

Office of the Secretary of Transportation, U.S. Department of Transportation

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Applicant:

San Bernardino County
385 N. Arrowhead Avenue
San Bernardino, CA 92415

Arrow Route Corridor Safety Improvements



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I. Overview

San Bernardino County, the largest county in the contiguous United States, is home to approximately 2.2 million residents, including about 310,000 living in unincorporated communities served by a 5,000-mile network of County-maintained roadways. These areas rely heavily on personal vehicles, with 97% of workers commuting by car. At the same time, they face significant socioeconomic challenges, as much of the surrounding region — including large portions of the City of San Bernardino — is designated as an Underserved Community by the U.S. Census Bureau. This intersection of high car dependency and economic hardship underscores the County’s critical need for equitable transportation safety investments.

Central to these efforts is the Arrow Route corridor in the Valley Subregion, bordered by five census tracts, including two Census Tracts (22.07 and 24.03) officially recognized as Underserved Communities with poverty rates of 21% and 26.8%, respectively. Two adjacent tracts (24.04 and 24.06) also experience elevated poverty confidence intervals up to 26.5%, highlighting a localized concentration of economic hardship. Many residents in this specific area rely on walking, biking, or transit due to limited vehicle access, making safe multimodal infrastructure a vital priority.

To address these challenges, San Bernardino County developed a data-driven Local Roadway Safety Plan (LRSP) in 2023 based on the Safe System approach: an international best-practice framework recognizing human vulnerability as central to safety planning. Analysis of 2016–2020 collision data revealed over 5,600 injury crashes, including 848 fatal or severe injury incidents, averaging 56 deaths or serious injuries annually. The LRSP identified ten high-crash locations and systemic risk factors, **with the Arrow Route corridor topping the list for fatal and serious injury risk.**

This U.S. Department of Transportation Safe Streets and Roads for All (SS4A) application builds on the LRSP to implement low-cost, high-impact countermeasures aligned with evidence-based Safe System principles. The County prioritizes equity-driven safety investments focused on Underserved Communities disproportionately affected by dangerous road conditions. SS4A funding will enable improvements that enhance access and mobility for all users, including people with disabilities, while supporting strong labor standards and workforce development, consistent with U.S. DOT safety and economic priorities.

Through partnerships with local cities, community organizations, labor groups, and private stakeholders, San Bernardino County is committed to a Vision Zero goal of eliminating roadway deaths and serious injuries while enhancing quality of life and economic opportunity across all communities.

The proposed project will take place along the identified high-injury network: Arrow Route, from Hickory Avenue to Almeria Avenue. This segment of Arrow Route is part of an east-west corridor that extends between the cities of Rancho Cucamonga and Fontana in the far southwest corner of the county.

A map of San Bernardino County, California, showing major highways, cities, and geographical features. The county is outlined in red. Major highways include I-5, I-15, I-215, and SR-78. Cities shown include San Bernardino, Fontana, Rialto, Redlands, and San Dimas. Geographical features include the Mojave National Preserve and the San Bernardino National Forest. A red location pin is placed near the bottom left corner, indicating a specific point of interest.

A detailed map of the Arrow Rte corridor, which is highlighted in red. The route starts in Rancho Cucamonga and extends east to Fontana. A blue box with the text "Arrow Rte" is positioned above the route. Red teardrop-shaped markers are placed at Rancho Cucamonga and Fontana. The map shows various cities and towns along the route, including San Antonio Heights, Upland, Claremont, Montclair, Pomona, Norco, and Fontana. Major highways like I-15, I-215, and SR-78 are also visible. The map includes a scale bar and a north arrow.

Figure 3: Arrow Route segment (between Hickory Ave. and Almeria Ave.)



