High Desert Corridor Project

Los Angeles and San Bernardino Counties, CA
District 7 - LA - 14 - PM 57.8 to PM 64.1
District 8 - SBD - 18 - PM 84.3

Project ID #0712000035 (EA:2600U)
SCH #2010091084

Final Environmental Impact Report/ Environmental Impact Statement and Section 4(f) (De Minimis Findings)

Volume 1 of 3

Prepared by the
State of California Department of Transportation

The environmental review, consultation, and any other action required in accordance with applicable federal laws for this project is being, or has been, carried-out by Caltrans under its assumption of responsibility pursuant to 23 U.S. Code 327.

June 2016

Caltrans® Metro

SCH Number: 201009084
07-LA/SB-New Route Alignment
PM: 07-LA-14 PM 57.8/64.1
08-SBd-18 PM 84.3
EA: 2600U/0712000035

HIGH DESERT CORRIDOR PROJECT
FROM STATE ROUTE 14 TO STATE ROUTE 18
IN LOS ANGELES and SAN BERNARDINO COUNTIES, CALIFORNIA

FINAL ENVIRONMENTAL IMPACT REPORT/ ENVIRONMENTAL IMPACT STATEMENT and Section 4(f) De Minimis Impact Determination

Submitted Pursuant to (State) Division 13, Public Resources Code
(Federal) 42 USC 4332(2)(c) and 49 USC 303 by

THE STATE OF CALIFORNIA
Department of Transportation
and Los Angeles County Metropolitan Transportation Authority (Metro)

COOPERATING AGENCIES:
Federal Railroad Administration
Federal Aviation Administration, Western Pacific Region
U.S. Environmental Protection Agency, Region IX
U.S. Army Corps of Engineers
Advisory Council on Historic Preservation (ACHP)
Federal Bureau of Prisons
Surface Transportation Board

RESPONSIBLE AGENCIES:
California Transportation Commission
California Department of Fish and Wildlife
California Public Utilities Commission

6-20-2016
Date of Approval

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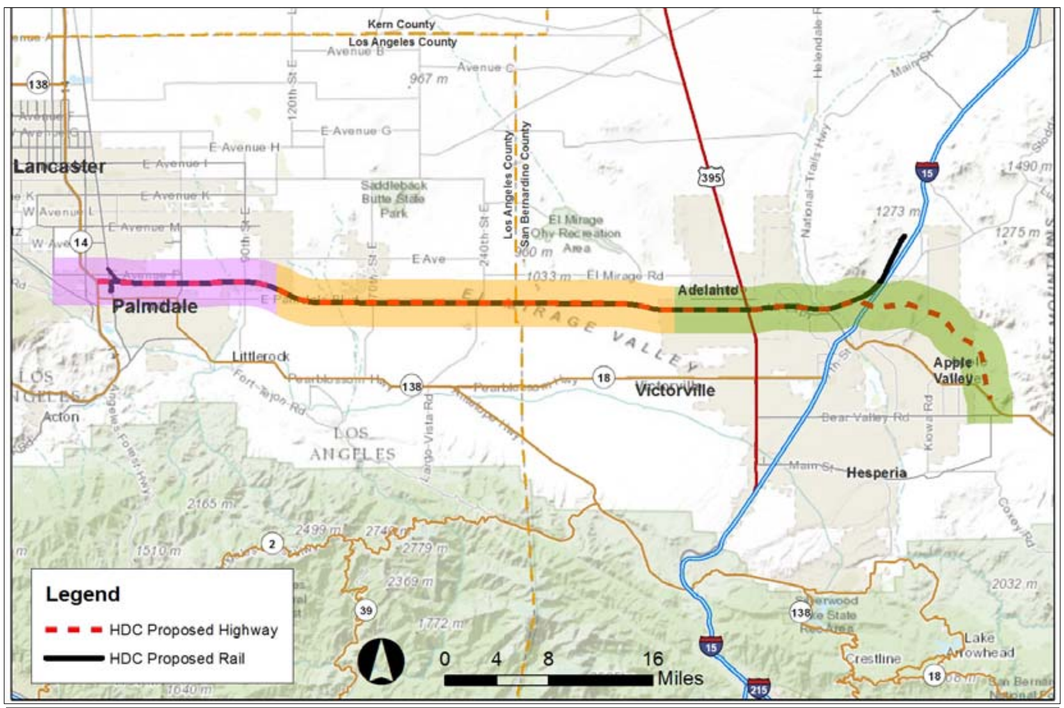
Abstract

This Final EIR/EIS addresses impacts of alternatives proposed for the High Desert Corridor (HDC) Project. This new multimodal east-west link would connect State Route (SR) 14 in Palmdale (Los Angeles County) and SR-18 in the Town of Apple Valley (San Bernardino County). The purpose of the proposed project is to address existing and future east-west transportation demand, travel safety, and reliability within the High Desert region, regional goods movement network, connectivity to regional transportation facilities, and greenhouse gas reduction goals. Expected environmental effects include impacts to aesthetics, land use and community cohesion, biological resources, air quality, noise, utilities, and Section 4(f) properties. This project is envisioned to be a green energy transportation improvement. A preferred alternative has been selected.

Summary

The California Department of Transportation (Caltrans), in cooperation with the Los Angeles County Metropolitan Transportation Authority (Metro), proposes construction of the High Desert Corridor (HDC) as a new transportation facility in the High Desert region of Los Angeles and San Bernardino counties. The proposed 63-mile-long west-east facility (Figure S-1) would provide route continuity and relieve traffic congestion between State Route (SR) 14 in Los Angeles County and SR-18 and Interstate 15 (I-15) in San Bernardino County. Caltrans is the lead agency for the project pursuant to both the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA).

Figure S-1 Proposed High Desert Corridor



ANTELOPE VALLEY Los Angeles County	HIGH DESERT Los Angeles County– San Bernardino County	VICTOR VALLEY San Bernardino County

Overview of Project Area

The High Desert is typically defined as the arid region north of the San Gabriel and San Bernardino mountain ranges. Starting in the northwestern corner of Los Angeles County near SR-138 and Interstate 5 (I-5), the High Desert extends east into Kern and San Bernardino counties in the shape of a horizontal "V" (Figure S-1). This expansive region is home to the Mojave Desert, Antelope and Victor valleys, and many small and large communities. While the central portion of the project area is currently sparsely developed, the HDC would connect large urban areas on the west and east ends. The communities through which the proposed HDC would cross include Palmdale, Victorville, Adelanto, and Apple Valley.

Purpose and Need

The purpose of the proposed action is to improve west-east mobility through the High Desert region of southern California by addressing present and future travel demand and mobility needs within the Antelope and Victor valleys. The proposed project is intended to achieve the following objectives:

- Increase capacity of west-east transportation facilities to accommodate existing and future transportation demand
- Improve travel safety and reliability within the High Desert region
- Improve the regional goods movement network
- Provide improved access and connectivity to regional transportation facilities, including airports and existing and future passenger rail systems (which include the proposed California high-speed rail (HSR) system and the proposed XpressWest HSR system)
- Contribute to state greenhouse gas (GHG) reduction goals through the use of green energy features

The specific needs to be addressed by the proposed action include:

- Recent and future planned population growth within the High Desert region
- Limited and unreliable west-east connectivity within the High Desert region
- Regional demands for goods movement to support the growth of the regional economy
- Future demands for the use of green energy, including sustainability and green energy provisions in State law and policy

Proposed Action

The HDC Project would entail construction of a new multimodal link between SR-18 in San Bernardino County and SR-14 in Los Angeles County. It would connect some of the fastest-growing residential, commercial, and industrial areas in southern California, including Palmdale, Lancaster, Adelanto, Victorville, Hesperia, and Apple Valley. As currently planned, the project would be implemented in three segments: the Antelope Valley segment, the High Desert segment, and the Victor Valley segment.

The 9-mile-long Antelope Valley segment would start from a new freeway-to-freeway SR-14/HDC interchange and extend east parallel with and near Avenue P-8 to 90th Street East in Palmdale. The right-of-way (ROW) to be acquired for this segment would accommodate ultimate expansion to possibly four lanes and one high-occupancy vehicle (HOV) lane in each direction plus a high-speed passenger rail line[1].

[1] The end points of the Antelope Valley, High Desert and Victor Valley segments have been adjusted slightly to define more readily constructible segments with logical termini. There has been no change in the overall scope or limits of the project.

The 33-mile-long High Desert segment would extend from Palmdale to Adelanto, running in a west-east direction parallel and south of Palmdale Boulevard. The freeway would be three lanes in each direction from 90th Street East to 210th Street East From 210th Street East to United States Highway 395 (US 395), the freeway would be four lanes in the westbound direction and three lanes in the eastbound direction. The ROW would be acquired to support an ultimate facility of possibly four mixed-flow lanes and one HOV lane in each direction plus a high-speed passenger rail line.

The 21-mile-long Victor Valley segment would generally follow the alignment of Air Expressway Boulevard, between Caughlin Road in Adelanto and Dale Evans Parkway east of I-15 in Apple Valley, and continue southeasterly as an expressway to join SR-18 just east of Joshua Street. The freeway portion of this segment between Caughlin Road and I-15 would be six lanes wide, continuing to Dale Evans Parkway as a four- or six-lane freeway. ROW would be acquired to support a future freeway of possibly four lanes and one HOV lane in each direction plus a high-speed passenger rail line.

Caltrans is also considering how to integrate the following proposed modes of transportation and additional project features to create a multipurpose corridor:

Highway/Expressway: Caltrans proposes a new freeway/expressway that will environmentally clear up to four lanes of travel in each direction. The number of lanes selected will be based on the traffic analysis. When fewer lanes are initially justified, the ROW will be preserved for a potential future build-out of a four-lane freeway/expressway. The number of lanes selected will be based on other considerations required under CEQA, NEPA, and other relevant laws.

Source: Parsons, 2013 (Existing roadway in project area).
The HDC would improve east-west mobility through the High Desert region of southern California.

HSR Feeder Service: Two proposed HSR projects are being evaluated for potential linkages with the HDC: the California HSR and XpressWest. Metro, Caltrans, and San Bernardino Associated Governments (SANBAG) have agreed to study an HSR feeder service as part of the HDC that would potentially link these two major rail systems in Palmdale and Victorville, respectively, and would also connect with Metrolink in Palmdale. This would create the potential to connect the San Francisco, Central Valley, Los Angeles, Las Vegas, and San Diego regions through an HSR system.

Source: Google Earth, 2013.
The Palmdale Transportation Center could be a future hub for HSR.

Bicycle Route: The HDC Project would include bicycle facilities, extending 36 miles along the corridor from US 395 in Adelanto to 20th Street East, with funding provided to the City of Palmdale to improve local streets to provide a bike route connection to the Palmdale Transportation Center (PTC) (it is geometrically infeasible to connect directly to the PTC). Coordination has been initiated to identify local routes for bicycle connections to the master-planned bike routes within Adelanto and Palmdale. This bike facility would be designed to complement the proposed freeway/expressway and HSR feeder service without impeding on operational performance or compromising safety.

Source: www.traillink.com.
Proposed HDC bike path would provide nonmotorized access from Adelanto to Lancaster via the Sierra Highway Bike Path (shown).

Green Energy: This project seeks to establish a truly sustainable corridor that addresses the goals set forth in landmark California legislation such as Assembly Bill (AB) 32 and Senate Bill (SB) 375. To this end, green energy generation, the development of a new transmission corridor, and provision for infrastructure to enable electric charging and alternative fueling stations will be considered for potential integration into the HDC. Based on results of the *Green Energy Feasibility Study Report* (June 2014), technologies that appear to be feasible for the HDC are solar installations near the necessary electric utility infrastructure and alternative fuel charging stations at selected interchanges.

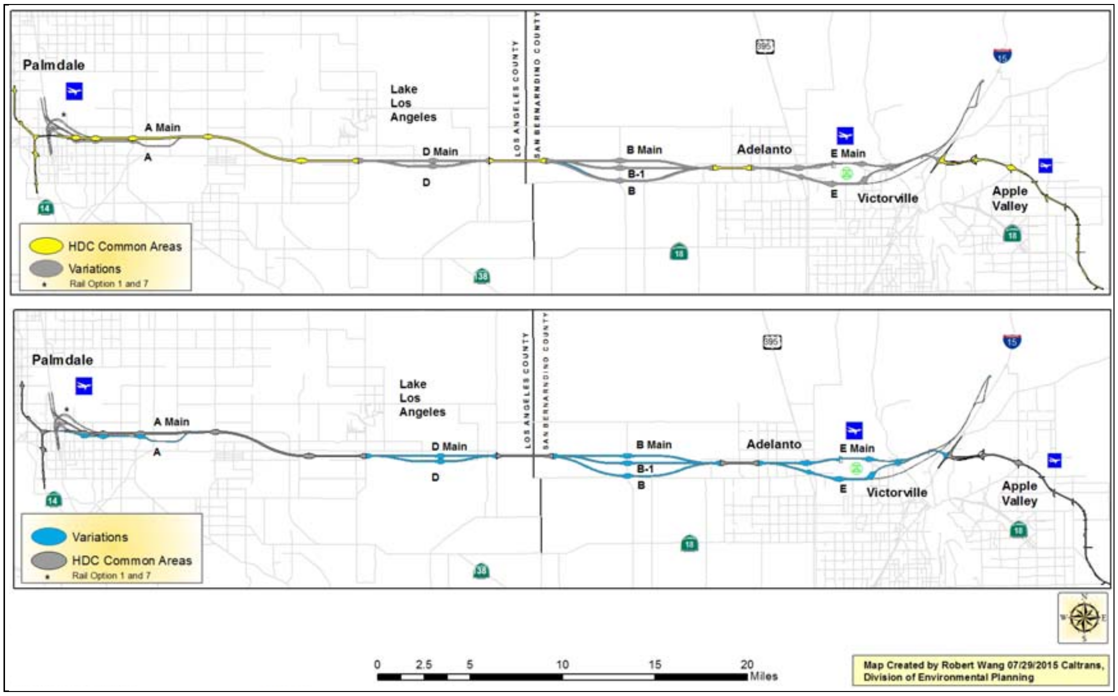


Based on the above consideration, several project alternatives have been studied. Four build alternatives and the No Build Alternative were selected for evaluation in the Draft Environmental Impact Report (EIR)/Environmental Impact Statement (EIS). The inclusion of green energy technologies (e.g., photovoltaic [PV] solar highways, nonfossil refueling stations, utility use of corridor ROW), bike paths along segments of the proposed project, vista points, and a multiuse pullout would be considered for all of the build alternatives. The alternatives are briefly described below.

- **The Freeway/Expressway Alternative** (four physical variations) would combine a controlled-access freeway and an expressway. The alignment would generally follow Avenue P-8 in Los Angeles County and just south of El Mirage Road in San Bernardino Countythen extend east to Air Expressway Road near I-15 and finally curve south, ending at Bear Valley Road.

Variations to the general HDC alignment are proposed to minimize environmental impacts (Figure S-2).

