shown, the target state takes unserved locations to 0% (currently at 4.6%) and increases 1G served locations from 6.5% to 83%.

	Current	Target
1G Served	1,206 (6.5%)	15,503 (83%)
Served	16,507 (89%)	2,732 (15%)
Underserved	12 (0.1%)	337 (1.8%)
Unserved	847 (4.6%)	0 (0%)
	18,572	

Figure 59. Current and Target Service Availability Comparison.

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 $18.5 million. This financial support is required for 2 Fiber and 6 FWA opportunity zones. Most important funding programs are the last mile FFA and the CASF grants.
2. **Existing Infrastructure Solutions:** There are 6 opportunity zones (2 fiber and 4 FWA) proposed to utilize the California MMBI network for middle mile connectivity. Additionally, the Hollister fiber opportunity zone will capitalize on the city's existing Fiber Infrastructure. This approach helps minimize costs and improve deployment efficiency.
3. **Middle Mile Investment:** A heavy investment in middle mile is required to enable two projects in southern remote areas: Southern Cluster and Hernandez Reservoir.
4. **Satellite Connectivity:** Satellite is the recommended solution for 337 underserved 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 $70 to $75 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[24] and NTIA's Best Practices[25] establish guidelines to incentivize and streamline the deployment of broadband infrastructure. These guidelines were integrated into the evaluation framework presented in Figure 60.

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 60. Broadband policy assessment framework.

Broadband policies established by the County of San Benito and the Cities of Hollister and San Juan Bautista were evaluated based on this framework. Key findings and recommendations resulting from this assessment are captured below:

Key findings

- Only San Benito County follows construction guidelines provided by the California Building Standards Commission but does not provide guidelines for telecommunication infrastructure.
- Only San Benito County provides an online tutorial showing the permit request process while the cities of San Juan Bautista and Hollister only provide construction fees and required construction formats online.
- Guidelines or methodologies for leasing of public assets are not available for either the County or the cities.

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

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

- San Benito County and the cities provide a detailed list of documents and templates related to the permit process.
- San Benito County and the cities provide a detailed list of fees related to the permit process.
- San Benito County and the cities are currently developing an online GIS tool to visualize key aspects of their communities, including telecommunications assets.

Recommendations

1. The County of San Benito and the cities should develop their own 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. The County of San Benito and the cities should develop a comprehensive permitting process that should be available to anyone online. The process should be flexible in terms of requirements and timelines for key/critical projects. Finally, the process should be periodically updated based on industry and expert feedback.
3. The County of San Benito and the cities 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. The County of San Benito and the cities 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. The County of San Benito and the cities should consider the implementation of trading26 (or swapping) access mechanisms and strategies to incentive and accelerate the deployment of broadband services across the county.
6. The County of San Benito and the cities consider the creation of a staff team dedicated to permit applications and responsible for tracking changes in federal and state telecommunications regulations.
7. The County of San Benito and the cities 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 61 summarizes the assessment of broadband policies and the associated recommendations.

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[26] Asset trading strategy: Mechanisms/strategies to negotiate the use of public and privates' assets between the government and providers.

Readiness Assessment

	San Benito County	SJB City	Hollister City
Construction standards			
Permitting process Documentation			
Differentiation between major and minor broadband projects			
Batch permitting process			
Leasing of public assets			
New Assets Policies			
Public GIS datasets			

Recommendations

Develop broadband construction standards and make them available online.

- Document Permitting process (Cities)
- Specify timelines for permitting (Cities)

Establish guidelines to classify and handle minor and major broadband permits

Establish rules and processes for batch permitting

- Inventory of public assets
- Provide guidance, rules, and fees to lease public assets (e.g., existing conduit, poles, towers) on Municipal websites.

- Dig Once / Open Trench Policies
- Enforce conduit deployment for major construction projects

Create (Hollister) / improve (SBC & SJB) GIS Portals with broadband data
- Serviceability, ongoing initiatives, existing infra, zoning, etc.

Not Broadband Ready   Broadband Ready

Figure 61. 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 San Benito 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 62.
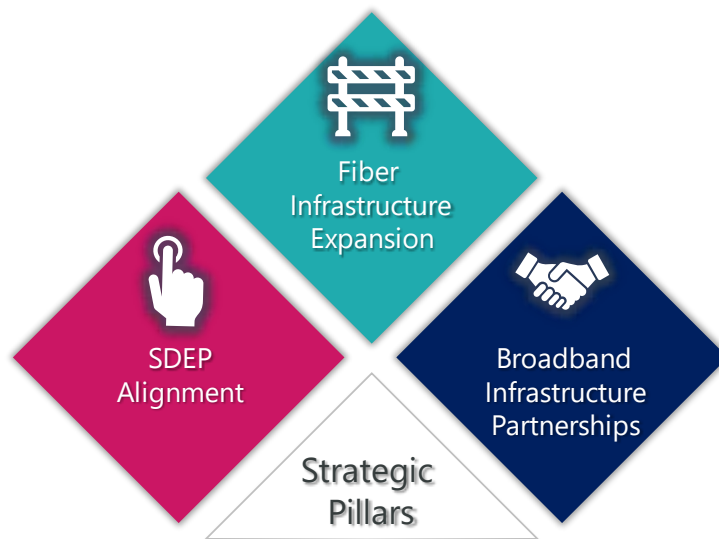
Figure 62. Strategic Pillars.

- **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 93.5% of San Benito 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.

  Examples of current partnerships with ISPs are:

  - LCB Communications and Garlic.com grant for a to provide broadband access to Aromas, San Juan Bautista, and some areas of the southern region of the County.
  - Garlic.com and Balanced access project to provide broadband access to the Aromas-San Juan Bautista unified school District.
  - Etheric Networks and San Juan Bautista project to provide wireless internet to City residents using the Water Tower site.

