

SMART COUNTY MASTER PLAN



EARLY ACTION PLAN

August 2023 Draft

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Table of Abbreviations and Acronyms

Abbreviation or Acronym	Definition
ATIS	Advanced Traveler Information System
CAD	Computer Aided Dispatch
CCTV	Closed-Circuit Television
CFI	Charging and Fueling Infrastructure
CHP	California Highway Patrol
CPUC	California Public Utilities Commission
ECC	Emergency Communications Center
EMS	Emergency Management Services
GHG	Greenhouse Gas
IE PSOP	Inland Empire Public Safety Operations Platform
IERBC	Inland Empire Regional Broadband Consortium
ISP	Internet Service Provider
ITS	Intelligent Transportation Systems
NOFO	Notice of Funding Opportunities
SBCOG	San Bernardino County of Governments
SBCTA	San Bernardino County Transportation Authority
SBVCTSS	San Bernardino Valley Coordinated Traffic Signal System
SWOT	Strengths, Weaknesses, Opportunities, Threats
ZEV	Zero Emission Vehicle

0 Executive Summary

The San Bernardino Council of Governments (SBCOG) leadership, in coordination with the SBCTA/SBCOG Emerging Technology Ad Hoc Committee and the full SBCTA/SBCOG Board, initiated a Smart County Master Planning process to ensure technology investments are aligned with the overall goals and objectives of the region. With the overall Master Plan, SBCOG is looking to:

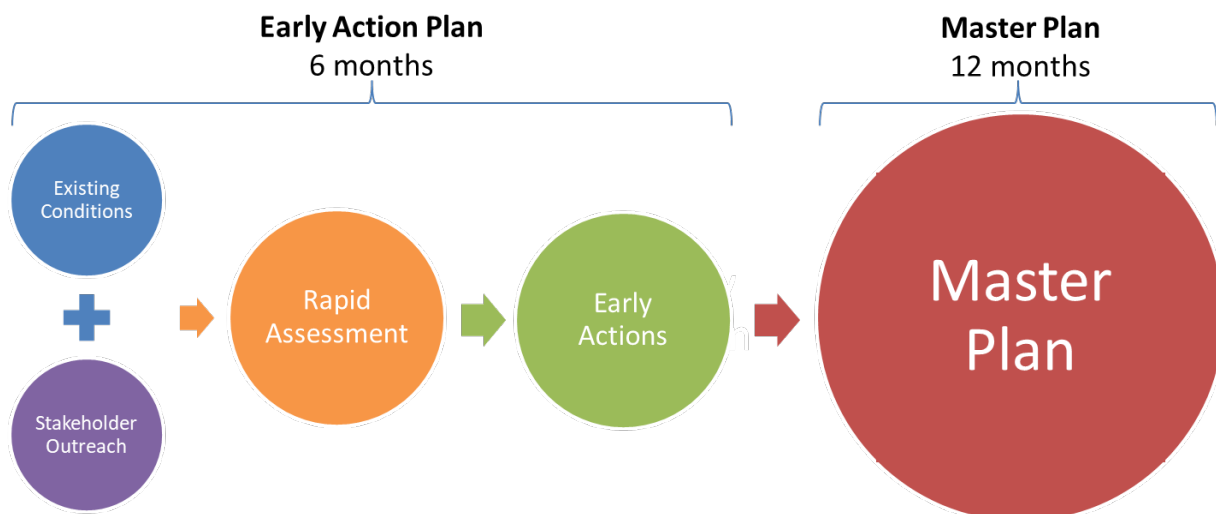
- Promote Clean and Sustainable Transportation,
- Enhance Traffic Flow and Connectivity,
- Improve Quality of Life through Universal Broadband Access, and
- Rewrite the Narrative by promoting advancements and celebrating early wins to incentivize living and working in this region of Southern California.

The Smart County Master Plan (Smart County MP) supports the overarching goals of the SBCTA/SBCOG Emerging Technology Ad Hoc Committee and the SBCTA/SBCOG Board, which is composed of one representative from each of the 24 incorporated cities and towns in San Bernardino County, and the five supervisorial districts of San Bernardino County.

The Emerging Technology Ad Hoc Committee is serving as the guiding committee for this effort. Additionally, a group of information technology representatives from the county and several cities are providing key technical input. Substantial funding for this Master Plan has been provided from San Bernardino County.

This Early Action Plan, the first step in the Smart County Master Planning effort, culminates a six-month effort involving existing conditions analysis and extensive stakeholder outreach (see **Exhibit 0-1: Planning Process**). The thrust of the Early Action Plan is to identify focus areas for further study in the Master Plan, and to identify projects and/or programs – preferably within the high priority focus areas – that represent “early wins” for the subsequent overall Master Planning effort. The Early Action Plan will be followed by a more detailed yearlong Smart County Master Planning effort that will result in medium- and longer-term solutions. The Master Plan is scheduled to kick off in the 4th quarter of calendar year 2023.

Exhibit 0-1: Planning Process



Stakeholders consulted for the Early Action Plan included city policy makers, city managers, and transportation and IT professionals from across the region. They were engaged through surveys, interviews, and collaborative meetings and identified the following three priorities:

Public Safety – Stakeholders identified public safety as a top priority more consistently than any other topic. Although the overall crime rate in San Bernardino County has been steadily decreasing the past five years¹, violent crimes have increased and there is still a strong perception that more needs to be done to address public safety. This priority involves using technology to bolster security measures and create safer communities. The overarching aim is to establish a secure environment where residents can conduct their daily activities with an assured sense of safety and security.

Transportation – On average, San Bernardino County residents' commute times are longer than all nearby regions including Las Vegas, Los Angeles, and San Diego.² On the positive side, coming out of the COVID pandemic, the percentage of people commuting alone dropped from 80% to 73% in 2021, which is lower than it was a decade prior in 2011. Although vehicle collisions resulting in injury or death dropped significantly in 2020, they've rebounded to approximately pre-pandemic levels.³ Stakeholders are looking to transform transportation systems through the application of innovative technologies.

Bridging the Digital Divide – Expanding the reach of digital connectivity is a core value in the Smart County initiative that reflects a commitment to fair access and opportunities to all San Bernardino County residents. San Bernardino County lags the California average (6.7%) with approximately 12.1% fewer overall households served at speeds greater than 25Mbps download/3Mbps upload⁴. Over 25% of households in numerous San Bernardino County zip codes do not have computer or internet connection⁵.

Based on these priorities, an assessment of the existing conditions data, and more specific input received from stakeholders, the following early action projects were identified (see **Exhibit 0-2**):

Exhibit 0-2: Early Action Projects Mapped to Priorities

	Public Safety	Transportation	Bridging the Digital Divide
Broadband Access: Building on the State Middle-Mile Broadband Initiative, bridge the broadband access gap between local networks and the middle mile fiber optic infrastructure, focusing on underserved areas and key local agency network integration points.			✓
Smart Intersections: Deploy smart intersection technology at strategic locations to improve safety and efficiency, information sharing, and communication, and offer amenities improving quality of life.		✓	
Smart Corridors: Implement Smart Corridor pilots to extend the principles of smart intersections along entire traffic corridors, to		✓	

¹ San Bernardino County Community Indicators: Crime Rate. Available at: <https://indicators.sbcounty.gov/safety/crime-rate/>. Accessed on August 20, 2023.

² San Bernardino County Community Indicators: Mobility. Available at: <https://indicators.sbcounty.gov/transportation/mobility/>. Accessed on August 20, 2023.

³ San Bernardino County Community Indicators: Traffic Safety. Available at: <https://indicators.sbcounty.gov/transportation/traffic-safety/>. Accessed on August 20, 2023.

⁴ <https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/communications-division/documents/broadband-mapping/docs-uploaded-2023/household-deployment-by-county-as-of-dec-31-2021.pdf>

⁵ https://scag.ca.gov/sites/main/files/file-attachments/report_of_digital_divide_within_the_scag_region.pdf?1646941482

	Public Safety	Transportation	Bridging the Digital Divide
facilitate smoother traffic flow, enhance safety, reduce travel times, and minimize environmental impact. Capture lessons learned to inform wider deployment across the county.			
Traveler Information and Emergency Medical Services (EMS): Integrate Advanced Traveler Information Systems (ATIS), video surveillance of key locations, and automation of emergency signage into EMS to make responses more efficient, effective, and timely.	✓	✓	
CAD-to-CAD: Leverage existing Computer Aided Dispatch (CAD) systems known as Inland Empire Public Safety Operations Platform (IE PSOP) to connect neighboring Emergency Communications Centers ECCs, that provide fire, rescue, and EMS communications and coordination, and other cooperating agencies through a cloud-hosted communications system interface known as CAD-to-CAD.	✓		
ZEV: Proactively secure funding for charging and fueling infrastructure for zero-emission passenger vehicles and trucks, through collaboration between SBCTA/SBCOG and local jurisdictions throughout San Bernardino County. SBCTA to focus on public agency-led grant applications with charging/fueling vendor partners, while encouraging local jurisdictions to develop zero-emission charging/fueling sites and apply for funding on their own in parallel.	✓	✓	

Exhibit 0-3 provides “early win” next steps that can be taken in the coming year in parallel with the upcoming Master Planning effort. These next steps are consistent with the high priority focus areas identified through outreach efforts; and they support execution of the identified Early Action Projects. In the case of the first three sets of projects – broadband deployments, smart intersections, and smart corridors – local agencies will now confirm or declare their interest and identify a local champion to move the projects forward. In the case of ATIS and EMS, CAD-to-CAD, and ZEV, SBCTA will continue to support concept and implementation planning in coordination with member agencies and will transition these projects to a local champion later in the process, as appropriate. Initial recommended locations identified for the six early action projects are shown in **Exhibit 0-4**. Next steps for grants, policies, and a risk/opportunity register were also identified to support the overall Smart County efforts.

Exhibit 0-3: SBCTA Early Action Plan Next Steps

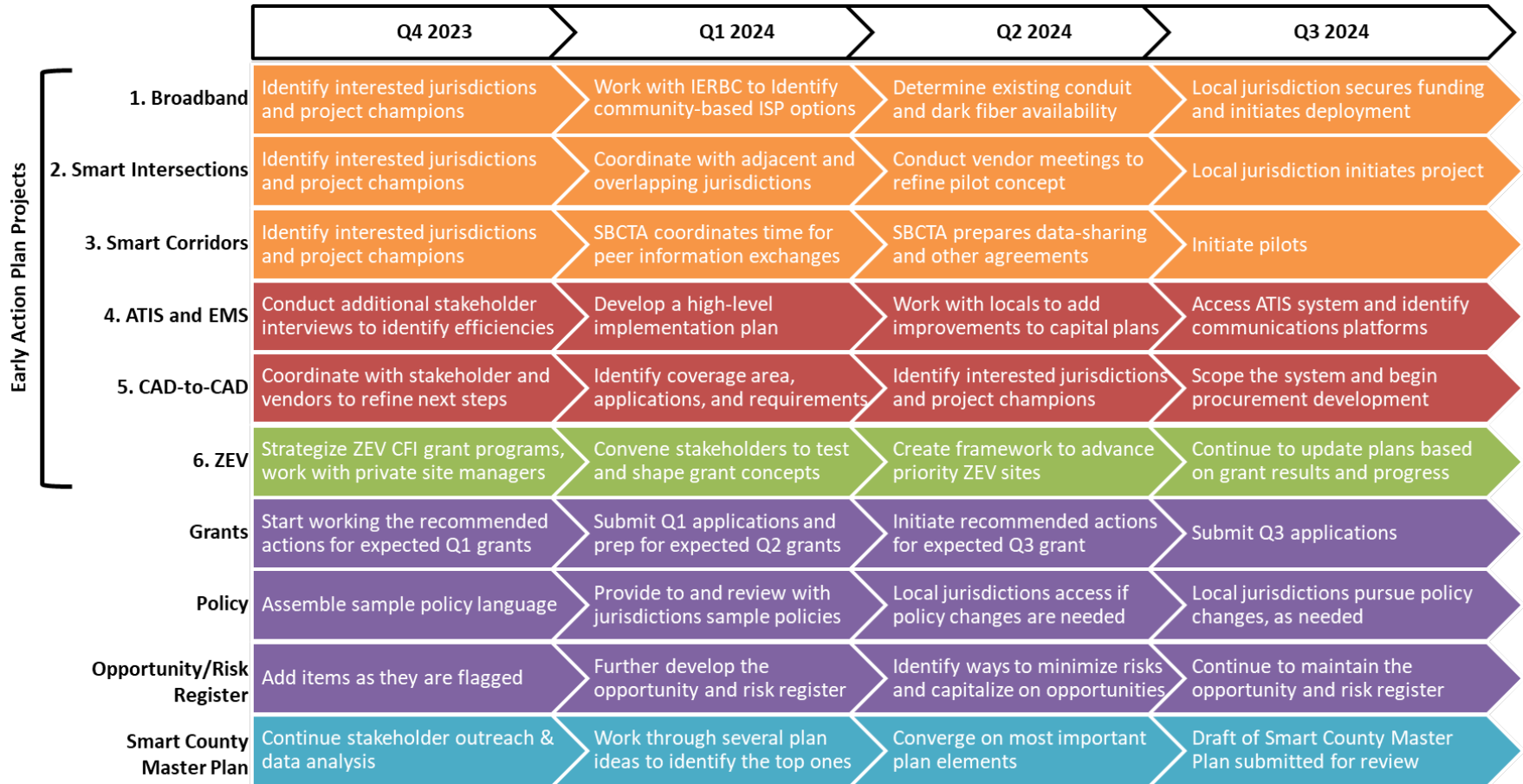
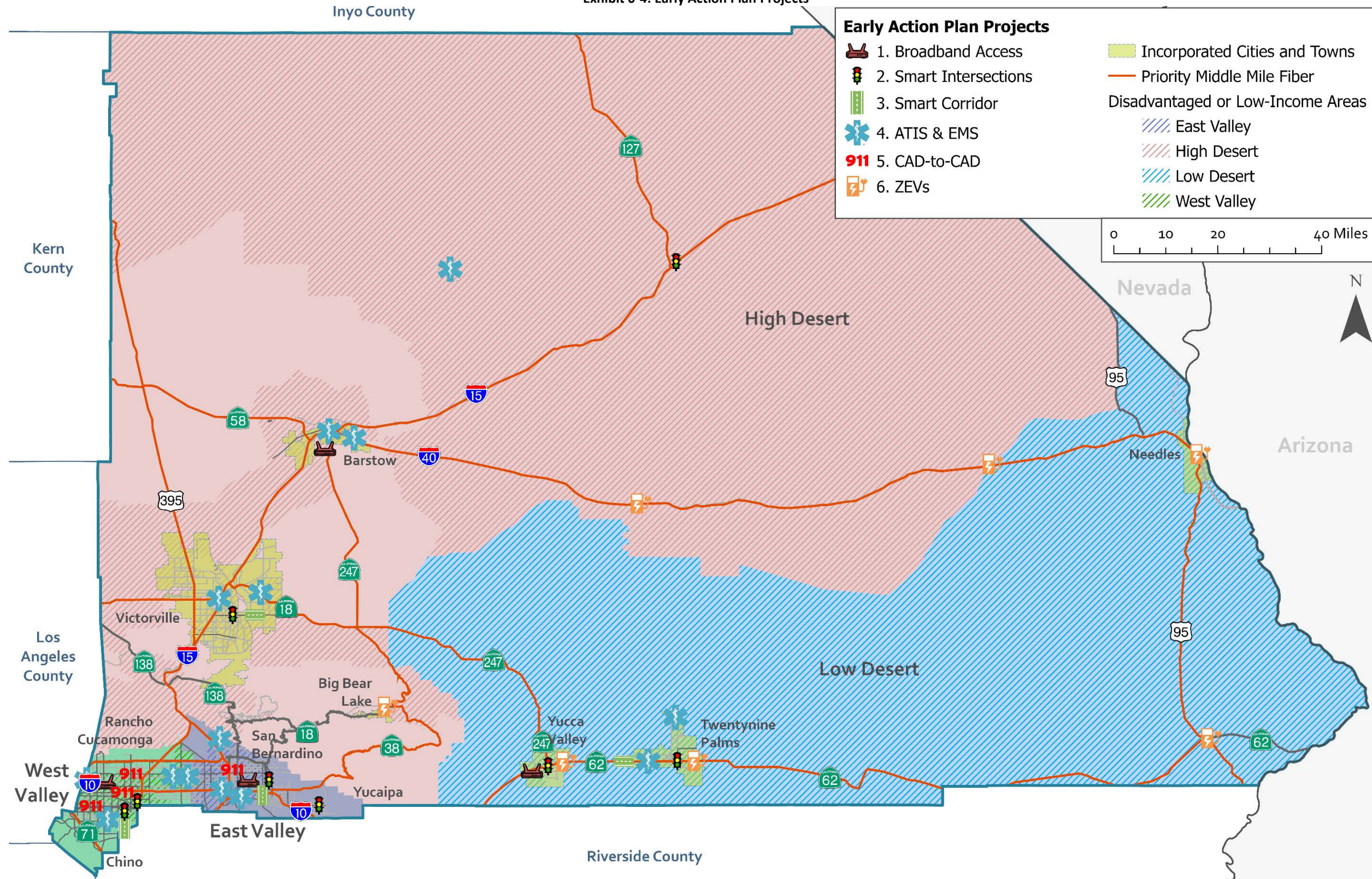


Exhibit 0-4: Early Action Plan Projects



1 Introduction

The San Bernardino Council of Governments (SBCOG) initiated a Smart County Master Plan (Smart County MP) to guide the decision-making and development processes to ensure that actions and technology investments in San Bernardino County are aligned with the overall goals and objectives of the region. It will provide recommendations for short- and long-term solutions taking into consideration existing infrastructure and upcoming developments and represents investments that provide efficiencies in delivery of government services that have a useful life for as long as technology allows.