Figure S-2 High Desert Corridor Alignment Variations

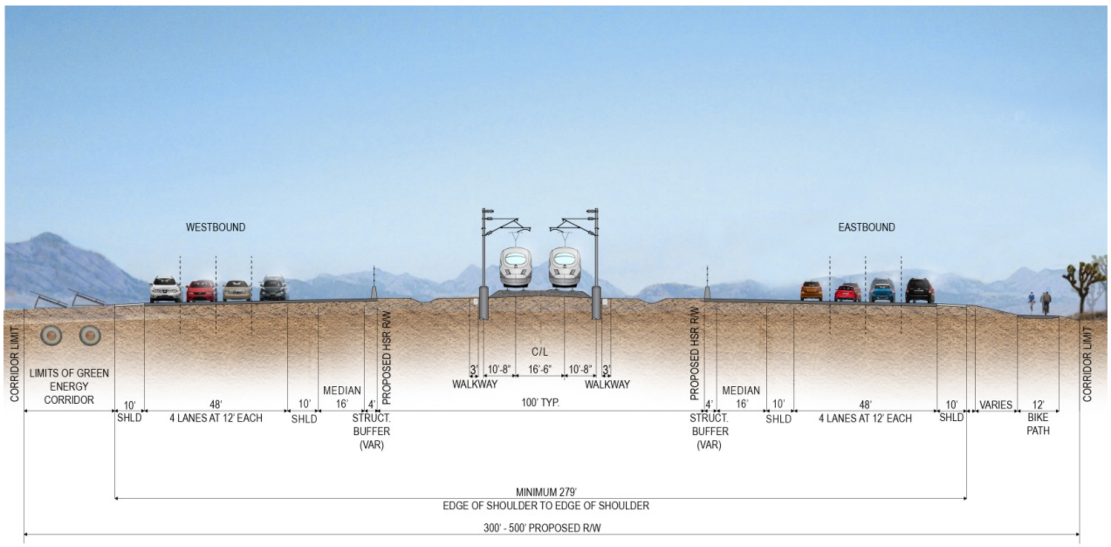


- Variation A – Near Palmdale, the freeway/expressway would dip slightly south of the main alignment, approximately between 15th Street East and Little Rock Wash.
- Variation B – East of the county line, the freeway/expressway would flare out slightly south of the main alignment between Oasis Road and Caughlin Road. Variation B1 would be at the same location, but it would flare out a little less and pass through Krey Field.
- Variation D – Near Lake Los Angeles, the freeway/expressway would dip south of the main alignment, just south of Avenue R approximately between 180th Street East and 230th Street East.
- Variation E – Near Adelanto and Victorville, the freeway/expressway would dip south of the federal prison.

- **The Freeway/Tollway Alternative** would follow the same alignment as the Freeway/Expressway Alternative, but the section between 90th Street East and US 395 would be operated as a tollway. The toll segment would likely be an all Electronic Toll Collection (ETC) System. The operation would be completely electronic with no toll booths or traffic gates. Collection of tolls would occur at the speed of flowing traffic, which means that motorists never have to slow down; therefore, traffic would remain free flowing. Variations A, B, D, and E as described under the Freeway/Expressway Alternative were also considered.
- **The Freeway/Expressway Alternative with HSR Feeder/Connector Service** (Figure S-3) would be the same as the Freeway/Expressway Alternative, but with

an HSR Feeder/Connector Service between the cities of Palmdale and Victorville. The HSR Feeder/Connector Service would utilize proven steel wheel-on-steel track technology and would have a maximum design speed of 180 miles per hour (mph) with a maximum operating speed of 125 mph. Variations A, B, D, and E were considered, but Variation A was later determined to not be a viable variation for this alternative. Two rail options (Options 1 and 7) in Palmdale were analyzed and, as the design proceeded, three variations under each option were studied to avoid and minimize environmental impacts.

Figure S-3 Freeway/HSR Conceptual Cross Section



- **The Freeway/Tollway Alternative with HSR Feeder/Connector Service** would be the same as the Freeway/Tollway Alternative, but it would include an HSR Feeder/Connector Service (as described above) between the cities of Palmdale and Victorville. Variations A, B, D, and E were considered, but Variation A was later determined to not be a viable variation for this alternative. Two rail options (Options 1 and 7) in Palmdale were analyzed and, as the design proceeded, three variations under each option were studied to avoid and minimize environmental impacts. Refer to the Freeway/Tollway Alternative for a description of tollway operation.
- **The No Build Alternative** would not provide new transportation infrastructure within the High Desert area to connect Los Angeles and San Bernardino counties. Only existing SR-138 safety corridor improvements in Los Angeles County and SR-18 corridor improvements in San Bernardino County would be constructed.

A preferred alternative has been selected (see the “Identification of Preferred Alternative” section later in this Executive Summary).

Joint California Environmental Quality Act/National Environmental Policy Act Document

The project is subject to State and federal environmental review requirements because it involves the use of federal funds from the Federal Highway Administration (FHWA). Project documentation, therefore, has been prepared in compliance with both CEQA and NEPA. Caltrans and Metro are the project proponents, and Caltrans is the lead agency under CEQA and NEPA. FHWA's responsibility for environmental review, consultation, and any other action required in accordance with applicable federal laws for this project is being, or has been, carried out by Caltrans under its assumption of responsibility pursuant to Section 6005 of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: a Legacy for Users (SAFETEA-LU), codified at 23 United States Code (U.S.C.) 327(a)(2)(a). With NEPA assignment, FHWA assigned, and Caltrans assumed, all U.S. Department of Transportation Secretary's responsibilities under NEPA. This assignment includes projects on the State Highway System and Local Assistance Projects off of the State Highway System within the State of California, except for certain categorical exclusions that FHWA assigned to Caltrans under the 23 U.S.C. 326 Categorical Exclusion (CE) Assignment Memorandum of Understanding (MOU), projects excluded by definition, and specific project exclusions.

Some impacts determined to be significant under CEQA may not lead to a determination of significance under NEPA because NEPA is concerned with the significance of the project as a whole.

The Draft EIR/EIS prepared for this project was circulated for public review between September 30 and December 2, 2014. Caltrans, in cooperation with Metro, held four public hearings at various locations in November 2014 (see details in Section 5.4.11). All comments received during the public review period were considered. This Final EIR/EIS was prepared to address all public comments and incorporate any changes to the project design, environmental setting, and impacts that have occurred since the Draft EIR/EIS was completed.

After the Final EIR/EIS is circulated, if Caltrans decides to approve the project, a Notice of Determination will be published for compliance with CEQA, and a Record of Decision will be published for compliance with NEPA. If impacts cannot be mitigated below a level of significance, Caltrans will also prepare a Statement of Overriding Considerations.

Project Impacts

No Build Alternative

The No Build Alternative may result in impacts to emergency services, traffic and transportation, and energy as listed below:

- Emergency Services – As future levels of service (LOS) on local roads deteriorate, response times of emergency response vehicles may increase.

- Traffic and Transportation – In the year 2040, 23 and 45 of the 116 intersections in the project area will perform at LOS E or F during the morning and afternoon peak hour, respectively.
- Energy – Fuel consumption by motor vehicles will increase due to idling in stop-and-go traffic and/or slow speeds through congested roadways.

Build Alternatives

The proposed project is listed in the 2012 financially constrained Regional Transportation Plan (RTP) Amendment No. 1, which was found to conform by Southern California Association of Governments (SCAG) on April 4, 2012, and FHWA and Federal Transit Administration (FTA) made a regional conformity determination finding on June 4, 2012. The project is also included in SCAG's financially constrained 2013 Federal Transportation Improvement Program (FTIP) No. 13-15, page 10 for Los Angeles County and page 8 for San Bernardino County. The SCAG 2013 FTIP was determined to conform by FHWA and FTA on December 18, 2013. The design concept and scope of the proposed project is consistent with the project description in the 2012 RTP, 2013 FTIP, and the "open to traffic" assumptions of SCAG's regional emissions analysis.

Table S-1 provides a brief comparison of the impacts associated with each of the build alternatives and their variations. In general, the impacts from the four build alternatives are the same or similar for most of the resources; however, impacts from the build alternatives with the HSR Feeder Service are slightly different from the build alternatives without the HSR Feeder Service for the following resources: land use, growth, farmland/grazing land, relocations, energy, Section 4(f), and cumulative impacts.

Table S-1 Summary of Major Potential Impacts from Alternatives

Environmental Resource	Potential Impacts				
	Freeway/ Expressway Alternative	Freeway/ Tollway Alternative	Freeway/ Expressway Alternative with HSR Feeder Service	Freeway/ Tollway Alternative with HSR Feeder Service (Preferred Alternative)	No Build Alternative
Land Use	• Approximately 4,667 acres would be converted from existing use to transportation-related use.[1] • Variations would result in slight changes to these numbers. • Provide infrastructure for surrounding land uses, improve access, and linkages between various residential communities, businesses, and facilities. Impacts are beneficial.	• Same as Freeway/ Expressway Alternative. • Some constraint on construction impact timing possible.	• Similar to Freeway/Expressway Alternative with additional right-of-way (ROW) acquired for construction of the high-speed rail (HSR) alignment to connect to the Palmdale and Victorville rail station. • Variations and rail options would result in slight differences in area of impact. • Provide infrastructure for surrounding land uses, improve access, and linkages between various residential communities, businesses, and facilities. Impacts are beneficial.	• Same as Freeway/ Expressway Alternative with HSR Feeder Service. Some constraint on construction impact timing possible.	• No impacts. • Slower changes to land use patterns may occur.
Parks and Recreation	• Partial ROW acquisition of approximately 5 acres would be needed on the south side of the Westwinds Golf Course. • Indirect impact to Rockview Nature Park by acquiring the parking lot in the Los Angeles Department of Water and Power's (LADWP) parcel. • There would be no additional impacts resulting from any of the variations.	• Same as Freeway/ Expressway Alternative.	• Same as Freeway/Expressway Alternative. • Variations and rail options: no additional impacts.	• Same as Freeway/ Expressway Alternative.	• No impacts.
Growth	• May shift future development toward the new interchanges in Palmdale and Victorville/ Adelanto. • Assist in achieving goals and policies of local general plans to attract investments to balance the current uneven supply of housing with more job-producing uses. • Impacts would be the same for all variations.	• Same as Freeway/ Expressway Alternative. • Potentially slower changes to growth patterns.	• May shift future development toward the new interchanges in Palmdale and Victorville/Adelanto. • Assist in achieving goals and policies of local general plans to attract investments to balance the current uneven supply of housing with more job-producing uses. • May foster higher-density and mixed-use developments near the proposed rail stations in Palmdale and Victorville. • May facilitate connections into Palmdale for passengers on XpressWest, a privately proposed HSR project between Las Vegas and Victorville. • Impacts would be the same for all variations and rail options.	• Same as Freeway/ Expressway Alternative with HSR Feeder Service. • Potentially slower changes to growth patterns for tolled segments.	• No impacts. Minimal growth potential between current urbanized areas.

[1] The increase in land use conversion between the Draft EIR/EIS and the Final EIR/EIS is due to the use of more precise mapping, which rendered more precise calculations and analysis, and the inclusion of the additional Palmdale rail options.

Table S-1 Summary of Major Potential Impacts from Alternatives

Environmental Resource	Potential Impacts				
	Freeway/ Expressway Alternative	**Freeway/ Tollway Alternative**	**Freeway/ Expressway Alternative with HSR Feeder Service**	**Freeway/ Tollway Alternative with HSR Feeder Service (Preferred Alternative)**	**No Build Alternative**
Farmland/ Grazing Land	• Would convert approximately 252 acres of Important Farmland and 2,760 acres of Grazing Land to nonagricultural use. • Variations would result in slight changes to these numbers.	• Same as Freeway/ Expressway Alternative.	• Would convert approximately 252 acres of Important Farmland and 2,760 acres of Grazing Land to nonagricultural use. • Would affect about 650 acres of sheep grazing land. • Variations would result in slight changes to these numbers. • The rail connection options would not result in any additional impacts.	• Same as Freeway/ Expressway Alternative with HSR Feeder Service.	• No impacts.
Community Impacts	• Temporary construction impacts (i.e., traffic, noise, and air impacts during construction) would affect nearby communities. • Affected communities in developed areas would experience changes in access and circulation, growth, urbanization, and quality of life. • Residential, commercial/industrial, educational, and nonprofit properties would be acquired for the project ROW. • Variations A, B, and B1 would result in similar impacts. • Variation D would result in less of an impact on the community of Lake Los Angeles. • Variation E would result in substantially more impacts to the community in Adelanto/ Victorville.	• Same as Freeway/ Expressway Alternative. • Tolling may have potential impacts to environmental justice populations unless mitigation is considered and included.	• Similar to Freeway/Expressway Alternative. • The rail connection options would result in additional community impacts near the Palmdale Station area. • Variation E would result in substantially more impacts to the community in Adelanto/Victorville	• Same as Freeway/ Expressway Alternative with HSR Feeder Service. • Tolling may have potential impacts to environmental justice populations unless mitigation is considered and included.	• Increased traffic congestion and impaired mobility, longer travel times on local roadways, and increased air pollution and noise, which could worsen quality of life. The economic benefits associated with implementation of the HDC would not be realized.

Table S-1 Summary of Major Potential Impacts from Alternatives

Environmental Resource	Potential Impacts				
	Freeway/ Expressway Alternative	Freeway/ Tollway Alternative	Freeway/ Expressway Alternative with HSR Feeder Service	Freeway/ Tollway Alternative with HSR Feeder Service (Preferred Alternative)	No Build Alternative
Relocations	• Affecting 38 to 79 residential units, depending on variation selected. • Affecting 42 to 64 nonresidential units, depending on variation selected. • Replacement land is available.	• Same as Freeway/ Expressway Alternative.	• Affecting 39 to 80 residential units, depending on variation selected. • An additional 1 to 54 residential units would be affected if Option 1A, 1B, or 1C is selected, or an additional 1 to 63 residential units would be affected if Option 7A, 7B, or 7C is selected • Affecting 31 to 53 nonresidential units, depending on variation selected. • An additional 5 to 34 nonresidential units would be affected under Rail Options 1A, 1B, or 1C. An additional 14 to 35 nonresidential units would be affected under Rail Options 7A, 7B, or 7C. • Replacement property is available.	• Same as Freeway/ Expressway Alternative with HSR Feeder Service.	• No community relocations required.
Utilities/ Emergency Services	• Utility facilities in the ROW subject to abandonment, removal, modifications, and/or relocation or replacement. • May improve response times for emergency services. • May need additional emergency personnel and equipment. • May expose the Big Rock Wash area to potentially contaminated groundwater from the north and the northwest. • May expose construction personnel to hydrocarbons, methane, and hydrogen sulfide during deep excavation or boring for bridge columns at two abandoned oil wells. • Variations would result in similar impacts.	• Same as Freeway/ Expressway Alternative. • Tolling may require additional law enforcement services.	• Similar to Freeway/Expressway Alternative. • Additional service impacts and requirements near the Palmdale and Victorville rail stations.	• Same as Freeway/ Expressway Alternative with HSR Feeder Service. • Tolling may require additional law enforcement services.	• No impacts to utilities and emergency services. • As future levels of service (LOS) on local roads deteriorate, response times of emergency response vehicles may increase.