III. Response to Selection Criteria

a. Safety Need

San Bernardino County continues to prioritize proactive transportation safety improvements in support of its Vision Zero goals, with a focus on enhancing travel conditions in its unincorporated areas. These communities are characterized by a high rate of personal vehicle usage, serving approximately 97% of local residents, and include many areas facing significant socioeconomic challenges. The Arrow Route corridor, located in the Valley Subregion, runs through a region with well-documented indicators of economic hardship and transportation inequity. Many nearby residents face mobility limitations due to inconsistent access to personal vehicles, making safer infrastructure for walking, biking, and transit essential to improving equitable outcomes.

To advance data-driven safety initiatives that address community needs, the County completed its Local Roadway Safety Plan (LRSP) in 2023. The LRSP incorporated a comprehensive analysis of roadway conditions and historical traffic collision trends across more than 5,000 miles of County-maintained roads. From 2016 to 2020, the analysis identified over 5,600 injury collisions, including 848 fatal or severe injury (KSI) crashes: an average of 56 people killed or seriously injured annually in unincorporated areas. These findings informed a countywide safety strategy, highlighting locations with recurring injury trends and systemic risk factors. The County now seeks funding to implement targeted improvements identified through this plan, reaffirming its commitment to safer, more accessible transportation for all users.

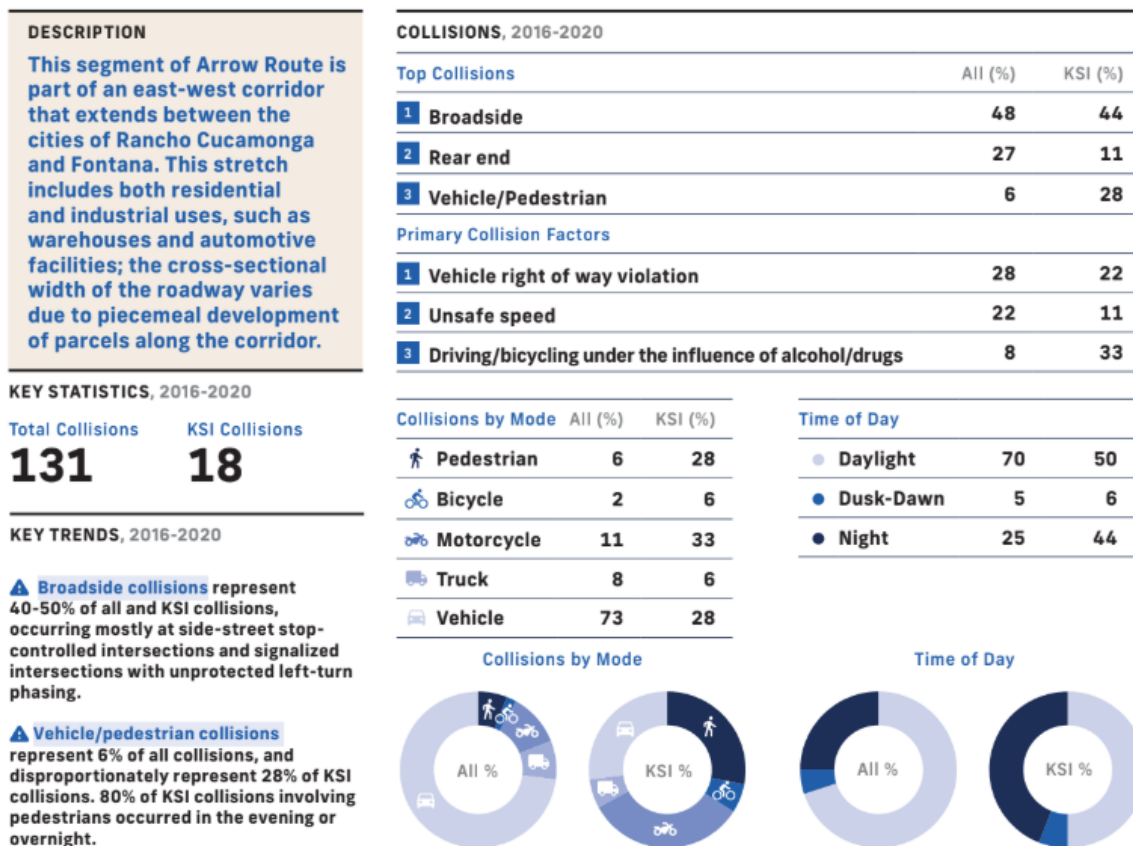
To guide the strategic allocation of future safety enhancements, the County employed a Weighted Collision Score methodology to review five years of disaggregated crash data by roadway