The Smart County MP supports the overarching goals of the San Bernardino County Transportation Authority (SBCTA)/SBCOG Emerging Technology Ad-Hoc Committee and the full SBCTA/SBCOG Board, which is composed of one representative from each of the 24 incorporated cities and towns in San Bernardino County, and the five supervisorial districts of San Bernardino County.

The Emerging Technology Ad-Hoc Committee is serving as the guiding committee for this effort, and a group of information technology representatives from the county and several cities are providing key technical input. Substantial funding has been provided from San Bernardino County.

The Smart County MP will analyze existing conditions, identify opportunities and challenges, and recommend strategies to achieve specific goals related to transportation, infrastructure, sustainability, and other key factors including:

- Improved Government Operations
- Improved Mobility
- Enhanced Public Safety
- Improved Economic Viability
- Attainment of Climate Goals
- Distribution of benefits that address the digital divide in San Bernardino County.

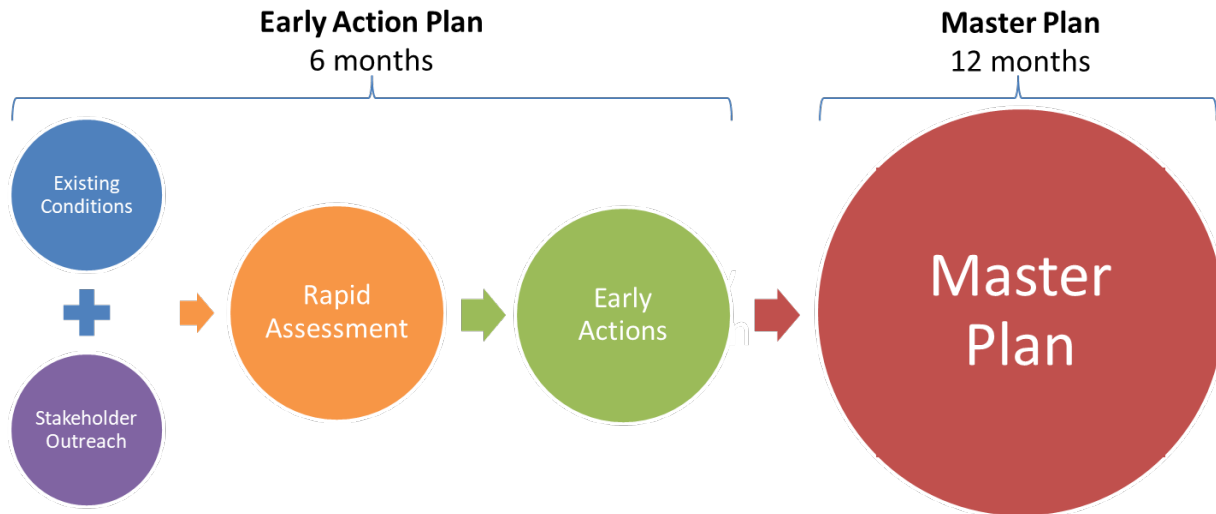
Phase One – This Early Action Plan: This Early Action Plan is the first phase of the Smart County MP and provides a basic county-level framework that identifies needs and establishes levels of opportunity based on the varying characteristics in the region. This basic framework will seek to identify short-term solutions and investments that position SBCOG’s member agencies to take advantage of relevant federal and state grant programs.

Phase Two – Longer Term Solutions and Investments: The second phase of the Smart County MP will provide longer term solutions and investment opportunities within the overall framework. SBCOG member agencies will be responsible for obtaining funding for initiatives that support the Smart County MP, as well as managing and operating their own assets, programs, and systems. SBCOG will provide grant application assistance and will facilitate multi-agency efforts, but is not anticipated to own or operate Smart County assets or systems.

Early Action Plan Development Process: This Early Action Plan culminates a six-month effort (see **Exhibit 1-1**) to understand existing conditions, gather stakeholder feedback, and use this collective understanding to perform a rapid assessment and lay the groundwork for development and funding of some higher-priority projects. Much of the information gained during this early action planning process will also be used to shape the focus and direction of the master planning effort that will kick-off in August 2023.

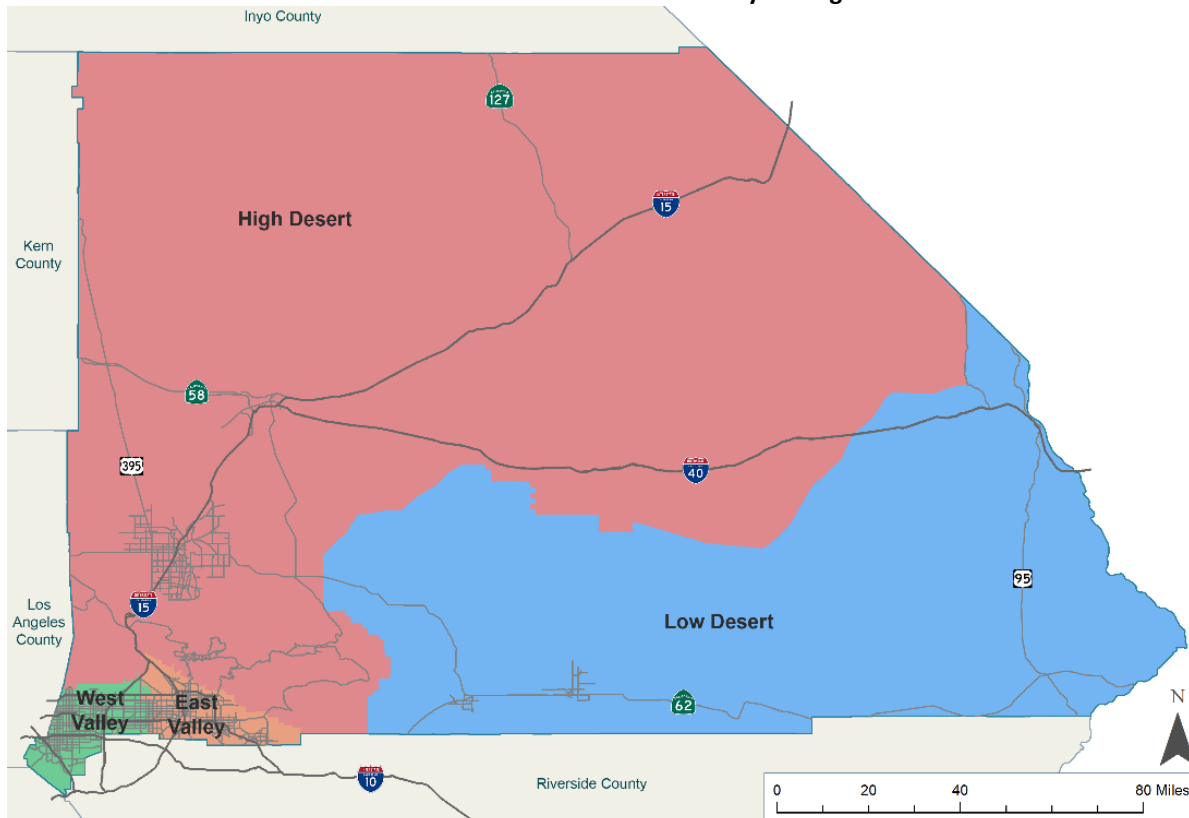
The Early Action Plan focuses on actionable steps that address the needs identified in the initial existing conditions and outreach meeting efforts. This early stage is designed to take these inputs and identify specific “early win” projects or initiatives that can be started immediately and can serve as building blocks to the more comprehensive efforts that will be identified as part of the overall Smart County MP.

Exhibit 1-1: Planning Process



The Four Subregions of San Bernardino County: As the largest county in the continental United States, staying connected and being technologically current can be a challenge. The Smart County MP is aimed at addressing this and finding ways to leverage the region’s strengths to its advantage. When discussing some of the existing conditions, stakeholder outreach, and recommendations, this plan is often divided into the four geographically diverse subregions shown in **Exhibit 1-2**.

Exhibit 1-2: San Bernardino County Subregions



2 Existing Conditions Report Highlights

San Bernardino County is the most geographically expansive county in the contiguous United States. It is comprised of 24 incorporated cities and towns plus unincorporated areas, with over 2.2 million residents, primarily residing in the southwestern region of the county. The Existing Conditions Report for this Smart County effort was finalized in July 2023 and assesses the current state of San Bernardino's technology infrastructure, systems, and their operational capacities and capabilities. That report should be referenced for a full detailing of existing conditions. Several key highlights include:

- **Major Logistics Hub:** San Bernardino County is a major logistics hub with over 300 million square feet of warehouse/distribution space and freight moving via the multiple freeways, railways, and through airports in the region.
- **Transportation Infrastructure:** Major transportation infrastructure such as the I-10, I-15, I-40, SR-60, SR-210, and I-215 freeways, passenger rail systems consisting of three Metrolink lines, Arrow service with new multiple-unit trainsets, from San Bernardino to Redlands, Amtrak, and the proposed Brightline High Speed Rail from Rancho Cucamonga to Las Vegas serve as key connections. Most of the interstates are well covered with dynamic message signs (DMS) and Closed-Circuit Television (CCTV) monitoring, and managed lanes with dynamic tolling are being added to both I-10 and I-15 in the San Bernardino Valley, over time.
- **Municipalities Operate Traffic Signals:** Each municipality is responsible for maintaining and operating their own traffic signals, each operating with varying levels of resources for operational monitoring. The majority of the local agencies manage traffic and traffic signals through a mix of traffic signal control software. Most arterial roadway intersections in the county feature field equipment to monitor and manage traffic signals.
- **Data Management:** San Bernardino County uses ArcGIS and a publicly available, online, Open Data portal to inform decision making, Office 365 for internal office productivity and data management, and other niche software such as Iteris ClearGuide⁶ for transportation analysis.
- **Emergency Management:** The San Bernardino County Office of Emergency Service (OES) coordinates emergency management and assists cities and entities within the county by providing technical assistance to municipalities and non-government organizations (NGOs) within the county and liaises between the state and federal partners⁷. Communication infrastructure in place to support emergency management include the Integrated Public Alert and Warning System, run by the U.S. government; the Telephone Emergency Notification System, overseen by the San Bernardino County Sheriff and Fire Department; and emergency vehicle signal preemption at many locations.
- **Air Quality:** Significant disparities in air quality and related health risks across different communities also stand out, particularly in areas near major transportation corridors and industrial facilities that produce higher pollution levels and health hazards. The San Bernardino Valley and Mountains are in the South Coast Air Quality Management District, which is classified as being in "extreme" non-attainment for ozone. The northern and eastern desert areas of San Bernardino County are in the Mojave Desert Air Quality Management District. Portions of the Mojave Desert Air Quality Management District are designated non-attainment for ozone. It should be noted that both air districts, together with the State of California, have initiatives to transition vehicle fleets to zero-emission over the next several decades. substantial amount of state and federal funding has become available, but it is largely distributed through competitive grants. Given its air quality challenges, San Bernardino County should seek to secure its share of this funding for both passenger vehicles and trucks.

⁶ Iteris. 2023. "Traffic Analytics Software." Available at: <http://www.iteris.com/oursolutions/traffic-analytics-software>. Accessed May 16, 2023.

⁷ San Bernardino County Fire Department. 2023. "About Office of Emergency Services." Available at: <https://sbctfire.org/aboutoes/#::~:~:text=About%20OES,risk%20to%20San%20Bernardino%20County>. Accessed July 5, 2023.

- **Bridging the Digital Divide – Availability and Affordability of Broadband Access:** Many stakeholders contacted for this project were concerned about having available and affordable broadband access for lower income households. Each subregion presents unique challenges in terms of internet and technological access. **Exhibit 2-1** highlights the percentage of households with no internet or with no computing devices (computers, tablets, smart phones) in San Bernardino County, compared to California. Current efforts to tackle these issues include the allocation of significant federal and state funding, highlighted by the State of California Middle-Mile Broadband Initiative that aims to commission 832 miles of fiber in San Bernardino County by the end of 2026. Despite the availability of low-cost plans for internet access in populated areas, there remain significant gaps, notably around the East Valley and Low Desert subregions.

Exhibit 2-1: Households Without Internet and Computing Devices in San Bernardino County

Region	Population	Households without a Computing Device (%)	Households with No Internet (%)
California	39,346,023	5.7%	8.7%
San Bernardino County	2,162,532	5.3%	8.8%
East Valley	669,636	7.0%	11.4%
West Valley	908,539	3.8%	6.5%
High Desert	505,761	5.1%	8.6%
Low Desert	78,596	8.6%	11.9%

Readers of this report are also referred to a range of transportation and sustainability initiatives on the Transportation Planning page of the SBCTA/SBCOG website at www.gosbcta.com. Among these is the 2021 Countywide Transportation Plan (CTP), which is undergoing a major update through the Long-Range Multimodal Transportation Plan for San Bernardino County⁸.

3 Stakeholder Outreach

Stakeholder outreach, a vital step to ensure informed decision-making is central to the Smart County early action planning process and the overall master plan. A broad spectrum of stakeholders including city policy makers, city managers, and transportation and IT professionals across the region were engaged through surveys, interviews, and collaborative meetings. Their feedback shaped the Early Action Plan focus areas.

3.1 Meetings

Exhibit 3-1 and **Exhibit 3-2** below shows the outreach completed to date for the project.

Exhibit 3-1: Stakeholder Interviews

Stakeholder	Interview Date	Stakeholder	Interview Date
City of Montclair	3/20/2023	City of Big Bear	4/7/2023

⁸ San Bernardino County Transportation Authority. "Countywide Transportation Plan" Available at: <https://www.gosbcta.com/plan/countywide-comprehensive-transportation-plan/>.

Stakeholder	Interview Date	Stakeholder	Interview Date
City of Apple Valley	3/28/2023	4 th District	3/20/2023
City of Colton	3/29/2023	5 th District	4/12/2023
City of Twentynine Palms	3/30/2023	Caltrans	6/5/2023
City of Needles	4/5/2023	Inland Empire Regional Broadband Consortium	3/28/2023
City of Ontario	4/5/2023	CONFIRE	4/3/2023

Key Take-aways – Caltrans Meeting:

Middle-mile fiber should be accessed at interchanges as opposed to intermediate access points between interchanges.

Local agencies can use Caltrans fiber for transportation purposes.

In some of the more urban areas the California Department of Technology (CDT) has decided to lease fiber instead of installing it.

Exhibit 3-2: Stakeholder Presentations

Presentations	Details & Date
City/County Manager's Technical Advisory Committee	Committee Meeting, 2/15/23 and 6/1/2023
Emerging Technology Ad Hoc Committee Meeting	Committee Meeting, 3/8/23 and 5/10/23
Transportation Technical Advisory Committee	Committee Meeting, 5/1/23
Group Presentations and Discussion	City of Highland, City of Loma Linda, City of Redlands, City of Victorville, City of Yucca Valley, County of San Bernardino, City of Fontana
Public Safety Meetings	San Bernardino County Sheriff's Department, 5/10/2023 City of Chino Police Department, 5/30/2023
Other	IT Working Group, 6/8/2023

In addition to the one-on-one meetings and presentations a Success Management Workshop was conducted on June 14, 2023, with the Emerging Technology Ad Hoc Committee. This committee is comprised of senior leaders from the county, cities, and local planning agencies including County Supervisors, SBCTA staff, city/town council members, mayors, and various other municipal staff involved with the community. See section **3.2.2** of this document and **Exhibit 3-3** for the workshop outcomes.

3.2 Outcomes

Priorities and a vision for near-term Smart County efforts were established through the feedback received from stakeholders, the assessment of current systems, and identification of opportunities for funding. Strengths,

weaknesses, opportunities, and threats to this vision were also identified and are discussed in this section. Feedback from the subregions was critical throughout the process, as local jurisdictions will be implementing most of the early action and master plan projects. Identification of initiatives for the Early Action Plan are particularly critical at this time because of funding opportunities coming from a range of agencies in the State of California and the infusion of federal funding for transportation, technology, and sustainability initiatives contained in the Infrastructure Investment and Jobs Act (IIJA, also known as the Bipartisan Infrastructure Law or BIL) of 2021 and the Inflation Reduction Act (IRA) of 2022. Both pieces of federal legislation open substantial opportunities for funding technology-based solutions in transportation, digital connectivity, and sustainability.

3.2.1 Priorities

Based on stakeholder surveys and several dialogues noted previously, priorities for the Early Action Plan were pared down and directed to three categories: public safety, transportation, and the digital divide as summarized below.

Public Safety

Stakeholders identified public safety as a top priority more consistently than any other topic. Although the overall crime rate in San Bernardino County has been steadily decreasing the past five years⁹, violent crimes have increased slightly and there is still a strong perception that more needs to be done to address safety. This priority involves using technology to bolster security measures and create safer communities. The overarching aim is to establish a secure environment where residents can conduct their daily activities with an assured sense of safety and security. Priorities include:

- **Homelessness:** technology-based tools to help address homelessness, as from 2022 to 2023 there was a 26% year over year increase in homelessness; and a 29% increase in people in shelters.¹⁰
- **Technological Assistance for Law Enforcement:** to include capabilities to assist with vehicle tracking, crime prevention, mitigation of vandalism, suspect identification, etc. Additional License Plate Readers (LPRs) and video surveillance were listed as important components of this strategy.
- **CAD-to-CAD systems:** to improve emergency response coordination.
- **Information Sharing Among Agencies:** collaboration and data sharing between law enforcement, emergency services and public safety agencies.

