


Santa Barbara County

Broadband Strategic Plan


SBCAG

BCPC

ACKNOWLEDGEMENTS

Prepared in partnership by the Broadband Alliance of Santa Barbara County. The partnership was formed in 2022 between the Santa Barbara County Association of Governments (SBCAG), County of Santa Barbara, and the cities of Buellton, Carpinteria, Goleta, Guadalupe, Lompoc, Santa Barbara, Santa Maria, and Solvang, the Santa Ynez Band of Chumash Indians, Broadband Consortium of the Pacific Coast (BCPC), and regional economic development organizations. The Regional Broadband Strategic Plan aims to identify broadband internet infrastructure and affordability needs in Santa Barbara County. The Alliance intends to leverage the plan to seek funding opportunities for projects to improve countywide affordable access to high-speed broadband in homes, schools, businesses, healthcare, and to connect community anchor institutions.

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GLOSSARY OF TERMS

Bandwidth: Capacity of a broadband connection, often a synonym for data transfer speed.

Broadband Service: The term “broadband service” means any technology identified by the Secretary (Secretary of Agriculture) as having the capacity to transmit data to enable a subscriber to the service to originate and receive high-quality voice, data, graphics, and video. (7 USC § 950bb(b)(1))

Broadband over Powerlines (BPL): Delivery of broadband over existing low and medium voltage electric power distribution network, with speeds comparable to DSL and cable modem.

Cable Modem: Provides broadband through same coaxial cables delivering television.

Community Anchor Institution: A public school, a public or multi-family housing authority, a library, a medial or healthcare provider, a community college or other institution of higher education, a State library agency, and any other nonprofit or governmental community support organization. (47 USC § 1721(6))

Connection speeds:

- **Kilobit/Kilobyte:** Kilobits per second (Kbps) is a measure of dial-up speed, where one Kb = 125 bytes. Kilobyte (KB) means 1,000 bytes and is a measure of storage capacity or data size.

- **Megabit/Megabyte:** Megabits per sec (Mbps or Mb) is a measure of transmission speed, with a 1Mb connection being able to transfer 1MB (megabyte/MB) of data in 8 seconds. Megabyte is a measure of the size of computer files or capacity. 1MB = 1,000 KB.

- **Gigabit/Gigabyte:** Gigabit is a unit describing data transfer speed, usually per second (Gbps). Gigabyte describes the size of computer files and capacity. 1GB = 1,000 MB (megabytes)

Dark fiber: “Unlit” or unused optical fiber available for use in fiber optic communication.

GLOSSARY OF TERMS

Devices that Connect to the Internet:

- Computer
- Tablet
- Smart phone
- Gaming consoles
- Smart televisions and appliances ie Alexa, Google Nest, Ring etc.
- Point of sale devices
- Smart city applications ie water meters, traffic cameras, air quality sensors etc.

DSL: Wireless transmission technology transmitting over traditional copper phone lines already installed in homes/ businesses. Provides speeds from several hundred kilobytes per sec (Kbps) to million bits per second (Mbps). Availability/speed dependent upon distance from nearest phone company facility.

Fiber: Fiber optic technology converts signals carrying data to light and sends light through miniscule glass fibers. Far exceeds speeds of DSL or cable modem.

Incumbent service provider: The term “incumbent service provider”, with respect to an application submitted under this section, (for Federal grant funding), means an entity that, as of the date of submission of the application, is providing broadband service to not less than 5 percent of the households in the service territory in the proposed application. (7 USC § 950bb(2))

Internet of Things: Network of objects, remotely controlled, with embedded electronics and sensors that share data. Can be anything from a smart thermostat to an internet-connected refrigerator.

Satellite: Wireless broadband delivered via satellite, usually to remote or rural locations. High speeds, but not yet available for enterprise connectivity.

GLOSSARY OF TERMS

Wireless Delivers high-speed internet using a radio link between customer location and service provider facility. Wireless broadband can be mobile or fixed:

- **Wi-Fi:** A wireless standard for forming local area networks and facilitating a connected network of devices.
- **Bluetooth:** A wireless data standard for transferring data over short ranges.
- **3G:** 3rd-generation mobile cellular technology, primarily used for voice and text messages and some slow (not broadband) data.
- **4G:** 4th-generation mobile technology offering far superior mobile connection speeds and high-definition voice.
- **5G:** 5th-generation mobile technology. Much faster than 4G, it adds capacity to the existing SG networks, and also supports large numbers of devices e.g. for the “Internet of Things” and “Smart Cities.”
- **Middle-mile:** The segment of telecommunications network infrastructure that connects major telecom (often international) networks, national or core networks to users in homes, schools, government, and businesses.
- **Last-mile:** The final leg of a telecommunications network that delivers telecom services to end users.

EXECUTIVE SUMMARY

The Santa Barbara County Broadband Strategic Plan (BSP) responds to the regional need for high-speed internet access, which was heightened during the COVID-19 pandemic when schools, businesses, public services, and health care support moved online and people started working from home. Gaps in access to reliable, affordable high-speed internet disenfranchise households by limiting their access to education, the workforce, health care, and democratic processes. The digital divide defines the gap between those with the capacity to use technology and those left out of opportunities provided by digital access. While Santa Barbara County has access to moderate levels of connectivity, all households, businesses, and public institutions would benefit from the faster and more reliable internet access broadband connections deliver.

Following the lead of the statewide Broadband for All initiative the project coupled quantitative research with community outreach forums and interviews to gather data that reveal opportunities for closing the digital divide across the county and in each of the eight municipalities. Assessment of countywide infrastructure resources and policies engaged stakeholders and MOU partners, and community conversations highlighted organizations improving affordable access and digital literacy. From infrastructure to end-user support, the plan provides a solution that guides Santa Barbara County's efforts to address the digital divide through infrastructure projects and the formation of a Digital Equity Coalition.

Outcomes of the project identify recommended actions for each of the MOU partners at the local and regional level. Success of the strategy implementation requires local organizational priorities to align with regional efforts, primarily through the development of a Joint Powers Authority (JPA). Organizing local and regional work efforts maximizes staff capacity and financial resources to achieve the following:

- Design of broadband infrastructure that results in middle-mile networks and last-mile priorities that interconnect communities and households, to increase capacity, redundancy, and resiliency for disaster preparedness and to encourage industry competition.

- Advance digital inclusion work efforts to improve access to affordable broadband and the necessary tools and training to connect with the support of the Digital Equity Coalition.

- Provide guidance on important partnerships and roles including public sector policy considerations, private sector participation, anchor institution connectivity and community-based organization engagement and support.

- Maintain a Geographic Information System (GIS) that leverages public and project data to identify priorities for infrastructure projects, and several scenarios for organization and execution provide action steps for public and private efforts.

The Broadband Strategic Plan provides the imperative to plan for future digital requirements that enhance economic development opportunities, and support health, safety, and equity in our communities.

Funding to improve high-speed internet access across the nation has been approved through the federal Infrastructure and Jobs Act and in California through legislation supporting the California Broadband Council's Broadband for All action plan. The Santa Barbara County Broadband Strategy Plan presents data and recommendations that make each community, and the county, grant-ready for federal and state funding resources to improve connectivity. During the development of the strategy, Local Agency Technical Assistance (LATA) grants were released and regional applications were submitted to support strategy implementation. As additional priorities are identified, the strategy provides the necessary support for future funding applications.

Digital equity is achieved when all members of a community have the capacity to use technology that enables them to fully participate in society, democracy, and the economy.[1]This includes access to reliable and affordable high-speed internet, the necessary device to connect to the service, and training and technology support that is responsive to the user's level of need. The digital divide disproportionately impacts people of color, Indigenous peoples, households with low incomes, people with disabilities, people in rural areas, and older adults[2]. The Broadband Strategic Plan provides the data, resources, and recommendations to foster digital equity in the region and prepare for a future of connectivity that serves the Santa Barbara County community.

Photo Credit Mike Eliason

SECTION 1: INTRODUCTION

In October 2021, Santa Barbara County formed the Broadband Alliance of Santa Barbara County (the Alliance) to develop a countywide strategy to close the digital divide between households able to access and navigate the digital world and those without the capacity or knowledge to do so. The Alliance is a formal partnership between the Santa Barbara County Association of Governments, the County of Santa Barbara, and the cities of Buellton, Carpinteria, Goleta, Guadalupe, Lompoc, Santa Barbara, Santa Maria, and Solvang, the Santa Ynez Band of Chumash Indians (Tribe), Broadband Consortium of the Pacific Coast (BCPC), and regional economic development organizations. State and Federal legislation approved funds for public sector response to increasing demand and need for broadband infrastructure. BSP funding comes from members of the Alliance and in part from American Rescue Plan Act (ARPA) funds. This project was supported by federal award number SLFRP5502 awarded to the County of Santa Barbara, SLFRP1758 awarded to the City of Santa Maria, and SLFRP1228 awarded to the City of Santa Barbara by the U.S. Department of the Treasury.

California formalized public response to the need for increased capacity in broadband infrastructure in 2010. The COVID-19 pandemic exposed the growing digital divide, and access to affordable, reliable, high-speed internet became an indisputable necessity for households across the country. The California Broadband Council was established through legislation[3] to promote broadband deployment in unserved and underserved areas of the State as defined by California Public Utilities Commission (CPUC) and to increase broadband adoption for the benefit of all Californians. In August 2020, Governor Newsom signed California Executive Order N-73-20 requiring the development of a California State Broadband Action Plan[4] (CBAP) in response to COVID-19. State and Federal Legislation supporting broadband deployment and adoption followed in 2021, with funding earmarked for the public sector targeting governmental agencies that had historically only participated via local permitting activities. California's Senate Bill 156[5] authorized Joint Powers Authorities (JPAs) to issue revenue bonds for the deployment of broadband infrastructure under the Broadband Loan Loss Reserve Fund (the Fund), established with $750 million intended to provide credit enhancements to finance local broadband infrastructure.

County Communities

- Santa Barbara Unincorporated Area
- Buellton
- Carpinteria
- Goleta
- Guadalupe
- Lompoc
- Santa Barbara
- Santa Maria
- Solvang

[3] *S.B. 1462 – Padilla*

[4] *broadbandcouncil.ca.gov/wp-content/uploads/sites/68/2020/12/BB4All-Action-Plan-Final.pdf,* adopted December 30, 2020

[5] *leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=202120220SB156*

SECTION 1: INTRODUCTION

New funding tools increase opportunities for public sector participation in broadband infrastructure development, either through public-private partnerships or alone. Public sector developments reach unserved and underserved communities efficiently, delivering increased capacity and addressing the need for redundancy and resiliency in infrastructure to address community safety concerns, increase community access and enhance future planning efforts toward smart city initiatives.

CBAP targets specific imperatives for closing the digital divide:

- 100% connectivity for all Californians at minimum speeds of 100Mbps
- Access to affordable broadband and devices to connect to the internet
- Access to training, equipment, and support to enable the use of the internet

BSP is aligned with CBAP imperatives and informed by multiple data collection methodologies. The plan identifies priorities for funding community access to high-performing internet at the personal, household, community, business, and systems levels to improve digital inclusion across the county with upgraded minimum speeds, ubiquitous connectivity, and access to digital training and support. While some areas of Santa Barbara County are well-connected, businesses, families, and students are affected by a lack of capacity and connection at an affordable cost. The Alliance is a regional leadership effort to develop a coordinated framework that improves efficiency as the county collectively works towards achieving digital equity.

In the world of broadband, there are multiple definitions for the “served” and “unserved” terminology. This BSP document leans heavily on two standards. First, the CBAP definition, which considers an area to be “served” if service is available with a speed greater than or equal to 100/100 Mbps. The second is the CPUC definition, which defines 25/3 Mbps as the threshold to consider an area to be “served”. For reference, Table 1 presents both standards used in this report.

CBAP Definition	CPUC Definition	Speed (Downstream/Upstream)
Served	Served	>= 100 Mbps / 100 Mbps
Underserved	Served	Between 100 Mbps / 100 Mbps and 25 Mbps / 3 Mbps
Unserved	Unserved	Between 25 Mbps / 3 Mbps and 10 Mbps / 1 Mbps
Priority Unserved	Priority Unserved	< 10 Mbps / 1 Mbps

Table 1: Broadband Service Definitions

Unless otherwise stated, all references to “served” and “unserved” terminology will carry the CBAP definition. In general, CPUC references are contained within Section 4 in the context of presenting data provided by CPUC.

BSP serves as a guiding document and planning tool for stakeholders to elevate awareness of broadband needs, accelerate and improve planning efforts across the county and within communities, and provide data that will support applications for funding allocated to Broadband for All initiatives. The strategic framework within this document offers an opportunity to pursue additional initiatives and engage with public and private partners to support community resiliency and growth.

Jurisdictions within the county can utilize the data in this plan to apply for funding identified at State and Federal levels and provide an organized approach that aligns areas of need with public and private interests to create a regional response. Federal and State grants allocated to support the Broadband for All initiative increasingly evaluate proposals on metrics that include collaboration between multiple entities. BSP highlights opportunities to leverage the collaborative potential established by the Alliance to make the Santa Barbara County region grant-ready to apply for these funds.

The COVID-19 pandemic exposed the
growing digital divide,
and access to affordable, reliable, high-speed internet became an indisputable necessity for households across the country.

SECTION 2: PROJECT SCOPE & APPROACH

The purpose of BSP is to address the planning needs of the region, encourage infrastructure investments in Santa Barbara County, and present models for investment opportunities made by internet service providers (ISPs), public sector investment, and a combination of public-private investment. The project scope used a regional context, aligning with CBAP and focused on identifying a middle-mile approach, last-mile priorities, policies and resources for broadband readiness, and future feasibility studies for the county and cities. Despite jurisdictional boundaries that can inhibit collaboration, regional analysis highlights the interdependent reliance on physical infrastructure shared by all communities.

Outreach and data collection processes were developed to identify areas of opportunity and priorities for achieving Broadband for All. Several methods were added beyond the project's original scope to meet community needs and gather accurate data reflecting communities' stories. Engaging stakeholders in data collection and outreach efforts mirrored the regional approach and contributed to unique municipal stories and those of several unincorporated areas within the county. The outreach and data collection methods used in the study assessed the overall status of the digital divide within the county and contributed to the formation of the Santa Barbara County Digital Equity Coalition.

Stakeholder Summary

To develop the strategic plan, an MOU was executed among the current SBCAG JPA to cover the costs and expenses of the regional planning effort. This action also formalized the Broadband Alliance of Santa Barbara County, an alliance that can be built on to execute project implementation.

Figure 1: Hub and Spoke Model

The SBCAG Ad-Hoc committee represented the core stakeholder group, comprised of two county supervisors and three city council members, providing an important interface between the project and the SBCAG board and serving as a conduit to city councils. The committee provided oversight and direction monthly and played a leadership role during the public forum process. The Technical Advisory Committee (TAC) provided oversight and input into the project, and members were actively engaged in executing the project scope and related activities. The EconAlliance team, with support of Tribe staff, organized public forums within each city and in unincorporated areas of the county.

SECTION 2: PROJECT SCOPE & APPROACH

The project defines stakeholders as representatives of government, ISPs, local agency staff, and technical consultants who assisted in the review and oversight of project activities, including GIS mapping, grant writing, and inclusion strategies. SBCAG was the hub for all the activities.

Interested parties include community organizations, businesses, and individuals whose input via the data collection process contributed to the project's outcomes and recommendations.

Methodology for Outreach and Data Collection

Data collection for the strategic plan followed an ambitious timeline through multiple stages. The project design utilized quantitative and qualitative methods to draw a comprehensive and inclusive reflection of Santa Barbara County's current status and needs.

The consultant began the process by developing a communication plan to outline steps for community engagement; the goal of the engagement was to collect accurate data to inform local government prioritization of projects and to enable stakeholders to secure funding to help close the digital divide. The communication plan captures each method of outreach and data collection and identifies the lead person(s) or organization responsible for the deployment of the method (see Appendix A). This approach allowed for expediency and overlap of work efforts due to the project's ambitious timeline.

Data collection methods were organized into three areas of effort:

1. Crowdsourced data
2. In-person community engagement
3. Geographic Information System (GIS) mapping tool data collection

Crowdsourced Data

Two separate platforms collected crowdsourced data using public access links on SBCAG's Broadband Project webpage: a needs assessment survey and speed tests.

Media outreach efforts started in March 2022 and ran through May 2022 to promote data collection efforts and notify the community of public forums, seeking public participation in the needs assessment survey and speed testing through publicly posted links. Efforts included coordinated press releases and a presentation to county Public Information Officers (PIOs) and legislative teams representing government, the Tribe, and school districts. Media outreach plans were built on the collaborative nature of the project, using a unified voice to reach underrepresented communities through trusted community sources.

Needs Assessment Survey (Available in English and Spanish)

The needs assessment survey was developed within an online survey tool, Survey Planet, and hosted on the BCPC website. The needs assessment survey was launched in March 2022 and ran through July 1, 2022. Early in the process, ten community members could not take the survey; browser or security settings within their unique network negatively impacted access. Community members unable to participate online could call in to report their internet connection status.

The needs assessment survey incorporates a skip-logic that collected data from four unique groups: The number of survey questions varied using skip logic associated with the age demographic; for example, surveys for the 13 – 18 age demographic incorporated specific questions about distance learning and device use before completing the assessment. If the respondent self-identified as a business owner or potential owner, the survey added questions about their business. In some cases, participants could opt out of questions or be taken directly to the end of the assessment. The time to take the test ranged from 5 to 15 minutes.

Age Range	Number Of Surveys Completed
13 - 18	58
19 - 65	635
65+	515
Business Owners	68

Table 2: Number of Needs Assessment Surveys Sorted by Age Group

Of the 1,276 tests completed, 1,208 were utilized for analysis and incorporated into recommendation deliberations. In the final analysis, two demographic groups, ages 19-65 and 65+, were combined into one group. The business owner group accounts for differentiation between the total number of tests and unique analysis. Everyone aged 19 and older could participate in additional business owner questions; only 68 opted to complete the assessment. Complete needs assessment data analysis is in Appendix B.

Speed Testing (Available in English and Spanish)

The speed test was launched in March 2022 and will collect data until early 2023 using a product licensed by Breaking Point Solutions, LLC and marketed by GEO Partners, LLC[6]. BSP incorporates data collected from March 2022 through July 2022. Speed test data is a significant ongoing benefit to planning purposes; authorized users can access the mapping tool for high-level planning, assess fiber routes, and identify available grants for proposed projects. Data will assist the public sector in defining scopes of requests for proposals (RFPs) for the design and engineering of future projects. The total number of tests taken was 3,213 at 2,584 unique locations.

In-Person Community Engagement

In-person meetings and forums provided a range of benefits to the project. Public forums engaged key stakeholders who serve local community sectors highly impacted by COVID-19.

[6] *geopartnersinc.com/*

SECTION 2: PROJECT SCOPE & APPROACH

Forums assessed community needs, identifying barriers to achieving Broadband for All as outlined in CBAP. A project FAQ was developed for English and Spanish speakers and was distributed during the forums (see Appendix C).

In-Person Community Engagement Summary

- SBCAG Ad Hoc committee held 7 meetings
- Technical Advisory Committee held 8 meetings
- Public forms totaled 12, with 5 of the forums providing Spanish interpretive services
- Interviews and meetings with City staff, including formal and informal, approximately 50 in total
- Interviews and meetings with internet service provider (ISP) staff, 15 in total
- City Council presentations for a total of 7
- Informal meetings and webinars total over 100 hours

Three ancillary educational webinars were developed and sequenced according to each stage of the public engagement process of the project

March 4, 2022: *Broadband Planning: A Conversation about Public-Private Partnerships*.
Kaina Pereira, Senior Advisor of Business Development, GO-Biz
Barbara Hayes, Chief Economic Development Officer, Rural County Representatives of California (RCRC)

May 12, 2022: *Broadband Planning: Benefits of a Countywide Programmatic EIR for Broadband Deployment*.
Steve Monaghan, CIO and Agency Director for Nevada County Information and General Service Agency

September 14, 2022: *The Broadband Landscape: An Overview of the Current State of Funding and Considerations for Grants*.
Megan Beresford, Director of Broadband Programs, Learn Design Apply Inc.

Interviews were conducted with City staff and ISP staff to identify barriers to deployment and steps to support the acceleration of infrastructure projects. Section 4, Current Status and Findings of Broadband in Santa Barbara County, and Section 5, Assessment of the Broadband Provider Landscape discuss key outcomes of these interviews. Presentations to city councils provided project updates and highlighted legislation and policy initiatives to consider in planning efforts related to infrastructure, public and private partnerships, and smart city planning.

Geographic Information System (GIS) mapping tool data collection

Using the California Public Utilities Commission (CPUC) map as a baseline for identifying underserved and unserved areas of the county, the strategic plan collected data to assess potential gaps within the map.

The data creates a framework for establishing priorities for future network design work by capturing the information within the project Geographic Information System (GIS) mapping tool to assist in setting priorities and actions to achieve Broadband for All. Additional data from other reports and resources are identified in section 8 and Appendix D.

The Geographic Information System (GIS) is a Map Data Portal developed to guide future planning and can be used by public sector staff. Some data collected for BSP is incorporated into the GIS, along with speed testing and early research on the status of broadband needs in the county. The GIS is a project deliverable covered at length in Section 6. To align with the state's data and identification of unserved and underserved, the project GIS uses the CPUC map (refer to Section 1, Table 1 for CPUC unserved/underserved definitions).

Additional GIS data layers correlate CPUC data and assist with expanding trusted local data to share at the state and federal levels. BSP uses the map and layers to analyze the status of broadband now and in the future. Data will assist communities with project prioritization, grant support, tracking and measurement, and identifying future opportunities to close the digital divide.

As the FCC releases updated maps from broadband providers (e.g., the "location fabric"), additional layers will be added to assist in the priority and planning process.

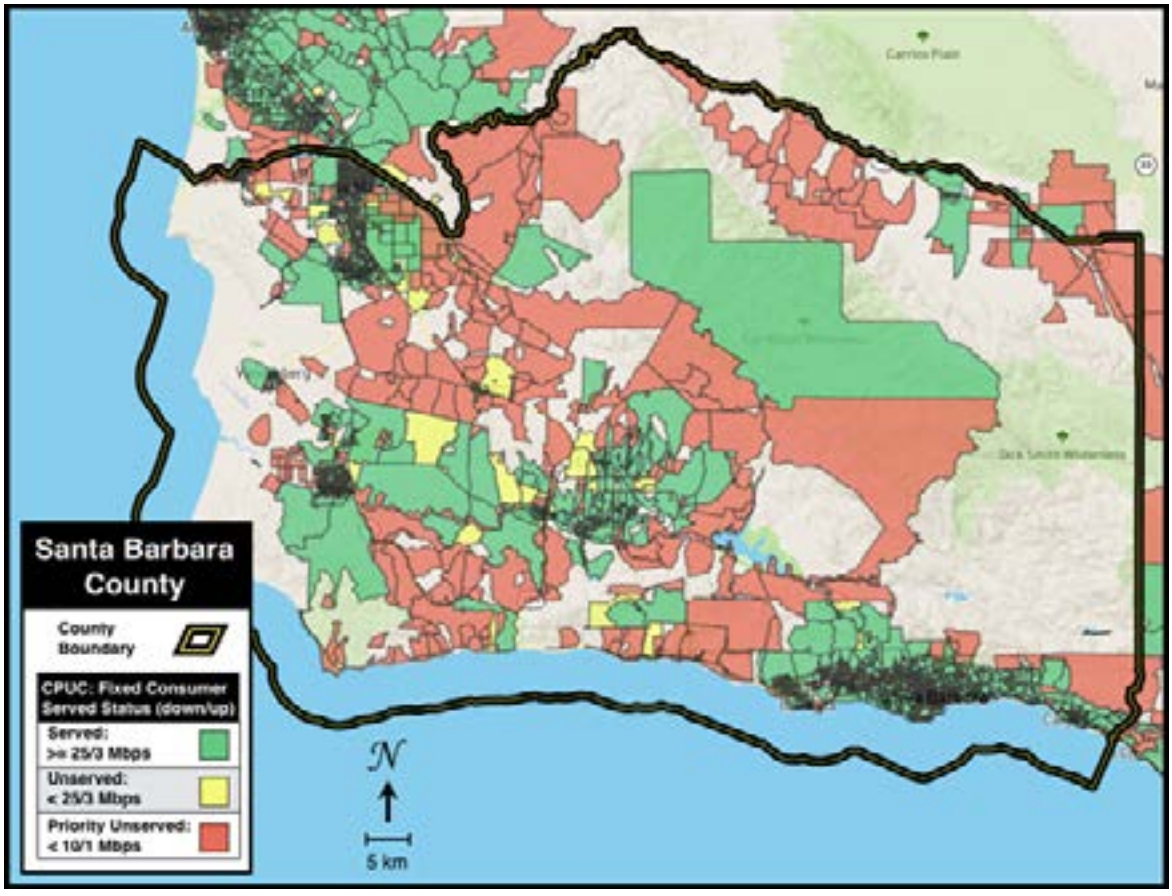


Figure 2: Santa Barbara County CPUC Broadband Map[7]

[7] *broadbandmap.ca.gov, 2020*

SECTION 3: OVERVIEW OF TECHNOLOGIES

The Broadband Concept & Architecture

Broadband refers to telecommunications technologies that provide high-speed internet connections to end users: households, businesses, and anchor institutions. A broadband internet connection provides users with a faster and better internet experience than the dial-up connections common in the early history of internet connectivity.

The amount of information (data) a broadband network can transmit is commonly known as bandwidth. Bandwidth is divided into downlink bandwidth (data received from the internet) and uplink bandwidth (data sent to the internet).

Bandwidth is measured in bits per second (bps). Depending on the transmission medium (e.g., fiber optic or wireless signals), a broadband network can reach speeds from dozens to hundreds of Mega bps (Mbps) or even Giga bps (Gbps)1. A higher network bandwidth enables higher web surfing speed or higher video quality for streaming.

Broadband connectivity enables users to access advanced digital services, such as telehealth, E-Learning, remote working, videoconferencing, interactive gaming, and pervasive video monitoring.

The Federal Communications Commission (FCC) has defined the minimum download bandwidth needed for adequate performance of typical online activities. Table 3 displays each activity with its corresponding bandwidth.

Activity	Minimum Download Speeds (Mbps)
General Browsing and Email	1
VoIP Calls	Less than 0.5
E-learning	5 - 25
Telecommuting	5 - 25
File Downloading	10
Social Media	1
Streaming High Definition HD Video	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

Table 3: Minimum Bandwidth For Typical Online Activities (FCC)

Notably, the connection bandwidth available for broadband service is shared among all services being used simultaneously within a household or business. Thus, a broadband service must provide enough bandwidth to support a combination of services.

Broadband Network Architecture

An internet service provider (ISP) is a company that offers access to the internet. A link must be deployed between a customer premise and ISP's Point-of-Presence (POP) to get the service.

Similar to other utilities (like water or electric services), there is no direct connection between the service provider and each user. Instead, a network is shared to aggregate connections from several houses, towns, and cities and direct them to the ISP.

Therefore, a broadband network is divided into segments. Each segment aggregates a larger number of connections and data volumes. These segments are the last-mile/access network, the middle-mile, and the backbone, as shown in Figure 3.

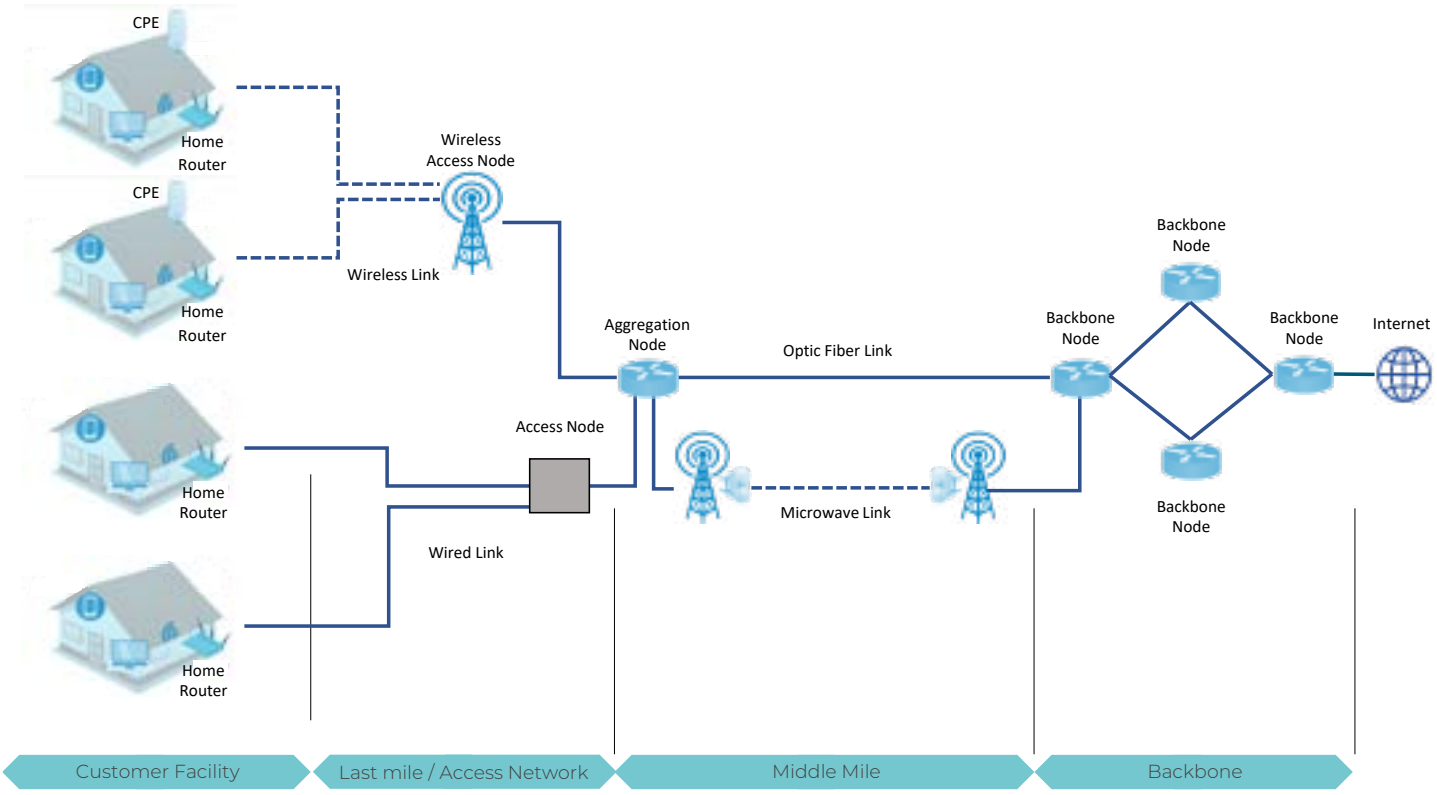


Figure 3: High-level overview of a Broadband Network

Customer Premise:

Customer premise is the location where users make use of the internet. A customer premise can be a home, a business, an enterprise, or a community anchor institution.

SECTION 3: OVERVIEW OF TECHNOLOGIES

The internet connection from the ISP is terminated at a Customer Premises Equipment (CPE), which provides users with local connections to access the internet, typically through a network cable or Wi-Fi connection.

Last-Mile/Access Network Segment:

The last-mile segment is closest to the customer and represents the connections from each customer premise to an access node. Each access node aggregates connections from multiple customer premises.

Compared to the rest of the network, this segment has the lowest bandwidth but enough to serve a specific number of customers based on bandwidth requirements. Last-mile segment costs can be high and will vary based on household density and distance from the access node.

Depending on bandwidth needs, economics, and geodemographic conditions, this segment can be implemented using different technologies, including:

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

Further description of these technologies is provided in the following section.

Middle-Mile Segment:

The middle-mile segment consists of the connections from each access node to an aggregation node. Each aggregation node groups the connections of various neighborhoods or small towns.

A middle-mile link is commonly implemented using fiber optics due to its high bandwidth. However, there are situations where deploying fiber is not feasible. For example, when an access node is remote, or fiber deployment is too expensive. In these situations, the option is to use wireless microwave links. Microwave links offer lower bandwidth than fiber links but enough to serve as a middle-mile solution in remote areas or as a redundant connection.

Backbone Segment:

The backbone segment is a high-capacity network that interconnects ISP's Points of Presence (PoPs) and datacenters. The backbone segment aggregates the traffic from large geographic regions such as medium and big cities or major towns. Thus, backbone links need much higher bandwidth than middle-miles as they transport massive amounts of data. Therefore, the backbone can only be implemented using fiber optics.

SECTION 3: OVERVIEW OF TECHNOLOGIES

Transmission Mediums

Internet signals can be sent from one point to another using different transmission mediums. Transmission mediums can be classified into two types: wired and wireless. Each medium will have characteristics that make it suitable for specific situations. The most common transmission mediums are summarized below:

Copper wires. Also known as "twisted pair," copper wires are used in legacy telephone systems. The electrical signal travels in the form of electrical pulses along the cable. Generally, broadband networks that use existing copper wires require low investment. Some copper wire (e.g., G.fast) technologies can achieve hundreds of Mbps. However, the speed rapidly decreases with distance going from hundreds of Mbps at 1,000 ft to less than 20 Mbps for distances higher than one mile.

Coaxial cables. These cables are used by most cable TV companies and also carry information in the form of electrical pulses. Coaxial cables transmit higher data rates than copper wires (dozens of Mbps). Copper and coaxial cables have the lowest cost and deployment effort since most of the passive infrastructure (cables) are already in place, and minimum upgrades (like user equipment) are required. However, copper and coaxial cables are susceptible to several issues, such as interference and heat, that can degrade the services.

Fiber Optic cables. These are thin cables made of glass the size of a human hair that transport data in the form of light pulses. Fiber optic access 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. Thus, fiber installed today can achieve higher bandwidths by upgrading the equipment, ensuring a future-proof network. The highest cost associated with fiber networks ranges from $40,000 to $80,000 or even $100,000 per mile. While the cost might seem high, the deployment of fiber provides robust, future-proof networks with high reliability and extremely high bandwidth.

Wireless media. Wireless technologies send data through the air in the form of electromagnetic waves. Wireless solutions are preferred when fiber/cable deployments are not feasible due to cost or construction/deployment restrictions. Current systems offer remarkably high speeds depending on the frequency band and technology. Wireless solutions can achieve hundreds of Mbps with the restriction that the access nodes need to be in high places to cover the areas that require service (commonly 10 to 50 meters structure). Common wireless technologies are mobile communications (e.g., 4G, 5G), satellite, microwave, and Wi-Fi. The cost associated with wireless systems is lower compared to fiber. However, it can be dramatically increased if new infrastructure (like towers) should be constructed. These systems have considerable high reliability, only affected by severe weather conditions like heavy rain.

A summary of the essential attributes for each transmission medium is provided in Figure 4:

Evaluation of different transmission mediums for broadband networks.

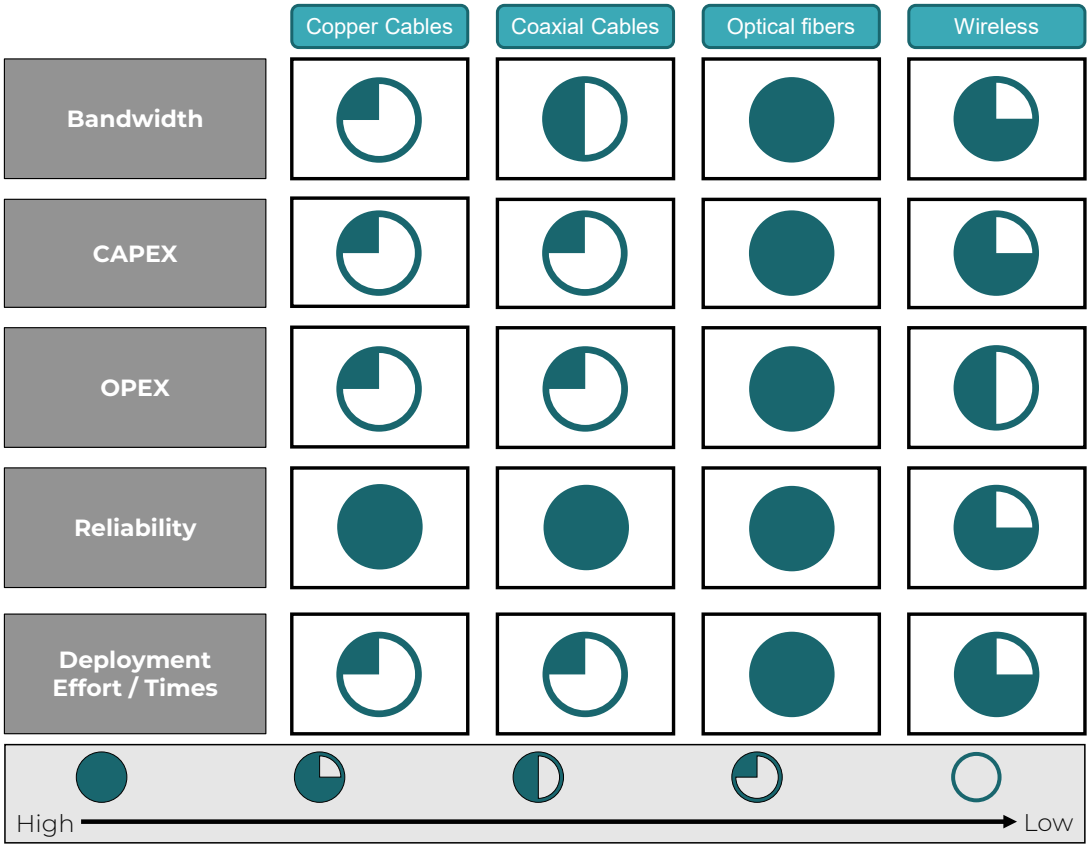


Figure 4: Evaluation of different transmission mediums for broadband networks

Broadband Technologies Overview

While fiber technologies prevail in the middle-mile and backbone segment, there are various broadband technologies to implement the last-mile/access network segment. It is then important to review each of them and understand their reliability, costs, reach, and bandwidth characteristics. The most important technologies are described below.

Digital Subscriber Line (DSL)

DSL technology delivers broadband services through existing telephone copper lines, a DSL modem at the customer premise (acting as the CPE), and an access node that aggregates individual subscriber lines into a high-capacity link called DSL Access Multiplexer (DSLAM). DSL speeds will vary based on distance going from a few hundred Mbps at distances lower than 300 ft to 20-30 Mbps at distances higher than 0.5 miles.

Figure 5 shows a high-level network access architecture for the DSL technology.

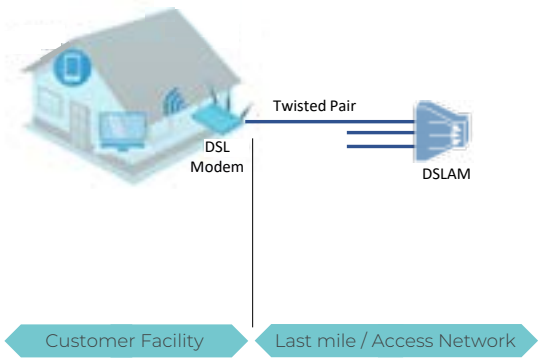


Figure 5: DSL high-level architecture

Data Over Cable Service Interface Specifications (DOCSIS)

This technology delivers broadband services through the coaxial cable used for cable TV. In the DOCSIS architecture, the CPE is referred to as the cable modem, and the access node is the Cable Modem Termination System (CMTS).

DOCSIS enables data speeds up to 1 Gbps with a maximum distance of 5 miles. However, the coaxial cable is usually shared with various subscribers, and the bandwidth decreases depending on the number of subscribers using the network simultaneously.

Figure 6 shows a high-level network access architecture for DOCSIS technology. Figure 6 shows a high-level network access architecture for DOCSIS technology.

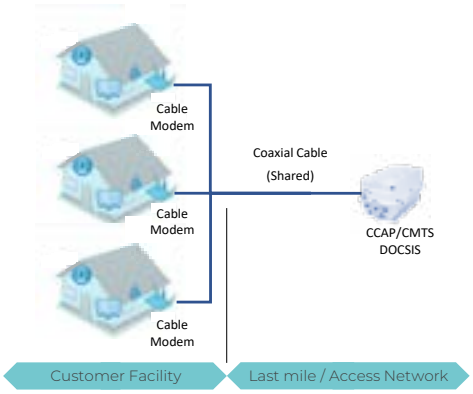


Figure 6: DOCSIS high-level architecture

Fiber To The Home (FTTH)

Fiber to the Home (FTTH) is a fiber-based access network. It allows a large number of subscribers to connect to the access node.

FTTH is usually implemented through a passive optical network (PON) in which the fiber cable from the access node is “split” to reach multiple subscribers. In this architecture, the CPE is known as Optical Network Terminal (ONT), and the access node is Optical Line Terminal (OLT).

Several standards enclose this technology. The XGS-PON standard is based on a 10-Gigabit-capable symmetric optical network. The XGS-PON network will deliver a downstream line rate of 9.95328 Gbit/s and an upstream line rate of 9.95328 Gbit/s per optical port, shared by up to 64,128, or 256 subscribers. In addition, an XGS-PON network supports a physical distance of up to 12.4 miles between the OLT and ONTs at customer locations.

Most Federal Grants consider FTTH the best solution to provide broadband services to rural and underserved areas. This preference is due to the high bandwidth achievable. Most deployments can achieve symmetrical connections up to 100 Mbps downlink and 100 Mbps uplink. FTTH can be deployed leveraging existing civil infrastructures such as electric poles and utility holes, significantly reducing the CAPEX.

Figure 7 shows a high-level network access architecture for the FTTH technology.

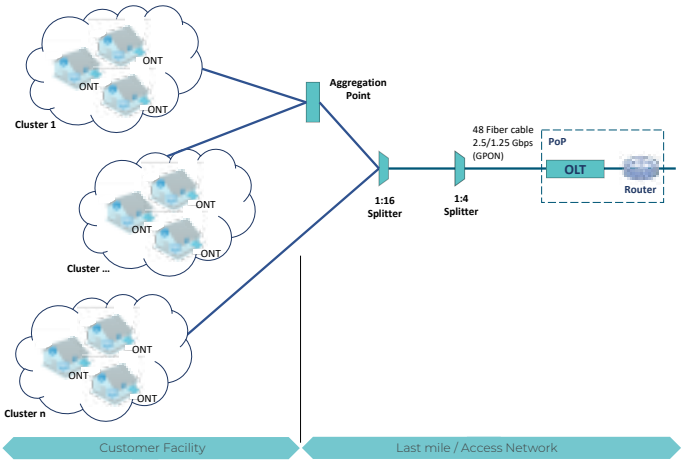


Figure 7: FTTH high-level architecture

Fixed Wireless Access (FWA)

There are various technologies to implement FWA, which uses wireless signals to distribute services to customer premises. The first solutions were based on Time-division Multiple Access (TDMA) systems. However, due to the expansion and popularization of mobile communications, technologies such as 4G and 5G have been adopted for FWA.

Wireless signals are transmitted from antennas installed at the top of high towers or buildings and received using CPEs located outside the customer premise. It leverages infrastructures like water tanks or electric poles/towers.

FWA supports different bandwidths depending on the mobile technology used. The 4G technology can meet FCC broadband definition providing bandwidth up to 25 Mbps/3 Mbps per subscriber. Similarly, the 5G technology can meet USDA qualified broadband definition of 100Mbps/20 Mbps bandwidth.

FWA is commonly considered an alternative to FTTH when fiber deployment or maintenance is too expensive or when geographic constraints exist (e.g., irregular terrain, the presence of natural resources).

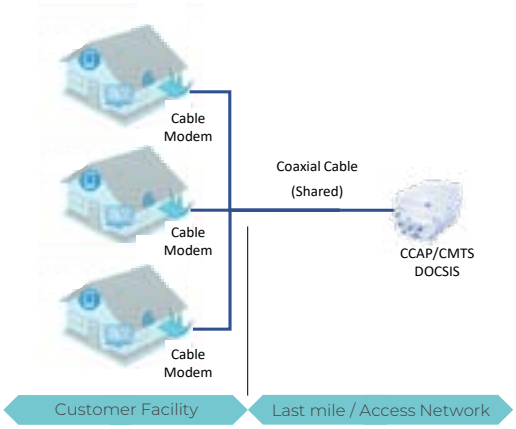


Figure 8: FWA high-level architecture

Satellite

Satellite broadband is another wireless-based access network technology. It is a high-speed bi-directional internet connection established via communications satellites. Quality, speed, and cost of satellite connections depend on the type of satellites and their orbits. Low Earth Orbit (LEO) satellites located between 2,000 and 200 kilometers above the earth can offer high speeds at reasonable costs.

In this case, the CPE consists of a Very Small Aperture Terminal (VSAT) that includes a parabolic antenna to connect to the satellite plus a home router. The satellite connects relays the connection to the satellite hub that connects directly to a backbone node or ISP PoP.

Satellite systems are an option for extremely remote locations where neither fiber nor microwave links can be deployed. However, high costs associated with satellite service, typical speeds of 25/3 Mbps, and latency (the delay in packets traveling many miles between the satellite and the CPE) tend to create a poor user experience.

Figure 9 shows a high-level network access architecture for the FWA technology.

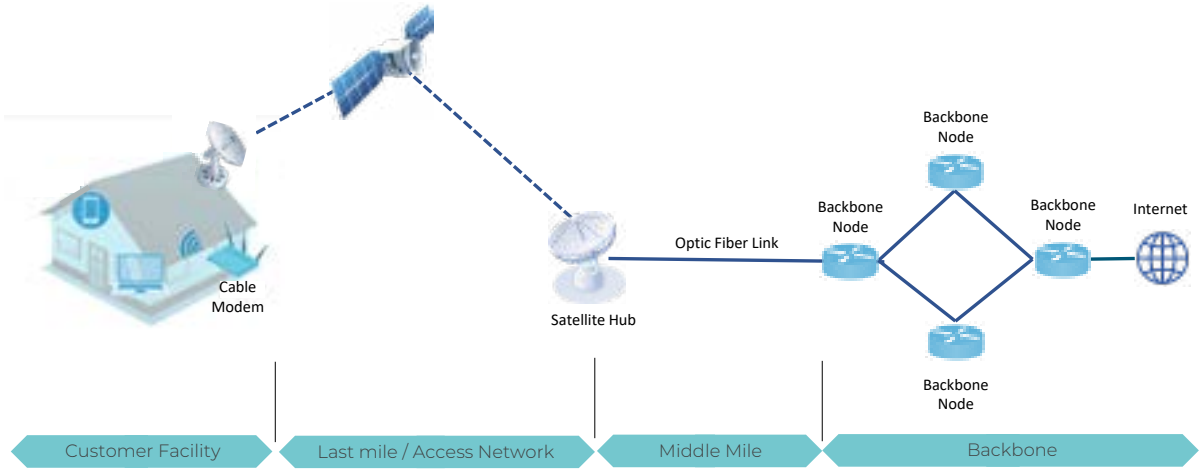


Figure 9: Satellite system high-level architecture

Table 4 summarizes pros and cons of broadband technologies.

Last Mile Technology	Pros	Cons
DSL	•Low investment •Simple architecture	•Low speeds •Data speeds decreases with the length of the copper line.
DOCSIS	•Low investment •Simple architecture	•Medium speeds •Data speeds decreases with the number simultaneous users.
FTTH	•Very high bandwidth •Easily upgraded to achieve faster speeds •Compatible with FCC and USDA grants.	•High investment for the deployment of the network. •High schedule times.
FWA	•Last mile cables not required •Coverage of wide areas with a single access node •Compatible with most FCC and USDA grants.	•Signal strength decreases with distance, reducing data speed. •Obstacle-free path between the node and CPE.
Satellite	•Low effort to be deployed. •Accessible from almost any part of the globe.	•High costs. •Regular user experience due to high signal delay •Susceptible to bad weather conditions (e.g., rain).

Table 4: Pros and Cons comparison of Last-Mile Technologies

SECTION 4: CURRENT STATUS AND FINDINGS OF BROADBAND IN SANTA BARBARA COUNTY

In Santa Barbara County, the COVID-19 pandemic highlighted the need for additional broadband capacity, just as it did across the country. Increased demand for infrastructure impacted reliability, and many users lacked access to adequate internet service and devices. School districts became first responders in this crisis, keeping students and teachers connected via hotspots and providing computers. The need for additional capacity in northern Santa Barbara County had been identified prior to the pandemic by several cities, the county, and economic development organizations, including the Economic Alliance Foundation (EconAlliance), regional Chambers of Commerce, and the Economic Development Collaborative (EDC). The Tellus Ventures' 2020 California Broadband Infrastructure Report Card assigned the County of Santa Barbara a "D" rating due to the lack of private sector competition (full report in Appendix E). Ratings were assessed if jurisdictions had at least one wireline provider that met the minimum standard of 100Mbps download and 20Mbps upload speeds based on CPUC and FCC data collected from ISPs as of December 2018.

During the outreach and data collection process, questions were presented to the county, cities, and several unincorporated areas to assess their alignment with best practices in broadband policy. A list of summary questions was developed from the statewide resource, G*etting Connected: A Broadband Deployment and Adoption Resource Guide for Local and Regional Government Leaders*[8]. The county and cities were presented with high-level policy questions, and full responses can be found in Appendix F. Broadband Policy and Planning summary tables are provided with red, yellow, and green assessments. A red marking suggests there is work to do; yellow suggests work is in process or a partial adoption of best practices; green suggests that the best practice is in place and in alignment with broadband readiness.

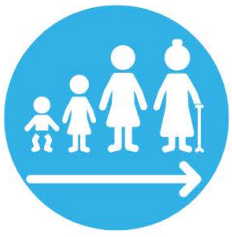
Community forum summaries are presented in tables, community themes are identified, and an opportunities section for each community includes action items suggested to align with Broadband for All goals.

Santa Barbara Countywide Broadband Profile

County Overview

Population Size*

448,229



Median Age*

33.8

Geographic Footprint

3789 sq mi

Demographic data from U.S. Census Community Snapshot [9]

[8] *California Emerging Technologies Fund (CETF) and Valley Vision, 2021: cetfund.org/report/getting-connected-a-broadband-deployment-and-adoption-resource-guide*

[9] *U.S. Census Community Snapshot, accessed September 2022: data.census.gov/cedsci/profile/Santa_Barbara_County,_California?g=0500000US06083*

SECTION 4: CURRENT STATUS AND FINDINGS OF BROADBAND IN SANTA BARBARA COUNTY

Located along California's coastline about 300 miles south of San Francisco and 100 miles north of Los Angeles, Santa Barbara enjoys a mild and sunny climate, with the Los Padres National Forest and the San Rafael Range running through a significant portion of the overall county footprint. The County of Santa Barbara is home to approximately 440,000 residents[10]. The county is known for its beaches and natural beauty and is home to a diverse economy of wine, tourism, agriculture, space, engineering, and education. The county is bordered on the north by San Luis Obispo County and the east by Ventura and Kern counties. State Highway 101 is the major transportation route. The county identifies, as do the communities, as having Northern and Southern regions.

Northern Region

The northern region economy is driven by agriculture, healthcare, higher education, and a growing technology hub supporting Vandenberg Space Force Base. There are five cities, with the largest city in the county, Santa Maria, serving as a hub for the extension of County offices headquartered in the southern region. Santa Maria is home to Allan Hancock College, ranked one of the five best community colleges in California and one of the top 120 community colleges in the nation[11]. The City of Lompoc neighbors the Vandenberg Space Force Base, a major regional employer. Some unincorporated communities in the northern region are very remote and isolated such as Cuyama, New Cuyama, and Ventucopa to the east and Casmalia to the west. Remote communities throughout the north are located in rugged terrain and isolated valleys where world-renowned Chardonnay and Pinot Noir grapes are cultivated, and remote tasting rooms dot the Santa Rita Hills. North county is home to the Santa Ynez Band of Chumash Indians (Tribe). Their sovereign lands are in the Santa Ynez Valley, where the Chumash host a casino and a cultural center, serving as a major contributor and economic driver for the area.

Southern Region

The southern region starts at Gaviota and runs through Carpinteria at the county's southern border. Much of the Gaviota coastline is unincorporated, with a mixture of outdoor recreation areas and large cattle ranches and orchards. There are fewer unincorporated communities in the southern part of the county, they are less remote, and the transition between cities and unincorporated areas is almost unnoticeable to the outside eye. In the hills outside of the city of Santa Barbara are the communities of Montecito and Summerland, and UC Santa Barbara is tucked away in unincorporated Isla Vista, adjacent to the city of Goleta. The local communities of the county's southern region are served by award-winning Santa Barbara City College and several higher education institutions, including a major research center at the University of California, Santa Barbara.

Data analysis illuminates the County's policy and planning gaps, depicts current infrastructure, and details the BSP county outreach strategy, revealing opportunities to reach Broadband for All goals. Unincorporated areas of the county play an important role in an overall strategy, including the role that Vandenberg Space Force Base and Community Services Districts are poised to play as anchor institutions in the countywide network.

[10] *U.S. Census Community Snapshot, accessed September 2022: data.census.gov/cedsci/profile/Santa_Barbara_County,_California?g=0500000US06083*
[11] *hancockcollege.edu/about*

SECTION 4: CURRENT STATUS AND FINDINGS OF BROADBAND IN SANTA BARBARA COUNTY

Broadband Needs Assessment

This section aims to examine the broadband needs in Santa Barbara County. This analysis provides the basis for characterizing the county's needs and identifying potential focus areas to improve broadband connectivity.

Four main components inform the analysis of the current broadband status across the county:

- Broadband Service Availability
- Speed Test Results
- Needs Assessment Survey Results
- Community Stakeholders Forums

The following subsections present the most relevant results from the above components.

Broadband Service Availability

This subsection aims to examine broadband service availability in Santa Barbara County using the California Public Utilities Commission (CPUC) data as a baseline to identify served and unserved areas of the county.

The CPUC collects broadband availability datasets from the incumbent ISP in the area and uses numerous resources to validate the data integrity, including subscription data, public feedback, and test results submitted by the public. The CPUC defines the following terminology according to the Senate Bill SB-156 released in July 2021. An area is considered "served" if at least one ISP offers service in the area according to the service characteristics in Table 5.

CPUC Definition	Velocity (Downstream/Upstream)
Served	>= 25 Mbps / 3 Mbps
Unserved	Between 25 Mbps / 3 Mbps and 10 Mbps / 1 Mbps
Priority Unserved	< 10 Mbps / 1 Mbps

Table 5: CPUC Broadband Service Definition

Federal and State funding agencies have made recent changes to meet societal requirements to achieve digital equity. It is important to note that the data presented in this section follows the CPUC convention described in Table 5 above. Importantly, the BSP is aligned with CBAP objectives, establishing a minimum download speed of 100 Mbps. It is worth noting that minimum speeds are in the process of being redefined. As noted previously, CBAP targets 100/100 Mbps, and the USDA grant applications require planning targets of 100/20 Mbps.

SECTION 4: CURRENT STATUS AND FINDINGS OF BROADBAND IN SANTA BARBARA COUNTY

As the data presented in this section is based on a lower CPUC standard, it will overstate the level and quality of broadband service in Santa Barbara County. Therefore, it must be viewed as a relative reference point for the broadband needs in the region.

The maps displayed below were created using the public CPUC information available via the GIS Map Data Portal. It is important to note that ISPs often use the "Maximum Advertised Speed" to report the download and upload speeds to the CPUC. However, these speeds are typically not achieved due to multiple factors, such as the number of simultaneous users and specific network conditions.

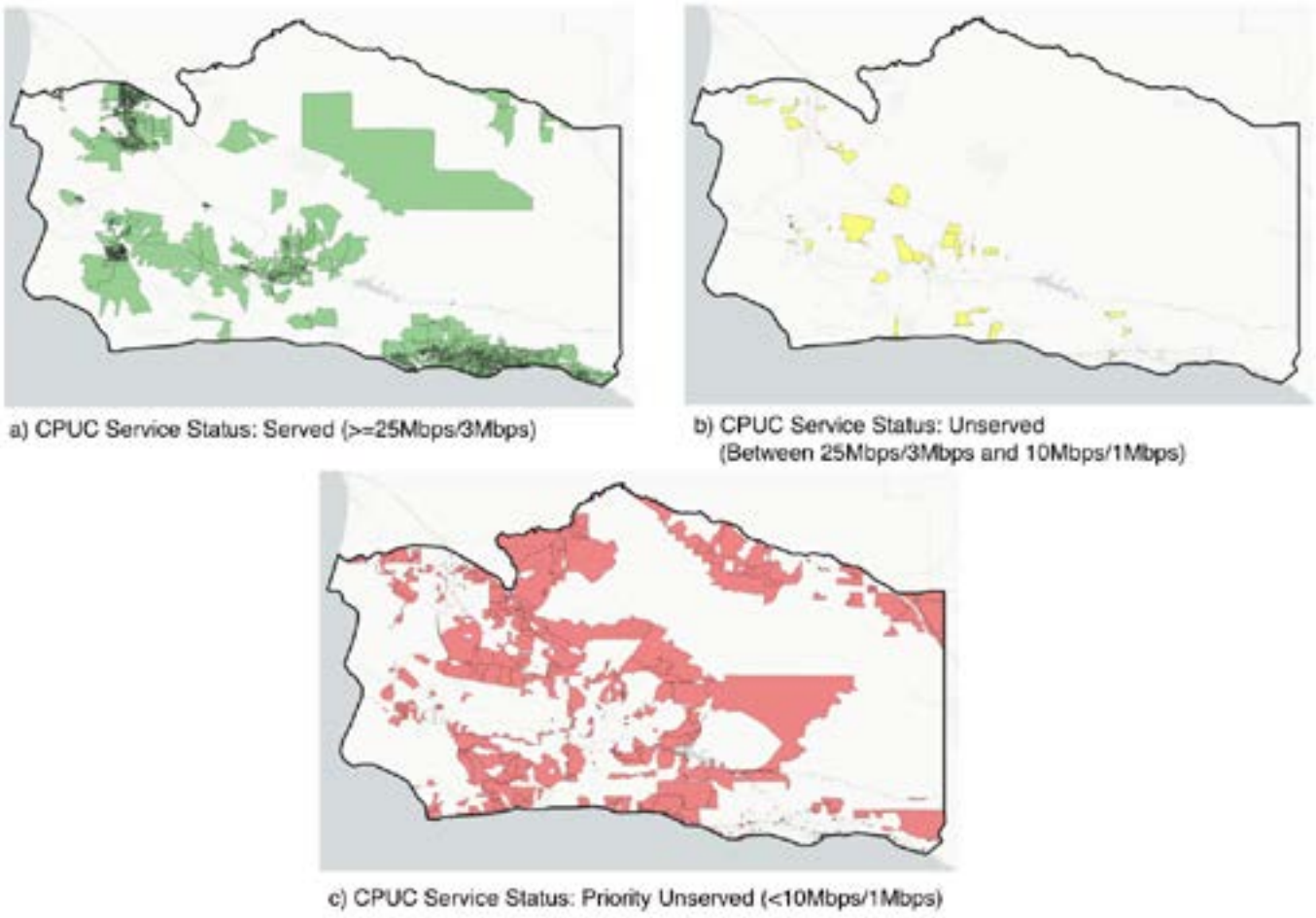
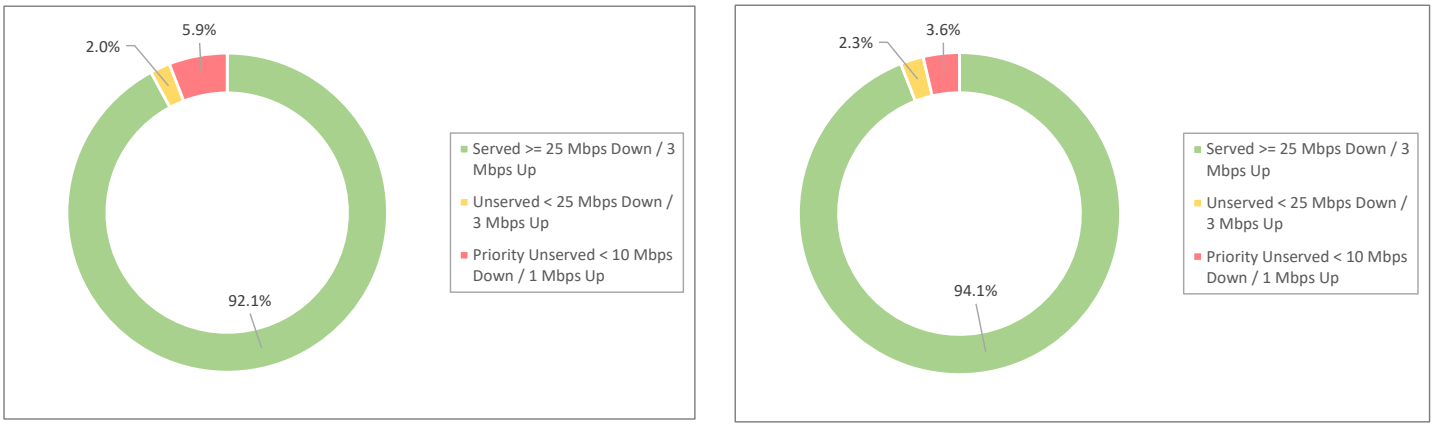


Figure 10: Broadband service availability in the County of Santa Barbara (CPUC Data)

The maps above, combined with U.S. Census Bureau data, indicate that 7.9% of the Santa Barbara County population does not have access to 25/3 Mbps internet services, corresponding with the population within unserved and priority unserved areas.

SECTION 4: CURRENT STATUS AND FINDINGS OF BROADBAND IN SANTA BARBARA COUNTY

The following charts detail the distribution of population and housing units according to broadband service availability:



a) Population Distribution

b) Housing Units Distribution

Figure 11: Population and Housing units Distribution (CPUC Data)

Although most of the population is concentrated in Served Areas with at least one incumbent ISP that offers 25/3 Mbps services, the service may not be available to each location within these areas. Furthermore, the pricing may be perceived as too expensive to adopt the service.

Finally, the analysis identifies Priority Unserved areas in remote communities such as Casmalia, Los Alamos, and Cuyama, which represent opportunities to partner in developing the last-mile network.

Speed Test Results

Speed test data is gathered through a product licensed by Breaking Point Solutions, LLC, and marketed by GEO Partners, LLC. The speed test was launched in March 2022 and will collect data until early 2023. The available results provide insights regarding the current broadband service end customers receive.

A total of 2493 speed tests were collected between March 2022 and July 2022. Figure 12 displays the locations of the speed tests received.

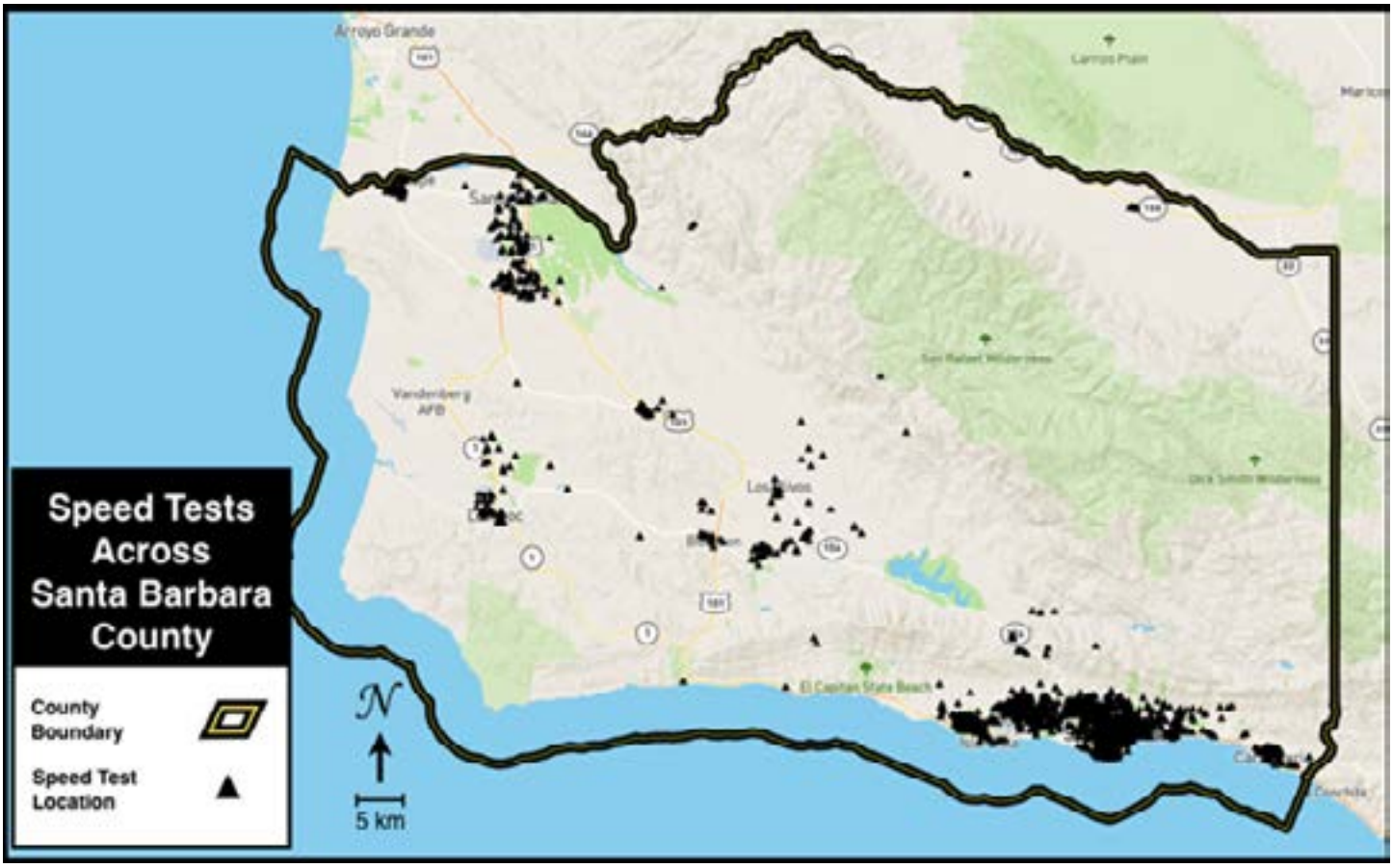
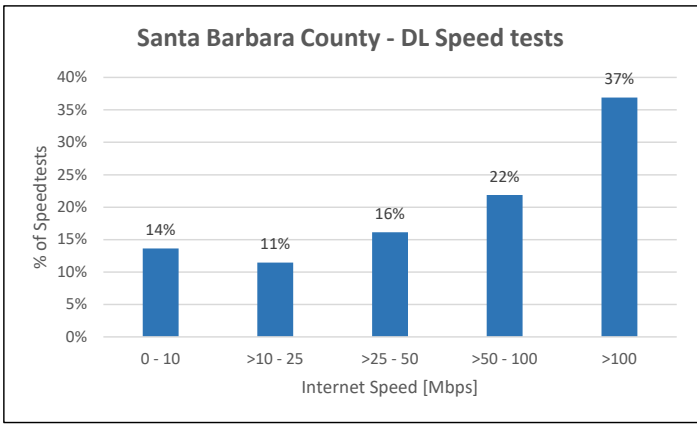
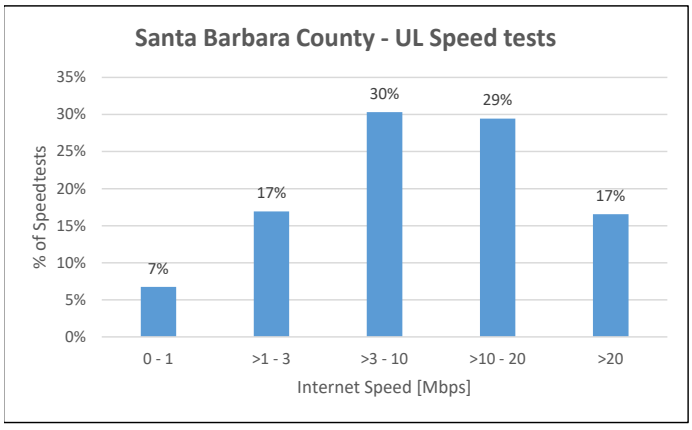


Figure 12: Speed Tests across Santa Barbara County

The graphics in Figure 13 detail the distribution of the received internet speed:



a) Download speed test results



b) Upload speed test results

Figure 13: Speed Test results across Santa Barbara County

SECTION 4: CURRENT STATUS AND FINDINGS OF BROADBAND IN SANTA BARBARA COUNTY

The following observations are derived from the analysis of the speed tests results:

- 94.5% of the received speed tests (2355 tests) were executed in served areas, with at least one incumbent ISP offering 25/3 Mbps services.
- 25% of the speed tests measured by the respondents show speeds below 25/3 Mbps service, indicating a low penetration of broadband services in the county population.
- Of the speed tests reporting download speeds above 100 Mbps, 70% (650 tests) were performed in the Goleta Union Elementary School District and the Santa Barbara Unified School District. This skew must be recognized in interpreting the data.

SBCAG will continue registering speed tests through early 2023 to provide more balanced county-level results.

Needs Assessment Survey Results

To obtain further insights into the current broadband needs, a needs assessment survey was conducted among Santa Barbara County residents. The needs assessment survey was developed within an online survey tool, Survey Planet, and hosted on the BCPC website. The needs assessment survey was launched in March 2022 and ran through July 1, 2022. The time to take the test ranged from 5 to 15 minutes.

Of the 1,276 tests completed, 1,208 were utilized for analysis and have been incorporated into recommendation deliberations. The business owner group accounts for the differentiation between the total number of tests and unique analysis. Everyone aged 19 and older could participate in additional business owner questions; only 68 opted to complete the full assessment.

The following graph details the age distribution of the survey respondents:

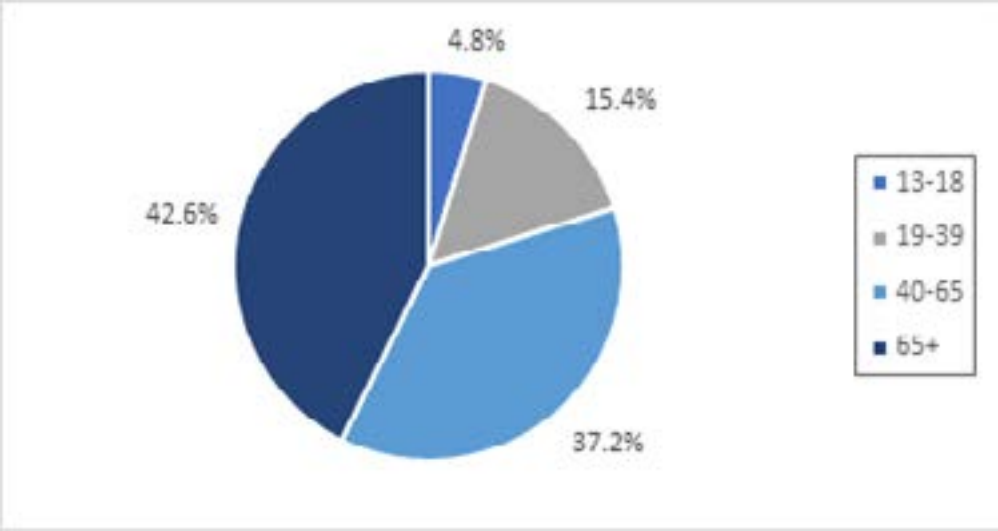


Figure 14: Age distribution of Survey Respondents

SECTION 4: CURRENT STATUS AND FINDINGS OF BROADBAND IN SANTA BARBARA COUNTY

The following observations are derived from the analysis of the needs assessment survey results:

98% of respondents reported having internet access at home. However, approximately 24% do not rely on at-home internet for work or school.	71% of respondents older than 19 years perceived the internet cost as too expensive.
The mean results assessing internet connection reliability were 6.18 with a standard deviation of 2.5, on a scale from 1 = very unreliable and 10 = very reliable.	Respondents indicated that the most important factors in internet service were reliability (32%) and price and speed (26%).

Santa Barbara County Unincorporated Area: Broadband Community Profile

There are two areas of strategic interest for the county. The first is the alignment of countywide interconnections and anchor institutions with Golden State Connect Authority and the middle-mile network infrastructure. The second is supporting last-mile connectivity for rural residents. Achieving these areas of interest will require significant coordination work of the middle-mile between the cities and the last-mile of the unincorporated areas. It is recommended that the County focus on the connectivity of anchor institutions and the required network development and work closely with SBCAG as lead on middle-mile and last-mile infrastructure planning and deployment.

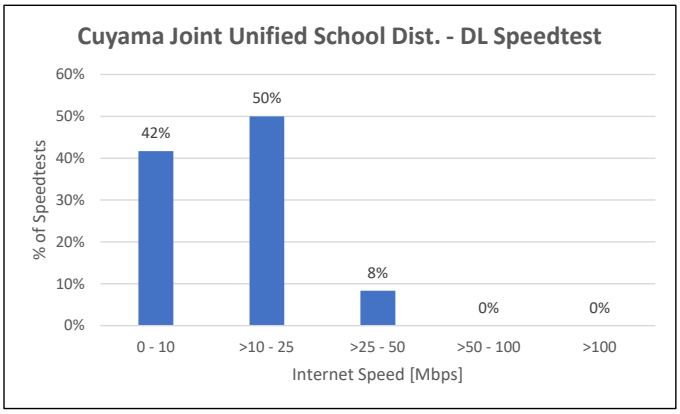
Future decisions will be made on who will build, operate, and maintain the infrastructure. Planning for infrastructure placement mapped to the needs of unserved and underserved communities is the priority. Communities lacking service, such as Casmalia, Los Alamos, and Cuyama, are priority areas, so network design work, grant writing, and identifying partners are the next steps to last-mile implementation and the Broadband for All goal.

Speed Test Results

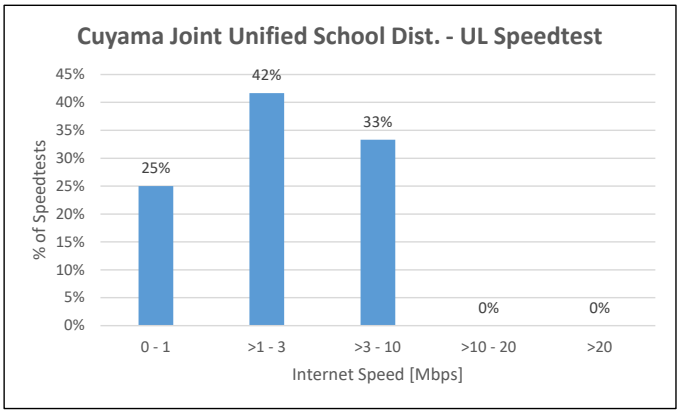
Speed testing was promoted throughout the county, and data were grouped for analysis by location. Data for unincorporated areas were sorted through two methods depending on the community. In Santa Ynez and Los Olivos, school district boundaries were used to provide clarity without overlapping Solvang data. Los Alamos provided a concentration of speed tests, so the data sort was completed using longitude and latitude parameters.

The graphics below detail the distribution of the received internet speed in the unincorporated areas.

Cuyama Valley



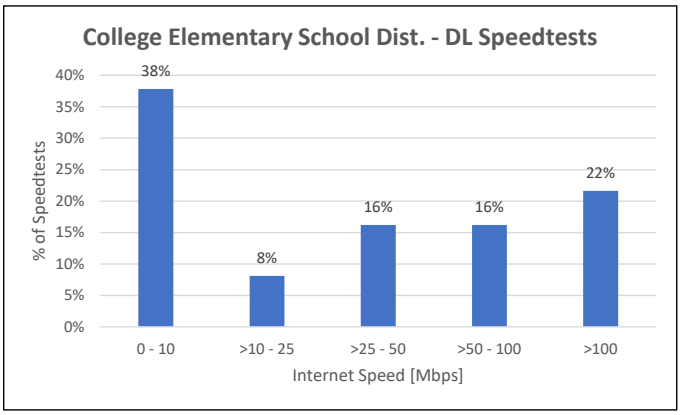
a) Download speed test results



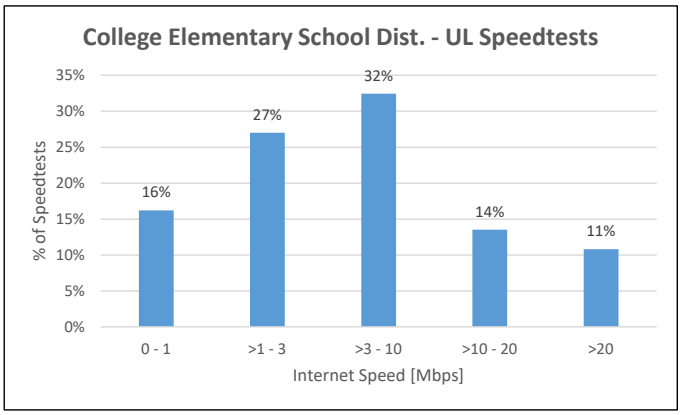
b) Upload speed test results

Figure 15: Speed Test results across Cuyama Joint Unified School District

Santa Ynez



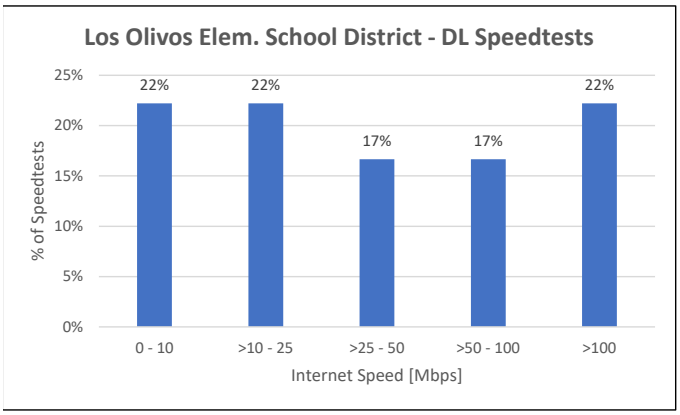
a) Download speed test results



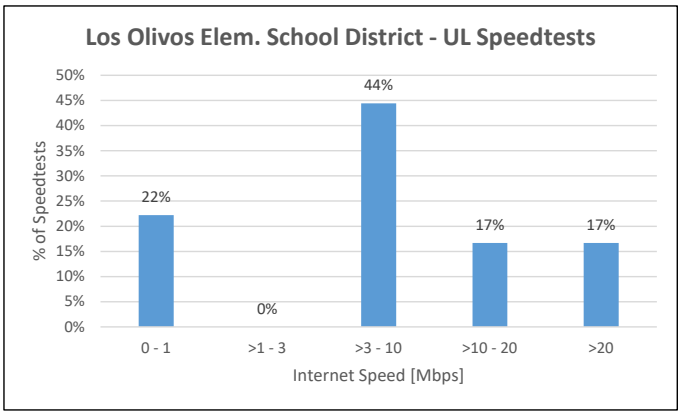
b) Upload speed test results

Figure 16: Speed Test results across College Elementary School District

Los Olivos



a) Download speed test results



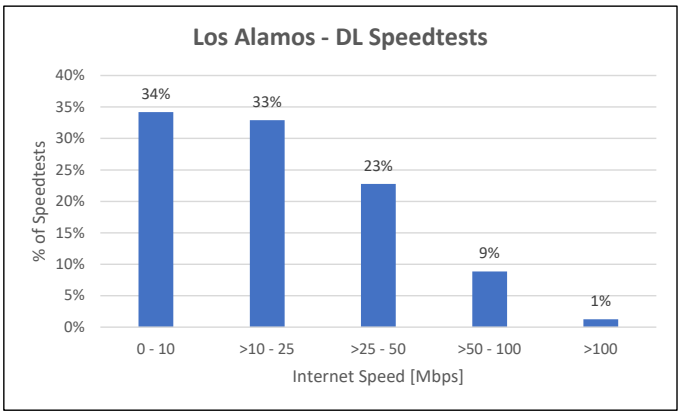
b) Upload speed test results

Figure 17: Speed Test results across Los Olivos Elementary School District

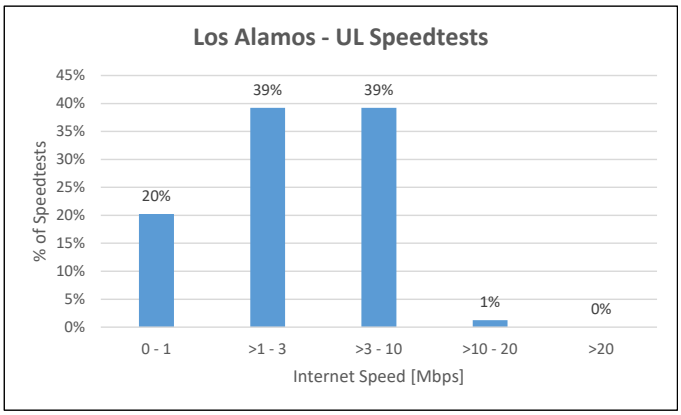
*The Los Olivos School District was one of the areas that showed 0/0Mbps, meaning no service.