segment and intersection. This consistent, data-informed approach allowed the County to pinpoint high-risk locations and prioritize corridors with the greatest potential safety benefit. **One such corridor, Arrow Route—from Hickory Avenue to Almeria Avenue—emerged as a top-ranked priority for investment based on crash history and regional connectivity.**

Arrow Route serves a mix of residential neighborhoods, industrial warehousing, and automotive facilities, generating complex travel patterns and increasing conflict points. The segment connects the cities of Rancho Cucamonga and Fontana, contributing to regional economic activity while also presenting safety risks for multiple modes of transportation. Crash data confirms that the corridor functions as a high-injury network, as illustrated below in Figure 4:

- Broadside collisions account for approximately 40% of all crashes, concentrated at side-street stop-controlled intersections. These crashes often result in severe injuries or fatalities.
- Rear-end collisions make up 25% of all crashes, typically involving vehicles attempting to turn without the benefit of turn pockets or deceleration lanes.
- The posted speed limit of 45 mph, coupled with inconsistent roadway width and lack of infrastructure for safe turning movements, compounds risk for all users.

Figure 4: Key Statistics for Arrow Route segment



Although pedestrian or bicycle crashes make up only 6% of total collisions along this corridor, 28% of those incidents resulted in serious or fatal injuries (KSI), and 80% of those KSIs involved pedestrians struck during the evening or overnight hours. The absence of continuous sidewalks, bike lanes, and ADA-compliant crossings presents significant barriers for non-drivers and people with disabilities. The corridor serves workers commuting to warehouses and industrial jobs, many of whom live in adjacent underserved communities and may lack access to safe multimodal options.

The Arrow Route segment demonstrates characteristics commonly associated with corridors prioritized in safety planning efforts, including roadway design features and travel patterns that align with systemic risk factors observed across San Bernardino County. These factors include higher-speed arterial roadways with limited access control, infrastructure nearing the end of its service life, and designs primarily oriented toward vehicular traffic. Analysis suggests that travel behaviors along this corridor follow consistent patterns that present opportunities for strategic, data-informed interventions. Investment in this location would support the County's broader goals of improving multimodal accessibility, encouraging safer driver behavior, and advancing equitable safety outcomes in line with its Vision Zero framework.

In identifying Arrow Route as a priority corridor, the County applied a rigorous, data-driven process through its 2023 Local Roadway Safety Plan, including crash trend analysis, systemic risk factor review, and geospatial prioritization consistent with a high-injury network approach. These efforts reflect a proactive safety strategy aligned with national and state guidance for data-informed roadway safety investments.

b. Safety Impact

The Arrow Route Corridor Safety Improvements project will implement critical roadway safety upgrades by converting the corridor to a three-lane cross-section with a center two-way left-turn lane, and by installing missing edgelines and raised pavement markers, which are projected to produce substantial safety benefits. These improvements are strategically selected to reduce crash frequency and severity, improve lane discipline, and enhance nighttime and all-weather visibility.

Two-Way Left-Turn Lane (TWLTL):

The conversion to a three-lane cross-section with a dedicated TWLTL will reduce conflict points between through and turning vehicles. This design provides a buffer between opposing traffic streams and allows vehicles to decelerate or accelerate out of the flow of through traffic, reducing the likelihood of both rear-end and broadside collisions. Nationally established crash modification factors suggest that TWLTL treatments alone can **reduce total crashes by approximately 30%**, especially those involving rear-end and broadside collisions. The expected lifespan of this improvement is 20 years, and it qualifies for high federal funding eligibility.