- **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 63 captures this workstreams and the main tasks that comprise the action plan.
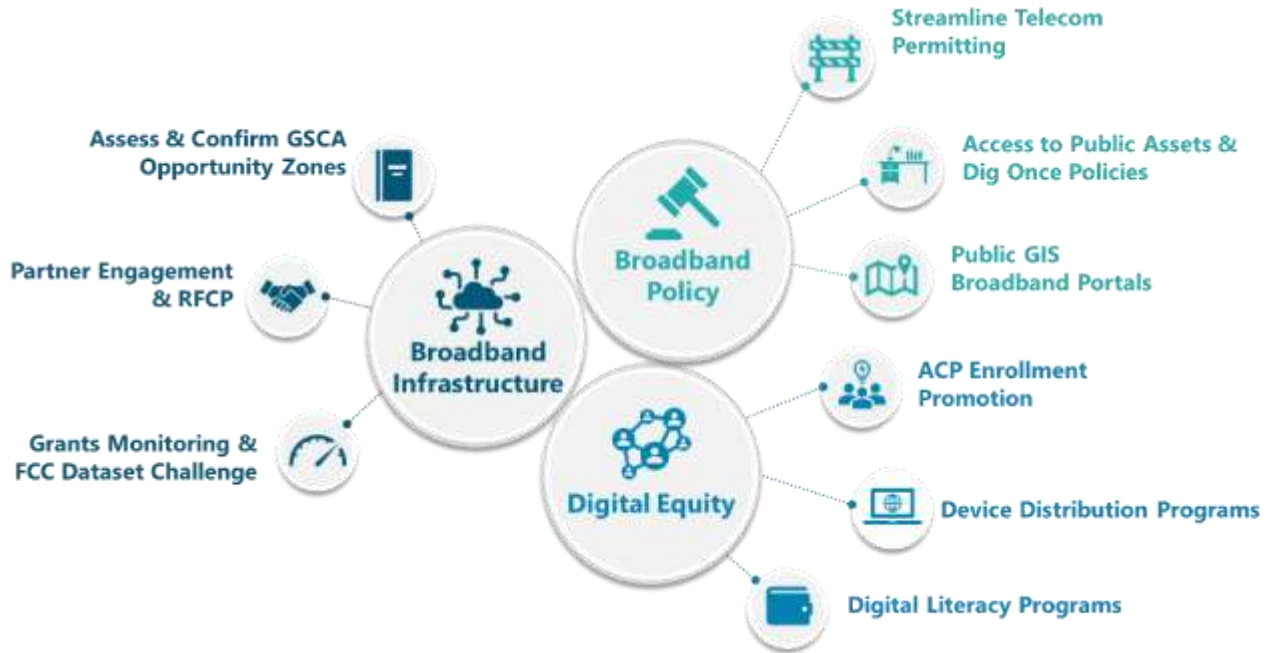
Figure 63. High Level Action Plan.

7.1 Broadband Infrastructure:
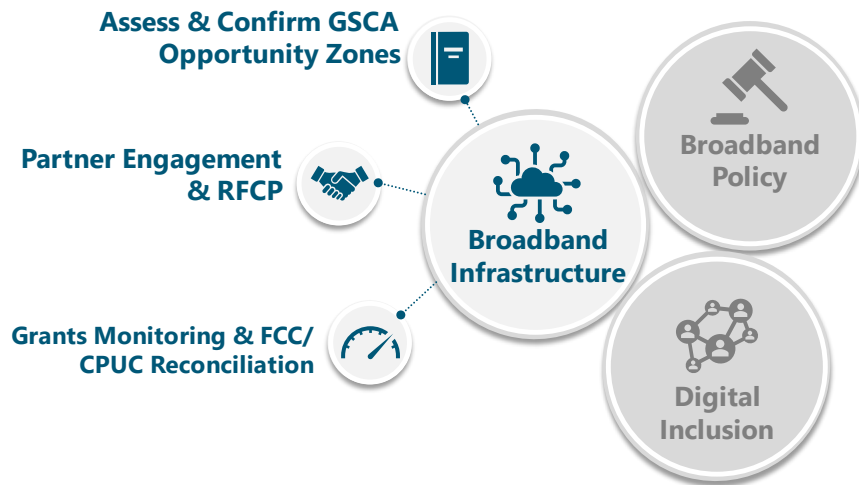
Figure 64. Action Plan -- Broadband Infrastructure.

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

1. **Assess & Confirm GSCA Opportunity Zones:** GSCA has submitted applications for some grants in the region (areas are still to be confirmed). In addition, discussion, and confirmation of GSCA's plans for other opportunity zones that are recommended under this model (e.g., Aromas and Hollister) must be carried out to make any course corrections for the opportunity zones that are left out.

2. **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.

3. **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:
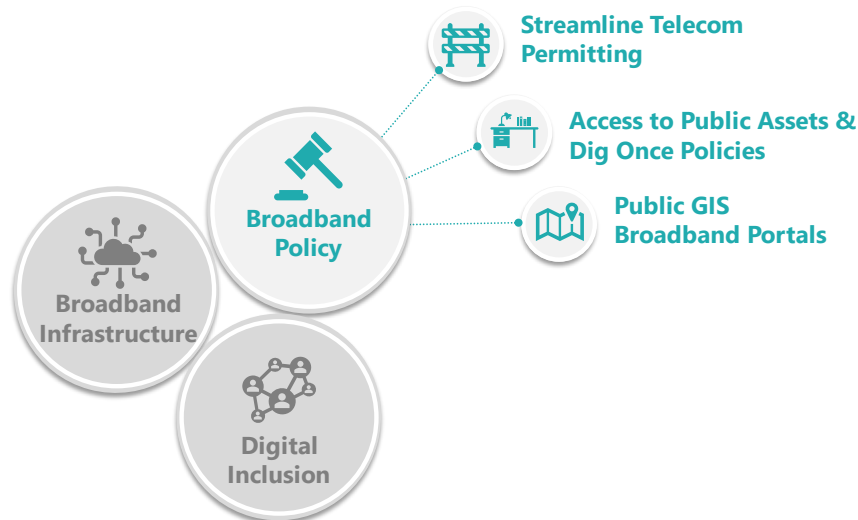
Figure 65. Action Plan -- Broadband Policies.

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:
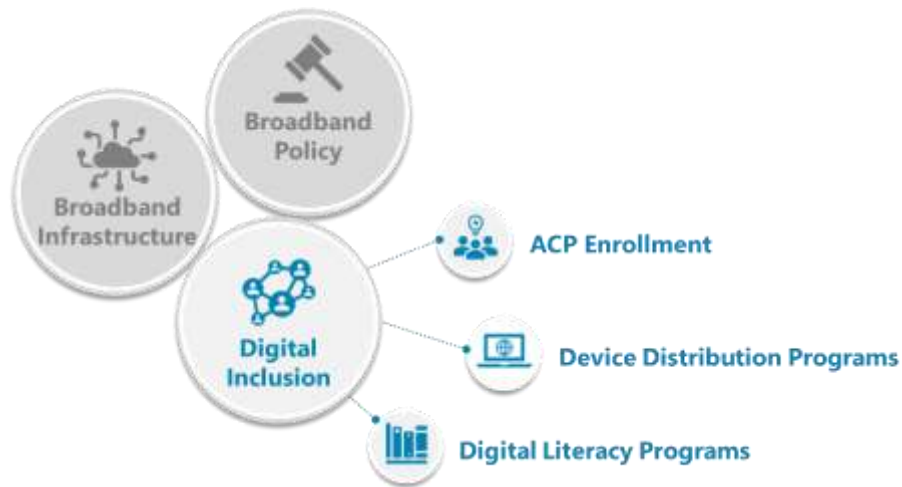
Figure 66. Action Plan -- Digital Inclusion.