Table S-1 Summary of Major Potential Impacts from Alternatives

Environmental Resource	Potential Impacts				
	Freeway/ Expressway Alternative	Freeway/ Tollway Alternative	Freeway/ Expressway Alternative with HSR Feeder Service	Freeway/ Tollway Alternative with HSR Feeder Service (Preferred Alternative)	No Build Alternative
Traffic and Transportation/ Pedestrian and Bicycle Facilities	• Intersections performing at LOS E or LOS F in year 2040: AM Peak – 2 of 159 PM Peak – 8 of 159 • May sever several north–south running local roads that are planned for future development, requiring future grade separations, cul-de-sac turnarounds, and/or frontage roads. • Portion of bus Route 32, Adelanto–Victorville North, would need to be rerouted if the HDC follows the Air Expressway alignment. • Would require construction of new and revised interchange access points along Interstate 15 (I-15) and State Route (SR) 14. • Would increase demand for existing park-and-ride lots located in Palmdale. • Variations would result in similar impacts.	• Same as Freeway/ Expressway Alternative. • Potential for diversion to local streets adjacent to tolled segments.	• Similar to Freeway/Expressway Alternative. • Additional Palmdale rail station area impacts.	• Same as Freeway/ Expressway Alternative with HSR Feeder Service. • Potential for diversion to local streets adjacent to tolled segments.	• Intersections performing at LOS E or LOS F in year 2040: AM Peak – 23 of 116 PM Peak – 45 of 116 • Continued limitations on east-west mobility.
Visual/ Aesthetics	• Increase in urban character from additional highway lanes, reduction of desert landscape, and construction of soundwalls and other structures that could block views. • Moderate overall visual impact. • Variations would result in similar impacts.	• Same as Freeway/ Expressway Alternative.	• Similar to Freeway/Expressway Alternative. • Additional visual impacts from HSR support facilities and Palmdale rail station. • Variations would result in similar impacts.	• Same as Freeway/ Expressway Alternative with HSR Feeder Service.	• No impacts.

Table S-1 Summary of Major Potential Impacts from Alternatives

Environmental Resource	Potential Impacts				
	Freeway/ Expressway Alternative	**Freeway/ Tollway Alternative**	**Freeway/ Expressway Alternative with HSR Feeder Service**	**Freeway/ Tollway Alternative with HSR Feeder Service (Preferred Alternative)**	**No Build Alternative**
Cultural Resources	• Nine historic properties within the area of potential effects (APE) determined eligible for listing in the National Register of Historic Places (NRHP): six linear historic properties and three individually determined eligible prehistoric archaeological sites that comprise an assumed eligible archaeological district. • An Adverse Effect finding for four historic properties: three prehistoric archaeological sites individually determined eligible under Criterion D, CA-SBR-66, CA-SBR-182, and CA-SBR-12336, which are also considered contributors to the *Topipabit* Archaeological District, and a fourth property determined separately eligible under Criteria A and D. • A Potentially Adverse Effect finding for two assumed eligible historic properties: CA-LAN-4362H and CA-SBR-16916H. • One assumed eligible historic property, CA-SBR-158, is anticipated to result in a No Adverse Effect determination with ESA. • Six properties with No Adverse Effect determinations: National Old Trails Highway, Mojave Trail-Mojave Road-Old Government Road, ATSF Railroad, Boulder Dam Transmission Lines 1, 2 &3 and Towers,, Edison Company Boulder Dam-San Bernardino Transmission Lines and Towers, and SCE Kramer-Victor and Victor-Roadway 115kV Transmission Lines and Towers. • Eight properties with No Historic Properties Affected determinations: CA-LAN-4187H, CA-LAN-4359, CA-LAN-4367H, CA-SBR-6312, CA-SBR-10960H, CA-SBR-16915H, P-36-026773, and P-36-026832. • Variations would result in no additional impacts.	• Same as Freeway/ Expressway Alternative.	• Similar to Freeway/Expressway Alternative. • Variations would result in no additional impacts.	Same as Freeway/ Expressway Alternative with HSR Feeder Service.	• No impacts.
Hydrology and Floodplain	• Nominal increase in runoff would be exhibited within the various watersheds traversed by the corridor due to an increase in impervious surface area. • Variations would result in slightly greater runoff.	• Same as Freeway/ Expressway Alternative.	• Similar to Freeway/Expressway Alternative. Impacts slightly higher due to additional surface area. • Variations and rail connection options would result in slightly greater runoff.	• Same as Freeway/ Expressway Alternative with HSR Feeder Service.	• No impacts.

Table S-1 Summary of Major Potential Impacts from Alternatives

Environmental Resource	Potential Impacts				
	Freeway/ Expressway Alternative	**Freeway/ Tollway Alternative**	**Freeway/ Expressway Alternative with HSR Feeder Service**	**Freeway/ Tollway Alternative with HSR Feeder Service (Preferred Alternative)**	**No Build Alternative**
Water Quality and Stormwater Runoff	• Would add an estimated 995 acres to the existing 80-acre impervious surface area. • The velocity and volume of downstream flow is expected to increase. • Potential pollutant sources would be associated with motor vehicle operations, highway maintenance activities, illegal dumping, accidental spills, and landscaping care. • Variations would result in slightly greater runoff.	• Same as Freeway/ Expressway Alternative.	• Similar to Freeway/Expressway Alternative. Impacts slightly higher due to additional surface area. • Would add an estimated 1,365 acres to the existing 80-acre impervious surface area. • Variations and rail connection options would result in slightly greater runoff. • Additional tunnel drainage necessary at Palmdale rail station and wye option areas.	• Same as Freeway/ Expressway Alternative with HSR Feeder Service.	• No impacts.
Geology/Soils/ Seismic/ Topography	• May facilitate the movement of economic mineral resources (i.e., aggregate base, sand, and gravel) from the area. • May facilitate the development of more sand and gravel quarries. • Variations would result in minimal additional grading.	• Same as Freeway/ Expressway Alternative.	• Similar to Freeway/Expressway Alternative. • Variations would result in minimal additional grading. • Additional grading needed for all rail connection options.	• Same as Freeway/ Expressway Alternative with HSR Feeder Service.	• No impacts.
Paleontology	• Ground disturbance within the project limits and at construction staging areas could disturb native materials, potentially impacting paleontological resources. • Variations would result in minimal additional ground disturbance.	• Same as Freeway/ Expressway Alternative.	• Similar to Freeway/Expressway Alternative. • Variations would result in minimal additional ground disturbance. • Additional areas of disturbance in Palmdale and Victorville rail connection areas.	• Same as Freeway/ Expressway Alternative with HSR Feeder Service.	• No impacts.

Table S-1 Summary of Major Potential Impacts from Alternatives

Environmental Resource	Potential Impacts				
	Freeway/ Expressway Alternative	**Freeway/ Tollway Alternative**	**Freeway/ Expressway Alternative with HSR Feeder Service**	**Freeway/ Tollway Alternative with HSR Feeder Service (Preferred Alternative)**	**No Build Alternative**
Hazardous Waste or Materials	• May expose construction personnel to asbestos-containing materials (ACM) and lead-based paint (LBP) if not removed prior to construction. • May expose workers and the general public to aerially deposited lead (ADL) during construction and operation of the HDC in San Bernardino County. • May expose workers and the general public to unsafe levels of pesticides and/or herbicides. • May expose construction personnel to hydrocarbons, methane, and hydrogen sulfide during deep excavation or boring for bridge columns at two abandoned oil wells. • May expose workers or generate contaminated groundwater if dewatering is required. • May expose construction personnel to potentially contaminated soil underlying several commercial/industrial properties impacted (to be acquired) by this project. • Variations would result in similar impacts.	• Same as Freeway/ Expressway Alternative.	• Similar to Freeway/Expressway Alternative. • Lessened ability to adjust design for contamination avoidance under rail alternatives. • Variations would result in similar impacts. • Additional areas of disturbance in Palmdale and Victorville rail connection areas.	• Same as Freeway/ Expressway Alternative with HSR Feeder Service.	• No impacts.
Air Quality	• May likely cause violations of the State 24-hour particulate matter less than 10 microns in diameter (PM_{10}) standard in both counties. • Variations would result in similar impacts. • Temporary soil disturbance during construction grading activities could cause fungal spores, if present, to become airborne, potentially putting construction personnel, residents, and wildlife at risk of contracting Valley Fever.	• Similar to Freeway/ Expressway Alternative with minor differences related to toll avoidance.	• Similar to Freeway/Expressway Alternative. • Minor additional improvements in emissions depending on auto diversions to rail trips. • Variations and rail connection options would result in similar impacts.	• Similar to Freeway/ Expressway Alternative with HSR Feeder Service with minor differences related to toll avoidance.	• Potential conflict with local government goals and policies for reducing air emissions within its jurisdiction.
Noise	• Some residential areas, a school, a park, and a church within the project limits would be impacted as a result of this project alternative. Abatement measures considered. • Variations would result in similar impacts.	• Same as Freeway/ Expressway Alternative.	• Similar to Freeway/Expressway Alternative. • No measurable impact anticipated from HSR operation. • Variations would result in similar impacts. • Palmdale rail connection options would result in a small number of additional affected properties.	• Same as Freeway/ Expressway Alternative with HSR Feeder Service. • No impact anticipated from HSR operation.	• No impacts.

Table S-1 Summary of Major Potential Impacts from Alternatives

Environmental Resource	Potential Impacts				
	Freeway/ Expressway Alternative	**Freeway/ Tollway Alternative**	**Freeway/ Expressway Alternative with HSR Feeder Service**	**Freeway/ Tollway Alternative with HSR Feeder Service (Preferred Alternative)**	**No Build Alternative**
Energy	• Would result in energy consumption increase of 0.34 and 0.44 percent in 2020 and 2040, respectively. • Variations would result in similar impacts. • Increased energy consumption would be offset by the incorporation of sustainable energy facilities.	• Same as Freeway/ Expressway Alternative. • Additional energy required by tolling is negligible.	• Energy consumption increase of 0.37 and 0.46 percent in 2020 and 2040, respectively. • Variations and rail connection options would result in similar impacts. • Increased energy consumption would be offset by the incorporation of sustainable energy facilities.	• Same as Freeway/ Tollway Alternative with HSR Feeder Service.	• Inefficient energy consumption due to extra fuel used while idling in stop-and-go traffic or moving at slow speeds through congested roadways.
Natural Communities	• Would affect up to approximately 4,107 acres of natural plant communities (2,623 acres of permanent impacts and 1,484 acres of temporary impacts). A Habitat Mitigation and Monitoring Plan (HMMP) will be developed, in consultation with regulatory agencies, to compensate for impacts. • Would affect up to approximately 369 acres of Joshua tree woodland (274 acres of permanent impacts and 95 acres of temporary impacts). • Would affect up to approximately 7.48 acres of CDFW jurisdictional riparian habitat (2.13 acres of permanent impacts and 5.35 acres of temporary impacts). • Implementation of avoidance and minimization measures would reduce these impacts.	• Same as Freeway/ Expressway Alternative.	• Would affect up to approximately 3603.23 acres of permanent impacts to natural plant communities and 113.62 acres of temporary impacts to natural plant communities. A Habitat Mitigation and Monitoring Plan (HMMP) will be developed, in consultation with regulatory agencies, to compensate for impacts. • Would affect up to approximately 446 acres of Joshua tree woodland (384 acres of permanent impacts and 62 acres of temporary impacts). • Would affect up to approximately 7.76 acres of CDFW jurisdictional riparian habitat (2.63 acres of permanent impacts and 5.13 acres of temporary impacts). • Implementation of avoidance and minimization measures would reduce these impacts.	• Same as Freeway/ Expressway Alternative with HSR Feeder Service.	• No impacts.
Wetlands and Other Waters	• With the implementation of avoidance/ minimization measures, permanent impacts of up to 4.97 acres of Waters of the U.S would occur.	• Same as Freeway/ Expressway Alternative.	• With the implementation of avoidance/ minimization measures, permanent impacts of up to 4.99 acres of Waters of the U.S would occur.	• Same as Freeway/ Expressway Alternative with HSR Feeder Service.	• No impacts.
Plant Species	• Could potentially affect alkali mariposa lily, white pygmy poppy, Booth's evening primrose, crowned muilla, and Mojave fish-hook cactus and their habitat. • Variations would have similar impacts. • Implementation of avoidance and minimization measures would reduce these impacts.	• Same as Freeway/ Expressway Alternative.	• Same as Freeway/Expressway Alternative. • Variations would have similar impacts. • All rail connection options would likely result in greater impacts due to the larger footprint.	• Same as Freeway/ Expressway Alternative.	• No impacts.

Table S-1 Summary of Major Potential Impacts from Alternatives

Environmental Resource	Potential Impacts				
	Freeway/ Expressway Alternative	**Freeway/ Tollway Alternative**	**Freeway/ Expressway Alternative with HSR Feeder Service**	**Freeway/ Tollway Alternative with HSR Feeder Service (Preferred Alternative)**	**No Build Alternative**
Animal Species	• Twenty-one (22) nonlisted special-status wildlife species (and their habitats) have the potential to occur and be impacted within the project area, including mammals, birds and reptiles. • Impacts to all nonlisted special-status species would be low with implementation of avoidance, minimization, and mitigation measures, except the following: – Potentially substantial impact to raptor foraging habitat (up to 7400 acres) and burrowing owl (3 breeding pairs observed).. – Variations would have similar impacts.	• Same as Freeway/ Expressway Alternative.	• Same as Freeway/Expressway Alternative • Variations would have similar impacts. • All rail connection options would likely result in greater impacts due to the larger footprint.	• Same as Freeway/ Expressway Alternative.	• No impacts.