Transportation

On average, San Bernardino County residents' commute times are longer than all nearby regions including Las Vegas, Los Angeles, and San Diego.¹¹ On the positive side, coming out of the COVID pandemic, the percentage of people commuting alone dropped from 80% to 73% in 2021, which is lower than it was a decade prior in 2011. Although vehicle collisions resulting in injury or death dropped significantly in 2020, they've rebounded to

⁹ San Bernardino County Community Indicators: Crime Rate. Available at: <https://indicators.sbcounty.gov/safety/crime-rate/>. Accessed on August 20, 2023.

¹⁰ The Sun. "Homelessness climbed 26% last year in San Bernardino County". Available at: <https://www.sbsun.com/2023/04/26/homelessness-climbed-26-last-year-in-san-bernardino-county/>. Accessed on August 20, 2023.

¹¹ San Bernardino County Community Indicators: Mobility. Available at: <https://indicators.sbcounty.gov/transportation/mobility/>. Accessed on August 20, 2023.

approximately pre-pandemic levels.¹² Stakeholders are looking to transform transportation systems through the application of innovative technologies. Priorities include:

- **Smart Intersections and Smart Corridors:** this includes enhanced traffic signal synchronization, improved coordination across jurisdictions and with Caltrans, possible coordination with trucking schedules and focus on specific high-volume corridors in the San Bernardino Valley and Victor Valley.
- **Traveler Information:** providing consistent and real-time communications during disasters and adverse weather conditions across jurisdictions. This could include enhanced video surveillance of key locations and automation of emergency signage.
- **Zero-Emission Vehicle (ZEV) Initiatives:** California's high population concentrations, mountainous terrain, and warm climate lead to air pollution. As a result, California has an aggressive target of selling only zero-emission new cars and light trucks by 2035.¹³ Competitive state and federal grant programs are currently available to support this transition. San Bernardino County has more unhealthy and very unhealthy air quality days and a worse air quality index than almost all peer cities including Miami, Las Vegas, San Diego, and Los Angeles¹⁴, and needs to secure grant funding to ease the financial burden of the alternative fuel transition.
- **Data Sharing Across the Region:** establishing secure and efficient mechanisms to share data.

Bridging the Digital Divide

This priority of expanding the reach of digital connectivity reflects a commitment to fair access and opportunities to all San Bernardino County residents. San Bernardino County lags the California average, having approximately 6 percent fewer households considered to be served and having speeds less than 25Mbps download/3Mbps upload¹⁵. Over 25% of households in numerous San Bernardino County zip codes do not have computer or internet connection¹⁶. Priorities include:

- **Equitable Broadband Access:** affordable and reliable high-speed internet access for all communities.
- **Focus on Disadvantaged and Underserved Communities:** prioritize resources and initiatives to bridge the digital divide. About 7 percent of all Disadvantaged Communities as defined by California state law under Senate Bill 535 (SB 535) are in San Bernardino County. SB 535 designated Disadvantaged Communities are entitled to minimum funding levels from California's Cap-and-Trade Program¹⁷.

Equity in where and how these priorities are addressed will be an overarching focus as the county integrates smarter infrastructure and software solutions.

3.2.2 Goals

A "Success Management Workshop" was held with the SBCTA/SBCOG Emerging Technology Ad-Hoc Committee on June 14, 2023. The workshop consisted of a visioning exercise to brainstorm and collaboratively establish a shared

¹² San Bernardino County Community Indicators: Traffic Safety. Available at: <https://indicators.sbcounty.gov/transportation/traffic-safety/>. Accessed on August 20, 2023.

¹³ California Air Resources Board. Available at: <https://ww2.arb.ca.gov/>. Accessed on August 20, 2023.

¹⁴ San Bernardino County Community Indicators: Air Quality. Available at: <https://indicators.sbcounty.gov/environment/air-quality/>. Accessed on August 20, 2023.

¹⁵ CPUC (California Public Utilities Commission). December 2021. "State of California Fixed Consumer Broadband Deployment." Available at: <https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/communications-division/documents/broadband-mapping/docs-uploaded-2023/household-deployment-by-county-as-of-dec-31-2021.pdf>

¹⁶ Jamshid Damooei, Ph.D. Damooei Global Research. "Digital Divide Within the SCAG Region." Available at: https://scag.ca.gov/sites/main/files/file-attachments/report_of_digital_divide_within_the_scag_region.pdf?1646941482.

¹⁷ CA OEHHA (California Office of Environmental Health Hazard Assessment). May 2022. "SB 535 Disadvantaged Communities." Available at: <https://oehha.ca.gov/calenviroscreen/sb535>

vision of success for the Smart County program. The vision for San Bernardino County is to evolve into a pioneering Smart County, where innovative transportation systems and state-of-the-art technologies contribute to clean air, improved traffic flow, universal broadband connectivity, improved government operations, and an enhanced quality of life for all residents.

During the workshop, input was grouped into themes that were used to establish the following goals:

- **Promote Clean and Sustainable Transportation:** Revolutionize transportation within San Bernardino County by championing zero-emission mobility options and paving the way for clean air vehicles. The County aspires to establish itself as a leader in hydrogen and electric fueling infrastructure, underlining its commitment to environmental sustainability.
- **Enhance Traffic Flow and Connectivity:** SBCTA strives to collaborate with key stakeholders to devise and implement landmark solutions for improving traffic conditions. SBCTA will focus on enhancing and connecting traffic signals, using advanced technology to increase safety and optimize traffic flow and air quality. The overarching goal is to significantly reduce traffic congestion and contribute to a more efficient and safer transportation network.
- **Improve Quality of Life through Universal Broadband Access:** Bridging the digital divide has been shown to support education and career advancement, wages and standard of living, and public health and safety¹⁸. Recognizing the digital divide in its communities, SBCTA/SBCOG seeks to provide broadband access to disadvantaged and underserved areas in San Bernardino County to realize these benefits.
- **Rewrite the Narrative:** As noted, San Bernardino County leaders are committed to collaborative efforts, enhancing existing partnerships, and creating new ones to improve residents' quality of life. This goal involves better promoting advancements and early wins to incentivize living and working in this region of Southern California.

3.2.3 SWOT Analysis Summary

The Success Management Workshop also included a Strengths, Weaknesses, Opportunities, Threats (SWOT) exercise, where participants identified internal strengths and weaknesses and external opportunities and threats to realizing a Smart County future. The frame of reference for the SWOT analysis was the entire county, but with the technological angle in mind. This input informs the Early Deployment Recommendations section of this Early Action Plan.

Exhibit 3-3: SWOT Analysis

S	W
Land Availability: Potential for future development Economic Growth: Continued economic development showing positive growth trends Skilled Workforce: Availability of a strong and skilled workforce Relative Affordability: Housing is more accessible due to lower costs Job Opportunities: A wide variety of opportunities across income scales Housing Diversity: Various types catering to different demographic segments Resilient Community: Demonstrated resiliency, ability to bounce back from challenges	Geographical Barriers: Vast geographical expanse increases the cost of implementing developments and services Infrastructure: Needs modernization and improvement Power Accessibility: Difficulty in sourcing electricity for new developments including residential and industrial projects Resource Constraints: Large geographic size imposes constraints on resources, making efficient allocation and management challenging Safety Perception: Negative external views regarding community safety Job Deficiency: Shortage of high-paying jobs, which can impact economic mobility and income distribution

¹⁸ US Department of Education, Office of Educational Technology. "Advancing Digital Equity for All: Community-Based Recommendations for Developing Effective Digital Equity Plans to Close the Digital Divide and Enable Technology-Empowered Learning". Page 14. September 2022. Available at: https://tech.ed.gov/files/2022/09/DEER-Resource-Guide_FINAL.pdf. Accessed on: August 20, 2023.

Strong Partnerships: Established relationships and partnerships that foster collaboration Political Vision: Clear political vision guiding the community Quality Living: High standards of life, making it a desirable place to live Committed Leadership: Dedicated to progress and community enhancement	Homelessness: 30% of SB County homeless are located in SB City Unfavorable PR: County not being publicized properly Economic Dominance: Proximity to and in competition with an economically dominant region to the west (Los Angeles and coastal regions)
O	T
Population Growth: More people moving into the SB region Sustainable Logistics: Opportunity to clean up transport sector Aligned Leadership: Local leaders aligned on priorities Workforce: Young average age, 7 educational institutions, good trade training Grant Application Support: Assistance required in grant applications, along with the need for a strategic Smart County Plan featuring shelf-ready projects for effective grant applications Equal Opportunity Access: A need to ensure that all areas, including less developed and remote regions, have equal access to opportunities similar to more prosperous regions Federal Funding: Unprecedented levels due to IIJA Other Funding: Need shovel-ready projects to get additional grants	Educational Attainment: 81% high school graduation rate ¹⁹ , 58% of graduates attend college within 12 months ²⁰ – both lower than state averages Density of Warehousing: Limits other / future opportunities; community concerns over expansion State Priorities: Not always consistent with local needs

4 Early Action Recommendations

Based on stakeholder outreach, three Smart County regional priorities were identified: public safety, transportation, and bridging the digital divide. The recommended early action projects and next steps presented in this chapter are intended to serve as quick wins to jumpstart the region's Smart County efforts and establish momentum going into the master planning phase. These early action projects are grouped into six categories including: 1. Broadband Access, 2. Smart Intersections, 3. Smart Corridors, 4. ATIS for EMS, 5. CAD-to-CAD, and 6. ZEV (**Exhibit 4-1: Early Action Plan Projects Overview**) To be effective, these projects should be led by local jurisdictions except where they connect multiple jurisdictions, in which case more SBCTA/SBCOG involvement is appropriate. Each project is paired with a specific problem that has been identified and context and next steps are provided.

¹⁹ San Bernardino County. "Educational Attainment." Available at: <https://indicators.sbcounty.gov/education/educational-attainment/>. Accessed 28 August 2023.

²⁰ San Bernardino County. "College and Career Readiness." Available at: [https://indicators.sbcounty.gov/education/college-readiness/#:~:text=College%2DGoing%20Rates,-San%20Bernardino%20County's&text=Over%20half%20\(58%25\)%20of,the%20statewide%20rate%20of%2064%25](https://indicators.sbcounty.gov/education/college-readiness/#:~:text=College%2DGoing%20Rates,-San%20Bernardino%20County's&text=Over%20half%20(58%25)%20of,the%20statewide%20rate%20of%2064%25). Accessed 28 August 2023.

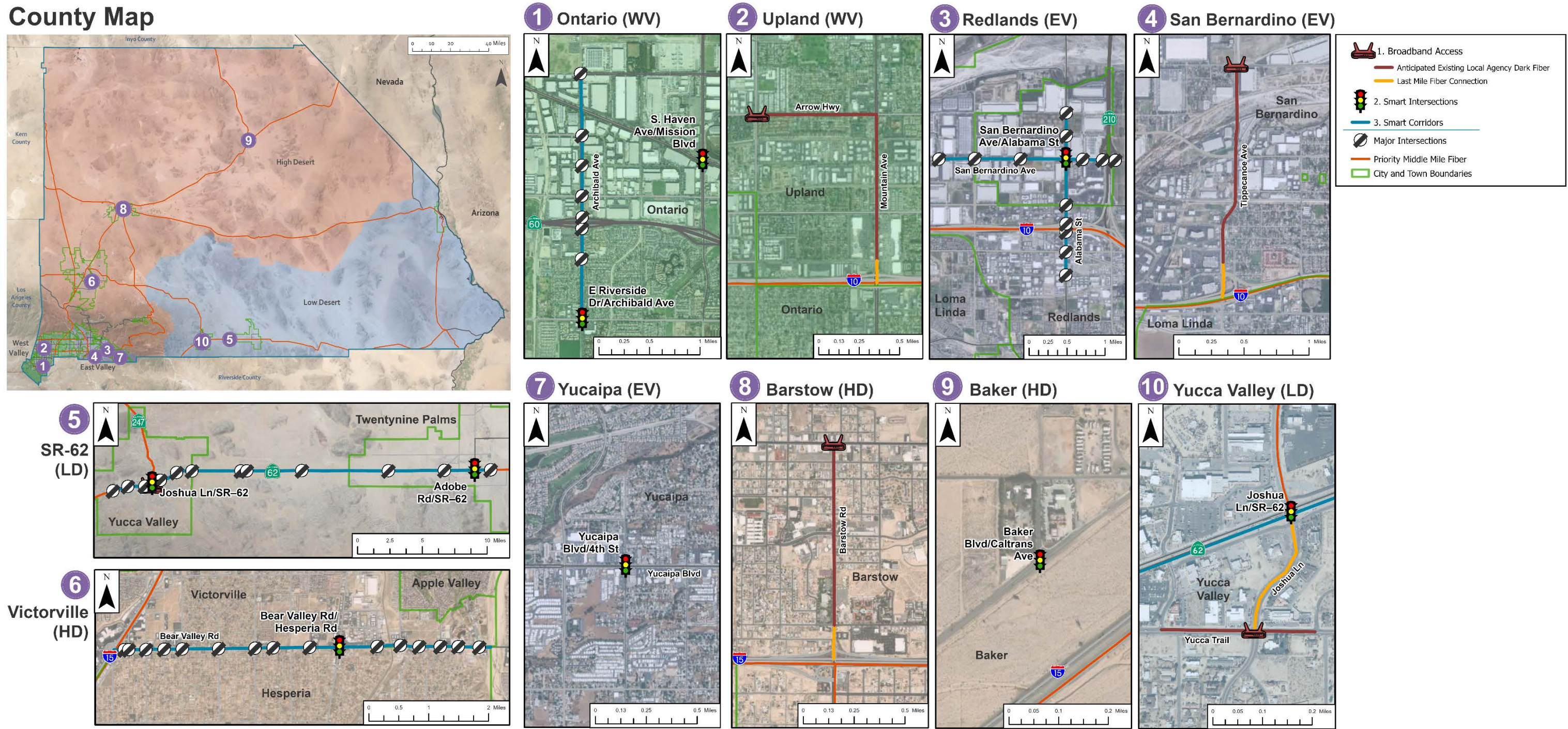
Exhibit 4-1: Early Action Plan Projects Overview



4.1 Early Action Plan Proposals/Projects (Locations Identified)

For the 1. Broadband Access, 2. Smart Intersections, and 3. Smart Corridors categories, specific locations have been identified already based on research and stakeholder input and are shown in more detail in **Exhibit 4-2**.

Exhibit 4-2: Broadband, Smart Intersection, and Smart Corridor Location Maps



4.1.1 Broadband Access

The Need Limited broadband access (88% in San Bernardino County compared with 93% in CA) disproportionately impacts low population density and remote regions²¹.

Recommended Project Building on the State's Middle-Mile Broadband Initiative, bridge the broadband access gap between local networks and middle mile physical fiber optic infrastructure, focusing on underserved areas and key local agency network integration points. A high-level map of the Middle-Mile Broadband Initiative is shown in **Exhibit 4-3**.

Context

Broadband Definition Change: While the FCC's historic definition of Broadband was 25/3Mbps (download/upload speeds), recent California Public Utilities Commission (CPUC) rulemaking has revised the target to 100/100Mbps (or 100/20Mbps where impractical)²². This paradigm shift emphasizes the need for wireline fiber connectivity to underserved communities, as opposed to reliance on wireless or other atypical methods.



Exhibit 4-3: State Middle Mile Broadband Initiative

State Middle-Mile Broadband initiative: Caltrans is currently working to deploy fiber optic conduit within Caltrans right-of-way on interstate and state highways, and San Bernardino County is slated to receive the most mileage of any county in the state²³. Conduit deployment is slated through 2026. It is important to capitalize on this new fiber availability and direct development of last mile connections that increase digital access to disadvantaged communities and bridge the digital divide. Residential communities that are nearest to middle mile networks (near freeways and state routes) will be the focus of this planning effort. Communities far from middle mile fiber would likely be better served by connecting to existing ISP networks, rather than creating a new last mile connection from middle mile fiber to extend service to these areas, as it is cost prohibitive and redundant to extend fiber from the middle mile network where there are much more suitable locations that impose less costs to construct.