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.

1. **ACP Enrollment:** The County and cities should actively promote and support enrollment into the ACP, supporting libraries, and schools to facilitate registration events, and enabling access to related online resources within the websites of the Counties and Cities. Subtasks related to this activity are listed below:

   o Identify, request, and upload online resources to County's and Cities' websites. A designate from each of the Cities from the IT or Economic Development organizations should start the research of materials related to ACP enrollment, selecting materials for publication on the County's and Cities' websites.
   o Establish a channel for partners to send information regarding registration events that can be promoted through the Cities' communication channels. The County and Cities should set up an inbox or point of contact to receive information and requests to support ACP enrollment events. A procedure to upload and publish content should also be established.

2. **Devices and Digital Literacy Programs:** The County and the Cities should continue and increase their programs distributing computers, hotpots mainly at libraries and schools. Partnering with Loaves Fishes and Computers and other digital inclusion advocacy groups such as the Rotary Club's Access Committee would help close the digital divide in San Benito County. Supporting the programs in place and enhancing capacity through coordinated grant applications would be significant in ensuring that the greater community is in alignment with California's Broadband for All.

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 *22*.

Table 22 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 67 displays these network segments.
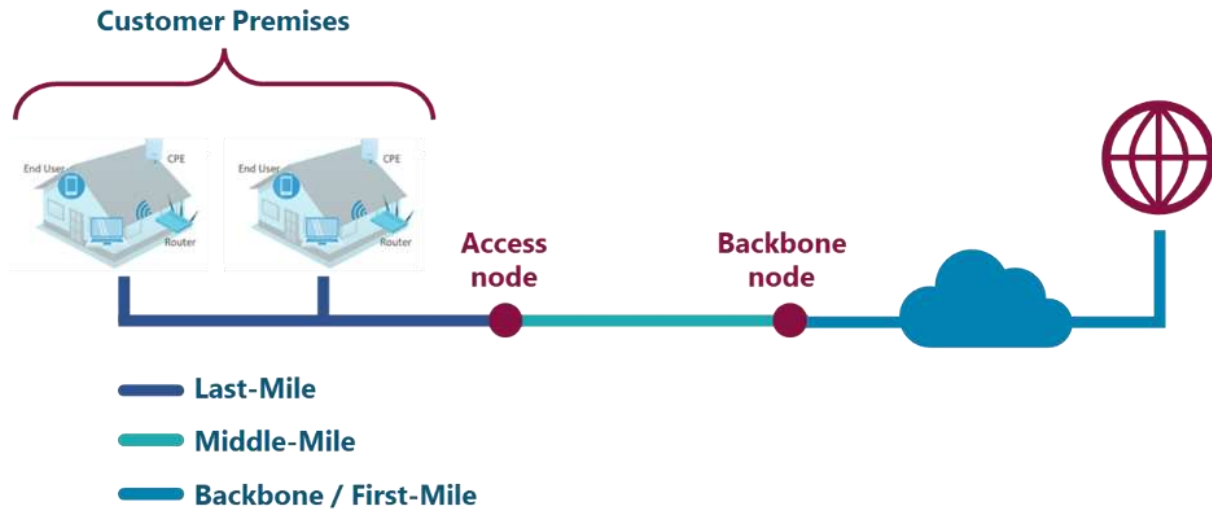
Figure 67 High-level broadband network architecture.

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

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 68 below depicts the high-level architecture for DSL technology.
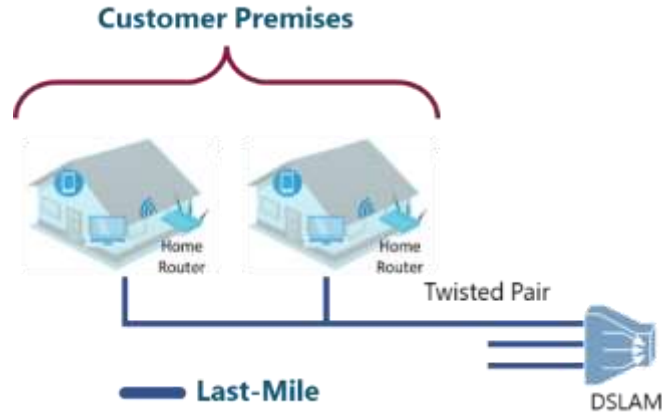
Figure 68 DSL high-level architecture

Data Over Cable Service Interface Specifications

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 69 shows the associated architecture.
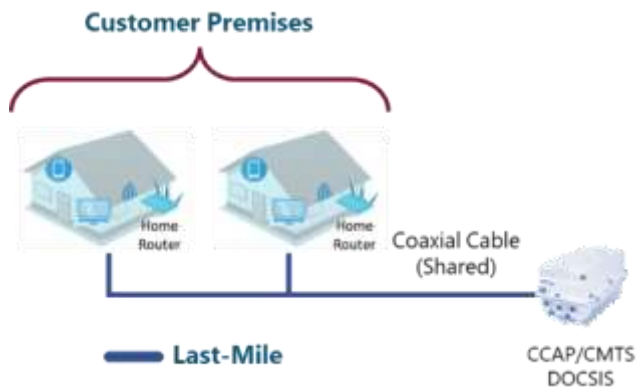
Figure 69 DOCSIS high-level architecture

Fiber-to-the Home

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 passive optical

network (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 Optical Line Terminal (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- Passive Optical Network (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 70 below.
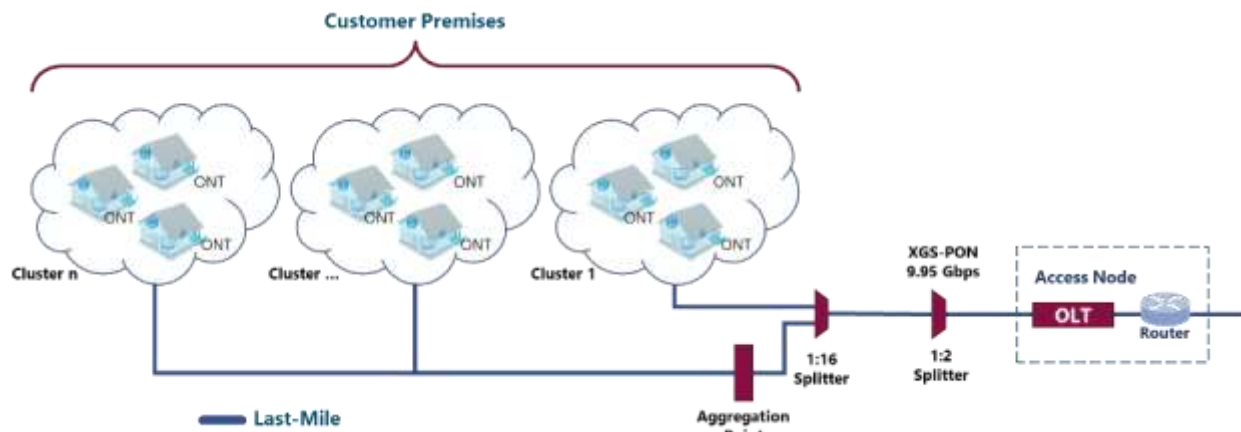
Figure 70 FTTH high-level architecture