The speed test data for this area shows that 100/100Mbps service is available, so closing this gap from no service to minimum targeted speeds is possible. Infrastructure investments made by the Tribe will be vital to closing the gap. Communities throughout the Santa Ynez Valley will benefit from the strategy work and grant funding investments which also present opportunities for the County or providers to prioritize last-mile connections to the remote regions to the east and should be a priority.

Los Alamos speed test data collected using longitude and latitude.



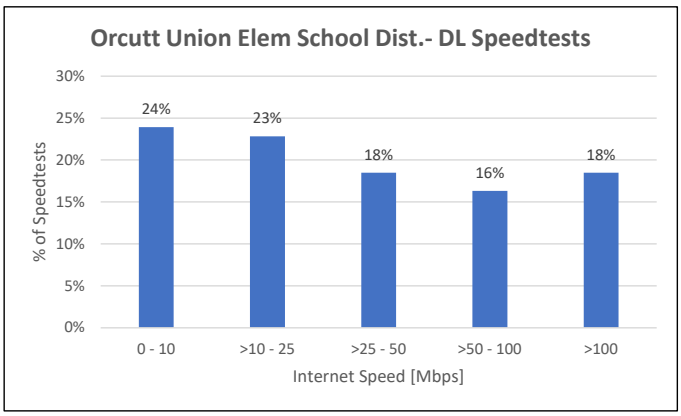
a) Download speed test results



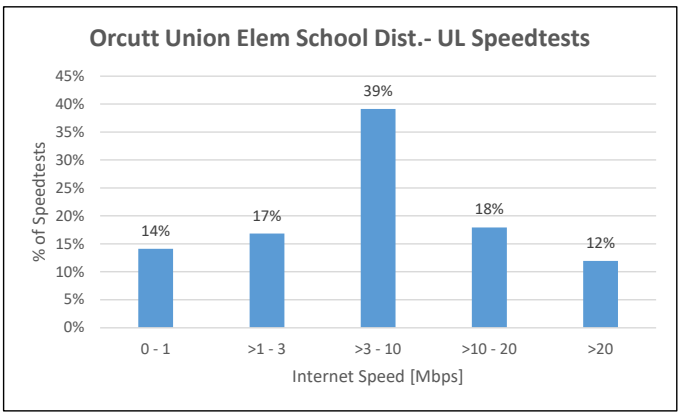
b) Upload speed test results

Figure 18: Speed Test results across Los Alamos

Orcutt



a) Download speed test results



b) Upload speed test results

Figure 19: Speed Test results across Orcutt Union Elementary School District

Community Stakeholders Forums

In April and May 2022, community forums were held in several unincorporated areas of the county's northern region: Santa Ynez, Los Alamos, and Orcutt. Panelists from each community engaged in community conversations, and MOU partners promoted data collection efforts for the strategic plan.

SECTION 4: CURRENT STATUS AND FINDINGS OF BROADBAND IN SANTA BARBARA COUNTY

Responses informed themes identified as broadband access gaps and community challenges in achieving Broadband for All and revealed the quality-of-life impacts. Tables 6, 7, and 8 summarize the discussion points arising from the responses to the questions provided and audience members' contributions.

Santa Ynez and Los Olivos

The Santa Ynez forum was moderated by a representative from the Santa Barbara Foundation, and panelists included representation from the College School District, the Tribe, and Visit Santa Ynez Valley.

April 27, 2022 – Santa Ynez Community Services District Office

Challenges	• Perceived as affordable for some, not all, residents • Digital literacy • Lack of awareness of training resources to increase self-sufficiency • Hot spots insufficient to reliably connect students to online curriculum • Increased demand on infrastructure decreases reliability • Need reliable point of sale connectivity for local businesses
Opportunities	• Increased access to education, tutorials for target populations • Online trainings: increase digital literacy and develop local digital navigators • Work force development, job opportunities require reliable connectivity
Barriers	• Disproportionately impacts students, rural community members, multilingual community members, and English language learners • Communication relies on internet service due to geography (e.g. the school district covers 585 square miles) • Equity requires accessibility to the same level of service

Table 6: Santa Ynez Community Services District Office Public Forum Themes

Los Alamos

The Broadband Consortium Pacific Coast moderated the Los Alamos forum, and panelists included community members representing the Los Alamos Senior Center, a local rancher, the school district, Farming First, and the Los Alamos Business Association.

May 10, 2022- Los Alamos Men's Club

Challenges	• Fixed income and low-income areas cannot afford service • Lack of awareness of affordability programs • Lack of equipment • Inadequate training resources/lack of awareness of training resources • Lack of at-home internet for students
Opportunities	• Improve outreach opportunities
Barriers	• Disproportionately impacts rural community members, certain neighborhoods, students, seniors • Emergency response time for certain areas is very high • Lack of internet/cell service makes it difficult or impossible to request service

Table 7: Los Alamos Men's Club Public Forum Themes

Photo Credit Mike Eliason

Orcutt

The Orcutt forum was moderated by the President of Allan Hancock Community College, and panelists included the Assistant Superintendent of educational services from Orcutt Union High School District, representatives of the OASIS senior center, and the Santa Maria Valley YMCA. The event focused on an in-depth discussion of infrastructure and the school district's challenges in reaching and serving their students. The school district serves students east of U.S. Route 101 to the coast in the west, as well as the community of Casmalia. School representatives shared plans to bus students from outlying communities to the school to complete online testing because they cannot reach them with hot spots and no other service is available.

Los Alamos is part of the Orcutt School District, so outreach summaries share similar themes.

May 18, 2022 – Lakeview Jr. High School

Challenges	• Fixed income and low-income areas cannot afford service • Lack of awareness of affordability programs • Lack of equipment • Inadequate training resources/lack of awareness of training resources • Lack of at-home internet for students
Opportunities	• Improve outreach opportunities
Barriers	• Disproportionately impacts rural community members, certain neighborhoods, students, seniors • Emergency response time for certain areas is very high • Lack of internet/cell service makes it difficult or impossible to request service

Table 8: Lakeview Jr. High School Public Forum Themes

Cuyama Valley

In 2019, the Blue Sky Center, the Rural Community Assistance Corporation, and the County Board of Supervisors developed a comprehensive community survey comprised of 63 questions for Cuyama Valley residents. The survey had a 42% response rate, with 143 households responding. The survey results identified broadband access as one of seven community priorities.

Key broadband results were as follows:

- 61% indicate internet access as a need.
- 23% have no internet at home, and 35% depend on cell phone data. Only 30% have high-speed internet, which is available via satellite subscription.
- 52% of respondents indicated Wi-Fi/broadband as a most important need, the highest of any option listed in the survey.

The Cuyama Valley Action Plan, Appendix G, is the primary planning document for the valley. Preceding this plan were years of advocacy from within the community and by the BCPC. These combined efforts result in a planned middle-mile fiber build from Santa Maria to Maricopa in Kern County. The build between Maricopa and New Cuyama is one of 18 priority projects in the queue for a planned build-out by the Golden State Connect Network. Last-mile fiber-to-the-home throughout New Cuyama is included in the project.

Analysis for additional last-mile opportunities along the route should be a planning priority for the County.

Engagement Summary

A common theme throughout each unincorporated area identified the remote geography and rugged terrain of parts of the county as a barrier to ubiquitous connectivity in the communities. If there are available connections, residents report that service is unaffordable. When affordability subsidies are applied, the quality of the connections may still not meet the 25/3 speeds originally required by the FCC. Further analysis and design work will establish the best paths to last-mile connections for the rural and rugged regions of the county to meet 100/100Mbps.

To further assess connectivity in unincorporated areas, additional analysis needs to be completed to determine if last-mile connections are best provided by fiber or a wireless network. One of the most concerning reports revealed the difficulty or impossibility of requesting emergency services in some parts of the county due to the lack of connectivity. Many residents face affordability barriers and have transitioned to cell service only to avoid landline costs. For those utilizing satellite service in remote areas, uncertainty may be reduced, and connectivity is not guaranteed. Access is tied to the quality of life and should be a primary consideration as priorities and policies are identified regionally and locally.

SECTION 4: CURRENT STATUS AND FINDINGS OF BROADBAND IN SANTA BARBARA COUNTY

Achieving digital equity in rural areas includes layers of challenges not noted in urban areas. Unincorporated communities identified a lack of awareness of affordable programs as a challenge, and some were not sure they would be beneficial due to a lack of service options. Even if there was access, seniors and families in these areas may face cost-of-living constraints and may not have the income to purchase the necessary internet equipment.

Policy & Planning

County staff received the policy and permitting questions sent to all MOU partners, drawn from the statewide resource: *Getting Connected: A Broadband Deployment and Adoption Resource Guide for Local and Regional Government Leaders*[12].

County policymakers have taken a very proactive stance on broadband deployment and were lead supporters of the strategic plan yet are challenged by a lack of capacity within planning staff to implement best practices for broadband infrastructure deployment. Broadband connectivity is a county priority, and community data collected through BSP can be used to fill gaps as regional broadband planning efforts progress.

The County's role in broadband deployment involves two strategic areas of interest. First, aligning the countywide interconnection of facilities to the broader middle-mile approach and linking anchor institutions throughout the county. Second, supporting broadband deployment in unincorporated communities missing last-mile connectivity.

Broadband Infrastructure

The County of Santa Barbara has invested in developing a regional network connecting County facilities. To date, this network exists through purchasing lit fiber from several providers. Conversations are underway regarding forming a public-private partnership (P3) approach to receiving service and benefits.

Santa Barbara County	
Inventory Of Assets	Yes
Permitting Authority	Maybe
Installed Conduit	Yes
Dig Once Policy	No
Permit Process	Yes
Online Process	Maybe
BB Priority In Planning	Yes
Smart City Priority	Maybe
Wi-Fi/Fiber Interest	Yes

Table 9: Santa Barbara County Broadband Policy and Planning Assessment

[12] *California Emerging Technologies Fund (CETF) and Valley Vision, 2021: cetfund.org/report/getting-connected-a-broadband-deployment-and-adoption-resource-guide*

The Northern Santa Barbara County Fiber Loop – Santa Ynez Band of Chumash Indians (Tribe)

In May 2021, the Tribe completed the *Broadband Strategy & Feasibility Study: Tribal Lands of Santa Ynez Band of Chumash Indians* (Appendix H). This work effort supported grant applications submitted in partnership with EconAlliance. The goals of the grant include a feasibility study and cost analysis of a potential fiber loop connecting their assets. The project would also benefit the communities of northern Santa Barbara County in accessing affordable, reliable, and redundant broadband service.

The Tribe has a population of 108 tribal members and has approximately 242 residents in 100 homes on the original Reservation land[13]. In December of 2019, the Tribe received Congressional approval for an additional 1,411.1 acres, including rights of way land into the federal trust status and is now known as “Camp 4”. Up until recently, tribal broadband infrastructure had been developed to support their casino, hotel, and other enterprises. With COVID, new demands were placed on broadband and cellular infrastructure. They provided challenges for regular day-to-day education, healthcare, and business operations, including security personnel and first responders. Due to the Tribe’s active participation in the region, their ability to lead broadband work efforts on the north county fiber loop feasibility project plays a significant role in countywide conversations and future work efforts.

In partnership and support by EconAlliance, the Tribe has submitted several applications for funding for tribal infrastructure needs. In June 2022, the Tribe and EconAlliance were awarded $444,787 in federal funding from the Economic Development Administration to build a Fiber Ring Broadband Strategy and Business Plan. A portion of the award will be used to identify and assess two viable routes for the fiber loop that will address the middle-mile broadband needs of northern Santa Barbara County.

In addition to contributions to the middle-mile vision, the Tribe has developed proposals and acquired assets for last-mile fixed point-to-point and wireless, including 2.5GHz from the FCC. While this build-out is still in development, the Tribe anticipates opportunities for the entire Santa Ynez Valley to benefit from their investments and expansion. While it is unknown how far the range of this future service may cover, fiber deployment for areas outside of the Tribal lands should still be considered if there is a partnership opportunity to boost and support either the Tribe’s or the County’s priorities.

Vandenberg Space Force Base

With the capacity to welcome new commercial partners and support the growing mission of Space Force and other government partners, Vandenberg is ideally positioned as the West Coast hub for commercial and military space operations. Including being named as one of six candidates to host STARCOM, the Space Force’s Space Training and Readiness Command, in April 2022.

Under development is a new master plan for the base and paves the path to enhancing the capabilities, infrastructure, and workforce to support a thriving space ecosystem, all of which rely on broadband infrastructure.

[13] *santaynezchumash.org/the-santa-ynez-reservation*

A “mission development zone” is in development with targeted infrastructure investments to improve regional transportation and incentives to spur commercial space activity.

Vandenberg’s infrastructure plans are generally closely held. However, the Commercial Space Master Plan outlines a detailed list of infrastructure opportunities that will enhance regional broadband connectivity. When the Telecommunications Infrastructure group began work in 2019, only Frontier offered internet connectivity to the base. Now, additional providers offer connectivity, but only on a limited basis over existing infrastructure, which means additional redundancy is an opportunity. The build-out of diverse communication routes and POP upgrades is a high-priority need for VSFB and potentially improve connectivity opportunities to the community of Lompoc.

This background reinforces a narrative that Vandenberg can be a critical anchor tenant for broadband infrastructure. Because of the base location, underserved communities around the base stand to strongly benefit from improvements in cross-connectivity and redundancy of internet connections to the base and the mission development zone. The opportunities Vandenberg provides to regional planning efforts are significant in ensuring redundancy and resiliency of the region’s infrastructure and should be considered a strong partner as plans and priorities are developed.

Community Services Districts (CSDs)

CSDs of the county provide varied services and participate in a high-level assessment of their service areas. Table 10 highlights opportunities that benefit rural communities with connectivity for residents, businesses, and CSDs. None of the responding districts noted any major infrastructure improvements that would contribute to broadband infrastructure deployment. Santa Ynez CSD does have a complete and up-to-date asset and right-of-way inventory that could support broadband development in the Santa Ynez Valley. Districts that oversee water and wastewater infrastructure have assets that should be considered in conduit deployment for fiber or fixed wireless access. Fixed wireless access is an opportunity to enhance redundancy for emergency service needs, water and wastewater monitoring, and community use.

Where feasible, CSDs in the county can engage in a full asset inventory activity relating to broadband planning to locate possible routes and provide insight into the number of service connections needed for last-mile planning in unincorporated communities.

Community Services Districts are positioned to become key partners in last-mile infrastructure deployment.

Community Services Districts	Isla Vista CSD	Los Olivos CSD	Santa Ynez	Vanden-berg Village
Does your CSD have a complete and up to date asset inventory – right of way, easements, or others - identified for broadband infrastructure deployment?	No, we own none	No	Yes	No. Lots of information but it's not complete or up to date
If yes to the above, do you believe it would be feasible to use for broadband deployment if deemed appropriate?	N/A	N/A	Maybe the sewer lines	N/A
Does your CSD have any major infrastructure projects planned within the next 5-10 years in your service territory that would allow for the installation of empty conduit for future fiber installation?	No	Assuming a Prop 218 vote that moves our wastewater treatment efforts forward is approved by voters, yes.	No	No
Does your CSD have a 'dig once' or 'open trench' policy/ordinance?	N/A	No	No	No
Does your agency have any permitting authority for infrastructure improvements within your service area?	No	Yes, but limited	Yes	Yes
If yes, what type of improvements are typically requested?	N/A	As a fledgling CSD our efforts are only around wastewater treatment powers we have from LAFCO	Sewer lines	Water and sewer
Who provides your internet service for any of your systems monitoring?	COX Communications	We currently do not have any systems	?	Comcast Business
Are you aware of whether there would be community support for community Wi-Fi access?	Yes – 100%	Not aware of any. Perhaps the businesses downtown would be, but that is the extent of it.	No	No

Table 10: Community Services District Assessment Questionnaire

Key Opportunities & Priorities (In Alignment With Broadband For All)

The Santa Barbara County should consider the following actions:

1. **Access (Capacity & Connectivity)**
   a. Based on data from the community forums and speed testing, the County should consider all options for last-mile infrastructure planning for rural communities to receive 100/100Mbps service.

   b. Connecting anchor institutions throughout the region should remain a priority as it can support other community fiber and Wi-Fi options.

   c. Engage with the Chumash Tribe and VSFB to identify partnership opportunities.

   d. Engage with RCRC and the Golden State Connect Authority network conversations to ensure local connections are identified as the network is in development.

2. **Affordability & Adoption**

   a. Support training opportunities in rural communities; plan regionally and implement through community partners able to do the work.

   b. Work with the Digital Equity Coalition to meet the needs of rural communities.

   c. Support county social services departments in joining Digital Equity Coalition work efforts and identify grant funding opportunities and community partnerships to increase capacity. Assist with adoption-related data collection in partnership with the Santa Barbara Foundation and the Digital Equity Coalition.

3. **Requirements for Redundancy & Resiliency**

   a. Continue to partner with SBCAG in regional coordination of the Golden State Connect Network and last-mile planning and implementation.

   b. Engage with the Tribe to assess partnership and coordination opportunities for the Golden State Connect Network and last-mile planning and implementation.

   c. Engage with VSFB to assess partnerships and coordination opportunities for Golden State Connect Network, anchor institution connectivity, and last-mile planning and implementation.

   d. Seek grant funding to build the capacity of County staff to participate in regional work efforts and bolster funding for SBCAG.

e. Review permit application process and evaluate opportunities for centralized work efforts with SBCAG.

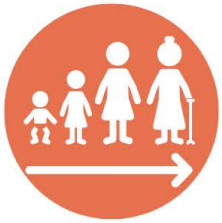
f. In partnership with SBCAG, meet with service providers to determine opportunities to expand last-mile through public/private partnerships and support private sector grant applications for funding to serve rural areas.

g. Engage with community services districts to assess opportunities such as anchor institutions, conduit deployment, and hosting community Wi-Fi.

BUELLTON: BROADBAND COMMUNITY PROFILE

The City of Buellton is poised to play a crucial role in the evolving development of broadband infrastructure. Situated along major arterials that already have fiber infrastructure or where fiber is planned via the Golden State Connect Network, Buellton must take the opportunity to either directly engage or partner regionally to ensure the community's needs are considered. While not imminently poised to develop smart city planning, careful consideration and conversation must evolve to meet the community's future needs.

Population Size*
5,161



Median Age*
40.8

Geographic Footprint
1.58 sq mi

Demographic data from U.S. Census Community Snapshot[14]

Buellton is located at the intersections of State Route 246 and U.S. Highway 101 in the Santa Ynez Valley, ideal positioning for broadband infrastructure along two major thoroughfares. Several hotels and restaurants serve as a vacation homebase for tourists visiting the greater Santa Ynez Valley area and Santa Barbara County coast. Buellton is a direct conduit connecting U.S. Highway 101 to Lompoc, Vandenberg Air Force Base, and Vandenberg Village along State Highway 246.

Buellton is the second-largest city in the Santa Ynez Valley, with a population of 5,161. The average annual income is $105,694. While a strong entrepreneurial spirit contributes jobs to the local economy, a significant proportion of the community commutes to Santa Barbara and Santa Maria for higher-paying jobs. Major industries providing jobs within Buellton represent the cross-section of agriculture, industry, and tourism in the heart of Santa Barbara County. Manufacturing leads in job creation, with industrial districts housing approximately 50 light-industry facilities. The Hospitality and Retail industries serve locals and visitors alike with a mixture of small family-owned businesses (some multi-generational) and large national chains. Wholesalers round up the major job creators in Buellton, ranging from wine and beer to construction materials and agriculture supply chain materials.

Only 1.8% of the population is considered to be living at or below the poverty line. Of all households in Buellton, 24% are eligible for the Affordable Connectivity Program (ACP) to reduce the costs of internet plans and provide discounted access to a device. Of the eligible households, only 9% are enrolled in ACP, leaving a significant population that may benefit from the program to relieve an unnecessary added cost burden[15].

[14] *U.S. Census Community Snapshot, accessed September 2022: data.census.gov/cedsci/profile/Buellton_city,_California?g=1600000US0608758*
[15] *Geographical Information Center, Chico State Enterprises, accessed August 2022: https://www.arcgis.com/apps/dashboards/8c0249a9de8d404a9b49966fb824b728*

BUELLTON: BROADBAND COMMUNITY PROFILE

The Buellton Union School District has two elementary schools serving the Buellton area: Jonata Middle School and Oak Valley Elementary School. Approximately 25% of households in Buellton speak a language other than English in the home, and the school district offers materials in English and Spanish to connect and communicate with families. The Santa Ynez Valley Joint Union High School serves all five local communities and is located six miles east of Buellton. Zaca Center is a preschool and after-school daycare center for children
operated by the County of Santa Barbara.

Medical care is available in Buellton and Solvang, connected directly through Route 246. The Buellton Medical Clinic takes both appointments and Urgent Care walk-ins. American Medical Response ambulance service operates out of Buellton with easy access to the U.S. 101 freeway and local communities. These facilities all rely on systems for patient care that require high-speed internet and strong infrastructure to function, especially during emergencies.

Photo Credit Mike Eliason

Broadband Needs Assessment

Broadband Service Availability

Based on all available data, broadband availability in Buellton is extensive. The map displayed below was created using the public CPUC information available via the GIS Map Data Portal (refer to Section 1, Table 1 for CPUC served/unserved definitions). It shows most of the city in green, indicating that a 25/3 Mbps Service is accessible in a significant portion of the county.

Comcast and Frontier are the major internet service providers serving the community. Although the CPUC data report high broadband availability, Buellton community members indicate that the actual bandwidth received is low.

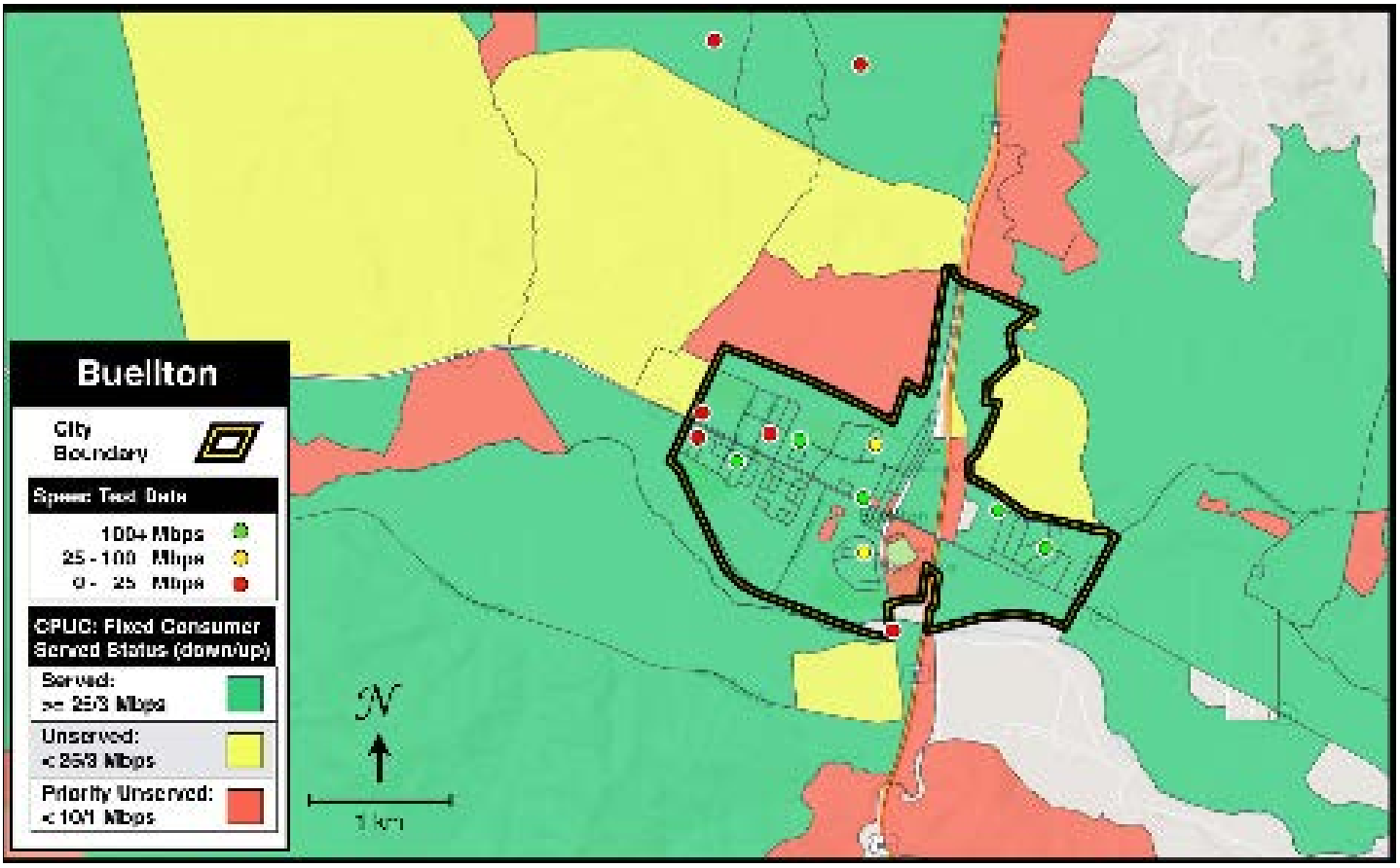
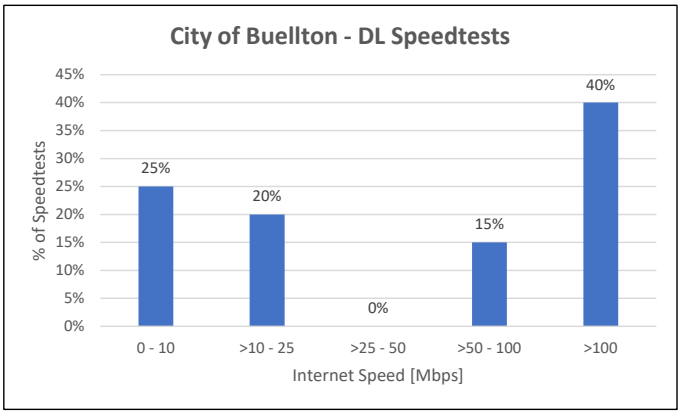


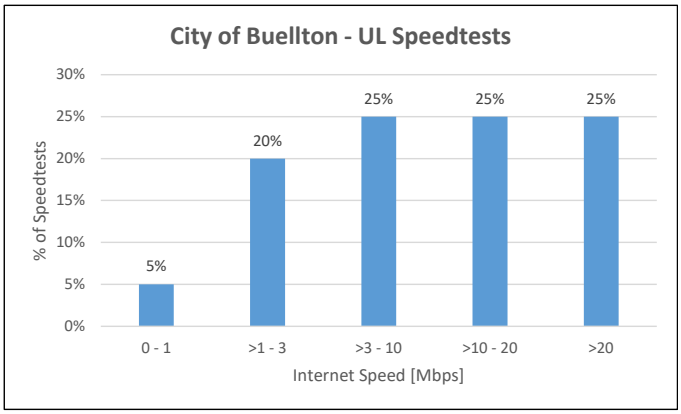
Figure 20: Broadband service availability in the City of Buellton

Speed Test Results

The graphics below detail the distribution of the received internet speed according to the data collected from the speed tests in the Buellton.



a) Download speed test results



b) Upload speed test results

Figure 21: City of Buellton Speed Test results

Response rates to the crowdsourced data collection were low, and data collected via the speed test showed that none of the test takers met the 100/100mbps; 8 of the 20 tests taken were able to download at speeds over 100 Mbps and upload speeds were significantly slower. Poor test results could be due to the time of day the test was taken and the equipment connecting to the internet.

Community Stakeholders Needs Assessment

A public forum was held on May 19, 2022, at Oak Valley Elementary School to discuss and understand the broadband status in Buellton. The central themes identified access and adoption as the primary gaps in achieving digital equity and inclusion for the community.

Panelists for the May public forum included the Superintendent of the Buellton Unified School District, the CEO of the Buellton Chamber of Commerce, the Executive Director of the Senior Center, and the CEO of the United Boys and Girls Club. Table 11 summarizes the discussion points arising from questions posed to the panel by the moderator and community discussion.

Public Forum Summary – event held May 19, 2022 Oak Valley Elementary School

Challenges	• Eligible community members don't use affordability programs due to low bandwidth • Lack of equipment • Inadequate training resources/lack of awareness of training resources • Need trusted agents to assist with training • Lack of home access (families drive to library for Wi-Fi for school access) • Enrollment in affordability programs (55% of students on free/reduced lunch)
Opportunities	• Centralize training at club houses where the senior population lives • Replicate San Jose municipal model affixing broadband on streetlights for students • Important for hospitality industry growth and businesses serving the industry • Business processes have changed and require higher bandwidth
Barriers	• Disproportionately impacts seniors who lack training, 27 families were never able to connect during the pandemic for school • Isolation for seniors and/or victims of domestic abuse

Table 11: Oak Valley Elementary School Public Forum Summary

Reliability of service to the community was identified as a need, and the leadership and advocacy of the school district will prove to be a reliable partner should the city choose to develop and broaden community connectivity through an open-access Wi-Fi network.

Economic development considerations were essential to the public forum conversation. It was noted that reliable connectivity plays a significant role in the city's ability to attract and retain businesses. The four top industries of Buellton all rely on the internet to maintain or grow their businesses; these industries likely have a client base outside of the area and therefore need reliable service. Retail businesses within the community serve local customers and visitors and need their point-of-sale equipment to stay online. The delay factor may be significant for businesses that rely on the system for day-to-day operations.

The school district did an outstanding job connecting their students to devices and hotspots during the COVID -19 pandemic. Even with their great work, students were in the library parking lot during the day accessing the library Wi-Fi system to do schoolwork; 27 families could never connect. While this may not seem significant based on the overall population, this anecdote does not account for senior citizens or others who were unable to connect during the pandemic but did not have a support network like the school to document their need.

Policy and Planning

Project team members met with city staff multiple times to discuss policy and planning efforts and shared the statewide resource, Getting Connected: A Broadband Deployment and Adoption Resource Guide for Local and Regional Government Leaders16. Survey questions were adapted from the Guide and emailed to city staff for their direct input. Responses informed key opportunities and priorities for the City of Buellton to improve redundancy and resiliency.

Analysis shows broadband has only recently become a priority for City Council. The city plans to take the step to add broadband considerations to the General Plan within the next year, building a baseline for support and future planning efforts. Policy considerations such as a Dig Once policy and placing conduit in the ground with every excavation are opportunities of interest as next steps.

Broadband Infrastructure

While the City does not envision itself in the role of ISP or even managing fiber agreements, staff intends to engage to the extent necessary to establish and manage public assets in areas where industry participation does not pencil out. The primary focus of infrastructure planning targets the lack of home access to mitigate the need for families to drive to the library to access Wi-Fi for schoolwork. The community has expressed interest in an initiative to create a community Wi-Fi system. High-priority areas for investment include the district of aging motels along Route 246 and the northern area of the city, in lower-income neighborhoods, and along the main arteries Central Ave, McMurray, and Avenue of the Flags.

Inventory Of Assets	No
Permitting Authority	No
Installed Conduit	No
Dig Once Policy	In Process
Permit Process	In Process
Online Process	No
BB Priority In Planning	In Planning
Smart City Priority	No
Wi-Fi/Fiber Interest	Yes

Table 12: City of Buellton Broadband Policy and Planning Assessment

[16] *California Emerging Technologies Fund (CETF) and Valley Vision, 2021: cetfund.org/report/getting-connected-a-broadband-deployment-and-adoption-resource-guide*

BUELLTON: BROADBAND COMMUNITY PROFILE

Key Opportunities & Priorities (In Alignment With Broadband For All)

The City of Buellton should consider partnering with neighboring communities, the County, and the private sector to achieve Broadband for All. Based on the lack of staffing capacity and infrastructure, the City of Buellton should consider the following actions and prioritize policy considerations:

1. **Access (Capacity & Connectivity)**

    a. Proactively work with the school district to determine the feasibility of an open-access network.

    b. Proactively work with the private sector to determine the feasibility of a public/private partnership to increase access for the business community through grant funding.

2. **Affordability & Adoption**

    a. Community feedback identified barriers for students and seniors in broadband adoption. While telehealth was not directly addressed, it is an area of opportunity and should be considered when prioritizing future planning efforts.

    b. Assist with promoting the Affordable Connectivity Program via community partners, including the Chamber of Commerce, the senior center, and the library.

3. **Requirements for Redundancy & Resiliency**

    a. Continue to partner with SBCAG as the regional lead on broadband planning.

    b. Focus on policy development that reduces the barrier to broadband deployment, including General Plan updates and analysis of smart city infrastructure.

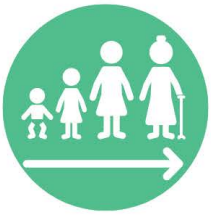
    c. Meet with major service providers and discuss barriers and necessary steps to reduce barriers.

CARPINTERIA: BROADBAND COMMUNITY PROFILE

The availability of service is high for much of the city of Carpinteria which is a benefit and good base for the community to build upon. The issues reported during the community outreach was that affordability is a barrier to accessing the internet. Therefore, community Wi-Fi would benefit Carpinteria residents and be a significant first step toward digital inclusion. It will be important for the city to seek partnerships to address access and adoption and work with ISPs, CBOs, and residents to determine a path forward to ensure a best-case scenario. Second, working towards smart city planning initiatives and solidifying relationships with neighboring communities for seamless transitions will support future redundancy and resiliency of broadband infrastructure. As noted in the process, broadband planning is a priority for the city so a good first action step would be to develop an inventory of assets that would support broadband deployment.

Population Size*

13,264



Median Age*

41.1

Geographic Footprint

9.27 sq mi

Demographic data from U.S. Census Community Snapshot[17]

Carpinteria is located on the south coast of Santa Barbara County, covering a land area of 2.6 square miles, and an ocean area of 4.7 square miles, for a total of 7.3 square miles. Elevation ranges from sea level to 700 feet above sea level.

Carpinteria was incorporated on September 28, 1965. It is a general law city, with an elected five-member City Council and a City Manager appointed by the Council. Five local citizens elected for four-year overlapping terms form the Carpinteria City Council. The mayor and vice-Mayor are selected by the Council from among the membership and customarily serve two-year terms. City departments include General Government, Administrative Services, Community Development, Public Works, and Parks & Recreation.

The Carpinteria Unified School District administers seven schools in Carpinteria and one in Summerland. Elementary Schools include Aliso, Canalino, Family School, and Summerland School. Carpinteria Middle School, Carpinteria High School, Rincon High School (a continuation school), Foothill High School (an alternative school), and Cate School (a private high school) form the options for secondary schools.

[17] *U.S. Census Community Snapshot, accessed September 2022: data.census.gov/cedsci/profile/Carpinteria_city,_California?g=1600000US0611446*

Broadband Needs Assessment

Broadband Service Availability

Based on all available data, broadband availability in Carpinteria is high. The map displayed below was created using the public CPUC information available via the GIS Map Data Portal (refer to Section 1, Table 1 for CPUC served/unserved definitions). It shows most of the City of Carpinteria in green, indicating that a 25/3 Mbps Service is accessible in a significant portion of the county.

Community reports from Carpinteria indicate that the cost of broadband service is too high, which impacts the service's adoption. In addition, a lack of awareness of affordability programs within the community was identified.

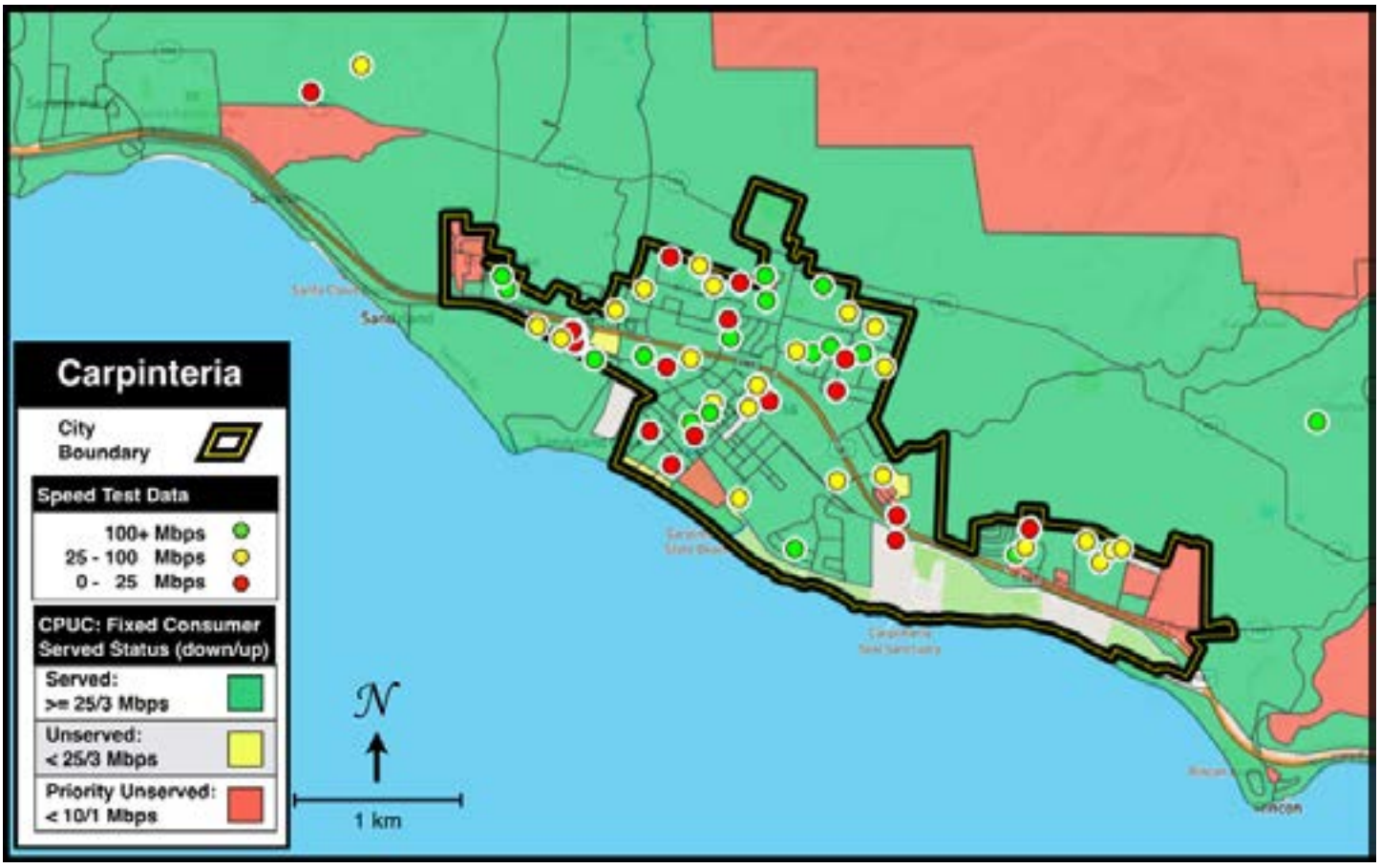
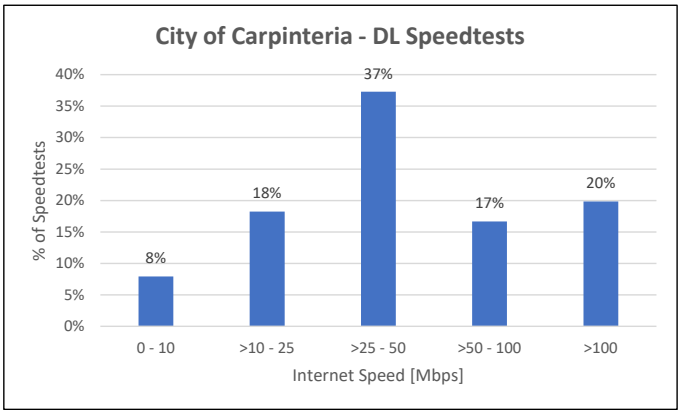


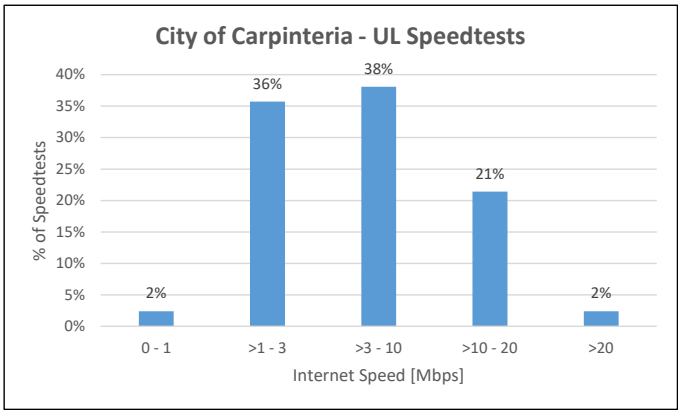
Figure 22: Broadband service availability in City of Carpinteria

Speed Test Results

The graphics below detail the distribution of the received internet speed according to the data collected from the speed tests in the City of Carpinteria.



a) Download speed test results



b) Upload speed test results

Figure 23: Speed Test results across the City of Carpinteria

Community Stakeholders Needs Assessment

The June 2022 public forum was held in the Carpinteria Children's Project auditorium and moderated by Supervisor Das Williams. Based on all the data collected, affordability and access appear to be the most significant barriers to broadband adoption for some Carpinteria community members.

Panelists for the event included the executive director for the Children's Project, the Carpinteria Unified School District's technical director, and a local Zumaya group representative. Table 13 summarizes the themes that emerged from the comments of the panelists and the conversation that followed.

CARPINTERIA: BROADBAND COMMUNITY PROFILE

Public Forum Summary -event held on June 1 at the Carpinteria Children's Project

Challenges	• High cost of service • Lack of awareness of affordability programs • Multi-family homes: inability to access service per individual or family • Inadequate training resources/lack of awareness of training resources • Gap is caused by lack of access to modern technology • Need training • 65% of students qualify for reduced/free lunches
Opportunities	• School district put Wi-Fi on busses/vans so students can access the internet • Partnerships with providers (Connect to Compete) • Digital Navigators and workshops • Outreach opportunities • Promotoras Network and digital navigators
Barriers	• Disproportionately impacts low-income neighborhoods • Everything relies on the internet, so connectivity is required for quality of life

Table 13: Carpinteria Children's Project Public Forum Summary

Internet service is available in Carpinteria, yet the community states there is a need for affordable access. During the pandemic, the school district found it necessary to station Wi-Fi service in specific neighborhoods to ensure connectivity.

Policy and Planning

Project team members met with city staff multiple times to discuss policy and planning efforts and shared the statewide resource, Getting Connected: A Broadband Deployment and Adoption Resource Guide for Local and Regional Government Leaders18. Survey questions were adapted from the Guide and emailed to city staff for their direct input. Responses displayed informed key opportunities and priorities for the City of Carpinteria to improve redundancy and resiliency.

Analysis shows key areas where Carpinteria can incorporate updated policies to accelerate broadband infrastructure development, including community Wi-Fi. The city's General Plan calls out broadband infrastructure as a priority, and therefore a comprehensive list of easements and rights-of-way should be developed to enhance future work efforts. An open trench work policy is a good start. Further analysis should be done to determine how it aligns with the placing of conduit and if further action needs to be taken to accelerate broadband deployment.

[18]*California Emerging Technologies Fund (CETF) and Valley Vision, 2021: cetfund.org/report/getting-connected-a-broadband-deployment-and-adoption-resource-guide*

CARPINTERIA: BROADBAND COMMUNITY PROFILE

Broadband Infrastructure

The city's broadband journey began with its investment in the SBCAG-led initiative to develop a regional strategy. The city does not intend to develop any level of broadband competency, capability, or staff support. Primary focus areas are the development of capacity in portions of the community with specific needs, which include mobile home parks and multifamily dwellings. The city does not currently provide community Wi-Fi.

Inventory Of Assets	Some
Permitting Authority	Yes
Installed Conduit	No
Dig Once Policy	No
Permit Process	Yes
Online Process	Yes
BB Priority In Planning	Yes
Smart City Priority	No
Wi-Fi/Fiber Interest	Yes

Table 14: City of Carpinteria Broadband Policy and Planning Assessment

Key Opportunities & Priorities (In Alignment With Broadband For All)

The City of Carpinteria should consider the following actions:

1. **Access (Capacity & Connectivity)**

    a. Continue development and availability of community Wi-Fi maintained by the City or in partnership with education and community centers.

    b. Seek grant funding to increase staffing capacity within City departments to work on broadband priorities.

2. **Affordability & Adoption**

    a. A community Wi-Fi system would benefit those unable to connect due to cost.

    b. Support partnerships with the Digital Equity Coalition to expand awareness of the Affordable Connectivity Program.

3. **Requirements for Redundancy & Resiliency**

    a. Continue to partner with SBCAG in regional coordination of the Golden State Connect Network and last-mile planning and implementation.

    b. Consolidate and create a complete asset inventory that could be utilized for broadband infrastructure deployment.

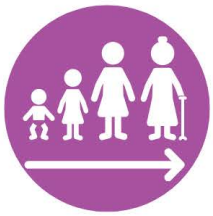
    c. Prioritize smart city planning in the General Plan and develop necessary and corrsponding policies.

GOLETA: BROADBAND COMMUNITY PROFILE

There are gaps in internet service for some of the community, but current major carriers plan to address the needs. Goleta has the opportunity to achieve smart city status and should consider installing conduit alongside any near-term and future city-led infrastructure projects. The overall footprint and proximity to neighboring communities benefit smart city planning, enabling them to connect regionally. In addition, the already-present high-tech industry could grow and expand with an increase in fiber infrastructure while also ensuring the surrounding community can connect.

Population Size*

32,690



Median Age*

35.6

Geographic Footprint

7.9 sq mi

Demographic data from U.S. Census Community Snapshot[18]

The City of Goleta was incorporated in 2002, marking its 20th anniversary in 2022. The city's eight square miles are nestled between the Santa Ynez Mountains and the Pacific Ocean, home to, among others, staff and faculty of the nearby University of California, Santa Barbara, and employees of a broad range of large companies headquartered within the city limits. Goleta's natural assets are a draw for families and businesses, including approximately 550 acres of city parks and open space, including nine neighborhood parks, five community parks, eight neighborhood open spaces, six regional open spaces, one community center, and three mini-parks[19]. The Goleta Train Depot is a passenger rail station served by Amtrak, connecting coastal train travel through the city. Another critical regional travel hub, the Santa Barbara Airport, is located within the City of Santa Barbara's jurisdiction adjacent to the City of Goleta.

More than 32,000 people live in Goleta, and many more commute to work within the city limits. The city hosts a thriving entrepreneurial business community. For a relatively small city, there is a well-established contingency of large, well-known companies that have made Goleta their headquarters, and new entrepreneurs are popping up each year. Manufacturing is an important industry feeding the Goleta job market and offering a range of employment opportunities across socioeconomic and educational backgrounds. The retail industry is another important job-producing sector, which positions successful homegrown shops alongside larger national retailers in one of the multiple shopping districts that serve students, homeowners, and renters across the community. The health care and social services industry includes Cottage Hospital sites, Sansum Goleta Family Medicine, administrative offices, and several specialized private practices. Finally, the information and communications sector in Goleta represents the many technology firms that have settled in Goleta since before its inception. The city continues to attract more interest from this industry.

[18] U.S. Census Community Snapshot, accessed September 2022: data.census.gov/cedsci/profile/Goleta_city,_California?g=1600000US0630378

[19] See Parks, Facilities, and Playgrounds Master Plan: cityofgoleta.org/projects-programs/parks-open-space/parks-master-plan

GOLETA: BROADBAND COMMUNITY PROFILE

Equalitech, a local non-profit, has served residents for over five years and provided no-cost computer access and digital literacy programming through the pandemic. Equalitech is an official proctor of the NorthStar Digital Literacy program and demonstrated the need for improved connectivity and adoption, particularly in Spanish-speaking communities, by creating partnerships with local promotoras and educational organizations to improve opportunities through digital access. The median household income in Goleta is $98,03520. Yet, 43% of households are eligible for the Affordable Connectivity Program (ACP), a benefit for low-income households identified by federal program standards. Only 13% of eligible households are enrolled in an ACP program, leaving an affordability gap to fill in efforts to narrow the digital divide[21].

One-fifth of the population of Goleta are children under 18[22], and the city posts the second lowest child poverty rate in the county at 9.3%[23], significantly lower than statewide and countywide averages. Over one-third of residents, 34% (ages 18 and older) and 37% (ages 5-17)[24], speak a language other than English in the home. The school district reflects the multilingual realities of students' families providing dual language immersion programs, bilingual support services, and a website using Google translate to adapt text into five different languages. Children attend one of the schools in either the Goleta Union School District (Transitional Kindergarten – 8th grade) or the Santa Barbara Unified School District (high school). The school district provides Chromebooks and hotspots as needed to the student community, along with technical support services in English and Spanish.

[21] U.S. Census Community Snapshot, accessed September 2022: data.census.gov/cedsci/profile/Goleta_city,_California?g=1600000US0630378
[22] Geographical Information Center, Chico State Enterprises, accessed August 2022: https://www.arcgis.com/apps/dashboards/8c0249a9de8d404a9b49966fb824b728
[23] U.S. Census Community Snapshot, accessed September 2022: data.census.gov/cedsci/profile/Goleta_city,_California?g=1600000US0630378
[24] U.S. Census Community Snapshot, accessed September 2022: data.census.gov/cedsci/profile/Goleta_city,_California?g=1600000US0630378

GOLETA: BROADBAND COMMUNITY PROFILE

Broadband Needs Assessment

Broadband Service Availability

Based on all available data, broadband availability in Carpinteria is high. The map displayed below was created using the public CPUC information available via the GIS Map Data Portal (refer to Section 1, Table 1 for CPUC served/unserved definitions). It shows most of the City of Carpinteria in green, indicating that a 25/3 Mbps Service is accessible in a significant portion of the county.

Community reports from Carpinteria indicate that the cost of broadband service is too high, which impacts the service's adoption. In addition, a lack of awareness of affordability programs within the community was identified.

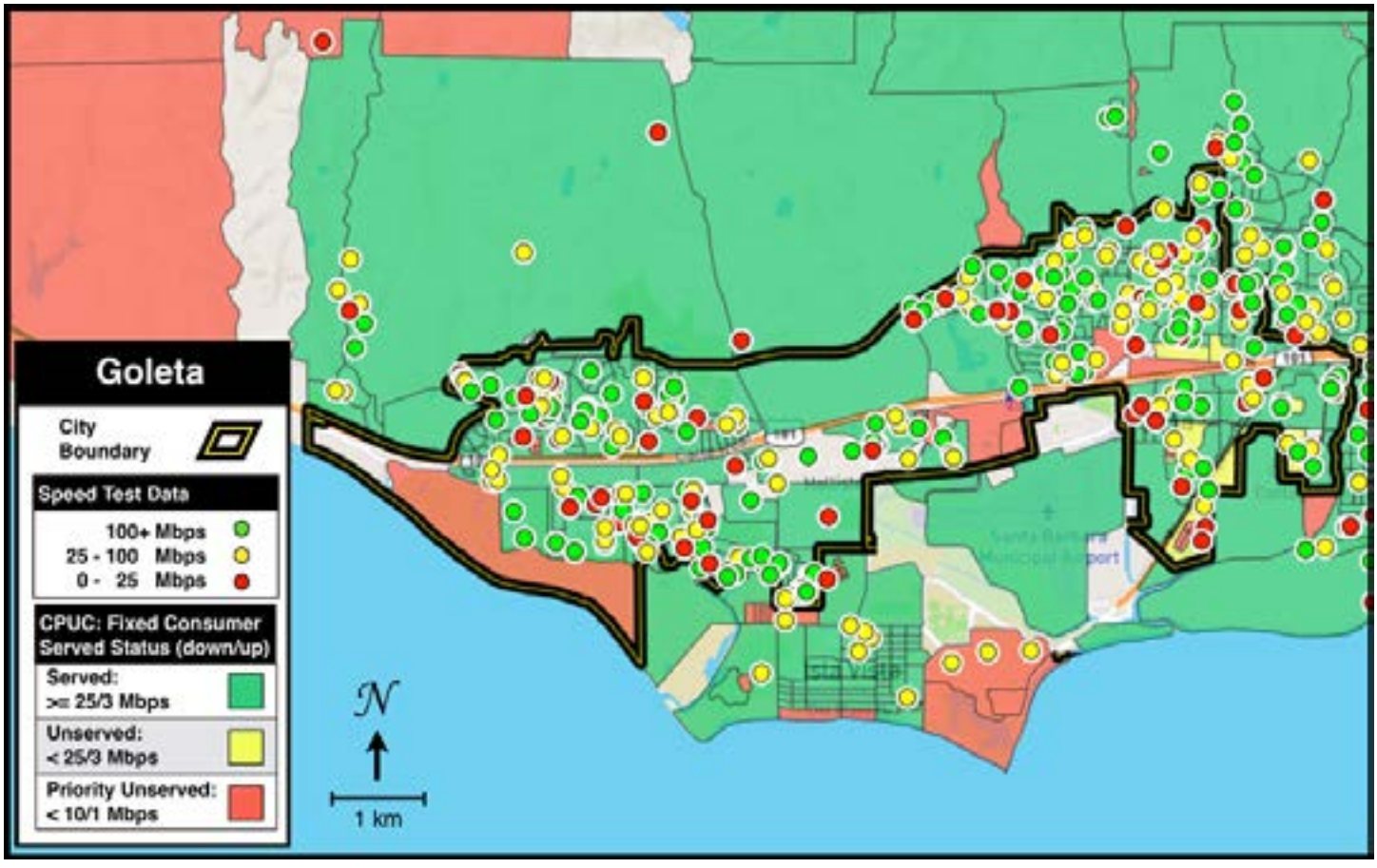
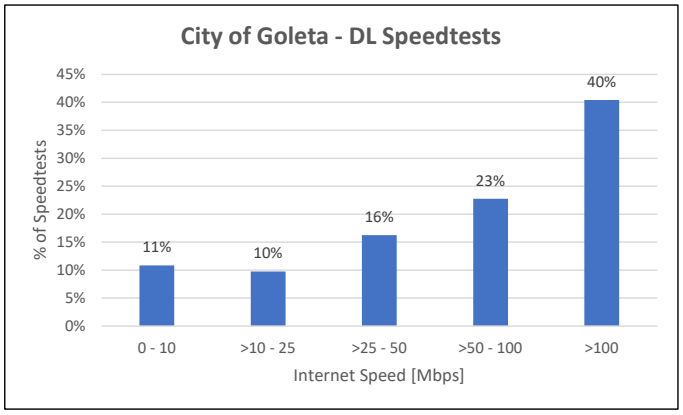


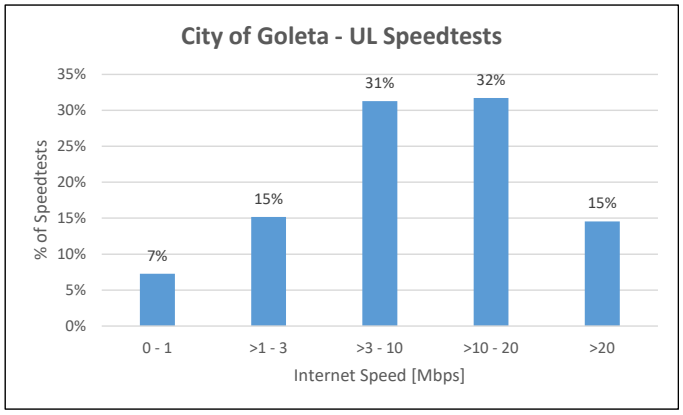
Figure 24: Broadband availability in the City of Goleta

Speed Test Results

The graphics below detail the distribution of the received internet speed according to the data collected from the speed tests in the City of Goleta.



a) Download speed test results



b) Upload speed test results

Figure 25: Speed Test results across the City of Goleta

The speed tests performed in Goleta showed speeds ranging from very slow downloads and upload speeds to having a nearby neighbor with download speeds of over 100Mbps. A speed test posted by the Goleta Valley Cottage Hospital network showed a download speed of 844Mbps and an upload speed of 328Mbps.

Community Stakeholders Needs Assessment

A public forum was held in Goleta on May 16 in the Goleta City Council Chambers and moderated by Supervisor Joan Hartmann. Based on the meetings and conversations and the data collected, Goleta's barrier to Broadband for All appears to be affordability and adoption for families, retirees, students, and the workforce as the cost of living continues to rise.

Panelists included the founder of Equalitech, property development and management professionals, the Executive Director of Isla Vista Youth Programs, the Assistant Superintendent of Goleta Union School District, the COO/CFO of Santa Barbara Neighborhood Clinics, and the President/CEO of the South Coast Chamber of Commerce. Table 15 summarizes the discussion points arising from questions posed to the panel by the moderator and the community discussion.

GOLETA: BROADBAND COMMUNITY PROFILE

Public Form Summary – event held May 16, 2022, Goleta City Council Chamber

Challenges	• Increased cost of living; internet may not be the priority • Concerns over internet safety for children • Digital literacy: unable to connect or know how to use the internet • Lack of devices • Lack of home access to the internet for some community members
Opportunities	• Need reliable connectivity for services to clients, patients, POS systems • A hub of technology that thrives on a business core with good connectivity • Equalitech model: digital navigators and NorthStar Digital Literacy programs
Barriers	• Disproportionately impacts some parents, seniors, students, and multilingual community members and English language learners • Lack of devices leaves some 'left out' and missing opportunities • Need reassurance that medical devices will stay connected

Table 15: Goleta City Council Chamber Public Forum Summary

In the public forum, two community members stated that access was challenging and unreliable. Based on conversations with the public sector and the major ISP, the community is covered in accessible internet service.

Results from the 93111 and 93117 zip codes were included in needs assessment reporting. Of the 145 participants that answered the question of access in the survey, all but one said they had internet access at home. In the public forum, two community members stated that access was challenging and unreliable. Based on conversations with the public sector and the major ISPs, the community is covered in accessible internet service.

Based on the meetings and conversations and the data collected, Goleta's barrier to Broadband for All appears to be affordability and adoption for their families, retirees, students, and workforce as the cost of living continues to rise.

Policy and Planning

Project team members met with city staff multiple times to discuss policy and planning efforts and shared the statewide resource, *Getting Connected: A Broadband Deployment and Adoption Resource Guide for Local and Regional Government Leaders*[25]. Survey questions were adapted from the Guide and emailed to city staff for their direct input. Responses informed key opportunities and priorities for the City of Goleta to improve redundancy and resiliency.

[25] *California Emerging Technologies Fund (CETF) and Valley Vision, 2021: cetfund.org/report/getting-connected-a-broad-band-deployment-and-adoption-resource-guide*

GOLETA: BROADBAND COMMUNITY PROFILE

Analysis shows Goleta is a contract city in that it has no intention to develop broadband as a utility. However, based on conversations with city staff, public money may be used to establish infrastructure and asset ownership. Whenever the development of new capacity is concerned, the city will seek a revenue model (sources) to maintain staff and ensure their access to ongoing professional development in this area year after year.

Broadband Infrastructure

With City ownership of the 1,464 local streetlights, Goleta is well-positioned to serve as a pilot for smart city technology. From a connectivity standpoint, the town is complete. The "Old Town" area is a specific area of interest where considerable planning and investment occur. A phased approach to planning starts with community Wi-Fi in strategic public areas (Phase 1), the development of a roadmap and grid of city assets (Phase 2 - community network connecting anchors) and leads to the deployment of smart city technologies (Phase 3).

Inventory Of Assets	Some
Permitting Authority	Yes
Installed Conduit	No
Dig Once Policy	No
Permit Process	Yes
Online Process	Yes
BB Priority In Planning	Yes
Smart City Priority	No
Wi-Fi/Fiber Interest	Yes

Table 16: City of Carpinteria Broadband Policy and Planning Assessment

> *"The Broadband Strategic Plan's community outreach showed us just how important affordable internet access and digital literacy is to Goleta residents. It is eye-opening to see how closely tied affordability and faster internet speeds is with broadband infrastructure which can help communities like ours innovate to improve public health, safety and transportation for the benefit of all residents."*
>
> ***-SBCAG Director Paula Perotte, Mayor of the City of Goleta***

Key Opportunities & Priorities (In Alignment With Broadband For All)

The City of Goleta should consider the following actions:

1. **Access (Capacity & Connectivity)**

    a. As per conversations with city staff, develop community Wi-Fi in the Camino/Calle Real corridor that meets 100/100Mbps.

    b. Lead the conversation exploring partnership opportunities with anchor institutions and neighboring communities in smart city planning and what sort of accessible work would be required for a smart city network.

2. **Affordability & Adoption**

    a. Ensure capacity to operate and maintain a 24/7 community Wi-Fi system through grant funding, private partnerships, or both.

    b. Partner with the Digital Equity Coalition to ensure affordability and adoption for the community is on track to meet 2026 targets.

3. **Requirements for Redundancy & Resiliency**

    a. Continue to partner with SBCAG in regional coordination of the Golden State Connect Network and last-mile planning and implementation.

    b. Consider developing a smart city strategy to draw the link from current and targeted businesses.

    c. Identify and support catalyst projects that benefit from smart city planning.

    d. Meet with major providers to discuss public/partnership opportunities and assess whether the installation of city-owned conduit could rapidly move Goleta forward in smart city planning.

    e. Prioritize infrastructure planning and necessary policies to reduce the barrier to fiber infrastructure deployment.

GUADALUPE: BROADBAND COMMUNITY PROFILE

What makes Guadalupe unique is the engagement and buy-in of civic organizations like the Guadalupe Business Association, Los Amigos de Guadalupe, Guadalupe Community Changers, and their grassroots community spirit. The community is well positioned to serve as a pilot and model for bridging their digital divide and increasing digital equity. While some data shows the community has access to the internet, the community reports say they are not, and there is work to do. The school district significantly upgraded its wiring during the pandemic to increase its ability to provide service to the hotspots they deployed. The district is poised now as a true anchor institution, and it will be important in the near term to explore other opportunities in the planning and development of a reliable and redundant network that meets the needs of the greater community and bolsters its resilience. Timing is essential as new developments are underway and the area within the city continues to grow.

Population Size*

8,057

Median Age*

27.6

Geographic Footprint

1.39 sq mi

Demographic data from U.S. Census Community Snapshot[26]

Geographic significance to broadband infrastructure are arterials that enable the state's middle-mile connectivity resulting in last-mile opportunities. The City of Guadalupe sits in the northwestern corner of Santa Barbara County, forming a crossroads between the Pacific Coast Highway CA-1 and CA-166. The city hosts an Amtrak station providing a passenger line stop near the junction of the Union Pacific Railroad and the Short Line Santa Maria Valley Railroad, which serves primarily commercial freight transportation. Aside from the transport lines through the city, Guadalupe is largely rural, sitting among some of the most productive agricultural lands in the state and next to the National Natural Landmark Guadalupe-Nipomo Dunes Preserve. Guadalupe also boasts a theater that has been recently added to the National Historic Register and has plans for renovation, which would include a three-story campus for support and regional education in the performing arts, emphasizing the need for high-capacity broadband connectivity.

Guadalupe is home to many agricultural workers, and the dominant industries providing jobs in the city include agriculture, education, wholesalers, and retail. In agriculture, employers have identified a growing reliance on technology to communicate, requiring employees to advance their digital literacy skills. The local school district is a significant employer in the education sector, serving students from preschool through 8th grade at the Guadalupe Union School District, after which students attend a high school in a nearby district.

[26] *U.S. Census Community Snapshot, accessed September 2022: data.census.gov/cedsci/profile/Guadalupe_city,_California?g=1600000US0631414*

GUADALUPE: BROADBAND COMMUNITY PROFILE

Neighboring Santa Maria provides additional opportunities in education through employment with Allan Hancock College, Santa Barbara Business College, and the pre-K – 12 districts serving the area. The wholesale market is made up predominately of agriculture-related products, from seeds to the distribution of produce. Small businesses owned by local entrepreneurs and their families comprise the retail sector. Within the corridor of the city, where there are food services and light industrial manufacturing businesses, there are opportunities to enhance and grow those businesses when they have better broadband access, as the Guadalupe Business Association notes that connectivity is lacking.

The city has an overall population of 8,057, with nearly 80% speaking a language other than English in the home. Over a third of the population are children under 18, and according to the most recent U.S. Census, 38% live below the poverty line. The median age is 27.6 reflecting the youngest average age among Santa Barbara County's municipalities. Guadalupe Union School District reported that during the COVID-19 pandemic, parents could attend school conferences and engage with educators in higher numbers because communication transitioned online, and they could use their cell phones to attend meetings. Of all households in Guadalupe, 47% are eligible for the Affordable Connectivity Program (ACP), and 46% of those eligible are enrolled[27]. Compared to countywide statistics, this is a significantly high number of enrollments in a benefits program designed to improve access to broadband through affordable plans and low-cost devices.

[27] *Geographical Information Center, Chico State Enterprises, accessed August 2022: https://www.arcgis.com/apps/dashboards/8c0249a9de8d404a9b49966fb824b728*

Broadband Needs Assesment

Broadband Service Availability

Based on all available data, broadband availability in Guadalupe is extensive. The map displayed below was created using the public CPUC information available via the GIS Map Data Portal (refer to Section 1, Table 1 for CPUC served/unserved definitions). It shows most of the City of Guadalupe in green, indicating that a 25/3 Mbps Service is accessible in a significant portion of the county.

Regarding ISP presence, Frontier and Charter are the incumbent broadband providers in Guadalupe. While there is a belief that the community has broadband connectivity opportunities, affordability and adoption appear to be the primary issues.

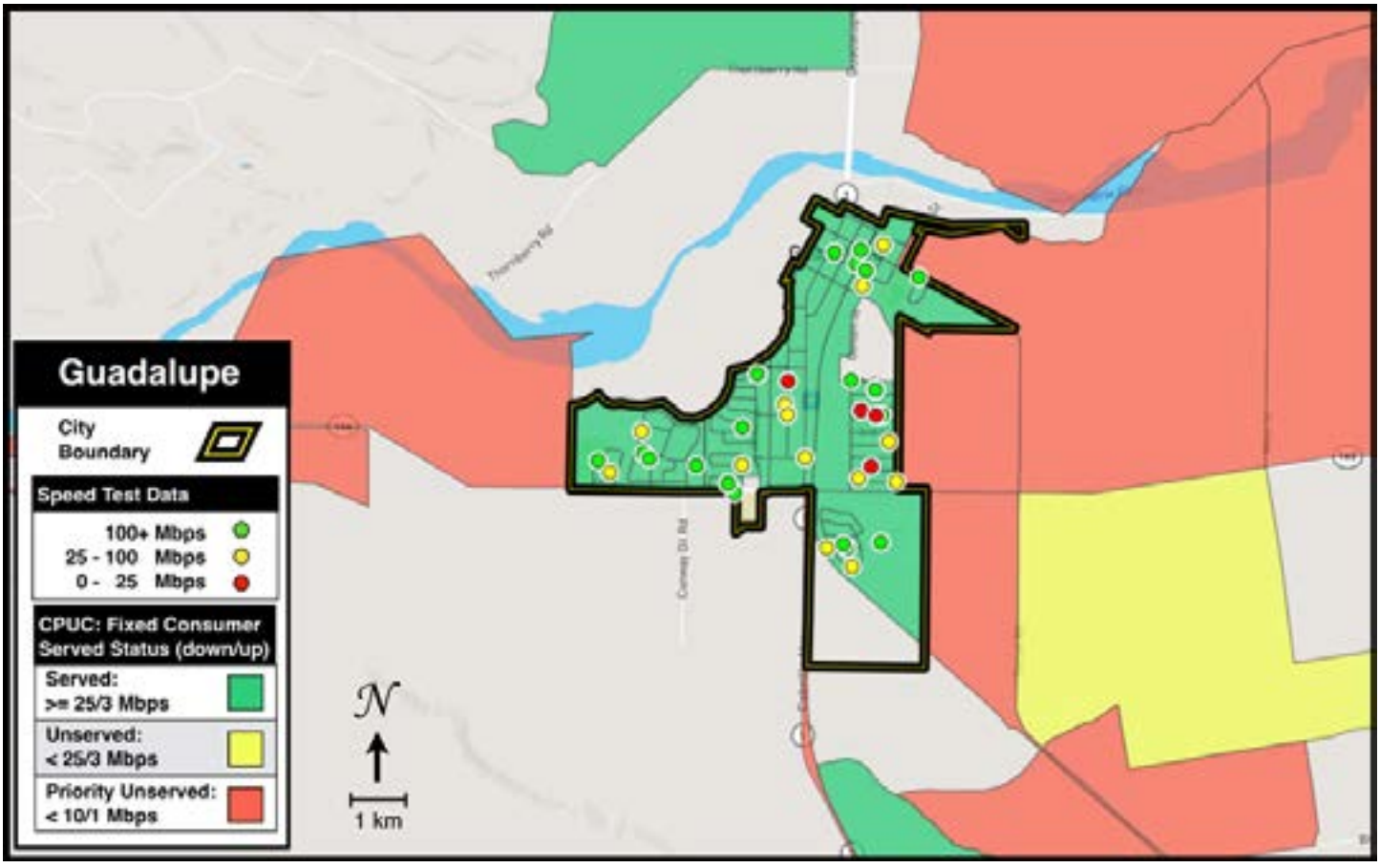
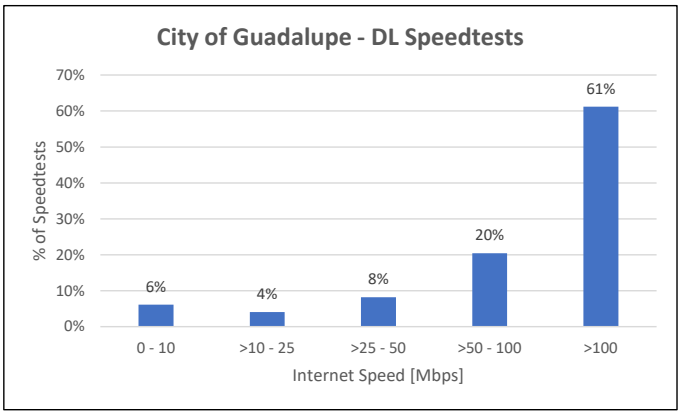


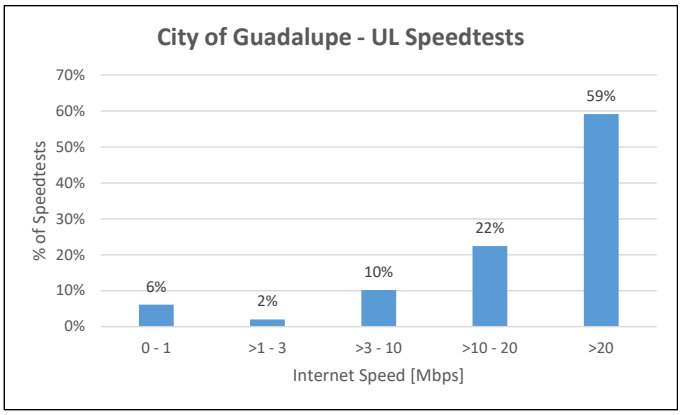
Figure 26: Broadband availability in City of Guadalupe

Speed Test Results

The graphics below detail the distribution of the received internet speed according to the data collected from the speed tests in the City of Guadalupe.



a) Download speed test results



b) Upload speed test results

Figure 27: Speed Test results across the City of Guadalupe

Speed test results did not reflect what was reported by the community during the outreach forums. During the pandemic, the school district deployed 500 hot spots; the business community representative reported slow speeds or difficulty accessing service, and the city reported a desire for more infrastructure. Of the 49 tests, speeds ranged from very slow to over 250mbps. Upload speeds ranged from very slow to over 250mbps.

What made this data challenging to understand was that most of the test takers were using a California State University connection and not the local primary carriers. Infrastructure within or around Guadalupe provides 100/100Mbps service, which may not be accessible in some community areas. Community members reported that there is some infrastructure, but it does not serve all areas of the community. Regardless of the infrastructure potentially available, the primary reasons that residents are reporting not being connected are due to affordability issues and a lack of devices.

Regardless of the infrastructure conversation, access and adoption are barriers to Guadalupe bridging the digital divide.

Community Stakeholders Needs Assessment

Two public forums were held in Guadalupe. Supervisor Lavagnino moderated the first forum. Participants included the Mayor of Guadalupe, the President of the Guadalupe Business Association, the director of the Family Services Agency, the Superintendent of Guadalupe Union School District, a co-executive director of Los Amigos de Guadalupe and the director of information services from the Community Health Centers of the Central Coast. The second forum was intended to be held in Spanish. It included the President of the Guadalupe Business Association, the director of the Family Services Agency, a co-executive director of Los Amigos de Guadalupe, and the lead educator from the local People's Self-Help Housing. Table 17 summarizes comments of the panelists and the conversations that followed.

Public Forum Summaries – events held on May 4 and May 11 at Guadalupe City Hall

Challenges	• Lack of awareness of affordability programs • Program/provider restrictions: unable to access affordability programs due to previous tenants • Multiple individuals/families sharing a home • Need access to training and devices • Requires trusted agents to do outreach and help with devices and training • Need reliable access – 500 hot spots deployed for students • School had to rewire school to increase access • Community members need access to devices
Opportunities	• Partner with Family Services Agency and Little House for outreach • Guadalupe Business Association has 40 members advocating for better connectivity • Business expansion needs more access to infrastructure
Barriers	• Disporportionately impacts students who need access to educational resources and ag-workers (transition to digital communication requires training)

Table 17: Guadalupe City Hall Public Forum Summary

It was also reported that within the agricultural workforce, there is a growing demand by employers for employees to be able to access scheduling and other information via the internet. Mostly, they are using phones to access the necessary information. In addition, employers in the education sector have identified parents' growing reliance on technology to communicate with their children's teachers.

Policy and Planning

Project team members met with city staff multiple times to discuss policy and planning efforts and shared the statewide resource, *Getting Connected: A Broadband Deployment and Adoption Resource Guide for Local and Regional Government Leaders*[28]. Survey questions were adapted from the Guide and emailed to city staff for their direct input. Responses informed key opportunities and priorities for the City of Guadalupe to improve redundancy and resiliency.

Conversations with community leaders suggest an interest in developing infrastructure and policies to improve broadband access. With regional support, the city can build a strong foundation of efficient and effective policy and planning strategies to reach broadband goals.

Inventory Of Assets	No
Permitting Authority	Sometimes
Installed Conduit	No
Dig Once Policy	No
Permit Process	Yes
Online Process	Yes
BB Priority In Planning	In Process
Smart City Priority	No
Wi-Fi/Fiber Interest	No

Table 18: City of Guadalupe Broadband Policy and Planning Assessment

[28] *California Emerging Technologies Fund (CETF) and Valley Vision, 2021: cetfund.org/report/getting-connected-a-broadband-deployment-and-adoption-resource-guide*

Broadband Infrastructure

In the development of Pasadera, there appear to be conduits and junction boxes available to support Fiber-to-the-Home. Charter Communications has shared with the city its fiber footprint:

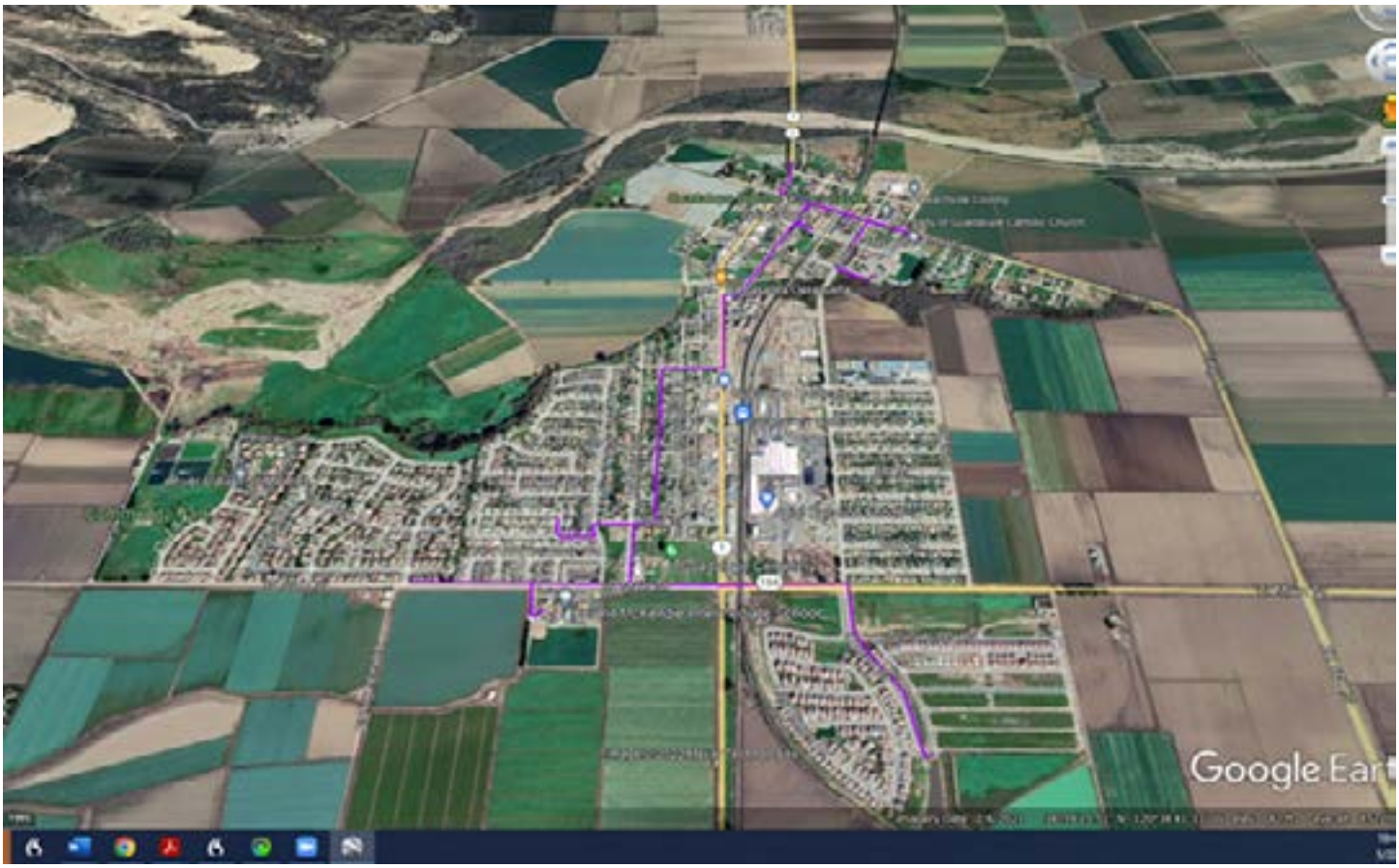


Figure 28: Charter Communications Fiber Map for City of Guadalupe

In recent years, the city has undertaken initiatives to provide community Wi-Fi access in public places, including recreation centers, libraries, and the senior center. The Leroy Park initiative recently included $39,000 of ARPA funding for updates.