Challenging Terrain: Geography in some of San Bernardino County's outlying communities poses a challenge to implementing equitable access to wired broadband internet because mountainous and desert terrain require costly construction, which deters initial deployment. While Caltrans continues to deploy conduit to host the middle

²¹ CPUC (California Public Utilities Commission).2023. "State of California Fixed Consumer Broadband Deployment." Available at: <https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/communications-division/documents/broadband-mapping/docs-uploaded-2023/household-deployment-by-county-as-of-dec-31-2021.pdf>

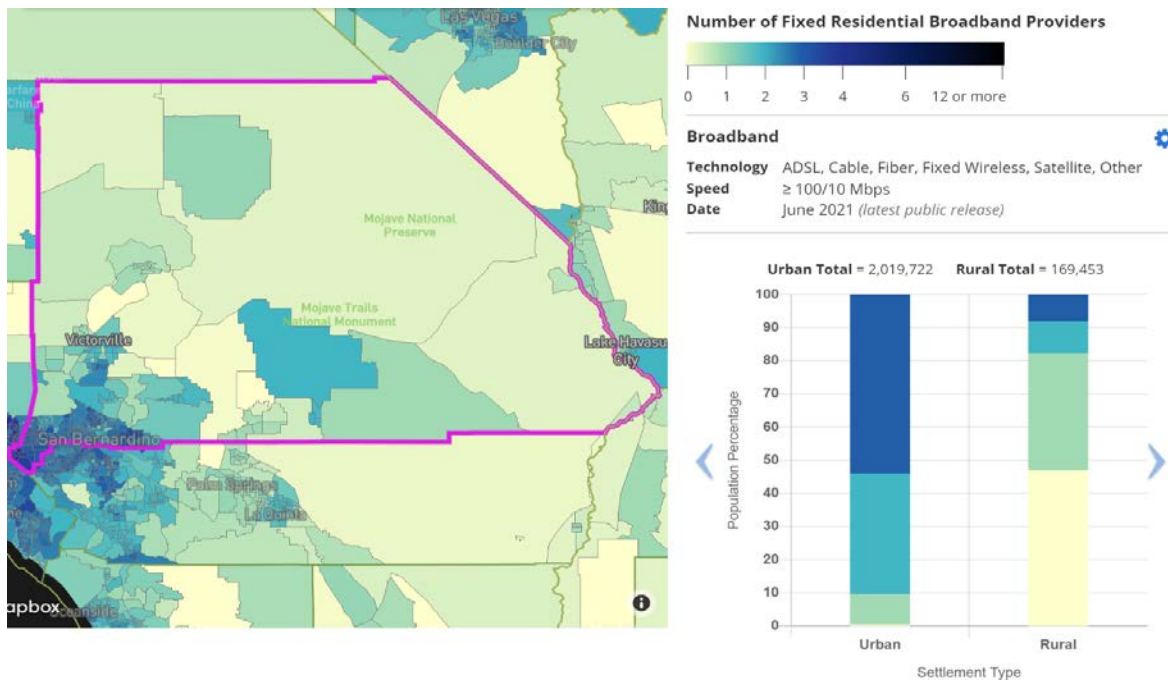
²² CPUC (California Public Utilities Commission).2023. "CPUC Adopts Program Rules To Bring Broadband to Communities Most in Need." Available at: <https://www.cpuc.ca.gov/news-and-updates/all-news/cpuc-adopts-program-rules-to-bring-broadband-to-communities-most-in-need>. Accessed June 27, 2023.

²³ CDT (California Department of Technology). 2023. "Statewide Construction Evaluation Map of 10,000 miles of proposed build." Available at: <https://site-cammmbi.hub.arcgis.com/pages/statewide-middle-mile-network-map>. Accessed June 27, 2023.

mile fiber, it will take time for that fiber to reach these outlying communities. In the meantime, these communities would be best served through satellite internet providers, fixed wireless connections, or other forms of high bandwidth point-to-point wireless internet, despite limitations that impact reliability.

Identifying Disadvantaged Communities: Approximately 47% of rural areas in San Bernardino County have no access to broadband providers and there is a significant provider gap between the High and Low Desert and the San Bernardino Valley, as shown in **Exhibit 4-4** below.

Exhibit 4-4: Fixed Residential Broadband Providers



Source: [FCC Fixed Broadband Deployment](#)

Methodology:

The maps were sourced from the CPUC with data including 2023, using two mapping tools:

- The Federal Funding Account Map²⁴: displays California Department of Finance designated low-income locations and California EPA designated disadvantaged communities, as well as broadband speed and availability information.
- The California Interactive Broadband Map²⁵: displays maximum download speeds per census block, with slower internet speeds indicating unserved/underserved census blocks.

The CPUC uses GIS software to display the various map layers and unserved locations. The GIS software aggregates unserved locations (households without speeds of 25 Mbps downlink, 3 Mbps uplink) into 1/10th of a square

²⁴ CPUC (California Public Utilities Commission). 2023. "California Public Utilities Commission Federal Funding Account". Available at: <https://federalfundingaccountmap.vetro.io/map#5.65/37.393/-116.87>. Accessed July 10, 2023.

²⁵ CPUC (California Public Utilities Commission). 2023. "California Interactive Broadband Map". Available at: <https://www.broadbandmap.ca.gov/>. Accessed July 10, 2023.

kilometer hexagonal areas, which are then ranked based on number of unserved locations. These areas are called out as “Mass Market Unserved.” Areas that were most disadvantaged, possessing a greater number of unserved locations, were then referenced with the CPUC Interactive Broadband Map, which displays internet speed by census block. Additional cross-referencing with map layers displaying the availability of non-legacy technology confirms that the installation of fiber optic conduit from the State’s Middle-Mile Broadband Initiative would be the preferential method of bridging the digital divide. Lastly, analysis of terrain maps confirms that the areas intended to be served are residential. Lack of existing broadband service in the areas identified for potential last mile enhancements is a critical factor, because the CPUC has identified that new community-based ISPs can expect “take rates” of 45% or above when establishing themselves in areas where they compete only against Weak DSL class of existing service. The “take rate” is the percentage of the potential market that will subscribe to newly offered broadband service.

Regions that were identified as currently having high-speed internet may still include households that cannot connect to it due to a lack of affordable options or awareness surrounding affordable connection options where available. Increasing the amount of available fiber optic cable for consumers use may bring down costs and increase accessibility of high-speed connections, especially in areas where bandwidth is near or at capacity.

Proposed Locations: While additional analysis at the census block level is needed to identify and prioritize all those lacking the infrastructure to provide high-speed connectivity, four unserved/underserved subregions have been identified with characteristics enabling impactful and efficient improvements: West Valley, City of Upland; East Valley, City of San Bernardino; High Desert, City of Barstow; and Low Desert, City of Yucca Valley. Characteristics of each subregion are provided below.

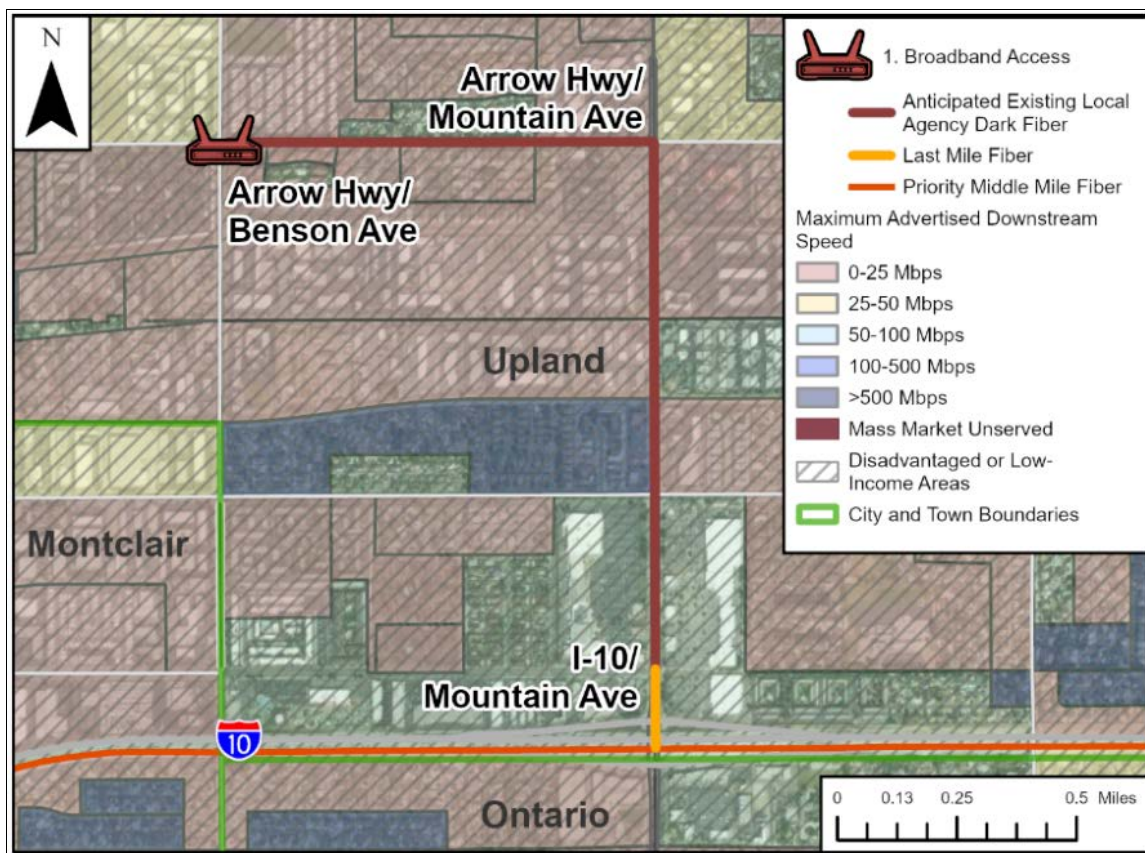
West Valley, City of Upland

The census block at which the proposed agency connection ends has two mobile home communities and an elementary school that currently lack adequate internet speeds and infrastructure to qualify as served.

This could be reached by an agency in the area through construction or a leased line. **Exhibit 4-5** shows the existence of higher speed internet along the proposed route. Connection to Middle Mile fiber could be made from I-10 to S. Mountain Ave. where the freeway interchange is located. The fiber would then terminate at W. 7th St./N. Mountain Ave. Caltrans currently operates a signal at I-10 EB ramp/N. Mountain Ave. that is connected via fiber optic cable that may provide free conduit space for a Last Mile connection.

An agency connection could be made from this Last Mile Terminus to this census block by extending north along N. Mountain Ave. and then west along W. Arrow Hwy, terminating at the intersection of W. Arrow Hwy./N. Benson Ave. There is non-legacy wireline technology present immediately off I-10, but there is likely a need for fiber deployment along W. Arrow Hwy. to connect to this census block, to impact more individuals in communities lacking adequate internet access.

Exhibit 4-5. Broadband Access – West Valley, City of Upland

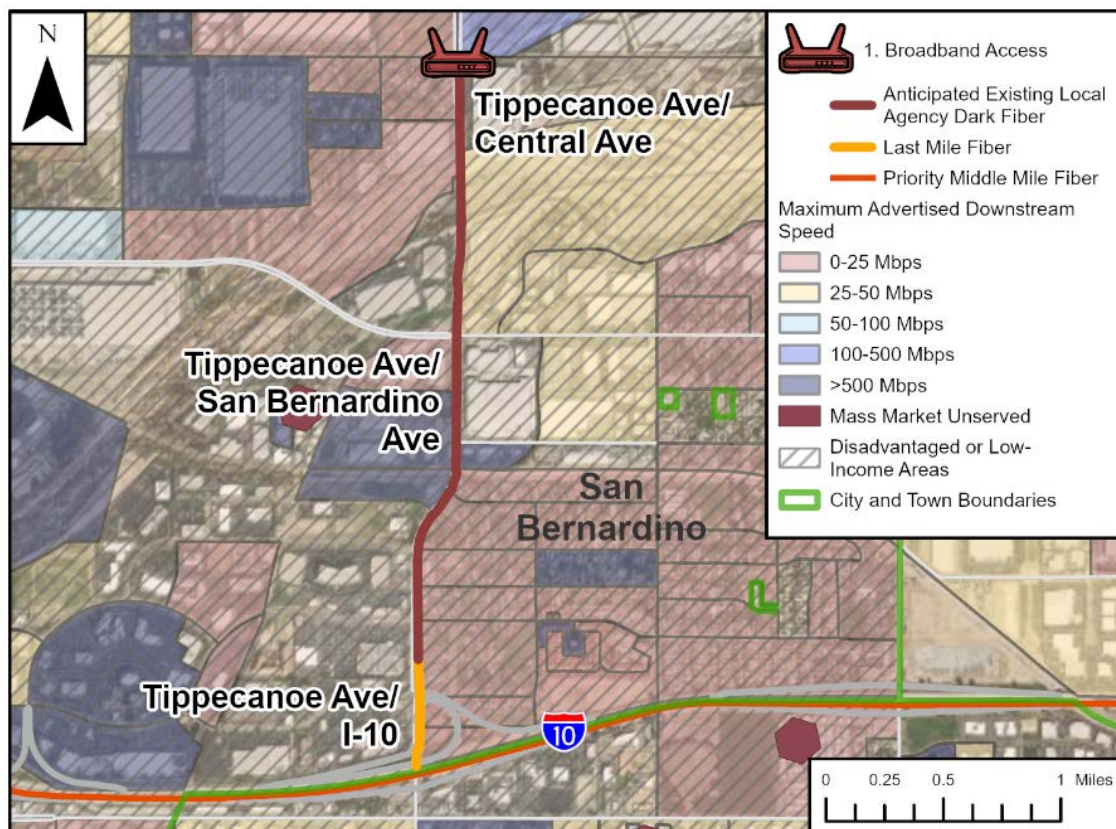


East Valley, City of San Bernardino

The proposed New Last Mile Connection in **Exhibit 4-6** would link from I-10 to the on/off ramp of S. Tippecanoe Ave. and I-10 and proceed north along S. Tippecanoe Ave. to the intersection with Lee St. where it would be vaulted. An anticipated local agency project could then be to run fiber optic conduit further north along S. Tippecanoe Ave. to E. Central Ave. This project would then bring fiber to areas with legacy technology and substantial residential areas with maximum advertised ISP speeds of 30 Mbps or less. There is some non-legacy technology in the area which could potentially be leveraged for local agency projects. Not only does this area have numerous households lacking fiber, but there are also numerous government agency offices that could be reached by extending fiber east along E. Hospitality Ln. or E. Brier Dr. These offices include In-Home Supportive Services (IHSS), U.S. Citizenship and Immigration Services (USCIS), San Bernardino County Superintendent of Schools, and the Morongo Tribal TANF, whose services would be augmented through access to higher speed internet connectivity.

Additionally, the fiber that is deployed along S. Tippecanoe to bridge the digital divide could enable future Smart Corridor technology, as it is a major surface street that leads to San Bernardino Airport from Loma Linda, paralleling I-215.

Exhibit 4-6. Broadband Access – East Valley, City of San Bernardino



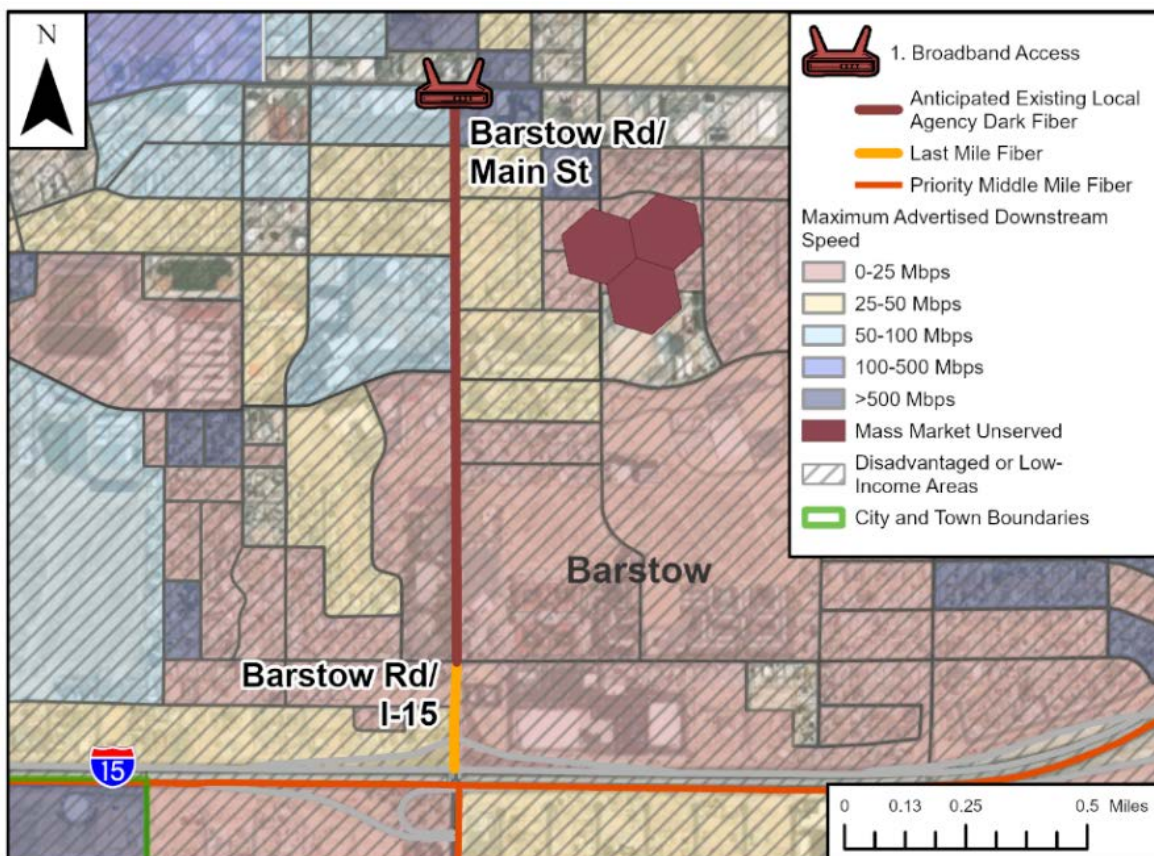
High Desert, City of Barstow

This New Last Mile Connection in **Exhibit 4-7** would link from I-15 to the Caltrans Middle Mile network at the interchange of Barstow Rd. and I-15. The new Last Mile Connection would then run from the interchange to the intersection of Barstow Rd./E. Virginia Way. Barstow Rd. becomes SR-247 south of I-15, which is slated to receive fiber in the Middle Mile program.

The anticipated agency connection would run from the terminus at E. Virginia Way and go north along Barstow Rd. to E. Main St., where more businesses are located. E. Main St. is a major east-west arterial in the region, which is part of historic Route 66. This would then enable a buildout of fiber within Barstow along E-W streets in the community, as Barstow Rd. is a central street in the community. Barstow Rd. and E. Main St. both also have potential to be Smart Corridors. The terminus of the New Last Mile Connection would be immediately adjacent to a community center, park, and fire station.