Fixed Wireless Access

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 Citizens Broadband Radio Service (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 71 illustrates the high-level architecture for FWA technology.
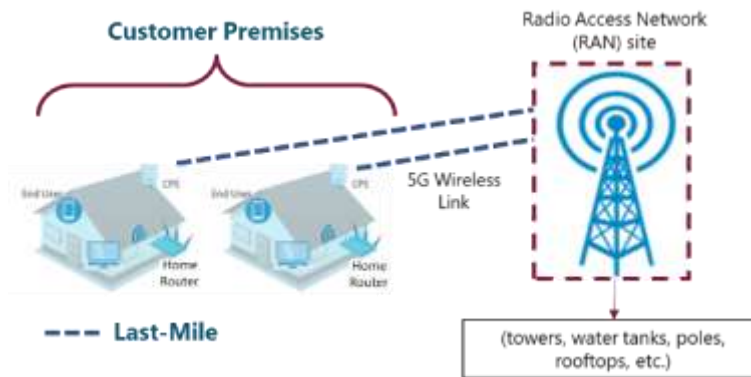
Figure 71 FWA high-level architecture

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 72.
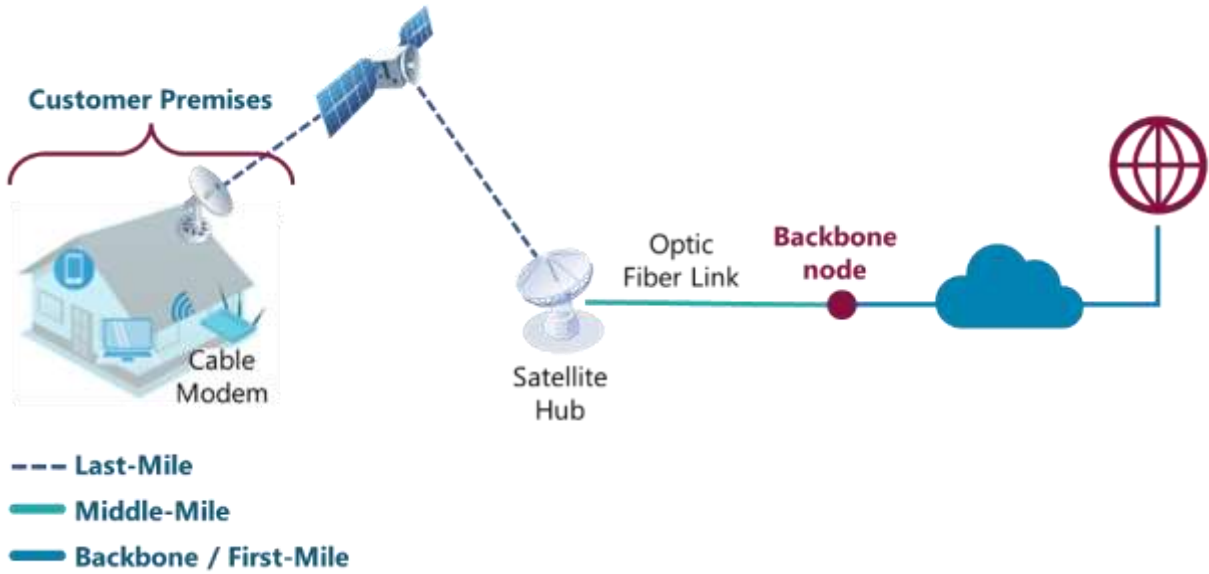
Figure 72 Satellite system high-level architecture

As a summary,

Table *23* provides a comparison of the last-mile technologies described in this section.

Table 23 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 Anlaysis

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 Hollister, San Juan Bautista, 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[27].

In addition to the bandwidth required by each household member, Table 24 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 24. 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

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[27] FCC Broadband Speed Guide

Table 25 displays the average household size for San Benito cities and unincorporated areas and their corresponding residential bandwidth.

Table 25. San Benito areas average household size and required residential bandwidth.

County Areas	Average Household Size*	Residential Bandwidth (Mbps)
Hollister	3.5	156.1
San Juan Bautista	2.7	128.1
Unincorporated Areas	3.01	138.9

A key takeaway from this analysis is that residential broadband service offerings at San Benito must be at least 150 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 26.

Table 26. Business Size categories and bandwidth requirements.

Number of Employees	Bandwidth per Category (Mbps)
1 – 9	100
10 – 49	300
50 – 99	1000 (1 Gbps)
> 100	10,000 (10 Gbps)

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

Anchor Institutions and Government Facilities

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

San Benito 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[28], 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.

The subscriber forecast is then obtained by multiplying the number of households by the adoption rate, resulting in the numbers presented in Table 27.

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

Table 27. Broadband Residential Subscriber 5-year forecast.

County Areas	Household Count*	Subscribers				
		2023	2024	2025	2026	2027
Hollister	13,224	12,351.2	12,470.2	12,589.2	12,708.3	12,827.3
San Juan Bautista	992	904.7	919.1	933.5	947.9	962.2
Unincorporated Areas	8,684	7,998.0	8,104.3	8,210.7	8,317.1	8,423.5

*US Census

Aggregated residential demand is then obtained as the product of the residential subscriber bandwidth (Table 25) and the number of subscribers for each year (Table 27). Table 28 presents the results.

Table 28. San Benito Aggregated Residential Demand.

County Areas	Total Residential Bandwidth (Gbps)*				
	Year 1	Year 2	Year 3	Year 4	Year 5
Hollister	192.37	194.23	196.08	197.94	199.79
San Juan Bautista	11.59	11.77	11.96	12.14	12.33
Unincorporated Areas	111.13	112.61	114.09	115.57	117.05

* - 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 29 shows the number of businesses in each San Benito city and unincorporated areas[29] and their required bandwidth on Year 1 based on previous assumptions. Table 30 summarizes the aggregated demand for the business segment by applying the 23% growth factor and an oversubscription factor of 5.

Table 29. San Benito's number of businesses by City and Unincorporated areas and required bandwidth.

County Areas	Number of Businesses	Aggregated Business Bandwidth (Gbps)*
Hollister	1131	60.1
San Juan Bautista	26	0.9
Unincorporated Areas	603	45.8
Total	1760	106.8

* - Computed with an oversubscription factor of 5.

Table 30. San Benito Aggregated Business Demand.