The City of Guadalupe does not currently have a complete and up-to-date asset inventory; rights-of-way, easements, and other broadband infrastructure deployment information and mapping are on the City's project list. Potential infrastructure components are already in place, and the viability of their structural integrity remains to be validated.

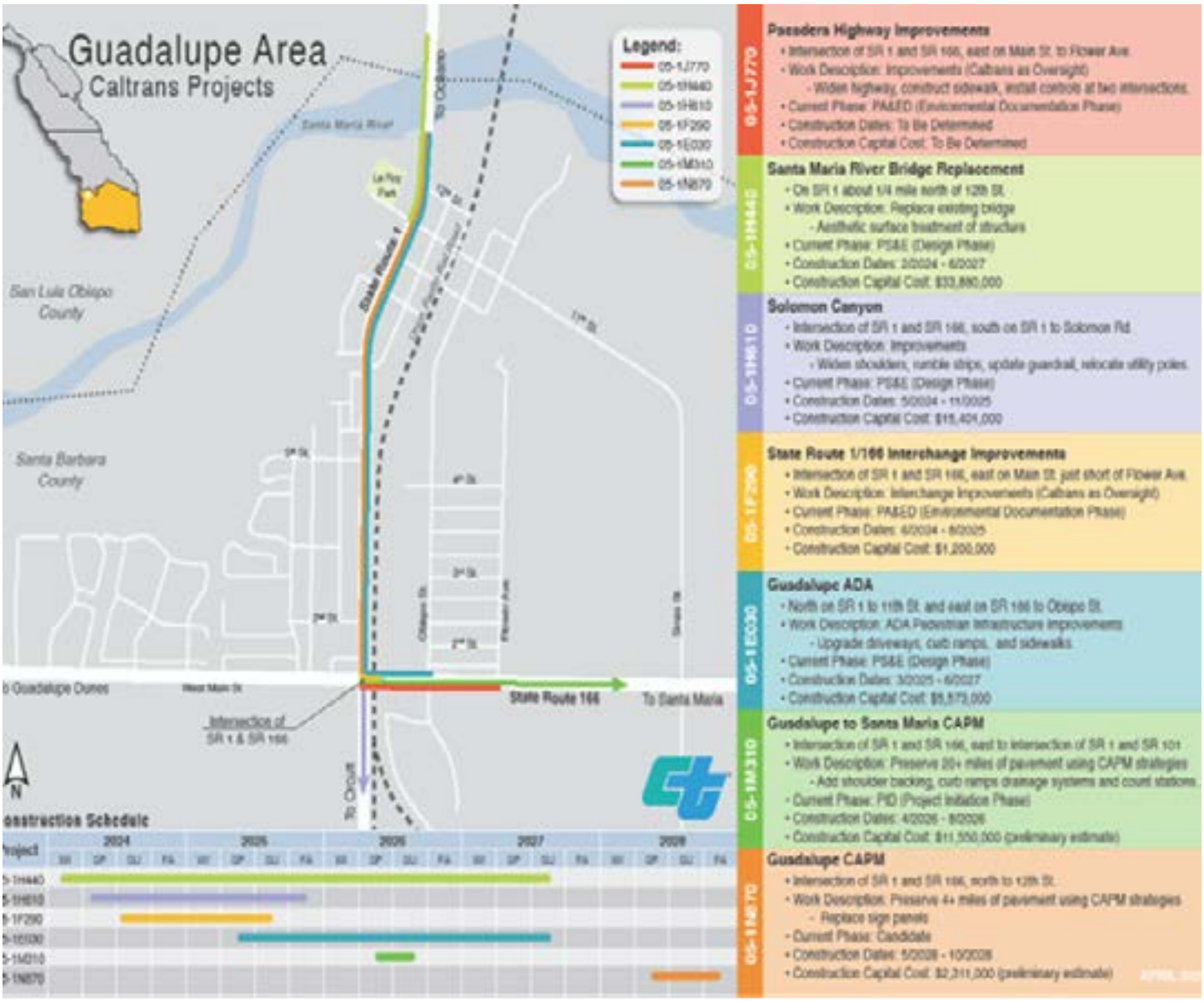


Figure 29: Caltrans Projects for City of Guadalupe

Key Opportunities & Priorities (In Alignment With Broadband For All)

The City of Guadalupe should consider the following actions:

1. **Access (Capacity & Connectivity)**

    a. Proactively work with the school district to determine any partnership opportunities either together or with the private sector.

    b. Assist in identifying residences that are unable to connect to internet service and develop an inventory of buildings not up to current standards as a tracker for future funding opportunities or ordinance development.

2. **Affordability & Adoption**

    a. Community feedback identified barriers such as lack of equipment, limited knowledge of affordability programs, and technology training. It is essential to foster partnerships that will overcome the barriers.

    b. Support deployment of the Affordable Connectivity Program

    c. Continue to engage with the community and support local work efforts and the work of the Digital Equity Coalition.

3. **Requirements for Redundancy & Resiliency**

    a. Continue to partner with SBCAG in regional coordination of the Golden State Connect Network and last-mile planning and implementation.

    b. Continue to partner with SBCAG as the regional lead on broadband planning to support staffing capacity.

    c. Focus on policy development that reduces the barriers to fiber broadband deployment, including General Plan update alignments

    d. Meet with the major local service providers and gain a clear understanding of the infrastructure available and determine what is needed for redundancy and resiliency

    e. Continue to engage with and track conversations and updates by the Golden State Connect network.

LOMPOC: BROADBAND COMMUNITY PROFILE

As Lompoc makes decisions on broadband infrastructure and planning, consideration must be given to the significant number of anchor institutions and the opportunity to build a safety net for the community. Internet is available, yet the community's low-income residents and some business sectors are challenged with a lack of affordable access. Economic development considerations connected to broadband infrastructure need to be explored. With the growing focus on Vandenberg Space Force Base, Lompoc should not be overlooked as an asset providing housing, a workforce, and services to the future private spaceport. Internet access and digital equity and inclusion initiatives are important to track to support workforce development.

Population Size*

44,444

Median Age*

33.4

Geographic Footprint

11.62 sq mi

Demographic data from U.S. Census Community Snapshot[29]

The City of Lompoc is nestled in the Santa Rita Hills, nearly equidistant to the city of Santa Barbara in the south and San Luis Obispo in the north. It is situated near the center of California's coast along the Pacific Coast Highway, California Highway 1, and has major arteries running through the city, including Highway 1 and Highway 246. A map of the city is available at 636657284447470000 (cityoflompoc.com). A map of the region is posted at 636657284445330000 (cityoflompoc.com).

The City of Lompoc was founded as a town in 1874 and incorporated as a city on August 13, 1888. Before the city's establishment, the construction of the La Purisima Mission in 1787 marked the earliest European settlement in the Lompoc Valley. Growth in the Lompoc Valley was sparked by the 1901 completion of the coastal railroad between San Francisco and Los Angeles, which included the extension of a spur into Lompoc. The Lompoc Valley is home to Vandenberg Space Force Base, the first missile base of the United States Air Force. Today, the city is a travel destination known for its downtown mural program, local wines and acclaimed cuisine, historic landmarks, parks, and nearby beaches.

This city profile provides complete information on the city and its services: 636657286079970000 (cityoflompoc.com). The presence of community Wi-Fi networks at local libraries and public spaces is of major significance to Broadband for All goals.

Lompoc is home to 44,444 residents, and approximately 44% speak a language other than English at home, indicating a strong need for multilingual resources to support the local community.

[29] *U.S. Census Community Snapshot, accessed September 2022: data.census.gov/cedsci/profile/Lompoc_city,_California?g=1600000US0642524*

LOMPOC: BROADBAND COMMUNITY PROFILE

Lompoc has the second-highest proportion of children as residents compared to other municipalities across the county; 27.8% of local community members are children under 18 and attend one of the schools in the Lompoc Unified School District. The largest job-contributing industry in the city is Health Care and Social Services. Major health centers within the city limits, Lompoc Valley Medical Center and Lompoc Health Center, and additional private providers run small businesses to serve the community. Education is the second-largest industry in the city in terms of jobs provided due to the presence of the Lompoc Adult Education Center and Allan Hancock College campuses, in addition to the local pre-K – 12 school district. Public Administration is the third-largest industry in Lompoc, with city staff serving the municipality and offices serving County departments housed within the city limits. Significantly, the Education and Public Administration sectors offer compelling benefits packages, including retirement planning and health plans. The fourth largest sector is Retail, comprised of small businesses and large nationwide chains serving the local community's needs.

The average household income is approximately $57,700, about $20,000 below the countywide average household income. Over a quarter of all children under 18 live below the poverty line (27%), and of the total population, 17% of residents are part of this designated underserved group. Over one-third of Lompoc residents are eligible for the Affordable Connectivity Program (ACP), 36% of total households. Of all the eligible households, 30% are enrolled with ACP and eligible for a reduced-price or free internet plan at minimum designated speeds[30]. The enrollment rate is on par with several North County zip codes and surpasses enrollment rates in the south county; however, increased enrollment rates would serve a significant portion of Lompoc residents. Current efforts aligned with initiatives at Partners in Education, Allan Hancock College, and the Department of Social Services may continue to improve enrollment rates.

Data collection efforts in Lompoc sourced city personnel, local business leaders, local non-profit leaders, education leaders, and community members, providing a clear picture of the current status of broadband efforts and revealing opportunities for future planning.

> *"The COVID-19 pandemic brought to light what many residents were already unnecessarily enduring, the lack of reliable and affordable access to internet. The broadband survey and speed test is vital to our efforts to advocate for fast, flexible, affordable, and reliable internet service for all residents and businesses in our county."*
>
> ***-2022 SBCAG Board of Directors Vice-Chair Jenelle Osborne***

[30] *Geographical Information Center, Chico State Enterprises, accessed August 2022: https://www.arcgis.com/apps/dashboards/8c0249a9de8d404a9b49966fb824b728*

Broadband Needs Assessment

Broadband Service Availability

Based on all available data, broadband availability in the City of Lompoc is extensive. The map displayed below was created using the public CPUC information available via the GIS Map Data Portal (refer to Section 1, Table 1 for CPUC served/unserved definitions). It shows most of the City of Lompoc in green, indicating that 25/3 Mbps Service is accessible.

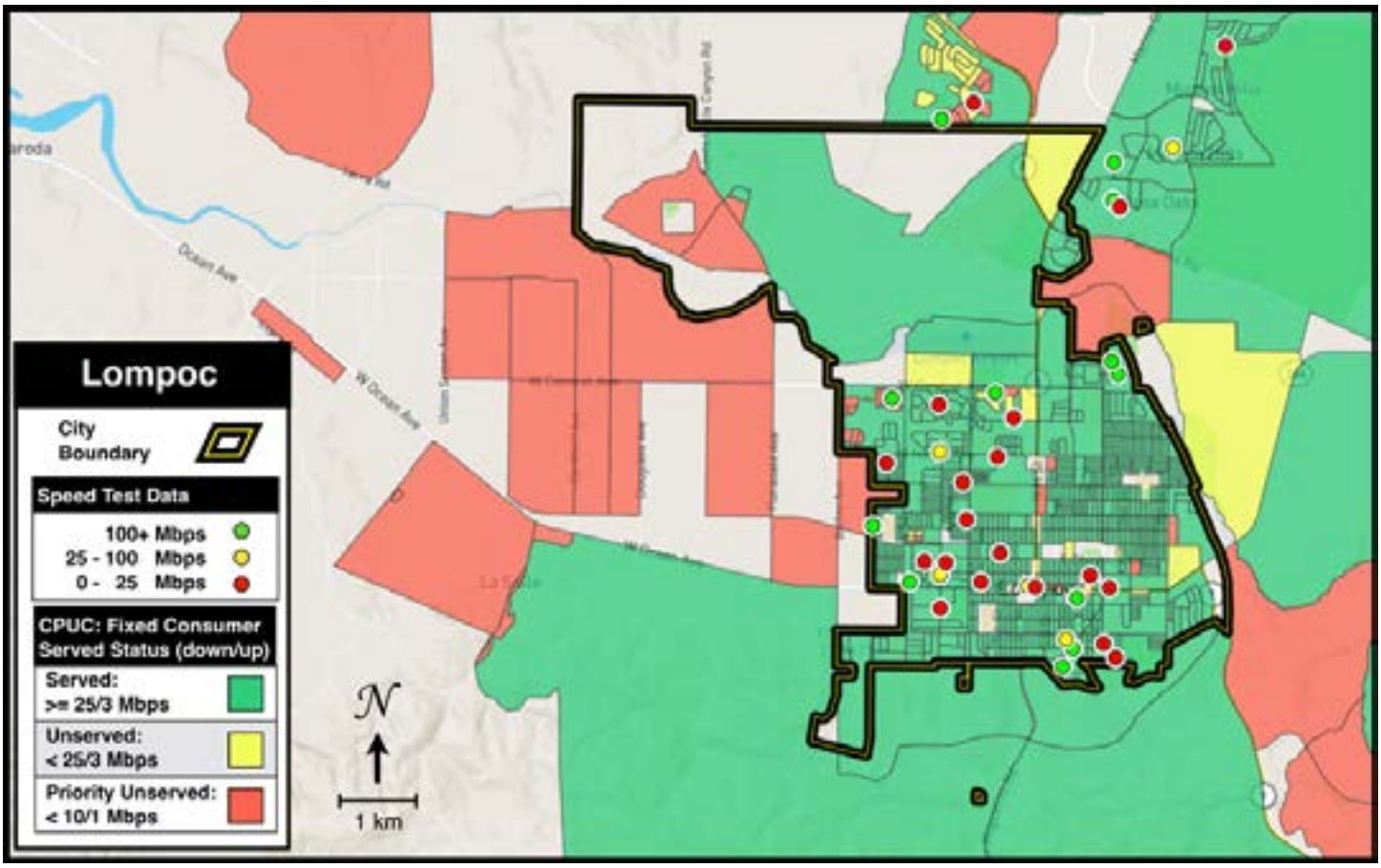
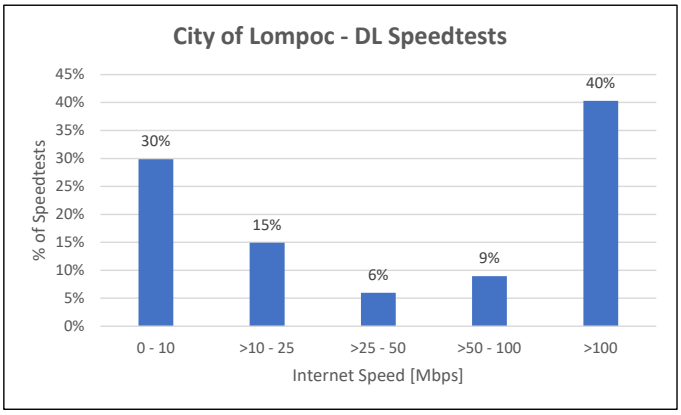


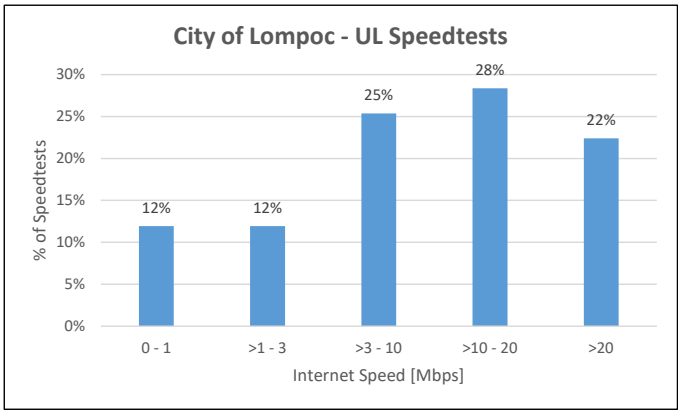
Figure 30: Broadband service availability in the City of Lompoc

Speed Test Results

The graphics below detail the distribution of the internet speed according to data collected from speed tests in the City of Lompoc.



a) Download speed test results



b) Upload speed test results

Figure 31: Speed Test results across the City of Lompoc

Based on the 76 speed tests taken in the city and analyzing for 100/100Mbps, very few of the tests achieved this result, although some participants had excellent download and upload speeds.

Community Stakeholders Needs Assessment

The May 2022 public forum held in the city was moderated by the President of the local American Association of University Women (AAUW). The panelists included the deputy superintendent of the Lompoc Unified School District, the local YMCA Executive Director, and a Lompoc librarian. The primary themes of the conversation were a lack of awareness of affordability programs, internet access, and safety.

There is a need for additional equipment and training resources within the community and access to a community Wi-Fi system. The library reported that their hot spot and computer checkout is a valuable program specifically for job seekers and others who lack connectivity. The school district had a challenging time connecting the students during COVID and, through a unique partnership with an energy company, was able to deploy hotspots throughout the city to ensure student access.

Public Forum Summary – event held May 14, 2022, at the Adult School and Career Center

Challenges	• Lack awareness of affordability programs • Internet safety for children connecting remotely • Inadequate training resources/lack of awareness of training resources • Poor connectivity • General lack of home access to the internet
Opportunities	• Access to online job applications and online trainings • Primo Energy was a key partner in helping deploy hot spots for children via School District properties • Library checks out chrome books & hot spots to community members
Barriers	• Disproportionately impacts students, multilingual community members and English language learners, community members lacking digital literacy • Unable to apply for certain resources or register for programs that require connectivity – increased stress

Table 19: Lompoc Adult School and Career Center Public Forum Summary

More data could help with a more thorough analysis, although affordability and access to reliable internet appear to be the biggest challenges for the community. Cost is the highest barrier to internet access as internet service is available throughout the entire community.

Policy and Planning

Project team members met with city staff multiple times to discuss policy and planning efforts and shared the statewide resource, Getting Connected: A Broadband Deployment and Adoption Resource Guide for Local and Regional Government Leaders[31]. Survey questions were adapted from the Guide and emailed to city staff for their direct input. Responses informed key opportunities and priorities for the City of Lompoc to improve redundancy and resiliency.

Analysis shows that there are good broadband infrastructure development and policy alignment processes, and they are broadband ready. For policy consideration and as new fiber is brought through the city, the pavement installation moratoriums could be a significant barrier unless micro-trenching technology is excluded from the moratoriums. If not, this should be reviewed and updated as staff determines the best path forward.

Inventory Of Assets	Yes
Permitting Authority	Yes
Installed Conduit	Yes
Dig Once Policy	Yes
Permit Process	Yes
Online Process	Yes
BB Priority In Planning	Yes
Smart City Priority	Yes
Wi-Fi/Fiber Interest	Yes

Table 20: City of Lompoc Broadband Policy and Planning Assessment

LOMPOC: BROADBAND COMMUNITY PROFILE

Broadband Infrastructure

The City of Lompoc is uniquely positioned in that broadband connectivity is more of an adoption than a deployment issue. As incumbent providers, the infrastructure provided by Frontier and Comcast within the city encompasses 100% of the community. With that said, some areas immediately adjacent to the city in the unincorporated areas have known coverage issues.

Frontier Communications is currently involved with an initiative to deliver fiber to the premises of all its subscribers. In addition, the town seems to be well-positioned with Verizon 5G Home Internet service. Finally, the city already has a well-established footprint of community Wi-Fi areas.

For nearly three decades, the city has emphasized broadband infrastructure. A significant investment in establishing the current city infrastructure occurred in the 1990s when Comcast created the INET, which interconnected city facilities and the school district. A decade later, LompocNet was created to provide anyone in the community with wireless access to the internet. Today, LompocNet has some 300 subscribers. While a technology refresh of Wi-Fi infrastructure is of particular interest, the backhaul wireless network is a state-of-the-art multipoint-to-point system that connects all city facilities and serves as a foundation for the municipal network.

[31] *California Emerging Technologies Fund (CETF) and Valley Vision, 2021: cetfund.org/report/getting-connected-a-broadband-deployment-and-adoption-resource-guide*

Key Opportunities & Priorities (In Alignment With Broadband For All)

The City of Lompoc should consider the following actions:

1. **Access (Capacity & Connectivity)**

    a. Explore partnerships with education, health, library, and community centers to support a community Wi-Fi system that meets 100/100Mbps.

2. **Affordability & Adoption**

    a. Ensure capacity to seek grant funding and possibly private partners to rehabilitate current wireless infrastructure.

    b. Support local partnerships with Santa Barbara Foundation and the Digital Equity Coalition and identify how it may support connectivity for qualifying community members.

3. **Requirements for Redundancy & Resiliency**

    a. Continue to partner with SBCAG in regional coordination of the Golden State Connect Network and last-mile planning and implementation.

    b. Full assessment of connectivity of anchor institutions – benefits and opportunities.

    c. Explore public/private partnerships and develop a funding model to reduce city risk with aging infrastructure.

    d. Explore Loan Loss Reserve funding from the State (SB156) to reduce city risk with aging infrastructure.

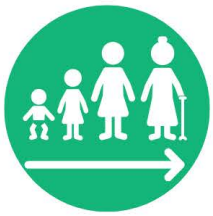
    e. Continue safety, emergency response, and cyber security in planning and policy deliberations related to smart city planning.

SANTA BARBARA: BROADBAND COMMUNITY

What makes Guadalupe unique is the engagement and buy-in of civic organizations like the Guadalupe Business Association, Los Amigos de Guadalupe, Guadalupe Community Changers, and their grassroots community spirit. The community is well positioned to serve as a pilot and model for bridging their digital divide and increasing digital equity. While some data shows the community has access to the internet, the community reports say they are not, and there is work to do. The school district significantly upgraded its wiring during the pandemic to increase its ability to provide service to the hotspots they deployed. The district is poised now as a true anchor institution, and it will be important in the near term to explore other opportunities in the planning and development of a reliable and redundant network that meets the needs of the greater community and bolsters its resilience. Timing is essential as new developments are underway and the area within the city continues to grow.

Population Size*

88,665



Median Age*

38.9

Geographic Footprint

42.0 sq mi

Demographic data from U.S. Census Community Snapshot[32]

The City of Santa Barbara is situated along U.S. Highway 101 between a south-facing coastline and the Santa Ynez Mountains. Santa Barbara has been promoted as the “American Riviera” and attracts over seven million visitors each year that attend arts and culture events and outdoor activities and enjoy the many hospitality services offered throughout the city’s network of hotels and restaurants.

In addition to being a popular tourist and resort destination, the city has a diverse local economy shaped by entrepreneurship and local investment. The accommodation and food services and retail sectors are the first and third largest industry contributors to the local economy and serve tourists and residents. Health care and social services are the second largest industry in terms of jobs provided in Santa Barbara due to the presence of Cottage Hospital and Sansum Health Care centers, community medical clinics, private practices, and government service offices located in the city. A growing hub for tech and research supported by entrepreneurial endeavors shapes the fourth largest sector in the city: professional, scientific, and technical services. The presence of four major institutions of higher learning provides a tributary to the local job market, including the University of California, Santa Barbara, Santa Barbara City College, Westmont College, and Antioch University.

Santa Barbara is home to a local population of 88,665 people living across seven zip codes and ranging across the socioeconomic spectrum.

[32] *U.S. Census Community Snapshot, accessed September 2022: data.census.gov/cedsci/profile/Santa_Barbara_city,_California?g=1600000US0669070*

SANTA BARBARA: BROADBAND COMMUNITY

The median age of 38.9 indicates that, among other things, a large population of digital natives reside in the city that is likely able to navigate the digital world with some ease. It would be a mistake to assume that digital literacy has been achieved across the population due to the socioeconomic and language factors influencing access and familiarity. Approximately 33% of people speak a language other than English in their homes, showing a significant population that benefits from multilingual resources. The average annual income of $88,665 is above the statewide average, and 12.3% of the population lives below the poverty line, including 11.2% of children under 18. Another revealing look at the impact of socioeconomic diversity on connectivity across the City of Santa Barbara can be seen in the percentage of households eligible for the Affordable Connectivity Program disaggregated by zip code.

Zip Code	93101	93103	93105	93108	93109
% Households eligible for ACP	41	28	19	14	30
% of Eligible Households that are enrolled*	23	24	18	7	11

Table 21: Affordable Connectivity Program Eligibility and Enrollment Rates for City of Santa Barbara, sorted by Zip Code[33]

The city of Santa Barbara benefits from a thriving non-profit sector that works alongside public institutions and private organizations to benefit the residents they serve. Collaborative efforts in the city of Santa Barbara are targeted and reach communities through trusted networks. For example, children under 18 make up 18% of the population and attend one of the many schools joined together in the Santa Barbara Unified School District. The School District works with non-profit Partners in Education to promote digital connectivity and access to technology devices. This effort was ramped up during the COVID-19 pandemic, which has led to greater connectivity. The City of Santa Barbara Public Library provides many opportunities for free access to the internet and can be a partner in the adoption of broadband. Cooperation between public, private, and non-profit agencies has proven effective in reaching underserved community members.

[33] *Geographical Information Center, Chico State Enterprises, accessed August 2022: https://www.arcgis.com/apps/dashboards/8c0249a9de8d404a9b49966fb824b728*

Broadband Needs Assessment

Broadband Service Availability

Based on all available data, broadband availability in the City of Santa Barbara is extensive. The map displayed below was created using the public CPUC information available via the GIS Map Data Portal (refer to Section 1, Table 1 for CPUC served/unserved definitions). It shows most of the City of Santa Barbara in green, indicating that 25/3 Mbps Service is accessible.

Some businesses and higher education offices utilize their own internet service. COX Communications and Frontier are incumbent ISPs in the area, and most respondents are subscribers. Other providers include T-Mobile, Verizon Business, and SpaceX Starlink.

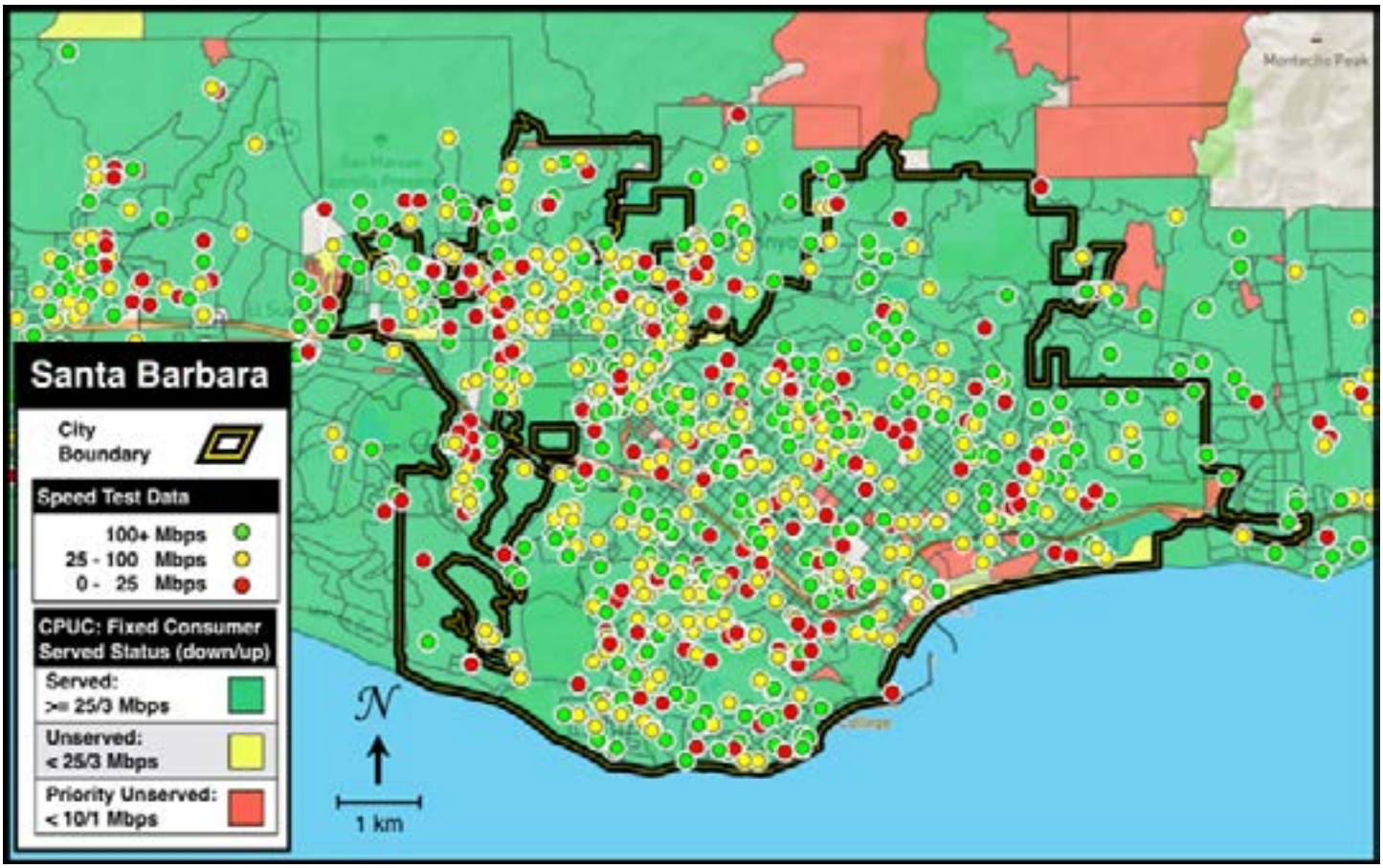
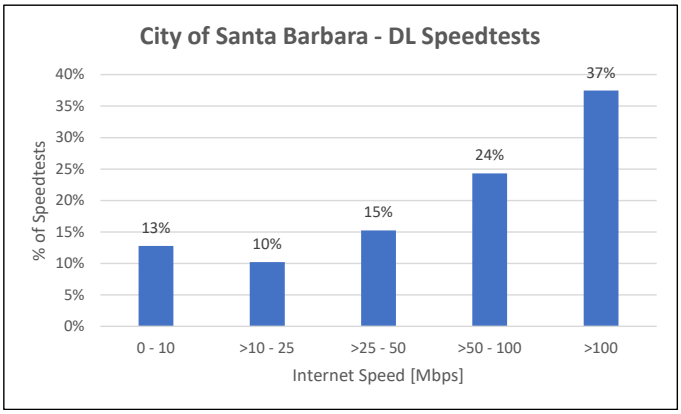


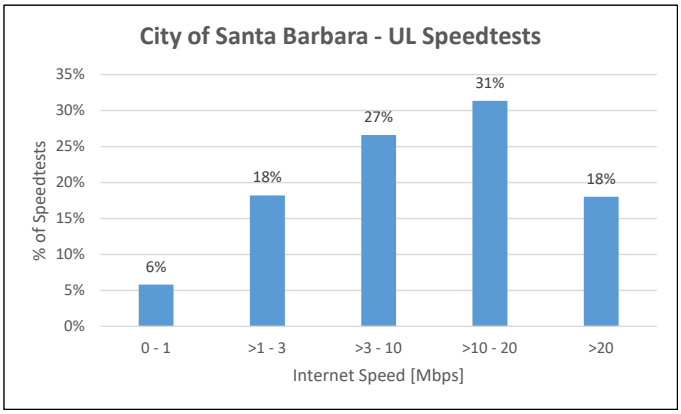
Figure 32: Broadband service availability in the City of Santa Barbara

Speed Test Results

The graphics below detail the distribution of the received internet speed according to the data collected from the speed tests in the City of Santa Barbara.



a) Download speed test results



b) Upload speed test results

Figure 33: Speed Test results across the City of Santa Barbara

The City of Santa Barbara had the largest number of respondents to the needs assessment and the speed testing. Data collected via the speed test showed that most of the area has connection options with a wide range of speeds. Areas show consistently lower speeds, specifically near the Santa Barbara Zoo and the area between 101 freeway and E Cabrillo Blvd. The rest of the speed testing showed inconsistent connection speeds based on the provider, possibly due to equipment in use or the subscriber's plan. Another example of inconsistent access speeds was between Foothill Road, State Street, San Roque Road, and Alamar Avenue, zip code 93105. The area appears to be predominantly served by Frontier and COX Communications, with some locations showing less than 10Mbps download speeds and a nearby or neighboring property exceeding 100 download Mbps. Broadband for All targets symmetrical 100/100Mbsp for all Californians.

Community Stakeholders Needs Assessment

Supervisor Das Williams moderated the May 2022 public forum held in the city. The panelists included Women's Economic Ventures, Santa Barbara Unified School District representatives, South Coast Chambers of Commerce, the Sansum Diabetes Research Institute, and Partners in Education. Spanish language interpretive services were provided to the community for the event. Notable for the City of Santa Barbara is that the discussion did not focus on the lack of infrastructure in the way it had in other communities. Primary themes included a lack of awareness of low-cost or affordability programs for internet service and the need for digital equipment. These issues can be addressed through partnerships and outreach and starting with options for low-cost and free equipment from Partners in Education and affordability programs offered by the city's primary carrier COX Communications.

SANTA BARBARA: BROADBAND COMMUNITY

Public Forum Summary – event held May 25, 2022, at La Casa de la Raza

Challenges	• Lack of awareness of affordability programs • Inadequate training resources/lack of awareness of training resources • Inadequate internet safety and responsibility training • Lack of reliable connectivity (1100 students needed assisted access during COVID)
Opportunities	• Private sector innovation showed great success and support for economic development • Partners in Education partnerships with the schools • Identify key partners and develop-wrap around approach
Barriers	• Disproportionate impacts on multilingual community members, English language learners, rural community members, and socially and economically disadvantaged community members • Physical and mental health impacts of lack of access to the internet • Need access to resources – nutrition and other social services • Improve community awareness of emotional/social impacts of excessive screen time

Table 22: La Casa de la Raza Public Forum Summary

The needs assessment evaluated community sentiment regarding access and affordability, and analysis showed the total responses by zip code and percentage as calculated by all responses.

Based on the responses received, more than 50% of the respondents have a service that meets their needs, and most use it for work or school. Overall, the Santa Barbara community is connected to the internet, and the gap is noted as affordability. During the public forum, it could be inferred that some feel that children are 'too connected to the internet, as noted in the quality-of-life impacts.

Policy and Planning

Project team members met with city staff multiple times to discuss policy and planning efforts and shared the statewide resource, *Getting Connected: A Broadband Deployment and Adoption Resource Guide for Local and Regional Government Leaders*[34]. Survey questions were adapted from the Guide and emailed to city staff for their direct input. Responses informed key opportunities and priorities for the City of Santa Barbara to improve redundancy and resiliency.

Analysis of responses to the survey reveals readiness to implement policy and planning efforts that improve the efficiency of infrastructure development. Specific policy and planning efforts include assessment of the fiber infrastructure permitting process to clarify the pathway for applicants, formalizing a "dig once" policy into planning processes, and integrating broadband planning and development goals into the General Plan or other relevant guidance documents.

[34] *California Emerging Technologies Fund (CETF) and Valley Vision, 2021: cetfund.org/report/getting-connected-a-broadband-deployment-and-adoption-resource-guide*

SANTA BARBARA: BROADBAND COMMUNITY

The current programs offered through the Santa Barbara Public Library present a significant opportunity for policy and planning to coalesce with grant funding opportunities that would increase the
capacity and reach of public-access internet and devices. In partnership with libraries and public entities, city efforts to accelerate public access Wi-Fi planning would reach multiple city goals, including support of the downtown business district and reaching underserved areas to further close the digital divide in Santa Barbara. It would be prudent to assess stakeholders' willingness to support such efforts.

Broadband Infrastructure

The City of Santa Barbara owns conduit, traffic signals, and some streetlights. Small cell facilities have been installed in some areas and are regulated by Municipal Code Chapter 9.170. As the City explores options for community Wi-Fi in the downtown corridor, developing a partnership with a provider and other public organizations may be the most feasible. Phasing in an entire system with fiber and Wi-Fi would create an open-access system that would provide the backbone for future smart city planning and support digital equity and inclusion initiatives.

For the city to move ahead, it would require investments, either grant funding or budget allocations, to build the capacity necessary for broadband infrastructure planning to become a priority. In addition to funding, City Public Works believes construction standard resources could assist the providers with the deployment of additional broadband capacity.

Inventory Of Assets	Yes
Permitting Authority	Yes
Installed Conduit	Yes
Dig Once Policy	Yes
Permit Process	No
Online Process	Yes
BB Priority In Planning	No
Smart City Priority	No
Wi-Fi/Fiber Interest	Yes

Table 23: City of Santa Barbara Broadband Policy and Planning Assessment

SANTA BARBARA: BROADBAND COMMUNITY

Key Opportunities & Priorities (In Alignment With Broadband For All)

The City of Santa Barbara should consider the following actions:

1. **Access (Capacity & Connectivity)**

    a. Community Wi-Fi for the downtown business district that meets 100/100 mbps – Phase 1

    b. Explore partnerships with education and community centers to expand community Wi-Fi- Phase 2

2. **Affordability & Adoption**

    a. A community Wi-Fi system would benefit those unable to connect due to cost.

    b. Ensure capacity to seek grant funding for ongoing maintenance and improvement of the library's broadband infrastructure.

    c. Define a partnership with the Santa Barbara Foundation and the Digital Equity Coalition to support connectivity.

3. **Requirements for Redundancy & Resiliency**

    a. Continue to partner with SBCAG in regional coordination of the Golden State Connect Network and last-mile planning and implementation.

    b. Full assessment of connectivity of anchor institutions.

    c. Design last-mile fiber for city infrastructure

    d. Explore public/private partnership development and funding models for infrastructure development – specifically the construction of conduit on Anacapa Street downtown and as part of future pavement maintenance projects.

    e. Smart city planning and policy development

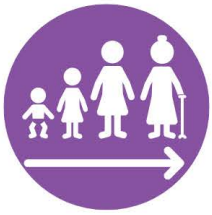
    f. Consider safety, emergency response, and cyber security in planning and policy deliberations.

SANTA MARIA: BROADBAND COMMUNITY PROFILE

The City of Santa Maria is well poised to lead smart city planning and initiatives that will benefit the local community and regionally. While it appears that the areas in and around Santa Maria have connectivity, there is a significant gap between current levels and future targets of 100/100Mbps. The industries within the city will benefit from enhanced broadband, as would the agricultural sector throughout the Santa Maria Valley, as the industry's reliance on broadband infrastructure will continue to grow. The agriculture sector should be considered a stakeholder, and key industry leaders should be included in broadband development conversations.

Population Size*

109,707



Median Age*

29

Geographic Footprint

22.4 sq mi

Demographic data from U.S. Census Community Snapshot[35]

The City of Santa Maria hugs the county's northern border and is the most populous municipality with nearly 110,000 residents. Santa Maria accounted for 90 percent of countywide population growth from 2000 to 2010 and 42 percent from 2010 to 2020. Santa Maria was designated an All-American City in 1998 by the National Civic League, attesting to the culture of creativity and collaboration, grassroots organization and civic engagement, and progress toward solving unique challenges in a highly diverse community.

Santa Maria is home to a strong and diverse workforce. Top industries in Santa Maria include agriculture, manufacturing, health care and social services, retail, government, and education. Agriculture creates an estimated 26.4 percent of employment in the city. The manufacturing industry spans a range of sectors. Major medical centers, such as Marian Regional Medical Center/Dignity Health Centers and Community Health Centers, are supplemented by an extensive network of small businesses providing in-person healthcare services to the community, creating job opportunities in small and larger business environments. Over 500 retail establishments comprised of national chains and small, family-owned businesses thrive in Santa Maria and provide the community with competitive shopping options and a strong job market sector. There are more than 6,500 business licenses. Santa Maria is home to Allan Hancock College and Santa Barbara Business College, providing vocational and community education and Associate degree courses that lead to transfer to four-year universities around the nation. A.T. Still University (ATSU), in partnership with Community Health Centers of the Central Coast, operates its Central Coast Physician Assistant Studies program and enrolls up to 100 students, bringing an influx of students, staff, and faculty who will contribute to the economy and quality of life.

[35] *U.S. Census Community Snapshot, accessed September 2022: data.census.gov/cedsci/profile/Santa_Maria_city,_California?g=1600000US0669196*

SANTA MARIA: BROADBAND COMMUNITY PROFILE

The median age in Santa Maria is 29.6, revealing a majority population raised in the age of digital media and access. Across Santa Maria, over 65% of households speak a language other than English at home, demonstrating an apparent demand for multilingual resources promoting public programs and community engagement. Nearly one-third of the population are children under 18 attending one of the seventeen elementary schools, four junior high schools, four high schools, or one technical school. Both districts offer programs for low-income families to ensure adequate access to the National School Lunch Program, multilingual and migrant education options, and health services. Schools utilize online applications to communicate with students and their families and are equipped to provide technical support at age-appropriate levels and devices for high school students to use for academic purposes.

The City of Santa Maria provides a full range of municipal services, including police and fire services, engineering and planning, street maintenance, recreation and parks services, water and wastewater utilities, solid waste collection and disposal, and general administrative activities. The information technology function is centralized, providing all services through a common network and two datacenters. The City supports a hybrid technical environment with email, file, and collaboration applications running in the Microsoft 365 cloud and internal systems running on a clustered, hyperconverged, virtualized environment.

Data collection efforts in Santa Maria sourced city personnel, local business leaders, local non-profit leaders, education leaders, and community members, providing a clear picture of the current status of broadband efforts and revealing opportunities for future planning.

Photo Credit Mike Eliason

Broadband Needs Assessment

Broadband Service Availability

Based on all available data, broadband availability in Santa Maria is high. The map displayed below was created using the public CPUC information using the GIS Portal Map (refer to Section 1, Table 1 for CPUC served/unserved definitions). It shows most of the City of Santa Maria in green, indicating that a 25/3 Mbps Service is accessible in a significant portion of the County. However, there are significant portions across the city, colored in red, that can be identified as unserved areas.

Comcast and Frontier are the major incumbent ISP providers.

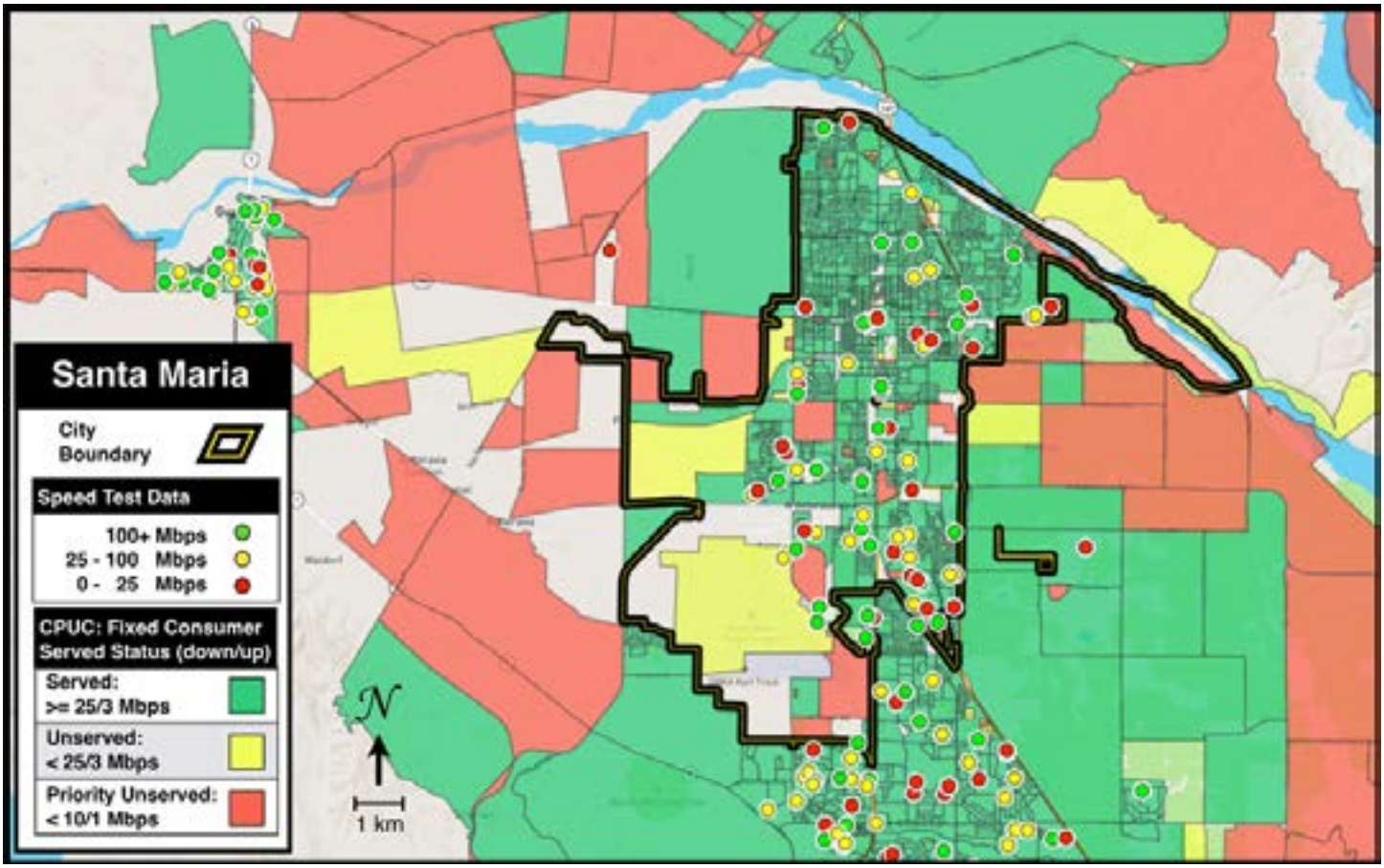
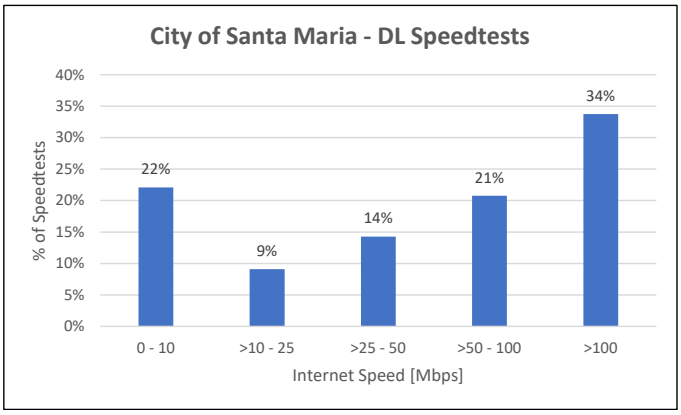


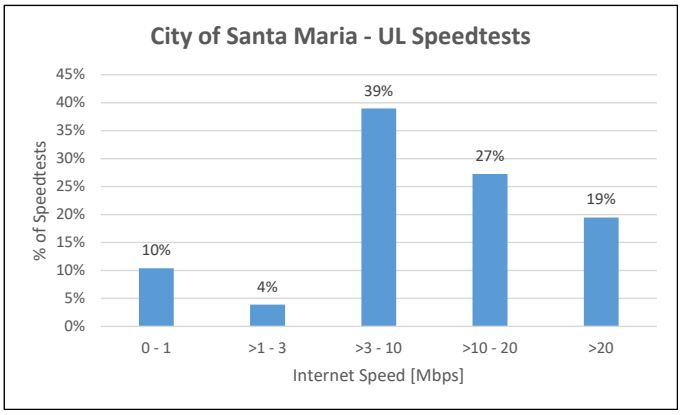
Figure 34: Broadband service availability in the City of Santa Maria

Speed Test Results

The graphics in Table 24 detail the distribution of the received internet speed according to the data collected from the speed tests in the City of Santa Maria.



a) Download speed test results



b) Upload speed test results

Table 24: City of Santa Maria Speed Test Results

Upon examination of the CPUC base map and the overlay of speed test data identifies where access or quality of connectivity is a barrier to internet adoption and, therefore, a barrier to full digital inclusion. Curious are the spikes in upload speeds because most data collected across the region show the upload speeds typically trend below 100Mbp.

For a community the size of Santa Maria, the needs assessment data sampling was not robust enough to draw solid conclusions. Additional data collection may show that a significant portion of the community lack access to affordable, reliable broadband.

Community Stakeholders Needs Assessment

In gathering information from stakeholders and the public, a public forum with a panel discussion was conducted on April 26, 2022. Moderating the event was Dr. Kevin Walthers, the Superintendent and President of Allan Hancock Community College. Panelists included the chief of operations for the Mid-Central Coast Boys & Girls Club, the economic development director of the Santa Maria Chamber of Commerce, the director of Instructional Technology for Santa Maria Joint Union High School District, the director of education for People's Self-help Housing, the COO of the Marian Regional Medical Center and a local legislative advocate for the Area Agency on Aging. Themes are captured in Table 25 and tracked similarly to data collected by the city for their CDBG funding regarding access and adoption.

SANTA MARIA: BROADBAND COMMUNITY PROFILE

Public Forum Summary – event held on April 26, 2022, at the Santa Maria Library, downtown branch.

Challenges	• Businesses find services to be cost prohibitive • Need access to devices to support digital literacy • Inequities with access include quality and availability of service
Opportunities	• Reliance on internet is going to continue to grow • Broadband improves opportunities to attract businesses • Continue to grow partnerships between the schools and parents • Positive impacts of internet access across all sectors • Increased patient engagement in health care
Barriers	• Disproportionate impacts on economically-disadvantaged community members • Exacerbating achievement gap for students • Community does not want to lose children in schools due to lack of access

Table 25: City of Santa Maria Public Library (Downtown Branch) Public Forum Summary

Policy and Planning

Project team members met with city staff multiple times to discuss policy and planning efforts and shared the statewide resource, *Getting Connected: A Broadband Deployment and Adoption Resource Guide for Local and Regional Government Leaders*[36]. Survey questions were adapted from the Guide and emailed to city staff for their direct input. Responses informed key opportunities and priorities for the City of Santa Maria to improve redundancy and resiliency.

Analysis shows city policies are not a barrier to broadband infrastructure deployment. With the pending update of their general plan prioritizing broadband deployment, they have the necessary data to apply for last-mile grant funding for a community Wi-Fi project.

Inventory Of Assets	Yes
Permitting Authority	Yes
Installed Conduit	Yes
Dig Once Policy	Mostly
Permit Process	Yes
Online Process	Yes
BB Priority In Planning	In Process
Smart City Priority	Yes
Wi-Fi/Fiber Interest	Yes

Table 26: City of Santa Maria Broadband Policy and Planning Assessment

[36] *California Emerging Technologies Fund (CETF) and Valley Vision, 2021: cetfund.org/report/getting-connected-a-broadband-deployment-and-adoption-resource-guide*

Broadband Infrastructure

In recent years, the City has established a 30-year partnership with Astound Business Solutions (formerly Wave Broadband) to establish and maintain a fiber ring around the entire city. Whereas the city provides facilities and rights of way, Astound Business Solutions provides connectivity and network support for city needs.

The Astound supported fiber network consists of a 288-strand fiber ring that surrounds the central part of the city and connects two datacenters in a redundant loop. Eight fiber spur segments tie into the ring, providing network connectivity to city departments and locations, and one additional segment is currently under construction. The fiber network buildout is expected to continue for the next few years as the city grows and funding becomes available.

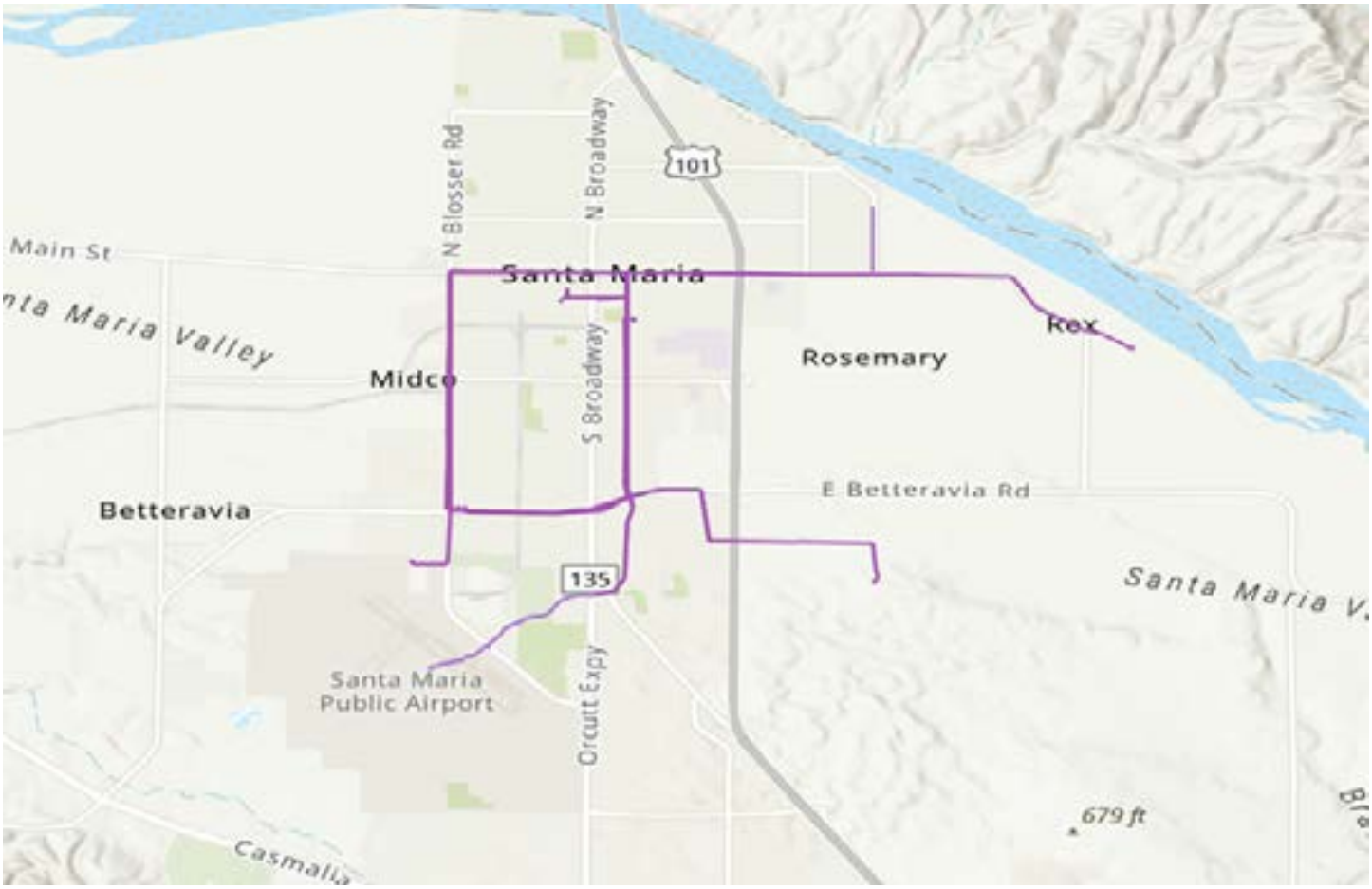


Figure 35: Astound fiber network (shown in purple)

The fiber network is 10 Gigabit Ethernet (GbE), with the other locations connecting at speeds from 300Mbps to 5Gbps. There are 39 city locations connected to the network through fiber, cable, Virtual Private Network (VPN), point-to-point microwave, and satellite connections. The average utilization across the network is approximately 50%.

SANTA MARIA: BROADBAND COMMUNITY PROFILE

Santa Maria is pursuing an initiative to establish a Citizens Band Radio Service (CBRS) in the city, which would increase infrastructure to provide Internet access. A request for proposals has been released, and prospective bidders are asked to design and scope the RAN to accommodate the proposed system and allow for expansion in the future. At the core of the system will be an on-premises radio access network (RAN) in the main data center, which is located inside the city Police Department. The facility is a start-of-the-art datacenter with redundant power, UPS, and HVAC and is connected to the secondary data center via a fiber ring. The data center has sufficient rack space to accommodate the additional RAN equipment. It is also anticipated that some components of the RAN can run on the existing V.M. infrastructure.

Civic leaders are considerably involved in conversations regarding Santa Maria's "Smart City, Safe City" initiative to guide the implementation of future technology investments. Research has been conducted, a roadmap developed, and select piloting of specific technologies with companies like Motorola has occurred. The initiative seeks to improve residents' access to services and enable staff to be more mobile and productive in the performance of their jobs. The strategic plan encompasses six focus areas: access to government services, public safety enhancements, community development projects, recreation, education, arts and culture, and environment. Ubiquitous network connectivity to create a mesh CBRS/Wi-Fi network across the city is foundational to these focus areas. It is anticipated that the wireless network will support the following:

- public access to Wi-Fi in selected parks and recreational facilities
- mobile access to network services for staff
- sensors and internet of things (IoT) components
- automated vehicle location (AVL)
- payment and information kiosks
- informational signage
- traffic control
- smart building monitoring and control
- security cameras
- Wi-Fi on buses
- smart meters

Core network infrastructure and 4 locations have been proposed to initiate this strategy. Final locations for this project will be selected based on available funding at the time of the award.

The city shows little interest in taking on the responsibility of broadband as a utility. On the other hand, a primary focus will be the need for computer access to support digital literacy and resolve inequities with access.

With that in mind, initiatives have been funded through Community Development Block Grants (CDBG) to provide community Wi-Fi access at recreation centers and libraries. Specifically, the Information Technology Division and the Special Projects Division have discussed the use of CDBG-CV funding to provide broadband access through community Wi-Fi in public facilities and parks during set timeframes, primarily in low-income neighborhoods with greater needs. The Wi-Fi would also serve a secondary purpose to providing Wi-Fi to city personnel conducting business in these areas.

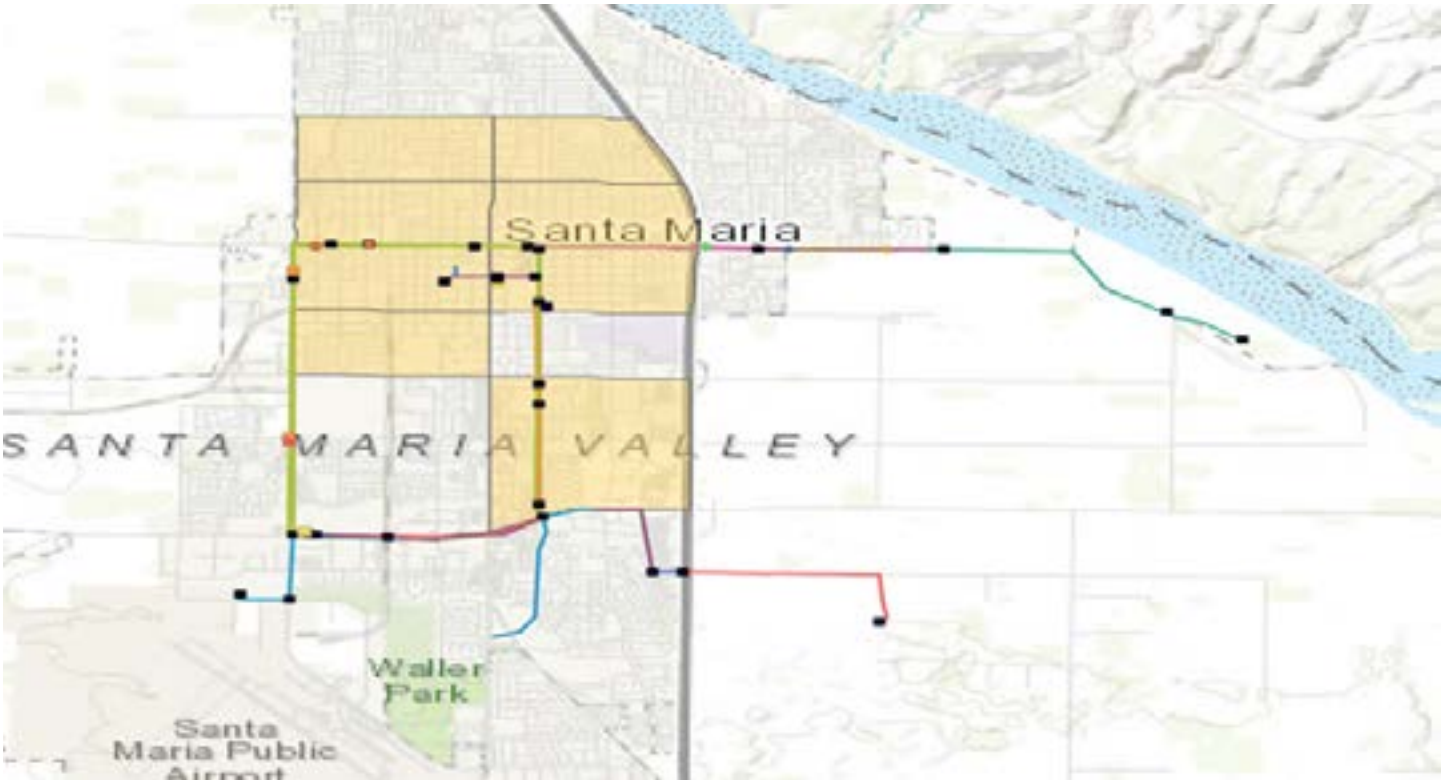


Figure 36: Santa Maria Fiber Network

SANTA MARIA: BROADBAND COMMUNITY PROFILE

In preparing for the application of CDBG funding, the analysis indicated:

1. According to HUD and Census information, Santa Maria has 13 Census Tracts that fall into the Low-to-Moderate income bracket. 50%+ with income 80% or less of the median.

2. These 13 tracts collectively have a population of over 89,000. Santa Maria, as a whole, has about 110,000 residents.

3. According to survey data from the "Hard to Count Maps" developed by the CUNY Graduate Center using Census Bureau data,

    a. Survey respondents were asked several questions about internet availability, including:

        i. Do you have **no** internet availability or/and **only** dial-up service? Yes/No

            - Results varied among tracts, but on average, 21.6% stated they had no internet access or only dial-up service.

        ii. Do you **just** have cellular service? Yes/No

            - Results varied among tracts, but on average, 15.4% stated they only had cellular service.

    b. If the above results are extrapolated across the 89,000 population, we get:

        - Over 19,000 with no internet or just dial-up; and

        - Over 13,000 with just cellular service.

Key Opportunities & Priorities (In Alignment With Broadband For All)

The City of Santa Maria should consider the following actions:

1. Access (Capacity & Connectivity)

a. Apply for grant funding via NTIA's BEAD program (2023) to expand the community network to support programs available that will increase levels of adoption and literacy and target speeds of 100/100Mbps.

b. Lead the conversation regarding partnership opportunities and the connection of anchor institutions locally and regionally.

2. Affordability & Adoption

a. Engage school districts to champion the imperative for ubiquitous connectivity.

b. Support the Digital Equity Coalition and CBOs in developing strategies to increas ACP enrollment.

c. In partnership with the Chamber of Commerce and workforce development, seek funding to support the community's business needs regarding business growth and digital training.

3. Requirements for Redundancy & Resiliency

a.Continue to partner with SBCAG in regional coordination of the Golden State Connect Network and last-mile planning and implementation.

b. Apply for grant funding to build capacity within City staff to lead work efforts.

c. Continue engagement in regional discussions of the middle-mile with SBCAG and Golden State Connect to ensure proper access points to assess opportunities with current projects under development.

d. Engage in and prioritize collaborative funding strategies to support last-mile projects in the unserved and underserved areas surrounding Santa Maria.

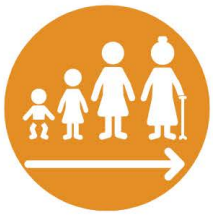
e. Identify and support catalyst projects that will benefit smart city planning related to fiber installations.

SOLVANG: BROADBAND COMMUNITY PROFILE

The City of Solvang is on track toward achieving Broadband for All. While current internet service does not meet the speeds targeted by the initiative for all community members, City staff and elected officials have shown their commitment to and consideration of necessary policy changes to continue to move towards Broadband for All, including the expansion of community Wi-Fi. It will be necessary for capacity to be built within the staff to track grant opportunities, planning, and policy updates and be the liaison with the community and potential private partners.

Population Size*

6,126



Median Age*

50.2

Geographic Footprint

2.4 sq mi

Demographic data from U.S. Census Community Snapshot[37]

The City of Solvang lies along State Route 246, approximately halfway between U.S. Highway 101 and State Route 154. Solvang is a well-known destination for tourists and locals known as "The Danish Capital of America," showcasing authentic Danish-American heritage and culture with over 1.5 million visitors each year traveling to experience the northern European culture, cuisine, and unique boutique shopping. The pedestrian-friendly village hosts three museums, over two dozen inns, hotels, a full-service guest ranch, meeting facilities, plenty of restaurants and bakeries, retail shops, and the Solvang Theaterfest, a unique outdoor theatre.

Beyond industries that serve the tourism economy in Solvang, major industries drive business development and are considered in economic development initiatives. Professional, Scientific, and Technical Services is a major industry of hundreds of entrepreneurs that provide technical expertise as small business owners. The Health Care and Social Services Industry in Solvang includes a local branch of Cottage Hospital that provides medical and emergency services, an urgent care center, several senior living facilities, and offices for the social service non-profit People Helping People.

The average household income is well above the federal poverty line, yet 7.3% of the Solvang population is below the poverty line, and 13% of all children under the age of 18 in the community are identified as living below the poverty line. While the median age of 50+ indicates a high population of older adults, 19.2% of the population are children under the age of 18 that attend local schools in the Solvang School District or the Santa Ynez Joint Union High School District. Of all households in Solvang, 20% are eligible for the Affordable Connectivity Program, and 7% of eligible households are actually enrolled[38].

[37] *U.S. Census Community Snapshot, accessed September 2022: data.census.gov/cedsci/profile/Solvang_city,_California?g=1600000US0672576*

[38] *Geographical Information Center, Chico State Enterprises, accessed August 2022: https://www.arcgis.com/apps/dashboards/8c0249a9de8d404a9b49966fb824b728*

Broadband Needs Assessment

Broadband Service Availability

Based on all available data, broadband availability in the City of Solvang is high. The map displayed below was created using the public CPUC information available via the GIS Map Data Portal (refer to Section 1, Table 1 for CPUC served/unserved definitions). It shows most of the City of Solvang in green, indicating access to 25/3 Mbps Service.

In terms of ISP presence, Comcast and Frontier are the major broadband providers serving the community. Although there is a high broadband availability, Solvang community reports indicate that the cost to access the internet is prohibitive.

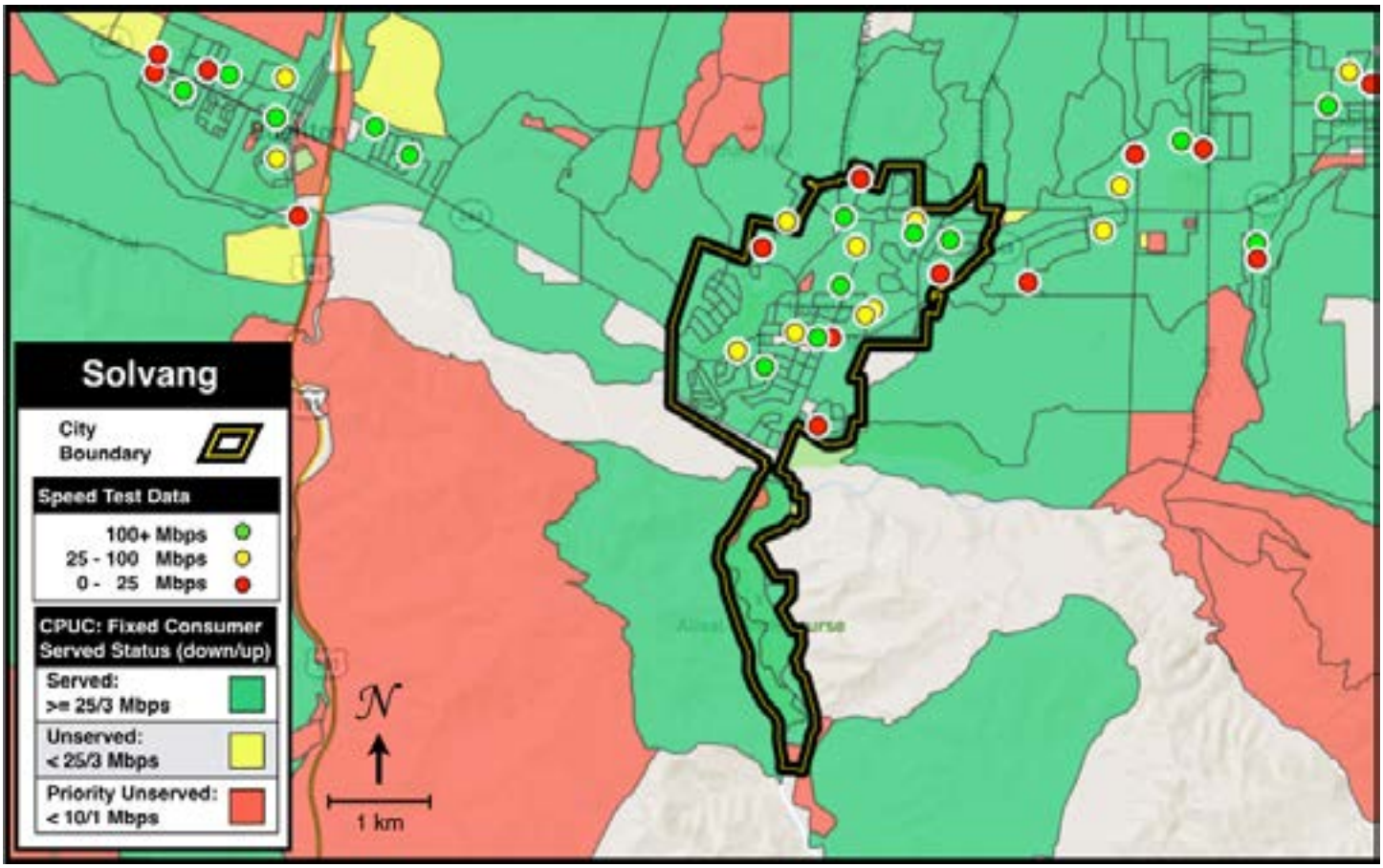
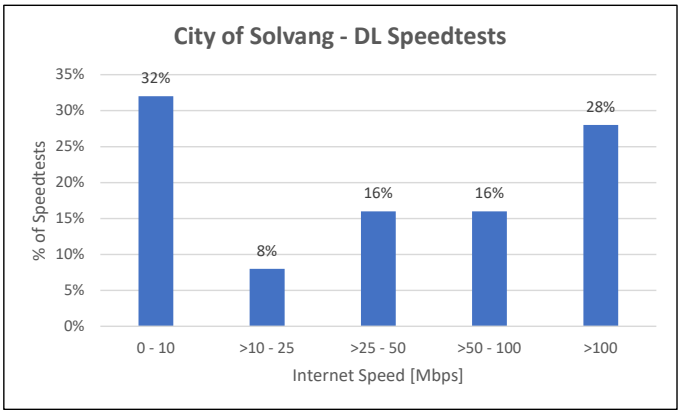


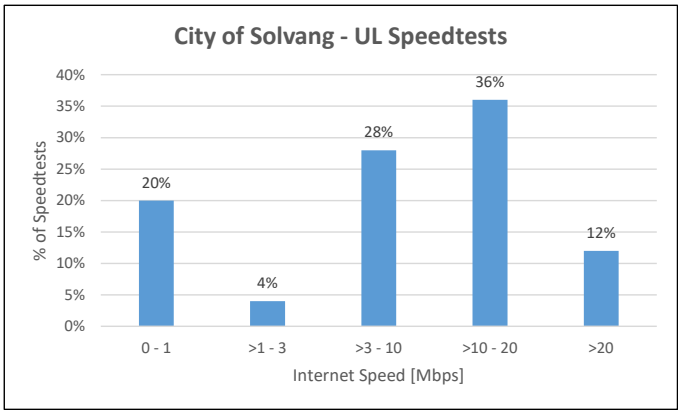
Figure 37: Broadband availability in City of Solvang

Speed Test Results

The graphics below detail the distribution of the received internet speed according to the data collected from the speed tests in the City of Solvang.



a) Download speed test results



b) Upload speed test results

Figure 38: Speed Test results across the City of Solvang

The number of tests taken for download and upload measurements was low but was adequate for data analysis purposes, with 25 submissions from 18 unique fixed locations:

While crowdsource participation was low, the speed test captured data that met the prior CBAP minimum standard of 25/3 Mbps; however, the service average is below the future minimum standard of 100/100 Mbps. On average, residents report satisfaction with their level of service. As mentioned in Section 2, what remains unknown is how the speed test takers were connected and what equipment they were using, as equipment may impact results.

Community Stakeholders Needs Assessment

A public forum was held on May 5, 2022, in Solvang City Council Chambers to discuss and understand the broadband status at the City of Solvang. Panelists for the May 2022 public forum included representatives from Santa Barbara County Women's Commission, the CEO of the United Way Boys and Girls Club of Santa Barbara County, the CEO of the Chamber of Commerce, and the CEO of People Helping People and the panel moderator. Responses informed the themes identified as broadband access gaps significant to Solvang stakeholders and community members. Table 27 summarizes the discussion points arising from panelist responses to the moderators' questions and audience members' contributions.

Public Forum Summary – event held May 5, 2022 in Solvang City Council Chambers

Challenges	• Cost to access internet is prohibitive • Inequity in pricing/speed tiers • 45% of the students qualify for reduced lunch and may not have access to the internet or devices • Lack of devices cause low internet use among community members • Inadequate training resources/lack of awareness of training resources
Opportunities	• Boys and Girls Club partners with schools to provide safety net for students who need internet access after school • Localized access: Chamber provided onsite access to online EDD, PPP and Lendistry support during the Pandemic • Partnerships and policy development to expand and streamline internet signups as part of their intake • Need reliable access to the internet for economic growth and job training, both tied to economic development
Barriers	• Limited access to healthcare for telehealth patients • Social isolation for some seniors without access and digital literacy • Students limited from accessing online educational resources • Low-income inability to access certain services or social aid (e.g. CalFresh) • Job searches, housing and job applications are predominantly completed online • Lack of redundancy in the system increases safety concerns

Table 27: Solvang City Council Chambers Public Forum Summary

Policy and Planning

Project team members met with city staff multiple times to discuss policy and planning efforts and shared the statewide resource, *Getting Connected: A Broadband Deployment and Adoption Resource Guide for Local and Regional Government Leaders*[39]. Survey questions were adapted from the Guide and emailed to city staff for their direct input. Responses informed key opportunities and priorities for the City of Solvang to improve redundancy and resiliency.

Analysis shows that Solvang intends to add Broadband in the update of their General Plan, which would open the way for policy development to lower barriers to infrastructure development, increase capacity, and allocate financial resources to support the work. The City of Solvang intends to adopt policies to track and develop comprehensive broadband connectivity throughout the city. While they have tracked rights-of-way and easements, there is a gap in records of fiber lines or services that could limit efficiency in infrastructure development.

[39] *California Emerging Technologies Fund (CETF) and Valley Vision, 2021: cetfund.org/report/getting-connected-a-broad-band-deployment-and-adoption-resource-guide*

SOLVANG: BROADBAND COMMUNITY PROFILE

Broadband Infrastructure

The City of Solvang identified enhanced connectivity as its priority to ensure the stability and reliability of services for the community. The near-term focus will be building awareness of broadband as a utility and establishing the necessary policies to support that reality.

While the City intends to ensure an adequate infrastructure exists to deliver broadband for all, there is no intent to develop any new capacity or to provide oversight for maintenance and support. Instead, the city leaders will seek to develop an approach with SBCAG and neighboring cities to establish uniform processes to manage the abundance of broadband installation and connections throughout the City of Solvang.

Inventory Of Assets	Some
Permitting Authority	Depends
Installed Conduit	No
Dig Once Policy	No
Permit Process	Yes
Online Process	No
BB Priority In Planning	In Process
Smart City Priority	Yes
Wi-Fi/Fiber Interest	Yes

Table 28: City of Solvang Broadband Policy and Planning Assessment

> *"We look forward to continuing to collaborate with our neighboring cities and the county of Santa Barbara to improve broadband access and infrastructure for all Solvang residents. We know that the future of Solvang's economy is dependent on better internet connectivity with robust broadband services."*
>
> ***-SBCAG Director Charlie Uhrig, Mayor of the City of Solvang***

SOLVANG: BROADBAND COMMUNITY PROFILE

Key Opportunities & Priorities (In Alignment With Broadband For All)

In addition to countywide opportunities and priorities listed in Section 7, the City of Solvang's efforts to reach Broadband for All should consider the follow actions:

1. **Access (Capacity & Connectivity)**

    a. Based on the data, enhancing broadband services should be considered a priority via private-sector investments, public-sector investments, or a public-private combination.

    b. Community feedback shows that increased connectivity is essential in increasing economic opportunities. Based on Solvang's top four economic industry sectors, each of them would benefit from a more robust infrastructure.

2. **Affordability & Adoption**

    a. Community feedback identified barriers to broadband adoption for their senior community, their children, and telehealth clients. Enhancing capacity and training on accessing the internet is a priority for the community.

    b. Increased training opportunities should be a top priority and considered when there are future discussions regarding what digital equity work efforts should be funded.

3. **Requirements for Redundancy & Resiliency**

    a. Continue to partner with SBCAG as the regional lead on broadband planning.

    b. Seek grant funding or other funding to build the capacity of City staff to work on broadband issues.

    c. Map city rights-of-way and incorporate it into GIS for future design and engineering.

    d. Develop and map city infrastructure that could be utilized for fiber installation, which may follow along with existing infrastructure.

    e. Work towards a 'dig once' policy at a local and regional level and continue to evaluate policies to align with deployment efforts.

    f. Review the permit application process for ease of use for fiber builds and apply best practices where feasible.

    g. Meet with service providers and identify local barriers to deployment and opportunities for public-private partnerships.

    h. The general plan update is on track toward Broadband for All goals.

SECTION 5: ASSESMENT OF BROADBAND PROVIDER LANDSCAPE

With the passing of SB 156 in 2021, the public sector can access funding to invest in infrastructure that would help close the gaps between the unserved and underserved. The lack of broadband access typically points to a marginal business case to incentivize local service providers to deploy the necessary fiber infrastructure. Historically, there have been significant challenges nationwide in reaching low-density rural areas due to topography or cost.

While no local governments within Santa Barbara County have stated an interest in becoming ISPs, through the strategy process, civic leaders are engaged and developing an understanding of the imperative to provide Broadband for All and the significant resources that have become available to achieve that vision. Based on this new awareness, a significant opportunity now exists for collaborative approaches, achievable through grant funding and for stakeholders to engage and help create the local landscape of the future. As a result, an industry transition occurs where incumbent service providers may consider the public sector a partner.

This section aims to assess the broadband provider landscape for residential subscribers in Santa Barbara County and provide initial recommendations for reducing broadband deployment barriers.