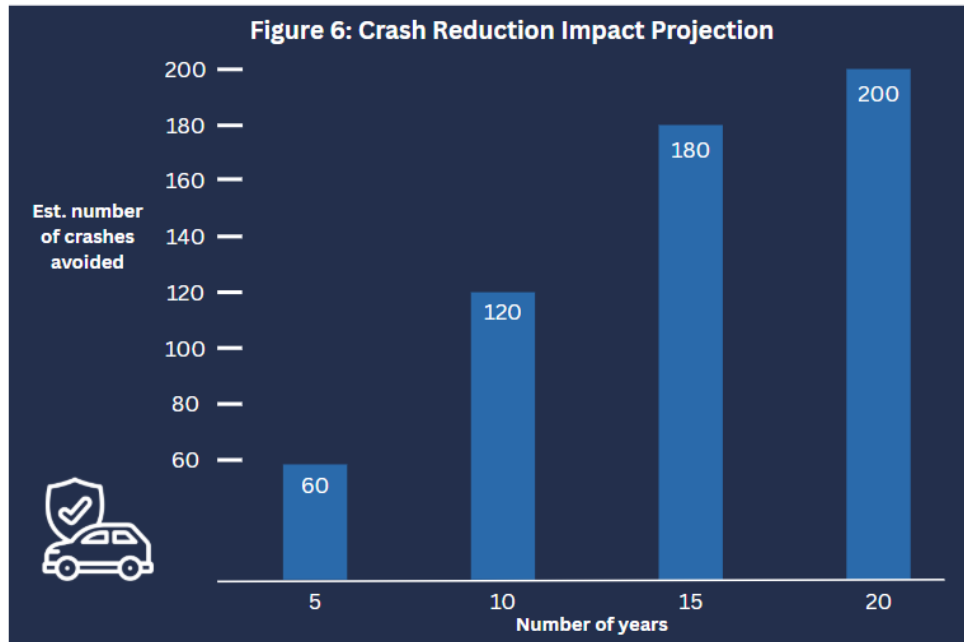
Edgelines and Centerlines with raised pavement markers (RPMs):

Installing edge and centerline striping where currently absent, or significantly upgrading existing markings (e.g., from paint to thermoplastic with embedded raised pavement markers or audible rumble features), will enhance delineation of the travel way. These treatments help prevent roadway departure by increasing visibility of pavement boundaries, particularly at night or in adverse weather conditions. Newer pavement marking technologies offer greater durability, all-weather performance, and superior retro-reflectivity compared to traditional markings. Upgraded lane delineation using reflective pavement markers and high-durability materials is associated with a **25% reduction in crash rates**, particularly effective in preventing nighttime and low-visibility departures and collisions. Expected service life is at least 10 years, with high federal funding support.

These safety treatments are also closely aligned with the built environment along Arrow Route. The corridor runs through a land use mix of residential neighborhoods, industrial warehousing, and automotive facilities, all of which generate complex traffic patterns, frequent turning movements, and increased interactions among multiple transportation modes. This diverse land use context contributes to conflict points and operational stress, particularly where turning vehicles and pedestrians interact with through traffic. The proposed improvements, including the addition of a center turn lane and enhanced visual cues, respond directly to these conditions by making the corridor more predictable, navigable, and forgiving. In doing so, the project supports a safer interface between the transportation system and the surrounding community it serves.

Applying these reduction rates to Arrow Route's historical crash data, **a combined 45% decrease in collisions is anticipated.** Over a five-year period, this could mean preventing nearly 60 crashes — over 10 collisions per year — with a meaningful reduction in the most dangerous crash types. More importantly, this reduction could prevent up to eight fatal or serious injury incidents during that same time frame, potentially saving several lives. Over the full 20-year life of the improvements, **this impact scales to more than 200 crashes avoided and as many as 16 lives saved or serious injuries prevented.**





Together, these countermeasures directly address safety concerns on the corridor, improving operational efficiency while delivering significant and long-lasting reductions in crash risk. Enhanced markings and nighttime visibility features offer targeted benefits for pedestrians, cyclists, and other vulnerable road users — groups already shown to be at higher risk on this corridor. The improved delineation of travel lanes, the buffering effect of the TWLTL, and increased visibility will together reduce conflict between all modes of travel and provide a more predictable, forgiving roadway environment.