County Areas	Total Business Bandwidth (Gbps)*				
	Year 1	Year 2	Year 3	Year 4	Year 5
Hollister	60.1	73.18	90.02	110.72	136.19
San Juan Bautista	0.9	1.12	1.38	1.69	2.08
Unincorporated Areas	45.8	55.80	68.63	84.41	103.83

[29] California Community & Place Based Data Tool

Anchor Institutions and Government Segment

The forecast for anchor institutions and government facilities follows the same procedure and assumptions used for the Business segment. Table 31 shows the number of anchor institutions in each area[30] and their required bandwidth. Table 32 summarizes the aggregated demand for the anchor institutions and government segment.

Table 31. San Benito's number of Anchor institutions and government by City and Unincorporated areas and required bandwidth.

County Areas	Number of Institutions
Hollister	64
San Juan Bautista	5
Unincorporated Areas	45
Total	114

Table 32. San Benito Aggregated Anchor Institutions and Government Demand.

County Areas	Total Institutions Bandwidth (Gbps)*				
	Year 1	Year 2	Year 3	Year 4	Year 5
Hollister	12.67	15.59	19.17	23.58	29
San Juan Bautista	1	1.22	1.50	1.84	2.27
Unincorporated Areas	8.91	10.96	13.48	16.58	20.39

* - Computed with an oversubscription factor of 5.

By adding the aggregated demand from all market segments, the overall 5-year demand for each city and unincorporated area can be obtained. These results are summarized in Table 33.

Table 33. San Benito's Cities and Unincorporated areas aggregated demand.

County Area	Aggregated Bandwidth (Gbps)				
	Year 1	Year 2	Year 3	Year 4	Year 5
Hollister	264.54	283.00	305.27	332.24	364.98
San Juan Bautista	13.49	14.11	14.83	15.68	16.68
Unincorporated Areas	165.41	179.37	196.20	216.56	241.27

Table 34 summarizes the aggregated demand by market segment and San Benito's Total Demand.

Table 34. Aggregated Demand by segment and San Benito total demand.

Market Segment	Total Aggregated Bandwidth (Gbps)				
	Year 1	Year 2	Year 3	Year 4	Year 5
Total Residential	315.10	318.61	322.13	325.65	329.16
Total Business	105.77	130.10	160.02	196.83	242.10
Total Institutions	22.57	27.76	34.15	42.00	51.66
San Benito Aggregated Demand	443.44	476.48	516.30	564.48	622.92

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[30] 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.

Figure 73 depicts the contribution of each market segment to the overall San Benito aggregated demand.
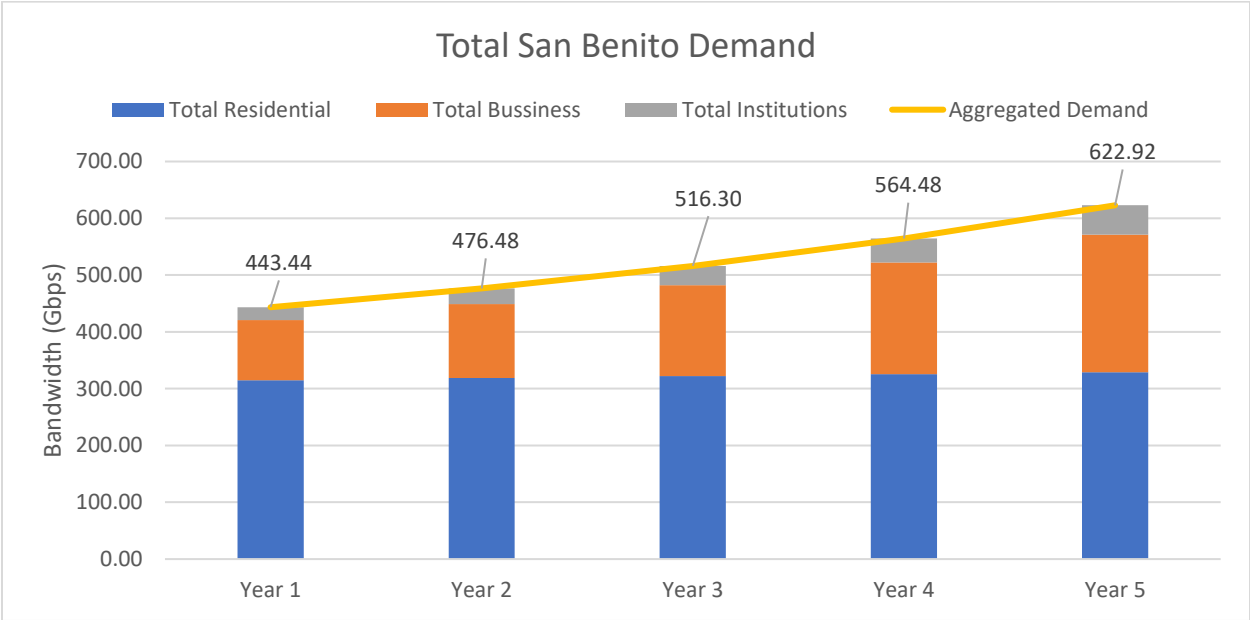
Figure 73. San Benito Aggregated Demand by Segment.

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

- ISPs willing service the San Benito residential market should offer speeds than 150 Mbps (downlink) to match the required residential demand for individual subscribers across the cities and unincorporated areas.
- The middle-mile network should support and aggregate of 200 Gbps capacity for Hollister City and unincorporated areas (independently).
- The aggregated San Benito Demand will surpass 600 Gbps within five years, and any ISP servicing San Benito County must cope with this demand.

Appendix C - Opportunity Zones Summary

Fiber Opportunity Zones

Aromas [Cluster ID: C]

Indicators of Need

	Total Locations	Unserved / Underserved
FCC:	351	1
CPUC:	642	343

Fiber Availability [%]	Location Density [locations/sq mile]
2%	267

Grant Eligibility
FFA

Target Area

— GSN

Existing Broadband Infrastructure & Ongoing Initiatives

Existing Infrastructure	No
On-going Initiatives	1) CASF application to cover this area with fiber or FWA solution. 2) The Aromas-San Juan Bautista project will deploy a fiber/FWA network to serve students in the area.
Distance to CMMBI [miles]	0.5

Recommended Solution & Financial Metrics

Operating Model	GSCA	Total CAPEX	$	4,157,935.56
Primary Partner	GSCA	Grant Amount	$	4,157,935.56
Alternative Partner	GARLIC	Year-10 Revenue	$	82,860.00
Grant(s)	FFA	NPV	$	191,462.60
Timeframe	Phase 1			

KEY SUCESS FACTORS

Ensure grant funding of $4 million
The feasibly relies on its proximity to the GSN

San Juan Bautista [Cluster ID: A]