The Anticipated Agency Connection would bring broadband down Barstow Rd., which is within one city block of most government agency offices, including California Highway Patrol (CHP), San Bernardino County Barstow Superior Court, and city hall.

Exhibit 4-7. Broadband Access – High Desert, City of Barstow



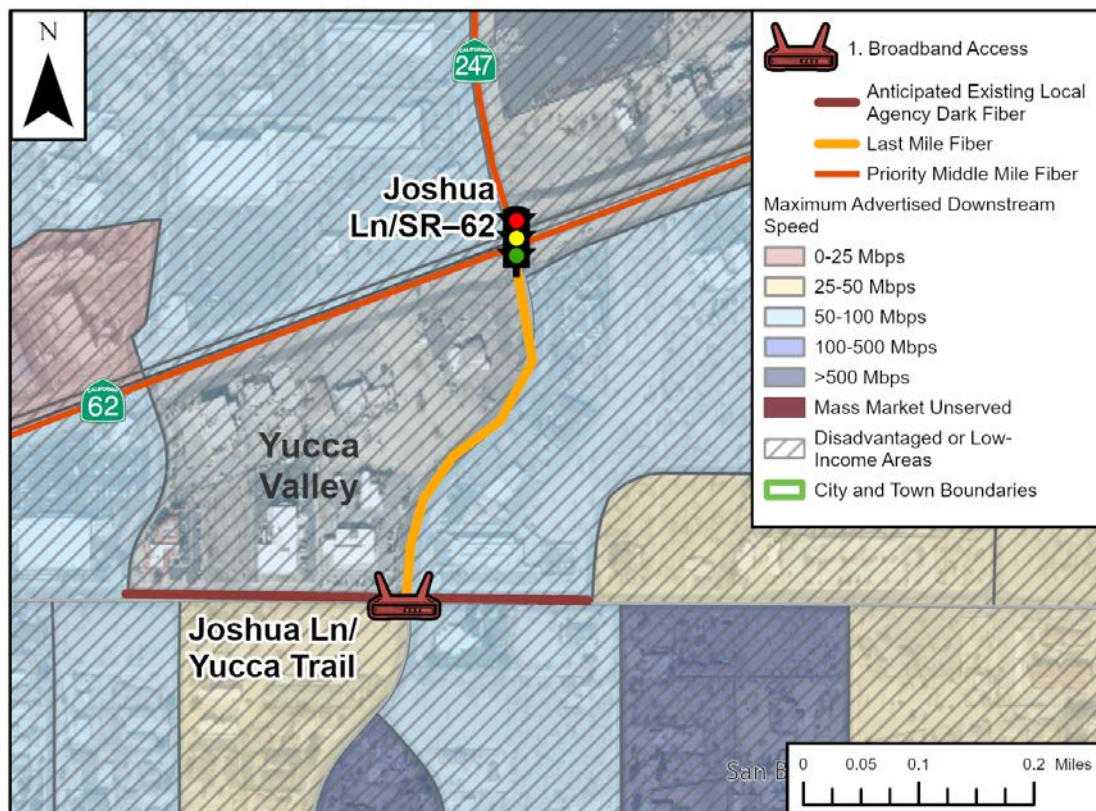
Low Desert, City of Yucca Valley

This proposed Last Mile Connection from Middle Mile fiber connects from the intersection of SR-62/SR-247 & Joshua Ln. (**Exhibit 4-8**). The Last Mile Fiber Connection would follow Joshua Ln. south to the intersection of Joshua Ln./Yucca Trail. From there, local agencies would be able to connect to the fiber and provide higher quality and speed internet to individuals in the area.

The terminus of the connection would be adjacent to a United States Post Office. This intersection has many important institutions nearby, including Yucca Valley town hall, Yucca Valley airport, and a library.

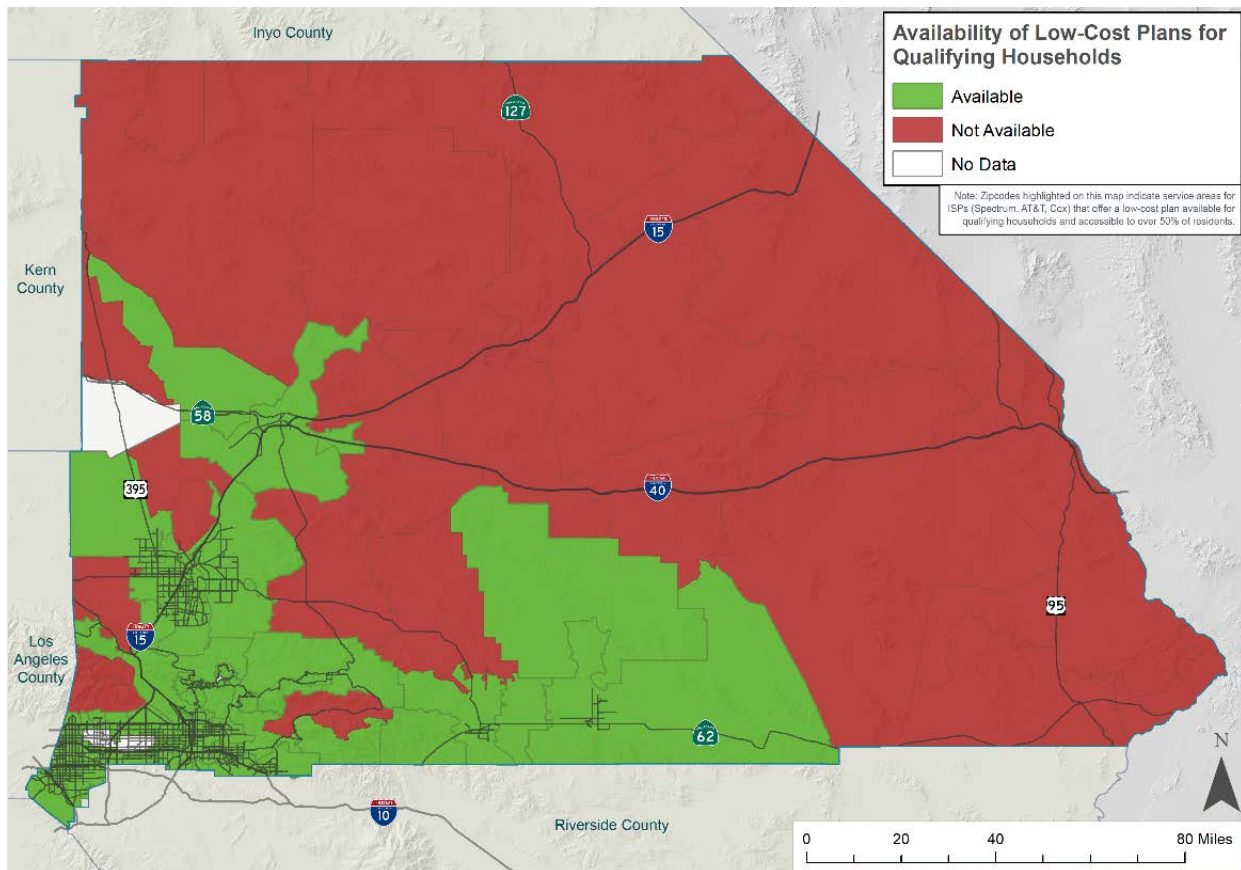
Along SR-62, going east from Yucca Valley, there are many other locations where small projects could be done that would bring fast and reliable broadband internet to more households. This point could be leveraged to bring fiber internet north along SR-247 as well, as there are households that are unserved in this region. This region is much less densely populated than the other potential sites, which presents unique challenges.

Exhibit 4-8. Broadband Access – Low Desert, City of Yucca Valley



Increasing Affordability: In addition to lack of infrastructure, lack of affordable access is also a barrier to high-quality, high-speed internet for lower income households. In more rural parts of the county, there is a lack of subsidized internet that could mitigate the cost barrier, as shown in **Exhibit 4-9**. Increasing the amount of broadband infrastructure to enable more competition would drive down costs. There are also programs that subsidize internet service and associated costs to qualifying households.

Exhibit 4-9. Availability of Low-Cost Plans for Qualifying Households in San Bernardino County



Source: Broadbandnow Map, May-June 2021 (Broadbandnow 2021)

Increasing Participation in Available Subsidies: Even where there are programs that provide subsidies to households for broadband, the adoption of these programs is not widespread. The California Department of Technology estimates that roughly half of all eligible households in San Bernardino County are participating²⁶. Greater adoption of these programs within San Bernardino County, where available, could provide the missing link between consumers and infrastructure where cost is an issue. Awareness campaigns regarding this program could enable greater broadband connectivity without requiring any construction to be done. Additionally, work that is done to expand broadband infrastructure should ensure that ACP (Affordable Connectivity Program) service will be provided. SBCOG can work towards bridging the digital divide by specifically targeting infrastructure improvements

²⁶ CDT (California Department of Technology). 2023. "Affordable Connectivity Program enrollment tracker." Available at: <https://broadbandforall.cdt.ca.gov/affordable-connectivity-program/acp-enrollment/>. Accessed June 27, 2023.

and affordability programs that enable disenfranchised groups to participate in low-cost, high-speed internet connectivity.

Broadband Access Enables Smart Intersections and Smart Corridors: Broadband infrastructure improvement throughout different areas of the county improve the constituent agencies' abilities to construct and implement effective Smart Intersections and Smart Corridors for traffic solutions in problematic or challenging corridors. The development of these two priority areas is complementary. Greater extension of fiber conduit enables more control and customization over intersections and corridors. As Smart Intersections and Smart Corridors are developed, they need higher bandwidth to function effectively. Smart Intersections and Smart Corridors can begin to play an important role in the proliferation of broadband and could be placed to leverage the benefit of wireline fiber connectivity to bring high-speed, high-quality internet to underserved/unserved communities.

Broadband Next Steps

- Determine which jurisdictions are interested in progressing broadband access.
- Identify champions for each interested agency.
- Identify interested ISPs for each interested agency.
- Continue to coordinate with IERBC to ensure decisions are informed by the latest funding and partner intelligence.
- Gather information on existing conduit availability and condition for high priority projects.
- Continue to coordinate with Caltrans and CPUC on the availability of dark fiber to help reduce project cost.
- Begin planning/preliminary design of last mile projects.
- Pursue funding opportunities (see **Section 4.3**).

4.1.2 Smart Intersections

The Need There is a high frequency of crashes at some intersections, posing safety risks and exacerbating traffic congestion. San Bernardino County has consistently ranked second for the highest total number of fatal crashes in the state over the past decade, trailing only behind Los Angeles County, which has a population more than four times greater^{27 28 29}.

Recommended Project Deploy smart intersection technology at strategic locations to improve safety and efficiency, information sharing and communication, and offer amenities improving quality of life.

Context Smart Intersections are the building blocks of a Smart County. Beyond serving key functions like lighting and dynamic signal control across corridors, they provide the opportunity to bring in communications and layer on customized amenities for each corridor/region, including:

- Public / Agency Wi-Fi
- Weather / Air Quality Emissions Sensors
- EV Charging
- Speed Indicators
- CCTV / Safety Systems / Vehicle Detectors
- Smart Metering
- Off-Pavement Parking Management
- Curb Management Sensor

²⁷ UC Berkley. 2022. "Transportation Injury Mapping Software." Available at: <https://tims.berkeley.edu/summary.php>.

²⁸ United States Census Bureau. Available at: <https://www.census.gov/quickfacts/fact/table/losangelescountycalifornia,US/PST045222>.

²⁹ United States Census Bureau. Available at: <https://www.census.gov/quickfacts/fact/table/sanbernardinocountycalifornia,losangelescountycalifornia,US/PST045222>

- Connected Vehicle Roadside Units (RSUs)
- License Plate Readers

San Bernardino County is equipped with thousands of signalized intersections managed by the county (unincorporated areas), cities/towns, and Caltrans (state highway on/off-ramp locations).

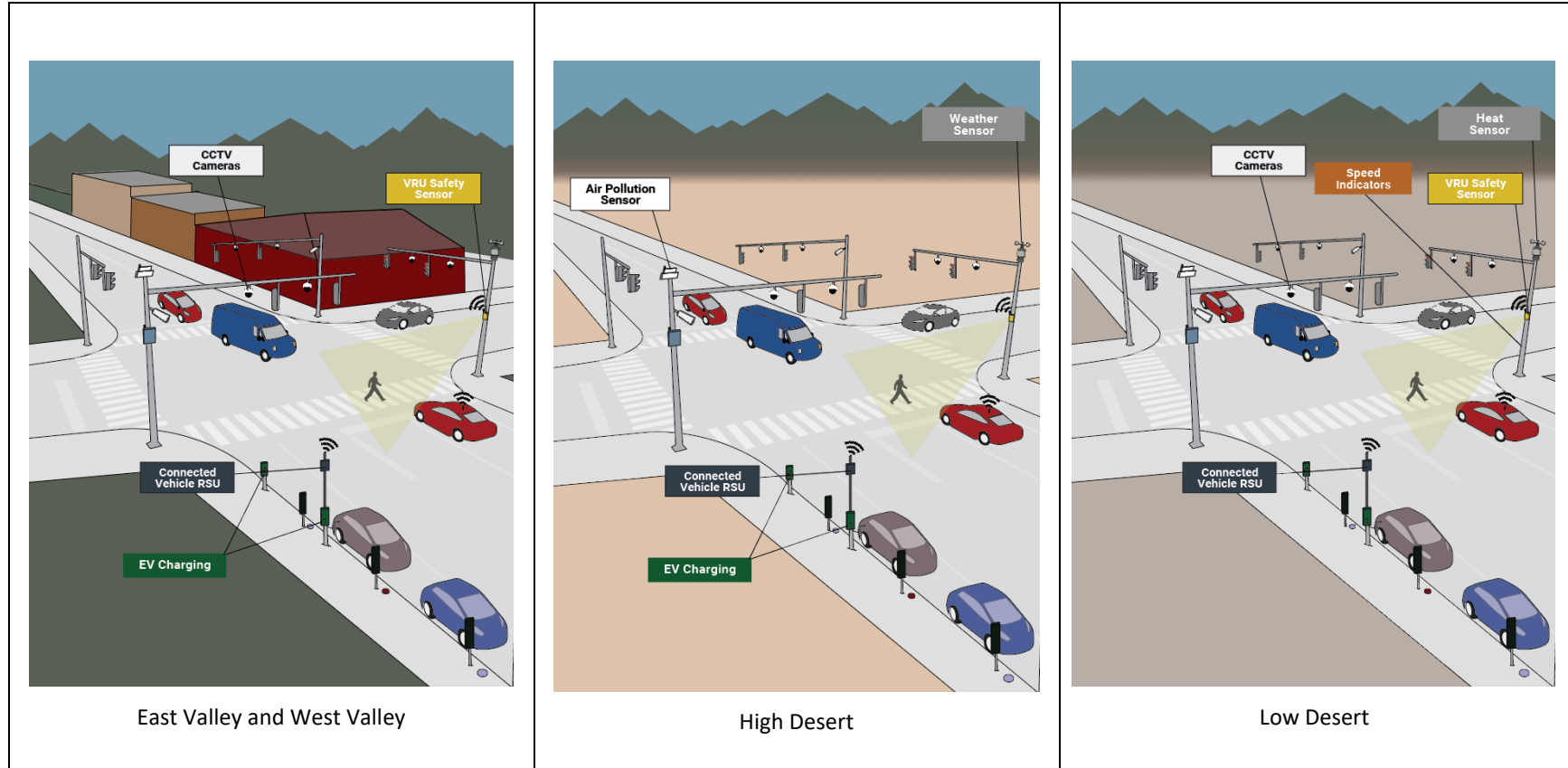
Identifying Strategic Locations: Potential Smart intersection pilot locations were identified in each of the county's subregions based on the following criteria:

- Poor safety record / history of crashes based on TIMS data³⁰
- Proximity to Broadband Field Network Connection Point
- Ability to ultimately integrate into Smart Corridor
- Positioned optimally to enable a key regional function (e.g., inclement weather sensor)
- Limited infrastructure upgrade needs, where possible
- Stakeholder input

Various sites and technology suites have been identified in each of the four regions (West Valley, East Valley, High Desert, and Low Desert) in **Exhibit 4-10**. **This is a preliminary list and is not comprehensive. Local jurisdictions will need to fine-tune and/or expand the list based on their own priorities and the needs of the communities they serve.**

³⁰ UC Berkeley. 2022. "Transportation Injury Mapping Software." Available at: <https://tims.berkeley.edu/summary.php>

Exhibit 4-10. Smart Intersections by Region



Enabling Infrastructure: Although the intersections selected here do not need infrastructure upgrades and have readily available fiber conduit, agencies may choose to implement Smart Intersections in other locations without up-to-date infrastructure. In such cases, agencies should consider adding fiber communication and new traffic controllers to those intersections to enable Smart Intersection technologies. Agencies could then evaluate the intersection controllers and decide if an upgrade to the system would benefit the desired functions. Intersections controlled by 170 and 170E controllers should be upgraded to 2070 or 2070ATC controllers to enable more traffic control modes. These controllers have greater functionality that benefits Smart Intersection and, by extension, Smart Corridor implementation.

Leveraging Existing Data in Decision-making: There has been work previously done regarding Smart Intersection and Smart Corridor technology in the East and West Valley sub regions. The San Bernardino Valley Coordinated Traffic Signal System was a tiered process that implemented new timing phases and installed a variety of hardware at various intersections across the San Bernardino Valley, to reduce travel times and GHG emissions. The plan achieved reductions in travel times and emissions, demonstrating the proof of concept. This program and studies can be leveraged to make informed decisions on existing infrastructure in the East and West Valley subregions. There were four tiers, with Tier 1&2 being implemented between 2006 and 2009 and Tier 3&4 being implemented between 2011 and 2014³¹. While the associated field equipment has likely reached end-of-life, the intersection selections provide valuable insight into key corridors and the existence of interconnect infrastructure. The High and Low Desert regions were not included in the SBVCTSS efforts, so there is less available information on these areas. Any further development of Smart Intersections and Smart Corridors should involve interested agencies so that a comprehensive understanding of the existing conditions can be developed to enable accurate planning.