Broadband Provider Landscape in Santa Barbara County

The data utilized for this analysis include the California Public Utilities Commission (CPUC) broadband availability data and U.S. Census Bureau data. The CPUC collects broadband availability datasets from the incumbent ISP in the area and uses numerous resources to validate the data integrity, including subscriber data, public feedback, and test results submitted by the public.

Table 29 lists residential internet service providers (ISPs) with a presence in Santa Barbara County and the technologies offered for end subscribers, as well as the percentage of the population and housing units served by each ISP.

Internet Service Provider	Technology	Population	Population (%)	Housing Units	Housing Units (%)
Frontier Communications	Asymmetric xDSL ADSL2, ADSL2+ VDSL Optical Carrier / FTTx	308,946	68.94%	115,217	72.81%
Comcast Cable Communications Management, LLC	Cable Modem – DOCSIS 3.1 Optical Carrier / FTTx	206,686	46.12%	66,112	41.78%
Cox Communications	Cable Modem – DOCSIS 3.1 Optical Carrier / FTTx	189,567	42.30%	77,251	48.82%
Impulse Internet Services	Asymmetric xDSL Copper Wireline (other than xDSL) Terrestrial Fixed Wireless	17,533	3.91%	7,483	4.73%
City of Lompoc (LompocNet)	Terrestrial Fixed Wireless	13,732	3.06%	5,280	3.34%
Charter Communications Inc	Cable Modem – DOCSIS 3.1	8,046	1.80%	2,118	1.34%
Inyo Networks	Optical Carrier / FTTx	3,061	0.68%	944	0.60%
Ranch Wi-Fi	Terrestrial Fixed Wireless	819	0.18%	267	0.17%
GeoLinks	Terrestrial Fixed Wireless	736	0.16%	317	0.20%
Others	--	661	0.15%	270	0.17%

Table 29: Santa Barbara County Residential Internet Service Providers

The following observations are derived from these results:

- Frontier Communications is the ISP that serves the largest segment of residential subscribers, offering service to nearly 69 % of the population in Santa Barbara County.

- The other two major ISP in Santa Barbara County are Comcast Cable Communications Management and Cox Communications, each serving more than 42% of the population in the county.

Furthermore, the map below displays the concentration of internet service providers (ISPs) across Santa Barbara County, representing the number of options available for end consumers. Areas with more than two ISPs offering services are minimal and concentrated in the county's cities, indicating that the broadband market is not very competitive and end subscribers do not have multiple choices for selection.

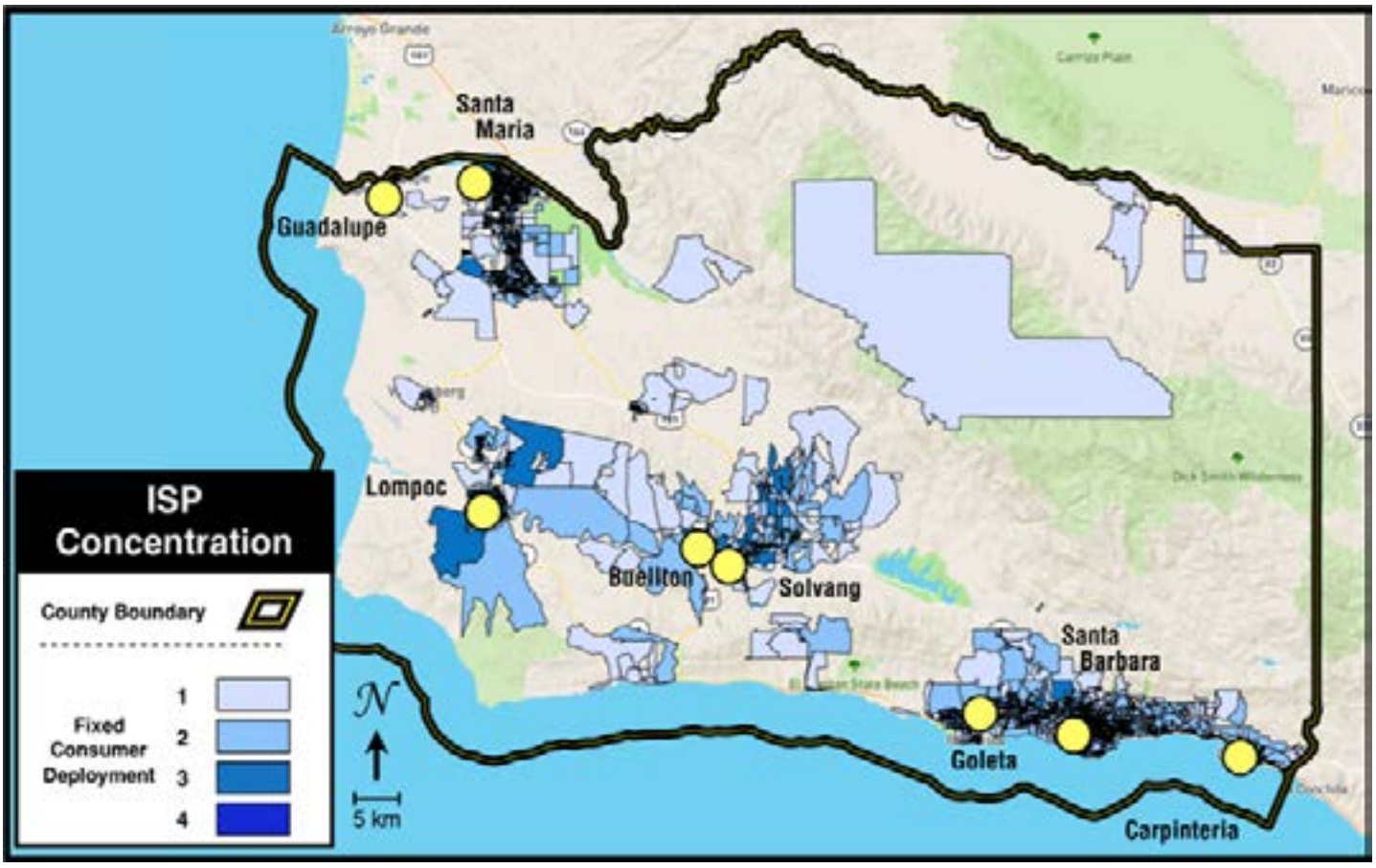


Figure 39: ISP concentration map in Santa Barbara County (CPUC Data)

Changing Roles

Significant government investment is and will continue to occur over the next few years to result in broadband becoming as available as power and water. What is unique about this is the level of investment of public funds and the new role of municipal government as a partner with industry. Prior to COVID, the availability of service to rural areas and neighborhoods where the return on investment was a risk, those barriers to entry can be removed through public/private models. A definition of roles is required where an ISP can offer its services and innovate its capabilities. The public sector can provide resources that close the gap related to providing areas to neighborhoods with needs.

Challenges in the Permitting Process

This strategy seeks to describe and develop a level of public-private collaboration where none has previously existed. Identifying current issues, removing barriers, and seeking to accelerate deployment and adoption will benefit the entire region.

The project team met with representatives from Charter/ Spectrum, COX Communication, Comcast, AT&T, and Verizon to gain an understanding of what the barriers are, from a business perspective, to deploy broadband and maintain their current assets. The summary from each of them was the same. The unique rules and regulations of each city and county territory make it challenging and costly when attempting to coordinate a build or upgrade existing infrastructure. Several even stated that, at times, a project could be delayed due to uncertainty of what is required, permit review may be delayed, and the project becomes too cost-prohibitive to continue.

Challenges Recap

- Unique rules and regulations in each location
- The high cost of the conduit installation
- Navigating the pole installation process for each location
- Working through the permitting department

The costliest aspect of a fiber installation project is the excavation for conduit installation, which increases the risk of added project delays. In response, California's Assembly passed AB-41, expanding the State's existing dig-once policy and requiring the Department of Transportation to not only notify broadband companies of a project and opportunity to install conduit but also to install conduit for fiber in priority areas by default. Replicating similar policies at the regional and local level would similarly be impactful with increased collaboration opportunities.

Similarly, pole attachments are increasingly more challenging yet vital as they provide a path for broadband installation where trenching is not feasible. Some Cities manage pole installations through the encroachment permit process, and some do not. Some poles are owned by a utility, and adding additional infrastructure may require pole replacements which also becomes cost prohibitive. High-fire districts have increased utility restrictions and updated specifications which increase costs. Centralized coordination and tracking of pole attachments could expedite broadband installations.

Carriers reported that it is incredibly challenging to work through a permitting department where staff may not have experience and do not understand the industry, leading to delays in issuing permits. Some established policies include requirements for a half-day (or less) upgrade or repair to include complete traffic control rather than a temporary alert cone. Providing telecommunications companies maintenance considerations similar to those provided to utilities would ease the burden, including allowing notification of customers directly of services provided versus notifications sent by permitting agencies which cause alarm and may lead to misunderstandings.

In summary, opportunities for regional coordination and local permit policy review would increase regional broadband readiness. As a starting point, the following are initial recommendations for reducing broadband deployment barriers:

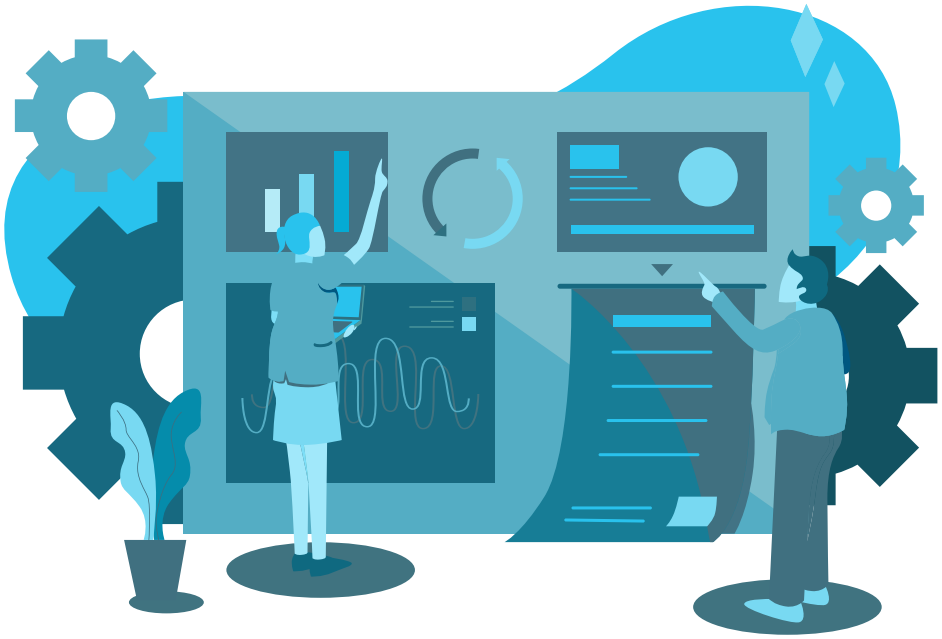
- Accelerate permit processing – City and County staff time is reported to be limited. Anticipating the number of new broadband projects, capacity building within permit departments, and support with regional coordination by SBCAG is recommended.

- Standardize permit requirements – Work towards a standardized application process where feasible. Regional coordination of a permitting system.

- Develop dig once policies and related communications – dig once enables multiple providers to participate and share costs and establish a planned approach to reduce construction costs and disruption.

- Develop a pole asset inventory, including ownership, maintenance, and replacement schedule.

Additional recommendations and strategies are provided in the California Local Jurisdiction Permitting Playbook[40].



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

SECTION 6: REGIONAL GIS MAP DATA PORTAL

Summary

Unique to this project is the creation of an online interactive map data portal, incorporating data from numerous validated sources into a single curated system. After investigating a variety of options, the project team selected Simple Layers[41] as the technology partner to provide this functionality for the following reasons: a) the company has a 10+ year history of providing GIS support to Santa Barbara County, b) the company has a history in the broadband space, and c) the company is entrepreneurial by nature and flexible in providing support and developing a city-driven business model.

Data Library and Map Development

The GIS Map Data Portal addresses the task of presenting societal needs in the context of existing and potential broadband infrastructure. It consists of a data library and an interactive map portal visualizing the data.

The online GIS data library is comprised of three categories of materials, referenced initially in Section 2:

- General context (3 layers): {municipal boundaries, county boundaries, anchor institutions}
- Broadband context (8 layers): {installed BB, proposed BB, speed test survey}
- Societal context (9 layers): {zones of designated need, demographics]

The process of accessioning map layers into the data library consists of two phases:

Phase 1:

Data Discovery & Validation: map layers relevant to the project are discovered through web searching and direct outreach to governmental channels; the provenance of found layers is validated to ensure that they are from primary sources. The data collected for this application was received from California Lutheran University, the California Public Utilities Commission (CPUC), the National Telecommunications Information Administration (NTIA), the California State Geoportal, Caltrans, the Center for Disease Control, the U.S. Treasury, the Santa Barbara County Public Works Department, and the Santa Barbara County Association of Governments (SBCAG).

Phase 2:

Technical Correction and Import: map layers passing validation are scanned for technical issues that interfere with data interoperability (undefined field types, disallowed characters in attribute fields, missing or wrong map projections, etc.); layers are corrected and imported to the library.

[41] *simplelayers.com*

SECTION 6: REGIONAL GIS MAP DATA PORTAL

The online interactive map presents the data library layers styled to represent desired facets and functionality, including navigation, search, query, and export. Comparing and aligning with CPUC areas-of-need mapping, the interactive map can discover and communicate how broadband service quality relates to CPUC-designated served and unserved areas (refer to Section 1, Table 1 for CPUC served/unserved definitions). Reconnaissance spatial analyses are presented in Section 4 of this document for municipalities and the county.

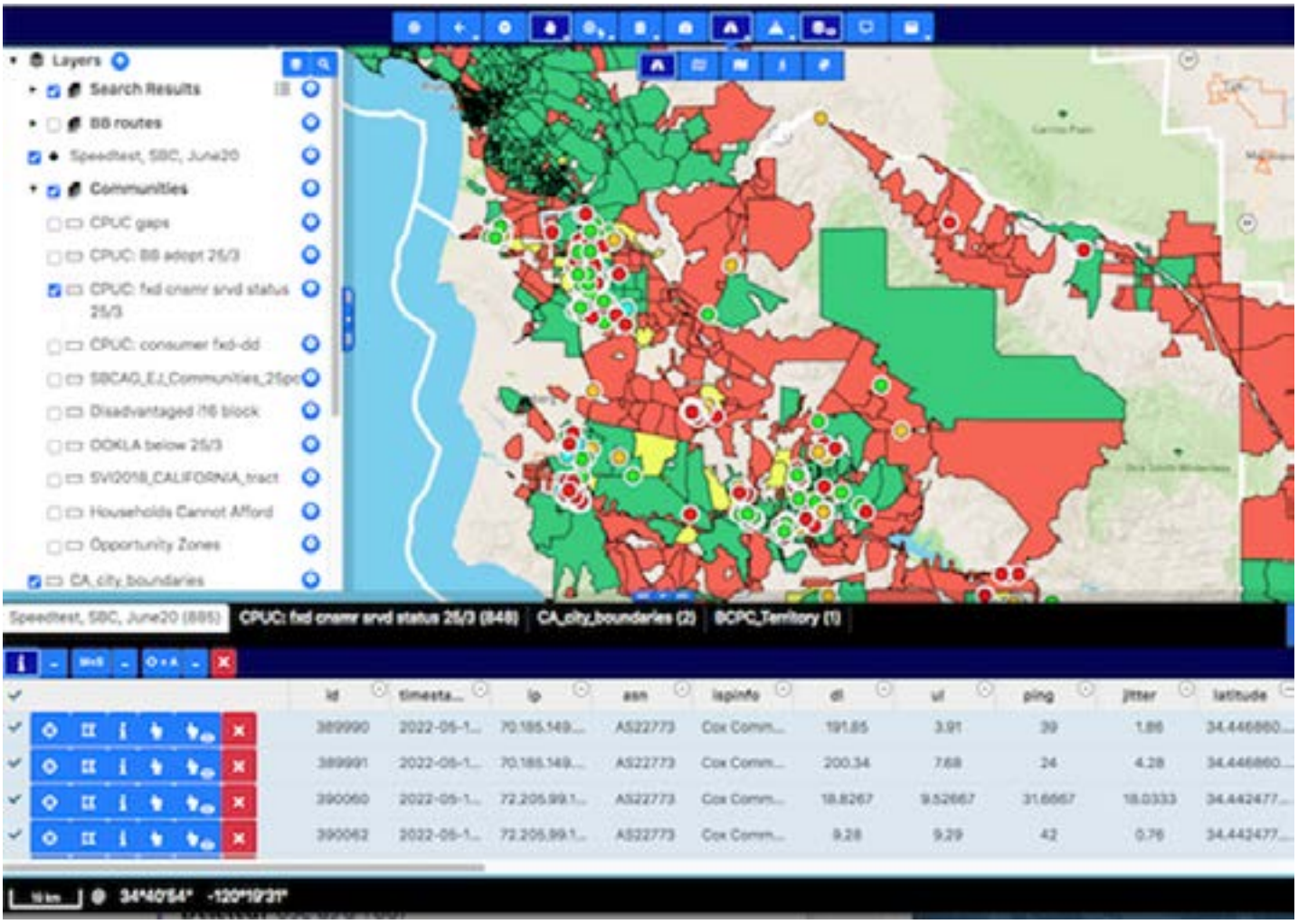


Figure 40: Map Portal Tool showing suite of interactive tools

SECTION 6: REGIONAL GIS MAP DATA PORTAL

Recommendation: Maintain and Expand Usage of the Map Data Portal

As broadband becomes recognized as a utility, visibility to all critical municipal infrastructure will become expected. The system offers many applications, including measuring the progress of digital inclusion work, assisting in fiber asset management and operation, and aiding in developing grants and applications for funding.

The platform requires support, maintenance, and continuous updates in capabilities to continue to leverage the information shared and result in benefits to the region. Absent use, the capability created will eventually be overcome by events as static data becomes outdated. Discussions required include:

- **Support:** This platform has been designed to provide every city with a map of priority areas and fiber infrastructure. Discussions should follow that examine the value of this platform in service to the cities and overall region. The information collected should continue with additional sources of fiber maps, right of ways, and adoption status.

- **Maintenance:** As an IT platform, systems administration is required. Adding data, continually enhancing functions and tools, software licenses, and user support are common needs that require technical resources.

SECTION 7: STRATEGIC PRIORITIES AND ACTIONS

This section brings together areas of consideration and recommendations based on the data collection and findings presented in previous sections. The recommendations are aligned with legislative and practical outcomes to achieve Broadband for All.

Three primary goals for improving broadband services within Santa Barbara County are discussed and elaborated on throughout this section.

- Achieving Access Through Improved Broadband Infrastructure
- Achieving Affordability and Adoption
- Achieving Redundancy and Resiliency

Achieving Access Through Improved Broadband Infrastructure

Ensuring broadband access requires significant improvement in broadband infrastructure across Santa Barbara County. Below are the requirements and vision for developing infrastructure, followed by an elaboration on one of many viable operating scenarios for the county and a plan to accelerate near-term outcomes essential to long-term broadband infrastructure development.

Characterize Broadband Network Needs

The requirements and vision for Santa Barbara County are characterized below based on the network segments of interest, namely, the middle-mile and the last-mile.

Middle-Mile Deployment

Santa Barbara County's middle-mile network requirements include high-capacity fiber optic infrastructure to interconnect the communities while extending proximal connectivity to last-mile networks across the county, particularly in the more rural areas.

It is desirable for jurisdictions to have two points of entry via a ring topology to ensure service continuity in the event of service outages or cuts on a fiber optic trunk line. It is further desired to rationalize the interconnection of middle-mile network segments of various network operators, including incumbent ISPs, future ISPs, and the State of California. Importantly, a robust middle-mile network will improve the economics of last-mile networks, stimulating more last-mile development where it is most needed.

In addition to planning for an ever-increasing need for capacity, the middle-mile network intends to provide an open-access network (OANs) framework that offers incumbent ISPs and new entrants equal and non-discriminatory network access to service the community.

For the public sector, middle-mile benefits include reduced costs for the interconnection of facilities, support for telehealth, remote learning, and economic development, as well as enhanced services and innovation for smart cities.

Santa Barbara County Middle-Mile Vision

The envisioned regional middle-mile network incorporates the work done to date. It completes the regional aspects of the network with the establishment of redundant fiber in the south, traversing both inland and along the coast.

The Santa Barbara County middle-mile vision is a robust middle-mile network with three main network segments displayed in the graphic below: the North County Fiber Network, the South Coast Route, and the Buellton Connector. The envisioned middle-mile network provides a robust network with four rings that offer physical route diversity and multiple interconnections with last-mile networks.

Figure 41: Santa Barbara County Middle-Mile Vision

In recent years, considerable dialogue and high-level designs have been developed for the North County Fiber Network. The Santa Ynez Band of Chumash Indians has led the way in securing initial resources to explore the feasibility of this network.

State of California Middle-Mile Broadband Initiative

In May 2022, the California Department of Technology (CDT) released a statewide construction evaluation map with 10,000 miles of proposed build-out spanning the entire state. This full-system design map was delivered to Caltrans as they are actively conducting pre-construction analysis on the proposed routes outlined in the map.

The updated map involving Santa Barbara County is displayed in Figure 42. In the coming months, CDT will evaluate affordability and identify where the state will be able to build and where it will need to use Indefeasible Right of Use (IRU) leases.

Figure 42: State of California Middle-Mile Broadband Initiative Planning

Santa Barbara County Broadband Delta Analysis

A delta analysis was performed to identify network segments of the Santa Barbara County middle-mile vision for potential projects to complete the map and provide the requisite connectivity throughout. The delta analysis presented in Figure 43 is contingent on the plans of the State of California, and as the State's plans evolve, the region will stay involved in the conversation.

Figure 43: Middle-Mile Broadband Delta Analysis

Note: Areas shaded in white represent the middle-mile gap in the current State of California plans.

According to the delta analysis, the South Coast Route and the Buellton Connector are the network segments requiring further analysis to close the gap unaddressed by the current plans from the State of California.

Areas of Focus

The State of California plans significant investment in the Santa Barbara County middle-mile network. Local efforts should focus on complementing the state-level work by analyzing funding requirements and business and operating models to deploy and manage the middle-mile network.

The areas of focus for middle-mile network deployment are:

1. Ensure funding to complete the high-level network design for the middle-mile network. Completing a high-level design of the middle-mile network must happen in concert with other key stakeholders, including the Golden State network, Caltrans, the Cities, and the Chumash Tribe.

2. Support and coordination with the work performed by the Chumash & Econ Alliance with funding from an EDA Grant for the North County middle-mile analysis and design.

3. Continue coordination with the State of California Middle-Mile Broadband Initiative. The actions of SBC will pivot off the states' plans which will be monitored closely.

Last-Mile Deployment

Last-mile fiber connectivity is the delivery network from the optical aggregation node to the subscriber locations, which are residential households, businesses, and anchor institutions throughout the community. Multiple technologies are available for delivering last-mile connectivity and are profiled in Section 3.

While a "fiber first" approach will be pursued via Fiber-to-the-Home (FTTH), it may be necessary to consider other technological alternatives, including fixed terrestrial wireless and satellite. Wireless technologies still require fiber connectivity for backhaul and middle-mile connections to the Internet Points of Presence (POPS). Points of Presence (POPS).

Last-Mile Deployment Prioritization

A cluster analysis was performed to identify areas lacking access to 25/3 Mbps service based on annually collected CPUC Broadband Data (December 2020). The map in Figure 44 displays areas of broadband need that are the target of last-mile network deployment. The radius of the circles is proportional to unserved and priority unserved populations (refer to Section 1, Table 1 for CPUC unserved definitions). An estimated 9,400 households lack 25/3 Mbps service.

Importantly, the CBAP initiative specifies a minimum download speed of 100 Mbps. The inference, therefore, is that a substantially higher number of households in Santa Barbara County lack sufficient broadband service.

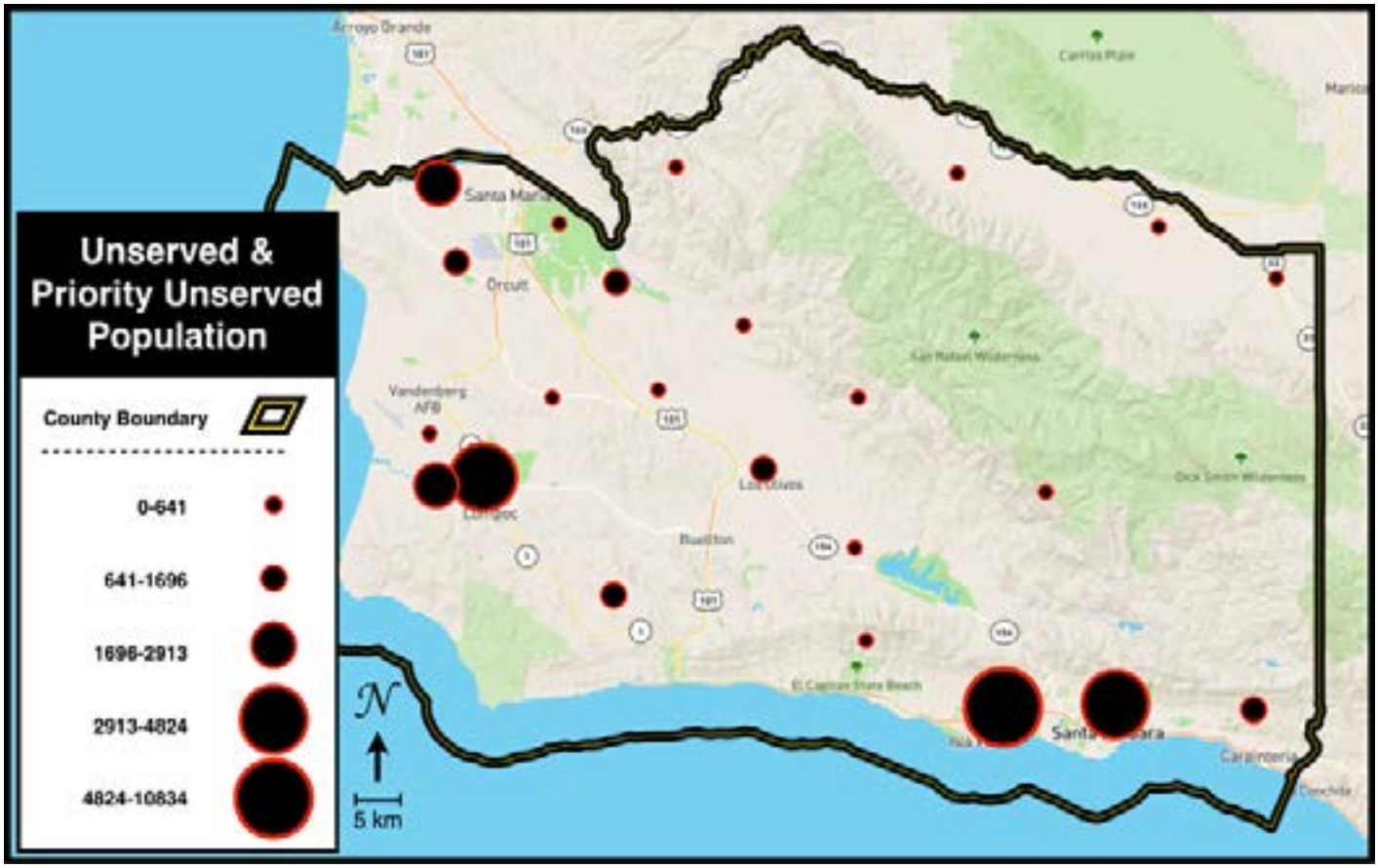


Figure 44: Last-Mile Broadband Delta Analysis (CPUC Data)

Urgent priorities for last-mile deployment are provided in Table 30 and are further referenced in Section 4.

Priority Community	Incumbent ISP In The Area
Los Alamos	Frontier Communications
Casmalia	None – providers left the area
Cuyama/ New Cuyama	Satellite availability; Applied Technology Group Inc.
Guadalupe	Frontier Communications and Charter Communications Inc.

Table 30: Last-mile deployment priorities in Santa Barbara County

Areas of Focus

There are two areas of focus for last-mile network deployment:

1. Ensure funding to complete feasibility analysis for last-mile broadband deployments in the unincorporated areas in broadband need.

2. Capitalize on the processes established during the strategy development and utilize a technical advisory committee to assist with developing plans for last-mile funding.

Broadband Operating Scenario

In parallel with the needs analysis and the network design views referenced throughout this document, it is crucial to begin the process of "imagineering" the future to consider how the middle-mile networks will acquire funding, how the network will be managed, and to determine roles and responsibilities. Primary components to consider in this journey are described below.

- *Funding and Ownership Model:* Analysis of funding options, stipulations, and obligations associated with receiving funds.

  The network scope is defined, often to comport to grant specifications. It encapsulates passive infrastructure (rights of way, conduit, poles, fiber cables, etc.) and active network infrastructure (fiber optic equipment) applied to middle-mile and last-mile networks.

  County partners will need to consider obligations of ownership of broadband infrastructure and develop plans accordingly.

- *Operating Model:* Consideration of the range of network operating activities (network provisioning and service delivery, network maintenance, customer care, etc.) and the delegation of such tasks by county partners to a selected entity.

  It is important to note that, as the owner of the broadband infrastructure, certain responsibilities defined in partnership and operating agreements are in full effect and must be planned accordingly.

  In short, a governance framework is required to accompany and oversee the defined operating model.

- *Roles and Responsibilities:* A responsibility assignment matrix is provided to identify the key project stakeholders and to convey the roles and responsibilities of each.

  County partners need to consider the ramifications of operating and governance models for Broadband Infrastructure.

SECTION 7: STRATEGIC PRIORITIES AND ACTIONS

In the context of Santa Barbara County, any reasonable broadband scenario will include two criteria:

- *Open-Access Network:* A requirement for most Federal and State funding, an open-access network offer public and private ISPs wholesale access to broadband infrastructure and services with fair, reasonable, and equal terms.

- *Outsourcing of Operating Activities:* The Communities have clearly stated a preference to avoid direct operational responsibility for managing and operating a broadband network.

Broadband Scenario: SBCAG, County or Municipal Ownership of Middle-Mile and Last-Mile Networks

In this Broadband scenario, SBCAG implements a countywide entity that acts as an Open-Access Network (OAN) provider, offering wholesale services to broadband infrastructure. In this way, jurisdictions are not competing with ISPs but are facilitating their service delivery to end subscribers.

The model would be the same if the County or a city were to act as an OAN provider. Throughout this section, SBCAG is referenced for the sake of the scenario, and it is important to keep in mind that the County or one of the eight cities would follow the same model.

The open-access approach enables competition among ISPs across the open-access network owned by SBCAG. Meanwhile, SBCAG maintains neutrality, non-discriminatory practices, and standard pricing for network providers.

The OAN could be managed via the Joint Powers Authority described in Section 2, which would establish SBCAG as the owner. The same standards would apply if the County or a city chose to act as an OAN provider.

The following approaches are implemented at the network level:

- *Middle-mile approach:* Ownership of a middle-mile network that complements and integrates with Golden State Network, providing a robust middle-mile network for Santa Barbara County.

- *Last-mile approach:* SBCAG, County or City, acts as the “provider of last resort” for the last-mile network in unserved areas offering wholesale services to incumbent ISPs and new entrants and stimulating retail service competition in Santa Barbara County.

Funding and Ownership Model

The funding and ownership model is described as follows:

- SBCAG applies for funding to design and build the middle-mile and last-mile network infrastructure, including the passive (e.g., conduit, fiber, poles) and the active (e.g., OTN, routers) components.
- The capital for the physical infrastructure can be obtained via the assistance of Federal and State funding programs. Provided that CAPEX deployment is funded, a sustainable business case is achievable.
- The construction activities for the network deployment can be outsourced to a third party, while SBCAG, County, or a city oversees the activities.
- SBCAG, County or city, maintains the ownership of the passive and active infrastructure.

Figure 45 provides an overview of the ownership model for the described broadband scenario.

Figure 45: Ownership Model

Operational Model

A three-actor model is proposed if SBCAG, the County, or a city within Santa Barbara County has no interest in becoming an ISP or managing the network. The model displayed in Figure 46 does not require SBCAG, the County, or a city to perform the functions of an ISP.

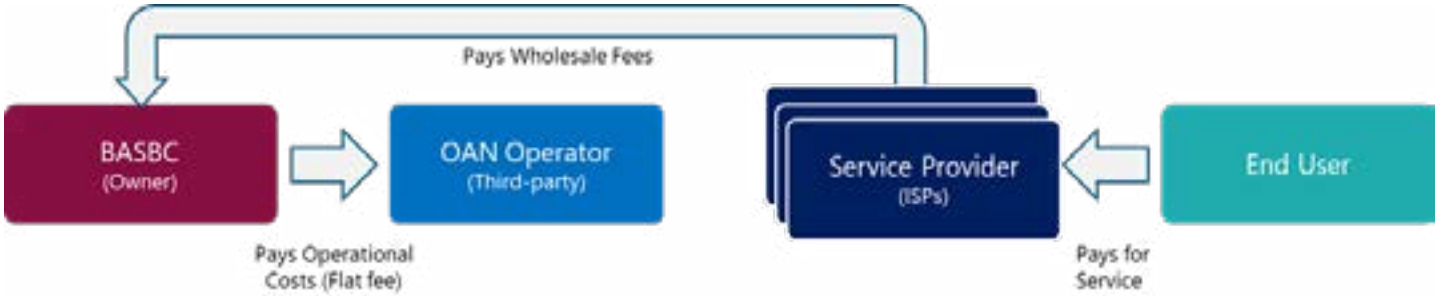


Figure 46: Operating Model

- *SBCAG (Owner):* SBCAG, the County or a city, is the open-access network owner and establishes the standard pricing structure and terms of service. SBCAG negotiates and contracts with an OAN Operator to perform operational activities. SBCAG has no operating responsibilities contract with ISPs or subscribers.

- *OAN Operator (Third-party):* A third-party entity outsourced by SBCAG to perform network operations and maintenance activities. On behalf of the owner, it sells and supports wholesale network services to ISPs. The OAN Operator does not sell services to end Subscribers.

- *Internet Service Provider (ISPs):* The ISP purchases access to the open-access network from the OAN Operator based on bandwidth utilized or a flat monthly fixed fee. It sells consumer-end services to Subscribers, such as internet access, telephone, or TV services. In addition, it performs subscriber installation, provisioning, subscriber management, and customer service activities.

- *Subscribers:* Subscribers are the end users that purchase services for their home from the ISP of their choice. They receive broadband services and pay the ISP of their choice.

Roles and Responsibilities

The responsibility matrix considering the principal activities for broadband network deployment and operations activities is presented in Table 31.

Broadband Scenario	Stakeholders				
	SBCAG (SBCAG JPA)	SBCAG (SBCAG JPA)	OAN Operator	Internet Service Provider(s)	Cities or County
Middle-Mile and Last-Mile Network					
Ensure Funding for Network Detailed Design	P	O	O	O	S
Passive Infrastructure Construction	S	P	O	O	S
Active Infrastructure Deployment	S	P	O	O	O
Network Operations					
Network O&M Activities	S	O	P	O	O
Field Maintenance Activities	S	O	P	O	O
Service Delivery					
Subscriber Installation and Service Provisioning	O	O	O	P	O
Subscriber Management and Billing	O	O	O	P	O
Customer Support	O	O	O	P	O

Table 31: Broadband Scenarios Responsibilities Matrix

P = Primary
S = Secondary
O = Observer

Accelerate Outcomes

Alvin and Heidi Toffler's book, Revolutionary Wealth[42], contrasts the speed at which various kinds of public and private organizations respond. It is no secret that change in the private sector can occur faster than in the public sector. To accelerate outcomes, strategies will require the innovation prevalent in the private sector to be strategically coupled with investment by the public sector via grants. Creating processes by which collaboration occurs provides the bridge and means to accelerate outcomes for all concerned.

[42] *Toffler, Alan and Heidi (2006): Revolutionary Wealth. Knopf Inc.*

SECTION 7: STRATEGIC PRIORITIES AND ACTIONS

Imperative

The overall imperative to achieve Broadband for All must occur sooner, not later, while funding opportunities are a priority at the State and Federal levels. Implementing 21st-century technology solutions will not occur without the future infrastructure in place. The gaps, shortfalls, and vulnerabilities revealed by the pandemic continue and, now that they are evident, also reveal foundational shortcomings in the social and economic well-being of our communities.

Focus Areas

As immediate next steps, resources through Local Agency Technical Assistance (LATA) grants were requested in September 2022 to accomplish the following:

- Formalize the countywide Broadband Alliance via a joint powers authority (JPA) and hire staff for initial capacity building.
- Complete a programmatic Environmental Impact Report (EIR) to remove obstacles to construction.
- Complete the high-level technical analysis to implement the strategy and validate feasibility, costs, and available funding.
- As feasible, align policies and permitting to expedite broadband builds.

Achieving Affordability and Adoption

Priorities

- Support the Digital Equity Coalition – leverage the countywide network of community-based organizations focused on connecting, literacy, & learning (Community Foundation).
- Leverage Federal Programs - Use federally funded programs as a catalyst to develop local strategies, attract collaborative funding, and conduct community action.
- Conduct a Last-Mile Pilot (s) – Develop processes for applying for technical support at the neighborhood level to achieve access, literacy, and community development. (Guadalupe)

Support the Santa Barbara County Digital Equity Coalition

Leverage the existing network of community-based organizations focused on connectivity in underserved communities, digital literacy, and e-learning opportunities. Work is already happening in Santa Barbara County amongst community partners and CBOs that offer programs relevant to affordability and adoption goals.

Imperative

To meet the diverse needs of communities across Santa Barbara County, a strong coalition of partners is needed to advocate for each area and deliver resources that empower constituents to engage in the digital world. A successful and sustainable effort to improve adoption requires a partnership between organizations that have already gained the trust of their members and can deliver culturally responsive programs and content that reflect community needs.

The Santa Barbara Foundation is a central convener in the county with the time, staff, funding, and aligned mission to support digital equity initiatives led by community organizations. With the support of the Broadband Consortium Pacific Coast, the Foundation has taken the lead in creating a Digital Equity Coalition. A successful Digital Equity Coalition is led by an organization that has established relationships with organizations working closely in each community and is mission-driven and financially able to support convening efforts on a long-term basis.

Focus Areas

Support the Santa Barbara County Digital Equity Coalition led by the Santa Barbara Foundation. Participation connects public, private, and non-profit entities to the existing networks of community-based organizations that represent the needs of underserved communities. Coordinate within the K-12 education system, community colleges, libraries, and CBOs with access and inclusion goals and strategies to create a broad network.

Formalize an agreement with the Santa Barbara Foundation to convene the Digital Equity Coalition in support of the following goals:

- Connectivity: Access and availability of affordable broadband is the first step in meeting last-mile needs. Inform residents of provider options and promote cost assistance programs to lower cost barriers.
- Adoption: Adoption occurs as residents sign up for service. Engage community bridge builders and trusted agents as digital navigators to assist neighbors in overcoming resistance and concerns using new technologies.
- Ubiquity: Ubiquity refers to the availability of the internet to all, everywhere. The COVID-19 pandemic demonstrated children's need for a virtual connection to the classroom. The same connections are needed for telehealth and social programs. To move forward, communities need to plan and secure funds for a ubiquitous capability to ensure no one is left unplugged in a time of need.

Actions

As next steps, the following actions are recommended:

- Solicit input from the Digital Equity Coalition in discussions about broadband improvements, focusing on recommendations from the community that would lead to ubiquity in their neighborhoods.
- Partner with the Santa Barbara Foundation and the Digital Equity Coalition to apply for and secure funding to sustain ongoing work in underserved communities.
- Encourage and support philanthropic partnerships that bolster digital literacy investment through education, workforce development, and vital services.

Leverage Federal and State Programs to Increase Adoption Rates

Use federal- and state-funded programs such as the Affordable Connectivity Program (ACP) as a catalyst to develop local strategies, attract collaborative funding, and conduct community action that supports ongoing connectivity and adoption.

Imperative

Federal and state programs encouraging consumer adoption provide directed processes and coordinated publicity to increase connectivity in underserved communities. Leveraging programs to increase outreach efforts provides a coordinated opportunity to build connectivity and adoption into social services, education, and workforce goals across the county. Programs such as ACP catalyze conversations about existing outreach efforts and opportunities for collaboration between organizations to ensure households in need are informed and supported as they seek affordable internet access and grow their digital literacy capacities.

Focus Areas

Utilize the Digital Equity Coalition to support and promote existing programs with outreach strategies that are multilingual, culturally responsive, and dynamic that can grow as community needs transform with increased digital literacy and improved access. Leverage existing federal and state subsidy programs to coalesce the efforts of public services and community-based organizations, and fund ongoing initiatives to support affordability and adoption goals.

Encourage local public agencies and organizations that work with households eligible for federal and state subsidy programs to identify strategies that will build digital literacy into their client success metrics:

- Embed conversations about connectivity and adoption into their client engagement processes
- Allocate resources toward digital literacy and educational programs
- Formalize accessibility and adoption as a metric for client success.

Partner strategically to apply for funding that supports adoption and connectivity outreach efforts.

Conduct a Last-Mile Pilot

A Last-Mile Pilot aims to develop processes for applying technical support at the neighborhood level to achieve access and adoption. This strategy identifies several communities where a pilot project provides an ideal opportunity for establishing best practices. A coordinated effort is necessary to achieve Broadband for All in communities of need, and includes the following activities:

- Public Sector Capacity Development: technical assistance grants are available to deliver the needed resources.

  Work with the local education sector (as a public partner lead) to create a ubiquitous network (wireless) that can serve as a safety net to overcome gaps due to availability and affordability. Plan for municipal oversight. Rely upon the participation of social service stakeholders and CBOs to deploy.

- Private Sector Engagement: identify resources and remedy pain points.

  Coordinate engagement of broadband providers to identify current levels of access, plans to increase levels of access, and opportunities for new and expanded services.

- Convene Community Stakeholders: coordinate community engagement to ensure the commitment and completion of planning and execution of local strategies.

  Task Description - Accompanying the availability of access and affordability to those disconnected, is the need to insure adoption and the development of digital literacy skills. This work involves community-based organizations creating an awareness of benefits and resources available online to stimulate access (connection) and the commitment to participate in digital skills training programs.

Imperative	*Focus Areas*	*Actions*
Communities of need appear across the region, and there is an urgency to acquire the resources necessary to conduct a last-mile pilot project. Guadalupe has been identified as a prime opportunity for the planning and execution of a project.	The Santa Barbara Community Foundation, in partnership with SBCAG and the Broadband Consortium, is uniquely suited to coordinate the conduct of this continuing activity. Guadalupe is applying for funding tO cover a last-mile pilot – coordinate and leverage the results to replicate in additional last-mile priority locations. Build an evaluation process to identify opportunities for replication and refinement.	The efforts in communities such as Guadalupe and Los Alamos require focus and acceleration, documentation, and communication of lessons learned so they can become best practices. Considering the imminent receipt of $15,870,746.44 for Santa Barbara County, these efforts provide confidence-building examples in repeating the successful conduct of the work required.

Achieving Redundancy and Resiliency

Priorities

- Create a Regional Organization – Expand SBCAG's role via LATA funding to establish a Joint Powers Authority for regional broadband planning and support.
- Identify and Prioritize Funding Opportunities – Attract funding and recruit technical resources to support local communities as they seek to increase local capacity and close the digital divide.
- Maintain a GIS capability – Continue to collect and maintain information and create tools that support the deployment of last-mile and middle-mile, and increase adoption levels.

Create a Regional Organization

The Santa Barbara County Association of Governments is a regional planning agency comprised of representatives from the County of Santa Barbara and all eight incorporated cities. SBCAG distributes local, state, and federal transportation funds and acts as a forum for addressing regional and multi-jurisdictional issues. Although this work focuses primarily on transportation, funding has been requested to broaden the work to include broadband planning and support by establishing a Joint Powers Authority (JPA) between the County and the Cities of Santa Barbara County. The work involved includes governance and oversight of fiber assets via shared ownership by the communities they serve. There are three primary activities required:

1) Oversight & Monitoring

A physical accounting of the assets involved, monitoring where the network goes, strands in use and users, and publicly used vs. available unused capacity. Oversight and monitoring activities provide for the establishment of lease arrangements of unused fiber to private telecoms until needed for public use.

2) Operations & Maintenance

Covers the day-to-day operation of a function like an internet service provider and will likely be a P3 arrangement. Municipalities will share the cost of the connection and the internet service it provides to the region. In addition to maintaining the help desk service, ongoing financial oversight (billing) will result in significant savings for all concerned.

3) Strategy & Planning

Focuses on the ongoing growth of the network size and capability, extending it to new areas, connecting to new anchors, and developing technology applications of interest to municipalities. The first two areas provide revenue, and this activity will result from the targeted strategic investment.

The Last-Mile Federal Funding Account[43] is the funding opportunity that supports this structure, designed to fund last-mile broadband infrastructure projects. Interested organizations include local governments, non-profits, and tribal entities. A full list of eligibility criteria, program rules, and guidelines can be found in Appendix A[44] of the California Public Utilities Commission's Decision 22-04-05545. A public map shows priority areas and digital equity data; potential applicants can register for more detailed information. SBCAG's collaborative role in this model is to convene and coordinate on behalf of the region, which provides added benefit to the overall proposal to be submitted.

Imperative

Communities of need appear across the region, and there is an urgency to acquire the resources necessary to conduct a last-mile pilot project. Guadalupe has been identified as a prime opportunity for the planning and execution of a project.

Focus Areas

The Santa Barbara Community Foundation, in partnership with SBCAG and the Broadband Consortium, is uniquely suited to coordinate the conduct of this continuing activity.

Guadalupe is applying for funding to cover a last-mile pilot – coordinate and leverage the results to replicate in additional last-mile priority locations.

Build an evaluation process to identify opportunities for replication and refinement.

> *"On the Central Coast, as in our entire nation, access to a reliable internet connection is as vital to prosperity in our times as electricity or the telegraph have been in previous eras. That's why I worked in Congress to pass the largest-ever investment in expanding high-speed internet for our region. But that investment won't close our digital divide on its own. It takes local leaders like SBCAG and their diligent work in Santa Barbara County to chart a path to universal internet access to help our students, our businesses, and our region's economy compete and thrive in the digital century."*
>
> ***-Congressman Salud Carbajal***

Support Model

The support model builds upon the existing relationship between SBCAG and the Cities and the County as defined by the project MOU. Regarding capacity-building, conversations will follow defining roles and responsibilities for regional processes and required revenue sources.

Hub and Spoke: SBCAG, governance, municipalities' participation

Figure 47: Hub and Spoke Model of governance and participation

Identify and Prioritize Funding Opportunities

With local and regional opportunities identified in this document, the MOU partners must collaborate in grant funding processes to increase their capacity to implement or support the capacity of SBCAG to lead broadband infrastructure work efforts. Collaboration is key when securing grant funding, as applications must show that work efforts are aligned at a local and regional level and to ensure no overlap in work or duplicative efforts. One of the main purposes of developing a regional strategy was to organize and prepare local government to secure and execute funding to deliver Broadband for All and to close the digital divide. The Digital Equity Coalition is organized similarly, and pending the direction the MOU partners determine is their best path forward, collaboration is recommended to coordinate the following as outlined above:

- Seek funding to complete the middle-mile in partnership with the Golden State Network and/or the private sector.
- Seek funding to complete the last-mile – partnerships may include the Rural County Representatives of California, the Tribe, SBCAG, and the private sector.
- Seek funding to support the Digital Equity Coalition to address internet adoption and access to technology and training.

A summary of public sector grant opportunities can be found in Appendix J.

Maintain Collaborative GIS Capability

Maintaining a centrally administered map data portal is an important collaborative tool with regional benefits to track progress as the strategic plan is implemented and public and private sector investments are made. The regional collaborative GIS will allow for SBCAG, public works, and planning teams throughout the county to interact through a common platform. As work efforts continue to center on achieving broadband for all and reaching the underserved, the measurement of progress is required in digital inclusion, last-mile planning and construction, construction management, asset management and operations, identifying priority areas, and developing grant funding. This tool should be for internal agency use; however, aspects of the map may be shared externally (with special considerations for privacy) to build trust with the private sector.

Imperative

The crowdsourced GIS platform is a unique product of the Santa Barbara County Broadband Strategy. The system is a functional prototype demonstrating the tool's power and is well-positioned for use as a resource. With that said, it lacks implementation and commitment for use by the community and the development of a support model. GIS positions the public sector with the systems necessary to manage broadband infrastructure and adoption as a utility. If the region is committed to broadband as a fourth utility, GIS will be essential in the tracking and management of assets, including continued collection and maintenance of information and the creation of tools that support the deployment of last-mile and middle-mile infrastructure and increased adoption levels.

For the near term, GIS is a tri-county resource and tool to assist in securing grant funding. A long-term sponsor should maintain the system and update data as capabilities evolve so it can continue to serve the interests of all communities.

Focus Areas

Assuming a commitment to continued use of the GIS platform, the following focus areas apply:

- Continue to collect maps related to public right-of-way, local and otherwise.
- Continue to work with Cal Trans and share GIS information related to the Golden State Network.
- Collect and manage fiber maps from providers and new map information collected through the permitting process.
- Develop tools that assist in estimating costs and applying for funding (for example – speed testing).
- Continue to monitor data from the CPUC, NTIA, USDA, and local sources related to adoption levels and areas of need.
- Strive for digital equity in all planning processes by utilizing GIS to prioritize projects that reach underserved populations.
- Identify needs and functional potential to use as a system for asset tracking, status, and operations.
- Full-service terms and costs related to the Regional Collaborative GIS are detailed in "Regional Collaborative GIS: Service Details" Appendix K.

SECTION 8: OPPORTUNITIES AND BENEFITS

The preceding section outlines priorities and action steps to reach Broadband for All goals in Santa Barbara County. The following section describes opportunities and benefits that updated infrastructure and a connected community could bring to the region, improving prosperity and retaining competitive advantage in a technologically advanced society.

Improve Safety and Security

Broadband infrastructure plays an essential role in public safety, locally and regionally. Public safety planning involves what is known as the OODA loop, specifically, engaging in activities that allow communities the capability to observe-orient-decide-act. The tools and technologies to bring this to communities are all enabled by broadband. The best description of the impact of broadband for safety and security involves response and recovery activities during a natural disaster. Today's Emergency Operations Centers (EOCs) serve as a facility where information is gathered somewhat mechanically from the internet, human input, media stories, and other resources where a fusion process occurs so that leaders can assess, plan, and respond to what is occurring.

Up-to-date broadband infrastructure takes these processes to a new level of situational awareness with the use of hardware and software that expands and accelerates the collection and analysis of data, increasing and improving emergency responders' understanding of incident command. The broadband infrastructure provides immediate feedback from audio, video, environmental (air, water, seismic), and other sensors to accurately convey what is occurring.

Redundancy in the network is imperative to keeping it operational. Redundancy can be achieved through network design, where anchor institutions are interconnected via a series of loops. If a line is cut, service to the network is not lost. On the other hand, resiliency is achieved through partnerships with multiple broadband providers and the hardening of the network to not fail in the absence of power loss. If one provider is experiencing an outage, another can pick up the slack. Disaster recovery equipment and planning can ensure the network is up and operational to keep anchor institutions connected, communication flowing within the response team, and necessary communications with the community impacted.

Broadband infrastructure plays an essential role in public safety, locally and regionally.

Economic Development

Whereas tourism is a primary economic driver in the county, the primary potential benefits of broadband development lie in education, business retention, public safety, and emergency response for existing and future residents and businesses.

Job and economic growth are directly tied to economic development, and the broadband initiative is central to attracting and retaining businesses in each municipality and across Santa Barbara County. Businesses are tied to local customers without the infrastructure to provide reliable, affordable, high-speed internet. They cannot utilize modern technologies for promoting and running their businesses through point-of-sale software, customer relationship management systems, permitting processes, and global supply chain management. As these online systems improve and grow, businesses will rely on updated infrastructure to keep up with the pace of development and innovation.

Santa Barbara County is home to multiple institutions of higher learning, including a significant research and innovation hub at UCSB. The higher education schools serve local students and attract out-of-area students because they are considered top-performing schools located in a safe and enjoyable place to live. In addition to the award-winning research from UCSB, the two county community colleges provide vocational and lower-division education to thousands of local residents who become employees and entrepreneurs who need to be trained in modern technologies to stay competitive in the marketplace. Formerly analog vocations such as auto mechanics, construction, landscape, and agriculture are increasingly digitized, as are the training programs preparing the labor force. On-campus and in-home access to technology and the internet is imperative for success in the workforce, and research shows that smartphone and small device access is insufficient[46]. Elementary and high schools are increasingly tasked to begin technology familiarization and training at younger ages. While some schools in the county adequately incorporate digital tools into the curriculum, pockets in the county do not have sufficient speed and capacity at their schools to enable children to learn using technology. These children are the job creators of the future and deserve high-capacity infrastructure to carry them through their education. The region needs multiple carriers to provide competition in the broadband space, which will lower prices and play a role in the attraction and diversification of businesses.

[46] *A. Gonzales, 2021: The Importance of Large Screen Device Ownership. (Digitunity Digital Opportunity Network)*

A portion of the needs assessment focused on businesses. Of the total respondents who took the needs assessment survey, 68 completed the section focused on business (Figure 48).

Q50 – Do you own a business?

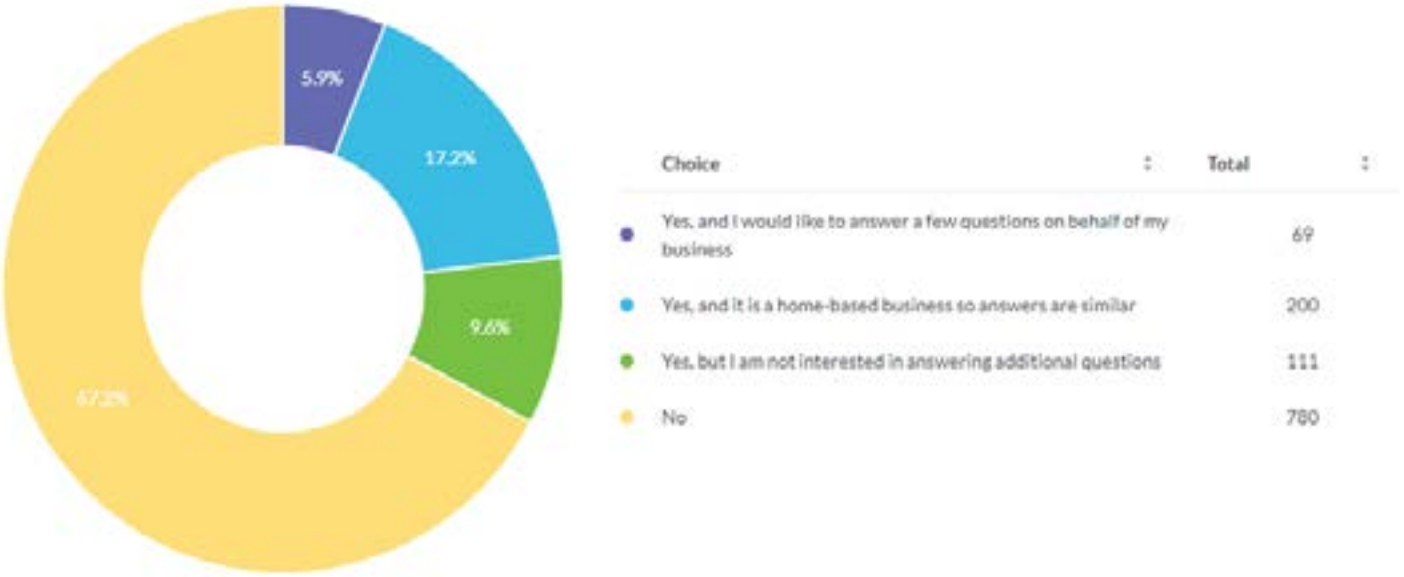


Figure 48: Needs Assessment Results to the question, "Do you own a business?"

Of significance to this section is Figure 49, displaying answers to needs assessment question Q60 – What impact would gigabit internet service have on your business? (Check all that apply):

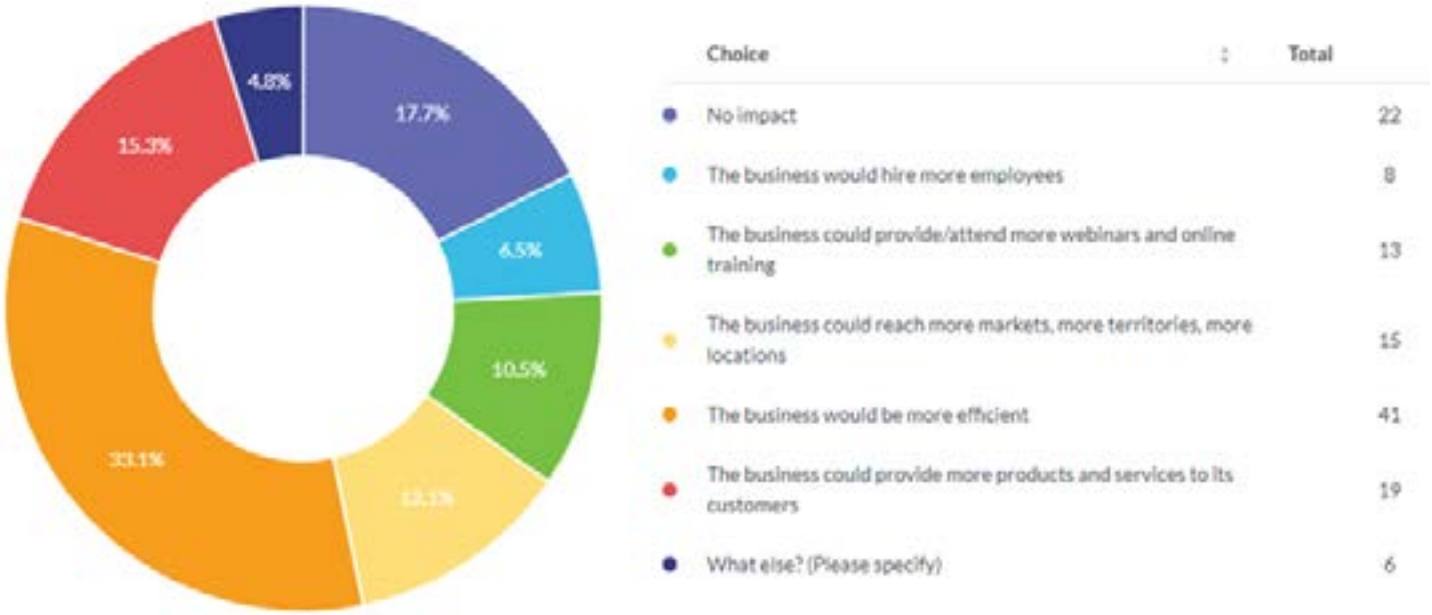


Figure 49: Needs Assessment Results to the question, "What impact would gigabit internet service have on your business?"

The responses show that there are businesses within Santa Barbara County that would benefit from access to faster and more reliable internet service, which would help them become more efficient, grow their market share, provide more products or services to customers, and access needed resources.

Achieving Digital Equity

Despite the high number of connections across Santa Barbara County, there are pockets of the population where broadband adoption is limited by barriers, including affordability, access to technology, and low digital literacy. The cost to access the internet is prohibitive for some households, and inequity exists in the tiers limiting high-speeds to higher-cost plans. Federal and state programs seek to reduce the digital divide by subsidizing the cost of internet plans and requiring a minimum 100Mbps download and upload speeds for low-cost plans. Opportunities exist in Santa Barbara County across public, private, and community-based organizations to embed affordability program enrollment into social services, education, and community engagement. To educate households about these programs and support their enrollment, community organizations build on partner relationships to conduct outreach and provide technical assistance.

Households excluded by the digital divide require access to in-home technology to fully participate in the digital economy, learning opportunities, and public services. Low-income households often rely on a mobile device rather than large device technology[47]. However, research repeatedly links success outcomes to in-home devices rather than mobile devices, finding that computer use significantly increases user engagement, digital literacy, and improved range and functionality48. County-wide programs such as Partners in Education deliver free technology devices and support services to families with students enrolled in public schools. Federal, state, and philanthropic funding opportunities exist to expand these programs and create specialized programs targeting other vulnerable populations.

Santa Barbara County is home to rural, urban, and suburban communities that reflect a range of cultural backgrounds, languages, and shared histories. Many of these communities require different approaches to outreach and education about broadband, access, and digital literacy; there is no one-size-fits-all approach to equitable connectivity. The fabric of the community-based organization network in the county is woven from organizations embedded in the communities they serve that have established reputations of trust with community members. Some already work with their communities to improve access to high-speed internet and offer digital literacy and educational content tailored to their needs, including several libraries across the county and higher education institutions. Opportunities to increase adoption and build capacity through multilingual programs would narrow the digital divide and empower users to participate in the digital landscape.

[47] *A. Gonzales, 2021: "The Importance of Large Screen Device Ownership." Digitunity/Digital Opportunity Network*

SECTION 8: OPPORTUNITIES AND BENEFITS

Santa Barbara County is ripe for collaborative efforts to bridge the digital divide through partnerships between community-based organizations and public services, increased access to educational opportunities, and improved funding with the aid of cooperative grants and philanthropic investment. Resources and goals have already begun to coalesce across the county under the leadership of the Santa Barbara Foundation supported by the Broadband Consortium Pacific Coast.

Smart City Planning

Aspects of a Smart City

Broadband infrastructure catalyzes the development of smart cities and communities. With faster internet speeds and improved communication, communities throughout Santa Barbara County can implement smart technology-based solutions to their unique local issues. Smart cities utilize digital technology to connect, protect, and enhance the lives of everyone in the community. It adopts practices that address challenges and creates a technologically enabled, sustainable infrastructure while equitably integrating technology, community, and even nature to enhance a community's livability and resilience. Once community broadband infrastructure is in place, smart city applications allow the collection and analysis of data from IoT sensors, cameras, and other technologies to monitor the environment enabling communities to decide how and when to act. As smart communities continue to develop, a host of technologies are possible that will improve public health and safety, communication, transportation, waste management, and more.

With the data collected from these technologies, communities will improve infrastructure, public utilities, services, and decision-making to improve quality of life.

Modern technologies that may one day find their way into a smart city include:

- Smart Utility Meters – Devices that attach to buildings and connect to a smart grid, allowing utility companies to efficiently manage the community's energy flow.
- Smart Transportation – Connected vehicles mean more efficient traffic flow, fewer hazards, and more reliable public transportation.
- Smart Waste Management – The collection and disposal of waste can be costly and inefficient. Smart Waste management monitors trash collection flow, rate, and amount, allowing cities to work with waste management companies to improve the overall efficiency of trash collection.
- Smart Air Monitoring – Smart air monitors detect dirt, chemicals, dust, and more floating in our air. This data can aid cities in detecting polluted areas so that they may develop solutions and improve public health and safety.
- Smart Streetlights – These streetlights utilize a combination of cameras and sensors to improve city efficiency, safety, and data collection. Smart streetlights create dynamic lighting, monitor weather and environmental changes, display digital signage and alerts, aid in parking management, extend cellular and wireless communication, manage traffic, and manage emergency response. The benefits include reduced energy costs, increased pedestrian satisfaction and safety, reduced carbon and light pollution, improved traffic and parking, revenue opportunities, and crime detection.

SECTION 8: OPPORTUNITIES AND BENEFITS

Health, Safety, and the Economy

Smart city planning results in a host of benefits to local communities and economies and feeds advanced technologies and solutions. A smart city is safer and more resilient by applying resources where they are most needed. Smart cities grow when civic leaders invest in their citizens and the future by looking forward at the physical environment, safety, economic development, job creation, education, distance learning, telehealth, and telemedicine, all of which cannot be improved without greater connectivity. Smart city technologies empower city agencies, citizens, businesses, and developers by allowing cities to optimize operations via real-time data intelligence to improve citizens' daily lives through enhanced city services. Smart city technology improves applications' use of city data and aids communities in enhancing operational efficiencies and citizen engagement, allowing public visibility of real-time city-wide data to improve mobility, connectivity, and safety services. In addition, the new technologies drive the creation of new businesses and revenue streams resulting in economic development.

Smart City Vision

A smart city cannot truly be smart without well-connected citizens, businesses, and government, equipped with the appropriate technologies and provided equal access to services that, in the future, require a reliable internet connection. The Santa Barbara County Broadband Strategic Plan is a launch point for smart city planning and could connect residents while improving public/private and citizen/local government relationships within the region.

Smart city development takes preparation and participation. Without ubiquitous broadband infrastructure, a community lacks a solid foundation for building smart solutions. A broadband strategy must be established for communities to connect as many citizens as possible. Once a broadband connection is available, civic leadership is required of city and community planners, local businesses (specifically technology and innovative services), and citizens. According to the American Planning Association, knowledgeable and forward-looking planners are the backbone of smart city development. City planners and public works departments are experienced in both the art and science of land use and public engagement, making them significant drivers behind the planning process.

The Urban Sustainability Directors Network outlines key steps in smart city planning. Government departments should become connected via digital strategies and sustainability, and IT directors should converge on a shared purpose to find similarities across departments, sectors, and jurisdictions. Local governments should begin to recognize new capacities in the changing role of IT, looking at the role to help build new staff expertise. Planners, businesses, and the public should collaborate to create new partnerships with the tech sector and develop a solid understanding of the potential for innovation in their region. Specifically, the partnership between the city and industry is critical to a smart city's success. In addition, local governments must better understand and adjust to emerging technologies, mastering innovation and quicker adoption.

Local governments can then increase communication with the public and get citizens more engaged in the process via crowdsourcing applications, staying mindful of the privacy issues for businesses and citizens when making city data available for smart city technologies. Finally, procurement rules are designed to ensure fairness and transparency but can sometimes create restraints on the adoption of new technologies in emerging markets. A re-examination of this system to become more transparent and innovative will speed up the smart city planning process.

Creating a mechanism for securing resources for investing in smart city development is recommended to create technology programs, grants, and opportunities that help governments, businesses, and citizens along the smart journey. By increasing the awareness of these opportunities, communities will find avenues to create smart solutions and opportunities to connect the government and the public to achieve common smart goals.

CONCLUSION

With the rapidly changing broadband landscape, including new FCC mapping requirements and varied definitions for served and unserved, this document provides a baseline for the Alliance. The document provides guidance for the region and recommendations focusing on additional fiber to support future demand and movement toward a ubiquitous network for all homes, schools, public services, libraries, and businesses.

Recomendations Moving Forward

- Take informed actions based in gathered and available data
- Adapt to an evolving landscape
- Put in place systems for redundancy and resiliency for safer communities
- Invest in the groundwork for smart city infrastructure

Using the strategic plan, Santa Barbara County can foster digital equity and become broadband ready, in alignment with California Broadband for All.

APPENDICIES

Appendix A - Communications plan

Appendix B - Needs Assessment data

Appendix C - Project FAQ's

Appendix D - GIS data list

Appendix E – California Broadband Infrastructure Report Card

Appendix F - Responses to Get Connected Resource Guide

Appendix G - Cuyama Valley Action Plan

Appendix H - Broadband Strategy & Feasibility Study

Appendix I- Santa Barbara public library broadband connectivity

Appendix J - Grant opportunities

Appendix K - GIS service details

APPENDIX A

Communications Plan for SB County Broadband Strategic Plan Development

Goal: Engage with the Santa Barbara community with the purpose to collect information that will help local government prioritize funding to help close the digital divide.

Purpose for Communication	Communication Prep Activity	Channel	Targets	Timing – Month	Lead	Notes
Data collection via needs assessment survey and speed test	Develop press kit to include digital collateral for social media channels; other orgs; PIO's	• Press release • Chambers • Websites	Businesses, individuals, Cities PIO's	Release date: Monday March 21	SBCAG/BCPC	Completed with great media pick up; good engagement with high level of engagement in survey and speed test; *GIS
Project status updates for Cities to keep communication channels open and build trust for the process; collect important data	Develop ppts; meet with CM's or other reps 1-1 to set up presentations to full councils	• Email • Phone • In person • Zoom	City Council's and general public	March/April/May/June/July	Bill and Maria	Target to complete by May 30; Still need Goleta to schedule City Council meetings *GIS
Monthly project status updates to keep communication channels open and build trust for the process and strengthen outreach	Develop ppts to be reviewed by TAC 2 weeks prior; develop content and track project status for presentation	• Email • Zoom • In person (?)	SBCAG Ad-Hoc Committee	February-November 2022	Technical Advisory Committee – Mike, Bill, Maria	Ongoing
Engage stakeholders and interested parties for data collection and corroboration	Chose location and audience – develop content and/or panels to focus on digital inclusion	In person	Panelists, stakeholders, and Interested Parties	April/May/June	Econ Alliance-community & outreach team: Lauren, Maria, Jill	Completed *GIS
Engage school districts to help provide insight into digital needs	Identify key point of contact; messaging development; identify key issues for student's	• Email key points of contact • Engage via outreach efforts and include in panel	• District IT staff • Superintendents		BCPC/Econ Alliance outreach	Ongoing *GIS

	ability to connect	discussions				
Connect with ISP's to determine services/service levels and digital inclusion initiatives	Develop ppt to share project goal and current status	One on one meetings with company representative's	• ISP team's	March - September	Bill and Maria	Additional detailed data possibly available with UCSB partnership *GIS
Second round of data collection to targeted areas	Identify what we need to ask for from current Needs Assessment Survey	• School districts • Local community channels • CBO's	• Areas of low participation	June/July	Maria/UCSB	To be addressed via Digital equity coalition - Completed
Public sector outreach	Identify expertise in public/private partnerships; deployment; grant writing; policy development	• Zoom	• Public sector staff and elected officials	March/May/ June/August/September	Bill and Maria	Public/Private partnership webinar – April; Programmatic EIR – May; Grants – September *GIS

Project Contributors and Outreach Audience

Governing Board/SBCAG

Who: SBCAG
Provide project leadership and oversight - Staff
Approve recommendations & assign resources- Board
Meet weekly with the BCPC Project Team and as needed – Staff

SBCAG Broadband Ad-Hoc Committee (Policy Advisory)

Who: Subset of SBCAG board members
Project participants that provide insight, feedback, advocacy and policy advisors
Meets monthly with the SBCAG staff and BCPC Project Team (second Mondays)

BCPC Project Team

Who: BCPC staff; Econ Alliance team; Santa Ynez Band of Chumash Tribe representative; REACH
Project organization for data collection and analysis; engages with the public/private sector
Meets daily/weekly/monthly and additional as needed

Technical Advisory Committee

Who: BCPC project team, SBCAG staff, local agency staff and technical consultants
Review and oversight of project activities; GIS mapping, grant writing, inclusion strategies
Meets monthly (first Fridays)

Stakeholders

Who: Representatives from government, telecom, education, anchor institutions and community-based organizations who contribute technical/policy information & feedback;
Engaged by project team via direct outreach throughout the project

Interested Parties

Who: Community organizations, businesses and individuals whose input via data collection may influence outcomes;

- Engaged with project via direct outreach and media; in person events and web-based data collection throughout the project

APPENDIX B

Table of Contents

Adolescents (n = 58)

- **Demographic and Background Information**
  - **Age**

	Frequency	Percent
13	22	37.9
14	27	46.6
15	2	3.4
17	1	1.7
18	1	1.7
Do not answer	5	8.6
Total	58	100.0

Mean	13.75
Std. Deviation	.939
Minimum	13
Maximum	18

  - **Gender**

	Frequency	Percent
Male	26	44.8
Female	30	51.7
Do not answer	2	3.4
Total	58	100.0

  - **Race**

	Frequency	Percent
Hispanic or Latino	41	70.7
White/Caucasian	7	12.1
White/Caucasian + Hispanic or Latino	3	5.2
White/Caucasian + Native American or Alaska	1	1.7
White/Caucasian + Asian	1	1.7
Asian + Native American or Alaska	1	1.7
Do not answer	4	6.9
Total	58	100.0

  - **City**

	Frequency	Percent

Orcutt	48	82.8
San Luis Obispo	6	10.3
Santa Barbara	3	5.2
Solvang	1	1.7
Total	58	100.0

- **Money concern**
  Q9 - Would you say that money is a concern in your household?

	Frequency	Percent
No, I do not have money concern	24	41.4
Yes, I have money concern	14	24.1
I am not sure	18	31.0
Do not answer	2	3.4
Total	58	100.0

- **Free or reduced lunch at school**
  Q8 - Do you qualify for free or reduced lunch at school?

	Frequency	Percent
No	1	1.7
Yes	35	60.3
I am not in an educational program	1	1.7
I am not sure	18	31.0
Do not answer	3	5.2
Total	58	100.0

- **Education level of parents/guardians**
  Q7 - What is the highest education level of a parent/guardian?

	Frequency	Percent
High school	23	39.7
Some college	10	17.2
4-year degree	6	10.3
Graduate/Doctoral/Professional Degree	3	5.2
Vocational or Certificate	1	1.7
Other	13	22.4
Do not answer	2	3.4
Total	58	100.0

- ## Internet & Device Use

  - **Types of Internet-connected devices**
    Q12 - Which of the following Internet-connected devices do you have? (Please select all that apply)

	Frequency	Percent
Laptop or Desktop	44	75.9
Tablet/iPad	26	84.5
Smartphone	49	84.5
Smart/Streaming TV	41	70.7
Gaming Console	33	56.9
Supporting Accessory (Alexa, etc.)	11	19
Medical Device	2	3.4
Security System, Doorbell, Camera	13	22.4
None	1	1.7

  - **Number of Internet-connected devices**
    Q13 - To the best of your knowledge, how many of each internet connected devices do you have in your household? (Please select a number for each if possible.

	N (who answered)	Minimum	Maximum	Mean	Std. Deviation
Laptop or Desktop	54	1	10	2.50	1.881
Tablet/iPad	41	1	10	2.07	1.649
Smartphone	55	1	10	4.07	1.864
Smart/Streaming TV	49	1	6	2.82	1.302
Gaming Console	41	1	9	2.29	1.569
Supporting Accessory (Alexa, etc.)	26	1	6	2.00	1.327
Medical Device	10	1	7	2.10	1.969
Security System, Doorbell, Camera	28	1	10	2.32	1.982
Total	58	0	38	14.03	6.994

  - **Data use**
    Q14 - What activities do you use the most data/Gigabytes on?
    (Select all that apply)

	Frequency	Percent
Gaming	30	51.7
Music/Video	30	51.7

Uploads/downloads (publishing videos, or downloading content)	18	31.0
Telehealth	0	0
Teleconferencing/video chat	9	15.5
Social Media Platforms	24	41.4
Other devices that connect to Wi-Fi	5	8.6

- **Internet use (for distance learning)**
  Q10 - While distance learning during the pandemic, I used...

	Frequency	Percent
Do not answer/unclear	2	3.4
I did not do distance learning	1	1.7
My home internet	53	91.4
Other (e.g., School internet)	2	3.4
Total	58	100.0

- **Internet assessment (for distance learning)**
  Q11 - How would you rate your experience with your internet during the pandemic as it related to distance learning?

	Frequency	Percent
Horrible, I was not able to learn much	4	6.9
It was bad, but I still made it possible	14	24.1
Okay, but wish that I had better connectivity	15	25.9
My connectivity was good, but it was hard for others	12	20.7
Incredible! I had no issues	11	19.0
Do not answer	2	3.4
Total	58	100.0

- **Broadband access for youth**
  Q6 - Do you think that Santa Barbara County needs to increase broadband access for its youth residents?

	Frequency	Percent
No	2	3.4
Yes	20	34.5
I have access but I am not sure about the whole region	4	6.9
I do not know	32	55.2
Total	58	100.0

- ## Relationships between money concern and Internet/device use

  - ### Money concern and internet experience (distance learning during the pandemic)

The t-test analysis examined whether adolescents rate their internet experience differently during the pandemic, as it related to distance learning, depending on whether they have money concern in their household. The result indicates that there was a statistically significant difference between two groups ($t = 2.54$, $p = .02$), such that adolescents who do *not* have money concern rated their internet experience more highly ($M = 2.48$, $SD = 1.16$), compared to those who have money concern ($M = 1.50$, $SD = 1.09$).

  - ### Money concern and types of internet-connected devices

The chi-square analysis examined the relationship between the types of internet-connected devices that adolescents have and money concern in their household. The result indicates that there was no statistically significant difference between two groups ($t = 1.24$, $p = .22$). Those who do not have money concern have approximately 4 different types of internet-connected devices on average ($M = 4.13$, $SD = 1.62$) and those who have money concern have approximately 3 different types of internet-connected devices on average ($M = 3.43$, $SD = 1.74$). The following table compares the types of devices between those who do and do not have money concern.

	I do not have money concern	I have money concern	I am not sure	Total	Statistics
Laptop or Desktop	18 (41.9%)	11 (25.6%)	14 (32.6%)	43	$\chi^2(2, N=56) = .078, p = .962$
Tablet/iPad	11 (44.0%)	5 (20.0%)	9 (36.0%)	25	$\chi^2(2, N=56) = .674, p = .714$
Smartphone	21 (43.8%)	14 (29.2%)	13 (27.1%)	48	$\chi^2(2, N=56) = 5.072, p = .079$
Smart/Streaming TV	20 (50%)	8 (20%)	12 (30%)	40	$\chi^2(2, N=56) = 3.267, p = .195$
Gaming Console	13 (40.6%)	6 (18.8%)	13 (40.6%)	32	$\chi^2(2, N=56) = 2.925, p = .232$
Supporting Accessory (Alexa, etc.)	7 (63.6%)	1 (9.1%)	3 (27.3%)	11	$\chi^2(2, N=56) = 2.866, p = .239$
Medical Device	1 (50%)	1 (50%)	0 (0%)	2	$\chi^2(2, N=56) = 1.210, p = .546$
Security System, Doorbell, Camera	8 (61.5%)	2 (15.4%)	3 (23.1%)	13	$\chi^2(2, N=56) = 2.438, p = .296$

Note. “Total” in each column is the number of participants who answered they have the corresponding Internet-connected devices.

- **Money concern and number of internet-connected devices**

The t-test analysis examined whether there are statistically significant differences in the number of internet-connected devices depending on whether they have money concern in their household. The result indicates the following:

- There is *no* statistically significant difference in the total number of internet-connected devices between those who do not have money concern (M = 15.38, SD = 6.54) and those who have money concern (M = 14.43, SD = 8.84).
- There is a statistically significant difference in the number of laptops/desktops (t = 2.33, p = .03), such that those who do not have money concern have more laptops/desktops (M = 3.00, SD = 1.98) than those who have money concern (M = 1.71, SD = .73).
- There is *no* statistically significant difference in the number of:
    - tablets/iPads between those who do not have money concern (M = 2.11, SD = 2.08) and those who have money concern (M = 1.89, SD = 1.36).
    - smartphones between those who do not have money concern (M = 4.54, SD = 2.27) and those who have money concern (M = 3.71, SD = 1.64).
    - smart/streaming TVs between those who do not have money concern (M = 2.86, SD = 1.17) and those who have money concern (M = 3.09, SD = 1.04).
    - gaming consoles between those who do not have money concern (M = 2.00, SD = 1.12) and those who have money concern (M = 2.90, SD = 2.56).
    - supporting accessories (Alexa, etc.) between those who do not have money concern (M = 1.91, SD = 1.22) and those who have money concern (M = 2.14, SD = 1.86).
    - medical devices between those who do not have money concern (M = 1.33, SD = .58) and those who have money concern (M = 2.50, SD = 3.00).
    - security systems/doorbells/cameras between those who do not have money concern (M = 2.23, SD = 1.54) and those who have money concern (M = 3.00, SD = 3.32).