Table S-1 Summary of Major Potential Impacts from Alternatives

Environmental Resource	Potential Impacts				
	Freeway/ Expressway Alternative	**Freeway/ Tollway Alternative**	**Freeway/ Expressway Alternative with HSR Feeder Service**	**Freeway/ Tollway Alternative with HSR Feeder Service (Preferred Alternative)**	**No Build Alternative**
Threatened and Endangered Species	• Forty-one (41) listed wildlife species have potential to occur in the project area (8 of these have high/moderate potential). • Would impact up to 987.41 acres (584.47 permanent and 402.94 temporary) of golden eagle and foraging habitat. • Would impact up to 1,597.09 acres (971.81 permanent and 625.28 temporary) of Swainson's hawk foraging habitat. • Is not likely to adversely affect the federally endangered southwestern willow flycatcher. Would impact up to 2.27 acres of potentially suitable habitat. • Is not likely to adversely affect the federally endangered least Bell's vireo, or vireo critical habitat. Would not result in impacts to occupied vireo habitat • Would affect up to approximately 2,120.72 acres of occupied desert tortoise habitat 1,245.36 acres of permanent impacts and 875.36 acres of temporary impacts). • Is not likely to jeopardize the continued existence of the desert tortoise. • Would have the potential to impact western yellow-billed cuckoo and Mohave ground squirrel. • Would have the potential to impact up to 3,016.8 acres of suitable Mohave ground squirrel habitat, although no occupied habitat was found. • Would have the potential to impact up to 2,745.75 acres of suitable Townsend's big-eared bat habitat, although no occupied habitat was found. • Implementation of avoidance and minimization measures would reduce impacts to listed species. • Variations would have similar impacts, except the following: – Variation E would affect nesting habitat for the least Bell's vireo and designated critical habitat for the southwestern willow flycatcher.	• Same as Freeway/ Expressway Alternative.	• Same as Freeway/Expressway Alternative. • Would impact up to 1,158.14 acres (696.19 permanent and 461.95 temporary) of golden eagle and foraging habitat. • Would impact up to 1,910.20 acres (1,258.10 permanent and 652.10 temporary) of Swainson's hawk foraging habitat. • Is not likely to adversely affect the federally endangered southwestern willow flycatcher. Would impact up to 4.47 acres of potentially suitable habitat. • Is not likely to adversely affect the federally endangered least Bell's vireo, or vireo critical habitat. Would result in permanent impacts to 1.86 acres of occupied vireo habitat. 4.19 acres of designated critical habitat would be impacted (3.23 permanent and 0.07 temporary). • Would affect up to approximately 2,283.43 acres of occupied desert tortoise habitat 1,590.36 acres of permanent impacts and 693.07 acres of temporary impacts). • Would have the potential to impact up to 3,453.15 acres of suitable Mohave ground squirrel habitat, although no occupied habitat was found. • Would have the potential to impact up to 3,147.74 acres of suitable Townsend's big-eared bat habitat, although no occupied habitat was found • Variations would have similar impacts, except the following: – Variation E for highway and rail would affect nesting habitat for the least Bell's vireo and occupied critical habitat for the southwestern willow flycatcher.	• Same as Freeway/ Expressway Alternative.	• No impacts.

Table S-1 Summary of Major Potential Impacts from Alternatives

Environmental Resource	Potential Impacts				
	Freeway/ Expressway Alternative	**Freeway/ Tollway Alternative**	**Freeway/ Expressway Alternative with HSR Feeder Service**	**Freeway/ Tollway Alternative with HSR Feeder Service (Preferred Alternative)**	**No Build Alternative**
Invasive Species	• Potential to spread invasive species to adjacent native habitats in the project area during construction. • Variations would have similar impacts.	• Same as Freeway/ Expressway Alternative.	• Same as Freeway/Expressway Alternative. • Variations and rail connection options would have similar impacts.	• Same as Freeway/ Expressway Alternative.	• No impacts.
Section 4(f)	• *De minimis* determination to four historic properties: National Trails Highway, ATSF Railroad, the Edison Company Boulder Dam – San Bernardino 115-kilovolt (kV) Transmission Line (BDSBL) (only one tower would be relocated), and multicomponent resource consisting of the Mojave Trail, Mojave Road and Government Road (MR). • Some visual and air quality proximity impacts on nearby parks during project construction and operation. • Variations would not result in a change in impacts, except that Variation E would avoid the *de minimis* impacts to the Westwinds Golf Course and Rockview Nature Park.	• Same as Freeway/ Expressway Alternative.	• *De minimis* determination to four historic properties: National Trails Highway, ATSF Railroad, BDSBL (7 towers would be relocated), and multicomponent resource consisting of the Mojave Trail, Mojave Road and Government Road (MR). • Some visual and air quality proximity impacts on nearby parks during project construction and operation. • Noise and visual proximity impacts on St. Clair Parkway in Palmdale due to relocation of the rail tracks closer to the parkway. • Variations and rail connection options would not result in a change in impacts, except that Variation E (for highway and rail) would avoid the *de minimis* impacts to the Westwinds Golf Course and Rockview Nature Park.	• Same as Freeway/ Expressway Alternative with HSR Feeder Service.	• No use and no impact to any Section 4(f) properties.
Cumulative Impacts	• Potential cumulative impacts to growth, farmland, emergency services, visual, and biological resources. • Variations would result in similar impacts.	• Same as Freeway/ Expressway Alternative.	• Potential cumulative impacts to same resources listed under the Freeway/Expressway Alternative. • Variations and rail connection options would not result in a change in impacts, except that Variation E with HSR would result in additional substantial impacts on the State and federally listed southwestern willow flycatcher and least Bell's vireo.	• Same as Freeway/ Expressway Alternative with HSR Feeder Service.	• No impacts.

Coordination with Public and Other Agencies

Caltrans, in cooperation with Metro, has coordinated with numerous public agencies throughout the environmental process. There have been extensive outreach efforts as outlined in Chapter 5. These efforts started with scoping in September 2010, followed by progress meetings in April 2011, January 2012, February 2012, December 2012, July 2013, and July 2014.

Cities and towns in the project area are supportive of the HDC Project.

The Draft EIR/EIS prepared for this project was circulated for public review between September 30 and December 2, 2014. Caltrans, in cooperation with Metro, held four public hearings at various locations in November 2014. All comments received during the Draft EIR/EIS public review period were considered and responded to.

As part of the Coordination Plan conducted by Caltrans, the following agencies either have accepted or are being considered as Cooperating Agencies for this project.

- Federal Railroad Administration (FRA)
- U.S. Federal Aviation Administration (FAA), Western Pacific Region
- U.S. Environmental Protection Agency (EPA), Region IX
- Advisory Council on Historic Preservation (ACHP)
- Federal Bureau of Prisons
- U.S. Army Corps of Engineers (USACE)
- Surface Transportation Board

Identification of Preferred Alternative

Caltrans, as lead agency under NEPA, as assigned by FHWA, and in cooperation with Metro, has identified a Preferred Alternative that consists of the following elements:

- The Freeway/Tollway with HSR Alternative (including Variations D and B1)
- HSR Option 1C to connect to the Palmdale Transportation Center
- HSR main alignment to connect to the Victorville XpressWest rail station
- Bike path between 20th Street East and US 395 (with funding to provide an extension along local streets to the Palmdale Transportation Center)
- Green energy production and transmission facilities within study area footprint

The Preferred Alternative would meet the project's Purpose and Need, as discussed in Section 1.2 of the Final EIR/EIS. This alternative would improve traffic operations along the approximate 63-mile length of the corridor, maintain mobility/accessibility, and enhance modal choice while accommodating planned growth in the High Desert region, particularly the Antelope and Victor valleys. As currently designed, the Preferred Alternative's surface transportation component with median separations would also help reduce the potential for head-on vehicular crashes and promote safety by introducing more gentle and gradual curves, wider lanes, and other geometric engineering improvements. The Preferred Alternative would also provide a connection to existing and future passenger rail systems, including the California HSR system and the proposed XpressWest HSR system. The proposed Class I bike path at the bottom of the freeway embankment would provide a continuous linkage between Los Angeles and San Bernardino counties. The green and renewable energy component would contribute to a reduction in GHG emissions and reduce energy costs. In addition to the above, the Preferred Alternative has been identified as the Least Environmentally Damaging Practicable Alternative (LEDPA) (see Section 3.3.2, Wetlands and other Waters).

Avoidance, Minimization, and Mitigation Measures

The project will be designed to avoid and minimize impacts to environmental resources to the extent practicable. Standard conditions and mitigation measures have been identified to minimize impacts when avoidance is not possible. An Environmental Commitment Record will be prepared and approved as a condition to project approval.

Source: www.wildpedia.com
The community character along historic Route 66 would be maintained.

Source: http://www.wildherps.com.
Desert tortoise.

Permits Required for the Project

Permits and approvals by agencies that may be required for construction of the project are listed in Table S-2.

Table S-2 Project Permits and Approvals

Agency	Permit/Approval	Status
United States Fish and Wildlife Service (USFWS)	Biological Opinion	Threatened and Endangered Species Act Section 7 consultation was initiated following identification of the Preferred Alternative. The Biological Opinion was obtained on April 6, 2016 and is included in Appendix L of Volume 2.
United States Army Corps of Engineers (USACE)	Jurisdictional Determination (JD) (Preliminary and Approved)	A Preliminary JD was received on April 11, 2016. An Approved JD was received on May 16, 2016.
United States Army Corps of Engineers (USACE)	Clean Water Act (CWA) Section 404 Permit for the discharge of dredge or fill materials into waters of the U.S.	Application to be submitted during the design phase.
Federal Emergency Management Agency (FEMA)	Conditional Letter of Map Revision and Letter of Map Revision	Coordination with FEMA during the design phase to ensure improvements are compatible with the floodplain.
Federal Highway Administration (FHWA)	Air Quality Conformity Determination	FHWA made a finding that the project is consistent with requirements of the Clean Air Act (CAA) on January 4, 2016 (see Appendix M of Volume 2).
Federal Aviation Administration (FAA)	FAA's Obstruction Evaluation/Airport Airspace Analysis process	Coordination with FAA during project design to ensure project features or mitigation measures would not obstruct airport/air space activities.
Department of Interior Bureau of Land Management (BLM)	Paleontological Resource Use Permit	To be submitted for the potential to encounter paleontological resources on BLM property during construction.
California State Water Resources Control Board (SWRCB)	Water Discharge Permit, approval of Notice of Intent (NOI) to comply with General Construction Activity National Pollutant Discharge Elimination System (NPDES) Permit (CWA Section 402)	NOI to be submitted during the design phase.
California Department of Fish and Wildlife (CDFW)	Section 1602 Lake or Streambed Alteration Agreement	Section 1602 Notification is to be submitted and agreement obtained prior to the start of construction.
Region 6, Lahontan Regional Water Quality Control Board (RWQCB)	Water Quality Certification (CWA Section 401)	Certification of compliance will be obtained prior to the start of construction.

Table S-2 Project Permits and Approvals

Agency	Permit/Approval	Status
State Historic Preservation Officer (SHPO)	Concurrence on the Finding of Affect (FOE) and approval of a Programmatic Agreement (PA)	SHPO concurred with the FOE on March 22, 2016 and approved the PA on March 30, 2016.
Interested Native American Tribes	Section 106 of the National Historic Preservation Act (NHPA) to include, but not be limited to, determinations of eligibility, findings of effect, and future work that includes involvement with the PA, Archaeological Monitoring Plan, and Data Recovery Plan	Native American Consultation for the High Desert Corridor (HDC) is ongoing.
Burlington Northern Santa Fe (BNSF) Railroad Company	Memorandum of Understanding (MOU) and a Construction and Maintenance Agreement between Caltrans and BNSF; approval of the proposed action, based on review of the Construction and Maintenance Agreement between Caltrans and BNSF	Prior to any construction within or above railroad right-of-way (ROW).
California Public Utilities Commission (CPUC)	General Order 131-D for relocation of electrical transmission lines between 50 and 20 kilowatts (kW); Certificate of Public Convenience and Necessity for relocations to electrical transmission lines and gas lines	Prior to relocation of electric utility lines; after certification of Environmental Impact Report (EIR)/Environmental Impact Statement (EIS) and the filing of a Notice of Determination to complete the California Environmental Quality Act (CEQA) process.
Local Air Pollution Control Districts	Dust Control Permit per Antelope Valley Air Quality Management District’s (AVAQMD) Rule 403 (Fugitive Dust) and Mojave Desert Air Quality Management District’s (MDAQMD) Rule 403.2 (Fugitive Dust Control for the Mojave Desert Planning Area), and South Coast Air Quality Management District’s (SCAQMD) Rules 401, 402, and 403.	Permit to be acquired after project approval and prior to construction.
Utilities (e.g., power, water, gas, cable, communication)	Approvals to relocate, protect in place, or remove utility facilities	Prior to any construction activities that would affect utility facilities.
San Bernardino County and Los Angeles County Flood Control Districts	Floodplain Encroachment Permit	During final design.
Southern California Edison (SCE)	Site Plan Review Relocation of Transmission Lines Approval	During final design.
Southern California Regional Rail Authority (SCRRA)/ Metrolink	Temporary Rights-of-Entry Agreements; Design Service Agreements or MOU for plan reviews and approvals; Construction & Maintenance Agreements for future grade separations	During final design.
California Transportation Commission (CTC)	Route Adoption for HDC along Preferred Alternative	Prior to final design.

Unresolved Issues

The following issues would need to be resolved before project implementation:

- Project funding
- Public-Private Partnership (PPP) arrangement
- Release of airport land at Los Angeles/Palmdale Regional Airport
- Development of a Habitat Mitigation and Monitoring Plan (HMMP) in consultation with regulatory agencies

Other Major Actions in the Proposed Project General Area

The following is a list of proposed major actions in the proposed project general area. A complete related project list is provided in Section 3.7, Cumulative Impacts.

- California HSR System – The California High-Speed Rail Authority proposes a train system capable of operating at speeds in excess of 200 mph on a fully grade-separated track serving the major metropolitan centers of California, including segments from Bakersfield to Palmdale and from Palmdale to Los Angeles.
- Route 395 Expressway – Caltrans will reconstruct US 395 into a four-lane expressway and provide at-grade intersections for existing street crossings. Phase 1 will widen US 395 from SR-18/Palmdale Road to Chamberlaine Way in Adelanto, Phase 2 will widen US 395 from Chamberlaine Way to Desert Flower Road, and Phase 3 will involve work from I-15 to SR-18.
- XpressWest (formerly DesertXpress) – The FRA is the lead agency for construction, operation, and maintenance of a high-speed passenger train between Victorville and Las Vegas, including stations and maintenance facilities at both ends of the rail alignment.
- State Route 138 Safety Improvement Project – Caltrans proposes to widen the shoulders from 2 to 8 feet, provide 2-foot-wide rumble strips near the edge of traveling roadway in each direction, and provide a 4-foot-wide median buffer with rumble strips on SR-138 between SR-138/SR-18 Junction (PM 69.3) and the San Bernardino County Line (PM 75.0). The Mitigated Negative Declaration was issued in April 2013.
- Palmdale Hybrid Power Project – The City of Palmdale proposes a 570-megawatt (MW) electric generating facility that combines the ultra-high efficiency clean-burning natural gas technology with solar energy to be located near the Los Angeles/Palmdale Regional Airport.
- Solar Project – The City of Adelanto is the lead agency for a 27-MW PV facility proposed on 205 acres at the southeast corner of Rancho and Emerald roads.
- Victorville 2 Hybrid Power Project – The City of Victorville proposes a hybrid natural gas-fired and solar thermal plant on three areas totaling 388 acres north of the Southern California Logistics Airport (SCLA).
- High Desert Detention Center – The City of Adelanto proposes construction of a 2,200-bed correctional facility at the northeast corner of Rancho Road and Raccoon Avenue. Phase 1 is complete, while Phases 2 and 3 are anticipated to be constructed in 2017.