Potential Smart Intersection Candidates: Potential Smart Intersection candidates were identified in each of the four regions described above.

West Valley, City of Ontario, E. Riverside Dr./S. Archibald Ave.

This intersection shown in **Exhibit 4-11** is in a mixed-used area in proximity to SR-60, I-15, and the Ontario Airport. The intersection lies at the confluence of two major arterials, which increases the use cases for an ITS-equipped intersection. There are loops and non-intrusive sensors present. City of Ontario intersections are typically equipped with a mix of ASC/2, ASC/3, and Cobalt NEMA Econolite traffic signal controllers. Those controllers use Econolite software. The city is in the process of migrating from the older (and discontinued) Aries central traffic signal control software to the more current Centracs central traffic signal control software. According to a 2009 SBVCTSS report, the controller at this intersection is an ASC/2 controller³². However, it may have been upgraded in the past 14 years. Further technology can be implemented at this intersection to further augment capabilities such as a signal timing project or deploying automated license plate readers to better resolve criminal activities. Additionally, this intersection could be enabled to play a key role in future Integrated Corridor Management as its location would be a key thoroughfare in the event of an accident on the I-15 or SR-60 freeways. SBCTA is currently working on design of

Exhibit 4-11. E. Riverside Dr./S. Archibald Ave.



³¹ SBCTA. 2023. "San Bernardino Valley Coordinated Traffic Signal System". Available at: <https://www.gosbcta.com/plan/sb-valley-coordinated-traffic-signal-system-plan/>. Accessed July 11, 2023.

³² Albert Grover and Associates. September 2009. "San Bernardino Valley Coordinated Traffic Signal System Plan Tier 1&2 Project – Appendix B-10". Available at: <https://www.gosbcta.com/wp-content/uploads/2019/10/Tiers-1-2-Final-Report.pdf>. Accessed July 11, 2023.

express lanes along the I-15³³. Connection with Middle Mile fiber could occur at the SR-60/S. Archibald Ave. interchange.

West Valley, City of Ontario, S. Haven Ave./Mission Blvd.

S. Haven Ave. is a north-south oriented corridor that connects Ontario Airport and the city of Rancho Cucamonga, where the southern terminal for the proposed Brightline West high-speed rail service is proposed to be located. This intersection shown in **Exhibit 4-12** could be enabled with Smart Intersection technology to monitor traffic patterns and near misses and improve safety. The CCTV cameras in place at this intersection, in combination with the appropriate traffic analytics software, can be utilized to monitor traffic patterns and near misses. Additionally, Mission Blvd. parallels SR-60 and I-10, and Haven Ave. parallels SR-83 and I-15, positioning this intersection to play a key role in Integrated Corridor Management to better manage recurring or non-recurring congestion. Connection to Caltrans Middle Mile fiber could occur at the SR-60/S. Haven Ave. interchange. The City of Ontario operates Econolite controller software at the intersection, and some mix of Aries and Centrac's central traffic control software. The signals are connected to communication with fiber optic conduit³⁴. The available fiber optic cable could be easily leveraged to begin deploying sensors that would begin a smart intersection transformation.

Exhibit 4-12. S. Haven Ave./Mission Blvd.



East Valley, County of San Bernardino, San Bernardino Ave./Alabama St.

This intersection, shown in **Exhibit 4-13**, is in a residential, commercial, and logistical area that enables users to access either SR-210 or I-10. Increasing vehicle detection through either loops, video analytics, or transponders will provide a higher level of data granularity and allow the city to develop signal timing plans that alleviate the impact of truck traffic. This intersection is also close to the San Bernardino Airport and could be subject to special events traffic.

Furthermore, San Bernardino County will be installing and utilizing a Centrac's central traffic control system to communicate with signals on Alabama St. Connection to the State Middle Mile fiber could occur at the I-10 and Alabama St. interchange, or potentially at the SR-210 and San Bernardino Ave. interchange. However SR-210 is not slated to receive priority fiber as soon as I-10.

San Bernardino County could benefit by connecting this intersection to its newly deployed Centrac's system, preferably via a fiber optic communications infrastructure. Connection via fiber optics would be advantageous for creating a pilot Smart Intersection to demonstrate capabilities, with a greater level of control and customization available than if it were connected using signal interconnect (copper) cable (SIC) or some other other technology that is less robust than fiber.

Exhibit 4-13. San Bernardino Ave./Alabama St.



³³ San Bernardino County Transportation Authority. "I-15 Express Lanes" Available at: <https://www.gosbcta.com/project/i-15-corridor/>

³⁴ Albert Grover and Associates. September 2009. "San Bernardino Valley Coordinated Traffic Signal System Plan Tier 1&2 Project". Available at: <https://www.gosbcta.com/wp-content/uploads/2019/10/Tiers-1-2-Final-Report.pdf>. Accessed July 11

East Valley, City of Yucaipa, Yucaipa Blvd./4th St.

Yucaipa Blvd. and 4th St. is an intersection, shown in **Exhibit 4-14**, with a poor safety record positioned along a major east-west corridor. There are numerous shops on the north side of 4th St. and the south side of 4th St. is largely residential, which may increase the number of pedestrians relative to other similar intersections. There are video detection cameras for all four approaches to the intersection. Depending on the capabilities of the cameras and the video detection system, it may be possible to utilize those cameras to implement video analytics to log and document near miss events. License plate readers should also be considered at this intersection. Fiber could be connected to the State Middle Mile fiber conduit at the interchange of I-10/Yucaipa Blvd. or Oak Glen Rd./Yucaipa Blvd. via I-10/Oak Glenn Rd. The City of Yucaipa uses McCain QuicNet for traffic signal operations. This intersection is equipped with a Type 179 controller and communicates with the QuicNet server using copper twisted pair cable. Further, it was slated for signal optimization as part of SBVCTSS's Tier 3&4 program.

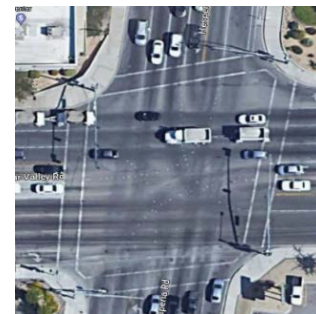
Exhibit 4-14. Yucaipa Blvd./4th St.



High Desert, City of Victorville, Bear Valley Rd./Hesperia Rd.

Bear Valley Rd. and Hesperia Rd., shown in **Exhibit 4-15**, is an intersection of two major arterials in the High Desert area. There have been 56 significant traffic incidents since 2015 at this location³⁵. Not only would it be beneficial to enable near miss crash detection and video analytics at the intersection, but also to implement the beginnings of a smart corridor system to bypass congestion on I-15. Connection to the State Middle Mile fiber could occur at the interchange of Bear Valley Rd. and I-15. The City of Victorville uses Trafficware ATMS, but it is unclear what level of control, or any other existing conditions exist at this intersection.

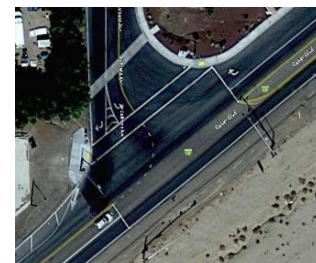
Exhibit 4-15. Bear Valley rd./Hesperia Rd.



High Desert, County of San Bernardino, Baker Blvd./Caltrans Ave.

This intersection, shown in **Exhibit 4-16**, is in Baker, CA, an unincorporated community located on I-15 between Southern California and Las Vegas. Baker is a popular rest stop for drivers making the 200+ mile drive between Southern California and Las Vegas. Baker is an hour or more drive removed from San Bernardino County Maintenance Facilities. This intersection could be equipped with inclement weather sensing devices, license plate readers, or other devices to improve safety in the area. The signal is relatively new, as it was constructed in 2016, and has a CCTV camera. This could be a quick win as it demonstrates County funding will be used to support all members of the county and will be easily publicized. Connection to the State Middle Mile Broadband could occur at the I-15 at the on/off ramp to Baker. This signal operates on an atomic clock and is not connected to a central traffic signal control system.

Exhibit 4-16. Baker Blvd./Caltrans Ave.



³⁵ UC Berkely. 2022. "Transportation Injury Mapping System." Available at: <https://tims.berkeley.edu/>. Accessed July 12, 2023.

Low Desert, City of Twentynine Palms, Adobe Rd./SR —62

State Route 62 is the major east-west route into the Low Desert portion of San Bernardino County. The intersection, shown in **Exhibit 4-17**, with Adobe Rd. leads to the main gate of the Twentynine Palms Marine Corps base, which may create different traffic congestion that could be mitigated with Smart Intersection capability. Additional improvements would be easily accomplished as the intersection is along the Caltrans Middle Mile Fiber route. Furthermore, proceeding south along Adobe Rd. leads to the Twentynine Palms Band of Mission Indians Reservation and a local elementary school. Placing focus on this intersection enables leverage for funding that targets the federal government, tribal land, and underserved communities.

Exhibit 4-17. Adobe Rd. and SR-62



Low Desert, City of Yucca Valley, Joshua Ln./SR - 62

Also located along State Route 62 and shown in **Exhibit 4-18**, this intersection is further west and intersects with State Route 247, which is a north-south corridor connecting to the High Desert. It is also near the Yucca Valley Airport, which may create some possible partnerships to enable weather monitoring or special event management. There is a Tesla Supercharger in the Northwest side of the intersection which could be leveraged for use in some Smart Intersection capability. As with Adobe Rd., the intersection is planned to be supplied with fiber optic conduit by 2026 by the Caltrans Middle Mile project. With only two traffic signals under their control, Yucca Valley does not utilize centralized traffic signal software; however, coordination could be accomplished with GPS clocks.

Exhibit 4-18. Joshua Ln./SR-62



Smart Intersection Next Steps

- Determine which jurisdictions are interested in augmenting/installing ITS. ITS necessitates infrastructure deployment and maintenance that can support advanced traffic management.
- Determine an agency champion to carry forward the strategy.
- Coordinate with agencies that have overlapping jurisdictions, specifically Caltrans at on/off ramps.
- Consider performing initial demonstrator pilots of ITS at intersections that poses more advanced infrastructure (fiber connectivity, detectors, 2070/2070 ATC controllers, cameras, central management software, etc.). Alternatively, determine the need for any new specific infrastructure upgrades.

4.1.3 Smart Corridors

The Need At the corridor level, intersection risks and challenges are compounded, negatively impacting safety, efficiency, environment, economic opportunity, and quality of life in San Bernardino County at scale.

Recommended Project Implement Smart Corridor pilots to extend the principles of smart intersections along entire traffic corridors, modernize transportation at a large scale to facilitate smoother traffic flow, enhance safety, reduce travel times, and minimize environmental impact. Capture data and lessons learned from pilots to inform the wider deployment of smart traffic management systems across the county.

Context

Successful Example in San Bernardino County: Previously, Haven Ave. in Rancho Cucamonga and Ontario was identified as a Smart Corridor and SBCTA funds were invested to upgrade signal coordination on Haven Ave. This is

an example of one of the corridors that were made up of the SBVCTSS planning that coordinated signals on major arterials throughout the San Bernardino Valley to reduce GHG and travel times. The project interconnected the city of Rancho Cucamonga with Caltrans District 8. Additionally, new software, fiber optic communications, CCTV camera coverage, and video-based traffic detection were deployed to make use of the latest transportation technologies. This project had a 16:1 ratio on money returned in the first year of the project (SBVCTSS Tiers 3&4), through reduction in GHG and travel times by enabling remote signal timing adjustment from central management systems as well as morning and evening peak period coordination plans for 40 corridors and 691 traffic signals³⁶. The Caltrans Traffic Signal Operations Manual notes that area-wide signal timing benefits can outweigh costs by a ratio of 40:1³⁷.

Identifying Smart Corridor Candidates: San Bernardino County has many corridors that play an increasingly important role in moving people and goods throughout the county. For the purposes of this project, representative corridor candidates were selected in each of the four regions (West Valley, East Valley, High Desert, and Low Desert) based on:

- Traffic volumes
- Traffic patterns
- Strategic importance
- Connectivity with Smart Intersections
- Stakeholder feedback
- Local needs, including proximity to logistics hubs and public transit
- Ongoing and planned projects in the area

Note: Because limited information was available at the time of selection, new information may be revealed as the projects progress, which may change the potential project locations.

³⁶ San Bernardino County Transportation Authority. "San Bernardino Valley Coordinated Traffic Signal System." Available at: <https://www.gosbcta.com/plan/sb-valley-coordinated-traffic-signal-system-plan/>

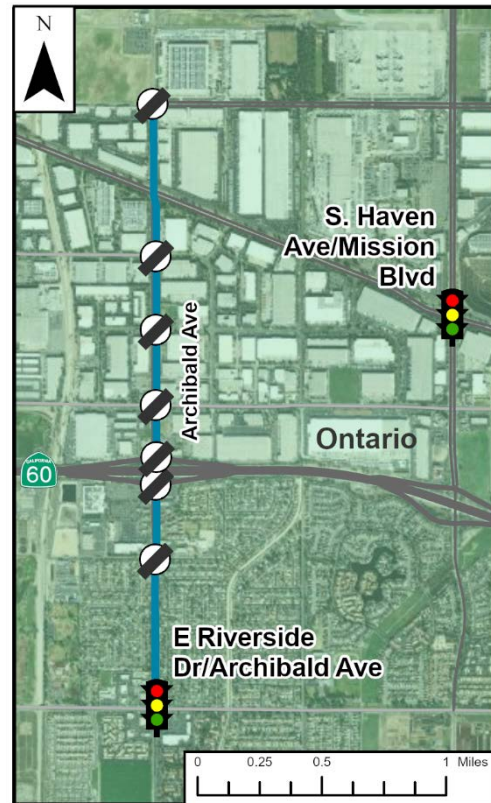
³⁷ Caltrans. 2020. "Traffic Signal Operations Manual." Available at: <https://dot.ca.gov/-/media/dot-media/programs/traffic-operations/documents/mobility/traffic-signal-operations-manual-1-31-2020-a11y.pdf>

West Valley: South Archibald Ave. runs north-south, intersecting SR-60 near the Ontario airport freight logistics area and has a busy at-grade rail crossing. This corridor, shown in **Exhibit 4-19**, goes through a dense warehousing and commercial area with numerous private driveways and tractor-trailers entering and exiting. This presents a challenge ensuring signal timing is appropriate and limits idling and acceleration/deceleration of tractor-trailers to improve air quality and reduce noise pollution. Signals should be coordinated to attempt to platoon trucks and passenger vehicles.

Archibald Ave. was identified in the SBVCTSS Tier 1&2 master plan for corridor analysis between Mission Blvd. and Riverside Dr. Archibald Ave. between E. Riverside Dr. and Mission Blvd. has signals that are connected using hardwire copper. There is a Caltrans signal at Archibald Ave. and SR-60EB ramp that, as of SBVCTSS Tier 1&2³⁸, has fiber optic connectivity. This may be leveraged to benefit the corridor as this is a centrally located intersection.

Furthermore, Haven Ave., which has a major intersection with S. Archibald Ave., was previously identified as a smart corridor. Note, the City of Ontario uses ASC Econolite software and Aries signals, while Caltrans ramps (for SR-60) use Caltrans C-8 software and CTNET signals. While not insurmountable, this issue will need to be addressed during the design and integration stages.

Exhibit 4-19. West Valley Corridor



³⁸ SBCTA. 2023. "San Bernardino Valley Coordinated Traffic Signal System". Available at: <https://www.gosbcta.com/plan/sb-valley-coordinated-traffic-signal-system-plan/>. Accessed July 11, 2023.

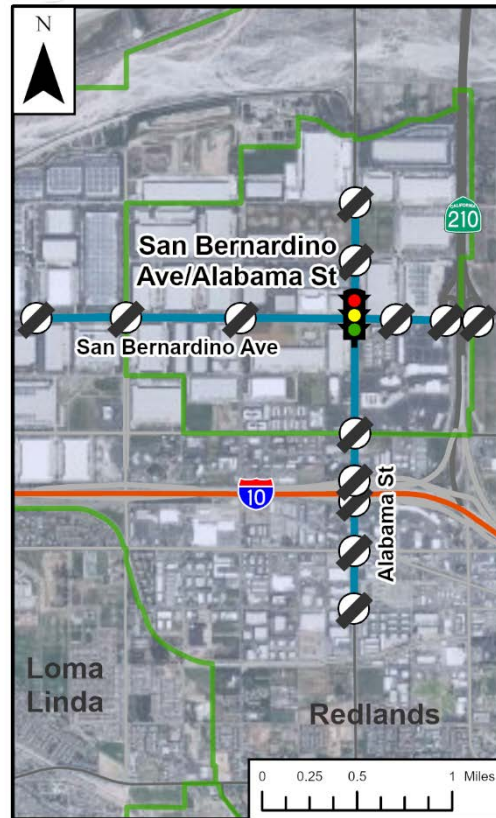
East Valley Alabama St./ San Bernardino Ave., shown in **Exhibit 4-20**, is another example of a primarily freight-oriented corridor that is heavily traveled by tractor-trailers due to the numerous warehousing and logistics facilities proximate to the I-10/ SR-210 interchange and the major logistics hub at San Bernardino International Airport. A Smart Corridor that emanates out of this intersection will enable more efficient movements of freight into and out of the area, improving the quality of life of residents, reducing GHGs, and increasing the speed of freight movements.