- **Money concern and data use**

The following table indicates the activities that adolescents, who do and do not have money concern, use the most data/Gigabytes on. The chi-square test analysis indicates that there are no statistically meaningful relationships between money concern and data use.

	I do not have money concern	I have money concern	I am not sure	Total	Statistics
Gaming	15 (50%)	8 (26.7%)	7 (23.3%)	30	$\chi^2(2, N=56) = 2.401, p = .301$
Music/Video	11 (36.7%)	9 (30.0%)	10 (33.3%)	30	$\chi^2(2, N=56) = 1.252, p = .535$
Uploads/downloads (publishing videos, or downloading content)	7 (38.9%)	5 (27.8%)	6 (33.3%)	18	$\chi^2(2, N=56) = .191, p = .909$
Telehealth	0 (0%)	0 (0%)	0 (0%)	0	

Teleconferencing/video chat	4 (44.4%)	3 (33.3%)	2 (22.2%)	9	$\chi^2(2, N=56) = .633, p = .729$
Social Media Platforms	11 (47.8%)	6 (26.1%)	6 (26.1%)	23	$\chi^2(2, N=56) = .689, p = .709$
Other devices that connect to Wi-Fi	2 (40%)	2 (40%)	1 (20%)	5	$\chi^2(2, N=56) = .756, p = .685$

Note. “Total” in each column is the number of participants who answered they use the most data/Gigabytes on the corresponding activity.

Adults (n = 1,168)

- **Demographic and Background Information**

  - **Age**

	Frequency	Percent
19-21	4	.3
22-39	185	15.8
40-54	237	20.3
55-65	222	19.0
65-70	184	15.8
70-75	169	14.5
75-80	89	7.6
80-85	54	4.6
85+	11	.9
Do not answer	13	1.1
Total	1168	100.0

Note. 3 participants in the 65+ group indicated themselves as “below 65.” These participants are classified to “55-65” in the above table.

  - **Gender**

	Frequency	Percent
Male	598	51.2
Female	517	44.3
Other	15	1.3
Do not answer	38	3.3
Total	1168	100.0

  - **Race**

	Frequency	Percent
White/Caucasian	939	80.4
Hispanic or Latino	69	5.9
Asian	45	3.9
Native American or Alaska Native	7	.6
Black or African American	4	.3
Middle Eastern/North African	3	.3
Native Hawaiian or other Pacific Islander	3	.3
White/Caucasian + Hispanic or Latino	24	2.1
White/Caucasian + Asian	10	.9
White/Caucasian + Native American or Alaska Native	7	.6
White/Caucasian + Native Hawaiian or other Pacific Islander	3	.3

White/Caucasian + Black or African American	4	.3
White/Caucasian + Middle Eastern/North African	4	.3
Hispanic or Latino + Native American or Alaska Native	5	.4
Hispanic or Latino + Black or African American	2	.2
Hispanic or Latino + Asian	1	.1
Asian + Native Hawaiian or other Pacific Islander	2	.2
Do not answer	36	3.1
Total	1168	100.0

- **Income**

	Frequency	Percent
<$20,000	56	4.8
$20,000 - $40,000	68	5.8
$40,000 - $60,000	112	9.6
$60,000 - $80,000	126	10.8
$80,000 - $100,000	146	12.5
>$100,000	571	48.9
Other	22	1.9
Do not answer	67	5.7
Total	1168	100.0

- **City**

	Frequency	Percent
Anaheim	3	.3
Boardman	9	.8
Buellton	21	1.8
Denver	3	.3
Forrest City	4	.3
Goleta	28	2.4
Hawthorne	5	.4
Isla Vista	19	1.6
Lompoc	31	2.7
Los Alamos	12	1.0
Los Angeles	32	2.7
Los Olivos	3	.3
Orcutt	79	6.8
San Francisco	10	.9
San Jose	6	.5
San Luis Obispo	18	1.5
San Marcos	6	.5
Santa Barbara	797	68.2
Santa Maria	3	.3
Santa Ynez	1	.1
Solvang	20	1.7

Thousand Oaks	2	.2
Ventura	1	.1
Other	53	4.5
Do not answer	2	.2
Total	1168	100.0

- **Number of household members**
  Q34 - How many people live in your household?

	Frequency	Percent
1	215	18.4
2	564	48.3
3	166	14.2
4	142	12.2
5	40	3.4
6	24	2.1
7	5	0.4
Do not answer	12	1.0
Total	1168	100.0

- **Number of *student* household members**
  Q49 - How many people living at your home are in elementary, high school or attending college?

	Frequency	Percent
1	177	15.2
2	126	10.8
3	32	2.7
4	6	0.5
5+	2	0.2
Do not answer	825	70.6
Total	1168	100.0

- **Internet at Home**

  - **Place for Internet use**
    Q43 - Where are you most likely to use the Internet?

	Frequency	Percent
Home	1048	89.7
Work or school	79	6.8
Café or some other public site	4	0.3
Library	2	0.2
Friend's house	1	.1
Other (e.g., car, hotspot)	18	1.5
Do not answer	16	1.4
Total	1168	100.0

  - **Reason of no at-home Internet**
    Q42 - If you do not have Internet at home, why not?

	Frequency	Percent
Too expensive	11	0.9
There is no internet service provider where I live	7	0.6
Other	49	4.2
I have Internet	24	2.1
I don’t have a device to connect to the internet	1	0.1
I don’t know how to sign up or connect to the Internet	1	0.1
Do not answer	1075	92.0
Total	1168	100.0

Note. The survey did not provide “*I have Internet at home*” option in this question. 24 responses of “I have Internet” were recorded by manually coding the responses of “Other”)

  - **At-home Internet access**
    Q35 - Do you have internet access at home?

	Frequency	Percent
No	10	.9
Yes	1154	98.8
Do not answer	4	.3
Total	1168	100.0

  - **Reliance on at-home Internet**
    Q36 - Do you rely on at-home Internet for work or school?

	Frequency	Percent
No	285	24.4
Yes	876	75.0
Other	5	.4

Do not answer	2	.2
Total	1168	100.0

- **At-home Internet service provider**
  Q37 - If you do have internet service at home, who is your internet service provider?

	Frequency	Percent
Advanced Wireless	9	0.8
AT&T	4	0.3
Boingo Wireless, Inc	1	0.1
Charter Spectrum	17	1.5
Comcast	110	9.4
Cox Cable/Cox Communications	807	69.1
Frontier	123	10.5
I do not know	2	0.2
Impulse	17	1.5
Other	48	4.1
T-Mobile	4	0.3
Verizon	13	1.1
Do not answer	13	1.1
Total	1168	100.0

- **Internet cost**
  Q41 - Do you think your internet cost is:

	Frequency	Percent
Inexpensive	17	1.5
Reasonable	316	27.1
Too expensive	832	71.2
Do not answer	3	0.3
Total	1168	100.0

- **Internet reliability**
  Q44 - How reliable do you find your internet connection?
  (1 = very unreliable ~ 5 = average ~ 10 = Very reliable)

N (Valid)	Mean	Std. Deviation	Median	Mode
1163	6.18	2.50	6.0	5

Note. There are 5 missing cases

- **Internet speed**
  Q45 - What speed do you feel your internet connection is?

	Frequency	Percent
Slow	247	21.1
Moderate	654	56.0
Fast	264	22.6

Do not answer	3	0.3
Total	1168	100.0

- **Internet performance**
  Q46 - Does your internet performance meet your needs?

	Frequency	Percent
No	172	14.7
Sometimes	300	25.7
Mostly	448	38.4
Yes	246	21.1
Do not answer	2	0.2
Total	1168	100.0

- **Most important factors for Internet**
  Q47 - What is most important to you regarding your internet service?

	Frequency	Percent
Price, I want it to be a competitive price	210	18.0
Speed, I do not want any delay in download or upload	182	15.6
Reliability, I do not want my internet to be interrupted	381	32.6
Bundled services, I want Internet, Cable, Phone service etc. to be in one place	6	0.5
Customer Service, I want responsive customer support	7	0.6
Price and Reliability	4	0.3
Price and Speed	314	26.9
Speed and Reliability	14	1.2
Price and Customer Service	9	0.8
Price, Speed, and Reliability	21	1.8
Price, Reliability, and Customer Service	1	0.1
Price, Reliability, Speed, and Customer Service	1	0.1
All of the above	9	0.8
Other (e.g., bandwidth, broadband)	8	0.7
Do not answer	1	0.1
Total	1168	100.0

- ## Internet-connected device

  - **Access/own of Internet-connected device**
    Q48 - Do you have access to or own a device that connects to the internet?

	Frequency	Percent
I neither have access to or own	8	0.7
I have access to	219	18.8
I own	936	80.1
Do not answer	5	0.4
Total	1168	100.0

  - **Types of Internet-connected devices**
    Q38 - Which of the following Internet-connected devices do you have? (Please select all that apply)

	Frequency	Percent
Laptop or Desktop	1148	98.3
Tablet/iPad	873	74.7
Smartphone	1107	94.8
Smart/Streaming TV	913	78.2
Gaming Console	267	22.9
Supporting Accessory (Alexa, etc.)	406	34.8
Medical Device	85	7.3
Security System, Doorbell, Camera	459	39.3
None	2	0.2
Total	1168	100.0

  - **Number of Internet-connected devices**
    Q39 - To the best of your knowledge, how many of each internet connected devices do you have in your household? (Please select a number for each if possible)

	N	Minimum	Maximum	Mean	Std. Deviation
Laptop or Desktop	1146	1	10	2.62	1.359
Tablet/iPad	922	1	10	1.88	1.034
Smartphone	1107	1	10	2.30	1.151
Smart/Streaming TV	942	1	10	1.87	1.127
Gaming Console	293	1	8	1.64	1.016
Supporting Accessory (Alexa, etc.)	434	1	10	2.82	2.141
Medical Device	103	1	4	1.29	.636
Security System, Doorbell, Camera	471	1	10	2.78	2.357
Total	1166	0	58	10.46	6.565

Note. A total of 1167 participants answered this question. One participant who answered “10” to each device was considered as an outlier and thus excluded.

- **Data use**
  Q40 - What activities do you use the most data/Gigabytes on? (Select all that apply)

	Frequency	Percent
Gaming	171	14.6
Music/Video	887	75.9
Uploads/downloads (publishing videos, or downloading content)	571	48.9
Telehealth	84	7.2
Teleconferencing/video chat	532	45.5
Social Media Platforms	265	22.7
Other activities (e.g., work, smart home devices)	259	22.2
Total	1168	100.0

- **Broadband speed choice**
  Q - The State of California has set a goal for all California businesses and homes to have access to at least one provider of broadband with download speeds of at least 100 megabits per second no later than 2026. Some cities have set a goal of residents to be able to choose Gigabit speeds or 1,000 megabits per second of service (1 Gbps or 1,000 Mbps). If you could subscribe to much faster speeds, which would you be more likely to choose?"

	Frequency	Percent
PRETTY GOOD, and MOST AFFORDABLE (For example - up to 4 devices) 100 Mbps for $55 - $60 per month	350	30.0
GREAT (Streaming, operating a business): 250 Mbps for $80 - $100 per month	347	29.7
BEST, VIRTUALLY UNLIMITED (Really fast Internet, can support all devices running at the same time, streaming, gaming, operating a business): 1,000 Mbps or 1 Gigabit for $100 - $150 per month	336	28.8
I am not sure	89	7.6
Other	40	3.4
Do not answer	6	0.5
Total	1168	100.0

- **Relationships between income and Internet/device use**

  - **Income X at-home Internet access**

A chi-square test analysis examined the relationship between adults' income and at-home internet access. The result indicates that there are significant differences in at-home internet access among the various income groups.

		At-home internet		
		No	Yes	Total
Income	<$20,000	2	54	56
	$20,000 - $40,000	2	65	67
	$40,000 - $60,000	4	108	112
	$60,000 - $80,000	0	125	125
	$80,000 - $100,000	1	144	145
	>$100,000	0	571	571
	other	0	21	21
Total		9	1088	1097

Note. $\chi^2(6, N = 1097) = 25.445$, $p < .001$; 71 missing cases

  - **Income X access/ownership of Internet-connected device**

A chi-square test analysis examined the relationship between adults' income and the access/ownership of Internet-connected device. The result indicates that there are significant differences in the access/ownership of Internet-connected device among the various income groups.

		Internet-connected device			
		I neither have access to or own	I have access to	I own	Total
Income	<$20,000	1	18	37	56
	$20,000 - $40,000	1	16	51	68
	$40,000 - $60,000	1	23	87	111
	$60,000 - $80,000	1	24	101	126
	$80,000 - $100,000	1	17	125	143
	>$100,000	3	97	470	570
	other	0	9	12	21
Total		8	204	883	1095

Note. $\chi^2(12, N = 1095) = 23.733$, $p = .022$; 73 missing cases

  - **Income X types of Internet-connected device**

A chi-square test analysis examined the relationship between adults' income and types of Internet-connected device among adults. The result indicates that there are significant differences in the types of Internet-connected device among the various income groups.

	< $20,000	$20,000 - $40,000	$40,000 - $60,000	$60,000 - $80,000	$80,000 - $100,000	> $100,000	Other	Total	Statistics
Laptop or Desktop	48 (4.4%)	66 (6.1%)	109 (10.1%)	125 (11.6%)	140 (13.0%)	570 (52.8%)	22 (2.0%)	1080	$\chi^2(6, N=1101) = 60.811, p < .001$
Tablet/iPad	25 (3.0%)	42 (5.1%)	82 (9.9%)	92 (11.1%)	108 (13.0%)	464 (56.0%)	16 (1.9%)	829	$\chi^2(6, N=1101) = 46.731, p < .001$
Smartphone	52 (5.0%)	61 (5.8%)	102 (9.8%)	118 (11.3%)	131 (12.5%)	560 (53.5%)	22 (2.1%)	1046	$\chi^2(6, N=1101) = 29.756, p < .001$
Smart/ Streaming TV	23 (2.6%)	40 (4.6%)	76 (8.7%)	100 (11.5%)	113 (13.0%)	502 (57.6%)	18 (2.1%)	872	$\chi^2(6, N=1101) = 102.022, p < .001$
Gaming Console	9 (3.4%)	11 (4.1%)	19 (7.1%)	31 (11.6%)	21 (7.9%)	169 (63.3%)	7 (2.6%)	267	$\chi^2(6, N=1101) = 25.007, p < .001$
Supporting Accessory (Alexa, etc.)	8 (2.0%)	11 (2.8%)	18 (4.6%)	44 (11.2%)	45 (11.5%)	257 (65.6%)	9 (2.3%)	392	$\chi^2(6, N=1101) = 64.711, p < .001$
Medical Device	5 (6.5%)	10 (13.0%)	2 (2.6%)	12 (15.6%)	14 (18.2%)	34 (44.2%)	0 (0%)	77	$\chi^2(6, N=1101) = 16.565, p = .011$
Security System, Doorbell, Camera	10 (2.3%)	12 (2.8%)	31 (7.2%)	43 (10.0%)	40 (9.3%)	279 (65%)	14 (3.3%)	429	$\chi^2(6, N=1101) = 68.086, p < .001$

- **Income X number of Internet-connected device**

The t-test analysis examined whether there are statistically significant differences in the number of internet-connected devices that adults have depending on their income levels. The result indicates the following:

		N	Mean	Std. Deviation
Laptop or Desktop	<$20,000	52	2.19	1.547
	$20,000 - $40,000	65	1.91	.931
	$40,000 - $60,000	111	2.40	1.201
	$60,000 - $80,000	124	2.59	1.460
	$80,000 - $100,000	142	2.27	1.053
	>$100,000	565	2.87	1.383
	other	21	3.00	1.225
	Total	1080	2.63	1.350
Tablet/iPad	<$20,000	29	1.62	.979

	$20,000 - $40,000	46	1.85	.816
	$40,000 - $60,000	85	1.75	.872
	$60,000 - $80,000	95	1.71	.933
	$80,000 - $100,000	118	1.67	.763
	>$100,000	488	2.00	1.159
	other	16	2.50	1.155
	Total	877	1.89	1.052
Smartphone	<$20,000	47	2.06	1.634
	$20,000 - $40,000	62	1.97	1.130
	$40,000 - $60,000	106	2.04	1.103
	$60,000 - $80,000	116	2.32	1.547
	$80,000 - $100,000	136	2.17	.939
	>$100,000	557	2.43	1.018
	other	21	2.86	1.153
	Total	1045	2.31	1.142
Smart/ Streaming TV	<$20,000	29	1.79	1.207
	$20,000 - $40,000	41	1.80	1.308
	$40,000 - $60,000	85	1.69	1.047
	$60,000 - $80,000	106	1.75	.984
	$80,000 - $100,000	116	1.72	.921
	>$100,000	501	1.95	1.172
	other	20	2.20	1.576
	Total	898	1.87	1.131
Gaming Console	<$20,000	13	1.69	.630
	$20,000 - $40,000	12	1.92	1.084
	$40,000 - $60,000	18	2.00	1.372
	$60,000 - $80,000	34	1.85	1.077
	$80,000 - $100,000	27	1.59	.931
	>$100,000	181	1.55	.974
	other	7	1.86	1.464
	Total	292	1.64	1.017
Supporting Accessory (Alexa, etc.)	<$20,000	9	1.89	.782
	$20,000 - $40,000	14	2.43	1.828
	$40,000 - $60,000	22	2.36	2.150
	$60,000 - $80,000	43	3.09	2.706
	$80,000 - $100,000	50	2.32	1.435
	>$100,000	275	2.93	2.181
	other	8	3.00	2.928

	Total	421	2.81	2.155
Medical Device	<$20,000	6	1.33	.816
	$20,000 - $40,000	10	1.40	.966
	$40,000 - $60,000	3	1.00	.000
	$60,000 - $80,000	11	1.36	.674
	$80,000 - $100,000	19	1.21	.535
	>$100,000	41	1.27	.593
	other	0	.	.
	Total	90	1.28	.636
Security System, Doorbell, Camera	<$20,000	10	1.80	1.135
	$20,000 - $40,000	13	1.77	1.166
	$40,000 - $60,000	33	2.36	2.074
	$60,000 - $80,000	44	2.93	2.193
	$80,000 - $100,000	41	2.22	1.891
	>$100,000	286	2.97	2.496
	other	14	3.07	2.895
	Total	441	2.79	2.362
Total	<$20,000	56	6.70	5.724
	$20,000 - $40,000	68	7.34	5.476
	$40,000 - $60,000	112	8.43	5.224
	$60,000 - $80,000	126	10.14	7.016
	$80,000 - $100,000	145	8.88	4.786
	>$100,000	571	12.12	6.822
	other	21	13.67	5.799
	Total	1099	10.55	6.582

a. Total number of devices

		N	Mean	Std. Deviation
Total	<$20,000	56	6.70	5.724
	$20,000 - $40,000	68	7.34	5.476
	$40,000 - $60,000	112	8.43	5.224
	$60,000 - $80,000	126	10.14	7.016
	$80,000 - $100,000	145	8.88	4.786
	>$100,000	571	12.12	6.822
	other	21	13.67	5.799
	Total	1099	10.55	6.582

– There are statistically significant differences in the total number of internet-connected devices among the various income groups (F(6, 1092) = 17.048, p < .001). Specifically, the following groups are statistically different from each other
    - ">$100,000" group has more internet-connected devices than
        - <$20,000 (p < .001)
        - $20,000 - $40,000 (p < .001)
        - $40,000 - $60,000 (p < .001)
        - $60,000 - $80,000 (p = .002)
        - $80,000 - $100,000 (p < .001)
    - "$80,000 - $100,000" group has more internet-connected devices than
        - <$20,000 (p = .028)
        - Other (p = .001)
    - "$60,000 - $80,000" group has more internet-connected devices than
        - <$20,000 (p < .001)
        - $20,000 - $40,000 (p = .003)
        - $40,000 - $60,000 (p = .037)
        - Other (p = .018)
    - "$40,000 - $60,000" group has more internet-connected devices than
        - Other (p < .001)
    - "$20,000 - $40,000" group has more internet-connected devices than
        - Other (p < .001)
    - "<$20,000" group has more internet-connected devices than
        - Other (p < .001)

b. Laptop or Desktop

		N	Mean	Std. Deviation
Laptop or Desktop	<$20,000	52	2.19	1.547
	$20,000 - $40,000	65	1.91	.931
	$40,000 - $60,000	111	2.40	1.201
	$60,000 - $80,000	124	2.59	1.460
	$80,000 - $100,000	142	2.27	1.053
	>$100,000	565	2.87	1.383
	other	21	3.00	1.225
	Total	1080	2.63	1.350

– There are statistically significant differences in the number of laptop/desktop among the various income groups (F(6, 1073) = 10.049, p < .001). Specifically, the following groups are statistically different from each other:

    - ">$100,000" group has more internet-connected devices than
        - <$20,000 (p < .001)
        - $20,000 - $40,000 (p < .001)
        - $40,000 - $60,000 (p < .001)
        - $60,000 - $80,000 (p = .029)
        - $80,000 - $100,000 (p < .001)
    - "$80,000 - $100,000" group has more internet-connected devices than
        - other (p = .019)

- "$60,000 - $80,000" group has more internet-connected devices than
  - $20,000 - $40,000 (p < .001)
- "$40,000 - $60,000" group has more internet-connected devices than
  - $20,000 - $40,000 (p = .018)
- "$20,000 - $40,000" group has more internet-connected devices than
  - Other (p < .001)
- "<$20,000" group has more internet-connected devices than
  - Other (p = .018)

c. Tablet/iPad

		N	Mean	Std. Deviation
Tablet/iPad	<$20,000	29	1.62	.979
	$20,000 - $40,000	46	1.85	.816
	$40,000 - $60,000	85	1.75	.872
	$60,000 - $80,000	95	1.71	.933
	$80,000 - $100,000	118	1.67	.763
	>$100,000	488	2.00	1.159
	other	16	2.50	1.155
	Total	877	1.89	1.052

– There are statistically significant differences in the number of tablet/iPad among the various income groups (F(6, 870) = 3.712, p = .001). Specifically, the following groups are statistically different from each other:

- ">$100,000" group has more internet-connected devices than
  - $40,000 - $60,000 (p = .048)
  - $60,000 - $80,000 (p = .013)
  - $80,000 - $100,000 (p = .002)
- "$80,000 - $100,000" group has more internet-connected devices than
  - other (p = .003)
- "$60,000 - $80,000" group has more internet-connected devices than
  - other (p = .005)
- "$40,000 - $60,000" group has more internet-connected devices than
  - other (p = .009)
- "$20,000 - $40,000" group has more internet-connected devices than
  - Other (p = .031)
- "<$20,000" group has more internet-connected devices than
  - Other (p = .007)

d. Smartphone

		N	Mean	Std. Deviation
Smartphone	<$20,000	47	2.06	1.634
	$20,000 - $40,000	62	1.97	1.130
	$40,000 - $60,000	106	2.04	1.103

	$60,000 - $80,000	116	2.32	1.547
	$80,000 - $100,000	136	2.17	.939
	>$100,000	557	2.43	1.018
	other	21	2.86	1.153
	Total	1045	2.31	1.142

– There are statistically significant differences in the number of smartphone among the various income groups (F(6, 1038) = 4.611, p < .001). Specifically, the following groups are statistically different from each other:

  - "$100,000" group has more internet-connected devices than
    - <$20,000 (p = .032)
    - $20,000 - $40,000 (p = .002)
    - $40,000 - $60,000 (p = .001)
    - $80,000 - $100,000 (p = .015)
  - "$80,000 - $100,000" group has more internet-connected devices than
    - other (p = .010)
  - "$60,000 - $80,000" group has more internet-connected devices than
    - $20,000 - $40,000 (p = .049)
    - other (p = .045)
  - "$40,000 - $60,000" group has more internet-connected devices than
    - other (p = .002)
  - "$20,000 - $40,000" group has more internet-connected devices than
    - Other (p = .002)
  - "<$20,000" group has more internet-connected devices than
    - Other (p = .008)

e. Smart/Streaming TV

		N	Mean	Std. Deviation
Smart/ Streaming TV	<$20,000	29	1.79	1.207
	$20,000 - $40,000	41	1.80	1.308
	$40,000 - $60,000	85	1.69	1.047
	$60,000 - $80,000	106	1.75	.984
	$80,000 - $100,000	116	1.72	.921
	>$100,000	501	1.95	1.172
	other	20	2.20	1.576
	Total	898	1.87	1.131

– There are NO statistically significant difference in the number of smart/streaming TV among the seven income groups (F(6, 891) = 1.662, p = .127).

f. Gaming Console

		N	Mean	Std. Deviation

Gaming Console	<$20,000	13	1.69	.630
	$20,000 - $40,000	12	1.92	1.084
	$40,000 - $60,000	18	2.00	1.372
	$60,000 - $80,000	34	1.85	1.077
	$80,000 - $100,000	27	1.59	.931
	>$100,000	181	1.55	.974
	other	7	1.86	1.464
	Total	292	1.64	1.017

– There are NO statistically significant difference in the number of gaming console among the seven income groups (F(6, 285) = 1.095, p = .365).

g. Supporting Accessory (Alexa, etc.)

		N	Mean	Std. Deviation
Supporting Accessory (Alexa, etc.)	<$20,000	9	1.89	.782
	$20,000 - $40,000	14	2.43	1.828
	$40,000 - $60,000	22	2.36	2.150
	$60,000 - $80,000	43	3.09	2.706
	$80,000 - $100,000	50	2.32	1.435
	>$100,000	275	2.93	2.181
	other	8	3.00	2.928
	Total	421	2.81	2.155

– There are NO statistically significant difference in the number of supporting accessory among the seven income groups (F(6, 414) = 1.226, p = .292).

h. Medical Device

		N	Mean	Std. Deviation
Medical Device	<$20,000	6	1.33	.816
	$20,000 - $40,000	10	1.40	.966
	$40,000 - $60,000	3	1.00	.000
	$60,000 - $80,000	11	1.36	.674
	$80,000 - $100,000	19	1.21	.535
	>$100,000	41	1.27	.593
	other	0	.	.
	Total	90	1.28	.636

– There are NO statistically significant difference in the number of medical device among the seven income groups (F(5, 84) = .270, p = .928).

i. Security System, Doorbell, Camera

		N	Mean	Std. Deviation
Security System, Doorbell, Camera	<$20,000	10	1.80	1.135
	$20,000 - $40,000	13	1.77	1.166
	$40,000 - $60,000	33	2.36	2.074
	$60,000 - $80,000	44	2.93	2.193
	$80,000 - $100,000	41	2.22	1.891
	>$100,000	286	2.97	2.496
	other	14	3.07	2.895
	Total	441	2.79	2.362

– There are NO statistically significant difference in the number of security system/ doorbell/ camera among the seven income groups (F(6, 434) = 1.632, p = .137).

- **Income X data use**

A chi-square test analysis examined the relationship between adults' income and activities that they use the most data/Gigabytes on. The chi-square test analysis indicates that there are statistically meaningful relationships between income and data use in terms of the following activities: music/Video, telehealth, teleconferencing/video chat, social media platforms. However, there are no statistically meaningful relationships between income and data use in terms of the following activities: gaming, uploads/downloads, and other activities.

	< $20,000	$20,000 - $40,000	$40,000 - $60,000	$60,000 - $80,000	$80,000 - $100,000	> $100,000	Other	Total	Statistics
Gaming	10 (5.9%)	10 (5.9%)	17 (10.0%)	22 (12.9%)	22 (12.9%)	83 (48.8%)	6 (3.5%)	170	$\chi^2(6, N=1101) = 3.411, p = .756$
Music/Video	30 (3.6%)	41 (4.9%)	79 (9.4%)	92 (11.0%)	112 (13.4%)	470 (56.1%)	14 (1.7%)	838	$\chi^2(6, N=1101) = 41.571, p < .001$
Uploads/downloads (publishing videos, or downloading content)	25 (4.7%)	37 (7.0%)	58 (10.9%)	64 (12.0%)	67 (12.6%)	275 (51.7%)	6 (1.1%)	532	$\chi^2(6, N=1101) = 6.415, p = .378$
Telehealth	7 (9.2%)	7 (9.2%)	14 (18.4%)	9 (11.8%)	18 (23.7%)	21 (27.6%)	0 (0%)	76	$\chi^2(6, N=1101) = 26.980, p < .001$

Teleconferencing/video chat	14 (2.8%)	22 (4.4%)	37 (7.3%)	52 (10.3%)	70 (13.9%)	300 (59.5%)	9 (1.8%)	504	$\chi^2(6, N=1101) = 34.039, p < .001$
Social Media Platforms	15 (5.9%)	23 (9.1%)	32 (12.6%)	21 (8.3%)	43 (17.0%)	114 (45.1%)	5 (2.0%)	253	$\chi^2(6, N=1101) = 16.181, p = .013$
Other devices that connect to Wi-Fi	11 (4.9%)	15 (6.7%)	25 (11.1%)	24 (10.7%)	30 (13.3%)	112 (49.8%)	8 (3.6%)	225	$\chi^2(6, N=1101) = 4.197, p = .650$

Adults who own business (n = 68)

- **Business**

  - **Business ownership**
    Q50 - Do you own a business?

	Frequency	Percent
No	773	66.2
Yes	68	5.8
Yes, and it is a home-based business so answers are similar	199	17.0
Yes, but I am not interested in answering additional questions	110	9.4
Total	1168	100.0

Note. The following analyses were done with the adults who own a business (n = 68), including 19-65 group (n = 43) and +65 group (n = 25)

  - **Business type**
    Q51 - What type of business are you in?

	Frequency	Percent
Agriculture or wine	6	8.8
Education	3	4.4
Healthcare	5	7.4
High tech	6	8.8
Mining/Manufacturing	3	4.4
Professional Services (consulting, legal, engineering, accounting, banking, etc.)	23	33.8
Restaurant/Food	3	4.4
Retail	5	7.4
Other (e.g., Entertainment, Construction	14	20.6
Total	68	100.0

  - **Number of employees**
    Q53 - About how many employees work for the company?

	Frequency	Percent
1-10	51	75.0
11-20	10	14.7
21-40	3	4.4
41-60	1	1.5
61-100	1	1.5
Do not answer	2	2.9
Total	68	100.0

  - **Number of employees in Santa Barbara**
    Q54 - About how many employees does your company have in the Santa Barbara area?

	Frequency	Percent
None	8	11.8
1-5	41	60.3
6-10	7	10.3
11-20	7	10.3
21-30	1	1.5
31-40	1	1.5
41-60	1	1.5
Do not answer	2	2.9
Total	68	100.0

- **Work from home before/after the pandemic**
  Q56 - Before the pandemic, did you have employees that work from home, and if so, how often did they work from home?

	Before		After	
	Frequency	Percent	Frequency	Percent
At least one day per week	11	16.2	4	5.9
2 - 3 days per week	5	7.4	6	8.8
More than 3 days per week	2	2.9	27	39.7
5 days per week	11	16.2	29	42.6
The company's employees do not work from home	37	54.4	4	5.9
Do not answer	2	2.9	2	2.9
Total	68	100.0	68	100.0

• Internet for business

- **Internet providers for business**
  Q58 - Which of the following Internet Service Providers do you use at your business?

	Frequency	Percent
Advanced Wireless	1	1.5
Comcast	6	8.8
Cox Cable	39	57.4
Frontier	9	13.2
I do not know	1	1.5
Impulse	5	7.4
Other	5	7.4
Verizon	1	1.5
I do not know	1	1.5
Do not answer	1	1.5
Total	68	100.0

- **Internet service for business**
  Q59 - For your business, what type of Internet service do you currently have?

	Frequency	Percent

Cable (usually provided as part of your cable TV package)	36	52.9
Dial-up (requires you to use a modem and your regular phone line)	1	1.5
DSL (usually provided by the phone company)	9	13.2
Fiber connection (uses fiber optics to provide the signal. May be provided by the phone company or other providers. Typically used for higher speeds)	3	4.4
Mobile Phone Wireless, Cellular (typically is part of your cell phone plan)	1	1.5
Satellite (usually provided as part of your Satellite TV package)	2	2.9
T-1 Service (a special kind of service often available from the phone company rated at 0 a fixed 1.5 Mbps)	1	1.5
Wireless (usually provided by an independent service provider using an antenna on the roof pointed to another ground antenna)	8	11.8
I do not know what type of connection I have at my place of business	5	7.4
Do not answer	2	2.9
Total	68	100.0

- **Internet service quality for business**
  Q60 - How is your business Internet Service?

	Frequency	Percent
Speed is too low	17	25.0
The connection interrupts	33	48.5
It meets my current needs	16	23.5
Do not answer	2	2.9
Total	68	100.0

- **Internet service speed for business**
  Q61 - How would you rate the speed of your Internet service?

	Frequency	Percent
very slow	10	14.7
slow	21	30.9
acceptable	23	33.8
good	8	11.8
excellent	5	7.4
Do not answer	1	1.5
Total	68	100.0

- **Impacts of Internet service on business**
  Q63 - What impact would Gigabit Internet service have on your business?

	Frequency	Percent
No impact	21	30.9
The business would hire more employees	7	10.3

The business could provide/attend more webinars and online training	13	19.1
The business could reach more markets, more territories, more locations	14	20.6
The business would be more efficient	37	54.4
The business could provide more products and services to its customers	18	26.5
Total	68	100.0

Note. 6 participants answered “Other.” The following are their responses:

- cost too much
- I could spend less time kicking the cox modem when they say I have super fast internet but can’t download a simple website.
- My services would be more professional as my video calls would be better quality with more continuous service
- Frankly it wouldn't really have any impact on business operations - I just get annoyed with slow connections and am more-or-less willing to pay for speed
- If this is code for 5G I am opposed.
- The owner would not scream in frustration after being throttled at week 3 each month.

- **Impact of Internet service on employees during the pandemic**
  Q64 - With the pandemic and the safer-at-home orders, how much has the current Internet service impacted you and your employees’ ability to work from home?

	Frequency	Percent
not at all (no reliance on internet)	9	13.2
not at all (works great)	20	29.4
SOMEWHAT (down or too slow)	25	36.8
In a BIG WAY (not able to effectively work)	12	17.6
Do not answer	2	2.9
Total	68	100.0

- **Important factors of Internet service**
  Q65 - What is most important to you regarding your Internet service? [Ranking]

	Rank	Frequency	Percent
Reliability, I do not want my internet service to be interrupted	***1**	**41**	**60.3**
	2	12	17.6
	3	-	-
	4	2	2.9
	5	10	14.7
Fast, I want speed and availability of abundant broadband	1	15	22.1
	***2**	**23**	**33.8**
	3	14	20.6
	4	1	1.5
	5	10	14.7
Price, I want to pay a competitive price	1	11	16.2
	2	12	17.6
	***3**	**32**	**47.1**
	4	4	5.9
	5	4	5.9
	1	6	8.8

Customer Service, I want a friendly voice and good customer support	2	5	7.4
	3	10	14.7
	***4**	**34**	**50.0**
	5	8	11.8
Bundled Invoice, I want one invoice for internet, cable TV, and/or phone service	1	13	19.1
	2	1	1.5
	3	4	5.9
	4	4	5.9
	***5**	**40**	**58.8**
Total		68	100.0

Additional Analysis by Zip Code

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Adolescents

Zip code

	Frequency	Percent
93434	44	75.9
93440	2	3.4
other	2	3.4
Do not answer	10	17.2
Total	58	100.0

Relationship between zip code and Internet use (for distance learning)

The chi-square test analysis indicates that there are statistically significant relationships between zip code and Internet use (for distance learning).

Q10 - While distance learning during the pandemic, I used...

	I did not do distance learning	My home internet	Other (e.g., school Internet)	Do not answer	Total
93434	0	41 (77.4%)	2 (100%)	1 (50.0%)	44 (75.9%)
93440	1 (100%)	1 (1.9%)	0	0	2 (3.4%)
other	0	2 (3.8%)	0	0	2 (3.4%)
Do not answer	0	9 (17.0%)	0	1 (50.0%)	10 (17.2%)
Total	1 (100%)	53 (100%)	2 (100%)	2 (100%)	58 (100%)

Note. $\chi^2(9, N = 58) = 30.604$, $p < .001$

Relationship between zip code and Internet assessment (for distance learning)

The chi-square test analysis indicates that there are no statistically significant relationships between zip code and Internet assessment (for distance learning).

Q11 - How would you rate your experience with your internet during the pandemic as it related to distance learning?

	Horrible, I was not able to learn much	It was bad, but I still made it possible	Okay, but wish that I had better connectivity	My connectivity was good, but it was hard for others	Incredible! I had no issues	Total
93434	2 (50.0%)	9 (64.3%)	11 (73.3%)	11 (91.7%)	10 (90.9%)	43 (76.8%)
93440	1 (25.0%)	0	1 (6.7%)	0	0	2 (3.6%)
other	0	0	2 (13.3%)	0	0	2 (3.6%)

Do not answer	1 (25.0%)	5 (35.7%)	1 (6.7%)	1 (8.3%)	1 (9.1%)	9 (16.1%)
Total	4 (100%)	14 (100%)	15 (100%)	12 (100%)	11 (100%)	56 (100%)

Note. $\chi^2(12, N = 56) = 18.813$, $p = .093$

Adults

Zip code

	Frequency	Percent
93013	19	1.6
93101	55	4.7
93103	37	3.2
93105	125	10.7
93108	37	3.2
93109	40	3.4
93110	32	2.7
93111	39	3.3
93117	117	10.0
93254	5	.4
93427	10	.9
93434	5	.4
93436	15	1.3
93440	23	2.0
93441	2	.2
93454	12	1.0
93455	17	1.5
93458	3	.3
93460	7	.6
93463	10	.9
other	5	.4
Do not answer	553	47.3
Total	1168	100.0

Relationship between zip code and at-home Internet access

The chi-square test analysis indicates that there are no statistically significant relationships between zip code and at-home Internet access.

Q35 - Do you have internet access at home?

	No	Yes	Total
93013	0	19 (1.6%)	19 (1.6%)
93101	0	55 (4.8%)	55 (4.7%)

93103	0	37 (3.2%)	37 (3.2%)
93105	0	125 (10.8%)	125 (10.7%)
93108	0	37 (3.2%)	37 (3.2%)
93109	0	39 (3.4%)	39 (3.4%)
93110	0	31 (2.7%)	31 (2.7%)
93111	0	39 (3.4%)	39 (3.4%)
93117	1 (10.0%)	116 (10.1%)	117 (10.1%)
93254	0	5 (0.4%)	5 (0.4%)
93427	0	10 (0.9%)	10 (0.9%)
93434	0	4 (0.3%)	4 (0.3%)
93436	0	15 (1.3%)	15 (1.3%)
93440	0	23 (2.0%)	23 (2.0%)
93441	0	2 (0.2%)	2 (0.2%)
93454	0	12 (1.0%)	12 (1.0%)
93455	0	17 (1.5%)	17 (1.5%)
93458	0	3 (0.3%)	3 (0.3%)
93460	1 (10.0%)	6 (0.5%)	7 (0.6%)
93463	0	10 (0.9%)	10 (0.9%)
other	0	5 (0.4%)	5 (0.4%)
Do not answer	8 (80.0%)	544 (47.1%)	552 (47.4%)
Total	10 (100%)	1154 (100%)	1164 (100%)

Note. $\chi^2(21, N = 1164) = 21.302, p = .441$

Relationship between zip code and reliance on at-home Internet

The chi-square test analysis indicates that there are statistically significant relationships between zip code and reliance on at-home Internet.

Q36 - Do you rely on at-home Internet for work or school?

	No	Yes	Other	Total
93013	10 (3.5%)	9 (1.0%)	0	19 (1.6%)
93101	17 (6.0%)	38 (4.3%)	0	55 (4.7%)
93103	10 (3.5%)	27 (3.1%)	0	37 (3.2%)
93105	53 (18.7%)	71 (8.1%)	1 (20.0%)	125 (10.7%)
93108	14 (4.9%)	23 (2.6%)	0	37 (3.2%)
93109	18 (6.3%)	21 (2.4%)	0	39 (3.3%)
93110	17 (6.0%)	13 (1.5%)	0	30 (2.6%)
93111	15 (5.3%)	24 (2.7%)	0	39 (3.3%)
93117	42 (14.8%)	73 (8.3%)	2 (40.0%)	117 (10.0%)
93254	0	5 (0.6%)	0	5 (0.4%)
93427	1 (0.4%)	9 (1.0%)	0	10 (0.9%)
93434	1 (0.4%)	4 (0.5%)	0	5 (0.4%)
93436	8 (2.8%)	7 (0.8%)	0	15 (1.3%)
93440	4 (1.4%)	19 (2.2%)	0	23 (2.0%)
93441	0	2 (0.2%)	0	2 (0.2%)
93454	5 (1.8%)	7 (0.8%)	0	12 (1.0%)

93455	7 (2.5%)	10 (1.1%)	0	17 (1.5%)
93458	2 (0.7%)	1 (0.1%)	0	3 (0.3%)
93460	1 (0.4%)	6 (0.7%)	0	7 (0.6%)
93463	3 (1.1%)	7 (0.8%)	0	10 (0.9%)
Other	2 (0.7%)	3 (0.3%)	0	5 (0.4%)
Do not answer	54 (19.0%)	497 (56.7%)	2 (40.0%)	553 (47.5%)
Total	284 (100%)	876 (100%)	5 (100%)	1165 (100%)

Note. $\chi^2(42, N = 1165) = 165.599, p < .001$

Relationship between zip code and Internet cost

The chi-square test analysis indicates that there are statistically significant relationships between zip code and Internet cost.

Q41 - Do you think your internet cost is:

	Inexpensive	Reasonable	Too expensive	Do not answer	Total
93013	1 (5.9%)	2 (0.6%)	16 (1.9%)	0	19 (1.6%)
93101	0	20 (6.3%)	35 (4.2%)	0	55 (4.7%)
93103	0	7 (2.2%)	29 (3.5%)	1 (25.0%)	37 (3.2%)
93105	2 (11.8%)	30 (9.5%)	93 (11.2%)	0	125 (10.7%)
93108	0	15 (4.8%)	22 (2.6%)	0	37 (3.2%)
93109	1 (5.9%)	9 (2.9%)	29 (3.5%)	1 (25.0%)	40 (3.4%)
93110	0	6 (1.9%)	26 (3.1%)	0	32 (2.7%)
93111	0	10 (3.2%)	29 (3.5%)	0	39 (3.3%)
93117	1 (5.9%)	23 (7.3%)	92 (11.1%)	1 (25.0%)	117 (10.0%)
93254	0	2 (0.6%)	3 (0.4%)	0	5 (0.4%)
93427	0	7 (2.2%)	3 (0.4%)	0	10 (0.9%)
93434	0	1 (0.3%)	4 (0.5%)	0	5 (0.4%)
93436	0	5 (1.6%)	10 (1.2%)	0	15 (1.3%)
93440	0	8 (2.5%)	15 (1.8%)	0	23 (2.0%)
93441	0	2 (0.6%)	0	0	2 (0.2%)
93454	0	4 (1.3%)	8 (1.0%)	0	12 (1.0%)
93455	0	3 (1.0%)	14 (1.7%)	0	17 (1.5%)
93458	0	1 (0.3%)	2 (0.2%)	0	3 (0.3%)
93460	0	1 (0.3%)	5 (0.6%)	1 (25.0%)	7 (0.6%)
93463	1 (5.9%)	3 (1.0%)	6 (0.7%)	0	10 (0.9%)
other	2 (11.8%)	1 (0.3%)	2 (0.2%)	0	5 (0.4%)
Do not answer	9 (52.9%)	155 (49.2%)	389 (46.8%)	0	553 (47.3%)
Total	17 (100%)	315 (100%)	832 (100%)	4 (100%)	1168 (100%)

Note. $\chi^2(63, N = 1168) = 151.754, p < .001$

Relationship between zip code and Internet speed

The chi-square test analysis indicates that there are statistically significant relationships between zip code and Internet speed.

	Slow	Moderate	Fast	Total
93013	3 (1.2%)	14 (2.1%)	2 (0.8%)	19 (1.6%)
93101	12 (4.9%)	29 (4.4%)	14 (5.3%)	55 (4.7%)
93103	6 (2.4%)	23 (3.5%)	8 (3.0%)	37 (3.2%)
93105	22 (8.9%)	76 (11.6%)	27 (10.2%)	125 (10.7%)
93108	6 (2.4%)	24 (3.7%)	7 (2.7%)	37 (3.2%)
93109	7 (2.8%)	25 (3.8%)	7 (2.7%)	39 (3.4%)
93110	5 (2.0%)	24 (3.7%)	3 (1.1%)	32 (2.7%)
93111	9 (3.6%)	18 (2.8%)	12 (4.5%)	39 (3.4%)
93117	21 (8.5%)	78 (11.9%)	18 (6.8%)	117 (10.1%)
93254	3 (1.2%)	2 (0.3%)	0	5 (0.4%)
93427	3 (1.2%)	4 (0.6%)	3 (1.1%)	10 (0.9%)
93434	0	4 (0.6%)	1 (0.4%)	5 (0.4%)
93436	3 (1.2%)	8 (1.2%)	4 (1.5%)	15 (1.3%)
93440	12 (4.9%)	11 (1.7%)	0	23 (2.0%)
93441	2 (0.8%)	0	0	2 (0.2%)
93454	4 (1.6%)	5 (0.8%)	3 (1.1%)	12 (1.0%)
93455	5 (2.0%)	9 (1.4%)	3 (1.1%)	17 (1.5%)
93458	2 (0.8%)	1 (0.2%)	0	3 (0.3%)
93460	5 (2.0%)	2 (0.3%)	0	7 (0.6%)
93463	2 (0.8%)	6 (0.9%)	2 (0.8%)	10 (0.9%)
other	0	3 (0.5%)	2 (0.8%)	5 (0.4%)
Do not answer	115 (46.6%)	287 (44.0%)	148 (56.1%)	550 (47.3%)
Total	247 (100%)	653 (100%)	264 (100%)	1164 (100%)

Note. $\chi^2(42, N = 1164) = 75.087, p < .001$

Relationship between zip code and Internet performance

The chi-square test analysis indicates that there are statistically significant relationships between zip code and Internet performance.

Q46 - Does your internet performance meet your needs?

	No	Sometimes	Mostly	Yes	Total
93013	1 (0.6%)	4 (1.3%)	10 (2.2%)	4 (1.6%)	19 (1.6%)
93101	7 (4.1%)	13 (4.3%)	22 (4.9%)	13 (5.3%)	55 (4.7%)
93103	3 (1.7%)	9 (3.0%)	19 (4.2%)	6 (2.4%)	37 (3.2%)
93105	17 (9.9%)	28 (9.3%)	44 (9.8%)	36 (14.7%)	125 (10.7%)
93108	5 (2.9%)	8 (2.7%)	18 (4.0%)	6 (2.4%)	37 (3.2%)
93109	8 (4.7%)	6 (2.0%)	16 (3.6%)	9 (3.7%)	39 (3.3%)
93110	4 (2.3%)	6 (2.0%)	13 (2.9%)	9 (3.7%)	32 (2.7%)
93111	7 (4.1%)	8 (2.7%)	14 (3.1%)	10 (4.1%)	39 (3.3%)
93117	14 (8.1%)	31 (10.3%)	50 (11.2%)	22 (9.0%)	117 (10.0%)

93254	4 (2.3%)	1 (0.3%)	0	0	5 (0.4%)
93427	3 (1.7%)	2 (0.7%)	3 (0.7%)	2 (0.8%)	10 (0.9%)
93434	0	2 (0.7%)	1 (0.2%)	2 (0.8%)	5 (0.4%)
93436	2 (1.2%)	2 (0.7%)	5 (1.1%)	6 (2.4%)	15 (1.3%)
93440	6 (3.5%)	8 (2.7%)	9 (2.0%)	0	23 (2.0%)
93441	2 (1.2%)	0	0	0	2 (0.2%)
93454	1 (0.6%)	2 (0.7%)	8 (1.8%)	1 (0.4%)	12 (1.0%)
93455	1 (0.6%)	6 (0.6%)	7 (1.6%)	3 (1.2%)	17 (1.5%)
93458	0	2 (0.7%)	0	1 (0.4%)	3 (0.3%)
93460	4 (2.3%)	1 (0.3%)	2 (0.4%)	0	7 (0.6%)
93463	2 (1.2%)	3 (1.0%)	4 (0.9%)	1 (0.4%)	10 (0.9%)
other	0	1 (0.3%)	2 (0.4%)	2 (0.8%)	5 (0.4%)
Do not answer	81 (47.1%)	157 (52.3%)	201 (44.9%)	112 (45.7%)	551 (47.3%)
Total	172 (100%)	300 (100%)	448 (100%)	245 (100%)	1165 (100%)

Note. $\chi^2(63, N = 1165) = 88.324, p = .019$

Relationship between zip code and Internet reliability

Q44 - How reliable do you find your internet connection?
(1 = very unreliable ~ 5 = average ~ 10 = Very reliable)

	N	Mean	Std. Deviation	Minimum	Maximum
93013	19	5.68	2.286	1	10
93101	55	6.53	2.602	1	10
93103	37	6.14	2.299	1	10
93105	**124**	**6.73**	**2.545**	**1**	**10**
93108	37	6.05	2.285	1	10
93109	38	6.68	2.494	1	10
93110	32	6.72	2.174	1	10
93111	39	5.87	2.557	1	10
93117	117	6.09	2.330	1	10
93254	5	4.60	1.517	3	7
93427	10	5.70	3.057	2	10
93434	5	6.20	1.095	5	7
93436	15	6.67	2.610	2	9
93440	23	4.91	1.756	1	8
93441	**2**	**2.00**	**1.414**	**1**	**3**
93454	12	6.33	2.605	1	10
93455	17	5.82	2.580	2	10
93458	3	5.33	3.512	2	9
93460	7	3.29	3.302	1	10
93463	10	5.40	3.627	1	10
other	5	7.00	3.240	3	10
Do not answer	551	6.17	2.504	1	10
Total	1163	6.18	2.501	1	10

APPENDIX C

FACT SHEET | Santa Barbara County Broadband Strategic Plan

SBCAG BCPC

The **Broadband Alliance of Santa Barbara County (Alliance)** formed in October 2021 to develop a regional broadband strategic plan through a partnership between the Santa Barbara County Association of Governments, County of Santa Barbara, and the cities of Buellton, Carpinteria, Goleta, Guadalupe, Lompoc, Santa Barbara, Santa Maria, and Solvang, the Santa Ynez Band of Chumash Indians, Broadband Consortium of the Pacific Coast (BCPC), and regional economic development organizations.

Broadband Alliance Strategic Plan

The plan will identify broadband internet infrastructure and affordability needs in Santa Barbara County.

The plan will be completed by the end of 2022.

Once the Plan is complete, the Alliance will seek funding opportunities for projects to improve internet access in homes, schools, businesses, healthcare, and facilities to high-speed internet countywide. It will also help improve disaster preparedness and encourage industry competition.

How you can help

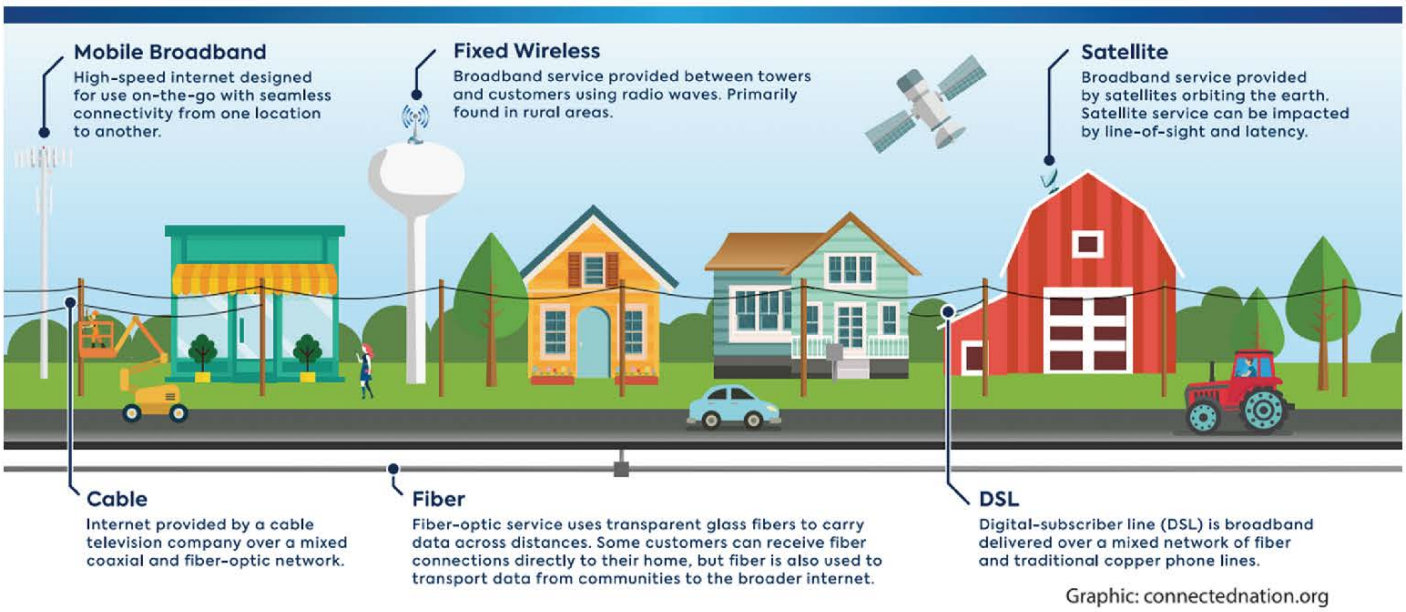
Please take a minute to complete a Santa Barbara County broadband internet needs assessment survey and speed test on a personal computer or laptop at home, work, or wherever you connect at www.sbcag.org/broadband

Information collected helps to improve affordable access to high-speed internet countywide. Privacy controls protect responses and anonymous participation is an option.

If you do not have internet, please call Santa Barbara County Association of Governments (SBCAG) at 1-805-961-8902 to report why you don't!

What is Broadband?

Broadband provides the fastest connections today, making it the most common type of residential internet service. Broadband is a type of high-speed internet connection that is always "on."



Graphic: connectednation.org

FAQ and Resources

1. Why am I important to this project?
By taking the Santa Barbara County broadband needs assessment survey and speed test, you are helping to identify if your community has good, poor, no or unaffordable internet service. Your information along with many others will be added to a map to seek funding improve affordable access to high-speed internet countywide.

2. What is the Santa Barbara County Broadband Needs Assessment Survey?
This survey helps us learn about your specific needs and experiences regarding internet access. Your response will help inform planning efforts to increase high speed internet access to communities that need it most within Santa Barbara County.

3. What is the Santa Barbara County Broadband Speed Test?
The SB County Broadband Speed Test will collect data about your internet speed and create a map of the community that will help inform decision makers in their effort to seek funding to improve affordable high-speed internet in Santa Barbara County.

4. What is Broadband-For-All?
In December 2020, Governor Gavin Newsom signed historic legislation, **Broadband for All**, to advance the State's commitment to bring affordable access to high-speed internet service across California.

5. Is the Broadband Strategy Plan about 5G network technology?
No. The work of the Broadband Alliance of Santa Barbara County is not to advocate for one particular technology. The Alliance is focused on fiber optic cable infrastructure and affordability of high-speed internet across all of Santa Barbara County.

Broadband Words To Know

Bandwidth: Capacity of a broadband connection, often a synonym for data transfer speed.

Kilobit/Kilobyte: Kilobits per second (Kbps) is a measure of dial-up speed, where one Kb = 125 bytes. Kilobyte (KB) means 1,000 bytes and is a measure of storage capacity or data size.

Megabit/Megabyte: Megabits per second (Mbps or Mb) is a measure of transmission speed, with a 1Mb connection being able to transfer 1MB (megabyte/MB) of data in 8 seconds. Megabyte is a measure of the size of computer files or capacity. 1MB = 1,000 KB.

Gigabit/Gigabyte: Gigabit is a unit describing data transfer speed, usually per second (Gbps). Gigabyte describes the size of computer files and capacity. 1GB = 1,000 MB (megabytes)

Middle-mile: The segment of telecommunications network infrastructure that connects major telecom (often international) networks, national or core networks to users in homes, schools, government, and businesses.

Last mile: The final leg of a telecommunications network that delivers telecom services to end users.

Dark fiber: "Unlit" or unused optical fiber available for use in fiber optic communication.

Tell us about…your internet experience.
Take a survey & speed test on a personal computer or laptop at home, work, or wherever you connect at www.sbcag.org/broadband

If you do not have internet or access to equipment to take this test, please call Santa Barbara County Association of Governments (SBCAG) at 1-805-961-8902 to report why you don't!

Last Updated: 4/20/22

Hoja Informativa | Plan Estratégico de Banda Ancha del Condado de Santa Bárbara

La **Alianza de Banda Ancha del Condado de Santa Bárbara (Alliance)** se formó en octubre de 2021 para desarrollar un plan estratégico regional de banda ancha a través de una asociación entre la Asociación de Gobiernos del Condado de Santa Bárbara, el Condado de Santa Bárbara y las ciudades de Buellton, Carpintería, Goleta, Guadalupe, Lompoc, Santa Bárbara, Santa María y Solvang, la Banda de Indios Chumash de Santa Ynez, el Consorcio de Banda Ancha de la Costa del Pacífico (BCPC) y organizaciones de desarrollo económico regional.

Plan estratégico de la Alianza de la Banda Ancha

El plan identificará la infraestructura de Internet de banda ancha y las necesidades de asequibilidad en el condado de Santa Bárbara.

El plan se completará a finales de 2022.

Una vez completado el plan, la Alianza buscará oportunidades de financiación para proyectos que mejoren el acceso a internet en los hogares, escuelas, empresas, centros de salud e instalaciones a internet de alta velocidad en todo el condado. También ayudará a mejorar la preparación ante las catástrofes y a fomentar la competencia en el sector.

Cómo puede ayudar

Por favor, tómese un minuto para completar una encuesta de evaluación de las necesidades de Internet de banda ancha del condado de Santa Bárbara y una prueba de velocidad en un ordenador personal o portátil en casa, en el trabajo o dondequiera que se conecte en www.sbcag.org/broadband.

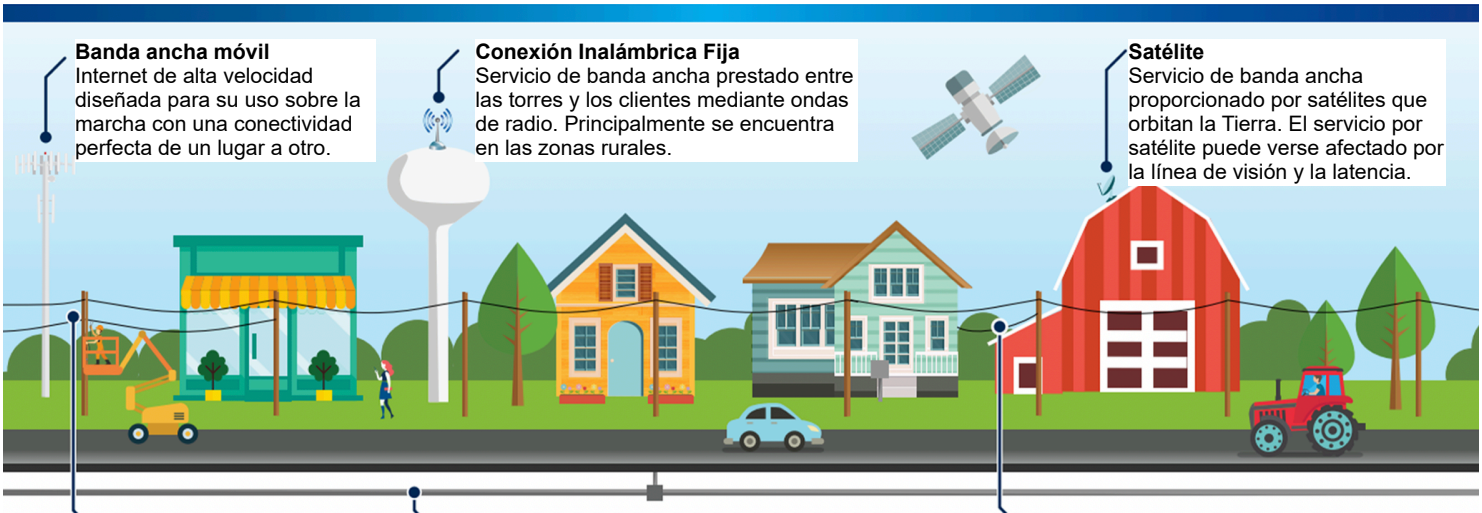
La información recogida ayuda a mejorar el acceso asequible a Internet de alta velocidad en todo el condado. Los controles de privacidad protegen las respuestas y la participación anónima es una opción.

Si no tiene Internet, llame a la Asociación de Gobiernos del Condado de Santa Bárbara (SBCAG) al 1-805-961-8902 para informar de por qué no lo tiene!

¿Qué es la banda ancha?

La banda ancha proporciona las conexiones más rápidas hoy en día, lo que la convierte en el tipo más común de servicio de Internet residencial. La banda ancha es un tipo de conexión a Internet de alta velocidad que siempre está "encendida".

Graphic: connectednation.org



Preguntas frecuentes y recursos

1. ¿Por qué soy importante para este proyecto?
Al realizar la encuesta de evaluación de las necesidades de banda ancha del condado de Santa Bárbara y la prueba de velocidad, está ayudando a identificar si su comunidad tiene un servicio de Internet bueno, malo, nulo o inasequible. Su información, junto con la de muchos otros, se añadirá a un mapa para buscar financiación para mejorar el acceso asequible a Internet de alta velocidad
en todo el condado**.**

2. ¿Qué es la encuesta de evaluación de las necesidades de banda ancha del condado de Santa Bárbara?
Esta encuesta nos ayuda a conocer sus necesidades y experiencias específicas con respecto al acceso a Internet. Su respuesta ayudará a informar los esfuerzos de planificación para aumentar el acceso a Internet de alta velocidad a las comunidades que más lo necesitan dentro del Condado de Santa Bárbara.

3. ¿Cuál es la prueba de velocidad de banda ancha del condado de Santa Bárbara?
La prueba de velocidad de banda ancha del condado de Santa Bárbara recopilará datos sobre su velocidad de Internet y creará un mapa de la comunidad que ayudará a informar a los responsables de la toma de decisiones en su esfuerzo por buscar financiación para mejorar el Internet de alta velocidad asequible en el condado de Santa Bárbara.

4. ¿Qué es Banda Ancha para Todos?
En diciembre de 2020, el gobernador Gavin Newsom firmó una legislación histórica, Banda Ancha para Todos, para avanzar en el compromiso del Estado de llevar un acceso asequible al servicio de Internet de alta velocidad en toda California.

5. ¿El Plan Estratégico de Banda Ancha es sobre la tecnología de red 5G?
No. El trabajo de la Alianza de Banda Ancha del Condado de Santa Bárbara no es abogar por una tecnología en particular. La Alianza se centra en la infraestructura de cable de fibra óptica y la asequibilidad de Internet de alta velocidad en todo el condado de Santa Bárbara.

Palabras de la banda ancha que hay que conocer

Banda ancha: Capacidad de una conexión de banda ancha, a menudo sinónimo de velocidad de transferencia de datos.

Kilobit/Kilobyte: Los kilobits por segundo (Kbps) son una medida de la velocidad de conexión telefónica, donde un Kb = 125 bytes. El kilobyte (KB) significa 1.000 bytes y es una medida de la capacidad de almacenamiento o del tamaño de los datos.

Megabit/Megabyte: Los megabits por segundo (Mbps o Mb) son una medida de la velocidad de transmisión; una conexión de 1Mb puede transferir 1MB (megabyte/MB) de datos en 8 segundos. El megabyte es una medida del tamaño de los archivos informáticos o capacidad. 1MB = 1.000 KB.

Gigabit/Gigabyte: Gigabit es una unidad que describe la velocidad de transferencia de datos, normalmente por segundo (Gbps). El gigabyte describe el tamaño de los archivos del ordenador y su capacidad. 1GB = 1.000 MB (megabytes)

Milla intermedia: El segmento de la infraestructura de la red de telecomunicaciones que conecta las principales redes de telecomunicaciones (a menudo internacionales), las redes nacionales o centrales a los usuarios en los hogares, las escuelas, el gobierno y empresas.

Última milla: El último tramo de una red de telecomunicaciones que entrega los servicios de telecomunicaciones a los usuarios finales.

Fibra oscura: Fibra óptica "no iluminada" o no utilizada disponible para su uso en la comunicación por fibra óptica.

Háblenos de... su experiencia con el Internet.
Realice una encuesta y una prueba de velocidad en un ordenador personal o portátil en casa, en el trabajo o donde se conecte en **www.sbcag.org/broadband**

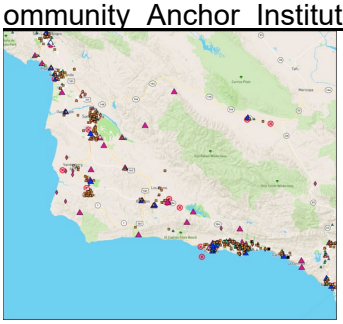
Si no tiene Internet o acceso al equipo para realizar esta prueba, llame a la Asociación de Gobiernos del Condado de Santa Bárbara (SBCAG) al 1-805-961-8902 para informar de por qué no lo hace.

Última actualización: 4/20/22

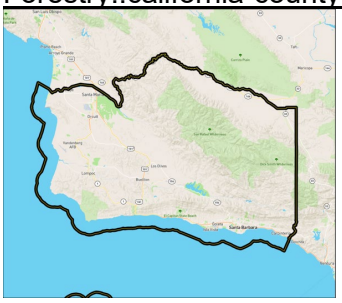
APPENDIX D

NAME: City Boundaries
DATE: June 3, 2022
DESCRIPTION: Polygons for California Incorporated Cities
SOURCE: CA State Geoportal (https://gis.data.ca.gov/datasets/CALFIRE-Forestry::city-boundaries/about)

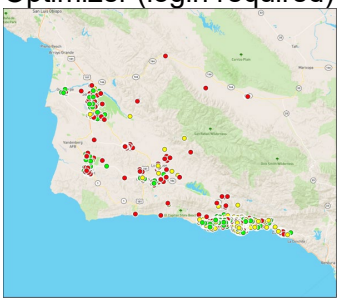
NAME: CPUC Anchor Institutions
DATE: March 27, 2022
DESCRIPTION: Community institutions; BB-capacity.
SOURCE: CPUC (https://cpuc2016.westus.cloudapp.azure.com/arcgis/rest/services/CPUC/CPUC_2021_Community_Anchor_Institutions/MapServer)



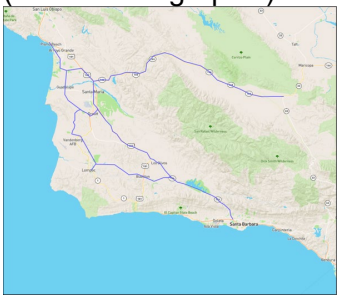
NAME: CA _County Boundaries
DATE: August 10, 2022
DESCRIPTION: Polygons for California Counties
SOURCE: CA State Geoportal (https://gis.data.ca.gov/datasets/CALFIRE-Forestry::california-county-boundaries/about)



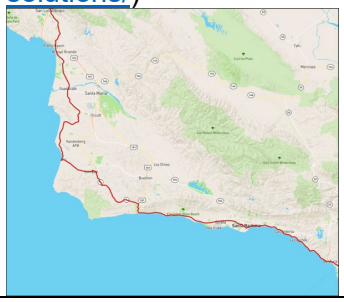
NAME: Speed Test Data
DATE: June 20, 2022
DESCRIPTION: Listened speed-test public survey.
SOURCE: GEO SOFTWARE Express Optimizer (login required)

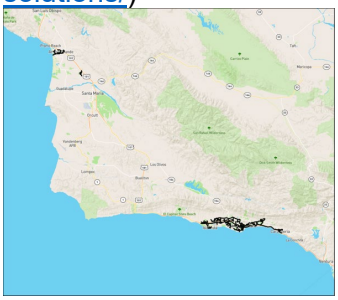
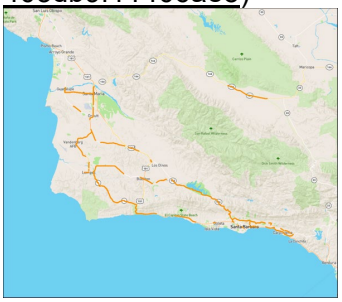
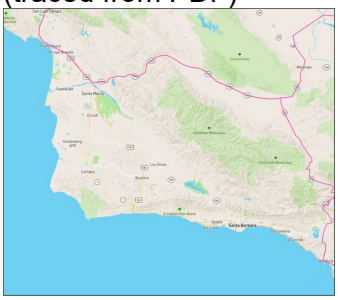
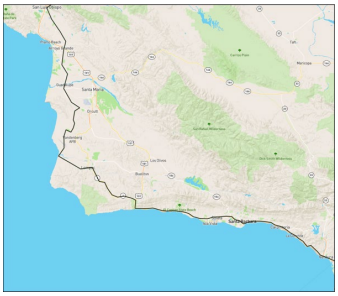
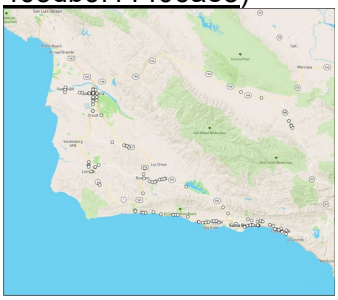


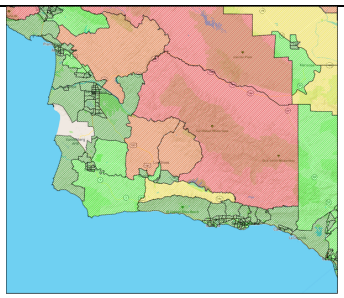
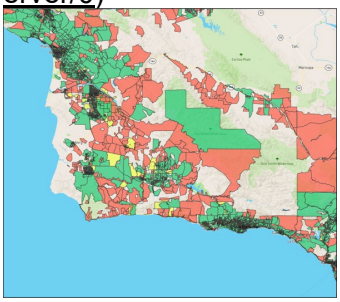
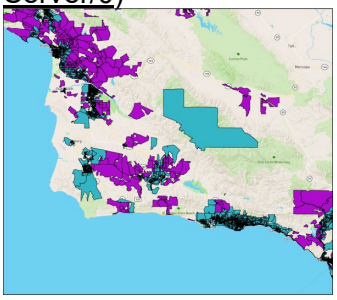
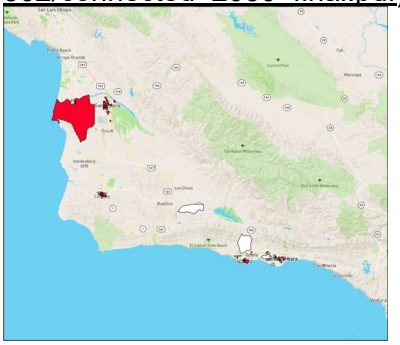
NAME: SBC North County Ring
DATE: June 22, 2022
DESCRIPTION: Proposed Network
SOURCE: BCPC Planning Discussion (traced from graphic)

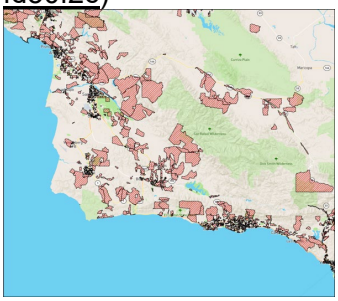
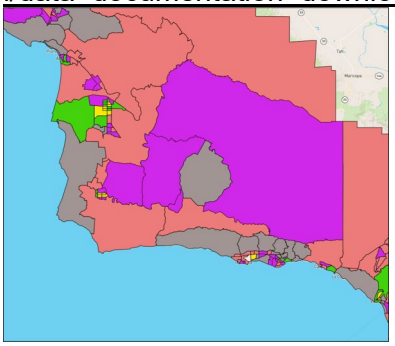
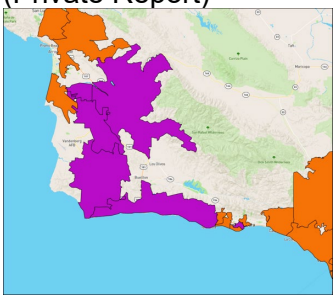
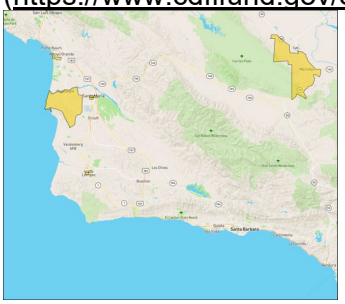


NAME: Crown Castle Intermarket Fiber
DATE: June 7, 2022
DESCRIPTION: Installed Network
SOURCE: Crown Castle (traced from web-map: https://www.crowncastle.com/infrastructure-solutions/)



NAME: Crown Castle Local Fiber DATE: June 7, 2022 DESCRIPTION: Installed Network SOURCE: Crown Castle (traced from web-map: https://www.crowncastle.com/infrastructure-solutions/) 	NAME: CalTrans permit-lines DATE: June 23, 2022 DESCRIPTION: Installed Network SOURCE: CalTrans District 5 (https://caltrans.maps.arcgis.com/apps/webappviewer/index.html?id=409850b9be624e3c8403db9f11406ae5) 
NAME: TPA Proposed Network DATE: April 22, 2022 DESCRIPTION: Third Party Administrator proposed network SOURCE: Golden State Network: Statewide Middle-Mile Network Design, April 22, 2022 (traced from PDF) 	NAME: CalRenNetwork DATE: April 22, 2022 DESCRIPTION: CalRen installed network SOURCE: Golden State Network: Statewide Middle-Mile Network Design, April 22, 2022 (traced from PDF) 
NAME: CalTrans permit-points DATE: June 23, 2022 DESCRIPTION: Installed Network SOURCE URL: CalTrans District 5 (https://caltrans.maps.arcgis.com/apps/webappviewer/index.html?id=409850b9be624e3c8403db9f11406ae5) 	NAME: BB Adoption at 25/3 DATE: June 7, 2022 DESCRIPTION: % of residential fixed Internet access connections per total households with BB SOURCE: CPUC (https://cpuc2016.westus.cloudapp.azure.com/arcgis/rest/services/CPUC/CPUC_2021_Broadband_Adoption/MapServer/1)

	
NAME: Fixed consumer served status 25/3 DATE: June 7, 2022 DESCRIPTION: ISP BB data, validated by the CPUC SOURCE: CPUC (https://cpuc2016.westus.cloudapp.azure.com/arcgis/rest/services/CPUC/CPUC_2021_Fixed_Consumer_CASF_Served_Status/MapServer/0) 	NAME: Consumer Fixed DD DATE: June 7, 2022 DESCRIPTION: Maximum advertised downstream speeds SOURCE: CPUC (https://cpuc2016.westus.cloudapp.azure.com/arcgis/rest/services/CPUC/CPUC_2021_Fixed_Consumer_Downstream_Maximum/MapServer/0) 
NAME: EJ Communities DATE: May 5, 2022 DESCRIPTION: “Environmental Justice" metrics SOURCE: SBCAG (http://www.sbcag.org/uploads/2/4/5/4/24540302/connected_2050_final.pdf) 	NAME: i16 Census BlockGroup Disadvantaged Communities 2018 DATE: May 5, 2022 DESCRIPTION: Designations of "disadvantaged" block groups SOURCE: CA State Geoportal (https://gis.water.ca.gov/arcgis/rest/services/Society/i16_Census_BlockGroup_DisadvantagedCommunities_2018/FeatureServer) 
NAME: OOKLA below 25/3 DATE: May 5, 2022	NAME: SVI2018_CALIFORNIA_tract DATE: May 5, 2022

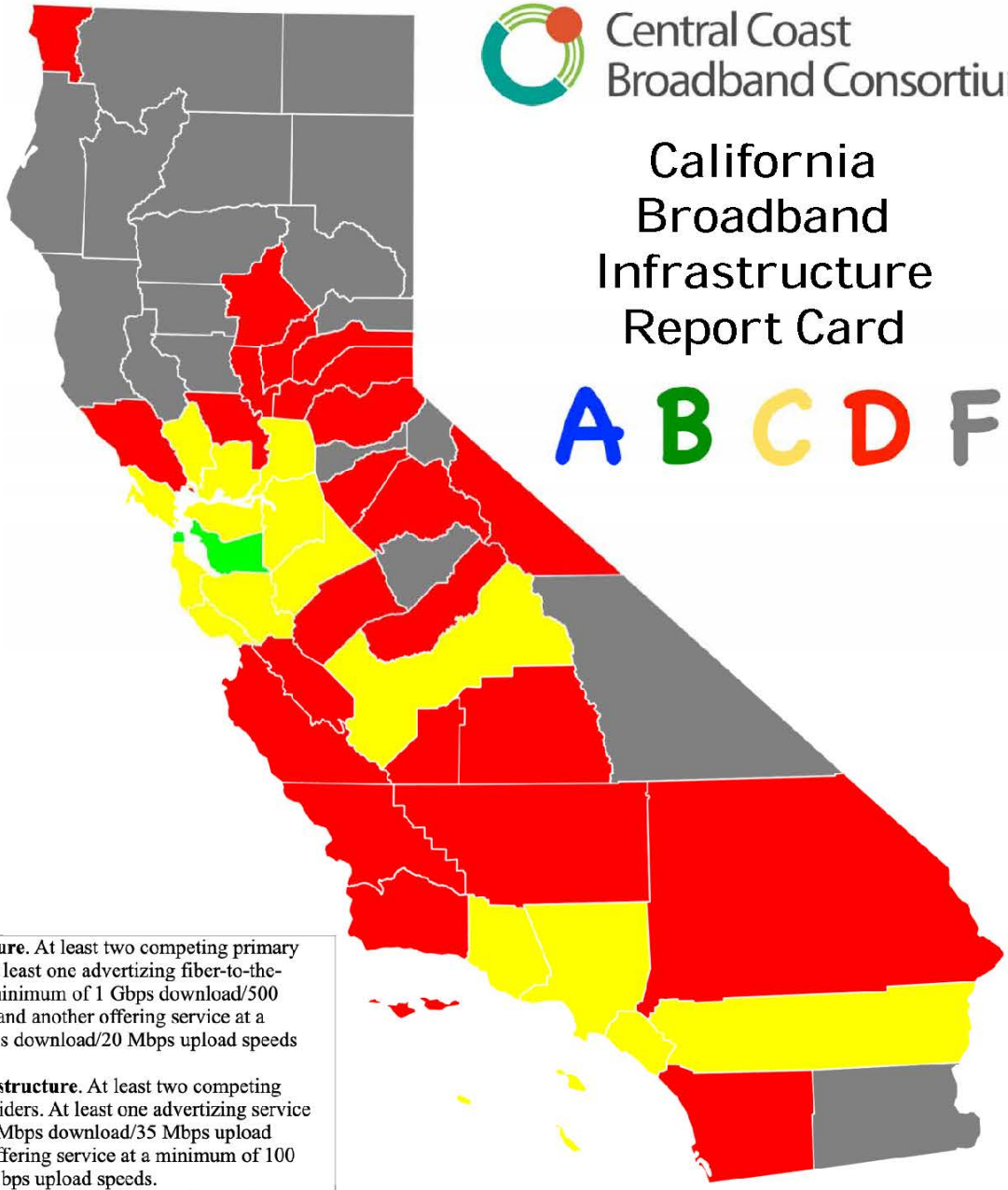
DESCRIPTION: Speed Tests - Ookla Median Speeds Fixed Broadband Below 25/3 Mbps (Census Tract Level) SOURCE: NTIA (https://broadbandusa.maps.arcgis.com/home/item.html?id=a3f9dbcb40e14f149628d082efd50f2c) 	DESCRIPTION: Communities that will most likely need support before, during, and after a hazardous event. SOURCE: CDC (https://www.atsdr.cdc.gov/placeandhealth/svi/data_documentation_download.html) 
NAME: Households Cannot Afford Last Update: June 23, 2022 DESCRIPTION: Demographic Analysis… SOURCE: Dr. Jamshid Damooei, CLU (Private Report) 	NAME: Opportunity Zones DATE: May 5, 2022 DESCRIPTION: Economically distressed communities where new investments, under certain conditions, may be eligible for preferential tax treatment. SOURCE: US Treasury (https://www.cdfifund.gov/opportunity-zones) 

APPENDIX E

Central Coast Broadband Consortium

California Broadband Infrastructure Report Card

A B C D F



A	**Superior infrastructure.** At least two competing primary wireline providers. At least one advertizing fiber-to-the-premise service at a minimum of 1 Gbps download/500 Mbps upload speeds, and another offering service at a minimum of 400 Mbps download/20 Mbps upload speeds using any technology.
B	**Above average infrastructure.** At least two competing primary wireline providers. At least one advertizing service at a minimum of 900 Mbps download/35 Mbps upload speeds, and another offering service at a minimum of 100 Mbps download/20 Mbps upload speeds.
C	**Average infrastructure.** At least two competing primary wireline providers. At least one advertizing service at a minimum of 400 Mbps download/20 Mbps upload speeds, and another offering service at a minimum of 30 Mbps download/5 Mbps upload speeds.
D	**Barely passing**. At least one wireline provider that meets the Central Coast Broadband Consortium/Monterey Bay Economic Partnership minimum standard of 100 Mbps download and 20 Mbps upload speeds.
F	**Fail**. At least one wireline provider offers service, but no service is available that meets the Central Coast Broadband Consortium/Monterey Bay Economic Partnership minimum standard of 100 Mbps download and 20 Mbps upload speeds.
F–	**Unserved**. No broadband service available

Data used in this analysis was submitted by Internet service providers to the California Public Utilities Commission and the Federal Communications Commission, and is current as of 31 December 2018.