Indicators of Need

	Total Locations	Unserved / Underserved
FCC:	761	1
CPUC:	744	41

Fiber Availability [%]	Location Density [locations/sq mile]
0%	527

Grant Eligibility

N/A (Applied for CASF through Garlic)

Target Area

— GSN

Existing Broadband Infrastructure & Ongoing Initiatives

Existing Infrastructure	No
On-going Initiatives	1) Construction of a water pipe between Hollister and SJB WWTPs (project on hold). 2) CASF application to cover this area with fiber or FWA solution 3) The Aromas-San Juan Bautista project will deploy a fiber/FWA network to serve students in the area.
Distance to CMMBI [miles]	0.4

Recommended Solution & Financial Metrics

Operating Model	Fiber ISP Standalone		Total CAPEX	$	3,335,685.60
Primary Partner	Garlic		Grant Amount	$	-
Alternative Partner	AT&T		Year-10 Revenue	$	177,600.00
Grant(s)	CASF		NPV	$	-2,019,961.42
Timeframe	Phase 1				

KEY SUCESS FACTORS

Success factor relies on the Garlic CASF application and its proximity to the GSN

Hollister [Cluster ID: B]

Indicators of Need

	Total Locations	Unserved / Underserved
FCC:	14,268	94
CPUC:	13,091	1,229

Fiber Availability [%]	Location Density [locations/sq mile]
7%	683

Grant Eligibility
FFA
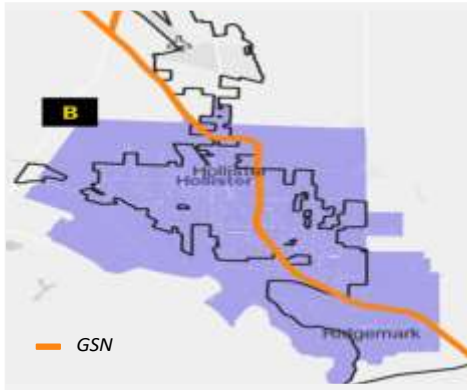
Target Area

— GSN

Existing Broadband Infrastructure & Ongoing Initiatives

Existing Infrastructure	City Fiber Network
On-going Initiatives	1) LATA grant submission to expand the existing fiber network to provide public WiFi at city parks. Fiber expansions would also allow to provide fiber connection to low income areas. 2) Construction of a water pipe between Hollister and SJB WWTPs (project on hold).
Distance to CMMBI [miles]	0.0

Recommended Solution & Financial Metrics

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

Total CAPEX	$	22,500,000.00
Grant Amount	$	11,400,000.00
Year-10 Revenue	$	2,517,288.00
NPV	$	-1,749,295.10

KEY SUCESS FACTORS

Ensure grant funding of $11 million
The feasibly relies on its proximity to the GSN

FWA Opportunity Zones

South Tres Pinos [Cluster ID: A]

Indicators of Need

	Total Locations	Unserved / Underserved
FCC:	139	42
CPUC:	100	27

Fiber Availability [%]	Location Density [locations/sq mile]
0%	47

Grant Eligibility

CASF | BEAD

Target Area

— GSN

Existing Broadband Infrastructure & Ongoing Initiatives

Existing Infrastructure	No
On-going Initiatives	CASF application to cover this area with fiber or FWA solution
Distance to CMMBI [miles]	0.1

Recommended Solution & Financial Metrics

Operating Model	FWA ISP Standalone		Total CAPEX	$	172,540.88
Primary Partner	Garlic		Grant Amount	$	172,540.88
Alternative Partner	T-Mobile		Year-10 Revenue	$	44,100.00
Grant(s)	CASF		NPV	$	36,898.49
Timeframe	Phase 1				

KEY SUCESS FACTORS

Success factor relies on the Garlic CASF application and its proximity to the GSN

Paicines [Cluster ID: B]

Indicators of Need

	Total Locations	Unserved / Underserved
FCC:	25	24
CPUC:	31	31

Fiber Availability [%]	Location Density [locations/sq mile]
0%	9

Grant Eligibility

CASF | BEAD

Target Area

— GSN

Existing Broadband Infrastructure & Ongoing Initiatives

Existing Infrastructure	No
On-going Initiatives	CASF application to cover this area with fiber or FWA solution
Distance to CMMBI [miles]	0.0

Recommended Solution & Financial Metrics

Operating Model	FWA ISP Standalone		Total CAPEX	$	160,240.88
Primary Partner	Garlic		Grant Amount	$	160,240.88
Alternative Partner	Razzolink		Year-10 Revenue	$	32,400.00
Grant(s)	CASF		NPV	$	-11,471.96
Timeframe	Phase 1				

KEY SUCESS FACTORS

Success factor relies on the Garlic CASF application and its proximity to the GSN

Southern Cluster [Cluster ID: C]

Indicators of Need

	Total Locations	Unserved / Underserved
FCC:	58	58
CPUC:	57	57

Fiber Availability [%]	Location Density [locations/sq mile]
0%	7

Grant Eligibility
ReConnect	BEAD

Target Area

Existing Broadband Infrastructure & Ongoing Initiatives

Existing Infrastructure	No
On-going Initiatives	NA
Distance to CMMBI [miles]	20.4

Recommended Solution & Financial Metrics

Operating Model	FWA PPP		Total CAPEX	$	9,361,140.88
Primary Partner	Razzolink		Grant Amount	$	172,140.88
Alternative Partner	NA		Year-10 Revenue	$	69,300.00
Grant(s)	ReConnect		NPV	$	-9,042,993.52
Timeframe	Long Term				

KEY SUCESS FACTORS

Success factor relies on an ISP inducements and grants for the deployment of a middle mile extension to reach the GSN

Scheid Vineyards [Cluster ID: D]

Indicators of Need

	Total Locations	Unserved / Underserved
FCC:	28	23
CPUC:	38	37

Fiber Availability [%]	Location Density [locations/sq mile]
4%	7

Grant Eligibility

CASF | BEAD

Target Area

— GSN

Existing Broadband Infrastructure & Ongoing Initiatives

Existing Infrastructure	No
On-going Initiatives	CASF application to cover this area with fiber or FWA solution
Distance to CMMBI [miles]	0.9

Recommended Solution & Financial Metrics

Operating Model	FWA ISP Standalone		Total CAPEX	$	569,740.88
Primary Partner	Garlic		Grant Amount	$	569,740.88
Alternative Partner	Pinnacles Telephone Co.		Year-10 Revenue	$	27,000.00
Grant(s)	CASF		NPV	$	-34,304.68
Timeframe	Phase 1				

KEY SUCESS FACTORS

Success factor relies on the Garlic CASF application and its proximity to the GSN

Willow Creek [Cluster ID: E]