This project advances critical Safe System principles by addressing **Safer Roads** through geometric redesign and visibility enhancements; **Safer Speeds** by facilitating smoother and safer turning movements with a dedicated TWLTL; and **Safer People** by improving protections for pedestrians and other vulnerable users, particularly in nighttime conditions where the risk of fatal and serious injuries is highest. These combined improvements create a more forgiving, intuitive roadway environment that reduces crash severity and enhances safety for all users.

The proposed improvements are also aligned with California’s **State Strategic Highway Safety Plan (SHSP)** and the **California Vulnerable Road User Safety Assessment**. By addressing turning conflicts, improving nighttime visibility, reducing lane departure risks, and prioritizing pedestrian and cyclist safety, the project supports SHSP emphasis areas, including **Intersection Safety**, **Lane Departure Prevention**, and **Improving Safety for Vulnerable Road Users**. These countermeasures help advance state-identified priorities for reducing traffic fatalities and serious injuries and reinforce local and regional commitments to Vision Zero.

Moreover, these upgrades represent not only a technically sound solution grounded in proven safety countermeasures but also a fiscally and socially responsible investment. With strong

eligibility for federal funding, a long projected service life, and clear alignment with both state and national Vision Zero goals, the Arrow Route Corridor Safety Improvements project offers a sustainable and equitable path to saving lives, preventing injuries, and creating a safer transportation network for everyone in the community.

i. Implementation Costs

The total estimated cost for this safety improvement project is **\$2,530,638**. This includes converting the corridor to a three-lane cross-section with a dedicated two-way left-turn lane (TWLTL) and installing missing edgelines and raised pavement markers (RPMs).

These treatments are strategically designed to address serious safety challenges on Arrow Route. From 2016 to 2020, the corridor experienced **131 total crashes**, including **18 fatal or serious injury (KSI) collisions**. Crash trends show:

- Broadside collisions account for approximately 40% of all crashes, heavily concentrated at stop-controlled side-street intersections, and are often severe or fatal.
- Rear-end collisions make up 25% of crashes, frequently involving vehicles turning without the benefit of dedicated turn pockets or deceleration lanes.
- A 45 mph posted speed, inconsistent roadway width, and limited infrastructure for safe turning movements create safety concerns for all users, especially in low-visibility conditions.

The proposed improvements are directly aligned with these crash patterns. The two-way left-turn lane is associated with a **30% crash reduction**, addressing both rear-end and broadside crashes. Its **Crash Modification Index (CMI) benefit is valued at \$34,805,142**. The addition of high-visibility edgelines, RPMs, and thermoplastic striping is expected to reduce lane departure and nighttime crashes by **25%**, with a **CMI benefit of \$13,441,397**.

Together, these countermeasures provide a **combined safety benefit of \$48,246,539**, yielding a **Benefit-Cost Ratio (BCR) of 19.07** — meaning every \$1 invested is projected to return \$19.07 in societal safety and mobility benefits.

In addition, bundling this project with other corridor safety improvements will reduce administrative and implementation costs. Shared data collection, project management, environmental review, and contractor mobilization across projects will help to lower the cost burden per project and accelerate delivery timelines.

Given the scale of expected benefits, the demonstrated crash history, and the cost-efficiency of bundling, this project represents a high-impact, high-value investment in roadway safety.

c. Engagement and Collaboration

The Arrow Route Corridor Safety Improvements project is grounded in broadly representative stakeholder engagement, with a strong emphasis on community-reflective and community-driven planning. From the earliest phases of the County's Local Roadway Safety Plan (LRSP) development, collaboration with public agencies, community-based organizations, and directly impacted residents—including those from underserved communities—has shaped the project's priorities and direction.