The Central Coast Broadband Consortium's online map shows Report Card and other broadband infrastructure data for California:

Central Coast Broadband Consortia online map

Tabular data are here:
Central Coast Broadband Consortium wireline broadband availability analysis (22 March 2020 revision)

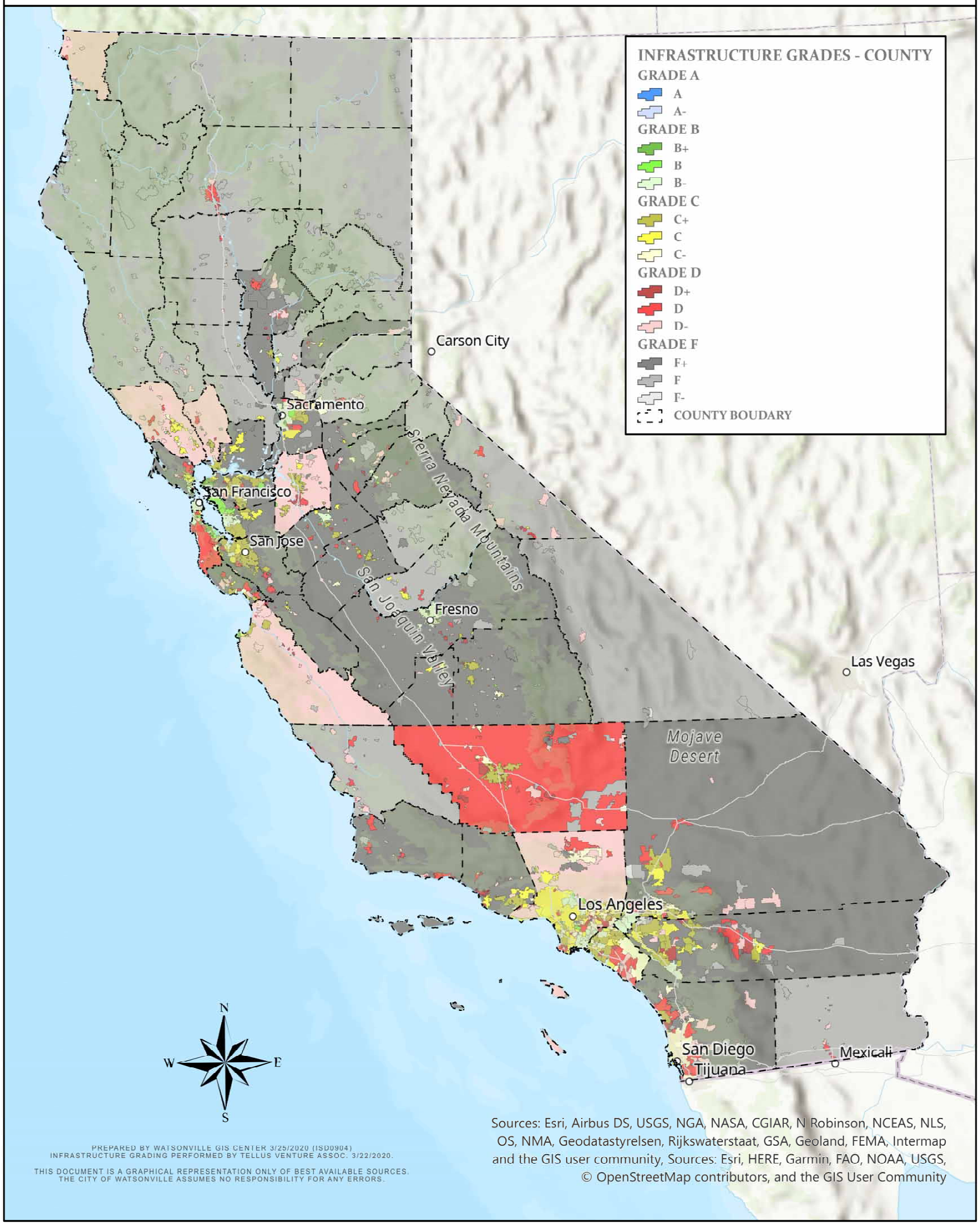
County	Grade	GPA	Median HH income	Population 2019	Pop at Zero service	Pop at 6/1	Pop at 10/1	Pop at 25/3	Pop at 100/20	Pop at 1000/500
Alameda	B-	2.77	$96,623	1,669,301	42,183	1,625,420	1,625,420	1,625,328	1,624,526	777,443
Alpine	F	0.04	$63,330	1,162	964	184	184	93	93	0
Amador	F+	0.61	$59,360	38,294	7,304	29,955	29,955	29,704	16,273	8,794
Butte	D-	0.68	$48,900	226,466	17,220	202,173	202,173	202,021	202,015	908
Calaveras	D-	0.84	$43,709	45,117	6,395	37,631	37,598	36,481	32,803	7,333
Colusa	F+	0.62	$55,333	22,117	9,972	11,912	11,902	11,687	8,724	3,125
Contra Costa	C+	2.40	$99,646	1,155,879	16,123	1,137,941	1,137,941	1,137,817	1,135,594	271,988
Del Norte	D-	0.78	$46,327	27,401	2,298	25,103	25,103	25,094	24,967	0
El Dorado	D-	0.70	$66,814	191,848	29,090	155,560	155,147	152,277	118,455	18,770
Fresno	C-	1.86	$53,004	1,018,241	58,250	928,507	928,474	911,406	892,284	416,031
Glenn	F+	0.41	$44,677	29,132	6,582	19,415	19,415	18,855	18,855	0
Humboldt	F	0.01	$43,351	135,333	19,729	111,202	111,186	110,201	4,656	2,678
Imperial	F+	0.52	$44,003	190,266	22,872	165,968	165,968	163,093	161,599	0
Inyo	F	0.17	$49,545	18,593	2,898	15,685	15,685	15,685	3,161	1,086
Kern	D+	1.41	$52,777	916,464	60,629	853,571	853,232	851,993	812,876	227,405
Kings	D	1.25	$44,243	153,710	31,351	117,502	117,502	116,989	116,867	21,557
Lake	F+	0.50	$39,469	65,071	8,931	49,561	49,561	49,073	49,044	5
Lassen	F	0.02	$40,141	30,150	16,885	11,393	11,044	8,970	1,420	780
Los Angeles	C	2.09	$71,244	10,253,715	123,278	10,117,079	10,114,383	10,099,184	10,020,081	1,491,396
Madera	D	0.96	$53,976	159,536	21,563	136,909	136,906	120,396	106,634	22,030
Marin	C-	1.70	$103,955	262,879	10,142	251,262	251,247	251,244	247,958	44,016
Mariposa	F	0.01	$53,020	18,068	4,270	13,332	13,332	1,621	665	545
Mendocino	F+	0.39	$49,229	89,009	22,110	64,377	64,377	63,241	60,134	165
Merced	D	1.24	$45,356	282,928	29,758	240,454	240,371	236,197	235,308	64,661
Modoc	F	0.01	$46,453	9,602	4,815	4,501	4,281	3,560	212	21
Mono	D-	0.72	$51,725	13,616	1,806	11,761	11,761	11,758	11,748	3,978
Monterey	D+	1.63	$66,576	445,414	25,796	415,779	415,779	413,959	411,606	64,361
Napa	C-	1.85	$81,413	140,779	9,643	129,893	129,893	129,555	129,080	23,844
Nevada	D-	0.69	$63,475	98,904	16,681	75,129	75,129	74,480	61,265	18,871
Orange	C	1.97	$90,950	3,222,498	95,492	3,117,814	3,117,810	3,114,447	3,102,956	631,080
Placer	D-	0.77	$69,455	396,691	23,527	364,684	364,684	358,814	254,737	72,227
Plumas	F	0.13	$54,063	19,779	6,980	12,685	12,459	7,696	4,562	4,050
Riverside	C-	1.85	$61,520	2,440,124	70,900	2,363,555	2,362,246	2,358,462	2,311,946	138,013
Sacramento	C+	2.30	$65,857	1,546,174	32,382	1,501,390	1,501,158	1,495,666	1,485,576	278,441
San Benito	D	1.17	$77,834	62,296	7,179	53,627	53,627	53,345	53,109	3,597
San Bernardino	D+	1.47	$53,008	2,192,203	62,384	2,125,625	2,122,675	2,113,136	2,094,985	61,085
San Diego	D+	1.33	$75,775	3,351,785	146,198	3,193,656	3,193,599	3,188,076	3,174,047	809,031
San Francisco	B-	2.73	$105,602	883,869	5,654	875,514	875,514	875,499	875,243	434,942
San Joaquin	C-	1.89	$61,184	770,385	39,920	724,429	724,213	722,354	717,529	115,364
San Luis Obispo	D-	0.71	$71,439	280,393	30,464	238,007	237,958	235,704	231,472	6,627
San Mateo	C+	2.63	$109,450	774,485	5,530	767,981	767,981	767,959	765,051	356,271
Santa Barbara	D-	0.86	$73,141	454,593	20,794	433,088	432,028	430,158	423,978	36,981
Santa Clara	C+	2.27	$114,959	1,954,286	56,749	1,894,086	1,893,868	1,892,893	1,879,862	493,878
Santa Cruz	C-	1.67	$79,281	274,871	15,745	258,099	258,094	257,890	255,805	61,596
Shasta	F+	0.49	$47,020	178,773	22,906	145,334	144,613	140,654	128,288	4,295
Sierra	F	0.03	$49,899	3,213	2,817	131	131	131	131	131
Siskiyou	F	0.00	$43,244	44,584	7,476	35,199	35,199	21,685	106	48
Solano	C-	1.79	$77,349	441,307	23,178	416,332	416,289	416,184	392,264	40,362
Sonoma	D+	1.56	$75,627	500,675	17,307	479,842	479,840	479,385	475,062	23,238
Stanislaus	C-	1.88	$56,162	558,972	23,859	529,325	529,000	526,042	522,228	106,628
Sutter	D+	1.51	$60,713	97,490	4,920	90,688	90,688	90,064	89,972	11,647
Tehama	F+	0.32	$44,185	64,387	21,362	34,336	34,172	31,531	31,298	236
Trinity	F	0.00	$38,118	13,688	11,379	1,865	1,865	1,865	0	0
Tulare	D+	1.34	$45,565	479,112	44,568	419,298	418,925	403,208	400,619	134,853
Tuolumne	D-	0.80	$53,722	54,590	12,280	38,533	38,533	38,267	37,892	9,495
Ventura	C-	1.72	$82,761	856,598	19,476	834,276	833,405	832,061	826,581	18,218
Yolo	D-	0.72	$64,825	222,581	19,234	199,757	199,652	195,318	141,673	20,589
Yuba	D+	1.39	$54,145	77,916	11,541	62,426	62,426	62,282	61,688	13,597
California total	C-	1.69	$68,011	39,927,313	1,491,734	38,170,740	38,157,599	37,982,739	37,247,563	7,378,314

County	Grade	GPA	Median HH income	Population 2019	% Pop at Zero service	% Pop at 6/1	% Pop at 10/1	% Pop at 25/3	% Pop at 100/20	% Pop at 1000/500
Alameda	B-	2.77	$96,623	1,669,301	3%	97%	97%	97%	97%	47%
Alpine	F	0.04	$63,330	1,162	83%	16%	16%	8%	8%	0%
Amador	F+	0.61	$59,360	38,294	19%	78%	78%	78%	42%	23%
Butte	D-	0.68	$48,900	226,466	8%	89%	89%	89%	89%	0%
Calaveras	D-	0.84	$43,709	45,117	14%	83%	83%	81%	73%	16%
Colusa	F+	0.62	$55,333	22,117	45%	54%	54%	53%	39%	14%
Contra Costa	C+	2.40	$99,646	1,155,879	1%	98%	98%	98%	98%	24%
Del Norte	D-	0.78	$46,327	27,401	8%	92%	92%	92%	91%	0%
El Dorado	D-	0.70	$66,814	191,848	15%	81%	81%	79%	62%	10%
Fresno	C-	1.86	$53,004	1,018,241	6%	91%	91%	90%	88%	41%
Glenn	F+	0.41	$44,677	29,132	23%	67%	67%	65%	65%	0%
Humboldt	F	0.01	$43,351	135,333	15%	82%	82%	81%	3%	2%
Imperial	F+	0.52	$44,003	190,266	12%	87%	87%	86%	85%	0%
Inyo	F	0.17	$49,545	18,593	16%	84%	84%	84%	17%	6%
Kern	D+	1.41	$52,777	916,464	7%	93%	93%	93%	89%	25%
Kings	D	1.25	$44,243	153,710	20%	76%	76%	76%	76%	14%
Lake	F+	0.50	$39,469	65,071	14%	76%	76%	75%	75%	0%
Lassen	F	0.02	$40,141	30,150	56%	38%	37%	30%	5%	3%
Los Angeles	C	2.09	$71,244	10,253,715	1%	99%	99%	98%	98%	15%
Madera	D	0.96	$53,976	159,536	14%	86%	86%	75%	67%	14%
Marin	C-	1.70	$103,955	262,879	4%	96%	96%	96%	94%	17%
Mariposa	F	0.01	$53,020	18,068	24%	74%	74%	9%	4%	3%
Mendocino	F+	0.39	$49,229	89,009	25%	72%	72%	71%	68%	0%
Merced	D	1.24	$45,356	282,928	11%	85%	85%	83%	83%	23%
Modoc	F	0.01	$46,453	9,602	50%	47%	45%	37%	2%	0%
Mono	D-	0.72	$51,725	13,616	13%	86%	86%	86%	86%	29%
Monterey	D+	1.63	$66,576	445,414	6%	93%	93%	93%	92%	14%
Napa	C-	1.85	$81,413	140,779	7%	92%	92%	92%	92%	17%
Nevada	D-	0.69	$63,475	98,904	17%	76%	76%	75%	62%	19%
Orange	C	1.97	$90,950	3,222,498	3%	97%	97%	97%	96%	20%
Placer	D-	0.77	$69,455	396,691	6%	92%	92%	90%	64%	18%
Plumas	F	0.13	$54,063	19,779	35%	64%	63%	39%	23%	20%
Riverside	C-	1.85	$61,520	2,440,124	3%	97%	97%	97%	95%	6%
Sacramento	C+	2.30	$65,857	1,546,174	2%	97%	97%	97%	96%	18%
San Benito	D	1.17	$77,834	62,296	12%	86%	86%	86%	85%	6%
San Bernardino	D+	1.47	$53,008	2,192,203	3%	97%	97%	96%	96%	3%
San Diego	D+	1.33	$75,775	3,351,785	4%	95%	95%	95%	95%	24%
San Francisco	B-	2.73	$105,602	883,869	1%	99%	99%	99%	99%	49%
San Joaquin	C-	1.89	$61,184	770,385	5%	94%	94%	94%	93%	15%
San Luis Obispo	D-	0.71	$71,439	280,393	11%	85%	85%	84%	83%	2%
San Mateo	C+	2.63	$109,450	774,485	1%	99%	99%	99%	99%	46%
Santa Barbara	D-	0.86	$73,141	454,593	5%	95%	95%	95%	93%	8%
Santa Clara	C+	2.27	$114,959	1,954,286	3%	97%	97%	97%	96%	25%
Santa Cruz	C-	1.67	$79,281	274,871	6%	94%	94%	94%	93%	22%
Shasta	F+	0.49	$47,020	178,773	13%	81%	81%	79%	72%	2%
Sierra	F	0.03	$49,899	3,213	88%	4%	4%	4%	4%	4%
Siskiyou	F	0.00	$43,244	44,584	17%	79%	79%	49%	0%	0%
Solano	C-	1.79	$77,349	441,307	5%	94%	94%	94%	89%	9%
Sonoma	D+	1.56	$75,627	500,675	3%	96%	96%	96%	95%	5%
Stanislaus	C-	1.88	$56,162	558,972	4%	95%	95%	94%	93%	19%
Sutter	D+	1.51	$60,713	97,490	5%	93%	93%	92%	92%	12%
Tehama	F+	0.32	$44,185	64,387	33%	53%	53%	49%	49%	0%
Trinity	F	0.00	$38,118	13,688	83%	14%	14%	14%	0%	0%
Tulare	D+	1.34	$45,565	479,112	9%	88%	87%	84%	84%	28%
Tuolumne	D-	0.80	$53,722	54,590	22%	71%	71%	70%	69%	17%
Ventura	C-	1.72	$82,761	856,598	2%	97%	97%	97%	96%	2%
Yolo	D-	0.72	$64,825	222,581	9%	90%	90%	88%	64%	9%
Yuba	D+	1.39	$54,145	77,916	15%	80%	80%	80%	79%	17%
California total	C-	1.69	$68,011	39,927,313	4%	96%	96%	95%	93%	18%

County	Grade	GPA	Median HH income	Housing Units 2019	HU at Zero service	HU at 6/1	HU at 10/1	HU at 25/3	HU at 100/20	HU at 1000/500
Alameda	B-	2.77	$96,623	605,977	12,617	592,666	592,666	592,627	592,237	286,659
Alpine	F	0.04	$63,330	1,783	782	980	980	533	533	0
Amador	F+	0.61	$59,360	18,278	1,608	16,178	16,178	15,966	8,366	4,380
Butte	D-	0.68	$48,900	85,447	7,856	74,805	74,805	74,738	74,736	294
Calaveras	D-	0.84	$43,709	28,210	3,640	23,882	23,866	23,346	21,107	3,824
Colusa	F+	0.62	$55,333	8,195	3,741	4,362	4,356	4,272	3,299	1,241
Contra Costa	C+	2.40	$99,646	416,062	5,712	409,642	409,642	409,577	408,523	92,540
Del Norte	D-	0.78	$46,327	11,352	1,236	10,116	10,116	10,113	10,055	0
El Dorado	D-	0.70	$66,814	91,987	14,887	73,246	73,073	71,455	48,900	8,058
Fresno	C-	1.86	$53,004	334,239	18,746	306,626	306,615	301,474	291,820	144,122
Glenn	F+	0.41	$44,677	11,310	2,860	7,247	7,247	7,025	7,025	0
Humboldt	F	0.01	$43,351	63,138	10,705	50,211	50,202	49,704	1,918	1,166
Imperial	F+	0.52	$44,003	58,002	7,312	49,967	49,967	48,944	48,204	0
Inyo	F	0.17	$49,545	9,532	2,005	7,520	7,520	7,520	1,586	526
Kern	D+	1.41	$52,777	299,674	16,184	282,640	282,489	281,933	265,138	75,189
Kings	D	1.25	$44,243	46,414	4,851	40,028	40,028	39,853	39,804	7,402
Lake	F+	0.50	$39,469	34,409	5,020	25,889	25,889	25,565	25,542	5
Lassen	F	0.02	$40,141	12,763	5,743	6,089	5,913	4,564	637	285
Los Angeles	C	2.09	$71,244	3,568,898	39,424	3,524,367	3,523,182	3,516,837	3,484,265	514,205
Madera	D	0.96	$53,976	50,496	5,025	45,046	45,045	36,548	30,416	5,476
Marin	C-	1.70	$103,955	112,394	2,949	108,659	108,652	108,650	105,980	19,755
Mariposa	F	0.01	$53,020	10,489	3,094	7,120	7,120	793	308	252
Mendocino	F+	0.39	$49,229	40,760	11,160	28,500	28,500	28,030	25,968	63
Merced	D	1.24	$45,356	86,955	8,966	73,992	73,964	72,586	72,304	20,843
Modoc	F	0.01	$46,453	5,272	2,779	2,335	2,209	1,844	118	12
Mono	D-	0.72	$51,725	14,106	1,955	12,103	12,103	12,042	12,029	2,431
Monterey	D+	1.63	$66,576	141,007	8,313	131,465	131,465	130,996	130,053	20,034
Napa	C-	1.85	$81,413	55,180	3,499	51,036	51,036	50,982	50,728	10,229
Nevada	D-	0.69	$63,475	53,984	8,448	41,913	41,913	41,631	35,482	9,192
Orange	C	1.97	$90,950	1,104,164	39,232	1,057,955	1,057,953	1,056,522	1,052,637	202,491
Placer	D-	0.77	$69,455	167,548	10,761	152,028	152,028	149,130	102,866	28,479
Plumas	F	0.13	$54,063	15,895	5,900	9,930	9,779	6,410	2,899	2,549
Riverside	C-	1.85	$61,520	847,851	31,634	814,638	814,008	812,432	793,068	40,936
Sacramento	C+	2.30	$65,857	574,449	11,831	557,682	557,595	555,532	551,336	112,613
San Benito	D	1.17	$77,834	19,395	2,558	16,352	16,352	16,216	16,149	1,069
San Bernardino	D+	1.47	$53,008	723,783	30,913	691,137	690,339	686,634	678,374	20,968
San Diego	D+	1.33	$75,775	1,219,460	43,908	1,170,774	1,170,750	1,168,513	1,163,371	316,880
San Francisco	B-	2.73	$105,602	399,372	1,359	396,384	396,384	396,383	396,197	178,384
San Joaquin	C-	1.89	$61,184	246,521	12,360	231,858	231,791	231,175	229,588	39,238
San Luis Obispo	D-	0.71	$71,439	122,810	10,856	107,109	107,095	106,091	104,254	2,387
San Mateo	C+	2.63	$109,450	279,248	2,357	276,455	276,455	276,445	275,305	127,039
Santa Barbara	D-	0.86	$73,141	160,111	5,216	154,599	154,120	153,272	150,840	14,826
Santa Clara	C+	2.27	$114,959	671,439	17,035	653,208	653,139	652,821	648,034	171,945
Santa Cruz	C-	1.67	$79,281	105,862	3,777	101,706	101,705	101,620	100,729	26,930
Shasta	F+	0.49	$47,020	78,027	11,430	61,973	61,625	59,874	54,024	1,793
Sierra	F	0.03	$49,899	2,352	2,062	77	77	77	77	77
Siskiyou	F	0.00	$43,244	24,200	4,600	18,600	18,600	11,560	43	20
Solano	C-	1.79	$77,349	159,586	6,382	152,512	152,497	152,455	142,971	15,420
Sonoma	D+	1.56	$75,627	204,976	7,611	195,511	195,509	195,254	192,112	9,610
Stanislaus	C-	1.88	$56,162	182,514	8,107	172,452	172,362	171,300	169,830	37,677
Sutter	D+	1.51	$60,713	34,398	2,062	31,600	31,600	31,359	31,323	4,094
Tehama	F+	0.32	$44,185	27,655	9,655	14,417	14,328	13,025	12,921	96
Trinity	F	0.00	$38,118	8,942	7,695	843	843	843	0	0
Tulare	D+	1.34	$45,565	150,622	16,142	130,046	129,932	125,732	124,840	41,734
Tuolumne	D-	0.80	$53,722	31,624	7,256	21,208	21,208	21,066	20,899	4,735
Ventura	C-	1.72	$82,761	289,647	7,060	281,613	281,308	280,728	278,329	5,559
Yolo	D-	0.72	$64,825	77,679	4,561	72,156	72,156	71,163	52,216	7,630
Yuba	D+	1.39	$54,145	28,650	5,099	21,937	21,937	21,877	21,636	4,848
California total	C-	1.69	$68,011	14,235,093	550,536	13,575,389	13,570,218	13,495,657	13,163,951	2,648,209

County	Grade	GPA	Median HH income	Housing Units 2019	% HU at Zero service	% HU at 6/1	%HU at 10/1	% HU at 25/3	% HU at 100/20	% HU at 1000/500
Alameda	B-	2.77	$96,623	605,977	2%	98%	98%	98%	98%	47%
Alpine	F	0.04	$63,330	1,783	44%	55%	55%	30%	30%	0%
Amador	F+	0.61	$59,360	18,278	9%	89%	89%	87%	46%	24%
Butte	D-	0.68	$48,900	85,447	9%	88%	88%	87%	87%	0%
Calaveras	D-	0.84	$43,709	28,210	13%	85%	85%	83%	75%	14%
Colusa	F+	0.62	$55,333	8,195	46%	53%	53%	52%	40%	15%
Contra Costa	C+	2.40	$99,646	416,062	1%	98%	98%	98%	98%	22%
Del Norte	D-	0.78	$46,327	11,352	11%	89%	89%	89%	89%	0%
El Dorado	D-	0.70	$66,814	91,987	16%	80%	79%	78%	53%	9%
Fresno	C-	1.86	$53,004	334,239	6%	92%	92%	90%	87%	43%
Glenn	F+	0.41	$44,677	11,310	25%	64%	64%	62%	62%	0%
Humboldt	F	0.01	$43,351	63,138	17%	80%	80%	79%	3%	2%
Imperial	F+	0.52	$44,003	58,002	13%	86%	86%	84%	83%	0%
Inyo	F	0.17	$49,545	9,532	21%	79%	79%	79%	17%	6%
Kern	D+	1.41	$52,777	299,674	5%	94%	94%	94%	88%	25%
Kings	D	1.25	$44,243	46,414	10%	86%	86%	86%	86%	16%
Lake	F+	0.50	$39,469	34,409	15%	75%	75%	74%	74%	0%
Lassen	F	0.02	$40,141	12,763	45%	48%	46%	36%	5%	2%
Los Angeles	C	2.09	$71,244	3,568,898	1%	99%	99%	99%	98%	14%
Madera	D	0.96	$53,976	50,496	10%	89%	89%	72%	60%	11%
Marin	C-	1.70	$103,955	112,394	3%	97%	97%	97%	94%	18%
Mariposa	F	0.01	$53,020	10,489	29%	68%	68%	8%	3%	2%
Mendocino	F+	0.39	$49,229	40,760	27%	70%	70%	69%	64%	0%
Merced	D	1.24	$45,356	86,955	10%	85%	85%	83%	83%	24%
Modoc	F	0.01	$46,453	5,272	53%	44%	42%	35%	2%	0%
Mono	D-	0.72	$51,725	14,106	14%	86%	86%	85%	85%	17%
Monterey	D+	1.63	$66,576	141,007	6%	93%	93%	93%	92%	14%
Napa	C-	1.85	$81,413	55,180	6%	92%	92%	92%	92%	19%
Nevada	D-	0.69	$63,475	53,984	16%	78%	78%	77%	66%	17%
Orange	C	1.97	$90,950	1,104,164	4%	96%	96%	96%	95%	18%
Placer	D-	0.77	$69,455	167,548	6%	91%	91%	89%	61%	17%
Plumas	F	0.13	$54,063	15,895	37%	62%	62%	40%	18%	16%
Riverside	C-	1.85	$61,520	847,851	4%	96%	96%	96%	94%	5%
Sacramento	C+	2.30	$65,857	574,449	2%	97%	97%	97%	96%	20%
San Benito	D	1.17	$77,834	19,395	13%	84%	84%	84%	83%	6%
San Bernardino	D+	1.47	$53,008	723,783	4%	95%	95%	95%	94%	3%
San Diego	D+	1.33	$75,775	1,219,460	4%	96%	96%	96%	95%	26%
San Francisco	B-	2.73	$105,602	399,372	0%	99%	99%	99%	99%	45%
San Joaquin	C-	1.89	$61,184	246,521	5%	94%	94%	94%	93%	16%
San Luis Obispo	D-	0.71	$71,439	122,810	9%	87%	87%	86%	85%	2%
San Mateo	C+	2.63	$109,450	279,248	1%	99%	99%	99%	99%	45%
Santa Barbara	D-	0.86	$73,141	160,111	3%	97%	96%	96%	94%	9%
Santa Clara	C+	2.27	$114,959	671,439	3%	97%	97%	97%	97%	26%
Santa Cruz	C-	1.67	$79,281	105,862	4%	96%	96%	96%	95%	25%
Shasta	F+	0.49	$47,020	78,027	15%	79%	79%	77%	69%	2%
Sierra	F	0.03	$49,899	2,352	88%	3%	3%	3%	3%	3%
Siskiyou	F	0.00	$43,244	24,200	19%	77%	77%	48%	0%	0%
Solano	C-	1.79	$77,349	159,586	4%	96%	96%	96%	90%	10%
Sonoma	D+	1.56	$75,627	204,976	4%	95%	95%	95%	94%	5%
Stanislaus	C-	1.88	$56,162	182,514	4%	94%	94%	94%	93%	21%
Sutter	D+	1.51	$60,713	34,398	6%	92%	92%	91%	91%	12%
Tehama	F+	0.32	$44,185	27,655	35%	52%	52%	47%	47%	0%
Trinity	F	0.00	$38,118	8,942	86%	9%	9%	9%	0%	0%
Tulare	D+	1.34	$45,565	150,622	11%	86%	86%	83%	83%	28%
Tuolumne	D-	0.80	$53,722	31,624	23%	67%	67%	67%	66%	15%
Ventura	C-	1.72	$82,761	289,647	2%	97%	97%	97%	96%	2%
Yolo	D-	0.72	$64,825	77,679	6%	93%	93%	92%	67%	10%
Yuba	D+	1.39	$54,145	28,650	18%	77%	77%	76%	76%	17%
California total	C-	1.69	$68,011	14,235,093	4%	95%	95%	95%	92%	19%

STATEWIDE INFRASTRUCTURE GRADES BY CDP/ROC



PREPARED BY WATSONVILLE GIS CENTER 3/25/2020 (ISD0904)
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Central Coast Broadband Consortium Broadband Infrastructure Grading Methodology

Broadband infrastructure grades compare the primary, wireline infrastructure in a region, county, town or census block to the Californian average:

A	**Superior infrastructure**. At least two competing primary wireline providers. At least one advertizing fiber-to-the-premise service at a minimum of 1 Gbps download/500 Mbps upload speeds, and another offering service at a minimum of 400 Mbps download/20 Mbps upload speeds using any technology.
B	**Above average infrastructure**. At least two competing primary wireline providers. At least one advertizing service at a minimum of 900 Mbps download/35 Mbps upload speeds, and another offering service at a minimum of 100 Mbps download/20 Mbps upload speeds.
C	**Average infrastructure.** At least two competing primary wireline providers. At least one advertizing service at a minimum of 400 Mbps download/20 Mbps upload speeds, and another offering service at a minimum of 30 Mbps download/5 Mbps upload speeds.
D	**Barely passing**. At least one wireline provider that meets the Central Coast Broadband Consortium/Monterey Bay Economic Partnership minimum standard of 100 Mbps download and 20 Mbps upload speeds.
F	**Fail**. At least one wireline provider offers service, but no service is available that meets the Central Coast Broadband Consortium/Monterey Bay Economic Partnership minimum standard of 100 Mbps download and 20 Mbps upload speeds.
F-	**Unserved**. No broadband service available

In a study conducted for the East Bay Broadband Consortium (EBBC) in 2013[1], in cooperation with the Central Coast Broadband Consortium, core broadband infrastructure was evaluated in Alameda, Contra Costa and Solano Counties using data submitted to the California Public Utilities Commission by Internet service providers. A comparative report card was developed, with the average grade – "C" – set at the most prevalent infrastructure, and corresponding service levels, available to residents of California: a combination of relatively high speed cable modem and mid-range telephone company DSL facilities.

This methodology was subsequently used by the Central Coast Broadband Consortium to evaluate Californian broadband infrastructure and service on a statewide basis, on behalf of the California Emerging Technology Fund and the California Center for Rural Policy, and to do in-depth analysis of broadband service and infrastructure in Monterey, Santa Cruz and San Benito counties.

The primary data for assessing the quantity and quality of broadband infrastructure comes from the California Public Utilities Commission, which collects service level reports submitted by providers to the Federal Communications Commission annually, and then runs that data through a validation process. The most recent data available was submitted by carriers as of 31 December 2017. This data can be broken down to the census block level, and shows what level of service Internet companies claim to provide, but not necessarily what they deliver. The accuracy of this data and the definition of

[1] East Bay Broadband Report Card, Tellus Venture Associates, 28 January 2014.

service levels varies from company to company, although it is generally consistent within any given company. In other words, if Company Z exaggerates the speeds and availability of home Internet service, it tends to do so to more or less the same extent everywhere. By using a comparative system for ranking, rather than using the absolute values provided, the variation in the accuracy of the data can be smoothed out and an apples-to-apples comparison can be achieved.

Consumer-grade service throughout California was assessed, and the averages of available service (median, mode and mean) used as one of the two primary grading benchmarks. The other benchmark was the minimum level of service of 100 Mbps download and 20 Mbps upload speeds, which was determined by a 2018 study conducted by the Central Coast Broadband Consortium and the Monterey Bay Economic Partnership[2] to be the minimum necessary to conduct business, do homework, enjoy online entertainment and otherwise fully participate in today's digital economy.

Upload speed was given equal weight to download speed because upload speed provides a reliable indication of the capacity of the underlying infrastructure. It is increasingly important to consumers and businesses alike. When a service provider skimps on upload speeds, as frequently happens, it is usually because its cables and other core equipment have a limited capacity.

The data was examined, and irrelevant data points that skewed results were removed. Grades were then assigned according to the criteria in the table above.
A "C" grade indicates that consumer grade broadband service, and consequently the underlying core infrastructure, in a given area meets the statewide average. A "D" grade means it meets the minimum service standard determined by the CCBC/MBEP study. "F" grades indicate full or partial failure. "A" and "B" grades show that service in an area is superior to the California average.

The first step in grading was to give a letter grade to each census block in California. Then, the grade points were tallied, weighted by population and averaged for the census blocks within cities, counties and unincorporated areas, to produce a numerical grade on a four point scale, which was rounded to the nearest tenth.

The numerical grade point average for an area was then converted to a letter grade on the following scale:

Infrastructure Grade Point Scale					
A	4.0	**C+**	2.3-2.6	**D-**	0.7-0.9
A-	3.7-3.9	**C**	2.0-2.2	**F+**	0.3-0.6
B+	3.3-3.6	**C-**	1.7-1.9	**F**	0.0-0.2
B	3.0-3.2	**D+**	1.3-1.6	**F-**	No service available
B-	2.7-2.9	**D**	1.0-1.2		

[2] Achieving Ubiquitous Broadband Coverage in the Monterey Bay Region, Monterey Bay Economic Partnership, November 2018.

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APPENDIX G

County and City responses - policy and permitting questions

Questions presented to all MOU partners, drawn from the statewide resource, *Getting Connected- A Broadband Deployment and Adoption Resource Guide for Local and Regional Government Leaders, CETF/Valley Vision, March 2021*.

County of Santa Barbara	
Does your City/County have a complete and up to date asset inventory – right of ways; easements; or other identified for broadband infrastructure deployment.	SB County General Services and Public Safety agencies
Does your agency manage and approve permits for fiber installation on poles?	Unsure
Has your jurisdiction installed any conduit for fiber?	Yes, for County department/agency use only.
Does you City/County have a 'dig once' or 'open trench' policy/ordinance?	No
Does your planning department have a clear process for permitting for fiber or other telecom infrastructure?	Yes, there is a permitting process.
If yes, can the application be completed online?	Unsure
Does your General Plan or other planning documents uniquely call out broadband or telecommunications infrastructure as a priority?	Efficient and reliable broadband connectivity is a priority.
Does your General Plan or other planning documents identify Smart City planning as a priority?	Unsure
Is your jurisdiction interested in developing or improving your municipal Wi-Fi or fiber infrastructure?	SB County has taken steps to enhance both, but there is always room for improvement.

City of Buellton	
Does your City/County have a complete and up to date asset inventory – right of ways; easements; or other identified for broadband infrastructure deployment.	No
Does your agency manage and approve permits for fiber installation on poles?	No
Has your jurisdiction installed any conduit for fiber?	No
Does you City/County have a 'dig once' or 'open trench' policy/ordinance?	In process

County and City responses - policy and permitting questions

Does your planning department have a clear process for permitting for fiber or other telecom infrastructure?	Public Works manages through encroachment process – policies are in development in planning.
If yes, can the application be completed online?	Planning is online, however not specific to fiber installation.
Does your General Plan or other planning documents uniquely call out broadband or telecommunications infrastructure as a priority?	Not currently, but likely will be later this year
Does your General Plan or other planning documents identify Smart City planning as a priority?	Not yet
Is your jurisdiction interested in developing or improving your municipal Wi-Fi or fiber infrastructure?	Some interest: potential to partner with schools

City of Carpinteria	
Does your City/County have a complete and up to date asset inventory – right of ways; easements; or other identified for broadband infrastructure deployment.	Some plans exist as part of permitting process, but they have not been consolidated as a citywide resource.
Does your agency manage and approve permits for fiber installation on poles?	Yes, through the encroachment permit process
Has your jurisdiction installed any conduit for fiber?	No, not yet.
Does you City/County have a ‘dig once’ or ‘open trench’ policy/ordinance?	No, Carpinteria Municipal Code (12.04) provides provisions for open trench work (excavation)
Does your planning department have a clear process for permitting for fiber or other telecom infrastructure?	Yes
If yes, can the application be completed online?	Forms are PDF and permits are processed electronically.
Does your General Plan or other planning documents uniquely call out broadband or telecommunications infrastructure as a priority?	Yes, and this was reiterated recently when discussing the MOU with the Council
Does your General Plan or other planning documents identify Smart City planning as a priority?	No
Is your jurisdiction interested in developing or improving your	Within City properties, yes. The Carpinteria City Library already has Wi-Fi as well.

municipal Wi-Fi or fiber infrastructure?	

City of Goleta	
Does your City/County have a complete and up to date asset inventory – right of ways; easements; or other identified for broadband infrastructure deployment.	The City of Goleta does not have an asset inventory of right-of-way or easements identified for broadband infrastructure deployment. Proposed locations must comply with the City's adopted Design and Development Standards for Wireless Facilities in the Public Rights-of-Way.
Does your agency manage and approve permits for fiber installation on poles?	Yes
Has your jurisdiction installed any conduit for fiber?	No, we have not.
Does you City/County have a 'dig once' or 'open trench' policy/ordinance?	The City does not have a 'dig once' or 'open trench' policy/ordinance.
Does your planning department have a clear process for permitting for fiber or other telecom infrastructure?	The Wireless Telecommunications Chapter 17.42 TELECOMMUNICATIONS FACILITIES of the Goleta Municipal Code provides standards, permit requirements, and procedures for wireless telecommunications antennas and related facilities consistent with the applicable provisions of Federal law. Public Works also provides Chapter 12.20 WIRELESS FACILITIES IN PUBLIC ROAD RIGHTS-OF-WAY of the Goleta Municipal Code.
If yes, can the application be completed online?	Yes, the application can be completed online through our Goleta Web Portal or can be submitted via email @Planning Counter - City of Goleta.
Does your General Plan or other planning documents uniquely call out broadband or telecommunications infrastructure as a priority?	No, while we have policies regarding Wireless Antennas, it is not called out as a priority.

County and City responses - policy and permitting questions

Does your General Plan or other planning documents identify Smart City planning as a priority?	No
Is your jurisdiction interested in developing or improving your municipal Wi-Fi or fiber infrastructure?	In concept, yes, but we would need to evaluate the feasibility of this further.

City of Guadalupe	
Does your City/County have a complete and up to date asset inventory – right of ways; easements; or other identified for broadband infrastructure deployment.	No, only partial.
Does your agency manage and approve permits for fiber installation on poles?	Only when it involves encroachment permit.
Has your jurisdiction installed any conduit for fiber?	No
Does you City/County have a ‘dig once’ or ‘open trench’ policy/ordinance?	No
Does your planning department have a clear process for permitting for fiber or other telecom infrastructure?	No
If yes, can the application be completed online?	No
Does your General Plan or other planning documents uniquely call out broadband or telecommunications infrastructure as a priority?	No
Does your General Plan or other planning documents identify Smart City planning as a priority?	No

County and City responses - policy and permitting questions

Is your jurisdiction interested in developing or improving your municipal Wi-Fi or fiber infrastructure?	No

City of Lompoc	
Does your City/County have a complete and up to date asset inventory – right of ways; easements; or other identified for broadband infrastructure deployment.	Yes, the City has a thorough inventory via our GIS.
Does your agency manage and approve permits for fiber installation on poles?	Our Agency does manage and approve permits for fiber installation on poles. For the work in the ROW required to install fiber, an encroachment permit is required from the Engineering Division. This work also requires a Joint Pole Agreement from our Electrical Division.
Has your jurisdiction installed any conduit for fiber?	Yes.
Does you City/County have a 'dig once' or 'open trench' policy/ordinance?	We do have a policy that sets a moratorium for trenching on newly resurfaced/improved streets. For more substantial street improvement projects, such as reconstructions, overlays, 3 steps, or cape seals, a 5-year moratorium will be in place. For slurry seals and microsurfacing, a 3 year moratorium will be in place. For fog seals, a 2-year moratorium will be in place. As far as open trenches go, our policy is to either have trenches filled in by the end of the workday or otherwise place steel plates over them until they can be backfilled.
Does your planning department have a clear process for permitting for fiber or other telecom infrastructure?	Yes, but each project is reviewed on a case-by-case basis and would either be submitted as a building permit or a discretionary planning project based on location, size, etc.
If yes, can the application be completed online?	Yes, applications can be found online but must be submitted by mail or in person.

County and City responses - policy and permitting questions

Does your General Plan or other planning documents uniquely call out broadband or telecommunications infrastructure as a priority?	Yes. The Lompoc 2030 General Plan (Public Services Element) refers to broadband and telecommunications in policies 14.1, 14.2 and implementation measure 30.
Does your General Plan or other planning documents identify Smart City planning as a priority?	Yes, the City's 2030 General Plan specifically refers to "Smart Growth".
Is your jurisdiction interested in developing or improving your municipal Wi-Fi or fiber infrastructure?	Yes.

City of Santa Barbara	
Does your City/County have a complete and up to date asset inventory – right of ways; easements; or other identified for broadband infrastructure deployment.	Yes, regarding street rights of way.
Does your agency manage and approve permits for fiber installation on poles?	Yes, as relates to temporary traffic control in street right of way. Design approval is more relevant for underground infrastructure or pad mounted equipment.
Has your jurisdiction installed any conduit for fiber?	Yes, for traffic signal and governmental IT purposes.
Does you City/County have a 'dig once' or 'open trench' policy/ordinance?	We have a pavement maintenance moratorium policy to encourage coordination.
Does your planning department have a clear process for permitting for fiber or other telecom infrastructure?	No. PW and Planning have been focused on clear process for small cell facility deployment.
If yes, can the application be completed online?	Yes.
Does your General Plan or other planning documents uniquely call out broadband or telecommunications infrastructure as a priority?	No
Does your General Plan or other planning documents identify Smart City planning as a priority?	No
Is your jurisdiction interested in developing or improving your municipal Wi-Fi or fiber infrastructure?	Some interest in municipal Wi-Fi in Downtown and other areas for Economic Development. No re. fiber infrastructure.

City of Santa Maria	
Does your City/County have a complete and up to date asset inventory – right of ways; easements; or other identified for broadband infrastructure deployment.	Yes – Public Works
Does your agency manage and approve permits for fiber installation on poles?	If the poles are in the right-of-way, an encroachment permit would be needed through public works engineering. Planning would not require a permit for installation of fiber on poles in the right-of-way.
Has your jurisdiction installed any conduit for fiber?	Yes, and we have been building out our fiber infrastructure over the last few years.
Does you City/County have a ‘dig once’ or ‘open trench’ policy/ordinance?	No policy or ordinance. But open trench comments are identified on the encroachment permit prior to commencement of work.
Does your planning department have a clear process for permitting for fiber or other telecom infrastructure?	The city does not have a specific telecom. ordinance but does follow FCC requirements for permitting telecom infrastructure. The Community Development Department Planning Division has specific information regarding permitting telecom projects.
If yes, can the application be completed online?	The planning application is available online. Completed applications may be submitted via email or directly to the Community Development Department office.
Does your General Plan or other planning documents uniquely call out broadband or telecommunications infrastructure as a priority?	The version that is now being updated does.
Does your General Plan or other planning documents identify Smart City planning as a priority?	Yes.

County and City responses - policy and permitting questions

Is your jurisdiction interested in developing or improving your municipal Wi-Fi or fiber infrastructure?	Yes.

City of Solvang	
Does your City/County have a complete and up to date asset inventory – right of ways; easements; or other identified for broadband infrastructure deployment.	The city has an inventory of right of way and easements that have been dedicated to the city. *The city does not have an inventory of broadband lines or services.*
Does your agency manage and approve permits for fiber installation on poles?	It depends on what is being attached to the poles. Signs and telecommunication equipment needs to go through a permit process.
Has your jurisdiction installed any conduit for fiber?	No, the City does not install conduit for fiber.
Does you City/County have a 'dig once' or 'open trench' policy/ordinance?	No
Does your planning department have a clear process for permitting for fiber or other telecom infrastructure?	For broadband conduit being installed in the streets and public right of ways. An encroachment permit would be required.
If yes, can the application be completed online?	No
Does your General Plan or other planning documents uniquely call out broadband or telecommunications infrastructure as a priority?	No. The City of Solvang is going through an update to the General Plan and there will be provisions for broadband in the updated General Plan which is anticipated to be completed in the first half of 2023.
Does your General Plan or other planning documents identify Smart City planning as a priority?	The General Plan Update identifies broadband as a specific goal and priority.
Is your jurisdiction interested in developing or improving your municipal Wi-Fi or fiber infrastructure?	Yes. Grant funding or private sector investment will be needed to achieve such goal.

Appendix G

F: BROADBAND INTERNET

Rationale: More than half of respondents indicated their preference to direct funds to improve internet access and speed.

Goals: Bring in reliable communications infrastructure including fiber, licensed microwave systems, etc. Bring in permanent network infrastructures. Bring rural broadband to the Valley for all residents.

Strategies: Coordinate with the Cuyama Joint Unified School District and the Kern County Superintendent of Schools in continuing to make progress on the telecommunications tower located at Cuyama Valley High School. Identify a telecommunications or public entity partner. Explore grant funding options through USDA and the California Public Utilities Commission. Communicate the Cuyama Valley's need for broadband infrastructure to the Broadband Consortium of the Pacific Coast. Consult Caltrans to more efficiently install broadband infrastructure.

Responsible parties: County of Santa Barbara District 1 Supervisor's Office, U.S. Department of Agriculture (USDA), Broadband Consortium of the Pacific Coast, California Public Utilities Commission, Cuyama Joint Unified School District, Kern County Superintendent of Schools, Applied Technology Group, Digital West, Caltrans

Cuyama Valley Action Plan, 2020 pg 35

APPENDIX H

Broadband Strategy & Feasibility Study: Tribal Lands of Santa Ynez Band of Chumash Indians

Final Report for the

U.S. Department of the Interior

Office of Indian Energy and Economic Development (IEED)

Chumash Grant Award 2020-2021

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Executive Summary

The Chumash Broadband Feasibility/Strategy Study grant, awarded fall 2020 by the U.S. Department of Commerce Office of Indian Energy and Economic Development (IEED), was to develop a feasibility study for connecting traditional Chumash lands with new Chumash Trust lands, identifying potential use of the 2.5GHz spectrum awarded the Chumash by the Federal government (FCC) as part of the Tribal Rural Priority Window (TRPW).

The Santa Ynez Band of Chumash is a federally-recognized tribe comprised of 113 Tribal members, 1200 lineal descendants, and 200 members residing in 100 homes on the reservation. As articulated in the Chumash Comprehensive Economic Development Strategy (CEDS), there is not only alignment, but an inter-relationship, of Chumash economic vitality and broadband needs and those of Northern Santa Barbara County (NSBC). The Chumash Casino Resort and the Tribe's two gas stations are in Santa Ynez, as is the Chumash Museum in development. The Tribe has two hotels are in Solvang, and the Kita Winery is in Lompoc. The Chumash have potential future commercial investment interests in Santa Ynez Valley, Lompoc, in other NSBC areas and Santa Barbara County areas and beyond. The Chumash workforce includes workers from numerous Santa Barbara County communities.

The Chumash IT department can be applauded for continually enhancing internet service over the past several years. The Tribe made a major investment by having Frontier build fiber from Buellton to the Casino, and by contracting for redundant services from additional carriers. The Tribal IT approach has been measured, deliberate, responsive, cost-conscious, and admirable. The Chumash have enjoyed great growth and expansion over the years in both commercial development and member support services and the IT department has been successfully navigating this rapid growth by unusual responsiveness, if not consistent connectivity across the enterprise. Connectivity impacts of Chumash growth, however, are now straining IT resources and a new way forward is critical.

This Study includes a Broadband Asset Inventory, a Business Entity/Department Survey (of 12 Facility, program and Tribal leaders) and a Household survey of 58 Tribal members living on the reservation (Household survey response rate of 40%). Interviews of nearly all of the Business Entity/Department Survey respondents were conducted, and from the results of all of the above, a Gap Analysis was performed. Final piece in the Study is a *Chumash Broadband Strategy Options Table* (preliminary trade-off review), providing Tribal leadership with six optional strategies to explore against numerous target considerations.

The Gap Analysis includes an "Ideal Future" (Chumash Tribal members, facilities and guests enjoy "Robust, reliable, equivalent, state-of-the-art connectivity across the greater Tribal Enterprise"), yet the current Tribal broadband profile features the following:

- Several key areas currently unserved completely (e.g. Camp 4); other areas significantly under-served or have reliability issues (existing residential area, Education Center, Chumash Employee Resource Center (CERC), Fire Department, etc.).
- Tribal member broadband service in existing residential area does not meet demand.
- Guest broadband expectations of the Tribe's key tourism-related, revenue-producing entities are not being fully met (in Solvang hotels, and some parts of the Resort).
- Tribe now owns FCC-awarded 2.5GHz spectrum not yet deployed for Tribal benefit
- Tribe's new Enterprise Resource Planning (ERP) platform cannot be maximized at current connectivity levels in most locations and cloud-based apps will only increase
- Tribe is currently without a planning strategy for meeting 5-year connectivity demands *(Note: This Study is a first step in addressing this)*

Reviewing these gaps in light of research data and likely future needs, Study partners articulated several areas of key consideration for evaluating broadband strategy options include:

- Need for a "consistent connectivity platform" across the Tribal enterprise
- Gigabit speed as a standard for all Tribal locations and stakeholders
- Redundancy assurance
- Five-year planning framework
- Alignment with the Northern Santa Barbara County Fiber Ring
- Ownership of broadband assets to increase Tribal control and future commercial opportunity

It is suggested that Tribal leaders evaluate the following identified options using the factors in the Options Table as well as the above considerations as guidance. Strategy Options:

Option 1 – Trust Lands:
Midmile fiber from Goleta to Trust Lands with last mile fiber to all Tribal service and business sites on federal land. Tribe owns fiber on its Tribal lands.

Option 1 – Off-Site Tribal Locations:
Upgrade current contracts to gig service for business competitiveness, to accommodate cloud apps like ERP

Option 2 – Trust Lands:
Extend mid-mile fiber from Goleta, Buellton or elsewhere to reservation's key anchor facilities (Casino/Resort). Provide last mile to reservation sites with 2.5GHZ fixed wireless Tribal spectrum. Tribe owns fiber on fed lands; Tribe owns spectrum connecting fed lands.

Option 2 – Off-Site Tribal Locations:
Adopt Option 1 for Off-Sites

Option 3 – Trust Lands:
Option 1 model for mid-mile fiber to reservation's (Resort & Clinic). Last mile to Tribe's fed sites with 2.5GHz Tribal wireless. Tribe owns fiber on fed lands, spectrum connecting fed lands. Tribe seeks Competitive Local Exchange Carrier (CLEC) or other Tribal authority to provide fiber to local

areas, possibly off-setting service costs of Tribe's off-site locations (see Klamath River Rural Broadband model)

Option 3 – Off-Site Tribal Locations:
Option 1 Off-Site model until CLEC/other designation secured; then extend owned fiber to Tribe's off-site locations, local area

Option 4 – Trust Lands:
Participate in MuralNet/Cisco Sustainable Tribal Networks Program re sovereign network pilot program, an infrastructure trial providing data in exchange for Cisco support, equipment, etc. (would use Tribe's dedicated spectrum throughout Tribal lands)

Option 4 - Off-Site Tribal Locations:
Adopt Option 1 Off-Site model

Option 5 – Trust Lands:
Upgrade current fiber agreement with Frontier to gigabit service and provide non-anchor fed land service/business sites with Tribal spectrum

Option 5– Off-Site Tribal Locations:
Upgrade current contracts to gigabit service

Option 6 – Trust Lands:
Adopt a Service-Level Agreement (SLA) Model for single point management and control: SLA contractor would assist the Chumash in upgrading, investing, transitioning and maintaining gigabit service (outsourced broadband management for IT dept)

Option 6 - Off-Site Tribal Locations:
See above Trust Lands

The Chumash and Northern Santa Barbara County: Stakeholders in Broadband and Economic Vitality

As the Chumash Comprehensive Economic Development Strategy (CEDS) points out, the economic interests of the Santa Ynez Chumash, the Santa Ynez Valley and Northern Santa Barbara County (NSBC) are not only aligned but are very much inter-related.

The Chumash Casino Resort and the Tribe's two gas stations are in Santa Ynez, as is the Chumash Museum now in development. The tribe's two current hotels are in Solvang, and the Kita Winery is in Lompoc - all of these entities contribute to Northern Santa Barbara County tourism and retail and benefit from Northern Santa Barbara County (NSBC) tourism services and other attractions. The Chumash have potential future commercial investment interests in Santa Ynez Valley but also other NSBC areas and elsewhere (currently including a space-related education and visitor destination to be potentially developed in the City of Lompoc and a commercial center being proposed for the City of Buellton). The Chumash workforce includes not only Tribal members, but workers at various levels from many geographical areas in Northern Santa Barbara County and beyond. The Tribe operates two NSBC bus stops for employee pick-ups – one in Santa Maria and one in Lompoc. Tribal member entrepreneurship is being fostered not just on Tribal lands but also in the communities housing current Tribal members and lineal descendants. Chumash representatives contribute and serve on boards and committees throughout the region.

Currently, four of the greatest economic opportunities of Northern Santa Barbara County (NSBC) cannot be realized due to a lack of robust, reliable, affordable broadband. All of the NSBC opportunities below are dependent upon enhanced broadband and all are critical to the Chumash as well:

- Chumash business expansion and Tribal member entrepreneurship
- Vandenberg's transition to a "Spaceport of the Future" featuring commercial space launch and space business
- Development of the Santa Maria Public Airport's commercial park
- Development of the seven Northern Santa Barbara County Opportunity Zones (three in Santa Maria, three in Lompoc and one in Guadalupe, two cities of which provide many Chumash employees)

California Public Utilities Commission (as of December 31, 2018) showed the Santa Barbara County broadband adoption rate as 83%. But this is for a minimum of 6 Mbps download speed and 1 Mbps upload speed, hardly the speed of business, telework, telehealth and distance learning. **A recent analysis of statewide broadband (*California Broadband Infrastructure Report Card, March 2020, Tellus Venture Association)* gave Santa Barbara County a D-, meaning that there is only one wireline provider as of 2018 offering (not necessarily even in all areas) broadband speeds of 100 Mbps down/20 Mbps up.** While 2019 figures not yet out may show some slight improvement, the fact is that broadband in the area is insufficient to the needs of the new reality of online sales, global collaborative work platforms, teleworkers, telemedicine and distance learning.

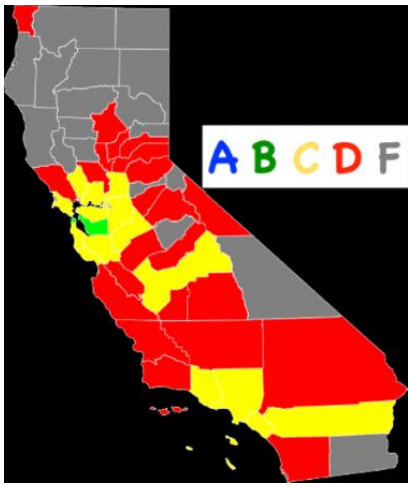


Figure 1: California Broadband Infrastructure Report Card, Tellus

Note: In the Interim Final Rule of the American Rescue Plan (ARP) Broadband Rules (page ***No table of figures entries found.****71), it is stated that "eligible projects are expected to be designed to deliver, upon project completion, service that reliably meets or exceeds symmetrical upload and download speeds of 100 Mbps."*

As seen by the following Fiber Locator maps, neither Santa Ynez Valley nor other parts of Northern Santa Barbara County are well served with broadband:

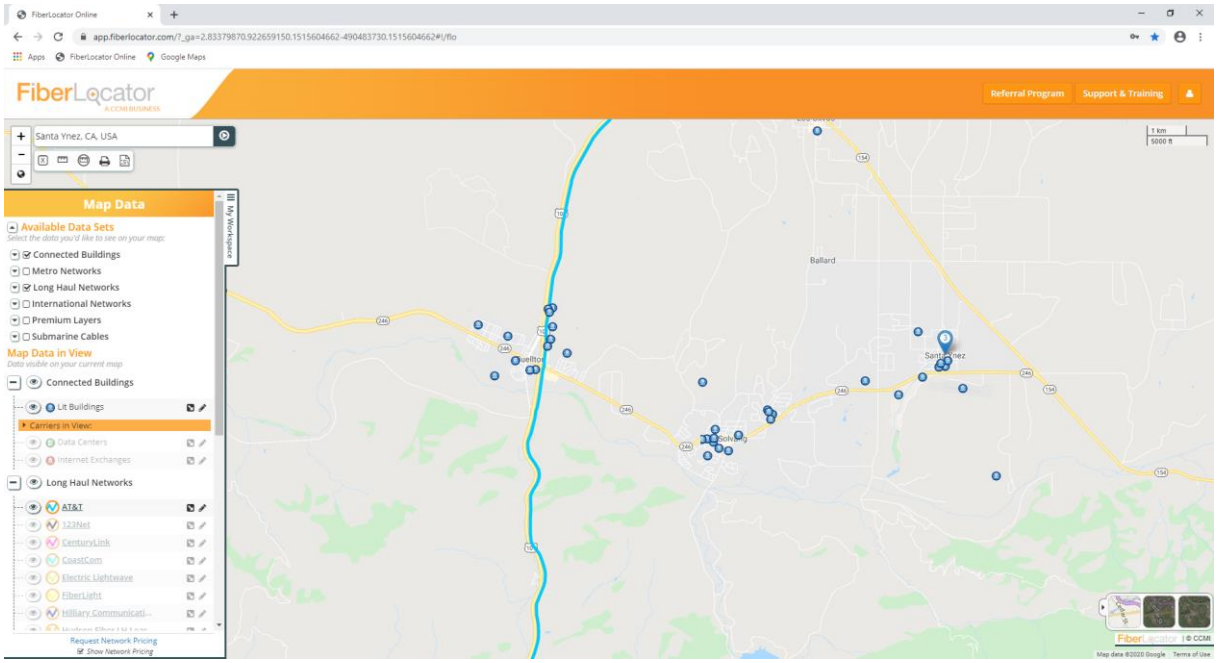


Figure 2: Santa Ynez Valley long haul

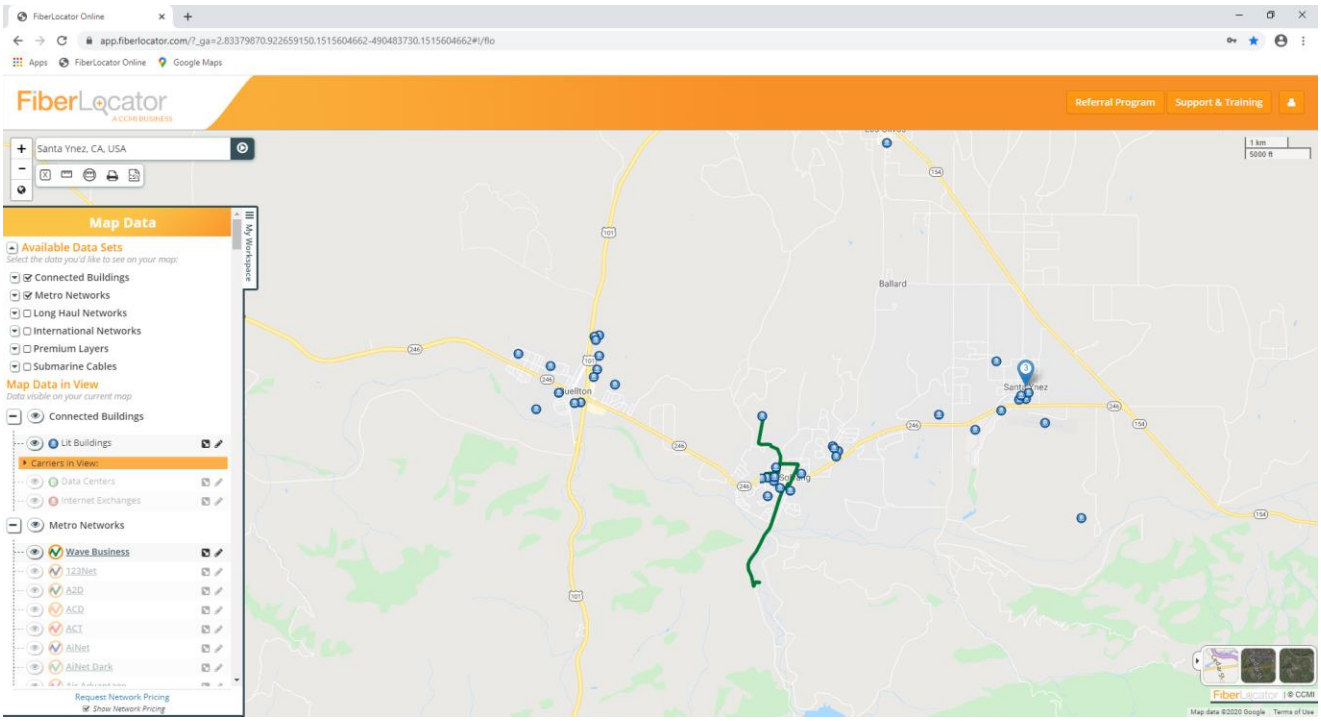


Figure 3: Santa Ynez Valley metro

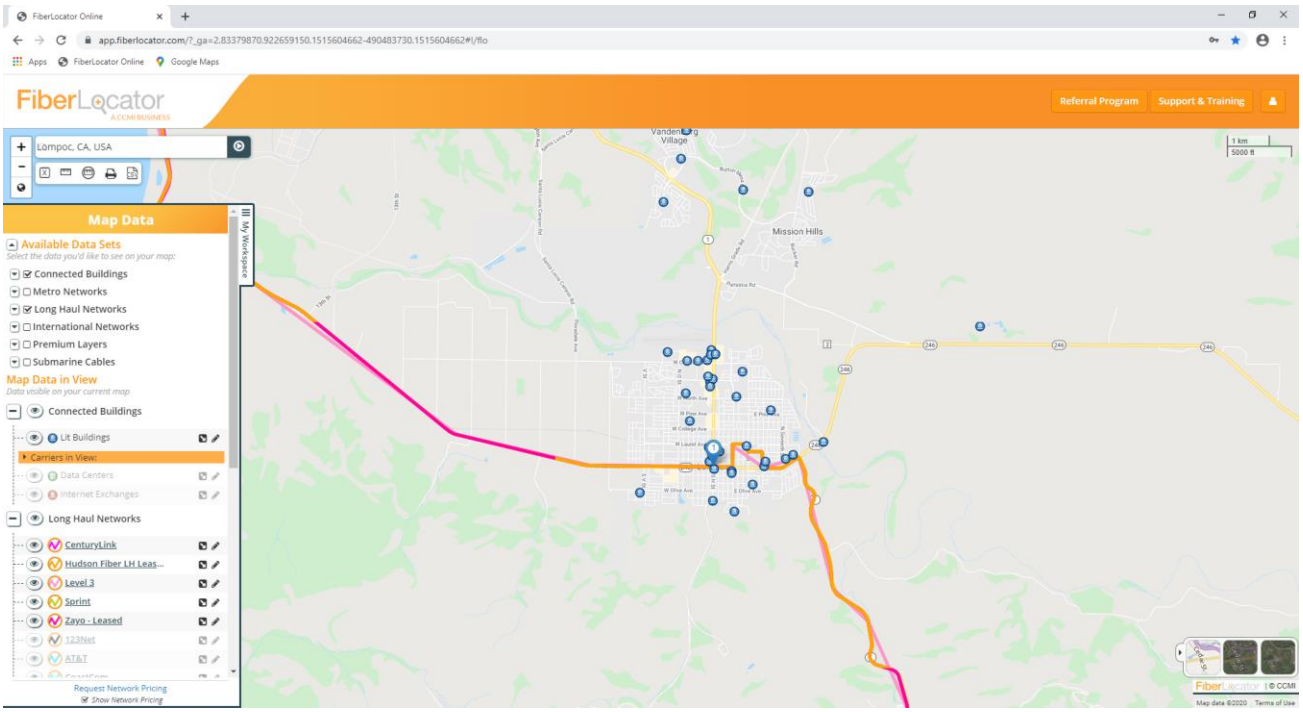


Figure 4: Lompoc Long Haul

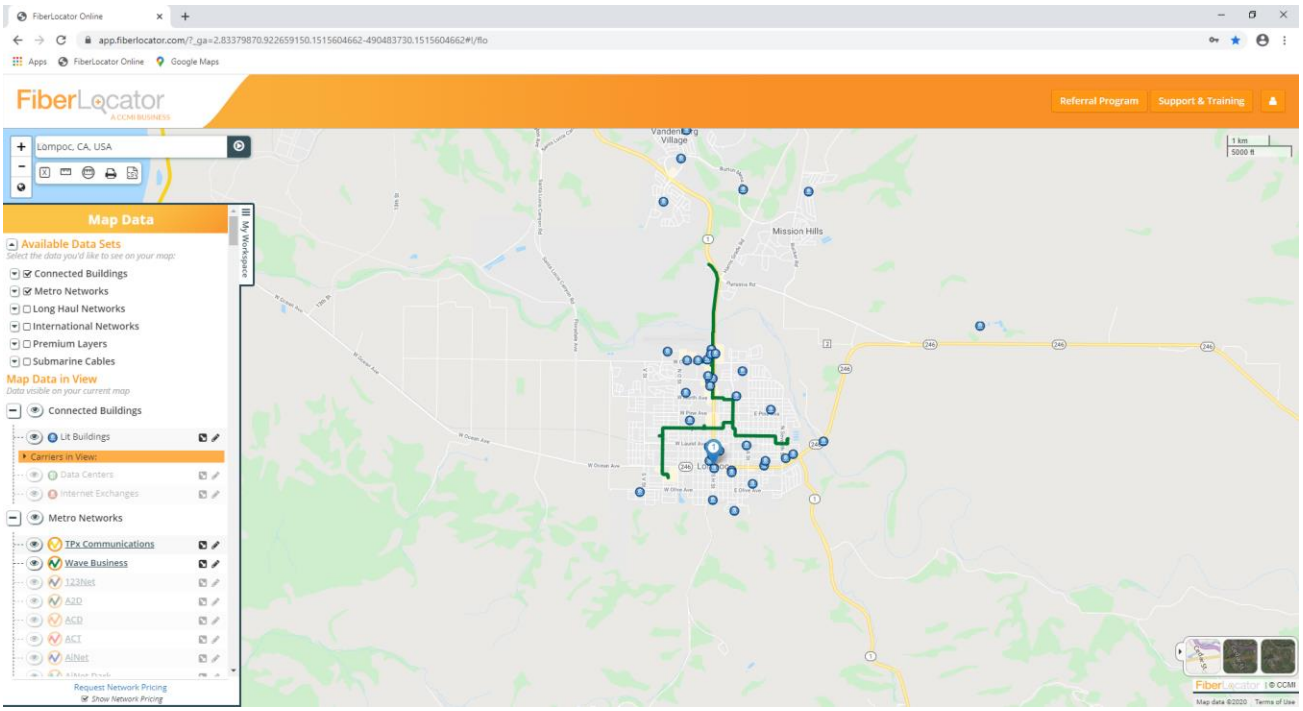


Figure 5: Lompoc Metro

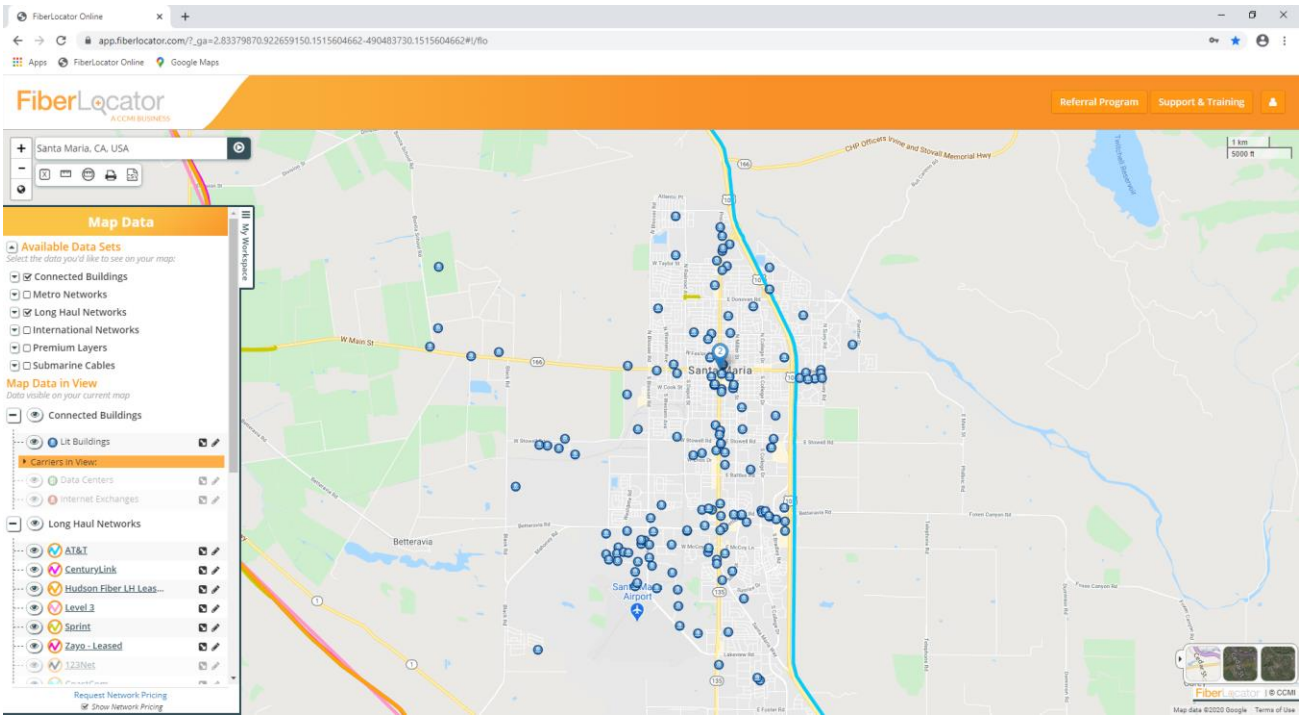


Figure 6: Santa Maria Long Haul

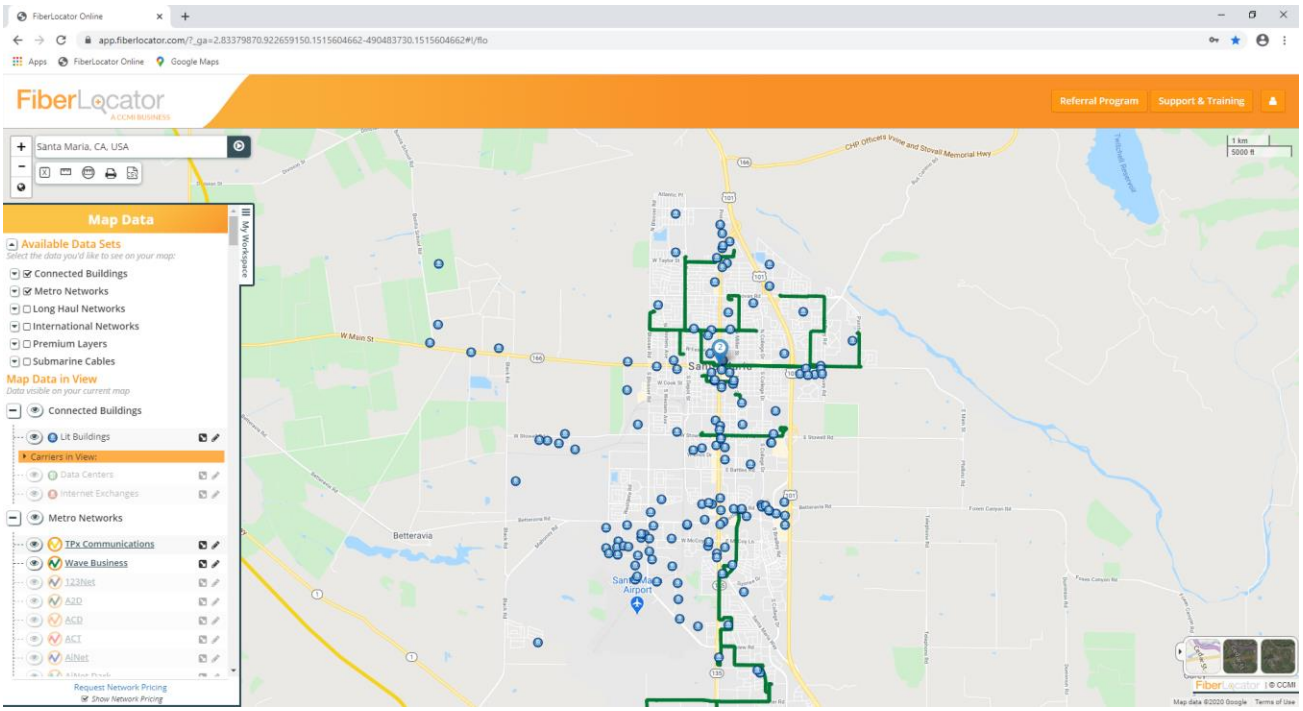


Figure 7: Santa Maria Metro

Other North County communities, e.g. the City of Guadalupe and the communities of Los Alamos and Cuyama communities, are similarly un or underserved.

Improved Northern Santa Barbara County infrastructure, such as the Northern Santa Barbara County Fiber Ring Network conceptualized by Chumash grant partner EconAlliance, is a broadband enhancement that is a key focus of both Chumash and Northern Santa Barbara County stakeholders. It supports job creation and the business attraction, retention and launch that foster economic vitality of the tribe, of the Santa Ynez Valley, and also of the other cities and communities in Northern Santa Barbara County and the broader region.

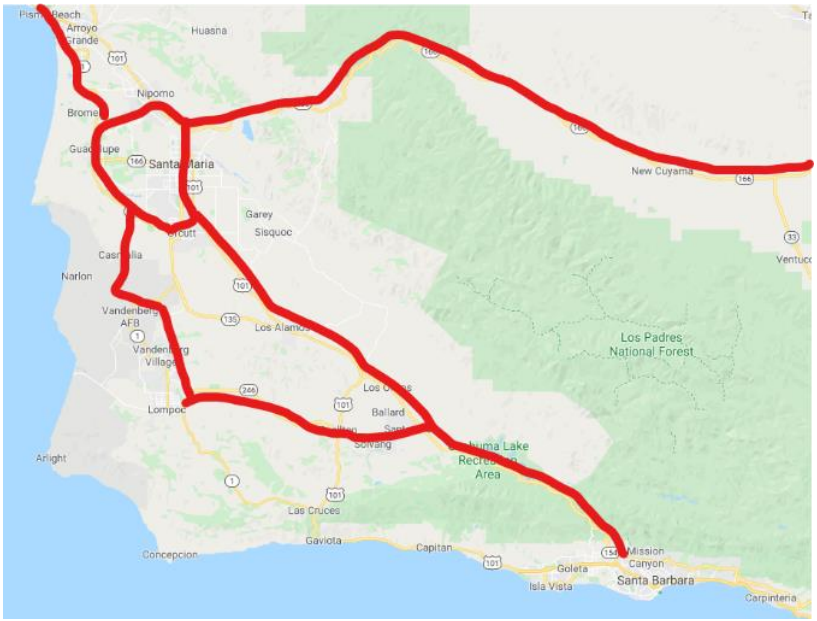


Figure 8: Notional: Northern Santa Barbara County Fiber Ring Network Concept

Tribal representatives have served on the Northern Santa Barbara County Advisory Group for the Broadband Consortium Pacific Coast since the Group's inception, working cooperatively to address Chumash, Santa Ynez Valley, and North County broadband enhancement needs and to support development of the Northern Santa Barbara County Fiber Ring Network which would benefit them all.

The broadband interface between the Chumash and the Santa Ynez Valley, and ultimately all of Northern Santa Barbara County, took an even more positive turn upon the award by the Federal government of dedicated Tribal 2.5GHz spectrum to the Chumash, spectrum which will benefit at least the Township of Santa Ynez as by default it needs to cross over the Santa Ynez community to connect traditional and new Chumash Tribal lands recently placed in trust. Any new fiber laid on or to the Reservation to enhance Chumash broadband connectivity in effect will also enhance broadband in Santa Ynez Valley and serve as a "first leg" of the Northern Santa Barbara County Fiber Ring Network.

The Chumash serve on numerous other NSBC and regional boards addressing the economic vitality, infrastructure, workforce development and other common needs of Northern Santa Barbara County, an area boasting a diverse industry portfolio and great potential, but also featuring seven Opportunity Zones within its footprint.