Indicators of Need

	Total Locations	Unserved / Underserved
FCC:	24	24
CPUC:	17	17

Fiber Availability [%]	Location Density [locations/sq mile]
0%	7

Grant Eligibility

ReConnect | BEAD

Target Area

— GSN

Existing Broadband Infrastructure & Ongoing Initiatives

Existing Infrastructure	No
On-going Initiatives	NA
Distance to CMMBI [miles]	0.6

Recommended Solution & Financial Metrics

Operating Model	FWA ISP Standalone		Total CAPEX	$	443,640.88
Primary Partner	Pinnacles Telephone Co.		Grant Amount	$	443,640.88
Alternative Partner	NA		Year-10 Revenue	$	34,200.00
Grant(s)	ReConnect		NPV	$	-2,920.51
Timeframe	Phase 2				

KEY SUCESS FACTORS

Success factor relies on its proximity to the GSN and engagement with local ISP

Hernandez Reservoir [Cluster ID: F]

Indicators of Need

	Total Locations	Unserved / Underserved
FCC:	28	22
CPUC:	26	26

Fiber Availability [%]	Location Density [locations/sq mile]
0%	5

Grant Eligibility
ReConnect | BEAD

Target Area

Existing Broadband Infrastructure & Ongoing Initiatives

Existing Infrastructure	No
On-going Initiatives	NA
Distance to CMMBI [miles]	16.9

Recommended Solution & Financial Metrics

Operating Model	FWA PPP	Total CAPEX	$ 7,781,993.46
Primary Partner	Razzolink	Grant Amount	$ 156,740.88
Alternative Partner	T-Mobile	Year-10 Revenue	$ 33,300.00
Grant(s)	ReConnect	NPV	$ -7,631,582.02
Timeframe	Long Term		

KEY SUCESS FACTORS

Success factor relies on an ISP inducements and grants for the deployment of a middle mile extension to reach the GSN

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 74

Figure 74. Smart Community applications summary.

Outcomes of the Data Collection from County and City staff suggest that that the Public WiFi is key for the City of Hollister since they are proposing (through a LATA* grant) to provide fiber and wireless connectivity to all major City and County Park Areas for Public WiFi Access.

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 35.

Table 35. Survey respondents' perception of Smart Community applications.

Smart Community Application	% of respondents that find the application as very important
Emergency Alert Enhancement	57%
Public WiFi	46%
Smart surveillance	36%
Smart Public Transportation	32

Considering the inputs above, apart from the Public WiFi, the main applications that the County should consider for implementation are the Emergency Alert Enhancement, smart surveillance, and smart public transportation. These applications are further analyzed in the following sections.

Public WiFi

Public Wi-Fi provides free internet access in public areas via WiFi. The application is composed by WiFi access points distributed across the service area and connected to the Municipal Network as shown in Figure 75. Locations where Public WiFi can be deployed are open public venues (e.g., parks), libraries, schools, and shopping malls. Each location where Public WiFi is to be deployed should provide up to 2.5 Gbps bandwidth to each access point to support 280 simultaneous connected devices.
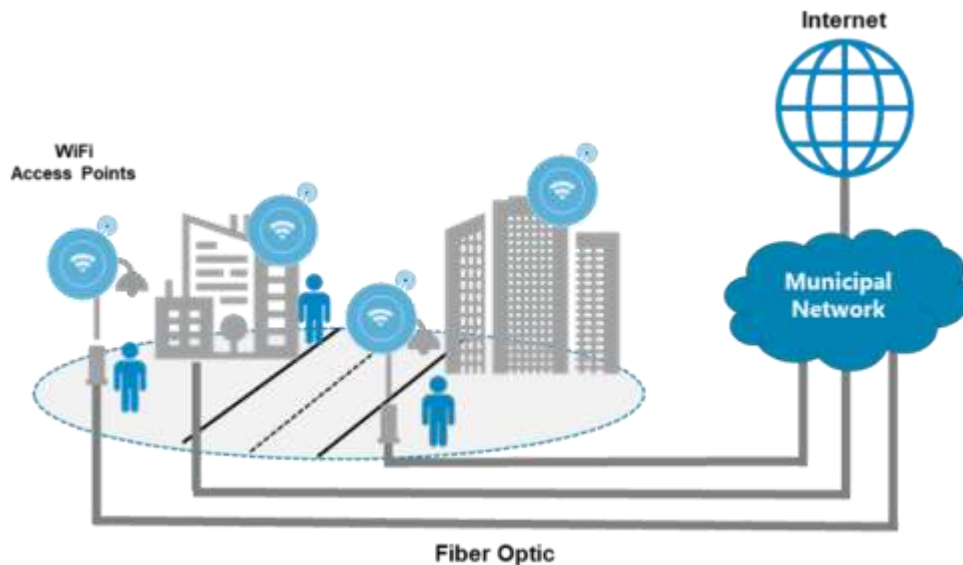

Figure 75. High-level architecture of the Public WiFi application.

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 WiFi application. The city / municipality should also define an operating model of the public WiFi network such as a partnership with mobile operators in exchange for accessing municipal infrastructure. Finally, the implementation of security protocols is also key for user and city protection.

In April 2023 The City of Hollister applied for a LATA grant to deploy Public WiFi access points at City and County park areas to provide broadband access to residents including underserved areas and lower income areas in the City.

The implementation of the Public WiFi application to offer free internet has the potential to improve life experience not only for residents but also for visitors who can be incentivized to increase their stay in the county. People can rely on the Public WiFi as backup internet service when suffering from internet outage of their own service. Finally, the Public WiFi application can also serve as the first step into the implementation of other smart community applications (e.g., smart public transportation, bike/scooter sharing).

Emergency Alert Enhancement

The Emergency Alert Enhancement refers to a set of applications to provide early detection and alerts about forest fire, flooding and earthquake allowing faster response, preventions, and damage minimization. The most important benefit from this application is that the population can be warned about natural distastes in a fast and efficient way, reducing serious damage and fatalities.