- Adelanto Gateway Logistics Center – The City of Adelanto proposes an industrial park on 400 acres across from the SCLA at Air Expressway and Adelanto Road.
- Global Access (SCLA Development) – The City of Victorville proposed this multiphase industrial development at the SCLA consisting of 43.5 million square feet for SCLA, 65 million square feet for the Southern California Logistics Centre, and 60 million square feet for the Southern California Rail Complex
- Desert Gateway Specific Plan – The City of Victorville proposes a 10,203-acre community at the interchange of the HDC and I-15, consisting of 26,100 housing units and other land uses (i.e., commercial, mixed-use, industrial and open space).

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Chapter 1 Proposed Project

1.1 Introduction

The California Department of Transportation (Caltrans), in cooperation with the Los Angeles County Metropolitan Transportation Authority (Metro), proposes construction of the High Desert Corridor (HDC) as a new transportation facility in the High Desert region of Los Angeles and San Bernardino counties. The proposed 63-mile-long west-east facility would provide route continuity and relieve traffic congestion between State Route (SR) 14 in Los Angeles County and SR-18 and Interstate 15 (I-15) in San Bernardino County. The HDC was identified as E-220 in SAFETEA-LU (the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users, signed into law on August 10, 2005) and is officially designated as a high-priority corridor on the National Highway System. Figures 1-1 and 1-2 are project vicinity and location maps, respectively.

A route adoption (formal alignment selection) by the California Transportation Commission (CTC) would be needed once the alignment is identified for a continuous route from SR-14 in Palmdale to SR-18 in Apple Valley. The existing portions of SR-18 and SR-138 would be relinquished (i.e., made a local road, no longer a State highway) to the local jurisdictions (i.e., cities of Palmdale, Adelanto, Victorville, and Town of Apple Valley; and Los Angeles and San Bernardino counties). Freeway cooperative agreements between Caltrans and the affected jurisdictions would also be required.

The project is subject to State and federal environmental review requirements because it involves the use of federal funds administered by the Federal Highway Administration (FHWA). Project documentation has been prepared in compliance with the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA). Caltrans is the lead agency under CEQA. FHWA's responsibility for environmental review, consultation, and any other action required in accordance with applicable federal laws for this project is being carried out by Caltrans under its assumption of responsibility pursuant to Section 6005 of SAFETEA-LU, codified at 23 United States Code (U.S.C.) 327(a)(2)(A). Effective July 1, 2007, FHWA has assigned, and Caltrans has assumed, all U.S. Department of Transportation (USDOT) Secretary's responsibilities under NEPA; therefore, Caltrans is also the lead agency under NEPA.

The Draft Environmental Impact Report (EIR)/Environmental Impact Statement (EIS) prepared for this project was circulated for public review between September 30 and December 2, 2014. Caltrans, in cooperation with Metro, held four public hearings at various locations in November 2014 (see details in Section 5.4.11). All comments received during the public review period were considered. The Final EIR/EIS has been prepared to address all public comments and incorporate refinements of the project design, environmental setting, and impacts that have occurred since the Draft EIR/EIS was completed.

Figure 1-1 Project Vicinity Map

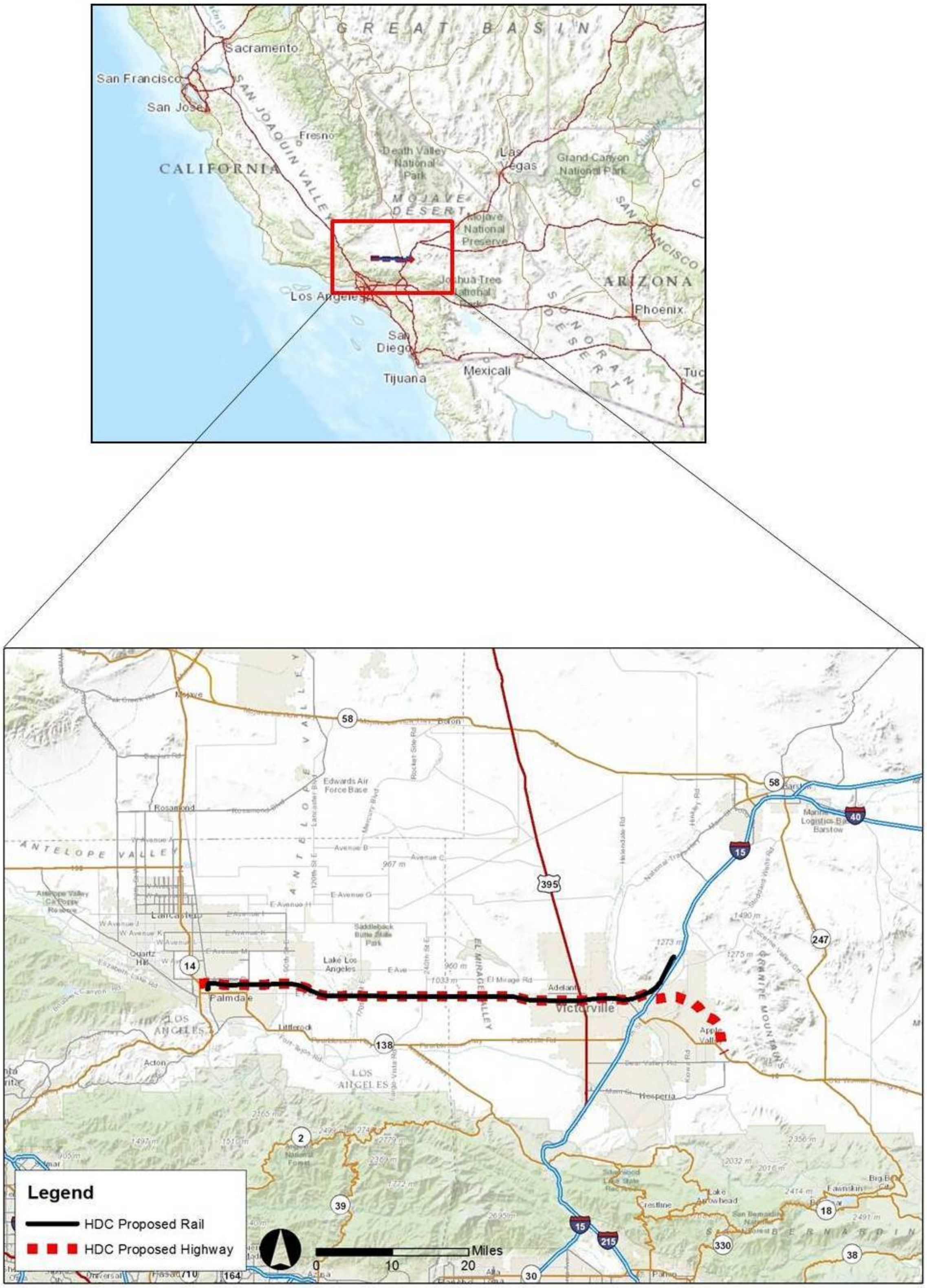
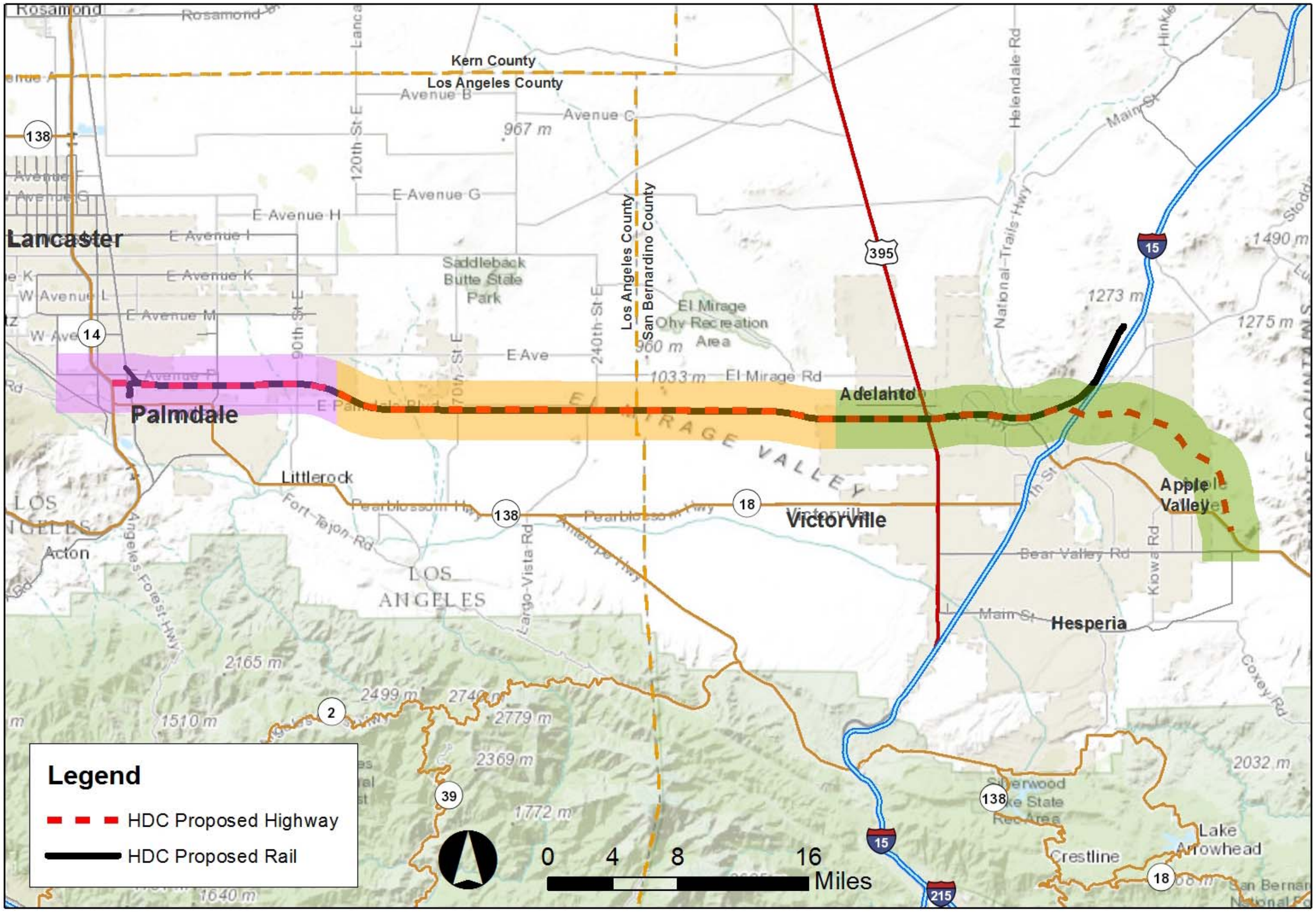


Figure 1-2 Project Location Map Showing High Desert Region



ANTELOPE VALLEY Los Angeles County Lancaster, Palmdale	HIGH DESERT Los Angeles County–San Bernardino County Lake Los Angeles, El Mirage	VICTOR VALLEY San Bernardino County Adelanto, Victorville, Apple Valley, Hesperia

1.1.1 Project Location and Setting

The High Desert is typically defined as the arid region north of the San Gabriel and San Bernardino mountain ranges. Starting in the northwestern corner of Los Angeles County near SR-138 and Interstate 5 (I-5), the High Desert extends east into Kern and San Bernardino counties. This expansive region is home to the Mojave Desert, Antelope and Victor valleys, and many small and large communities. The communities through which the proposed HDC would cross include Palmdale, Victorville, Adelanto, and Apple Valley.

While the central portion of the project area is currently sparsely developed, the HDC would connect large urban areas on the west and east ends of the HDC. Land uses in the project vicinity include residential, commercial, industrial, recreational, resource/utility, agriculture, undeveloped/vacant, and government. Beginning on the east end at SR-18 and Bear Valley Road in San Bernardino County, the HDC alignment extends northwesterly through Apple Valley, then west across I-15 into Victorville, running parallel to and north of Air Expressway Boulevard into Adelanto. The HDC then generally follows an alignment along a westward extension of Air Expressway Boulevard. In Los Angeles County, the alignment continues west just to the north of Gray Butte Field, then runs parallel with Palmdale Boulevard to the south. In the vicinity of 120th Street East, the alignment crosses northwesterly across Palmdale Boulevard and Little Rock Wash to become parallel with East Avenue P-8 and end at SR-14.

1.1.2 Planning Background

The need for a high-capacity transportation corridor has been recognized by State, regional, and local planners for decades. Originally conceived as the “Metropolitan Bypass” in the 1930s/40s, a freeway alignment generally following SR-138 was intended to provide a northeast bypass of Los Angeles for vehicular trips from the San Joaquin Valley to communities to the east such as San Bernardino and Victorville; however, the concept lay dormant until rapid population growth and urbanization in the last 2 decades of the 20th century led to renewed interest in the project.

Increasing traffic and safety concerns caused officials to consider the possibility of adopting a new alignment for SR-138. In 1993, Caltrans prepared a study, *The Adoption for the Route 138 Transportation Corridor*, which explored various east-west alignment options.

Between 1992 and 2002, Caltrans, in cooperation with the HDC Steering Committee, prepared a Regionally Significant Transportation Investment Study (RSTIS), which provided documentation of the need for improved transportation infrastructure to accommodate the expected continuing growth in the rapidly developing Antelope Valley and Victor Valley areas of Los Angeles and San Bernardino counties, respectively. The RSTIS Steering Committee adopted a corridor similar to that shown in Figure 1-2.

At the same time that the RSTIS Steering Committee adopted the corridor, the North County Combined Highway Corridor Study (SR-138, I-5, and SR-14) was initiated by Metro to develop a multimodal transportation plan for the northern Los Angeles County region. In 2003, Metro completed the alternatives development and screening for this study, which recommended strategies for addressing the high volume of traffic traveling between the Antelope and Victor valleys. The HDC was one of the strategies identified in the study (Metro, 2004).

In 2005, the HDC, identified as E-220, was officially recognized in Section 1105 of the Intermodal Surface Transportation Efficiency Act (ISTEA) as a High Priority Corridor on the National Highway System between Los Angeles and Las Vegas via Palmdale and Victorville.

In 2006, the High Desert Corridor Joint Powers Authority (HDCJPA) was formed to oversee the financing and construction of a freeway corridor from SR-14 in the Palmdale/Lancaster area to the cities of Adelanto, Victorville, Hesperia, and Apple Valley. Its members include the counties of San Bernardino and Los Angeles, the Town of Apple Valley, and the cities of Adelanto, Victorville, Lancaster, and Palmdale.

In 2007 and 2009, environmental studies began on two small components of the HDC. In 2007, the City of Victorville, with oversight from Caltrans District 8, began work on Phase 1 of the HDC. This project extended between United States Highway 395 (US 395) and SR-18 at the eastern end of the corridor. In 2009, Caltrans District 7 began working on the western end of the corridor by initiating the new SR-138 project between SR-14 and 100th Street East. During the course of conducting these studies and coordinating with regulatory and resource agencies for the proposed projects, it was determined that the public interest would be better served by combining the two projects into one larger one – the HDC – which incorporates the two “end pieces” and fills in the gap between them.