NSBC hosts Vandenberg Space Force Base (Vandenberg Air Force Base until 2021), one of the nation's two most critical space launch complexes. VAFB supports Department of Defense polar launches and ICBM missile testing, as well as NASA civil launches and commercial launches for global corporations. The Base has a stated goal of becoming a "spaceport of the future", catering to the commercial space business opportunity projected to grow exponentially, with the Base projecting economic impact of its traditional and new space support being estimated at $2.4 billion.

Despite its being in a high-tech sector, VASB itself struggles to provide broadband at the speed of today's business demands. (In 2020, Chumash grant partners EconAlliance and the Broadband Consortium Pacific Coast were asked by the Base IT leadership to support Base broadband enhancement efforts through market research with telecom providers.)

As cited in the Tribe's Comprehensive Economic Development Strategy (CEDS), Chumash Tribal leaders are considering support options for a proposed multi-million-dollar space destination attraction/space education center in Lompoc which leverages Lompoc's proximity to Vandenberg. This investment would give the Chumash linkage to the City of Lompoc and further the Tribe's tourism opportunities for its Kita Winery, based just outside Lompoc.

All six of Santa Barbara County's American Viticultural Areas (AVAs), are located in Northern Santa Barbara County, including that in which the Chumash Kita Cellars are located (Sta. Rita Hills AVA). Wine grapes are the County's second largest crop and NSBC is home to about 250 wineries and 95% of the County's vineyards.

Most of Santa Barbara County's $2.8B ag community, boasting over 100 commodities with exports to 40 countries, is in Northern Santa Barbara County and in normal times provides approximately 25,000 jobs. While strawberries are the North County's premier crop, wine grapes are second and row crops and nursery products fall consistently in the top ten. It is worth noting that many of the NSBC employees working as field workers in the ag and wine business transition to hospitality workers, staffing hotels and restaurants such as those owned by the Chumash.

The NSBC region also features a significant manufacturing industry, a 100-year-old energy industry, and has struggled to welcome an emerging IT sector, hampered by insufficient or non-existent connectivity. Growth, effectiveness and innovation in these non-agricultural industries and sectors are not able to be maximized due to the area's broadband limitations.

The shortcomings of Northern Santa Barbara County's high-speed internet and connectivity infrastructure (broadband) have been brought into sharp focus through the lens of the COVID-19 disaster. In addition to impacts on healthcare and education, hospitality and retail, key industry sectors important to both NSBC and the Chumash, have been significantly impacted.

Impacts on hotels and restaurants are well understood, but the lack of robust, reliable connectivity, and in some cases the lack of any internet at all, has also impacted the area's ability for retailers and wineries to thrive.

In the Chumash-adjacent City of Solvang, for example, which normally welcomes over one million visitors a year, 2020 saw days in which less than 25 visitors were to be seen in the entire town. For various months in 2020 and the start of 2021, 100% of the tasting rooms of over 200 wineries, in addition to restaurants, bars and other visitor-serving businesses, were shuttered or severely restricted by the State, throwing thousands of hospitality workers out of work.

Northern Santa Barbara County broadband inadequacies hindered retailers in transitioning from just "Main Street" retail to offering products online to a global market. Wineries commonly generating over 50-80 percent of their revenue from tasting rooms faced not only the usual shipping and exporting obstacles in transitioning to online sales, but also the NSBC broadband issues.

North County's three hospitals and string of Community Health Centers (CHCs) are now, due to COVID-19, forcefully implementing telehealth options, as is the Chumash Tribal Health Clinic. Hospitals are either offering or exploring telesurgery for the future, as well. While the Chumash Clinic connectivity is currently acceptable, Tribal health services, as well as those of Northern Santa Barbara County, will no doubt have increased broadband needs as healthcare migrates increasingly to virtual platforms.

The seven Opportunity Zones of Northern Santa Barbara County (NSBC) include three in Santa Maria, the largest city of the County, three in Lompoc, adjacent to Vandenberg, and one in Guadalupe, a community comprised of many disadvantaged farm workers. Many Chumash Casino employees come from these areas, so much so that the Chumash operate bus pick-up stops in Santa Maria and Lompoc. At the height of the pandemic, in April 2020, unemployment in the three Opportunity Zone cities skyrocketed. Lompoc unemployment, for example, was at 19.1%, Santa Maria at 11.7% and the ag community of Guadalupe was at 11.7% (*source: California Employment Development Department-EDD).* Many Chumash Casino and hotel employees were furloughed or terminated.

The 2019 per capita income in Santa Ynez township, adjacent to the Chumash reservation, was $50,400, but according to the American Community Survey 2019-1 Year Estimates (ACS 2019), the average per capita income in the three North County cities housing NSBC Opportunity Zones is only $19,374 in comparison to the U.S. per cap of $35,672, while the average per capita income of all five of the incorporated cities in Northern Santa Barbara County is $27,940 (ACS 2019).

In the United Ways of California pre-COVID report *Struggling to Stay Afloat, The Real Cost Measure in California 2019,* authors demonstrate that the poverty rate in most California communities is much greater than national poverty rates indicate. While the U.S. poverty rate is determined mostly by food costs, the United Ways of California *Real Cost Measure* analyze the "real cost" of living in California (community by community) by considering not only food costs, but housing, transportation, health care, childcare and other basic needs. In this analysis, over 35% of Santa Barbara County residents do not meet the report's $75,000+ household income level required to meet basic needs. The greatest number of these residents reside in Northern Santa Barbara County, as shown by the area's Opportunity Zone locations.

There is a direct correlation between education and poverty and in this regard, Northern Santa Barbara County is at a disadvantage. While NSBC is home to Allan Hancock College, a highly respected California community college, and is situated nearly midway between two world-renowned universities - California Polytechnic University San Luis Obispo (Cal Poly) and University of California Santa Barbara (UCSB), NSBC suffers from a lack of four-year degree program access. North County actively engages in seeking to attract other four-year degree programs accessible to more students than Cal Poly and UCSB, and the Chumash Education Director has expressed an interest in hosting university coursework in the Chumash Education Center to afford access to Chumash Tribal members potentially interested in university degrees.

As mentioned above, possibly the four greatest current economic opportunities of Northern Santa Barbara County – Chumash business expansion, Vandenberg's "Spaceport of the Future", Santa Maria Public Airport development, Opportunity Zone development - all have

an important nexus with the Chumash, and none can be fully maximized currently due to a lack of affordable broadband.

However, the lack of robust, state-of-the-art, reliable broadband on Chumash lands and in Northern Santa Barbara County already is considered an NSBC priority and it can be further addressed cooperatively through Chumash partnerships with the organizations, communities and service providers who have been working this issue for the benefit of the residents, economic stakeholders, and visitors of Northern Santa Barbara County.

Introduction

Purpose of Grant Broadband Strategy and Feasibility Study

The Feasibility Study grant provided by the U.S. Department of Commerce Office of Indian Energy and Economic Development (IEED) for development of a Tribal broadband strategy was designed to "improve quality of life, spur economic development and commercial activity, create self-employment opportunities, enhance education and distance learning, and meet emergency and law enforcement needs by bringing broadband services to Native American communities".

The Scope of Work for which the IEED contracted with the Santa Ynez Band of Chumash Indians was "a feasibility study to develop a strategy to connect the traditional Chumash Reservation with new Reservation lands at Camp 4, providing broadband to the current underserved reservation area and the new unserved reservation area recently placed into Trust by the Tribe."

"The immediate benefits of broadband deployment will be harnessing opportunities for technology for current and future Tribal residents of the reservation, enabling opportunities for telework, distance learning, telemedicine, and other quality of life" aspects.

The goals of the Chumash broadband feasibility study are to:

- Create an effective strategy to support the enhancement of broadband services to the Tribal members who are currently or will eventually be residing on Tribal land.
- Evaluate feasibility, broadband delivery options, and possible routes for an extension of existing service to the underserved residential portion of the existing reservation and to the newly acquired Tribal lands at Camp 4, which is currently unserved.
- Identify connectivity issues and potential solutions to ensure enhancement of Chumash service delivery to Tribal members (healthcare, education, etc.)
- Support acquisition of newly available licensed spectrum being awarded through the FCC's Rural Tribal Priority Window offering 2.5 GHz spectrum to American Indian tribes.
- Recommend connectivity enhancements to better support existing Tribal businesses
- Facilitate greater access to broadband for Tribal businesses to be located on traditional Chumash reservation land and on new Tribal lands and in the local community. As an active participant in the local community, the Chumash will design a Tribal broadband strategy that will support not only the reservation, but also local economic, educational, infrastructure, and community development initiatives.

Objective 1 (Process): *Provide a strategy for broadband deployment & support.*

- *Assess the current state of broadband capabilities, including current gaps & community needs.*
- *Integrate potential opportunity resulting from the availability of 2.5 GHz spectrum.*
- *Apply best practices to create a shared roadmap.*

Objective 2 (People): *Accelerate broadband adoption.*

- *Determine the level of overall community awareness of broadband capabilities.*
- *Create a sense of urgency for broadband deployment and the development of digital literacy.*
- *Develop Tribal advocates and community stakeholders for adoption.*

Objective 3 (Technology): *Identify broadband infrastructure needs, potential applications.*

- *Validate the current and create a potential future topology of broadband infrastructure for Tribal lands.*
- *Create a technology map that describes what exists, current gaps, and potential future applications.*
- *Create an investment strategy to acquire tools and technologies for development of future capabilities.*

Overview: Santa Ynez Band of Chumash Indians

The Santa Ynez Band of Chumash Indians (Chumash) is a federally recognized tribe of 113 Tribal members and 1,200 lineal descendants. Over 200 Chumash Tribal members live in 100 homes on the original reservation.

Tribal lands are situated 20 miles north of Santa Barbara in northern Santa Barbara County, and is accessible by Highways 154 (the Chumash Highway) and Highway 246. The lands are adjacent to the township of Santa Ynez and the City of Solvang.

In 2019, the tribe placed an additional 1,411.1 acres in new trust lands; this land is referred to as "Camp 4" and is expected to have 143 new homes as well as support some agricultural activity.

The Chumash own and operate the Chumash Casino and Resort, the Hotel Corque and Hadsten House hotel properties in Solvang, as well as the Kita Winery in the nearby Santa Rita Hills. The Santa Ynez Band of Chumash is a member and supporter of hundreds of community organizations and is a leader in both the economic and philanthropic sectors of Santa Barbara County and the region. Its

What the Chumash Tribal Community currently lacks is adequate broadband and cellular coverage to support many of the technology platforms that are needed for everyday life and competitive business activities. The lack of adequate coverage also hinders the work of security personnel and first responders who are often challenged in meeting security, emergency and law enforcement needs by weak and/or unreliable signal strength on both Tribal lands and in the Chumash facilities sited in nearby Northern Santa Barbara County communities.

Methodology

The broadband feasibility study development featured a 3-step process:

1. The first step involved both qualitative and quantitative research.
2. Analysis of this information led to a comprehensive understanding of the current state as well as immediate needs. The collection of survey and interview data also provided an understanding of emerging and anticipated requirements.
3. From here, a review of recommended potential strategies (options) and comparison factors (Strategy Options Analysis Table) was created to facilitate Tribal leadership decision-making.

Process Elements and Flow

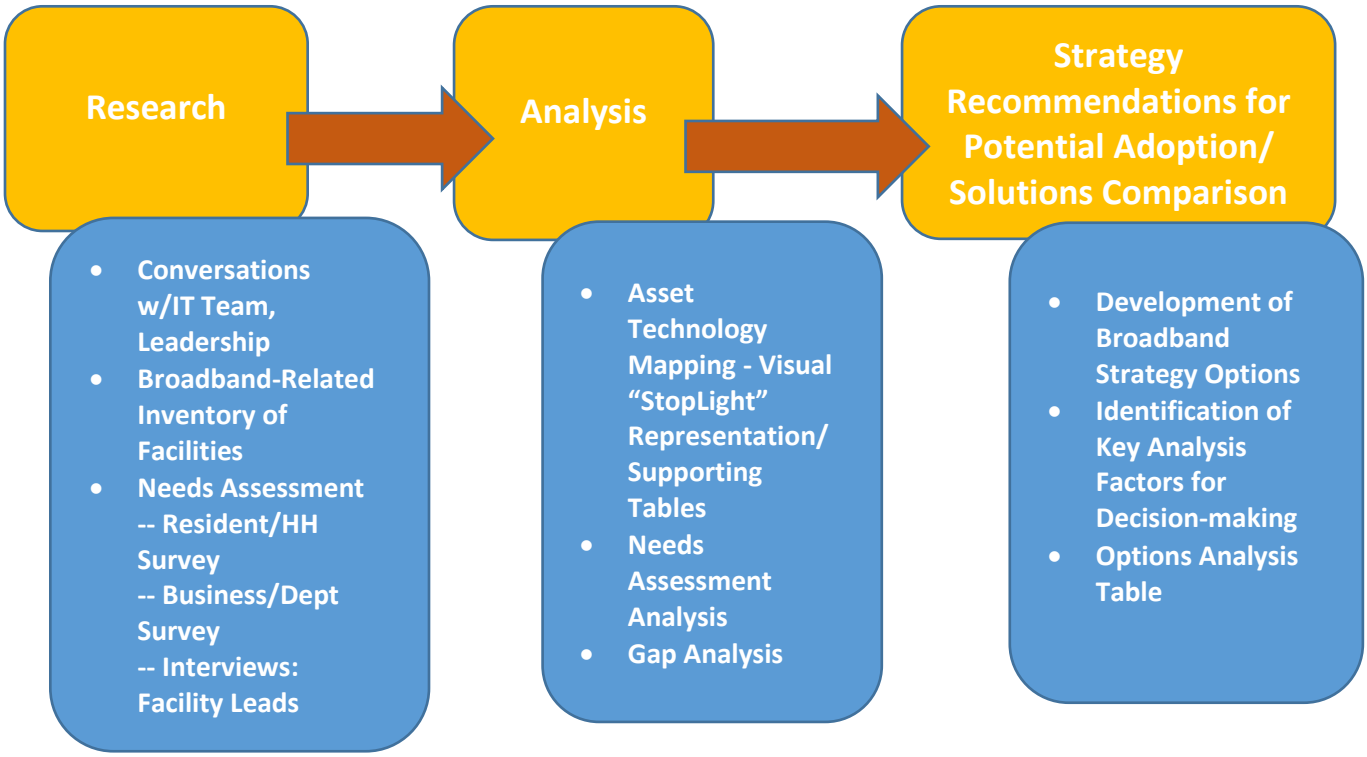


Figure 9: Methodology Elements and Process Flow

Broadband Connected Facility Inventory & Asset Technology Mapping

An inventory of the broadband assets at the Tribal facilities was performed. The facilities were organized in a "stoplight" graphic (page ___) that was color coded to indicate the adequacy of the existing connectivity. This visual representation enabled a simple way of highlighting problem areas and priorities. A survey question of facility leads or support personnel contributed information on the download and upload speeds of each Chumash facility asset.

Additional information gathering from the IT team regarding service providers, types of service, contracts, etc. facilitated a foundational understanding for the remainder of the grant work.

Tribal Needs Assessment

The Tribal needs assessment was comprised of two perspectives – those of the Tribal business enterprises/ service departments and those of the Tribal residents/households. To assess potentially diverse needs, two separate surveys were developed and administered:

The business enterprise/department survey (Appendix B) was distributed to 12 Tribal leaders, executives, and managers of either Tribal business entities (i.e. the casino, hotels, etc.) or Tribal service domains (i.e. HR, Education, Clinic, etc.). Business entity/department survey respondents were offered a follow-up interview to clarify or enhance their survey input. Appendix A summarizes the results from each question of this survey. Interview input was synthesized and incorporated into the overall needs assessment (see page___), with Highlights of the Business Entity/Department Interviews appearing in Appendix E.

The Tribal resident/household survey summarized in Appendix D was distributed to 58 Tribal members living on the reservation. Twenty-four responses were received for an impressive 41% response rate.

Gap Analysis

From needs assessment and asset inventory data, ideal versus actual states related to broadband were compared, with gaps identified and next steps articulated in a Gap Analysis Table.

Tribal Broadband Strategy Options, Decision-Making Factors, Options Table

Due to finding a greater number of enhanced broadband strategy options than expected, with decision-making considerations quite possibly unique to Tribal perspectives and priorities, Study partners elected to articulate all identified strategy options, contributing suggested decision-making factors and an Options Analysis Table for Tribal leadership use in narrowing the field. It is quite good news to have found so many potentially viable strategies, as this fact could support a greater number of funding opportunities, as well.

Chumash Tribal Spectrum Update

FCC Rural Tribal Priority Window Opportunity

As mentioned previously, the Tribe applied for spectrum through the FCC's 2.5 GHz Rural Tribal Priority Window ("RTPW"). The 2.5 GHz band is suitable for both mobile coverage and fixed point-to-point uses and is currently used to provide broadband service by legacy educational licensees and commercial providers that lease the spectrum.

To facilitate RTPW Tribal applicants, the FCC established reservation maps. The SYBCI map included the 137-acre existing reservation ("Old Reservation") but did not include the additional 6.9 acres Museum parcel ("Museum") and the Camp 4 annexations. It also did not include the fee lands that the Tribe owns in Santa Ynez. For all lands not on the FCC map, the Tribe requested waivers from the FCC and was required to show a local presence for the Tribe.

The Tribe applied for the spectrum for the "Old Reservation" in application 0009169139 which was granted on January 4, 2021.

The Tribe applied for waivers for the Museum and Camp 4 parcels plus for the Tribal lands in between these 2 parcels; this was necessary for contiguous transmission/routing of broadband between both parcels. The Tribe applied for waivers for all three (3) parcels by application Nos. 0009169131, 0009169143, 0009169146 Santa Ynez Band of Chumash Mission Indians, Eligibility and Local Presence Exhibit and Request for Waiver (collectively the "Waiver Requests"). The Waiver Requests were all approved by the FCC Memorandum Opinion and Order dated March 1, 2021. DA-21-247A1.pdf (fcc.gov)

On March 9, 2021, the FCC Wireless Telecommunications Bureau granted the three remaining applications from the Santa Ynez Band of Chumash Indians. The call signs of the licenses are WRKZ447, WRKZ448, and WRKZ449.

Tribal Broadband Facilities Analysis

The broadband asset inventory included identification of Chumash-owned facilities and the level of broadband or other service they "officially" feature. For analysis, comparison was also made with what facility users are experiencing on the ground* (survey and/or interview information). Findings are presented in a map and a "stoplight" graphic depicting the Tribal facilities. Facilities are color-coded to allow for quick identification of problem areas and priorities. As might be expected in a stoplight image, the colors are as follows:

- Green indicates the site is well-connected with services that are somewhat scalable for the near future.
- Yellow sites depict locations where service availability is limited and less than the bandwidth desired for current needs.
- Red sites have unacceptable bandwidth and options or are unserved.

While several of the sites in the stoplight graphic on the next page show "green" or "Acceptable" connectivity service level based on purchased services, it is noteworthy that there is variance in this service in comparison to speeds documented at the site. Speed data garnered from "on the ground" users in those facilities was often quite different. (See table of on-site speeds reported below Facility table)

If on-site speeds recorded rather than purchased speeds were used as the metric for the stoplight graphic, of the six "green" or "Acceptable" sites shown* in the Facility table, only the Chumash Casino, the Chumash Resort and the Clinic would fall into the "Acceptable" range (while Clinic would be "Acceptable", the rest of "Santa Ynez Reservation" - e.g., residences - in the Facilities table would not).

While most of the facility inventory includes only Chumash business entities (e.g.Resort, hotels), or Tribal member service sites (Education/Learning Center, HR), the "facility" labeled Santa Ynez Reservation includes both the Clinic, with satisfactory service at a documented 500 Mbps, and Tribal residences. While not indicated in following tables of the asset inventory, Tribal member survey respondents reported upload and download speeds at their homes on the reservation (See Household Survey Analysis, Question 6). Of the ten respondents reporting upload speeds, four indicated only "high" or "slow", six documented speed tests at their homes. Average household upload speed for six reporting: 19 Mbps. Ten respondents reported download speeds of between 55 and 404 Mbps as tested at the residence. Download speed of those reporting averaged 234 Mbps. At an average of 19 Mbps up and 234 Mbps down, Chumash Reservation residences are severely under-served.

It should be mentioned that both the variance in facility "official" speeds and on-site speed tests as well as the Chumash residential connectivity service issues described above were further validated by non-speed-related survey questions regarding service satisfaction.

*"On the ground" speeds at Chumash Santa Maria and Lompoc bus stops have not been tested

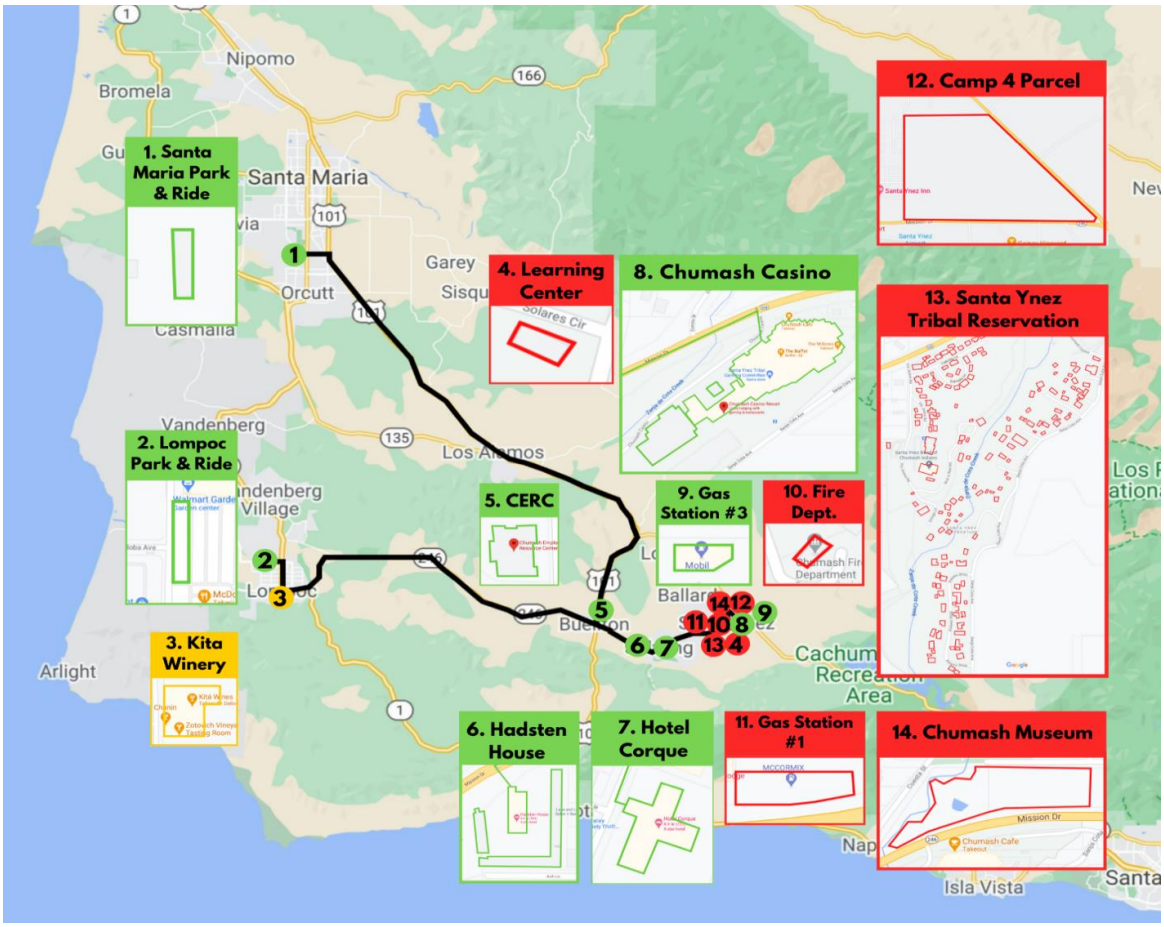


Figure 10: Asset Inventory Map and "Stoplight" Image

Green – Acceptable Service Levels	
1. Santa Maria Park & Ride	50 Mb Cloud Metro Ethernet
2. Lompoc Park & Ride	50 Mb Cloud Metro Ethernet
5. CERC	1GB Ethernet Cloud Solution (Back to the Casino)
6. Hadsen House	100 Mb Cloud Metro Ethernet
7. Hotel Corque	100 Mb Cloud Metro Ethernet (Fiber to restaurant)
8. Chumash Casino	Redundant Dual 500 MB Fiber (Comcast / AT&T)
9. Gas Station #3	50 Mb Cloud Metro Ethernet
Yellow – Functional, but Limited	
3. Kita Winery	200 MB Business Class
Red – Unacceptable / Unserved	
4. Learning Center	Point to Point Wi-Fi to Tribal Clinic
10. Fire Department	Point to Point Wi-Fi to Tribal Fire Department
11. Gas Station #1	1.5Mb T1
12. Camp Four Parcel	Not developed
13. Santa Ynez Tribal Reservation	500 MB for the Health Clinic – Otherwise local offerings
14. Chumash Museum	In development – Anticipate 100 MB solution

Figure 11: Inventory Asset Service Description

Note: Speeds identified for the CERC Human Resources center in the "official" data above show a contracted simultaneous speed of 100 Mbps up and down, while the Chief HR Director on site documented only 129.39 Mbps uploading and 296.30 Mbps downloading speed (wired/Frontier). Wireless was much worse. The data below, compared with that above, indicates a significant variance in what is assumed and what users are experiencing.

Chumash Enterprise: Internet Speeds				
Wired Upload (Mbps)	**Wired Download (Mbps)**	**Entity (ies) or Domain**	**Wireless Upload (Mbps)**	**Wireless Download (Mbps)**
19.3	72	Division- LLCs Hotel Corque	3.9	47
17	73.5	Division LLCs Hadsten House (Hotel)	18	56.47
		Education Department	6.9	32.8
		Chumash Fire Department	22.9	180
500 - Comcast 500 - AT&T	500 - Comcast 500 - AT&T	Chumash Casino & Resort		
129.39 Frontier	296.30 Frontier	Human Resources Chumash Employment Resource Ctr (CERC)	TBA	24.27
		Tribal Clinic	500	500
309.5	432.7	Casino: Technology Svcs		
		Chumash Gas Station	38.3	48.6
	3.1	Casino: Strategy Div		

Figure 12: Facility Asset On-Site Speeds

Broadband Needs Assessment

As mentioned in the Methodology, the needs assessment was comprised of 2 elements and 2 separate surveys: a Chumash business enterprise/service department survey with follow-up interviews and a Chumash household survey of residents. The Business/Department Survey (Appendix B) was developed as an in-depth look at the applications needed by the entity or department, with survey questions and interview points of coordinated with the Tribe's IT team. The Household survey (Appendix D), also developed in coordination with Chumash IT, was developed to determine typical household usage and needs. Surveys were administered from mid-March through mid-April 2021.

Tribal Business Enterprise/Department Survey

The following table lists the key contacts who participated in the Business Enterprise/Department survey, with the facility or department they were representing listed as well. Interview dates are also shown (interviews summarized on p. _____).

Bus Entity/Dept Survey Submitted	Entity (ies) or Domain	Survey Respondent	Interview Date
3/22/21	Division- LLCs Hotel Corque Hadsten House Hotels	Scott Gold, Director	3/26/21
3/23/21	Chumash Fire Department	Joseph Zavalla, Fire Chief	3/23/21
4/02/21	Education Department	Dawn Valencia, Director	4/09/21
4/02/21	Chumash Foundation	Veronica Sandoval, Chief Operations & Communications Officer	
4/05/21	Chumash Casino & Resort	Kyle Schaffer, Director IT Infrastructure	4/05/21
4/05/21	Human Resources	Dan Nogal, Chief HR Officer	4/07/21
4/05/21	Tribal Clinic	Nathan Hawk, IT Security Specialist	4/07/21
4/05/21	Strategy Division	Halise Ekmen, Chief Strategy & Performance Mgmt Officer	4/16/21
4/06/21	Santa Ynez Band of Chumash Indians	John Elliott, CEO	4/16/21
4/14/21	Technology Services	Michael Figueroa, Audio Visual Supervisor	4/19/21
4/16/21	Chumash Cellars (Kita Winery)	Michael Figueroa	4/19/21
4/16/21	Santa Ynez Chumash Museum & Cultural Center (in development)	Kathleen Conti, Director	

Figure 13: Business/Dept. Survey/Interview Contacts

Key Findings from the Business Enterprise/Department Survey

The findings from the Business Enterprise/Department survey are summarized as follows:

- There are many Tribal locations that are unserved (Camp 4, new Tribal lands), underserved (Chumash residences on Reservation), or lacking reliable adequate service (e.g. CERC, Education Center, Fire Station, Kita Winery, hotels)
- Responses to Business Enterprise/Department Survey "speed" question shows a significant variance of user speeds at the site from reported purchased speeds, indicating that the Tribe does not have the control it needs over its connectivity
- Tribal business and service entities are not well-positioned for new or emerging applications, enterprises or Tribal member support service expansion (e.g., new Tribal ERP platform, increasing cloud-based applications, Internet of Things (IOT), Education Center's possible University programs, potential new duties for Chumash Fire Department, etc.)
- The Internet services the tribe has today are not Service Level Agreement (SLA)-based, thereby leaving the tribe vulnerable to performance issues and outages. SLA-based services would give the tribe greater reliability than it has today
- In lieu of owning its own fiber, having additional carrier and service options would be beneficial to the Tribe, potentially addressing purchased vs received services
- The opportunity to have fiber-based options should be pursued
- Considering additional ISP options would also allow the Tribe to build redundancy into its network
- Gigabit service across all Tribal enterprises would enhance current service and support all current and projected near-term needs

Key Findings from Business Enterprise/Department Interviews

- The remoteness of the reservation causes there to be limited ISP carrier options with limited and/or costly service offerings. As a result, ISP solutions have accordingly become transactional rather than strategic.
- Tribal business enterprise and Tribal member support services growth are increasing the number of transactional solutions, complexity of service, IT efficiency, and creating more of a challenge in providing a comprehensive, streamlined strategy scalable to meet growing Tribal broadband needs and opportunities.
- Adequate service today does not imply satisfactory service in the near future, as on-premise assets such as the new Chumash Enterprise Resource Planning (ERP) platform and other cloud-based solutions, as well as off-site opportunities such as potential off-site gaming, will require greater bandwidth and speed
- Software as a service migrating to platform as a service, may need new carrier for "platform as a service"
- Numerous Tribal areas are unserved (newly acquired lands) or under-served (Reservation residential, Education/Learning Center). See Facility Inventory above

- Broadband asset ownership never previously considered, as assumed that costs of entry would be cost-prohibitive. Knowing that provider costs are increasing and that transactional leasing can never capitalize on best pricing, Tribe's IT department has also learned that the Tribe now owns 2.5GHz spectrum awarded by Federal government, that grants are available for broadband infrastructure development, that other Tribes own and sometimes enjoy a healthy ROI on Tribal-owned broadband assets, so owning fiber or other broadband assets is no longer off the table – asset ownership would allow for Tribal broadband to grow and expand as needed and already owning its own equipment, time to ROI may only be two-three years
- Fiber to individual Chumash facilities probably still too expensive when spectrum may suffice or be equivalent
- Wifi modernization needed; only hard-wired sites (e.g., Casino, Clinic) seem to have reliable connectivity
- Telework will be ongoing, will expand, CERC will be requiring as space becoming a premium (50% of workers at home; 50% in office). Videoconferencing and teleconsulting are Tribal cost-savers
- A Chumash key carrier (Frontier) is currently in bankruptcy proceedings
- Guest experience, guest expectations, proximity marketing key competitive factors that must be met for growing Chumash visitor-related service revenue
    - Current guest dissatisfaction with Hotel Corque/Hadsten House connectivity.
    - Families now bringing minimum of four devices (Corque x122 rooms + lobby, pool, etc., Hadsten House
    - Geo-fencing or proximity marketing also requires high bandwidth/speed at hotel/Resort locations
- Connectivity issues of special (safety/security) concern:
    - Internet drop-offs during high-traffic events or peak times (issues create security concerns)
    - Residents without landlines cannot get them from Frontier ("port is full"); cell phones go out with electricity outages because Casino generator does not power cell tower on top of Casino (security concern)
    - Cell phone usage in Resort/Casino, hotels
    - Internet issues, slow speeds at hotels
    - Fire Department internet drops (often Mondays, plus 2x/week)
    - Employee Verizon cell users without access in certain areas, in emergencies need to send/receive calls on personal (non-Verizon) cell phones
    - Residents without landlines entirely dependent on internet and cell phone in emergency, cannot get landlines unless another resident gives one up (Frontier claims to be out of "ports"); only cell service that works in residential area is Sprint; Sprint tower on Casino not energized during outages, presenting residents with no internet, no cell service when electricity

is out unless they have a landline (Note: HR states eventually employees will take training on phones, have access on phones to Employee Handbook, time-off requests, etc., so HR impact as well for residents who are also employees)

- Tribe needs to ensure that new acquisitions come under IT connectivity control
- Lack of single strategic solution (single platform, Service Level Agreement (SLA) or and/or asset ownership and current connectivity gaps or unreliability creating significant Tribal inefficiencies, probably increased overall costs of doing business, costs of service
- Gigabit service across the Tribal enterprise – owned or leased – would solve many of the stated connectivity issues, if what was leased was what was actually available at the site (see variance mention above in Facility Inventory text)
- Planning for broadband needs of Tribal businesses, service entities and residents 5 years out is advisable (CEO) to meet already anticipated or potential demands:
    - Development of Camp 4 – new homes, RV park (entrepreneurship needs, business operation needs)
    - Clinic – advanced diagnostics
    - Chumash museum
    - Possible expanded role for Tribal Fire Department with Camp 4 development
    - Possible four-year university coursework at Education Center; remote educational services for Tribal member students distributed across U.S.
    - Increasing digitalization
    - Growing need for interconnectivity across enterprise

Key Findings from the Household Needs Survey

Fifty-eight (58) Tribal member households were surveyed regarding their current Internet service and family broadband needs; 24 of those households (40%) completed the survey.

Key findings:

- Important take-away: Tribal residents on the Reservation are greatly underserved for high-speed Internet. Over 78% of respondents had either unsatisfactory Internet service (52%) or no reliable Internet service (26%). Several respondents reported no internet services and only 22% stated that their internet service was satisfactory.

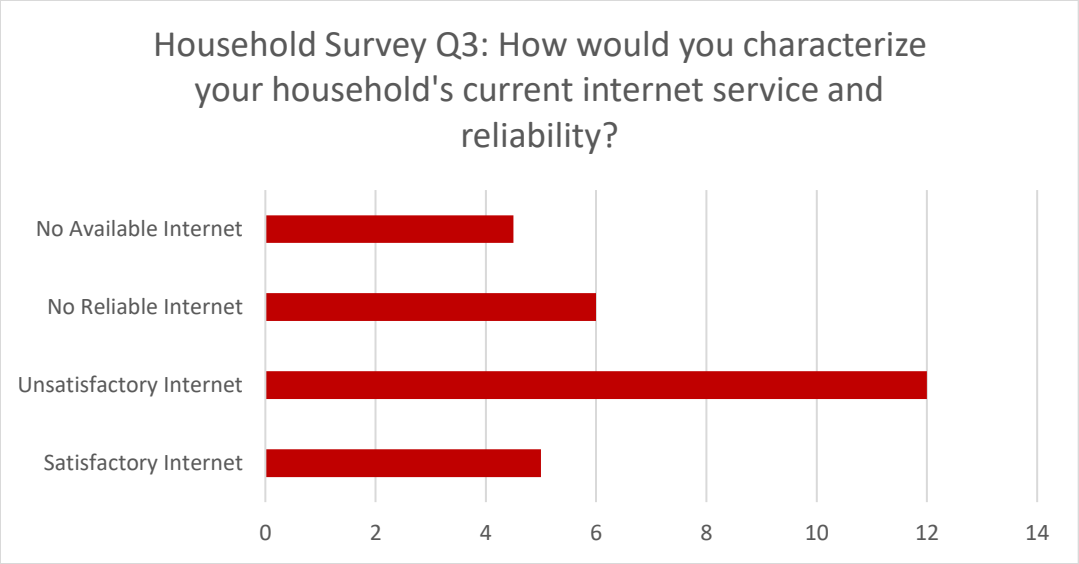


Figure 14: Household Survey Internet Service

- Average download speed of was 234 Mbps; upload speed averaged only 19 Mbps
- Households with home businesses or students are most disadvantaged
- Compounding issue that three-quarters of Tribal households either lack high-speed internet or are underserved is the fact that new Chumash lands earmarked for residential development are completely unserved
- With an average of 7 devices per household and 87% of households classifying their need for "Basic" internet/social media applications as "Great" or "Moderate", Tribal members have indicated that they are indeed robust internet users
- Probability for Tribal residents to expect greater access, reliability, and speed is fairly certain with greater than 50% of respondents noting their usage as "Great" or "Moderate" regarding video conferencing, video streaming, gaming, etc. (This is especially true for Tribal members who are also Chumash employees or members who are frequent users of the tribe's many support services)
- Since the tribe is undertaking a transition to enterprise software (much of which will be in the cloud), Tribal members will need much greater access, reliability, and speed to benefit from these Tribal improvements. A minimum of 500 Mbps will be required to access these cloud-based programs
- For telecommuters and residents with businesses, digital payments and credit card processing are key activities, 80% of respondents reported a "Great" or "Moderate" need for support of such activities
- Top item regarding expected needs for next five years: enhanced student access to internet, with greater speed and reliability
- Tribal member households with either home businesses, teleworkers or students are most impacted by being connectivity-challenged
- Suggestions for improving Tribal member household internet included two recommendations (1)Explore potential solutions of new internet providers and (2) Put Xfinity and Verizon towers on Casino parking structure

Gap Analysis

There are six main gaps in Chumash current connectivity profile:

- Several key areas are currently unserved completely (e.g. Camp 4) and other areas are significantly under-served or have reliability issues (existing residential area, Education Center, CERC, Fire Department, etc.).
- Tribal member service in existing residential area does not meet member expectations and presents the Tribe issues in serving its members in the areas of security, service delivery/efficiency, telework/entrepreneurship, educational opportunities, and leisure activities
- Customer expectations of the Tribe's key tourism-related, revenue-producing entities are not being met
    - Depending on carrier, guest cell users often need to go to lobby or valet area to make/receive calls at the Casino Resort
    - Internet at off-site hotels (Hotel Corque/Hadsten House) inadequate for guest applications – guests experiencing latency issues, drop-offs, downed internet. Note: Robust, reliable internet now an expectation as important as robust, consistent power
    - Geo-fencing/proximity marketing needs greater connectivity, speed
- Tribe now owns FCC-awarded 2.5GHz spectrum not yet deployed for Tribal benefit
- Tribe's new Enterprise Resource Planning (ERP) platform cannot be maximized at current connectivity levels; additional HR and cloud-based Tribal business/operating solutions projected
- Future connectivity needs are not yet being addressed

The following table provides the gap analysis:

Chumash Broadband Gap Analysis				
DOMAIN	**IDEAL FUTURE**	**CURRENT STATE**	**GAP**	**NEXT STEPS**
Tribal Facilities	Robust, reliable, equivalent, state-of-the-art connectivity across greater Tribal Enterprise: (a) uninterrupted service continuity across all sites, even during emergencies, peak times (b) accessible cloud apps all sites, all times (c) smooth cross-facility, outbound/inbound call service, smooth videoconferencing even in peak times (d) all inside/outside facilities state-of-art cell, & internet	Diverse connectivity platforms, service levels, issues	Numerous facilities experiencing inefficiencies due to lack of robust, reliable connectivity/broadband	Ensure gigabit service all locations; consider ownership of broadband infrastructure to maximize asset control and provide Enterprise-wide solution. Evaluate Tribal Broadband enhancement offerings in Options Table, this document, p.___ , with consideration for ideal futures articulated at left.
Tribal Member Service	See above, also for residences	Land lines, cell use, internet all w/issues or problematic	Tribal member daily life impacted by basic connectivity issues	See above
Customer Expectations	See Ideal Future above	Reliability and speed not meeting guest expectations; Indoor cell use issues	"Speed of life" connectivity not currently available at some Tribal visitor sites	See above
Spectrum Award	2.5GHz awarded spectrum providing Tribe cost/service benefits	Not currently deployed	Spectrum is available, but not yet deployed	Integrate 2.5GHz into Enterprise solution for benefit of Tribe
ERP, Proj'd Cloud Apps	See Ideal Future above	Some areas@speed of 500, others not	Not all sites may benefit from new apps	See next steps Facilities
Variance-Purchased or Installed vs Actual Connectivity Services	Services expected are received consistently, even during peak times	(Frequently) Variance in purchased, received service, speeds	Lack of dependability in quality, level of services purchased	See next steps Facilities
Broadband Planning for Future	State-of-art Enterprise Broadband capacity, speeds scalable, expansion-ready	Diverse connectivity platforms, service levels, issues	Connectivity services vary across facilities, domains, no single Enterprise solution	See next steps Facilities

Figure 15: Chumash Broadband Gap Analysis

Broadband Strategy

The Chumash IT department can be applauded for continually enhancing internet service over the past several years. The tribe made a major investment by having Frontier build fiber from Buellton to the Casino and by getting redundant services from 2 additional carriers. The Tribal IT approach has been measured, deliberate, responsive, cost-conscious, and admirable.

The Santa Ynez Chumash have been fortunate to enjoy great growth and expansion over the years, both in business enterprise and Tribal member services, and the Tribe is positioned to continue that development and growth of enterprise and service delivery.

The impacts of this vitality, however, have been significant on demands for Tribal connectivity. Being in a rural area, the broadband solutions provided for high connectivity demands like those of the Chumash, are limited. The tribe's IT department has done as much as possible to address new internet application needs, ameliorate issues, and provide reliability through multiple contracts, periodic upgrades and troubleshooting and new services from new provider assets as they become available.

This strategy, which has worked satisfactorily for several years, can now be seen to have drawbacks going forward. There is a hidden cost to the growing complexity of providing connectivity and services as more new businesses and lands are added to the Chumash enterprise, according to IT Infrastructure Director Kyle Schaffer. Additional ISP contract negotiations will be necessary and additional installation, maintenance, and troubleshooting will be required for the underserved locations. This is a draw on the IT staff's limited time that could be used more productively for planning and for other IT projects.

Due to connectivity issues at all but perhaps the Casino/Resort and the Clinic, inefficiencies of Tribal operations in other areas besides IT also can be identified. Education Director Dawn Valencia and Fire Chief Joseph Zavalla, for example, both mentioned the numerous times a Zoom meeting suffered from internet drop-offs, or that Zoom log-in failed and other communications arrangements had to be made with the parties involved. An employee that cannot make a call from his/her office in the building in which he/she is located or needs to use a personal phone instead of a Tribe-issued phone, has a real, if difficult to quantify, episode of inefficiency, at a cost to the Tribe.

The question of whether these (inefficient) costs of connectivity would be more than the cost of a holistic Tribal enterprise broadband solution is probably not answerable, as not all inefficiencies are evident or subject to quantification.

But with the likelihood of continuing Chumash vitality and growth and the fact that the cost of these connectivity inefficiencies is already significant and certain to increase, it is clear

that it may be worth examining some infrastructure investment options not previously under consideration.

This is especially true as grant opportunities related to broadband, especially those available to tribes, continues to grow. Before grant opportunities existed to bring Internet to Tribal lands, the Tribe believed the cost to be prohibitive to get gigabit internet to the residential and commercial and service-delivery locations on the reservation.

Grant opportunities have the potential to change that. With grant funding, the Tribe can now feasibly consider a wealth of options for state-of-the-art connectivity. It has the opportunity to own and operate its own assets, even becoming a reseller under certain requirements, to partner with an ISP to build middle mile and last mile fiber optics to the reservation, to leverage its recently-awarded 2.5GHz spectrum to serve Tribal connectivity needs, to negotiate a Service Level Agreement for enhanced gigabit services for a one-solution approach – its options are numerous, both in regard to infrastructure and asset ownership.

Chumash broadband options are so numerous, in fact, that Study developers believe a firm strategy recommendation of at this time is premature. Study research has uncovered Tribal best practices that include options for Tribal asset ownership, ownership and management, and even becoming an Internet Service Provider. Since the Study grant was applied for, the Chumash are no longer just seeking, but have been awarded government spectrum. New grant opportunities have arisen that could promise much greater infrastructure investment support. New provider and other partners have emerged since the Study began

All this has added to the complexity of analysis, number and breadth of opportunities, but more importantly to the need for much more Tribal consideration of Chumash priorities, culture, business opportunity perspective, investment resources, etc., some of which cannot be completed in a Study such as this.

What can be accomplished on the Strategy front is an articulation of at least the key strategy options identified during the development of the Study, recognizing that new options could emerge or options identified could become less feasible, at any time.

This said, Study developers have created a "Chumash Broadband Strategy Options Table" to outline the six different options identified. A preliminary trade-off analysis, the Table includes categories for comparison of each option by Tribal leadership.

While inherent in the Table's comparison categories, it is worth mentioning that several factors from the wealth of data presented thus far should hold special value for the Chumash in evaluating the Tribe's Strategy Options:

Consistent Connectivity Platform for All Tribal Facilities

The tribe's cloud service needs are heavily reliant on reliable and symmetrical broadband services offered by Internet Providers. With the growing need for robust connectivity, information management, and a supportable application environment, the Tribe should create an online platform that offers an enterprise approach to responding to the needs of the community. Once defined, a governance process (feedback, policies & standards) will assist in maintaining an understanding of performance through ongoing communications with users. The first step to developing an information technology platform for the Tribe is establishing a consistent fiber footprint across all locations where service is needed. The second step would be confirming the inclusion of a robust and 'live' monitoring platform to track the success in availability, throughput, and uptime across the Tribal network.

Gigabit Speed

A gigabit speed solution over the next few years to Tribal facilities and member homes is a future-proof approach to ensuring comprehensive, "speed of business, speed of life" internet service for the Tribe for at least the next few years. This solution would address all current and projected needs of the tribe for years to come. The Chumash IT Infrastructure lead (Schaffer), the HR lead (Nogal), and the Audio-Visual lead (Figueroa) all stated that gigabit service "would do it all".

Asset Ownership Consideration

The Tribe is not currently in control of its broadband destiny. Having the ability to own and deploy fiber-based Internet assets and supplement its distribution with the 2.5 GHz spectrum would allow the tribe to gain control. Ownership of broadband assets in conjunction with future Tribal connectivity needs, existing Tribal success models, Chumash commercial investment priorities, and the desirability of connectivity control should be carefully considered, despite the potentially high investment costs if grant funding cannot be secured.

2.5 GHz Spectrum

The 2.5 GHz spectrum awarded the Chumash by the Federal government is suitable for both mobile coverage and fixed point-to-point uses. Complimentary to fiber optics, the 2.5 GHz spectrum can play an important role in the deployment of broadband and other advanced communications on the Chumash reservation. (See Figure ___ below)

The FCC website provides the map above as areas of spectrum coverage assigned to the tribe. This initial strategy provides insight to underserved areas and potential needs. The next step is to do a cost benefit analysis of specific solutions (see Options Table below).

Managed spectrum is one option, but if the tribe is to internally support the wireless spectrum, they will need to gather information about hardware needed; network design;

training, installation, operation, and maintenance of the hardware; as well as staffing needed to support the services offered over the spectrum.

The two spectrum management options above are not mutually exclusive. The IT department should also consider a hybrid solution using the best aspects of each solution.

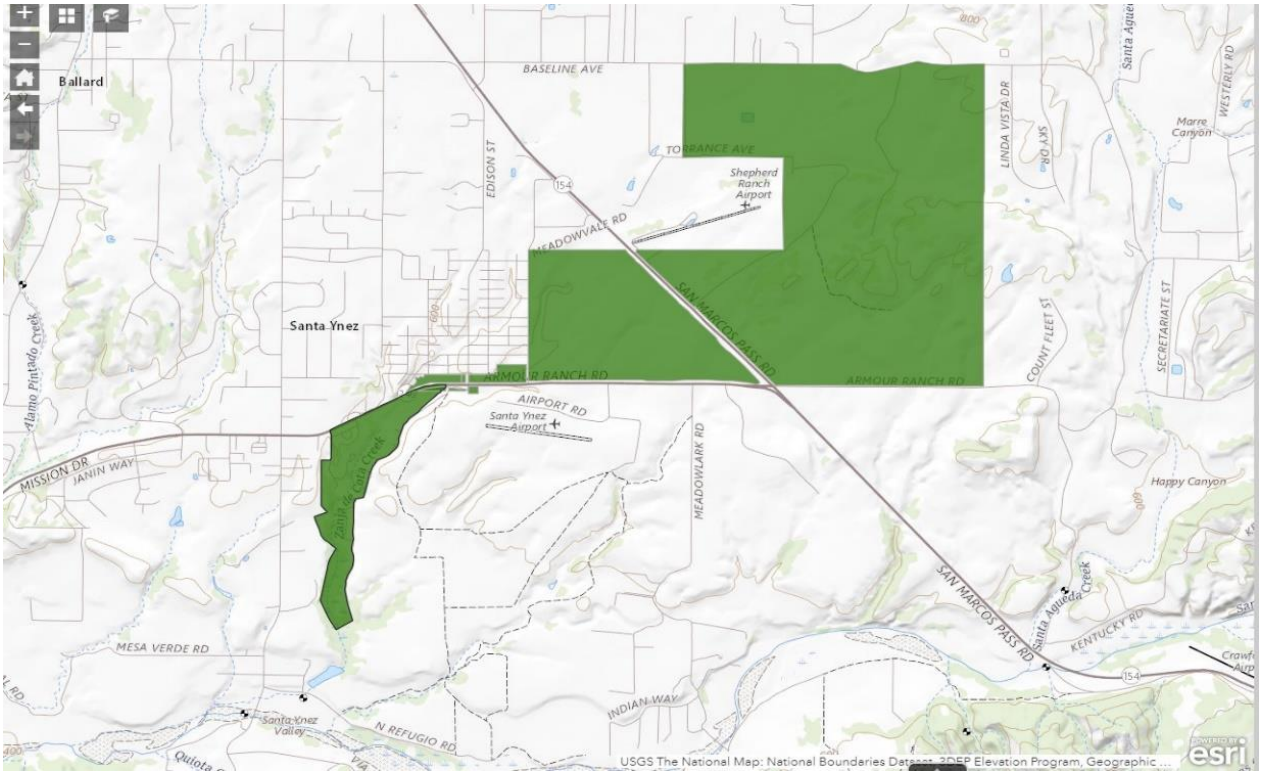


Figure 26: Chumash Lands for Potential Spectrum Use

Redundancy Assurance

The tribe should research what physical path the Frontier provided service takes to get to or from the reservation as well as what major peering point this bandwidth is connected to at the head end. For example, does Frontier take the service down to LA and meet AT&T and it's upstream bandwidth at One Wilshire? If this is the case, for redundancy's sake, it is important for the second carrier to ultimately bring the connection north to 11 Great Oaks or another Bay Area peering point. In a perfect world, the tribe would find an ISP that would build northern and southern paths off of the reservation and have the redundancy built into their backbone network; with this design, the ISP would be able to automatically route around issues in the backhaul or Internet.

Five-Year Planning Timeframe

Planning for at least five years out is a critical priority. Facility and service leads with programs and software options need the confidence of knowing that level and type of

connectivity they can count on for the foreseeable future in order to make wise purchases. Planning for a five-year planning period can ensure continuity of service, efficiency, and cost-effectiveness. Evaluating options for a five-year window of performance, especially if phased, can make investment requirements more feasible, grant opportunities more numerous, and disruption less problematic.

Northern Santa Barbara County Fiber Ring

Tribal existing and proposed facilities and investment projects ae located in diverse cities across Northern Santa Barbara County (NSBC). Connecting these sites is critical for Tribal enterprise efficiency and connectivity control. The Chumash employees and Tribal members are also located throughout the region. Talks and needs assessments are underway in support of development of a middle mile network that interconnects the communities in the Northern Santa Barbara County area. The tribe can both leverage its infrastructure to support this effort and also benefit from development of phases of the Fiber Ring in which the Chumash are not engaged.

As a key member of the Northern Santa Barbara County Broadband Advisory Group, the Chumash will be included in planning conversations and potentially partner opportunities to accelerate development of the Fiber Ring Network development.

The Tribe is encouraged to evaluate Chumash Strategy options in light of the Tribe's support for and benefit from accelerated development of the NSBC Fiber Ring.

Chumash Broadband Strategy Options for Tribal Leadership Consideration							
Sample Options for Chumash Broadband Enhancment*	**Infra-structure Cost/ Maintenance Cost** (low/med/ High)	**Complexity Inefficiency** (little/med/ great)	**Tribal Control of Costs/ Services Scala-bility** (little/ med/great)	**Tribal Ex-clusive Asset** (yes/no)	**Tribal Staffing Rqmts** (low/med/ high)	**Local Com-munity Benefit** (if yes, describe)	**Pot'l Fund-ing**
Option (1) Trust Lands Midmile fiber from Goleta to Trust Lands w/last mile fiber to all Tribal svc & business sites on fed land- Tribe owns fiber on its Tribal lands	High Infra cost if self-funded, Low if grant and/or provider-funded Maintenance Low to Med	Little (once built)	Great	Yes	TBD, Probably Less than w/multiple service contracts	Yes in terms of Closer Fiber Access for Local Areas (Less Cost) No re direct svc	• Nat'l Telecom & Information Admin (NTIA) (Provider Ptnrship and/or State Political Subdiv. Partnership) • Tribe or Tribe/Provider Ptnrship, w/o Grant
Off-Site Tribal Locations Upgrade current Contracts to gig svc to accommodate cloud ERP, business competitiveness	Infra: n/a Monthly Fee: High	Great- Multiple contracts	Little	No	Med-High Contract & Service Monitoring	No	Tribe
Next Steps: *Next Steps: (through Chumash Leadership/IT discussions, select Option 1)* *For Trust Lands- Identify potential NTIA partner(s), support NTIA grant application development; For Off-Site Locations – Upgrade current contracts to gigabit service*							

Chumash Broadband Strategy Options for Tribal Leadership Consideration							
Sample Options for Chumash Broadband Enhancment*	**Infra-structure Cost/ Maintenance Cost** (low/med/ High)	**Complexity Inefficiency** (little/med/ great)	**Tribal Control of Costs/ Services Scala-bility** (little/ med/great)	**Tribal Ex-clusive Asset** (yes/no)	**Tribal Staffing Rqmts** (low/med/ high)	**Local Com-munity Benefit** (if yes, describe)	**Pot'l Fund-ing**
Option (2) Trust Lands Extend mid-mile fiber from Goleta, Buellton or elsewhere to reservation's key anchor facilities (Casino/Resort). Provide last mile to reservation sites with 2.5GHZ fixed wireless Tribal spectrum. Tribe owns fiber on fed lands; Tribe owns spectrum connecting fed lands.	High Infra cost for fiber if self-funded, Low if grant and/or provider-funded; Eqmt costs for spectrum fixed wireless; Maint Low to Med	Little-Medium (once built)	Great	Yes	TBD, Probably Less than w/multiple service contracts	Yes - closer fiber for Local Areas Yes for Santa Ynez, where spectrum crossing township; No re others for direct svc	• NTIA (Provider Ptnrship and/or State Political Subdivision Partnership) • Tribe/Provider Ptnrship, w/o Grant • Tribe
Off-Site Chumash locations Adopt Option 1 for Off-Sites	Infra: n/a Monthly Fee: High	Great-Multiple contracts	Little	No	Med-High Contract & Service Monitoring	No	Tribe
Next Steps: *(through Chumash Leadership/IT discussions, select Option 1) For Trust Lands (fiber and wireless)- Identify potential NTIA partner(s), support NTIA grant application development; For Trust Lands (wireless) Engage RF Engineering or Wireless Telecom firm to determine cost/equipment/tech deployment needs; For Off-Site Locations – Upgrade current contracts to gigabit service*							

Chumash Broadband Strategy Options for Tribal Leadership Consideration							
Sample Options for Chumash Broadband Enhancment*	**Infra-structure Cost/ Maintenance Cost** (low/med/ High)	**Complexity Inefficiency** (little/med/ great)	**Tribal Control of Costs/ Services Scala-bility** (little/ med/great)	**Tribal Ex-clusive Asset** (yes/no)	**Tribal Staffing Rqmts** (low/med/ high)	**Local Com-munity Benefit** (if yes, describe)	**Pot'l Fund-ing**
Option (3) Trust Lands Option 1 model for mid-mile fiber to reservation's (Resort & Clinic). Last mile to Tribe's fed sites with 2.5GHz Tribal wireless. Tribe owns fiber on fed lands, spectrum connecting fed lands. Tribe seeks CLEC or other Tribal authority to potentially provide fiber to local areas, off-setting svc costs of Tribe's off-site locations (see Klamath River Rural BB model)	High Infra cost for fiber if self-funded, Low if grant and/or provider-funded; Eqmt costs for spectrum fixed wireless; Maint Low to Med	Little-Medium (once built)	Great	Yes	TBD, Probably Less than w/multiple service contracts	Yes re closer fiber access for Local Areas Yes for Santa Ynez, to receive svc by wireless passing thru SY; No re direct svc to others	• NTIA (Needs rsch to see if Provider can be included to build but not own fiber for which application is being made) • Tribe/Investment Partners, public or private, Ptnrship w/o grant • Tribe
Off-Site Tribe Locations Option 1 Off-Site model until CLEC/other designation secured; then extend owned fiber to Tribe's off-site locations, local area	Infra: High for fiber build-out, ROI TBD, Pot'l cost off-sets	TBD-Medium (?) <multi-contracts once built; maintenance	Little	Yes	Med-High if Contracting; once tribe-owned fiber – Med/Maint	No	Tribe Tribe or Tribe & Investment Ptnrs, Public or Private
Next Steps: *Determine NTIA eligibility, if eligible: Identify potential NTIA partner(s) and service areas applicable, wireless rqmts, etc. support NTIA grant application development; If not eligible, or not all areas are eligible for NTIA, determine gaps and identify other grant and/or investment funding available to pursue, simultaneously researching CLEC and/or other Tribal designation options, requirements*							

Chumash Broadband Strategy Options for Tribal Leadership Consideration							
Sample Options for Chumash Broadband Enhancment*	**Infra-structure Cost/ Maintenance Cost** (low/med/ High)	**Complexity Inefficiency** (little/med/ great)	**Tribal Control of Costs/ Services Scala-bility** (little/ med/great)	**Tribal Ex-clusive Asset** (yes/no)	**Tribal Staffing Rqmts** (low/med/ high)	**Local Com-munity Benefit** (if yes, describe)	**Pot'l Fund-ing**
Option (4): Trust Lands Participate in MuralNet/Cisco Sustainable Tribal Networks Program re sovereign network pilot program, an infrastructure trial providing data in exchange for Cisco support, eqmt, etc. (would use Tribe's dedicated spectrum throughout Tribal lands)	Low	Stated to be little (simple tech architecture, etc.)	Great	Yes, but possibly not as valuable as fiber	Medium – interface w/MuralNet and Cisco	TBD, probably only for Santa Ynez, over which the wireless spectrum needs to pass	Tribal funding for MuralNet (rsch grant funding), Cisco services free(?), spectrum already authoirized
Off-Site Chumash locations Adopt Option 1 Off-Site model	High	Great	Little	No	Med to High	No	Tribe
Next Steps: ***Trust Lands -Register*** *with Cisco/MuralNet for Pilot Program/Trial; upgrade Off-Site agreements to gigabit service*							

Chumash Broadband Strategy Options for Tribal Leadership Consideration							
Sample Options for Chumash Broadband Enhancment*	**Infra-structure Cost/ Maintenance Cost** (low/med/ High)	**Complexity Inefficiency** (little/med/ great)	**Tribal Control of Costs/ Services Scala-bility** (little/ med/great)	**Tribal Ex-clusive Asset** (yes/no)	**Tribal Staffing Rqmts** (low/med/ high)	**Local Com-munity Benefit** (if yes, describe)	**Pot'l Fund-ing**
Option (5): Trust Lands Upgrade current fiber agmt with Frontier to gigabit service and provide non-anchor fed land service/business sites with Tribal spectrum	Medium (higher contracts, no infra build)	Medi (partially Tribe-owned, partially contract) + add'l agmts for off-site, but no build-out except spectrum deployment	Little – Tribe owns & controls only 2.5GHz	Partially – spectrum an asset	High – multiple solutions	Yes, but only for Santa Ynez, as spectrum can cross over township	Tribe and/or MuralNet/Cisco, if spectrum piece of solution facilitated through their program
Off-Site Chumash locations Upgrade current contracts to gigabit service	High	Med contract/service monitoring	Little	No	Medium-Contract, Service Monitoring	No	Tribe
Next Steps: *Upgrade Frontier contract for gigabit fiber to Casino/Clinic; register for MuralNet/Cisco program if desired, or seek RF engineering or telecom consulting firm to provide spectrum deployment guidance; upgrade off-site agreements to gigabit service*							

Chumash Broadband Strategy Options for Tribal Leadership Consideration							
Sample Options for Chumash Broadband Enhancment*	**Infra-structure Cost/ Maintenance Cost** (low/med/ High)	**Complexity Inefficiency** (little/med/ great)	**Tribal Control of Costs/ Services Scala-bility** (little/ med/great)	**Tribal Ex-clusive Asset** (yes/no)	**Tribal Staffing Rqmts** (low/med/ high)	**Local Com-munity Benefit** (if yes, describe)	**Pot'l Fund-ing**
Option (6): Trust Lands and Off-site Locations Adopt a Service-Level Agreement (SLA) Model for single point management and control: SLA contractor would assist the Chumash in upgrading, investing, transitioning and maintaining gigabit service (outsourced broadband management for IT dept)	TBD, depending upon fiber/wireless spectrum infrastructure guidance	Little – single point of contact for upgrades, installation, investment, maintenance	Great, medium or little, depending on tech solutions and quality of SLA service	Possibly but not necessarily, depending on solutions selected	Low once contractor relationship established, initial	Possibly, depending upon tech solutions, governance and other decisions made	Tribe for consulting, grants etc for tech solutions
Next Steps: *Recruitment of Service-Level Agreement contractor…recommended that if this option is selected, contractor be engaged prior to Phase 2, or during grantwriting for NTIA or other grants*							
**Proposing these options for cost/benefit analysis Phase 2, with exception for any options requiring NTIA funding, apps for which are due Aug 2021; Options using Tribal spectrum must provide svc to 50% of population identified in spectrum application w/in 2 yrs of award*							

Funding Sources

The COVID pandemic has served as a catalyst to bring focus and funding to potential broadband investments. The time is now to take full advantage of the resources available. "Listening sessions" are underway for communities to present their needs, submit applications, and secure the needed resources. Sample grant opportunities thatthe tribe is pursuing include:

EDA: https://eda.gov/funding-opportunities/

CASF: https://www.cpuc.ca.gov/TribalAssistance/

NTIA: Tribal Broadband Connectivity Grants Program (TBCG): Written Input | BroadbandUSA (doc.gov)

USDA: USDA to Host Listening Session to Expand Broadband Access in Tribal Communities | Rural Development

Timeline & Action Plan

CY21, Q2 (Apr-June): Apply for USDA, EDA, CASF Funding to connect facilities

CY21, Q3 (July-Sep): Perform cost analysis of spectrum / POP solutions

CY21, Q4 (Oct-Dec): Engage in collaborative design and engineering

CY22, Q1 & Q2 (Jan-Mar): Commence connecting Tribal facilities / spectrum

CY,22, Q2(Apr-Jun): Collaborative participation in the Regional Fiber Loop

Appendix A: Results of the Business Enterprise/Department Survey

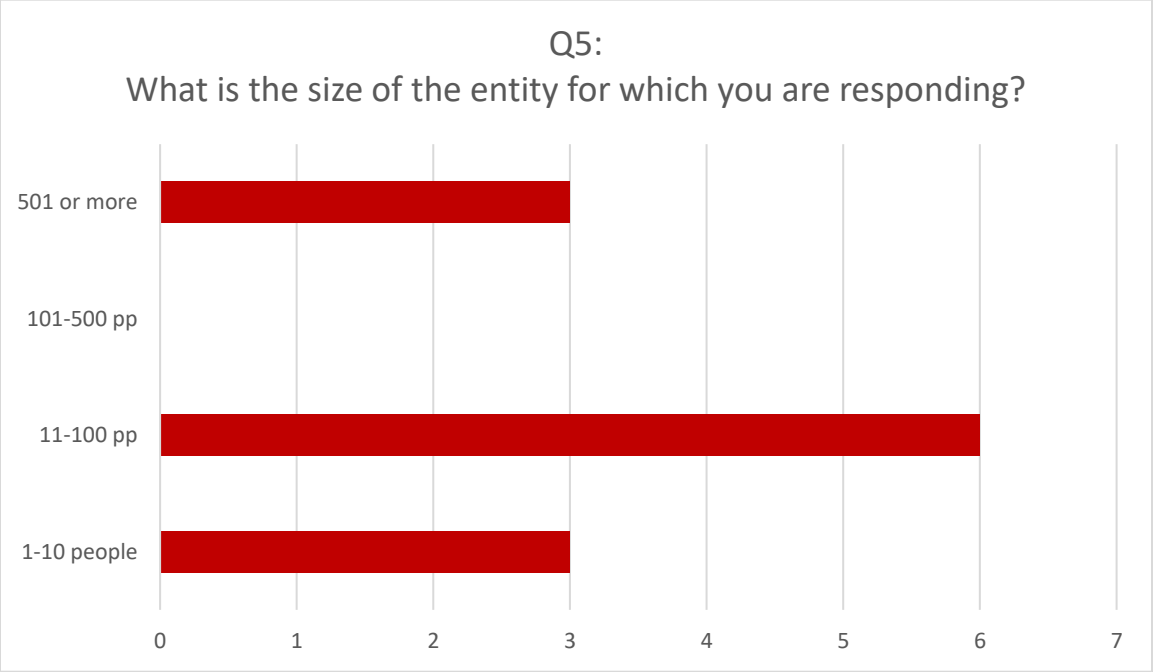
The questions from the Business Enterprise/Department Survey are located in Appendix B; the results to the 27 questions are as follows:

Question (Q)1 asked to indicate whether they were responding to the survey as an individual or as a representative (of an enterprise or department), all 12 respondents indicated that they were responding as a representative. The entity for which each person was responding can be seen in the chart above. Q2 asked for contact information.

Q3 asked for the type of entity respondents represented. 6 respondents (54%) indicated they were responding for a department, four (36%) for a division, and one respondent identified "an entire organization" as the entity for which he/she was responding.

Q4 asked for the name of the organization.

The size of respondent entities was requested in Q5, and as seen in the chart below, 50% of the entities were comprised of 11-100 people, 25% were 1-10 people, and 25% were 501 or more people.

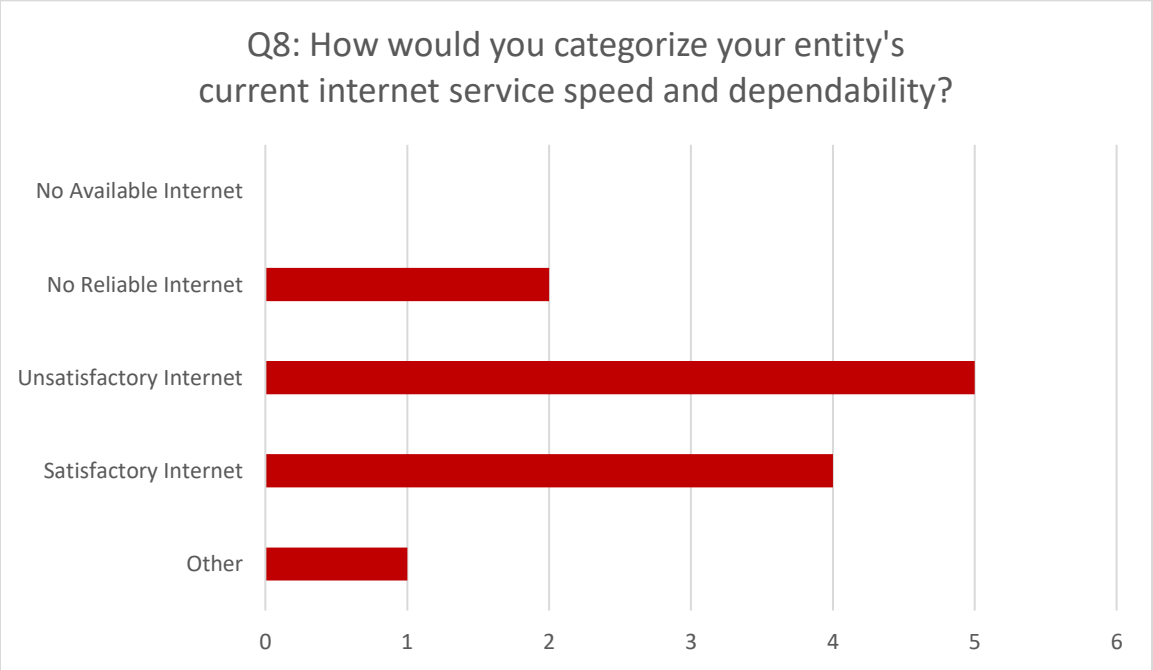


Q6 requested the role of the respondent; these are listed in the table above (p. ___).

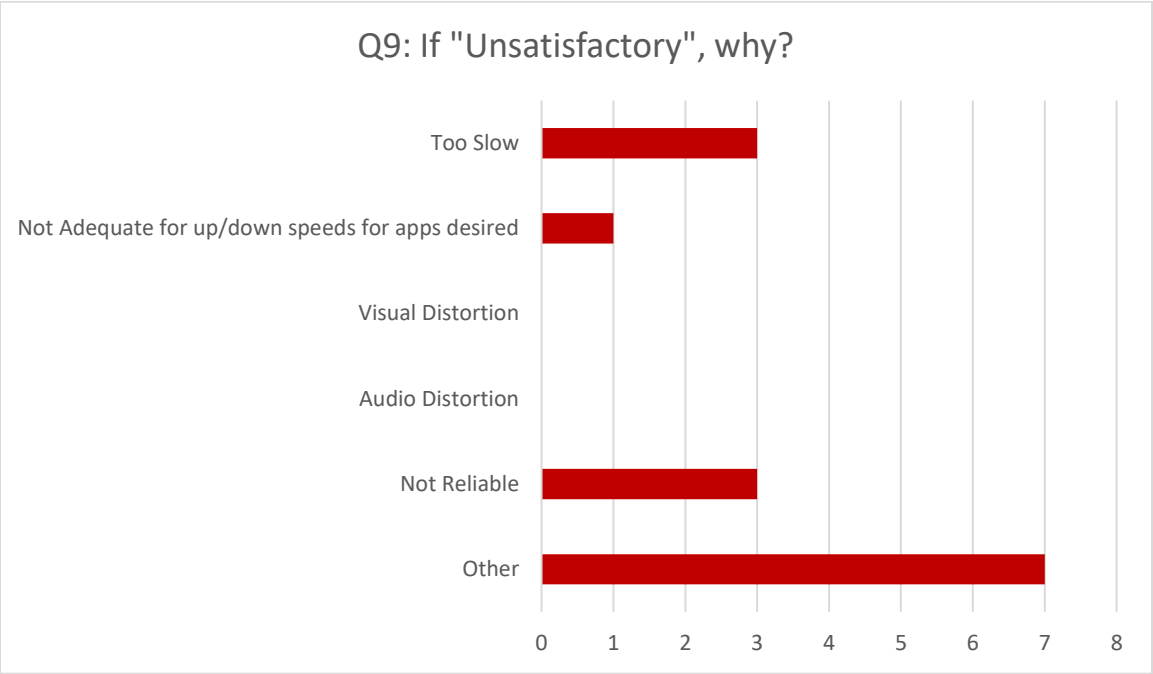
In Q7, respondents were asked the nature of the work of the surveyed entity. While the nature of the work of most entities surveyed can be assumed from the name of the entity (e.g. Clinic, Education Center, Museum, etc.), Q7 write-in responses were:

- Museum (Santa Ynez Chumash Museum & Cultural Center)
- Kita winery makes, sells and distributes wine made from the Camp 4 vineyard (Kita Winery)
- Technical Support for the enterprise (Chumash Casino: Technology Services)
- Hospitality and resort operations and diversified businesses (Santa Ynez Band of Chumash Indians)
- Shared Services for Project Management, Analytics, Business Planning and Supply Chain (Casino/Resort: Strategy Division)
- Oversee the Human Resources function for the tribe and its 1,700 employees (Chumash Indians: Human Resources)
- Gaming and Hospitality (Chumash Casino)
- Philanthropic (Chumash Foundation)
- To provide educational services to eligible Tribal descendants (Chumash: Education Department)
- Fire fighting, EMS and rescue (Chumash fire department)
- Hotel Management (Hotel Corque & Hadsten House)

Q8 was the beginning of the survey regarding current Internet service, and it asked how the respondent would categorize their representative entity's Internet speed and dependability. 33% of respondents were satisfied with their entity's Internet service (4 respondents/entities), while 58% (7 respondents/entities) indicated either "unsatisfactory internet" (42%/5 people) or "no reliable internet" (17%/2 people), with the Museum respondent checking "other", indicating that the Museum and Cultural Center were still in development.



For those indicating that their internet service was unsatisfactory, Question 9 was an attempt to discern the reason why.



While 1 person indicated speeds were not adequate for apps desired, 33% responded speeds were "Too Slow" or "Not Reliable", the majority of respondents checked "Other", with the following in the comment box:

- In construction (Santa Ynez Chumash Museum & Cultural Center)
- Wider availability and access (Santa Ynez Band of Chumash Indians)
- There are blind spots in the organization, where certain functions cannot be served (Casino/Resort: Strategy Division)
- Only 1 provider with Comcast and at times the service goes out (Chumash Indians: Human Resources)
- Satisfactory (Chumash Casino)
- To further define unreliable, our internet cuts out during zoom calls, our phones frequently don't work, and we frequently have issues logging in to online services such as on-time (Chumash: Education Department)
- Services comes in and out. weak signal. coverage is not wide enough for properties (Hotel Corque & Hadsten House)

Responses for Question 10 were for those respondents who selected "satisfactory" or "good" internet services:

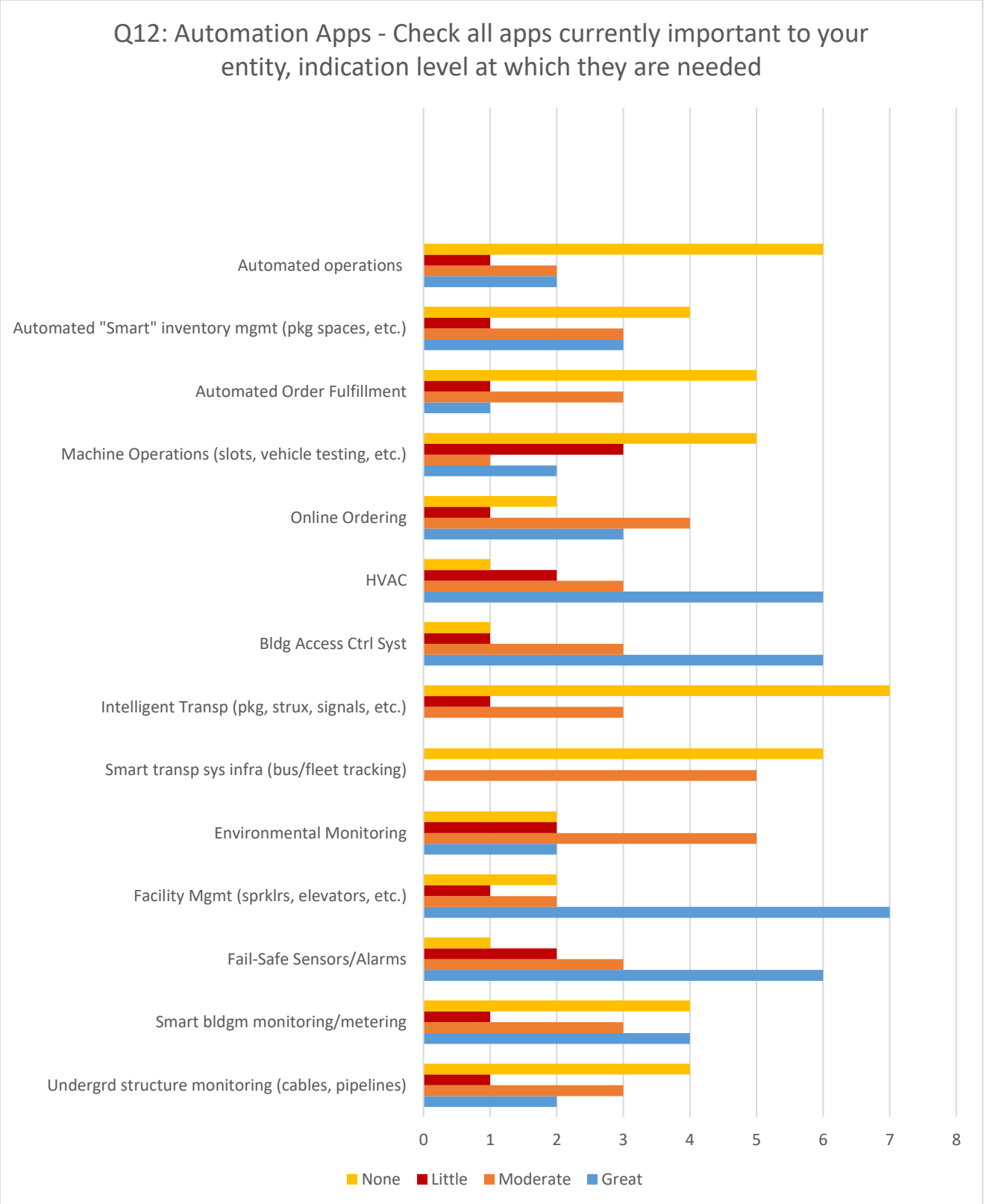
- There isn't a huge demand for internet at the location, what we have installed is adequate for the workload (Kita Winery)
- Our service is reliable (Chumash Casino: Technology Services)

- Ample speed for our current needs and redundant connections make it highly available (Chumash Casino)
- We lose internet service two or three times a week (Chumash fire department)

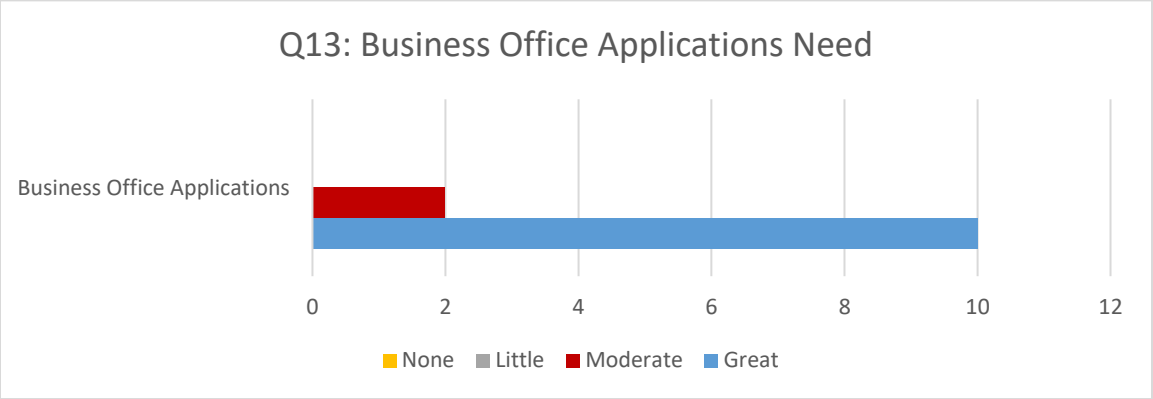
Q11 polled survey respondents for their entity's upload and download Internet speeds. The table below shows there is a significant discrepancy in speeds at the various entities, with the Chumash Casino/Resort at 500 Mbps up and down and having redundancy with 2 connections from separate carriers. The Tribal Clinic IT respondent also indicated a speed of 500 Mbps up and down. All other entities have significantly slower speeds - no doubt creating efficiency gaps and operating obstacles.