There have been 26 significant crashes in the past 10 years in a one block radius of the W. San Bernardino Ave. and Alabama St. intersection³⁹. Implementation of a smart corridor can improve traffic safety and reduce conflicts with Vulnerable Road Users.

Alabama St. is a pilot project for San Bernardino County, being the first location where the county controls signal timing using Centrac. Caltrans Middle Mile Fiber slated to be installed along I-10 will also support the efficient traffic management of Alabama St. and San Bernardino Ave.

The City of Redlands operates signals using SEPAC software with Siemens Eagle ACTRA signals along Alabama St. from Redlands Blvd. to Almond Ave. with copper twisted pair communications⁴⁰. At the Alabama St. and 3rd St. intersection, the City of Highland has an online traffic signal that is connected to fiber conduit that runs along Greenspot Rd⁴¹. This road interchanges with SR-210 and thus this intersection will likely be connected to Middle Mile fiber via fiber conduit that interfaces with the Caltrans signals at the interchange. Further investigation should be done to determine if Caltrans fiber is available to be interfaced with at the interchange of SR-210 and W. San Bernardino Ave., which is one block east of the Alabama St. and the W. San Bernardino Ave. intersection. These streets were selected in tandem due to the unique position they occupy at the corner of two major freeways which links their movements, especially during recurring and non-recurring congestion. Corridor management can assist with this.

Exhibit 4-20. East Valley Corridor



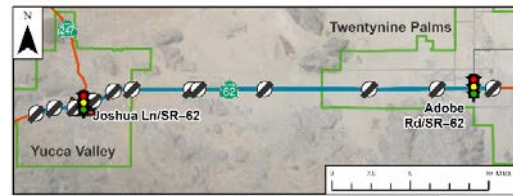
³⁹ UC Berkely. 2022. "Transportation Injury Mapping System." Available at: <https://tims.berkeley.edu/>. Accessed July 12, 2023.

⁴⁰ SBCTA. 2023. "San Bernardino Valley Coordinated Traffic Signal System". Available at: <https://www.gosbcta.com/plan/sb-valley-coordinated-traffic-signal-system-plan/>. Accessed July 11, 2023.

⁴¹ Albert Grover & Associates. 2018. "Highland California Traffic Signal System Map." Accessed July 11, 2023.

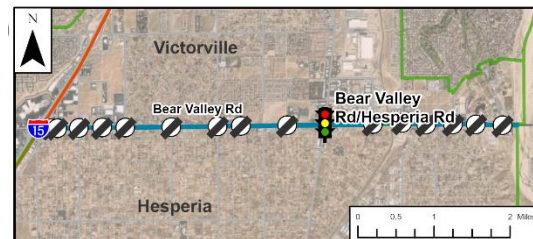
Low Desert: State Highway 62, shown in **Exhibit 4-21**, is a major east-west arterial that connects communities in the Low Desert to the San Bernardino Valley via an interchange with I-10. State Route 62 additionally has major institutions such as the Marine Corps Air Ground Combat Center, Joshua Tree National Park, and the Twentynine Palms Band of Mission Indians. Between 2012 and 2022, there have been over 1,000 crashes on State Route 62 in the Low Desert subregion, the most crashes of any principal arterial in the Low Desert subregion⁴². Over 65% of crashes occur between the cities of Yucca Valley and Twentynine Palms⁴³, where there are numerous signalized intersections operated by varying agencies. This therefore would require more interagency cooperation than some of the other Smart Corridor options. A Smart Corridor system can aid in crash prevention, and in the event of a crash can provide congestion relief. Upgrades to traffic signal cabinets and controllers may be required as the existing conditions for the devices are unknown.

Exhibit 4-21. Low Desert Corridor



High Desert: Bear Valley Rd, shown in **Exhibit 4-22**, is a major east-west corridor in the High Desert that intersects I-15, SR-395, and SR-18. The surrounding area has commercial, residential, and logistical/warehousing zones that, along with I-15, create varying traffic patterns. There have been numerous crashes near the on and off ramps and within a block of I-15 and Bear Valley Rd.⁴⁴. Additionally, there are intersections with arterial north-south surface streets that, when connected to and enabled with Smart Intersection/ Smart Corridor abilities, would proliferate congestion alleviation on I-15. The City of Victorville operates traffic signals on a majority of this corridor; Bear Valley Rd. is the border between Hesperia and Victorville. They utilize Trafficware ATMS indicating existing communication of some nature that could be utilized for the corridor and the planned Smart Intersection at Bear Valley Rd. and Hesperia Rd. There are two further sections of Bear Valley Rd. that will be considered in the Smart County MP: West of I-15 to US395 and the section in Apple Valley.

Exhibit 4-22. High Desert Corridor



⁴² UC Berkely. 2022. "Transportation Injury Mapping Software." Available at: <https://tims.berkeley.edu/tools/gismap/>

⁴³ UC Berkely. 2022. "Transportation Injury Mapping Software." Available at: <https://tims.berkeley.edu/tools/gismap/>

⁴⁴ UC Berkely. 2022. "Transportation Injury Mapping System." Available at: <https://tims.berkeley.edu/>. Accessed July 12, 2023.

Interagency Coordination is Critical: Arterials tend to cross numerous jurisdictions, and if there is no discussion between agencies, this degrades the effectiveness of any implemented Smart Corridor technology. Any well-executed Smart Corridor requires coordination between each agency that has jurisdiction along the corridor. San Bernardino County has many freeways and highways and, therefore, it will be important to involve Caltrans in the planning, engineering, and procurement of these systems. SBCTA and SBCOG can function as intermediaries between agencies to ensure that smart transportation planning is not done in silos.

Smart Corridor Next Steps

- Determine which jurisdictions are interested in augmenting/installing ITS. ITS necessitates infrastructure deployment that can support advanced traffic management.
- Determine an agency champion to carry forward the strategy.
- Start agency cooperation early in the planning process for precedent.
- Agencies with existing ITS/ Smart Corridors can aid other agencies to develop their infrastructure.
- SBCTA/SBCOG can facilitate data-sharing guidelines and agreements that will bolster the back-end development of effective traffic operations management.

4.2 Early Action Plan Proposals/Projects (Locations TBD)

For the 4. Advanced Traveler Information Systems and Emergency Management Services, 5. CAD-to-CAD Systems, and 6. Zero-Emissions Passenger Vehicles and Trucks, specific locations and project participants will be identified as part of project development activities.

4.2.1 Advanced Traveler Information Systems and Emergency Management Services

The Need Current Emergency Management Services (EMS) protocols rely heavily on personnel traveling to the site of the emergency in order to assess conditions and post emergency signs. This takes time and resources and occupies personnel during peak demand times.

San Bernardino County has no shortage of emergencies, including wildfires, floods, snowpack, earthquakes, or major incidents on the rail and highway networks. The series of atmospheric rivers hitting San Bernardino County is a recent reminder of the county's vulnerabilities. The Office of Emergency Services, Caltrans, Forest Service, law enforcement, CalFIRE, and others regularly train for these events and have standard operating procedures set up to guide response. These standard operating procedures include ways of communicating with the public during emergencies, but there is room for improved communication and information sharing.

Recommended Project Integrate Advanced Traveler Information Systems (ATIS), video surveillance of key locations, and automation of emergency signage into EMS to make responses more efficient, effective, and timely. This will also free up personnel bandwidth at critical times, further improving EMS.

Context

ATIS and EMS are two distinct but interrelated components of the broader transportation and public safety framework. When these systems work together, they can significantly enhance the efficiency of managing emergencies and improve traveler safety.

What is ATIS? The purpose of ATIS is to provide real-time or up-to-date information. These systems are designed to enhance the overall travel experience by offering useful information to travelers and improving the efficiency and safety of transportation networks. ATIS are commonly found in various forms, such as websites, mobile applications, and dynamic message signs. By providing timely and accurate information, ATIS contribute to better-informed decision-making, increased safety, reduced travel times, and improved overall travel experiences for individuals and communities. They play a crucial role in modern transportation management and are continually evolving with advancements in technology and data integration.

What is EMS? EMS is the process of planning, organizing, coordinating, and implementing measures to respond to various types of emergencies and disasters. The primary goal of EMS is to save lives, protect property, and mitigate the impact of emergencies on communities and individuals. Emergencies come in various forms, from natural disasters, such as hurricanes, earthquakes, floods, wildfires, and tornadoes, to human-made incidents, such as terrorist attacks, industrial accidents, disease outbreaks, and technological failures.

Benefits of integrating ATIS and EMS: By integrating ATIS with EMS, authorities can establish a comprehensive and efficient approach to managing emergencies and safeguarding the traveling public. Collaboration between these systems can help save lives, reduce response times, and enhance overall emergency preparedness and response capabilities. Collaboration can be accomplished by:

- **Data Sharing:** ATIS gather real-time data from various sources, such as traffic conditions, weather updates, road closures, and public transit schedules. This data can be valuable for EMS agencies during crisis situations, helping them make informed decisions and respond effectively to emergencies.
- **Emergency Alerts and Notifications:** ATIS often have the capability to broadcast alerts and notifications to the public through electronic message boards, social media, mobile apps, and email alerts. During emergencies, EMS agencies can use these systems to disseminate critical information and evacuation notices, helping travelers to stay safe and avoid affected areas.
- **Incident Management:** ATIS (e.g., website, mobile apps) can be integrated with EMS systems to aid in incident management. For instance, during a major traffic accident, mobile apps can redirect traffic away from the affected area, helping emergency responders reach the scene faster and minimizing additional risks caused by congestion.
- **Evacuation Planning:** In emergency situations where evacuation is necessary, ATIS can play a vital role in providing real-time traffic conditions and alternative routes to help manage traffic flow during evacuations. EMS agencies can use this data to adjust evacuation plans and ensure a smooth and safe process.
- **Data Analytics for Preparedness:** ATIS can accumulate extensive data over time, such as historical traffic patterns, transportation infrastructure vulnerabilities, and crowd behavior during events. EMS agencies can leverage this data to analyze trends and patterns, leading to better preparedness strategies and disaster response plans.
- **Coordinating Resources:** During emergencies, it is crucial to efficiently allocate resources such as ambulances, police officers, and other emergency responders. ATIS can provide real-time data on traffic conditions and congestion, allowing emergency management agencies to deploy resources more effectively to areas where they are most needed.
- **Public Awareness:** ATIS can be utilized to educate the public about emergency preparedness, safety protocols, and best practices. By promoting safety and emergency awareness through different channels, EMS agencies can improve overall community resilience.
- **Collaborative Partnerships:** Collaborative partnerships between the agencies responsible for ATIS and EMS are essential. Regular meetings, joint training exercises, and shared resources can facilitate better communication and coordination during critical situations.

Several illustrative opportunities to deploy these technologies were brought to light during stakeholder outreach for the Smart County Master Plan, including:

- **Apple Valley** indicated problems with people dumping trash in sewer lines through manhole covers in remote areas. Remediation of subsequent blockages has proved very costly. Video surveillance and more secure manhole covers are tools that could be used to prevent and detect these intrusions.
- **Twentynine Palms** experiences periodic roadway flooding during which personnel must go to the flood location and physically deploy signage to warn the traveling public. Instead, video surveillance and remote-controlled signage could improve the response time, accuracy, and outcome. Integration of ATIS can also help notify travelers of real-time flood conditions and corresponding road closers.

ATIS and EMS Next Steps

- Hold further interviews with county and city/town public works departments, law enforcement, flood control, CalFIRE, and other entities with jurisdiction to identify and inventory all opportunities to make EMS more efficient and effective, including ATIS integration.
- Develop an implementation plan that summarizes these initiatives, provides cost estimates and potential cost savings, identifies party responsible for implementation, and specifies implementation timeline.
- Identify grant opportunities that may provide financial assistance for EMS improvements, whether for an entire project or just certain aspects of it.
- Work with local jurisdictions and county-level agencies to incorporate these improvements into their capital plans, where feasible. Ensure that the need for cross-jurisdictional communications and technological consistency/interoperability have been accommodated.
- Assess current county-wide conditions of existing ATIS systems in depth and execute early action plans that emphasize interoperability and compatibility.
- Identify potential platforms for communication that enable traveler information and emergency management services to exchange information efficiently.

4.2.2 CAD-to-CAD Systems

The Need Municipal and regional public safety emergency communications centers (ECCs) often lack the technology to efficiently interface with neighboring jurisdictions during emergencies. This may lead to delayed response times from not utilizing closer resources that are in a different jurisdiction or missing critical information necessary for the safety of first responders and the public.

Both San Bernardino County and public safety agencies, such as police, fire, and emergency medical services, utilize Computer-Aided Dispatch (CAD) systems and software in their dispatch centers to manage and coordinate EMS. A CAD-to-CAD approach is particularly beneficial for operations centers dispatching services, enabling swift and efficient data exchange across diverse platforms. CAD systems streamline the dispatch process by providing real-time information and automating various functionalities. These systems typically include features such as call-taking, incident creation, unit assignment, mapping and routing, status tracking, and resource management.

While CAD systems offer numerous benefits, there are challenges with their implementation and use, particularly when it comes to use across different jurisdictions. San Bernardino County agencies use different versions and variations of CAD systems available, each with its own features and capabilities. Some of the most common challenges across jurisdictions using different CAD systems include:

- **Data Compatibility:** CAD systems may use different data formats or standards across jurisdictions. This can result in interoperability issues when sharing information or coordinating responses between different agencies. It becomes crucial to establish common data exchange protocols or invest in systems that can seamlessly integrate and translate data across various CAD versions.
- **Communication Protocols:** CAD systems rely on effective communication channels to exchange information between dispatchers, responders, and other stakeholders. Inconsistent or incompatible communication protocols between jurisdictions can impede the timely, accurate transmission of data, leading to delays or errors in emergency response efforts.
- **System Reliability and Downtime:** CAD systems are complex and rely on robust infrastructure and networks. Issues such as system failures, downtime, or inadequate backup solutions can occur, affecting emergency response operations. In a multi-jurisdictional context, disparities in system reliability and downtime management practices can create challenges during critical incidents.

In addition to CAD system differences, multi-jurisdiction response agencies face other challenges, including:

- **Training and Standardization:** CAD systems require proper training and standardization to ensure effective utilization. However, different jurisdictions may have varying levels of training, operational

procedures, or customization of their CAD systems. This can result in challenges when collaborating during mutual aid situations or when personnel from different jurisdictions need to work together.

- **Legal and Policy Differences:** Laws and policies governing emergency response operations can differ across jurisdictions. These variations can impact how CAD systems are configured, utilized, and integrated with other systems. Issues related to data privacy, information sharing, and access permissions can arise when different jurisdictions have conflicting regulations or policies.
- **Resource Coordination:** In multi-jurisdictional incidents, coordinating resources and sharing information seamlessly is essential. However, disparities in CAD versions or capabilities can hinder resource coordination efforts. It becomes necessary to establish clear protocols and procedures for cross-jurisdictional resource sharing and coordination, considering the limitations and differences in CAD systems.

Collaboration between jurisdictions is critical when working to bridge information gaps in CAD-to-CAD systems. Standardizing CAD systems can help streamline operations, improve response times, and ultimately, reinforce public safety measures.

The Federal Communications Commission (FCC) collects data to build a registry of public safety answering points (PSAPs). The PSAP database serves as a tool to aid the FCC in evaluating the state of PSAP readiness and E9-1-1 deployment. The FCC's 911 Master PSAP Registry lists PSAPs by an FCC assigned identification number (PSAP ID), PSAP name, state, county, and city. San Bernardino County has 13⁴⁵ PSAPs, as shown in **Exhibit 4-23**. Although all for San Bernardino County, these PSAPs operate different versions of the CAD system, creating a need for improved communications.

Exhibit 4-23. San Bernardino County PSAPs

PSAP ID	PSAP Name	City	County	State
8075	USMC Logistics Base Barstow - Nebo Provost Marshall	Barstow	San Bernardino	CA
8122	Marine Corps Logistics Base Barstow	Barstow	San Bernardino	CA
724	Fontana Police Department	Fontana	San Bernardino	CA
615	CHP Barstow (San Bernardino)	Barstow	San Bernardino	CA
856	Ontario Police Department	Ontario	San Bernardino	CA
1027	USMC Twentynine Palms Combat Center - Fire	Twentynine Palms	San Bernardino	CA
625	CHP Inland (San Bernardino)	San Bernardino	San Bernardino	CA
912	San Bernardino County Sheriff (Rialto/Valley)	Rialto	San Bernardino	CA
915	San Bernardino County Sheriff (Victorville/Desert)	Victorville	San Bernardino	CA
829	Montclair Police Department	Montclair	San Bernardino	CA
736	US Army Fort Irwin Provost Marshall (MP)	Fort Irwin	San Bernardino	CA
660	Colton Police Department	Colton	San Bernardino	CA
683	CSU San Bernardino Police Department	San Bernardino	San Bernardino	CA

⁴⁵ FCC (Federal Communications Commission). "911 Master PSAP Registry Locator." Available at: <https://opendata.fcc.gov/Public-Safety/911-Master-PSAP-Registry-Locator/tph8-9bz3>

Recommended Project Leverage the existing Inland Empire Public Safety Operations Platform (IE PSOP) to connect neighboring ECC's and other cooperating agencies through a cloud-hosted communications system interface known as CAD-to-CAD.