In April 2010, the Metro Board of Directors authorized entry into a Memorandum of Understanding (MOU) for implementation of the HDC Project, in cooperation with the following entities: HDCJPA; Southern California Association of Governments (SCAG); San Bernardino Associated Governments (SANBAG); State of California represented by Caltrans Districts 7 and 8; County of Los Angeles; County of San Bernardino; and cities of Lancaster, Palmdale, Victorville, Adelanto, and the Town of Apple Valley. On March 22, 2012, the Metro Board formally recognized the project as a Strategic Multipurpose Corridor, with the intent of providing enhanced mobility as well as economic and environmental benefits. The Board further identified the corridor as potentially being able to accommodate a green energy production and/or transmission facility, a High-Speed Rail (HSR) feeder service line from Victorville to Palmdale, and a bikeway.

1.1.3 Project Overview

The HDC Project would entail construction of a new multimodal link between SR-18 in San Bernardino County and SR-14 in Los Angeles County. It would connect some of the fastest growing residential, commercial, and industrial areas in Southern California, including Palmdale, Lancaster, Adelanto, Victorville, Hesperia, and Apple Valley.

Project Elements

As currently planned, the project would be implemented in three segments: the Antelope Valley segment, the High Desert segment, and the Victor Valley segment.

Freeway/Expressway Facility

A combination of a full controlled-access freeway and partial controlled-access at-grade expressway for a total distance of 63 miles would be constructed. As currently planned, the project would be implemented in three segments: the Antelope Valley segment, the High Desert segment, and the Victor Valley segment.

Antelope Valley Segment (SR-14 to 90th Street East)

Starting with a new freeway-to-freeway SR-14/HDC interchange, the new facility would extend east parallel with and near Avenue P-8, in Palmdale. Right-of-way (ROW) acquisition for this 9-mile-long segment would accommodate ultimate expansion that could include as many as four mixed-flow lanes and one high-occupancy vehicle (HOV) lane in each direction plus a high-speed passenger rail line. New local interchanges are currently proposed at 20th Street East, 30th Street East, 50th Street East, and 90th Street East. Viaduct structures would be constructed between Division Street and 10th Street East and over Little Rock Wash. There would be several required grade separations at freeway crossings. A new frontage road would be built which would help maintain local accessibility where street closures are required. The existing partial interchange at SR-14/Rancho Vista Boulevard would be closed, and a full interchange would be constructed at 10th Street West to provide better weaving distance with the direct connector ramps of the SR-14/HDC interchange.

High Desert Segment (90th Street East to US 395)

This 33-mile-long freeway segment would extend from Palmdale to Adelanto, running in a west-east direction parallel and south of Palmdale Boulevard. The freeway would be three lanes in each direction from 90th Street East to 210th Street East. From 210th Street East to US 395, the freeway would be four lanes in the westbound direction and three lanes in the eastbound direction. The ROW would be acquired to support an ultimate facility that could include as many as four mixed-flow lanes and one high-occupancy vehicle (HOV) lane in each direction plus a high-speed passenger rail line. New local interchanges are currently proposed at Longview Road/140th Street East, 170th Street, 210th Street, and 240th Street in Los Angeles County, and Oasis Road, Sheep Creek Road, Caughlin Road, and Koala Road in San Bernardino County. Freeway grade separations (i.e., overcrossings or undercrossings) are also proposed.

Victor Valley Segment (US 395 to SR-18)

This 21-mile-long freeway segment would generally follow the alignment of Air Expressway Boulevard between Caughlin Road in Adelanto and Dale Evans Parkway east of I-15 in Apple Valley, and continue southeasterly as an expressway to join SR-18 just east of Joshua Street. The freeway portion between Caughlin Road and I-15 would be six lanes wide, continuing to Dale Evans Parkway as a four- or six-lane freeway. ROW would be acquired to support a future freeway that could include as many as four mixed-flow lanes and one high-occupancy vehicle (HOV) lane in each direction plus a high-speed passenger rail line between US 395 and I-15. From I-15 to Dale Evans Parkway, the typical section would be four mixed-flow lanes with one HOV lane in each direction. East of Dale Evans Parkway, a partial access-controlled, four-lane divided expressway would be constructed to connect with the existing SR-18 at Bear Valley Road cutoff. A freeway-to-freeway interchange would be constructed at the I-15/HDC junction. Bridge structure(s) would be constructed over the Burlington Northern Santa Fe (BNSF) and Mojave Northern railways and the Mojave River. New local interchanges are proposed at US 395, Phantom Road West, Phantom Road East, National Trails Highway, Choco Road, and Dale Evans Parkway. Several additional grade separations would be required to assist with traffic flow and road safety, and they would be identified during detailed design.

Freeway/Tollway Facility

Similar to the facility described under Freeway/Expressway, a segment that begins at 90th Street East in Palmdale and ends at US 395 in Victorville would be operated as toll lanes.

High-Speed Rail

Recognizing the HDC as a multipurpose corridor with potential to connect to the expanding regional rail system, the project is proposed to include a HSR feeder service between Palmdale and Victorville. This feeder service would connect the XpressWest System (a planned HSR service from Victorville to Las Vegas) with Metrolink at the Palmdale Transportation Center and a planned future California HSR stop at Palmdale. Two station connections are proposed – one in Victorville and one in Palmdale.

Green Energy Production/Transmission Facility

Continuing increases in the cost of energy, coupled with the trend to seek alternative means of environmentally sound and sustainable energy production, clearly indicate the need to support the advancement of renewable energy technologies. In this regard, the HDC would be designed as a sustainable and environmentally responsible project. Based on the results of the *Draft Green Energy Feasibility Study Report* (June 2014), solar installations near the necessary electric utility infrastructure and alternative fuel charging stations at selected interchanges appear to be feasible options for the HDC Project. Support of green and renewable energy technologies will contribute to meeting Caltrans' greenhouse gas (GHG) reduction goals, and Caltrans intends to incorporate the green energy component into every alternative of the HDC Project.

Bike Route

Under every alternative evaluated in this environmental document, the HDC Project would include Class I bicycle paths and/or Class III bicycle routes, extending approximately 39 miles along the corridor from US 395 in Adelanto to 20th Street East in Palmdale. Financial assistance would be provided to the City of Palmdale to provide a connection to the Palmdale Transportation Center along the City's local roads. Coordination with relevant cities has been initiated to identify local routes for bicycle connections to the master-planned bike routes within Adelanto and Palmdale (see Chapter 5).

Decisions to be Made by the California Department of Transportation

The HDC Project consists of several elements as described above. Caltrans intends to prepare one or more Records of Decision once funding is available for the next phase of the project. The timing and source of funding will determine which elements are in each ROD. This/these ROD(s) will provide the environmental approval required for each of these elements:

- Freeway/Tollway, including on-site facilities used during construction and operation (batch plants, electric vehicle charging stations)
- HSR Feeder Service, including,
  - traction power sub-stations
  - track connections to stations in Palmdale and Victorville (see Figures 2-5 and 2-10)
  - track connections to the proposed CHSR tracks in Palmdale (see Figure 2-5)
- Green Energy Production/Transmission Facility (at a programmatic level)
- Bike Route

Caltrans is aware that detailed information concerning the green energy facility is not currently available because the technology is constantly evolving. This information will be provided as a supplement to this environmental document at a later date, once funding is available and the specific technologies are selected.

Caltrans is also aware that additional projects sponsored by other entities will have elements that are connected to the HDC. These project elements will require their own environmental clearances and will not be included in the ROD(s) prepared for the HDC:

- CHSR station in Palmdale, including parking facilities
- XpressWest station in Victorville, including parking facilities
- Energy transmission line(s) within the HDC 300-foot or 500-foot wide corridor
- Renewable energy facilities outside of the HDC 300-foot or 500-foot wide corridor
- Bike path connection from 20th Street East (where the HDC bike route ends) to the Palmdale Transportation Center

New Route Adoption

As stated previously, several studies have been conducted to identify a preliminary alignment for the HDC. Thus far, however, a formal resolution requesting a route adoption has not been submitted to the CTC. Caltrans intends to use this approved EIR/EIS to support a CTC resolution for a new route adoption for the HDC along the path of the preferred alternative.

1.1.4 Planning Context

The HDC Project is included in SCAG's 2012-2035 Regional Transportation Plan/ Sustainable Communities Strategy (RTP/SCS) (Project Identification Number 1C0404). FHWA and the Federal Transit Administration (FTA) adopted the RTP/SCS on April 4, 2012. The project is also in SCAG's 2013 Federal Transportation Improvement Program (FTIP), which was federally approved on December 14, 2012 (Project Identification Numbers LA962212, LA0G665, and SB20061702).

This project is currently funded for the Project Approval and Environmental Document (PA/ED) phase only for a total of $45.5 million. Metro has programmed a total of $30.0 million through the Measure R program for the environmental and preliminary engineering work, along with $15.5 million from the State Regional Improvement Program. The actual funding agreement addressing this Measure R money was entered into between Metro and Caltrans in March 2011. The current funding of $45.5 million is expected to be adequate for completion of the PA/ED phase. There is also an additional source of $213.0 million that was identified in SANBAG's Measure I Strategic Plan, of which an estimate of $16.0 to $27.7 million may be used for the HDC in San Bernardino County over the life of Measure I (2010-2040) through all project development stages.

Support and capital funding necessary for the final design, ROW, and construction of the project has not yet been programmed by Metro or any Partnering Agency. It is anticipated that the next project phases would be funded from other sources, including tolls/public-private partnership (PPP) investment, state programs, and various federal formula, earmarks, and grant programs.

Table 1-1 shows the identified funding sources for the PA/ED phase of the project.

Table 1-1 High Desert Corridor Funding Sources (PA/ED only)

Source	Funding ($ Million)
Local	
Measure R (Los Angeles County- Metro)	33.0
State	
State Regional Transportation Improvement Program	15.5
Total*	48.5

* The budget to complete preliminary design and environmental documents is approximately $50.0 million.
** An additional $16.0 to $27.7 million of SANBAG's Measure I Strategic Plan money may also be used for the HDC in San Bernardino County over the life of Measure I (2010-2040) during all project development stages.

Source: Caltrans, 2014.

1.2 Purpose and Need

The purpose and need statement for any given project serves three primary functions. First, it establishes the problem, or problems, leading up to why the project is being proposed (i.e., need); second, it identifies the project objectives that would solve those problems (i.e., purpose). A third and equally important function of the purpose and need statement is that it provides a basis for comparing the alternatives against one another. The following sections describe in more detail the project's purpose and need.

1.2.1 Purpose

The purpose of the proposed project is to improve east-west mobility through the High Desert region of southern California. This can be achieved by addressing present and future travel demand and mobility needs within the Antelope and Victor valleys. The proposed project is intended to achieve the following objectives:

- Increase capacity of east-west transportation facilities to accommodate existing and future transportation demand
- Improve travel safety and reliability within the High Desert region
- Improve the regional goods movement network
- Provide improved access and connectivity to regional transportation facilities, including airports and existing and future passenger rail systems (which include the proposed California HSR system and the proposed XpressWest HSR system)
- Contribute to state GHG reduction goals by supporting future plans for green energy features along the corridor

1.2.2 Need

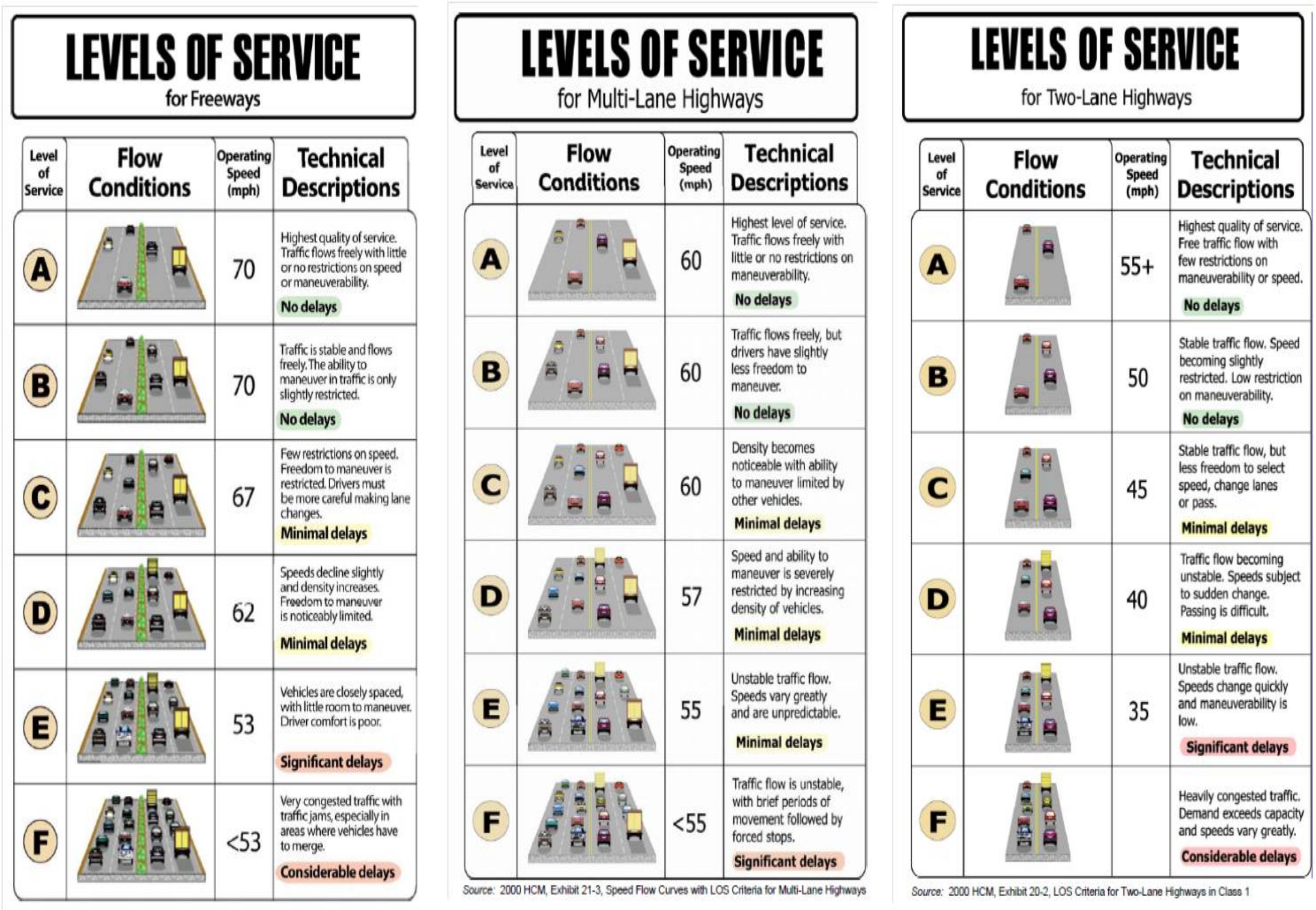
Capacity and Transportation Demand

Level of Service and Congestion

The effectiveness of traffic operations on a transportation facility is measured in terms of level of service (LOS). LOS ranges from A to F, with LOS A representing the best traffic conditions (i.e., free-flowing traffic) and LOS F representing the worst (i.e., congestion and stop-and-go traffic). LOS descriptions are shown in Figure 1-3 for freeways, multi-lane highways, and two-lane highways. These LOS measurements would apply where appropriate according to the varying segments of the roadways described in Section 1.1.3.