Stakeholder Engagement and Coordination

Two formal stakeholder meetings were convened to guide LRSP development and the prioritization of projects like the Arrow Route Corridor. These meetings included representatives from the San Bernardino County Department of Public Works (DPW), Caltrans, the California Highway Patrol, San Bernardino County Regional Parks, and members of the Board of Supervisors. For agencies unable to attend the meetings, targeted follow-up outreach was conducted, including with the Department of Public Health and County Fire. Stakeholder discussions included review of collision data, interactive surveys on plan priorities, and collaborative refinement of proposed projects and strategies.

In addition to formal agency collaboration, the planning process involved direct field engagement with residents and local organizations. In May 2022, engineering and planning teams conducted two days of on-site field visits to observe traffic conditions and gather local perspectives. This included conversations with business owners and unhoused residents in the Muscoy community, as well as representatives from the Lucerne Valley Economic Development Authority. These engagements provided qualitative context that complemented quantitative analysis and helped prioritize systemic and location-specific interventions.

Culturally Relevant and Accessible Engagement

The County recognizes that meaningful engagement must reflect the demographics and lived experiences of the communities served. San Bernardino County is 54% Hispanic, and 42% of households speak a language other than English at home. In response, the County incorporated multilingual outreach strategies, including the dissemination of safety materials in both English and Spanish, to ensure accessibility for non-English speakers. Culturally-relevant engagement extended beyond translation to include targeted outreach to communities with limited access to services, including people experiencing homelessness.

Project Selection and Evaluation for Underserved Communities

Underserved communities and census tracts remain a central focus of this SS4A application, consistent with the equity-driven priorities outlined in San Bernardino County's 2023 Local Roadway Safety Plan (LRSP). The County's approach to project selection emphasizes the intersection of traffic safety risk and socioeconomic vulnerability, using community-level

indicators to identify areas where strategic investment will yield the greatest equity and safety benefits.

The Arrow Route corridor, a top-ranked priority from the LRSP, is surrounded by five census tracts with notable indicators of economic hardship. Two of these tracts, Census Tract 22.07 and Census Tract 24.03, are officially designated by the U.S. Census Bureau as Underserved Communities, with poverty rates of 21% and 26.8%, respectively. Two adjacent tracts, 24.04 and 24.06, exhibit elevated poverty confidence intervals, with upper bounds of 21.7% and 26.5%. These conditions highlight a concentrated area of socioeconomic disadvantage directly adjacent to the project area, reinforcing the need for equitable infrastructure investment. While vehicle usage is high countywide, many residents in these census tracts have limited access to reliable personal vehicles, making safe and accessible walking, biking, and transit infrastructure a critical priority.

The selection of the Arrow Route project reflects not only a high incidence of fatal and serious injury crashes but also a strong alignment with federal and state equity goals. Countermeasure strategies—such as roadway reconfiguration to support safer turning movements and the installation of enhanced visibility features—were intentionally chosen to reduce risk for the most vulnerable travelers, including pedestrians, cyclists, and people with disabilities. These improvements are designed to deliver measurable safety and mobility benefits to historically underserved populations who face disproportionate exposure to unsafe roadway conditions.

The County is also committed to ongoing evaluation of its engagement practices and project impacts. This includes tracking the demographics of traffic collision victims, ensuring that safety outcomes are improving equitably, and adjusting outreach strategies as needed to better reach and support those most at risk.

Collaboration in Implementation

Moving forward, the County will continue working with regional and community stakeholders to refine project elements and ensure successful implementation. Partnering with labor organizations, public health agencies, school districts, and business associations along the Arrow Route corridor will support coordinated safety education, workforce development, and infrastructure maintenance. The County is also committed to applying strong labor standards, including the use of registered apprenticeship programs and local hiring where possible.