Chumash Enterprise: Internet Speeds				
Wired Upload (Mbps)	**Wired Download (Mbps)**	**Entity (ies) or Domain**	**Wireless Upload (Mbps)**	**Wireless Download (Mbps)**
19.3	72	Division- LLCs Hotel Corque	3.9	47
17	73.5	Division LLCs Hadsten House (Hotel)	18	56.47
		Education Department	6.9	32.8
		Chumash Fire Department	22.9	180
500 - Comcast 500 - AT&T	500 - Comcast 500 - AT&T	Chumash Casino & Resort		
129.39 Frontier	296.30 Frontier	Human Resources Chumash Employment Resource Ctr (CERC)	TBA	24.27
		Tribal Clinic	500	500
309.5	432.7	Casino: Technology Svcs		
		Chumash Gas Station	38.3	48.6
	3.1	Casino: Strategy Div		

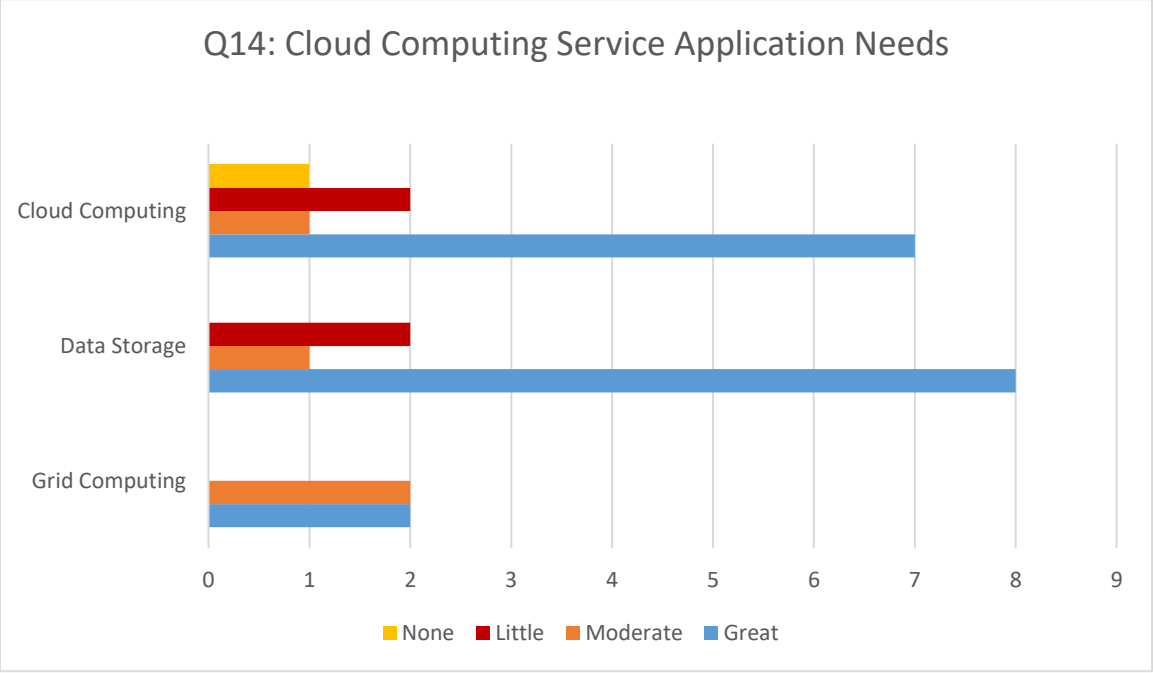
Question 12 polled respondents regarding various categories of usage, type of applications used, and level of use (great, moderate, little or none). Summarized in the chart below, the application of greatest need is "Facility Management" (59%). Facility-related automation needs articulated as a "Great" need included Building Access Control Systems (55%), HVAC (50%), and Fail-Safe Sensors or Alarms (50%). Additionally, 33% of respondents indicated that the need for Smart Building Monitoring/Metering was "Great".


Q12: Automation Apps - Check all apps currently important to your entity, indication level at which they are needed
Automated operations
Automated "Smart" inventory mgmt (pkg spaces, etc.)
Automated Order Fulfillment
Machine Operations (slots, vehicle testing, etc.)
Online Ordering
HVAC
Bldg Access Ctrl Syst
Intelligent Transp (pkg, strux, signals, etc.)
Smart transp sys infra (bus/fleet tracking)
Environmental Monitoring
Facility Mgmt (sprklrs, elevators, etc.)
Fail-Safe Sensors/Alarms
Smart bldgm monitoring/metering
Undergrd structure monitoring (cables, pipelines)
0
1
2
3
4
5
6
7
8
None
Little
Moderate
Great

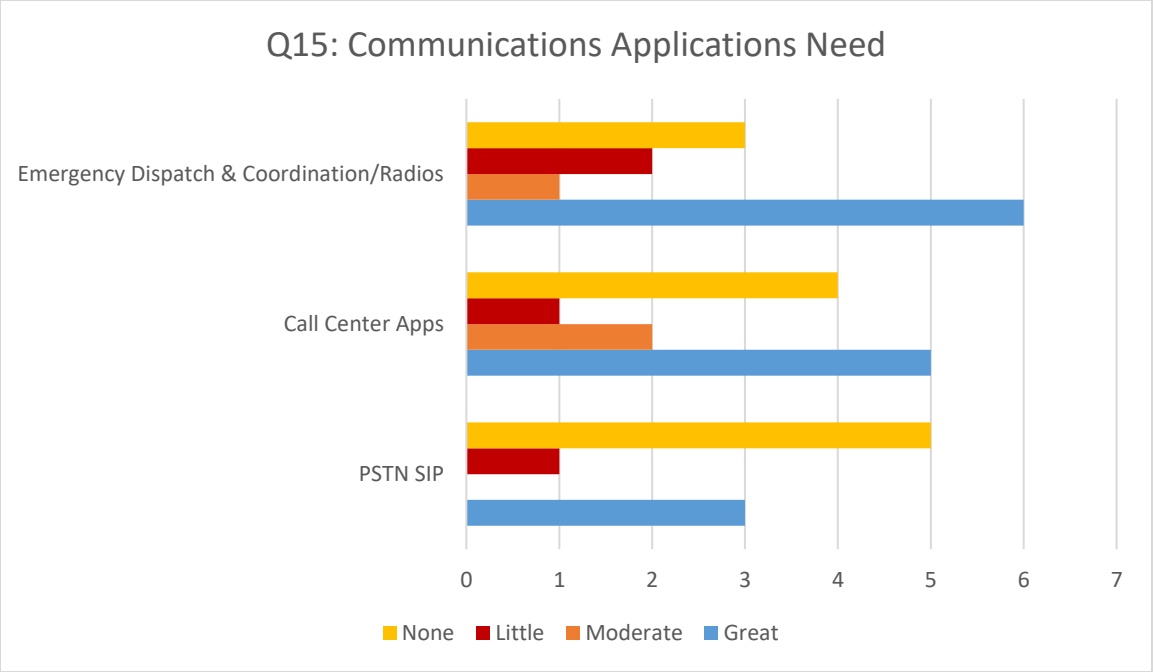
Q13 asked for the level of importance of business office applications (e.g. MS Office). 83% of respondents (10 people) indicated a "Great" need while 16% (2 people) claimed a "Moderate" need.



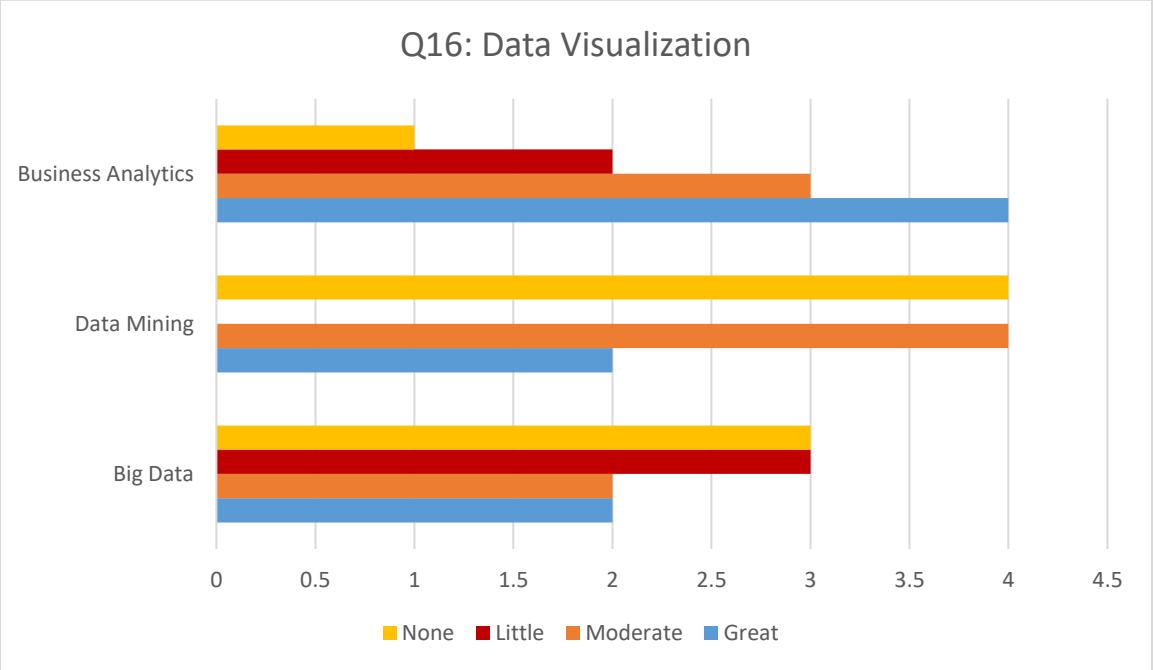
Q14 dealt with the needs for cloud computing applications. Respondents indicating cloud computing needs were "Great" totaled 64% while 73% said data storage need was "Great".



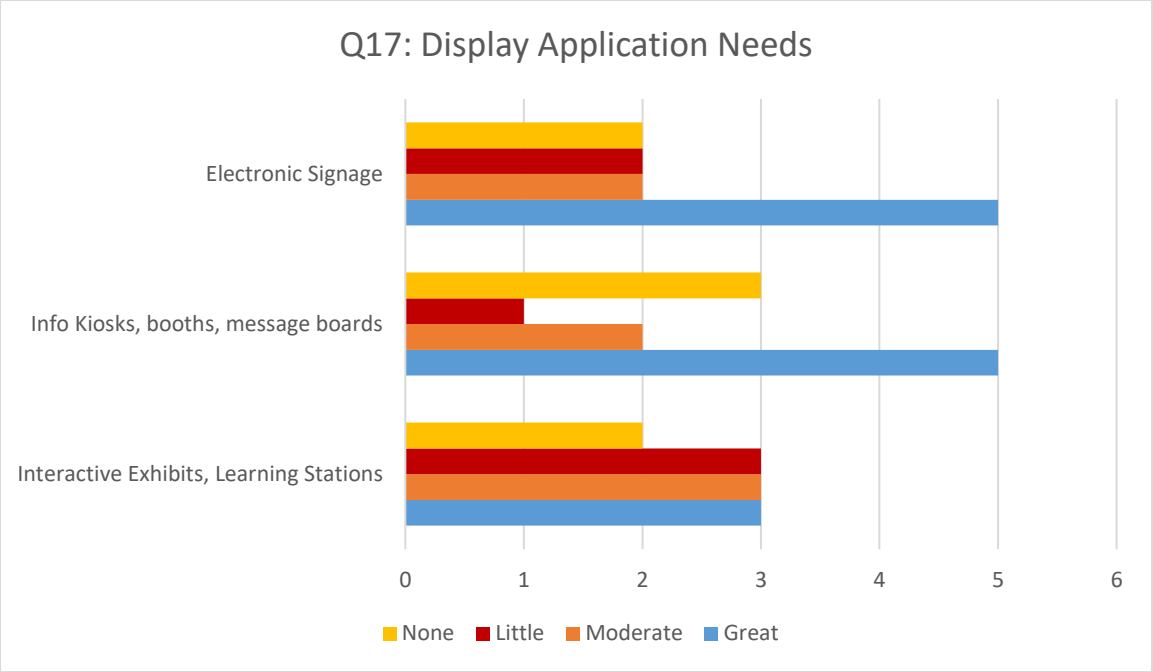
Surprisingly, in regard to communications (Q15), only 50% of respondents indicated a need as "Great", with call center applications nearly as important at 42%.



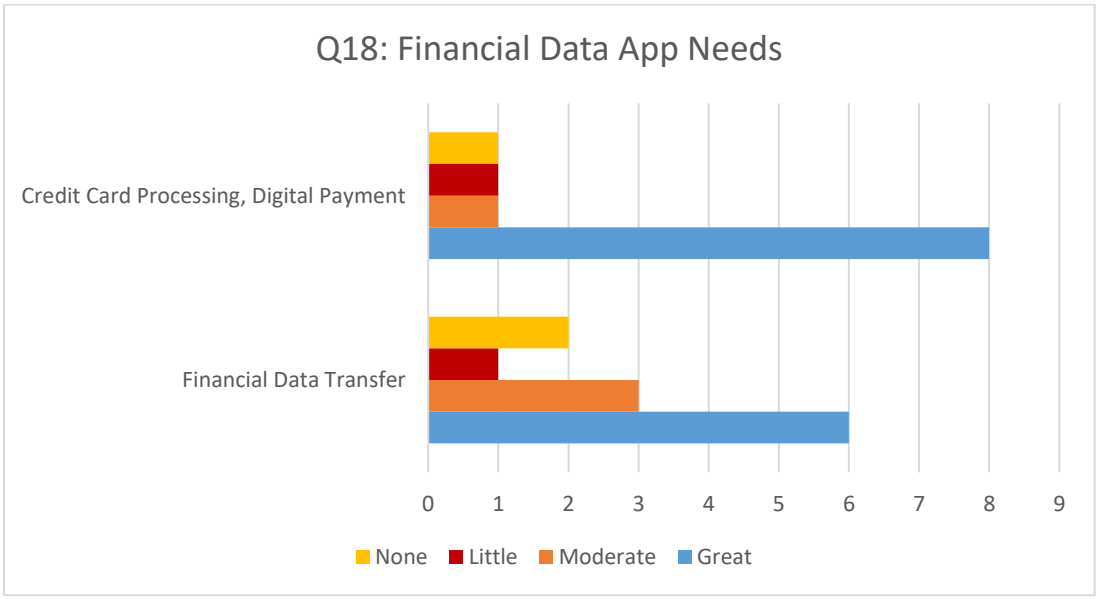
Chumash Data Visualization Needs (Q16) at this time are not severely under met, with only 40% of respondents indicating a "Great" need for data visualization in the area of business analytics.



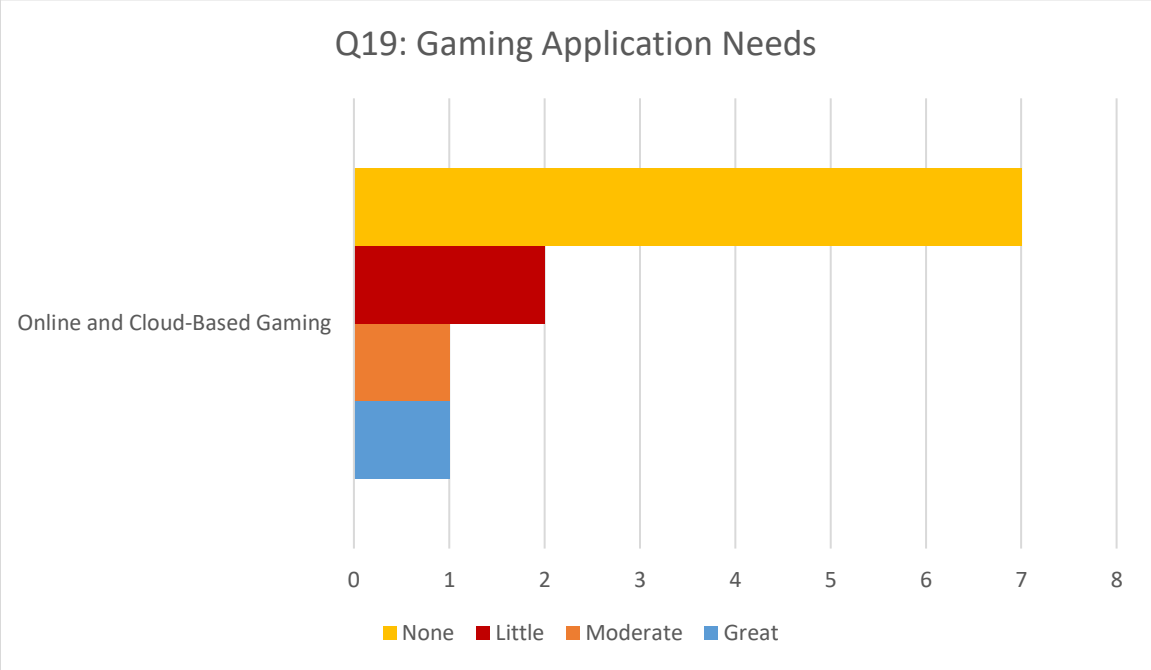
Q17 surveyed broadband "Display" needs. The greatest needs were found in the areas of marketing and information (45% electronic signage, 45% informational kiosks). Interactive exhibits and learning stations were also important to the Museum and Cultural Center and less necessary elsewhere.



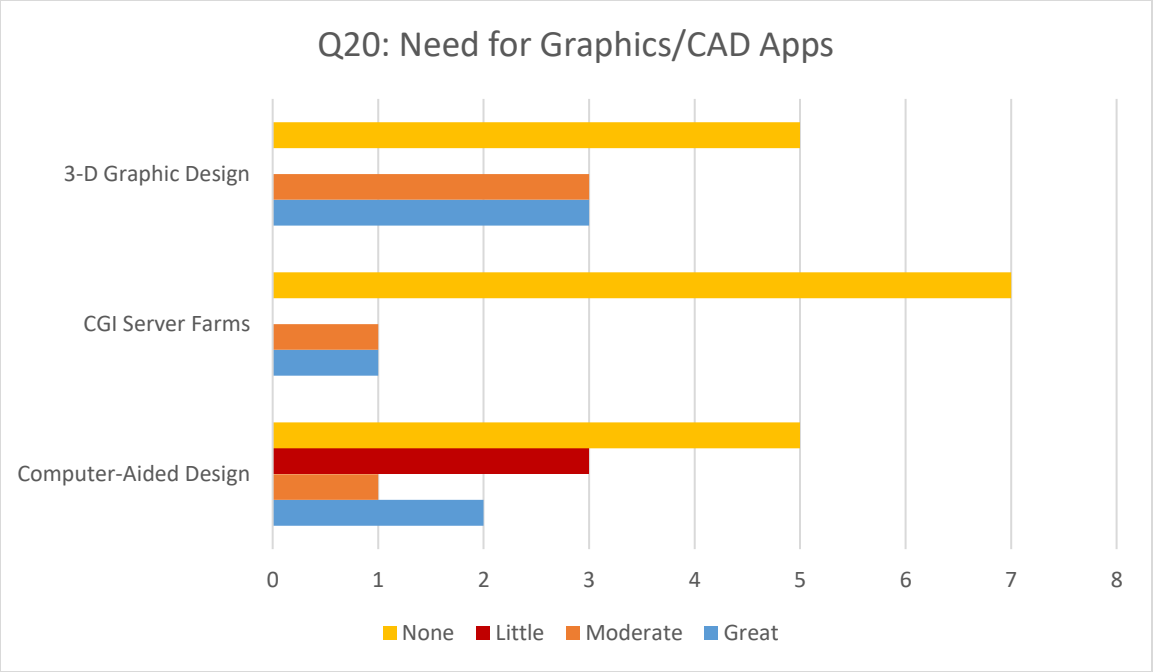
Question 18 requested Financial Data Application needs. Credit card processing and digital payment was a "Great" need among 73% of respondents (8 people). Financial data transfer was shown as a "Great" need by 50% (6 people). Financial application need seems to be a significant need across the enterprise.



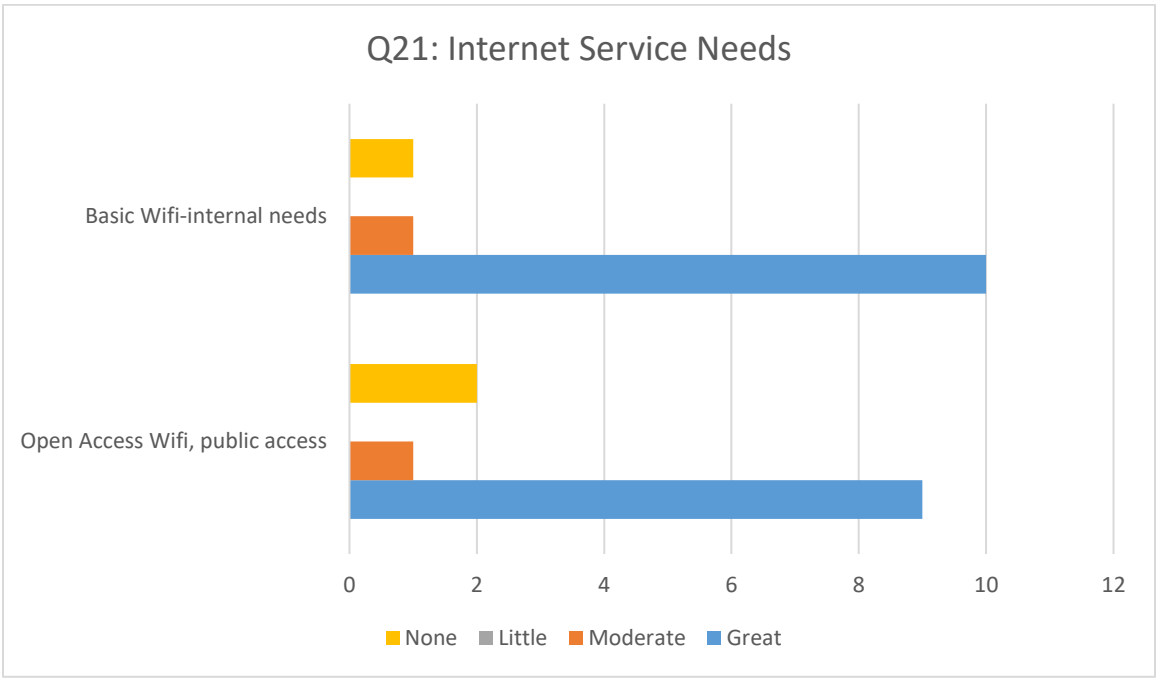
Gaming was the application topic for Question 19, and only 1 type of gaming application was queried: online and cloud-based gaming. While the majority of respondents indicated little or no need for gaming, this may be short-sighted, as the number of gamers and types of gaming applications is growing exponentially. There is also potential of off-site mobile betting becoming adopted in California, which may increase the need for cloud-based gaming.



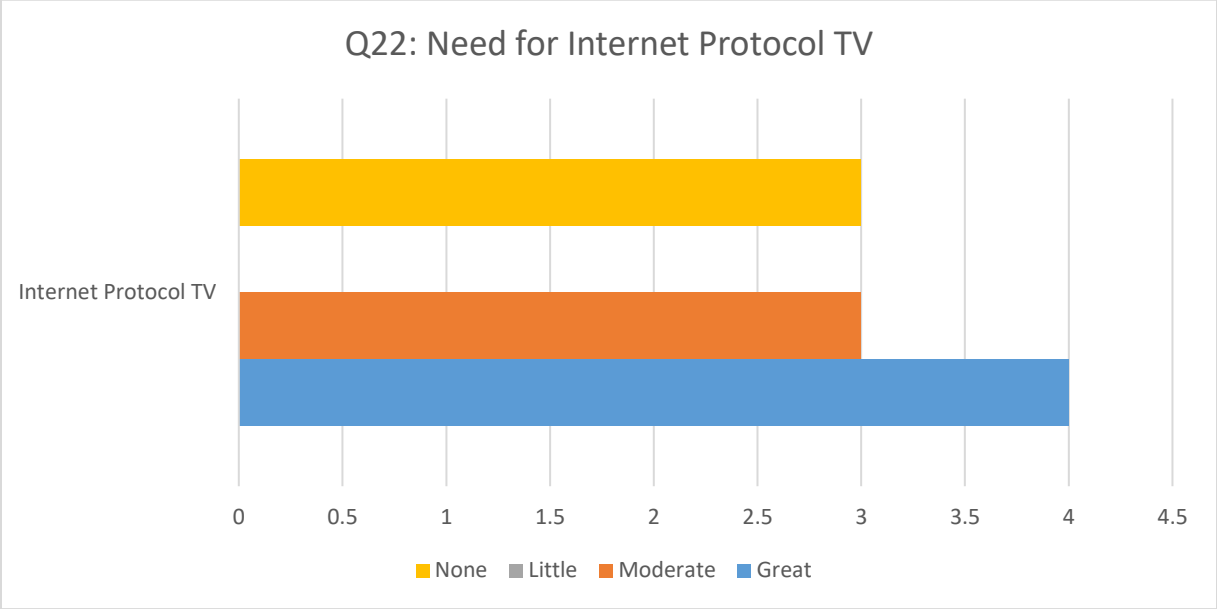
Q20 indicates there is little demand for graphic and CAD applications. Nearly half of respondents checked "none" for 3-D graphic design, 8 of the 12 respondents reported little or no need for Computer-Aided Design or CAD (73% collectively), and 7 respondents (78%) saw no need for CGI server farms. 6 respondents indicated a moderate or great need for 3-D graphics. This need could increase for a marketing-heavy enterprise like the Chumash if they choose to adopt some of the newer simulation-oriented marketing strategies and/or bring more marketing and development in-house.



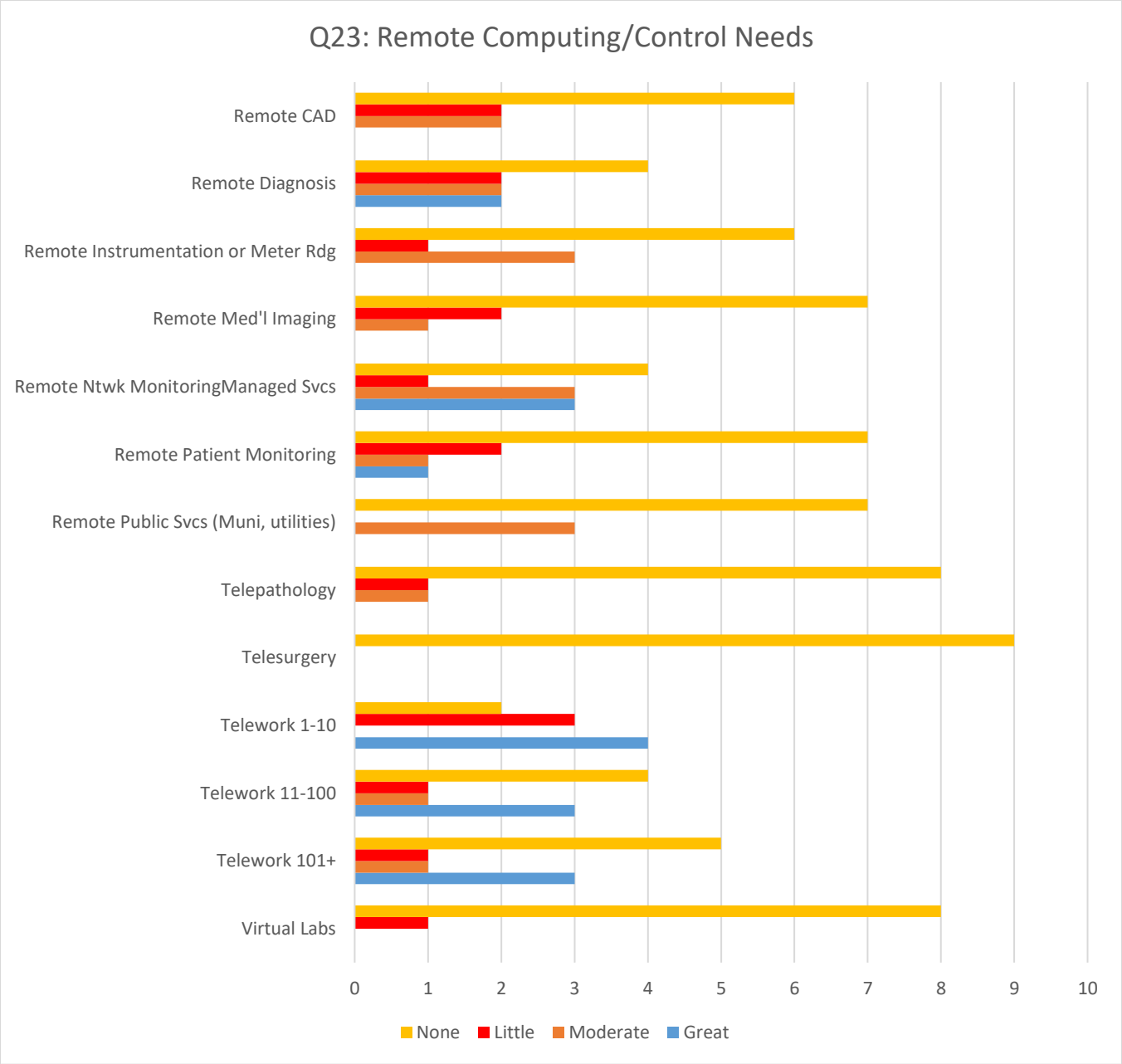
As indicated in Q21, Internet services are among the greatest needs of the Chumash enterprise. "Basic Wi-Fi Internal Needs" were identified as a "Great" need by 83% (10) of the respondents, 9 respondents indicated a "Great" need for "Open Access Wi-Fi, Public Access", and another person called that need "Moderate". 84% (10 respondents) also cited the importance of both internal and public Wi-Fi due to the heavy investment of the Chumash into guest services and convenience.



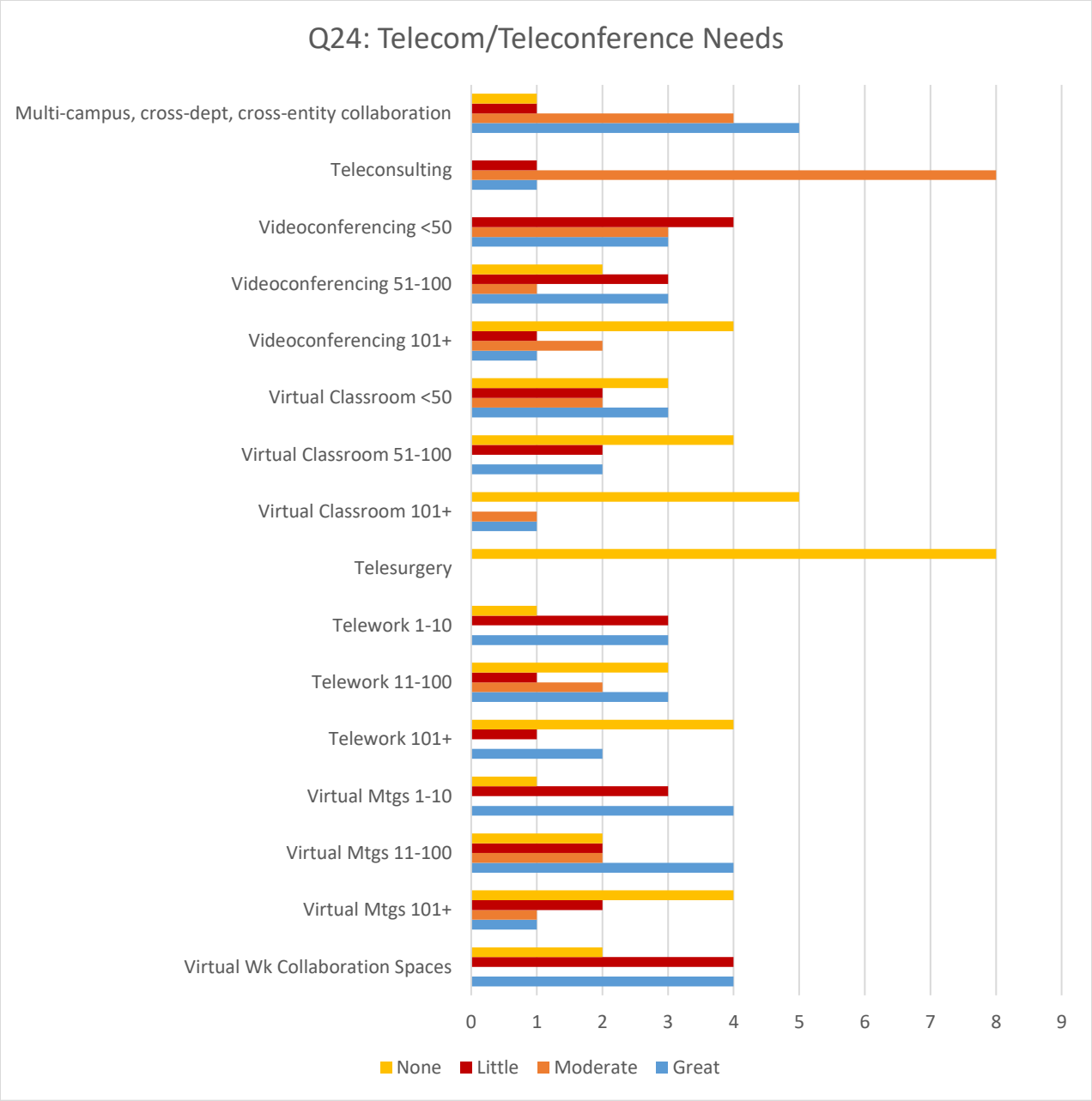
Q22 asked about the need for IP TV and was fairly straightforward. 7 people or 70% of those surveyed found IP TV to be either a "Great" or a "Moderate" need. The other 30% found no need for it at all. In this age when there is a television in every direction keeping everyone up to the minute on news and information, it is critical for guest-services companies to offer IP TV.



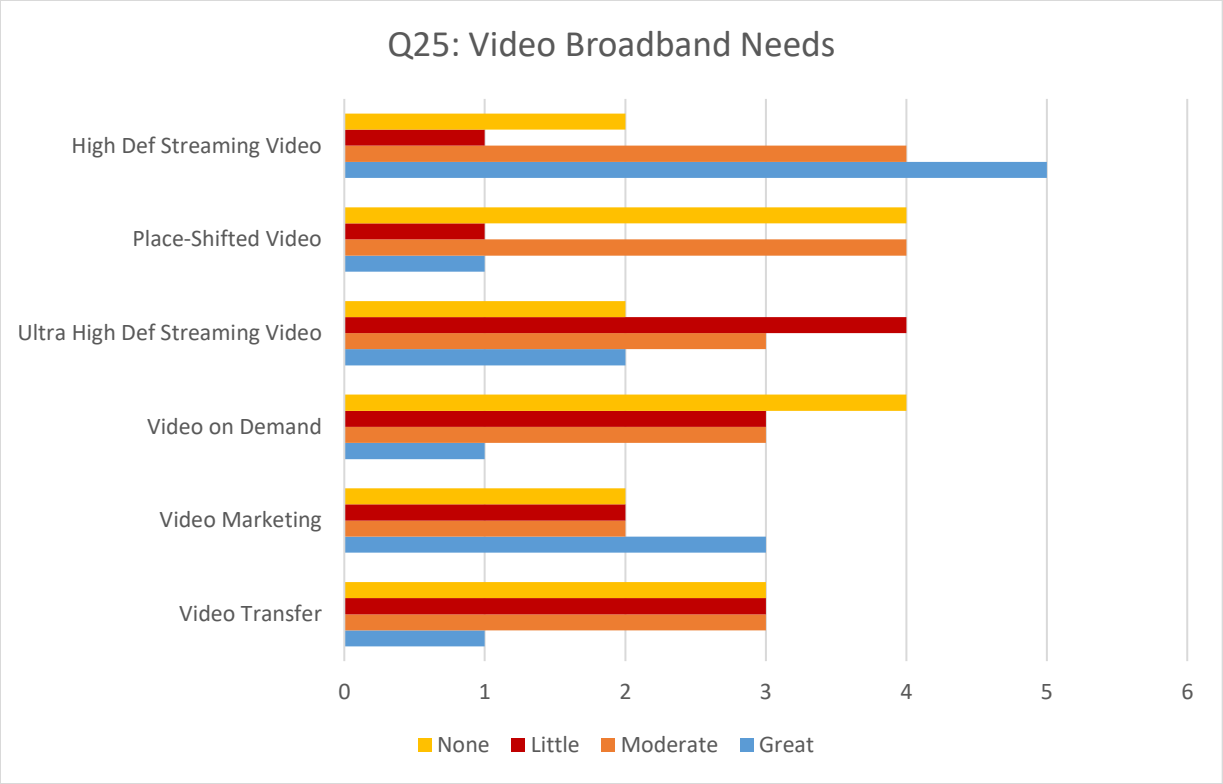
Remote Computing and Control, the topic of Q23, is another important growth area as we enter the age of the Internet of Things (IOT). While Remote Network Management and Managed Services was a "Great" or "Moderate" need for 55% (6 responses) of respondents, this is one area set to increase over the next five years.



Zoom meetings, teleconferencing, videoconferencing, virtual classrooms, and the like all came of age in 2020 when the pandemic forced meetings, lessons, forums, and consultations online. Chumash survey responses to Q24, dealing with Telecoms and Teleconferences confirmed this. 90% of respondents indicated that the need for online teleconsulting was either "Great" or "Moderate". 64% of those respondents also noted a "Great" or "Moderate" need for cross-department, cross-campus, or cross-entity collaboration. The Chumash have a significant need for robust videoconferencing capability as the tribe has _____ employees to onboard, train, manage, consult, and guide.



Video was the specific application explored in Q25. 75% of respondents selected either a "Great" (42%) or "Moderate" (34%) need for Video Streaming. Video Marketing was the next highest need, with 55% of respondents reporting either a "Great" (33%) or "Moderate" (22%) need. 50% of those queried also indicated a need for "place-shifted" video, i.e. video accessible on platforms other than that on which it was originally posted.



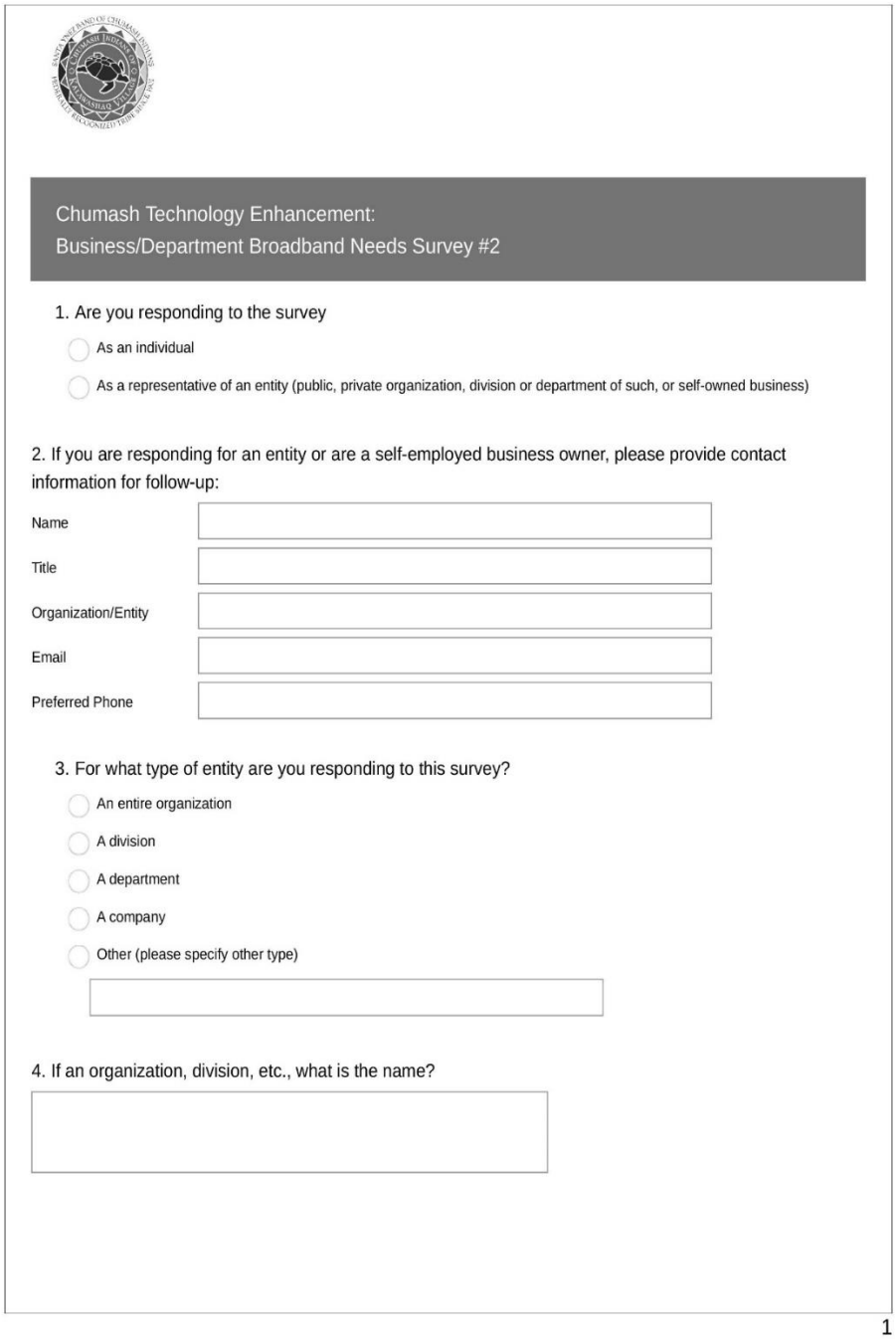
Q26 had the write-in responses below to the question: "Are there broadband, internet or 'smart' applications you foresee needing in the next five years that should be mentioned?":

- Yes, mobile gaming/sports betting, mobile offers, ERP use on mobile device, etc. (Casino/Resort: Strategy Division)
- Employee performance management, Smart Phone time and attendance with Geo-fencing (Chumash Human Resources)
- Move to o365, cloud ERP, Cloud data analysis (Chumash Casino)
- Wireless printing, security camera feed monitoring (Education Dept)

The final Chumash Enterprise/Department survey question (Q27) asked for any "additional information" the respondent believed would be helpful in planning for the tribe's broadband needs for the foreseeable future. 2 responses were received:

- With the decreasing labor pool, there is an increased demand for use of automation and technology. Our company will have to evaluate new tools to help offset the labor shortage and some of these items are still in early stages of development. Having 1-GB is going to become necessary in the area in order to provide that ability for technology when it is available. (Chumash Human Resources)
- With only a percentage of the staff working, we have access issues. Once we are at full staff, and the students return to the facility, our capacity cannot meet the needs (Education Department)

Appendix B: Business Entity/Dept. Needs Assessment Survey



Chumash Technology Enhancement:
Business/Department Broadband Needs Survey #2

1. Are you responding to the survey

- ◯ As an individual
- ◯ As a representative of an entity (public, private organization, division or department of such, or self-owned business)

2. If you are responding for an entity or are a self-employed business owner, please provide contact information for follow-up:

Name	
Title	
Organization/Entity	
Email	
Preferred Phone	

3. For what type of entity are you responding to this survey?

- ◯ An entire organization
- ◯ A division
- ◯ A department
- ◯ A company
- ◯ Other (please specify other type)

4. If an organization, division, etc., what is the name?

1

5. What is the size of the entity for which you are responding?

- ◯ 1-10 people
- ◯ 11-100 people
- ◯ 101-500 people
- ◯ 501 or more people

6. What is your role in the entity named above?

- ◯ CEO, President, or Owner
- ◯ Executive Director
- ◯ COO
- ◯ CIO
- ◯ Director
- ◯ Manager
- ◯ Other (please specify)

7. What is the nature of the work of the entity above?

8. How would you categorize your entity's current internet service speed and dependability?

- ◯ No available internet
- ◯ No reliable internet
- ◯ Unsatisfactory internet service
- ◯ Satisfactory internet service
- ◯ Other (please explain)

9. If "Unsatisfactory," why?

- ☐ Too slow
- ☐ Not adequate for download/upload applications desired
- ☐ Video distortion
- ☐ Other (please specify)
- ☐ Audio distortion
- ☐ Not reliable

2

10. If Satisfactory or Good, describe what makes it so.

11. If you do have available internet, what is your internet speed? (Go to Speedtest.net, hit “Go”, and that page should give you an upload and download speed)

Upload speed	
Download speed	

12. Automation applications: Check or list all automation applications currently important to your entity, indicating the level at which they are needed. You may skip those that are "None."

	None	Little	Moderate	Great
Automated operations, e.g. waste water plant, gas stations, etc.	○	○	○	○
Automated “smart” inventory mgmt., e.g. room or parking space availability, items in stock	○	○	○	○
Automated order fulfillment	○	○	○	○
Machine ops, monitoring, testing, troubleshooting (slots, vehicle testing, food service)	○	○	○	○
Online ordering	○	○	○	○
HVAC	○	○	○	○
Building access control systems	○	○	○	○
Intelligent transportation (smart road systems, pkg structures, signals, pedestrian warning systems, etc.)	○	○	○	○
Smart transportation systems infrastructure (bus/fleet tracking)	○	○	○	○
Environmental monitoring	○	○	○	○

3

	None	Little	Moderate	Great
Facility management ("smart" smoke detectors, sprinklers, elevators, escalators, HVAC, lighting, etc.)				
Fail safe sensors or alarms				
Smart home/building monitoring, metering				
Underground infrastructure monitoring (cables, water/sewer, pipelines)				

Other (please specify and indicate level needed)

13. Business: Check or list all applications currently important to your entity, indicating the level at which they are needed. You may skip those that are "None."

	None	Little	Moderate	Great
Business Office (e.g. MS Office)				

Other (please specify and indicate level needed)

14. Cloud Computing: Check or list all applications currently important to your entity, indicating the level at which they are needed. You may skip those that are "None."

	None	Little	Moderate	Great
Cloud Computing Services				
Data Storage (digital content storage/distribution, digital libraries)				
Grid computing (medical/academic research)				

Other (please specify and indicate level needed)

4

15. Communications: Check or list all applications currently important to your entity, indicating the level at which they are needed. You may skip those that are "None."

	None	Little	Moderate	Great
Emergency dispatch & coordination/radios				
Call center applications				
PSTN SIP				

Other (please specify and indicate level needed)

16. Data Visualization: Check or list all applications currently important to your entity, indicating the level at which they are needed. You may skip those that are "None."

	None	Little	Moderate	Great
Big data				
Data mining				
Business analytics				

Other (please specify and indicate level needed)

17. Displays: Check or list all applications currently important to your entity, indicating the level at which they are needed. You may skip those that are "None."

	None	Little	Moderate	Great
Electronic signage (programmable)				
Info kiosks, booths, message boards				
Interactive exhibits, learning stations				

Other (please specify and indicate level needed)

5

18. Financial Data: Check or list all applications currently important to your entity, indicating the level at which they are needed. You may skip those that are "None."

	None	Little	Moderate	Great
Credit Card processing, digital payment	○	○	○	○
Financial data transfer	○	○	○	○

Other (please specify and indicate level needed)

19. Gaming: Check or list all applications currently important to your entity, indicating the level at which they are needed. You may skip those that are "None."

	None	Little	Moderate	Great
Online and cloud-based gaming	○	○	○	○

Other (please specify and indicate level needed)

20. Graphics/CAD: Check or list all applications currently important to your entity, indicating the level at which they are needed. You may skip those that are "None."

	None	Little	Moderate	Great
3-D graphic design	○	○	○	○
CGI server farms	○	○	○	○
Computer-Aided Design (CAD)	○	○	○	○

Other (please specify and indicate level needed)

6

21. Internet Services: Check or list all applications currently important to your entity, indicating the level at which they are needed. You may skip those that are "None."

	None	Little	Moderate	Great
Basic wifi-internal needs	○	○	○	○
Open access wifi, public wireless	○	○	○	○

Other (please specify and indicate level needed)

22. IP Services: Check or list all applications currently important to your entity, indicating the level at which they are needed. You may skip those that are "None."

	None	Little	Moderate	Great
Internet Protocol TV	○	○	○	○

Other (please specify and indicate level needed)

7

23. Remote Computing/Control: Check or list all applications currently important to your entity, indicating the level at which they are needed. You may skip those that are "None."

	None	Little	Moderate	Great
Remote Computer-Aided Design (CAD)	○	○	○	○
Remote diagnosis	○	○	○	○
Remote instrumentation or meter reading	○	○	○	○
Remote medical imaging	○	○	○	○
Remote network management, managed services	○	○	○	○
Remote patient monitoring	○	○	○	○
Remote public services (e.g. municipal, utilities)	○	○	○	○
Telepathology	○	○	○	○
Telesurgery	○	○	○	○
Telework (work from home) 1-10 people	○	○	○	○
Telework 11-100	○	○	○	○
Telework 101+	○	○	○	○
Virtual Laboratories	○	○	○	○

Other (please specify and indicate level needed)

8

24. Telecom/Teleconference: Check or list all applications currently important to your entity, indicating the level at which they are needed. You may skip those that are "None."

	None	Little	Moderate	Great	Weekends
Multi-campus or cross-department, or cross-entity collaboration					
Teleconsulting (Consultant, Specialist appts)					
Videoconferencing <50 people					
Videoconferencing 51-100 people					
Videoconferencing 101+					
Virtual Classroom <50					
Virtual Classroom 51-100					
Virtual Classroom 101+					
Telesurgery					
Telework (work from home) 1-10 people					
Telework 11-100					
Telework 101+					
Virtual Meetings 1-10 people					
Virtual Meetings 11-100 people					
Virtual Meetings 101+					
Virtual Work Collaboration Spaces					

Other (please specify and indicate level needed)

9

25. Video: Check or list all applications currently important to your entity, indicating the level at which they are needed. You may skip those that are "None."

	None	Little	Moderate	Great
HD (high def) streaming video	○	○	○	○
Place-shifted video	○	○	○	○
Ultra high def streaming video	○	○	○	○
Video on demand, e.g. Netflix	○	○	○	○
Video marketing	○	○	○	○
Video transfer	○	○	○	○

Other (please specify and indicate level needed)

26. Are there broadband, internet, or “smart” applications you foresee needing in the next five years that should be mentioned? If so, please list and/or explain:

27. Is there any additional information you believe would be helpful in planning for the broadband needs of your entity or organization for the foreseeable future? If so, please explain:

10

Appendix C: Results of the Household Survey

Fifty-eight (58) Tribal member households were surveyed regarding their current Internet service and family broadband needs; 24 of those households (40%) completed the survey.

- Q1 asked the number of people in the household using the Internet. 23 of the 24 respondents replied citing 1 to 6 household members - with an average of 3.
- The number of devices per household reported by the 23 respondents answering Q2 ranged from 4 to 26 with an average of 9. If we dropped the outliers, the average number of devices per household is 7.
- In response to Q3, 26% respondents stated that their households have NO reliable internet, 52% said their Internet was unsatisfactory, and only 22% stated their internet service was satisfactory.
- In Q4, "Too Slow" and "Not Adequate for Download/Upload Apps Desired" were the reasons for dissatisfaction, with a 50/50 split for each.
- Q6 requested upload and download speeds of household internet.
    - 10 respondents have upload speeds between 5 Mbps and 45 Mbps. A few responded "high" or "slow" with the average of 6 upload speeds of 19 Mbps
    - 9 responded regarding download speed, and 6 of these responses recorded speeds between 55 Mbps and 404 Mbps (average 234 Mbps).
- Online banking was identified as the greatest basic internet need by the largest number of respondents (59% chose "Great" and 36% "Moderate" need), with "basic" internet/social media needs and home security, home systems each receiving over 45% in responses of "Great" need in Q7.
- In Q8 regarding entertainment applications, over 81% of respondents identified Video on Demand as either a "Great" (50%) or "Moderate" (32%) need, with 59% stating either a "Great" or "Moderate" need for gaming app support.
- The greatest needs under telecommuting and home business were for credit card processing and digital payment, with an 80% identified need as "Great" or "Moderate". Ultra-high definition video streaming was second most important of the six choices, with over 71% of respondents indicating a need at the level of "Moderate" or "Great" in Q9.
- Question 10 dealt with distance learning/teaching/training. Virtual classrooms and ultra-high-definition video streaming were the top 2 needs identified. 65% of respondents indicated virtual classroom apps were a "Great" or "Moderate" need, and 60% of respondents claiming the same for ultra-high-definition video streaming.
- Q11 requested custom answers about applications that would need support in the next 5 years. Student access to internet speed and reliability was the top response.
- Q12 requested suggestions for household internet improvement. Answers included:
    - Explore potential solutions through evaluation from a new internet provider
    - Put an Xfinity and Verizon tower on the Casino parking structures
    - Enhance speeds of uploads, downloads
    - Deploy 5G

Appendix D: Household Needs Assessment Survey

Chumash Household Survey:
Internet/Broadband Needs #2

1. How many people in your household use the internet?

2. How many devices in your household might be using the internet simultaneously? (Don't forget "smart" devices: phones, TVs, thermostats, "Alexa"s, etc.)

3. How would you categorize your household's current internet service speed and dependability?

- ○ No available internet
- ○ No reliable internet
- ○ Unsatisfactory internet service
- ○ Satisfactory internet service.

4. If unsatisfactory, please indicate why:

- ☐ Too slow
- ☐ Not adequate for download/upload/applications desired
- ☐ Video distortion
- ☐ Audio distortion
- ☐ Not reliable
- ☐ Other (please specify)

5. If "Satisfactory," please describe what qualities make it "Satisfactory":

1

6. If you do have available internet, what is your internet speed? (Upload and download speeds can be found either on your internet services bill, or go to Speedtest.com, hit "Go", and it should give you an upload and download speed)

Upload speed:

Download speed:

7. Check all BASIC applications listed currently important to your household and the level they are needed as indicated (Note: Next questions deal with Entertainment, Telecommuting/Home Business, and Distance Learning/Teaching/Training):

	None	Little	Moderate	Great
Basic Internet, Social Media				
Online Banking, Shopping				
Home security, Home systems (Alarms, Ring, Lighting, Alexa, Sprinklers)				

Other: please list and indicate the level of usage

8. Entertainment – list all applications, current or desired, for your household:

	None	Little	Moderate	Great
Ultra High Def Streaming Video				
Video on Demand, e.g. Netflix				
Gaming				

Other: please list and indicate the level of usage.

2

9. Telecommuting/Home Business – list all applications, current or desired, for your household use

	None	Little	Moderate	Great
MS Office Pro or equivalent	○	○	○	○
Virtual Work Collaboration Space	○	○	○	○
Videoconferencing <50	○	○	○	○
Computer Aided Design(CAD)	○	○	○	○
Credit Card Processing, Digital Payment	○	○	○	○
Ultra High Def Video Streaming	○	○	○	○

Other: please list and indicate the level of usage

10. Distance Learning/Teaching/Training – list all applications, current or desired, for your household

	None	Little	Moderate	Great
Virtual Classroom <50	○	○	○	○
Virtual Classroom 50-99	○	○	○	○
Multi-Campus Collaboration	○	○	○	○
Webcasting	○	○	○	○
Ultra High Def Video Streaming	○	○	○	○

Other: please list and indicate the level of usage.

11. Are there broadband, internet, or “smart” applications you foresee needing in the next five years that should be mentioned? If, so, please list and/or explain:

3

12. Is there any additional information you believe would be helpful in planning for the broadband needs of your household for the foreseeable future? If so, please explain:

4

Appendix E: Highlights of Chumash Business Enterprise/Department Interviews

Highlights of Post-Survey Interviews: Chumash Broadband Study

Chumash Broadband Study Business/Enterprise Surveys were administered from mid-March through mid-April, 2021. The following table shows survey participants, and those interviewed.

Bus Entity/Dept Survey Submitted	Entity (ies) or Domain	Survey Respondent	Interview Date
3/22/21	Division- LLCs Hotel Corque Hadsten House Hotels	Scott Gold, Director	3/26/21
3/23/21	Chumash Fire Department	Joseph Zavalla, Fire Chief	3/23/21
4/02/21	Education Department	Dawn Valencia, Director	4/09/21
4/02/21	Chumash Foundation	Veronica Sandoval, Chief Operations & Communications Officer	
4/05/21	Chumash Casino & Resort	Kyle Schaffer, Director IT Infrastructure	4/05/21
4/05/21	Human Resources	Dan Nogal, Chief HR Officer	4/07/21
4/05/21	Tribal Clinic	Nathan Hawk, IT Security Specialist	4/07/21
4/05/21	Strategy Division	Halise Ekmen, Chief Strategy & Performance Mgmt Officer	4/16/21
4/06/21	Santa Ynez Band of Chumash Indians	John Elliott, CEO	4/16/21
4/14/21	Technology Services	Michael Figueroa, Audio Visual Supervisor	4/19/21
4/16/21	Chumash Cellars (Kita Winery); Chumash Museum	Michael Figueroa	4/19/21
4/16/21	Santa Ynez Chumash Museum & Cultural Center (in development)	Kathleen Conti, Director	
	Chumash Broadband Infrastructure – General	Kyle Schaffer, Director IT Infrastructure	4/23/21

4/5/21 and 4/23/21 Interviews:
Kyle Schaffer, Director, Chumash IT Infrastructure

4/5/21 Interview Highlights (prior to most survey responses): Casino et al

1. Key Considerations
   a. On premise solutions within next 5 years will require major new applications
      i. Adequate Casino services today could be broadband deficient in future based on cloud needs and other applications
      ii. Tribe likely to find itself needing more capacity
   b. Currently: Office 365 – all office products
   c. Enterprise applications
      i. Modern data analytics
      ii. Hybrid cloud need
   d. Software as a service (software in cloud) migrating to platform as a service (management of your own services)
2. Carriers
   a. Frontier land lines engaged for phone services
      i. Carrier seems to be wanting to get out of land line business
   b. Wifi modernization needed (see heat map of asset inventory)
   c. Possible new carrier needed to address "platform as a service"
3. Possible new spectrum uses – lighting up new areas? Improved phone service?

4/23/21 Interview Highlights (after survey responses): Chumash IT/Broadband

1. Key Considerations
   a. Business/enterprise survey responses held few surprises, IT is aware of shortcomings called out in surveys
   b. IT needs to upgrade to gigabit service to meet growing needs of service entities and businesses, to meet customer and resident expectations and for continuity across the enterprise-build for future even if some sites satisfactory now
   c. Tribal IT needs a strategy to ensure new acquisitions are under IT control
   d. Chumash residential area vastly underserved (Camp 4 area completely unserved at this point and is slated for new residential housing)
   e. Chumash has experienced no outages from Comcast last ten years, only a few days lost from Frontier…key provider service has been redundant
   f. Cost of entry probably too prohibitive for Chumash to pull fiber to individual Tribal business/service sites, or off-site Chumash locations
   g. Need greater reliability for new cloud-based Chumash Enterprise Resource Planning (ERP) solution
   h. "Gigabit would do everything"

i. Would be great to own our own network fiber allowing ability to grow and expand as needed. Tribe currently dependent on carriers for access, capacity, speed. Have equipment, might need to upgrade equipment to own assets.

2. Issues
    a. Patchworked wifi on reservation not a problem, but aged wifi – equipment and models – is a problem
    b. Most reservation sites have LAN to the data center without having their own internet
    c. Complexity of solutions growing…various contracts, various providers, various services, constant monitoring, renegotiating; Tribal business and service entities outside Trust lands subject potentially to different carrier plans, difficult to provide continuity in services from location to location – complexity will only increase with new Chumash business offerings

4/19/21 Interview:
Michael Figueroa, Audio Visual Supervisor, Chumash Casino Resort

4/19/21 Interview Highlights – Casino

- Casino connectivity (less than 500Mbps up/down) more reliable than most sites due to being hard-wired
- Satisfactory for concerts, guest use, etc., streaming works, lower speed in Casino
- Near future needs will require greater speed, capacity: cloud-based apps, data storage

4/19/21 Interview Highlights – Winery

- Winery has minimal connectivity needs
    - Back of the house ops
    - Tasting room wifi
- Point of Sale is networked, not on internet

4/19/21 Interview Highlights – Museum

- Museum once developed will have significant needs
    - Interactive exhibits
    - QR codes
    - Great need for archiving, data storage
    - Online events
    - Surveillance
    - Streaming

    - Point of Sale – gift shop
    - Storage/inventory
    - Multiple systems online simultaneously
- Gigabit service could run everything

4/16/21 Interview:
John Elliott, CEO

4/16/21 Interview Highlights: Chumash Tribal Broadband Needs

Key Priorities

- Plan not for today but for five years of Tribal Business/Service needs -examples of already anticipated needs:
    - Development of Camp 4, 360 acres – enhanced broadband, residential, entrepreneurship and basic business operation needs (homes, RV park, ballfield, other)
    - Clinic – advanced diagnostics
    - Chumash museum
    - Possible four-year university coursework at Education Center; remote educational services for students out of state, elsewhere than Central Coast
    - Increasing use of digital applications for operations, entertainment, services
- Growing need for inter-connectivity across enterprise, new Enterprise Resource Planning platform being rolled out
- For existing hospitality businesses, satisfying/exceeding guest expectations re connectivity, guest experience important to Chumash enterprise

Note: CEO states "no preferred model" in mind for Chumash broadband enhancement, open to all feasible solutions, but optimal strategies will weigh costs/timeframe to deployment, etc.

4/16/21 Interview:
Halise Ekmen, Chief Strategy and Performance Management Officer

4/16/21 Interview Highlights: Chumash Tribal Enterprise Broadband Needs

Key priorities/concerns:

- Viability of new cloud-based Enterprise Resource Planning (ERP) platform compatibility with mobile devices for those employees "on the go" or traveling
    - Teleworking
    - Leadership approvals
    - Vacation/time-off requests

    - Employee communication while en route
- Customer experience
    - Most visitors not satisfied with adequacy of internet service
    - Those sites off network really inadequate
    - Some cell service in hotel/Casino not adequate, customers, employees need to go to reception or valet area for cell service; blind spots in building
- Scanning devices
- Security applications
    - Blind spots during events, high traffic periods (capacity/speed)
    - Power also a security concern
- Moving analog to digital platform
- Preparedness for off-site betting
    - Pending legislation re mobile sports betting
- Proximity marketing capability

4/9/21 Interview:
Dawn Valencia, Director, Education Department

4/9/21 Interview Highlights: Education Center & Resident/Student Needs

1. Three key considerations
    a. New "Zoom" paradigm
        i. 300 online clients/stakeholders
        ii. Barely meeting capacity needs with (pandemic) skeleton crew, what will happen with full crew?
    b. Purchasing uncertainty regarding best available infrastructure, but not sure
        i. Voice over Internet phones – spotty quality, problems with hearing person on other end or vice versa
    c. Future plans include
        i. More online coursework to serve both local and out of the area Tribal members
        ii. Engagement with and connectivity needed with community colleges
        iii. Possible university partnerships
2. Positive outcomes from pandemic
    a. Education Department serving more people (Tribal members in Los Angeles, TX)
    b. Tutors busier, due to online rather than in-person consulting
3. Education Center
    a. Currently ~2500sf learning center (converted residence)
    b. Planning expansion of Learning Center within a year
    c. Currently comprised of Classroom Center, small rooms for tutoring, library and digital center (computer lab – check-out laptops for students)

4. Anecdotal inputs re broadband needs for Tribal residents, students
    a. Tribal members currently without landlines cannot get them from Frontier – company says they are out of "ports", so those desiring landlines would have to wait until someone gives up a landline – these Tribal members entirely dependent on internet and phone
    b. Only cell service that works in residential area is Sprint – neither Verizon nor AT&T work there
    c. During August 2020 blackout, no internet was available so no phone service was available to those without landlines – Sprint tower is on Casino, but generator did not electrify the Sprint tower, so no phone service for emergencies during blackout – Tribal member greatly inconvenienced with minor emergency (had to walk to get phone service), but could have been grave if emergency situation had been worse
5. Ancedotal inputs re Tribal Hall
    a. Employees have Verizon, but they don't work in certain areas, so if there is an emergency, you need to call the Tribal employee's personal phone

4/7/21 Interview: Chumash Employee Resource Center (CERC) & HR
Dan Nogal, Chief HR Officer

4/7/21 Interview Highlights: CERC, Employee, Enterprise

1. Telework and teleconferencing needs beginning in 2020 will continue
    a. Telework resource needs are permanent, space sharing of CERC building will require this as space is becoming a premium (moving up to 50% of work at home, 50% work in office)
    b. Doubled number of video cameras for employees
    c. Videoconferencing (101+) for HR compliance, training, etc.
    d. Travel dollar savings through online meetings with consultants
2. New Enterprise Resource Planning (ERP) system for warehouse inventory being launched across tribe
    a. Human capital management tool
    b. Need for employee shuttle to have connectivity for employee phone for clocking in, requesting time off, etc. (means bus pick-up spots need good service)
    c. Eventually employees will take training on their phones
    d. Rolling out more employee self-service online resources (e.g. Employee Handbook with keyword search capability)
    e. More interactive online work (Benefit questions, training webinars)
3. Geo-fencing (proximity marketing) growing, will need greater bandwidth, speed
4. Right now on Casino property, connectivity adequacy dependent on carrier

a. Verizon – satisfactory
b. AT&T and Sprint – not adequate
c. Intranet okay for now, but not future needs

5. HR changing quickly, becoming more automated, 1G estimated need for near future automation

4/7/21 Interview:
Nathan Hawk, IT Security Specialist, Tribal Clinic

4/7/21 Interview Highlights: Tribal Clinic

1. Internet at Clinic (Frontier connection) pretty solid, "All's well at the moment"
   Note: Some slight dissatisfaction with Clinic connectivity expressed by others
2. Main priority: Reliability/Redundancy
3. 80 employees currently – existing connectivity 500up/500down – adequate for current needs
4. Telemedicine usage – a little behavioral telemedicine, not much right now
5. Great need only applicable currently to office/business applications
6. Little to none most applications
   a. Little to moderate – automated facility management
   b. Moderate for cross-department, enterprise collaboration, teleconsulting
7. Does not see high need for greater connection any time in near future
   Note: CEO projected increase in remote diagnostics. telemedicine

3/26/21 Interview:
Scott Gold, Director, Hotel Corque & Hadsten House

3/26/21 Interview Highlights: Hotels

1. Two priorities:
   a. Wireless internet for guests – reliable connection + bandwidth
      i. CRITICAL – families bring minimum of 4 devices x 122 rooms + devices in lobby, at pool, restaurant
      ii. Hadsten House much worse, lots of complaints
   b. Business and management applications for staff
2. Note: Almost as bad now to lose internet as to lose power
3. Principal hotel applications: email, games, internet, movies, Zoom, social media
4. Key issue
   a. Wireless signal weak and unstable some parts of both facilities

3/23/21 Interview:
JP Zavalla, Fire Chief, Chumash Fire Department

3/23/21 Interview Highlights: Fire Department/Emergency Response

1. Chumash Tribal Fire Department is affiliated with Forest Service, considered a national asset…Chief gone 21 days of a month sometimes, across the country
2. Chumash Fire Department is not currently the "official" first responder for Tribal emergencies, although it frequently responds voluntarily to reduce wait time for those in distress. County Fire is "official" Chumash first responder entity.
3. Applications dependent upon tribe's repeater on top of Casino
4. Dispatch
    a. Dispatch currently through Forest Service – Tribal system compatible
    b. Once Camp 4 in use, dispatch will need to be compatible with County Fire (narrowband?)
5. Greatest current broadband need
    a. Zoom meetings, classes
        i. Four classes, eight hours/day
6. Current issues
    a. Mondays often have inconsistent internet, often with no service In the a.m., until IT is contacted to correct
    b. At least twice a week, Fire Department loses internet, is down until ticket is submitted, addressed
7. Future needs
    a. Anticipated increase in broadband need with Camp 4 establishment
    b. Even greater need if Tribal leaders determine to put Tribal Fire Department in leadership of reservation fire issues as first responder (in place of County as "official" first responder agency) Currently no knowledge regarding this decision

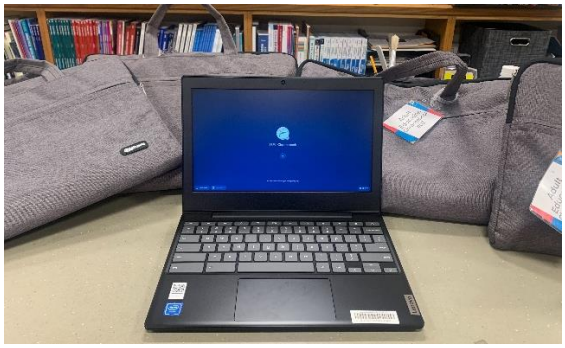
APPENDIX I

Santa Barbara Public Library Broadband Connectivity

The Santa Barbara Public Library, a community destination, offers programs and services in education, culture, and the arts. Serving tourists, residents, and some of the community's most vulnerable, the Library receives thousands of visitors daily, providing critical needs as community resource navigation, early literacy instruction, caregiver support, workforce development, and extensive free access to technology. With three locations in Southern Santa Barbara County and nearly $1,000,000 in overall technology assets, 20% of which are dedicated specifically to broadband connectivity, SBPL supports broadband efforts for the community through its wide range of equipment offered both on site and for at home use. Available resources include:

On Site Use

56 Public Access Computer Workstations	$53,883.00
37 Laptops	$39,627
16 Chromebooks	$7,328
23 iPads	$13,800.00

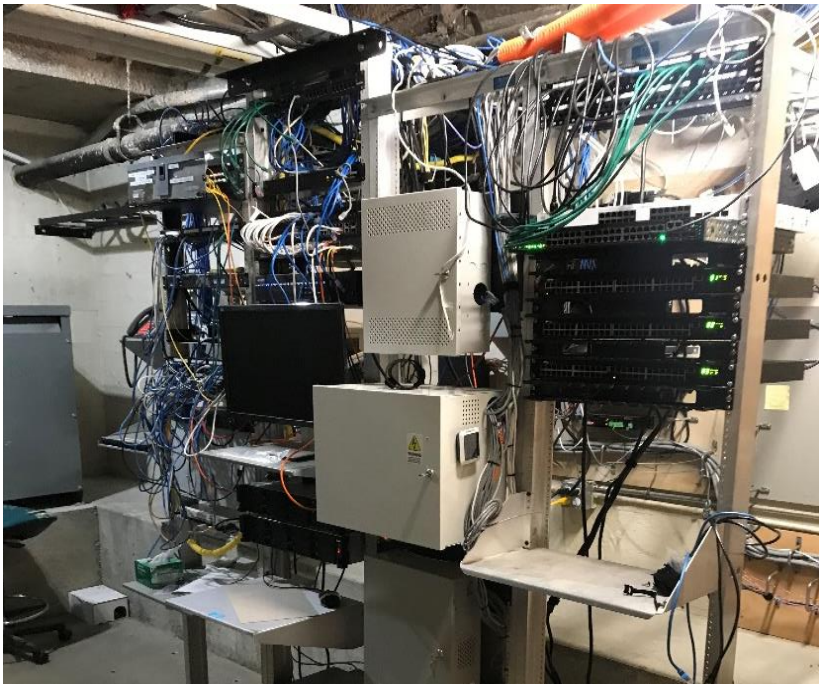


At Home Use

53 Hotspots	$5,300.00
17 Chromebook and hotspot combination kits	$9,486

Network Management

20 Access points for Wi-Fi	$15,600
9 Managed network switches administered remotely or via web interfaces that allow us to create networks.	$30,122
31 Unmanaged network switches.	$1,395.00
Van broadband equipment (Cradlepoint Wireless Router and Modem)	$3,359.00
5 Wi-Fi adapters	$100.00
Backup equipment/Replacement Parts	$20,000



With the Library investing $200,000 in total to fund initial equipment needed to provide connectivity, in addition to the one-on-one training and classes offered by staff to support its use, Library staff assess broadband needs on an ongoing basis and actively seek funding for critical upgrades and expansion. Most recently, the Library was in need of an entirely new Wi-Fi system with cloud-based management in order to better serve community members. The Library was awarded a $57,542.02 California State Library High-Speed Broadband grant, which partially funded these projects, but a large gap of over $140,000 remains for long term replacement and upgrade or remaining equipment.

A long-term plan is needed that incorporates a broadband needs assessment, including a cost and replacement schedule, and identifies funding sources. As community members continue to rely heavily on the Library for broadband access, there is the ongoing challenge of securing sustained funding to replace end-of-life equipment impacting Wi-Fi access, to update licenses needed to manage public computers and application updates, to backup critical servers, and most importantly to keep pace with expanding equipment needs.

APPENDIX J

2022 Federal Grant Programs		
Broadband Infrastructure		
Program	*Eligible Uses*	*Funds*
NTIA Tribal Broadband Connectivity Program Round II To bring high-speed internet to tribal lands. The goal of these programs is to promote the meaningful adoption and use of broadband services, and supports telehealth, distance learning, affordability, and digital inclusion activities.	Broadband infrastructure builds, broadband adoption activities, workforce development, hybrid projects.	Total Funding: $1 billion Maximum Amount: (anticipated $50 million max for infrastructure, $2.5 million max for adoption projects) No Match
EDA Economic Adjustment Assistance The Economic Adjustment Assistance program is EDA's most flexible program, and grants made under this program will help hundreds of communities across the nation plan, build, innovate, and put people back to work through construction or non-construction projects designed to meet local needs.	Technical planning, workforce development, entrepreneurship, public works, infrastructure projects.	Total Funding: Approximately $300 million per year Maximum Amount: Regionally specific, typically less than $5 million No Match
USDA Community Connect To assist the build of broadband networks that provide service on a community-oriented connectivity basis in rural areas.	Construction of infrastructure, leasing of facilities, providing broadband service free of charge for 2 years to essential community facilities, 10% can be used for improvement/expansion/construction of community center.	Total Funding: $35 million Maximum Amount: TBD, anticipated $3 million 15% Match
Digital Equity		
USDA Distance Learning & Telehealth The Distance Learning and Telemedicine program helps rural communities use the unique capabilities of telecommunications to connect to each other and to the world, overcoming the	Broadband facilities (capped at 20% or less), A/V and interactive video equipment, terminal and data terminal equipment, computer hardware, network components and software, inside wiring and similar infrastructure.	Total Funding: $35 million Maximum Amount: $1 million 15% Match

effects of remoteness and low population density. (only applicable for populations with less than 20,000)		
FCC Affordable Connectivity Program The FCC Affordable Connectivity Program helps those in need pay for high-speed internet service and technology.	$30 per month, or $75 per month if on Tribal Lands. $100 to help pay for desktop, laptop, or tablet computer.	Total Funding: $14 billion Maximum Amount: see eligible uses No Match
FCC Affordable Connectivity Outreach Grant Program To assist in outreach efforts to raise awareness about the Affordable Connectivity Program and increase enrollment in the ACP.	Outreach activities, staff salaries, training, hybrid projects.	Total Funding: $100 million Maximum Amount: TBD No Match
FCC E-Rate This FCC program assist schools and libraries obtain affordable broadband.	Services to a library or school (internet access) and services that deliver internet within a school (internal connections).	Total Funding: Annual determination Maximum amount: Discount between 20-90%, depending upon level of poverty in location No Match
2022 State Grant Programs		
Broadband Infrastructure		
California Last Mile Federal Funding Account Grant The Federal Funding Account will fund last mile connections to unserved and underserved areas, with equal funding to urban and rural areas. The program prioritizes unserved areas.	Construction of broadband infrastructure, lease access to property for backhaul services(5 years), upgrade of existing broadband facilities, costs between 3/3/21 & 12/31/24 (2% admin, and 15% contingency).	Total Funding: $2 billion ($1 billion for urban areas, $1 billion for rural areas) Maximum amount: $25 million No match required, but earn points if provided
Local Agency Technical Assistance Grant These grants support tribes and local agencies in their	Pre-construction expenses, including needs assessments, environmental and engineering studies, network design, strategic	Total funding: $50 million

efforts to expand broadband to communities lacking sufficient internet. This program aims to prepare eligible entities for last mile broadband deployment.	plans, joint powers authority formation.	Maximum amount: $500,000 No Match

2023 Federal Grant Programs (assumed)		
Broadband Infrastructure		
USDA ReConnect The ReConnect program offers loans, grants, and loan-grant combos to facilitate broadband deployment in unserved and underserved areas of rural America. The program will fuel long-term rural economic development.	Construction of broadband infrastructure, leasing of facilities for infrastructure, administrative 2%.	Total Funding: TBD Maximum amount: TBD, anticipated $25 million 15% Match
EDA Economic Adjustment Assistance See 2022 for program outline and details		
Digital Equity		
USDA Distance Learning & Telehealth See 2022 for program outline and details		
FCC Affordable Connectivity Program See 2022 for program outline and details		
FCC E-Rate See 2022 for program outline and details		
2023 State Grant Programs		
Broadband Infrastructure		
California Advanced Services Fund		Total Funding: Determined by city and county

2024 Federal Grant Programs
Digital Equity

NTIA Digital Equity Program This competitive program is to promote digital inclusion and equity to ensure that all individuals and communities have the skills, technology, and capacity needed to reap the full benefits of our digital economy.	Broadband adoption, education, healthcare, workforce development, hybrid projects.	Total Funding: $1.25 billion Maximum amount: TBD TBD Match Requirement

Appendix K: Regional Collaborative GIS: Service Details

APPENDIX: SERVICE DETAILS

Operation as well as potential terms and conditions for maintaining the current tool is outlined as follows:

- Users have a unique authenticated presence with capabilities for data upload, map creation, and interaction with other members.
- Map remains in interactive format
- System library and current layers can be built out to any scale
- Additional maps may be fitted with customized tool sets
- Each member user may access without going through a centralized administrator pending agreements
- Each member user may administer its own data and maps for updates
- Each member user would have access to a specialized broadband installation project management tool

As the State determines which of its properties may be important for broadband infrastructure development, this information should be added to the system.

Regional system cost to implement beyond current capacity is approximately $6,000 annually per collaborative partner or $60,000 regionally per project year. The business model can emerge on how to fully manage and subsidize with potential grant funding.

Each BCPC Member shall receive the following

~ one user account, with system usage limited to BCPC business

~ ability to upload unlimited map data layers (subject to a total storage limit of 1GB, which should be more than adequate for most cases, with extra space available on a no-markup basis). These layers may be shared the other users on the platform or to the public at large without restriction.

~ ability to develop an unlimited number of customized interactive maps (with different layer sets, covering different areas, and featuring different toolsets). These maps may be shared the other users on the platform or to the public at large without restriction.

~ ability to transact unlimited operations on maps (subject to a total data traffic limit of 1TB monthly, which should be more than adequate for most cases, with extra bandwidth available on a no-markup basis)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