The lack of route continuity along SR-138 and SR-18 contributes to traffic congestion and reduced LOS on adjoining highways and local streets. In addition, the corridor is increasingly unable to accommodate the existing and projected traffic demand attributed to residential and commercial growth in the Antelope and Victor valley areas. This growth is resulting in inadequate capacity along the existing west-east roadways.

Figure 1-3 Level of Service for Freeways, Multi-Lane Highways, and Two-Lane Highways



LEVELS OF SERVICE
for Freeways

Level of Service	Flow Conditions	Operating Speed (mph)	Technical Descriptions
A		70	Highest quality of service. Traffic flows freely with little or no restrictions on speed or maneuverability. **No delays**
B		70	Traffic is stable and flows freely. The ability to maneuver in traffic is only slightly restricted. **No delays**
C		67	Few restrictions on speed. Freedom to maneuver is restricted. Drivers must be more careful making lane changes. **Minimal delays**
D		62	Speeds decline slightly and density increases. Freedom to maneuver is noticeably limited. **Minimal delays**
E		53	Vehicles are closely spaced, with little room to maneuver. Driver comfort is poor. **Significant delays**
F		<53	Very congested traffic with traffic jams, especially in areas where vehicles have to merge. **Considerable delays**

LEVELS OF SERVICE
for Multi-Lane Highways

Level of Service	Flow Conditions	Operating Speed (mph)	Technical Descriptions
A		60	Highest level of service. Traffic flows freely with little or no restrictions on maneuverability. **No delays**
B		60	Traffic flows freely, but drivers have slightly less freedom to maneuver. **No delays**
C		60	Density becomes noticeable with ability to maneuver limited by other vehicles. **Minimal delays**
D		57	Speed and ability to maneuver is severely restricted by increasing density of vehicles. **Minimal delays**
E		55	Unstable traffic flow. Speeds vary greatly and are unpredictable. **Minimal delays**
F		<55	Traffic flow is unstable, with brief periods of movement followed by forced stops. **Significant delays**

Source: 2000 HCM, Exhibit 21-3, Speed Flow Curves with LOS Criteria for Multi-Lane Highways

LEVELS OF SERVICE
for Two-Lane Highways

Level of Service	Flow Conditions	Operating Speed (mph)	Technical Descriptions
A		55+	Highest quality of service. Free traffic flow with few restrictions on maneuverability or speed. **No delays**
B		50	Stable traffic flow. Speed becoming slightly restricted. Low restriction on maneuverability. **No delays**
C		45	Stable traffic flow, but less freedom to select speed, change lanes or pass. **Minimal delays**
D		40	Traffic flow becoming unstable. Speeds subject to sudden change. Passing is difficult. **Minimal delays**
E		35	Unstable traffic flow. Speeds change quickly and maneuverability is low. **Significant delays**
F			Heavily congested traffic. Demand exceeds capacity and speeds vary greatly. **Considerable delays**

Source: 2000 HCM, Exhibit 20-2, LOS Criteria for Two-Lane Highways in Class 1

Originally designed as a two-lane conventional highway, the existing SR-138/SR-18 corridor was not intended to handle current traffic flows, let alone the projected future traffic (refer to Table 1-3). With the exception of the SR-14 and I-15 components, there are currently no access controls along the corridor. A series of improvement projects have been implemented over the years; these have added lanes in various locations such that the corridor currently varies from a two- to six-lane highway, as shown in Table 1-2. Widening the highway from two to four lanes between Avenue T in Palmdale to SR-18 in Llano has been an ongoing project. Caltrans plans call for further widening in segments over the course of several years. As of mid 2015, eight segments have either been completed or are in construction, and three more segments are currently in the design stage. In Palmdale, ROW constraints can be attributed to the existing dense urban development. In Llano, further widening would result in impacts to sensitive cultural resources (see SR-138 Safety Improvement Project Mitigated Negative Declaration, approved February 15, 2014, on the Caltrans Web site, for more details [http://www.dot.ca.gov/dist07/resources/envdocs/]).

Table 1-2 Posted Speed Limits on SR-138/SR-18

Highway Segment	Jurisdiction	Speed Limit (mph)	Lanes
Palmdale Boulevard, West of 6th Street East	City of Palmdale	40-45	6
Palmdale Boulevard, 6th Street East to 12th Street East	City of Palmdale	40	4
Palmdale Boulevard, 12th Street East	City of Palmdale	25 (school zone)	4
Palmdale Boulevard, 12th Street East to 47th Street East	City of Palmdale	45-55	4
47th Street East, approaching Palmdale Boulevard	City of Palmdale	25	4
47th Street East	City of Palmdale	55	4
Fort Tejon Road	City of Palmdale	55	4
Pearblossom Highway, East of Little Rock Creek	County of Los Angeles	55	3-4
Pearblossom Highway, 82nd Street East	Community of Littlerock	25 (school zone)	2
Pearblossom Highway	County of Los Angeles, Community of Littlerock	40-45	2
Pearblossom Highway	County of Los Angeles	50-55	2-4
Palmdale Road	County of San Bernardino	55	2-4
Palmdale Road at Cobalt Road	City of Victorville	25 (school zone)	4
Palmdale Road	City of Victorville	35-55	4
I-15/SR-18	Caltrans	70	6
D Street	City of Victorville	40	2
Happy Trails Highway	Town of Apple Valley	50	4

Source: High Desert Corridor Traffic Study Report, 2014.

Constraints to widening the current SR-18/SR-138 facility also exist farther east. In Adelanto, Victorville, and Apple Valley, ROW issues exist due to existing and planned urban development. Collectively, these constraints make development of an improved continuous facility problematic.

The *Traffic Study Report, High Desert Corridor* (June 2014) was prepared to evaluate the operation of existing roadways, project those conditions 20 years into the future, and analyze operations of the proposed action. The traffic projections for future years were generated from SCAG's 2008 Regional Transportation Model, which is based in part on regional growth forecasts indicating a population increase within the combined region of more than 500,000 between 2010 and 2040. SCAG periodically updates model components for specific applications and refines inputs such as land use or transportation network components. The model version used for the HDC traffic volume forecasts was provided by SCAG in February 2010.

The LOS analysis for SR-18/SR-138 indicates, with three exceptions, that the current road network operates adequately in support of existing conditions. (Note that LOS C is considered acceptable in rural areas while LOS D is acceptable in urban areas). All signalized study area intersections operate at LOS D or better during peak hours. Three stop sign controlled intersections operate at LOS E or F as follows (see more detailed information in Section 3.1.6, Traffic and Transportation/Pedestrian and Bicycle Facilities):

- Rancho Vista Boulevard/East Avenue P and 10th Street East — LOS E (AM) and LOS F (PM)
- Palmdale Boulevard and 15th Street East — LOS E (PM)
- Palmdale Boulevard and 70th Street East — LOS F (AM)

In addition, field observations of traffic conditions on multiple occasions during 2012 and 2013 indicate that the intersection of 10th Street West and West Avenue P, adjacent to the Antelope Valley Mall in Palmdale, is also congested during afternoon peak hours; as population and employment increase, traffic is projected to also increase, resulting in continued degradation of travel conditions, thus reducing mobility.

Several mainline segments on SR-14 in the project vicinity are projected to operate at LOS E or F during both AM and PM peak hours by the design year 2040. Two southbound mainline segments of I-15 would operate at LOS E during the AM peak hour by 2040.

It is projected that 22 intersections, or 19 percent of those studied in the Traffic Study Report, would operate at LOS E or F during one or both peak hours by year 2020. In the year 2040, intersection LOS projections would worsen, with 43 of 113 intersections (38 percent) projected to operate at LOS E or F during the PM peak hour and 21 of 113 intersections (19 percent) projected to operate at LOS E or F during the AM peak hour.

Another way to evaluate the problem of insufficient capacity is by conducting a screenline analysis, which aggregates movements across a broader area. For the HDC, this analysis was performed for the network roadways crossing an imaginary north-south ‘screenline’ drawn along the Los Angeles/San Bernardino county line. It is estimated that approximately 66,000 vehicles crossed this imaginary screenline during an average weekday in 2010. As shown in Table 1-3, approximately 133,500 vehicles (combined eastbound and westbound daily totals) are forecast to cross the county line along five roadways in the year 2040, a doubling of traffic compared to 2010. Each of the five roadways would carry between roughly 16,000 and 45,000 vehicles per day (vpd).

Table 1-3 High Desert Corridor Screenline Volumes for Year 2040

	AM Peak		Mid Peak		PM Peak		Night		Daily	
Location	**EB**	**WB**	**EB**	**WB**	**EB**	**WB**	**EB**	**WB**	**EB**	**WB**
East Avenue G	2,962	548	2,571	1,633	3,403	5,751	1,112	864	10,048	8,796
El Mirage Road	5,050	1,067	5,573	4,602	4,478	8,684	1,803	1,794	16,903	16,148
233rd Street East/ SR-18	1,929	1,388	3,369	2,772	3,290	2,858	2,117	2,302	10,706	9,320
SR-138	5,235	2,072	7,489	6,518	4,723	7,507	5,082	6,473	22,529	22,571
Angeles Crest Highway	2,763	305	3,051	1,748	3,202	4,718	316	393	9,331	7,164
Total	17,939	5,380	22,053	17,273	19,096	29,518	10,430	11,826	69,517	63,999
Note that numbers may not add up due to rounding effect.										

Source: High Desert Corridor Traffic Study Report, 2014.

Travel Time

Commuter travel time to job centers is a key factor for household location. People generally prefer to have shorter commutes to work. Current mobility on SR-138 in Palmdale and SR-18 in Victor Valley is poor, and conditions within the corridor are expected to become more congested given the aforementioned SCAG projections of population growth; therefore, projected travel speeds are forecast to be increasingly slower over time. It is projected during the design year (2040) that motorists would average approximately 33 to 34 miles per hour (mph) using existing highways. Conditions contributing to this include circuitous routing; two-lane highways without enough passing lanes in rural segments of the corridor; lower speed limits and signalized controls at intersections in urban areas; delays at railroad grade crossings; and cross/merging traffic along the entire corridor.

A travel time analysis for the year 2040 was conducted using the SCAG travel forecast model to estimate the amount of time required to travel between the government center in Apple Valley and the SR-14 interchange with SR-138 in Lancaster, as a representative and recognizable origin-destination pair. The results indicate that the freeway/expressway alternatives would result in substantial travel time savings in comparison with travel times for the future condition without the project. Without a new facility, travel times across a 70.6-mile-long route during the AM and PM peak periods are projected to be 123 minutes and 127 minutes, respectively. With a new freeway/expressway facility, travel times for the same period across a more direct 67.0-mile-long route are projected to be approximately 77 minutes and 75 minutes, respectively. Travel times using the Palmdale to Victorville HSR facility would be generally less, under 30 minutes, based on HSR operating speeds being higher than freeway/expressway operating speeds.

Population Growth and Transportation Demand

As shown in Table 1-4 and Figure 1-4, the Antelope and Victor valleys have experienced explosive population growth in recent years, and this growth is expected to continue for at least the next 2 decades. This trend is fueled by the region's proximity to the major metropolitan areas of Los Angeles and the Inland Empire, and by the availability of undeveloped land and affordable housing.

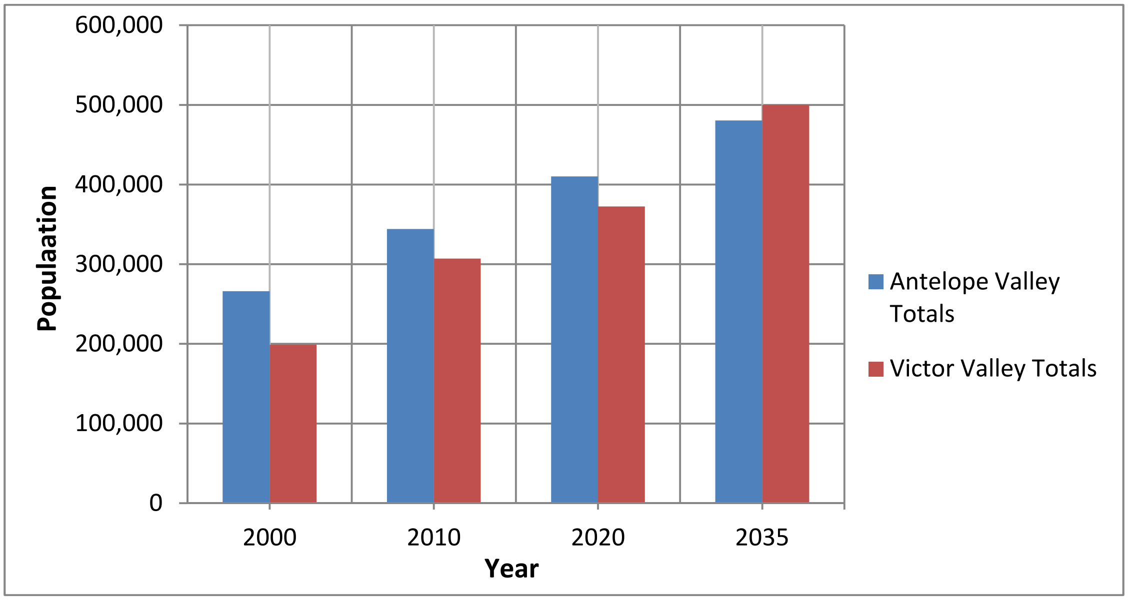
Table 1-4 High Desert Corridor Population Growth by Community

City / Community	Past		Projected		Projected Percent Growth (2010 to 2040)
	2000	2010	2020	2040	
Palmdale	118,718	156,633	202,406	261,501	67
Sun Village	9,375	11,565	14,267*	18,547**	60
Lancaster	116,670	152,750	257,545	363,252	137
Lake Los Angeles	11,523	12,328	18,100	23,530**	91
Quartz Hill	9,890	10,912	23,812	30,956**	184
Antelope Valley Totals	*266,176*	*344,188*	*516,130*	*697,786*	*103*
Adelanto	18,130	31,765	71,788	114,398	260
Victorville	64,029	115,903	138,023	182,275	57
Apple Valley	54,239	69,135	82,005	95,681	38
Hesperia	62,582	90,173	148,751	211,108	134
Victor Valley Totals	*198,980*	*306,976*	*440,567*	*603,462*	*97*
California	33,871,648	37,253,956	40,643,643	47,690,186	28

* Growth rate extrapolated based on 2000 to 2010 rate for Sun Village.
** Unincorporated community population estimates based on a Greater Antelope Valley Economic Alliance (GAVEA) forecasted growth rate of 30 percent between 2020 and 2035.