Context Whether routine calls or major emergencies, agencies may have the need to share information and/or resources to help mitigate escalating scenarios, and protocols to do so. In most cases, this is currently achieved through traditional telephonic means. This approach can cause delays in the response of neighboring agencies and impede closest available unit and mutual aid responses.

Compatibility Challenges: Each ECC's CAD system has features unique to a particular software vendor. Industry standards for networking these systems and sharing data are not well promulgated, which results in disparate interfaces between systems and ECCs, exacerbating the issues outlined above.

CAD-to-CAD helps solve the problem of disparate CAD interfaces by networking ECCs through a portal or "hub" that translates the information from one CAD into the language of another CAD in a manner that is native and intuitive for the public safety telecommunicators. This reduces the need for telephonic communication between the centers for routine information and/or resource sharing requests. When built out and fully operational, the system has been proven to reduce response times and improve real-time situational awareness and information sharing between cooperating agencies.

Leveraging the IE PSOP: The IE PSOP is a two-county coordinated effort to build a network of interconnected emergency communications centers with a cloud-hosted CAD-to-CAD solution. This project has been underway since 2019 when fire service leaders in Riverside County and San Bernardino County obtained Urban Area Security Initiative (UASI) grant funding to initiate the project. The system was initiated by CONFIRE JPA and the San Manuel Department of Public Safety in 2020. Subsequent participants include the Chino Police Department and the Riverside County Fire Department. Other agencies in the process of integrating into the system include American Medical Response, Murrieta Fire Department, Ontario Fire Department and Cal Fire San Bernardino County. Recent quotes have been sought by the Hemet Fire Department and Corona Police Department. Other agencies having expressed interest in the IE PSOP include Barstow Fire, San Bernardino County Sheriff, Riverside County Sheriff, Air Methods, Southwest Gas Company and the California Highway Patrol.

Funding: Funding for the program has come in the form of several UASI and Homeland Security grants totaling over \$1.5 million dollars. Participating agencies have signed a Memorandum of Understanding to provide funding for ongoing project support. CONFIRE JPA is the lead agency on the project and acts as the administrative agency for the system. Initial investments have been made and the IE PSOP is operational.

Long-term Sustainability: The effort to build out the system and support it long-term requires dedicated focus and energy that is often in limited supply. CONFIRE, as the system administrator, and the IE PSOP would benefit greatly from an injection of resources to facilitate agency participation and enable recruitment and retention of dedicated resources for ongoing coordination. Currently, CONFIRE employs a part-time person to coordinate the effort and utilizes existing admin and IT staff to support the program. These costs are not grant-funded. CONFIRE does assess participating agencies an administrative fee as part of the annual maintenance costs for the program.

A Comprehensive Regional Approach: CONFIRM has made the initial investment in the foundational hub and several entities are already collaborating to support IE PSOP. Moving forward, the goal is to coordinate and collaborate with as many of the following San Bernardino County entities as possible:

- Fire: Barstow FD, US Forest Service (FICC) and Military Base FDs
- Law: San Bernardino County Sheriff, CHP, local police departments, School and College Campus Police/Public Safety
- EMS: Private transport providers (ground and air)
- Utilities: Gas and electric
- Hospitals: Emergency Departments

SBCOG would partner with CONFIRE and other agencies presently participating in the IE PSOP to undertake a regional effort to outreach and inform the local agencies of what CAD-to-CAD is and ultimately gain commitments from agencies interested in participating. The effort needs a champion that has a broader reach than CONFIRE, and support is needed to keep the project moving forward. CONFIRE has a grant fund source that is available through Quarter 2 of 2024. This grant can cover the cost to onboard additional agencies up to that time. Should agencies sign on to the system following Q2 of 2024, the start-up/onboarding costs to participate in the CAD-to-CAD system range between \$35,000-\$50,000 depending on the size of the agency. Ongoing operating and maintenance costs for all agencies participating are currently \$20,000-30,000 per year.

CAD-to-CAD Next Steps

- Coordinate across agencies to determine what the product of a county wide CAD-to-CAD system looks like. This can be facilitated or championed through SBCOG, SBCTA, OES, or other parties.
- Establish a vision for SBCOG in collaboration with its partners, which includes identifying the coverage area, desired applications, functions, and procedural requirement.
- Determine interested agencies and look for partnerships that can scale CAD system countywide.
- Identify agency needs and the scope of the system.

4.2.3 Zero-Emission Passenger Vehicles and Trucks

The Need Charging infrastructure and funding for charging infrastructure is currently insufficient to support the volume of electric vehicles anticipated as the state works to meet zero-emissions goals for cars, passenger trucks, and medium- and heavy-duty vehicles in San Bernardino County.

Recommended Project Proactively secure funding for charging and fueling infrastructure for zero-emission passenger vehicles and trucks, through collaboration between SBCTA/SBCOG and local jurisdictions throughout San Bernardino County. Focus on public agency-led grant applications with charging/fueling vendor partners, while encouraging local jurisdictions to develop zero-emission charging/fueling sites and apply for funding on their own in parallel.

Context

[Governor Newsom's Executive Order N-79-20](#) requires that by 2035, all new cars and passenger trucks sold in California be zero-emission vehicles. Under the order, the California Air Resources Board (CARB) is mandated to develop and propose strategies to achieve 100% zero-emissions from medium and heavy-duty on-road vehicles in the State by 2045 where feasible and by 2035 from drayage trucks. In response, CARB, the California Energy Commission, the federal government, and other entities have been providing incentive funding and grants to support this transition. As the penetration of electric passenger vehicles increases, sufficient vehicle charging infrastructure will need to be in place to support it. While the private sector will address a significant part of this need, charging stations at publicly accessible facilities will also need to scale up, as well as at strategic locations, such as parking lots for multi-family dwellings.

[CARB Advanced Clean Truck](#) regulation requires manufacturers who certify Class 2b-8 chassis or complete vehicles with combustion engines would be required to sell zero-emission trucks as an increasing percentage of their annual California sales from 2024 to 2035. By 2035, zero-emission truck/chassis sales would need to be 55% of Class 2b – 3 truck sales, 75% of Class 4 – 8 straight truck sales, and 40% of truck tractor sales. Local jurisdictions and other government entities can be facilitators of this transition by developing partnerships with private entities and securing grant funding, as public entities need to be the applicant for many of the state/federal grants supporting zero-emission vehicles.

[Zero-Emission Vehicle Readiness and Implementation Plan](#)⁴⁶ Completed in 2019, this SBCOG effort can serve as a basis for a comprehensive approach to facilitating vehicle charging infrastructure in San Bernardino County. However, it only considered passenger vehicles, not trucks, and there has been only limited follow up on this initiative since the original study, with the COVID pandemic setting back some of that activity.

Funding and Incentives: The scale of state and federal grant funding for zero-emission vehicles has dramatically increased in the last two years. There is now a window of time where San Bernardino County could realize a significant infusion of funding for zero-emission charging/fueling infrastructure in partnership with other entities. Local jurisdictions will need to do the legwork of strategically locating sites (some of which may be located on public property), coordinating with host entities, utilities, and charging station vendors.

SBCTA has been involved in initiatives and partnerships to facilitate the development and funding of charging stations for electric trucks and fueling stations for hydrogen fuel cell (HFC) trucks. The SBCTA Board on January 5, 2022, took action to endorse both a clean truck fueling infrastructure initiative and the use of excess toll revenue to incentivize clean trucks.

SBCTA has been coordinating with Caltrans at the state level, SCAG at the regional level, and both air districts on a game plan for incentivizing zero-emission trucks and fueling infrastructure in major freight corridors, particularly I-10 and I-15. SCAG currently is sponsoring a regional study focused primarily on supporting the conversion of trucks to zero-emission. SBCTA has also been coordinating with vendors involved with both battery-electric truck charging and HFC truck fueling. The initial focus in the I-10 corridor is on two strategic locations in Colton and San Bernardino to supply hydrogen fueling and electric charging infrastructure primarily to service medium and heavy-duty trucks. Sites are already in development on E. Street south of Orange Show Road (electric) and on Riverside Avenue south of I-10 (hydrogen). An additional hydrogen site is being pursued with a vendor, in coordination with Caltrans, near the I-15/US 395 junction. Further, SBCTA has provided support letters to two recent applications for the USDOT Charging and Fueling Infrastructure (CFI) grant, one with Caltrans on their multi-state grant and one with MDAQMD for an I-15 focused grant under the same CFI program.

The proposed project would entail a more proactive effort to secure funding for charging and fueling infrastructure for zero-emission passenger vehicles and trucks. The exact nature of this initiative would need to be worked out between SBCTA/SBCOG and local jurisdictions throughout San Bernardino County. This would particularly be focused on grants that require a public agency to be the lead applicant. Partnerships with the charging/fueling station vendors would need to be incorporated. Local jurisdictions are also greatly encouraged to develop zero-emission charging/fueling sites and apply for funding on their own, with no need for SBCOG involvement. However, recent communications with many of the jurisdictions have indicated that their resources for such activities are limited. That said, San Bernardino County jurisdictions are in jeopardy of seriously underperforming in bringing their share of grant funding for zero-emission vehicle infrastructure to the county. This is all while the county experiences some of the most severe air pollution challenges in the nation, particularly given the proliferation of diesel trucks serving warehouses along our key corridors. San Bernardino County has a compelling story and can utilize this to secure grants and improve air quality.

ZEV Next Steps

- Based on the needs, strategize compelling ZEV charging and fueling grant programs.
- Convene meetings with local jurisdictions, the air districts, and vendors involved in the zero-emission vehicle space to test and shape grant ideas.
- Develop a framework for site development that helps position zero-emission projects for competitive grants. This should be done prior to the next cycle of state/federal grants, which could be due in spring/summer 2024.

⁴⁶ [Zero-Emission Vehicle Readiness and Implementation Plan \(2019\) - SBCTA \(gosbcta.com\)](#)

- Provide jurisdictions with resources to advance priority sites. Work with private site managers where appropriate, such as managers of multi-family apartment sites, consistent with the recently released grant opportunity from the California Energy Commission on Reliable, Equitable, and Accessible Charging for Multi-family Housing (REACH).
- Organize and implement the grant application strategy for 2024, coordinating with local jurisdictions.

4.3 High-Priority Grants

The Bipartisan Infrastructure Law and the State of California both have new funding resources for projects that improve technology and advance accessibility while supporting resiliency and addressing needs of disadvantaged populations. The 10 grants shown in **Exhibit 4-24** can be used by various entities to advance various parts of the Early Action Plan to ensure that there is funding to aid in project completion.

Exhibit 4-24. Relevant Grant NOFOs

Grant	Annual NOFO Release	Broadband Access	Smart Intersections	Smart Corridors	ATIS & EMS	CAD-to-CAD Systems	Zero Emission Vehicle Transition
Broadband Infrastructure Grant Account ⁴⁷	Q2	✓					
Last Mile- Federal Funding Account ⁴⁸	Q2	✓					
Digital Equity Act ⁴⁹	TBD	✓					✓
California Climate Investment ⁵⁰	Various	✓	✓	✓	✓	✓	✓
SMART GRANTS ⁵¹	Q3		✓	✓			
Advanced Transportation Technologies and Innovation ⁵²	Q3		✓	✓			
FTIP Funding Program ⁵³	Q1		✓	✓		✓	
Low or No Emission Vehicle Programs ⁵⁴	Q1						✓

⁴⁷ [Broadband Infrastructure Grant](#)

⁴⁸ [Last Mile - Federal Funding Account](#)

⁴⁹ [Digital Equity Act Programs](#)

⁵⁰ [California Climate Investment](#)

⁵¹ [Strengthening Mobility and Revolutionizing Transportation \(SMART\) Grants Program | US Department of Transportation](#)

⁵² [Advanced Transportation Technologies and Innovation](#)

⁵³ [FTIP Funding Program](#)

⁵⁴ [Low or No Emission Vehicle Program](#)

Grant	Annual NOFO Release	Broadband Access	Smart Intersections	Smart Corridors	ATIS & EMS	CAD-to-CAD Systems	Zero Emission Vehicle Transition
Charging and Fueling Infrastructure (CFI) Discretionary Grant ⁵⁵	Q1						✓
California Energy Commission ⁵⁶	Various						✓
Vehicle Technologies Office (VTO) Funding ⁵⁷	Various						✓

High Priority Grant Next Steps

There are actions that can be taken now to prepare and position to secure financial resources **Exhibit 4-25** below provides general guidance on what steps to take if seeking grant funds for the Early Deployment Projects.

In addition to these options, funding from private partnerships and existing resources that have less demand (due to additional funding in the market) should be sought out for funding to initiate or match these projects. Based on when NOFOs are expected, SBCTA can work with their partners to initiate these steps starting at four months, or 120 days, in anticipation of the NOFO announcement.

⁵⁵ [Charging and Fueling Infrastructure \(CFI\) Discretionary Grant](#)

⁵⁶ [Solicitations \(ca.gov\)](#)





















⁵⁷ [Funding Opportunities | Department of Energy](#)

EARLY ACTION PLAN

August 2023

Exhibit 4-25: Recommended Grant Actions Starting 120 Days Before Grant Submittal

120 Days to Win

120 days	 Sign up for Grant Program email notifications	 Talk to Grant Program Staff about the program of interest	 Research previous winning proposals for the program	 Prepare a pre-proposal summary one-pager	 Register with the national or state grant authority		
90 days	 NOFO or Solicitation Released	 Identify and leverage specialized resources specific to program of interest	 Complete Standard Forms (eg. SF424, Lobbying)	 Write narrative	 Seek letters of support		
60 days	 Determine Project Metrics	 Evaluate project against project rubric	 Complete first draft				
30 days	 Red Team Review by nonauthor subject matter experts	 Verify all standard forms are complete and accurate	 Second Draft Complete	 Letters of Support Returned	 Gold Team Review by nonauthor subject matter experts	 Principal/Leadership review	 Final Proposal



4.4 Policy Considerations

The policies listed in **Exhibit 4-26** will help position the region for the actions described in this plan and areas anticipated during larger upcoming master planning effort. These are policies that each jurisdiction and the county can keep in mind and begin work on and begin progressing now.

Exhibit 4-26. Policy Best Practices

Policy	Description
Dig Once	Take advantage of all projects and dig once by adding empty conduit or conduit with dark fiber for future use. If working at the edge of a jurisdiction, work with them to coordinate any work that might be on their roadmap.
Maximize Purchase Authority	Ensure procurement policies allow to maximize purchasing power by partnering with local agencies and/or county for purchases.
Remain Open to Unmanned Aircraft	While the FAA regulates airspace, local agencies control land use policies. Consider a review of all related state laws, including state parks and local policies and ordinances within the county. Keeping open policies, regulations and ordinances for unmanned aircraft can open up research and economic development

Policy	Description
	opportunities. Restrictive regulations can send a negative message to businesses.
Interoperability	As projects like CAD-to-CAD come to fruition, memorandums of understanding or mutual aid agreements to memorialize the extent of the partnership, information sharing, and interoperability should be considered.
Data Governance	Create a data governance plan to lay a foundation for how future data will be collected, stored, managed, procured, shared, and destroyed. Coordinating with other agencies involved in interoperability agreements would be key to establishing standards to make data sharing easier and more efficient.

Policy Next Steps

- Assemble sample policy information.
- Provide sample policy information to municipalities on each of these policy recommendations so they can perform an internal assessment to determine if this is something they need to address or something that is already part of their regulatory framework.

4.5 Opportunity and Risk Register

Along with generating important opportunities, technologies projects may also introduce potential risks. Applying systems engineering principles and maintaining and managing an opportunity and risk register will help to track potential opportunities and mitigate challenging internal and external factors. **Exhibit 4-27** contains initial opportunities and risks that were drafted as part of an exercise to think through what the project team can be doing to ensure successful Smart County deployments. As the team moves into the master planning portion of the project, this list will be expanded and used to identify items that need to be proactively addressed.

Opportunity and Risk Register Next Steps

- Further develop an initial opportunity and risk register during the Strategic Plan phase of this project.
- Pass the opportunity and risk register on to locals to build on, update, and track.

Exhibit 4-27: Preliminary Risk Register

Risk/Opportunity Identification				Assessment				Response	
Policy	Sector	Phase	Description (Cause, Effect)	Probability of Occurrence	Impact to Cost	Impact to Outcome	Impact to Schedule	Owner	Response plan
	Public Safety	Deploy Smart Intersections	Public backlash occurs when license plate readers are announced.	Moderate	Low	High	High	SBCTA & Locals	Develop and message safety and need talking points that support implementations.
Yes	Transportation	Stay open to Advanced Air Mobility Opportunities	Policies are put in place that inadvertently impact the ability to capitalize on transportation and economic development opportunities related to advanced air mobility.	High	Moderate	Moderate	High	SBCTA	Review state and local laws to keep regulations appropriately open to use cases such as medical package delivery in remote areas.
	Digital Divide	Increase Broadband Access	Partners are unable to dedicate resources to champion broadband upgrades.	Moderate	Low	High	High	Local Lead	SBCTA to begin dialogue in summer 2023 to assist partners is positioning
	Digital Divide	Increase Broadband Access	Shortfall in grant funds secured to support broadband implementations.	Moderate	High	High	High	Local Lead	Pursue multiple funding options including CPUC Federal Funding Account, California Advanced Services Fund Broadband Infrastructure Grant Account, and US Department of Commerce NTIA Digital Equity Act Programs.

5 Moving Forward

Several next steps will be initiated in parallel with the more comprehensive master planning effort. **Exhibit 5-1** summarizes these efforts. Once roles and responsibilities are established, a champion is identified, and the scope is refined, the lead jurisdiction can begin to develop systems requirements, high-level design, an independent cost estimate, and draft procurement documents.

Exhibit 5-1: SBCTA Early Action Plan