A high-level architecture of this application is shown in Figure 76. Key elements from the architecture are the smart application platform and sensors (fire/smoke, earthquake, and water level). Sensors are located in buildings, or areas susceptible to suffering from natural disasters or in places where people gather. The smart application platform receives the alert from sensors and disseminates the corresponding alert all residents in case of emergency.
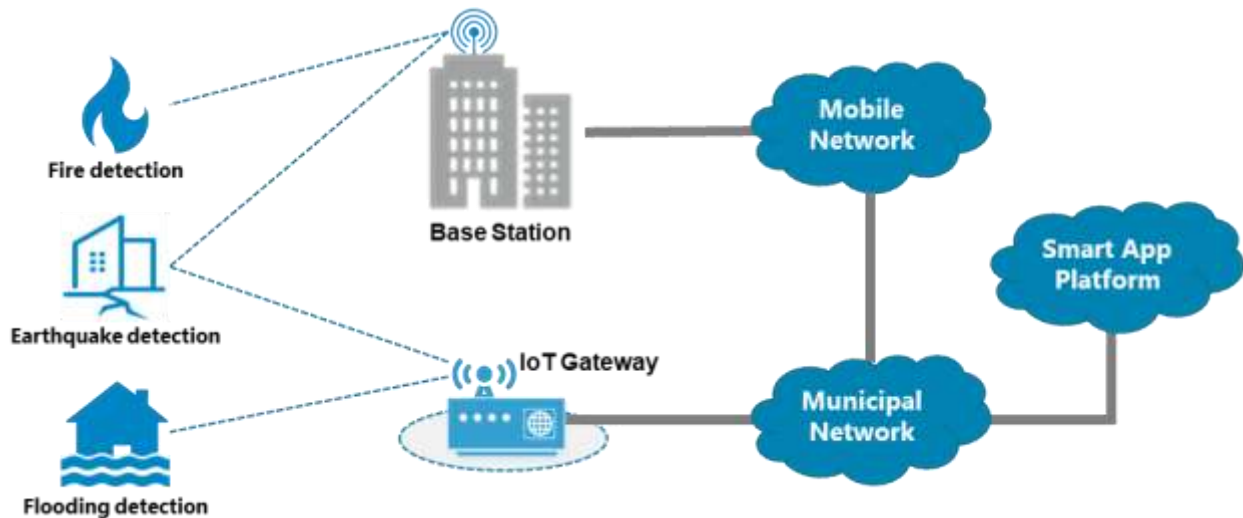

Figure 76. High-level architecture of the Emergency Alert Enhancement application.

The implementation of the Emergency Alert Enhancement application requires from the Installation of sensors in remote/dangerous locations (e.g., forest) and a constant maintenance of each sensor to guarantee its optimum operation.

Since 2018, San Benito County has experienced six significant wildfires, resulting in the burning of 3,100 acres of land. With the implementation of the Emergency Alert Enhancement application, a significant amount of lives, homes and land can be saved and preserved.

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 77.
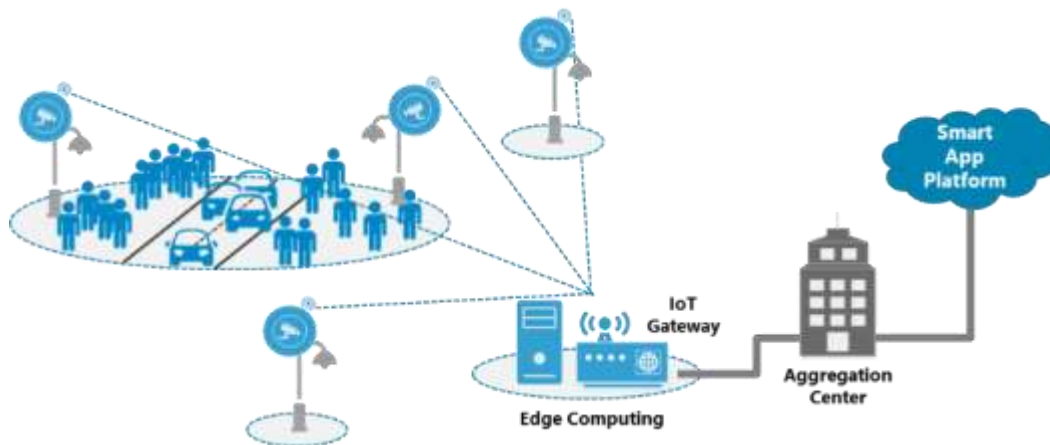

Figure 77. High-level architecture of Smart Surveillance

Smart surveillance systems capable of detecting and predicting crimes and suspicious activities. Most of these systems include facial recognition, biometrics, and gunshot detection to enhance public safety.

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, 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 78. 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.
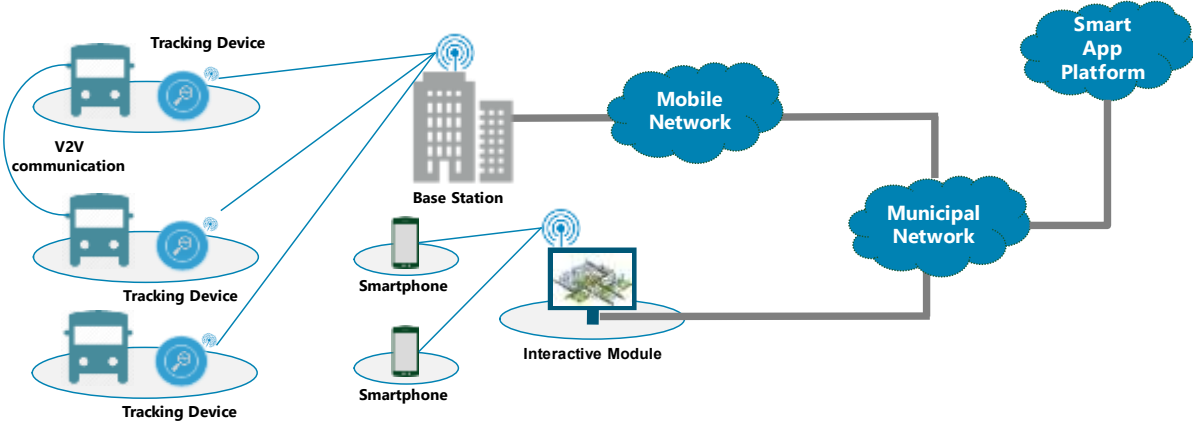
Figure 78. High-level architecture of the Smart Public Transportation application.

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.

Acronyms

ACP	Affordable Connectivity Program
ACS	American Community Survey
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
CDT	California Department of Technology
CEDS	Comprehensive Economic Development Strategy
CETF	California Emerging Technology Fund
CIP	Capital Investment Program
CMTS	Cable Modem Termination System
CPE	Customer Premises Equipment
CPUC	California Public Utilities Commission
DAC	Disadvantaged Communities
DIA	Direct Internet Access
DOCSIS	Data Over Cable Service Interface Specifications
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
GSCA	Golden State Connect Authority
GSFA	Golden State Finance Authority
GSN	GoldenStateNet
HDPE	High Density Polyethylene

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
NPV	Net Present Value
NTIA	National Telecommunications and Information Administration
OLT	Optical Line Terminal
ONT	Optical Network Terminal
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
SB-156	Senate Bill 156
SDEP	Statewide Digital Equity Plan
SLA	Service Level Agreement
SMART	Strengthening Mobility and Revolutionizing Transportation
TBD	To Be Determined
TDMA	Time-Division Multiple Access
U.S.	United States
USDA	United States Department of Agriculture
VoIP	Voice over Internet Protocol
VSAT	Very Small Aperture Terminal
WWTP	Wastewater Treatment Plant