IV. Project Readiness

Permitting, Approvals, and Design Standards

San Bernardino County has extensive experience delivering federally and state-funded infrastructure projects involving corridor safety improvements, complete streets design, and multimodal transportation planning. The Arrow Route Corridor Safety Improvements project will convert a four-lane roadway to a three-lane cross-section, including a two-way left-turn lane,

and will install missing edgelines and raised pavement markers to improve visibility and reduce collisions. The County has the necessary plans, institutional capacity, and project delivery structures in place to complete the full scope of work in this proposal within a five-year timeline, as evidenced by the schedule below.

The project is not anticipated to require permits and approvals, other than NEPA and CEQA clearance, under Categorical Exclusion/Exemption.

Design will adhere to applicable state and federal standards, including the Caltrans Highway Design Manual (HDM). Where appropriate, the County may apply for design exceptions or incorporate alternative standards (e.g., NACTO Urban Street Design Guide) to improve pedestrian safety.

Environmental Review and NEPA Status

San Bernardino County is the lead agency for the environmental review process. Based on the nature of the improvements—road diet and roadway striping within existing right-of-way—the County anticipates that the project will qualify for a Categorical Exclusion (CE) under NEPA.

The County has successfully completed NEPA reviews for federally funded projects and maintains in-house staff and on-call consultants to manage all aspects of environmental documentation, public engagement, and agency coordination.

Right-of-Way and Utility Coordination

The proposed improvements are expected to occur primarily within the County's existing right-of-way. Preliminary reviews indicate that no additional ROW acquisition but minor temporary easements may be required. Should acquisitions be necessary, San Bernardino County will follow all procedures in accordance with the Uniform Relocation Assistance and Real Property Acquisition Act (URA).

The County has a strong track record of timely coordination with utility providers. Based on current design concepts, no utility relocations are anticipated because all countermeasures will be constructed within the road footprint.

Technical Capacity Project Management

The County has an established track record of delivering projects of similar scope and size. The County has extensive experience, both in-house and through consultants, in administering federal aid projects, including the following bridge projects funded through USDOT's Highway Bridge Program and railroad crossing projects:

- **Glen Helen Bridge Project in San Bernardino** (\$52,000,000 - in progress)
- **Garnet Bridge Reconstruction in Mentone** (\$6,400,000 - completed in 2022)

- **10 Bridges Project** (bridges larger than 20 feet) on National Trails Highway (\$30,000,000 total - in progress)
- **Glen Helen Parkway Grade Separation** over the BNSF and UPRR rail lines, (\$25,685,000- completed in 2018)

In addition, the County has completed 95% design on its Rock Springs Road bridge over the Mojave River. This \$21,745,000 bridge project is expected to go to construction in the spring of 2025. Technical expertise, historical accomplishments, and successful project management will be brought to the table to ensure the Project is fully and successfully executed within the proposed time frame and budget.

Key Personnel Experience

The County will designate the following experienced staff to manage the proposed project:

- **Andy Silao, B.S., P.E.** will serve as project manager. Andy brings over 20 years of engineering experience in both the private sector and with the County. He currently serves as the Division Chief for the Contracts Division, which is responsible for the advertisement, award, and administration of federal, state, and locally funded County Public Works and Flood Control District construction projects.
- **Chris Nguyen, P.E.** Chris brings nearly 30 years of engineering experience within the public sector, bringing a key understanding of the dynamics of federal aid projects

Schedule

A preliminary project schedule is outlined below. Key milestones are based on typical timeframes for similar projects and will be updated as final design and environmental review progresses.

Milestone	Estimated Completion
Preliminary Engineering Start	April 2026
NEPA Clearance	March 2027
ROW Certification (if needed)	July 2027
Final Design and PS&E	March 2028
Utility Coordination Completed	May 2028
Construction Procurement	October 2028
Construction Completion	October 2029
Project Close-Out	June 2030