Sources: US Census, 2010; SCAG, 2008 & 2012; California Department of Finance, 2013.

Figure 1-4 Population Statistics and Future Trends for Antelope and Victor Valleys



Sources: U.S. Census (existing); SCAG (future projections).

As shown in Table 1-4, the population of the largest Antelope Valley communities is projected to grow at a steady rate over the next 30 years, from approximately 344,000 in 2010 to nearly 700,000 in 2040; an increase of 103 percent, or an average of 2.5 percent per year.

The Victor Valley has experienced a similar rate of steady growth. Combined, the four largest cities within the project area are projected to grow from a population of almost 307,000 to approximately 603,000 between 2010 and 2040 (a 97 percent increase and an average of 2.25 percent per year). These population projections are much higher than the projected growth rate for California as a whole, with an approximate 1 percent per year increase expected over the same 30-year period.

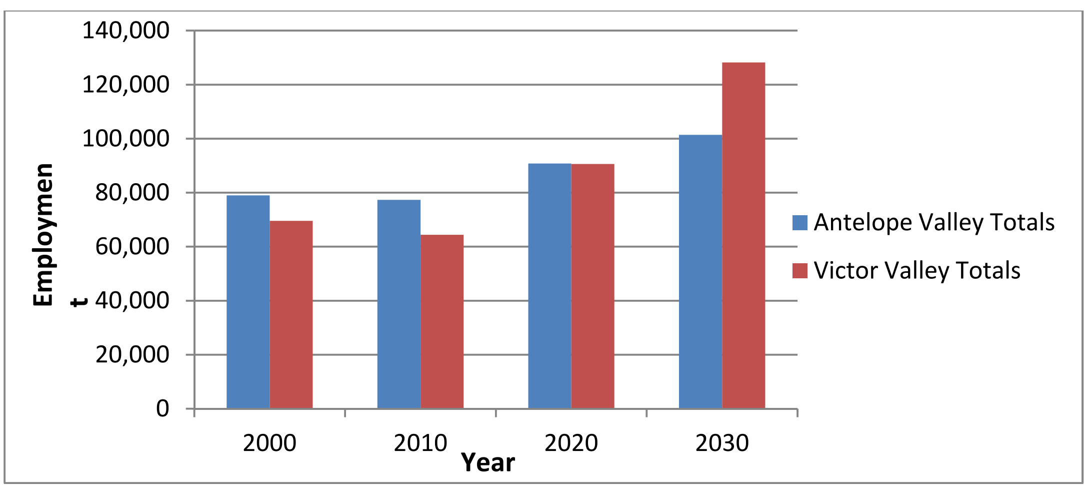
As shown in Table 1-5, the growth in population has been accompanied by a generally upward growth trend in employment. Although employment experienced a steep decline during the economic downturn since 2007, according to SCAG, the growth trend is expected to resume with the combined total jobs in the two valleys projected to reach almost 300,000 by 2040, an increase of 110 percent from the 2010 total employment figure. Figure 1-5 illustrates that employment growth in Victor Valley is projected to occur at a faster rate than in Antelope Valley. By 2020, total Victor Valley employment is expected to surpass that of Antelope Valley. By 2040, approximately 46 percent more people are expected to be employed in Victor Valley than Antelope Valley.

Concurrent with the migration of large numbers of people to the High Desert, even though there has been a lag due to the contracting economy in recent years, the area has experienced market expansion as evidenced by increases in jobs and payroll numbers. Thus, as incomes expand in this high-growth area, firms offering retail goods, consumer services, banking, and other population-serving products find it in their economic interest to open additional facilities. Meanwhile, the High Desert region's vast tracts of available undeveloped industrial land, combined with a new and growing pool of workers, suggests that southern California's production and distribution firms will ultimately be attracted to the area. This can be seen in the Victor Valley where in recent years the Southern California Logistics Airport (SCLA) has become the newest U.S. center for aircraft testing, servicing, painting, reconfiguring, and reconditioning. Firms either establishing themselves or expanding at SCLA include Boeing Aerospace, Leading Edge, Victorville Aerospace, and Southern California Aviation/Pratt & Whitney (County of San Bernardino EDA, 2014).

Table 1-5 High Desert Corridor Employment Growth by Community

City / Community	Past		Projected		Projected Percent Growth (2010 to 2040)
	2000	2010	2020	2040	
Lancaster	45,870	46,721	59,291	73,463	57
Palmdale	33,150	30,589	40,047	47,108	54
Antelope Valley Totals	*79,020*	*77,310*	*99,338*	*120,571*	*56*
Adelanto	4,866	4,871	12,682	20,884	328
Victorville	22,385	31,147	55,044	84,335	171
Apple Valley	19,758	14,479	17,283	23,662	63
Hesperia	22,533	13,889	28,959	47,998	246
Victor Valley Totals	*69,542*	*64,386*	*113,968*	*176,879*	*175*

Figure 1-5 Projected Antelope and Victor Valley Employment Statistics



Sources: California Employment Development Department, 2007 to 2010; InfoUSA; SCAG; 2010 U.S. Census; California Department of Finance.

The increasing population and employment outlook will put additional pressure on an already strained road network. This is demonstrated by the results of the Traffic Study Report, as previously described (see Table 1-3).

Safety and Reliability

As noted previously, it is expected that the growth in east-west traffic demand across the High Desert between the cities of Victorville and Palmdale would not be matched by corresponding increases in roadway capacity. The causes of increased highway congestion within the study area are many, but they can include accidents, road work, stranded cars, and poor weather. These nonrecurring incidents can create safety hazards and delays for miles, affecting commuters, trucks, and other motorists. According to FHWA, about half of congestion is caused by temporary disruptions that take away part of the roadway from use. The three main causes of nonrecurring congestion are incidents ranging from a flat tire to an overturned vehicle, work zones, and weather.

Summaries of existing accident data for SR-18 and SR-138, along with I-15 and SR-14, are shown in Table 1-6. The crash rate for mainline SR-14 between PM 58.17 and PM 63.67 is lower than the statewide average accident rate for similar facilities. Most of the ramps accessing this segment of SR-14 have accident rates lower or comparable to the statewide average accident rate for similar facilities; however, four of the ramps that provide access to and from SR-138 have accident rates at least 1.6 times higher than the statewide average. The majority of the accidents on the off-ramps to SR-138 are rear-end collisions and broadside collisions.

The crash rate for SR-138 between PM 43.42 and PM 57.18 is 15 percent higher than the statewide average accident rate for similar facilities. The report indicates that 27 percent of the accidents are broadside accidents, mainly associated with movements through intersections and with left-turn movements in and out of driveways. Furthermore, 39 percent of the accidents are rear-end collisions and 13 percent are sideswipe collisions; both are associated with traffic congestion. The crash rate for I-15 between PM 43.0 and PM 49.0 is approximately half of the statewide average rate for similar facilities, insofar as total accidents are concerned.

As noted above, Caltrans is currently making safety improvements to SR-138. This work includes adding turn pockets and full-standard shoulders, and widening to two lanes in each direction where feasible. While these improvements are resulting in a substantial safety benefit, there are still areas along the corridor needing corrective action. These areas include at-grade railroad crossings, multiple access points via private driveways and intersections, and areas of rural highway where vehicles drive and pass at high speeds. On SR-138, the improvements noted will address many of the safety and reliability issues. Notwithstanding this improvement, freeway and tollway facilities, such as proposed for the HDC, have much lower crash rates than multi-lane conventional highways due to the absence of driveways and intersections, both of which generate slower-moving vehicles turning onto and off of the facility.

Flooding is another concern along the SR-18/SR-138 corridor and on local roads, such as Palmdale Boulevard. There are numerous dips and "Arizona crossings" (i.e., a type of road crossing where water is allowed to flow over the road) that can flood during major rain events. In addition, in the High Desert, it is common for flash flooding to occur following intense rain events. Because most of the roads in this area were built "at-grade," or level with the surrounding ground, there are no barriers to stop or channel stormwater flow, or prevent mud and debris from washing over them. In addition to being a safety concern, these conditions impede the ability of motorists to travel in and around the community. The ability of emergency service personnel (i.e., police, fire, paramedics) to respond to emergencies could also be affected by flooding.

Table 1-6 Accident Rates and Collision Types for State Highways within Study Area

Accident Rates[1,2]									
				Actual Accident Rates			Average Accident Rates		
Route Segment	Total	Fatal	Injury	Fatalities	Injuries and Fatalities	Total	Fatalities	Injuries and Fatalities	Total
SR-14 PM 58-17-63.67	279	3	100	0.006	0.20	0.55	0.003	0.20	0.63
SR-138 PM 43.42-69.36	647	7	301	0.015	0.67	1.41	0.016	0.43	1.03
I-15 PM 43.0-49.0	146	2	41	0.005	0.11	0.39	0.003	0.17	0.52
SR-18: PM 84.46-115.91	522	17	156	0.032	0.33	0.99	0.014	0.49	1.16
SR-18: PM LA 0.00-4.50	17	0	8	0.000	0.31	0.65	0.018	0.31	0.72

	Collision Type								
PM	Head-On	Side-swipe	Rear-End	Broadside	Hit Object	Over-Turn	Auto-Pedestrian	Other	Total
SR-14 58.17-63.67	9	61	116	39	112	12	3	6	358
SR-138 PM 43.42-69.36	36	102	264	241	62	4	25	11	745
I-15 PM 43,0-49.0	2	29	52	6	61	17	0	5	172
SR-18: PM 84.46-115.91	28	52	229	127	57	29	12	30	564
SR-18: PM LA 0.00-4.50	0	3	0	2	10	1	0	1	16

1. Period: 10/1/2010 to 9/30/2013. Updated from Draft EIR/EIS, which used data from 4/1/2009 to 3/31/2012.
2. Accident rate expressed as number of accidents per million vehicle miles.

Source: TASAS-TSN Table B, Caltrans District 7 (August 2015).

Whenever a major highway facility is closed due to flooding, natural disaster, or other emergency, traffic jams result when motorists seek alternate travel corridors. Commuters, trucks, and other commercial vehicles traveling between the High Desert and the Los Angeles Basin on a regular basis would be significantly delayed by a closed facility.

Recent emergencies and events have closed parts of the existing highway network for extended periods of time. Interstates 5 and 15 and State Routes 2, 14, 18, and 138 have all been closed at some point in the recent past due to inclement weather, accidents, wildfires, or earthquakes. A list of recent closures includes:

- 2015 – Mudslides closed I-5 and numerous major local roads in the Antelope Valley.
- 2011 – The Hill Fire and numerous other wildfires caused the closure of I-15 through the Cajon Pass.
- 2008 – The Sayre Fire closed I-5 at the Newhall Pass and SR-14 from south Santa Clarita to the Newhall Pass.
- 2007 – The I-5 Truck Tunnel Fire caused the tunnel, located on southbound I-5 just south of SR-14, to be closed for more than 1 month.

In addition, the Northridge and Sylmar earthquakes, in 1994 and 1971, respectively, caused portions of the I-5/SR-14 interchange to collapse, resulting in closure for several months. Following the Northridge earthquake, the interchange was closed for less than 6 months, causing an immediate 59 percent drop in traffic on the affected section of I-5 due to lack of alternative routes. The network disruptions caused by the earthquake substantially affected the cost of trucking materials across the southern California region. It is estimated that this disaster resulted in a loss of approximately $9.2 billion in economic output (2012 dollars), of which $2.1 billion can be attributed to transportation service disruption. Of the $2.1 billion, more than $1 billion in losses was accrued due to commuter time delays, with the remainder assigned to business logistics issues (e.g., rerouting, rescheduling, increases in driver overtime) (NCHRP, 2012).

The HDC facility would provide a safe and reliable alternate travel corridor, diverting a substantial amount of traffic away from existing facilities. Exposure to unsafe and unreliable conditions, such as single and/or narrow travel lanes, at-grade crossings prone to flooding, at-grade railroad crossings, driveways that abut highways, and high travel speeds on rural sections of the highways, would therefore be reduced by the addition of a modern, state-of-the-art multimodal transportation facility. In addition, the HDC would be designed to avoid flooding.

Existing Route Continuity and Mobility

Currently, SR-138 and SR-18 provide the only major linkages within this area between the main north-south facilities of SR-14 and I-15. Due to the routing and limited capacity of these facilities, east-west connectivity is limited and inconvenient. The next closest major east-west connection across the High Desert is SR-58, which is located more than 25 miles to the north and well outside what can be considered a convenient distance for travel between the two valleys.

The SR-138/SR-18 route is largely discontinuous and lacks route continuity (see Figure 1-2). There is no direct east-west connection between the developed areas of the southern Antelope and Victor valleys. From the vicinity of the proposed eastern terminus, SR-18 (Happy Trails Highway) circuitously bends through Apple Valley into Victorville where it becomes D Street. The eastern and western portions of SR-18 are offset by approximately 3 miles where SR-18 and I-15 merge and share a common north-south alignment. Along this shared portion, SR-18/I-15 is a six-lane, access-controlled (i.e., access is limited to interchanges) freeway. Regional and inter-regional traffic, including heavy trucks, merge with local traffic using this segment to access Victor Valley cities, thereby creating conflicts in vehicular movement.

Traffic continuing west from the shared portion of SR-18/I-15 must exit at the Palmdale Road off-ramp to continue on SR-18, where the route resumes as an east-west local road known as Palmdale Road. Proceeding west, SR-18 terminates at SR-138 west of the San Bernardino county line, and the highway name changes to Pearblossom Highway. In the western portion of the corridor, the route again follows a circuitous path west and north through Palmdale, changing names to Fort Tejon Road and again to 47^{th} Avenue East. After transitioning through a traffic circle at the 47^{th} Avenue East/Palmdale Boulevard intersection, motorists proceed due west approximately 5 miles to the eastern terminus at SR-14.

There are additional arterial roads that provide alternative east-west routes, including Palmdale Boulevard, East Avenue J, East Avenue P/El Mirage Road, and East Avenue G/Shadow Mountain Road; however, these are all local roads with only one lane in each direction that do not have sufficient capacity to carry large volumes of traffic. They also do not provide direct connections between the major north-south facilities. In general, they are not well suited for the regional movement of people and goods.

In addition to transportation continuity, regional mobility is a key requirement of business and industry. Mobility along the existing SR-138/SR-18 corridor is hindered by speed limit changes (see Table 1-2), numerous traffic signals, at-grade railroad crossings, and other direct-access points (e.g., driveways and local roadways) that impede traffic flow and provide opportunities for conflicts (High Desert Corridor Traffic Study Report, 2014).

Trucks and other commercial traffic using the SR-138/SR-18 corridor are required to transition between two-lane rural highways, local arterials, and a freeway. As shown in Table 1-2, motorists must currently navigate a highway that constricts from six to two lanes. Regional traffic along this route is also delayed by slower traffic and intersection controls in Palmdale, Victorville, and Apple Valley. SR-18 is a two- to four-lane conventional highway with a continuous center turn lane in Apple Valley and Victorville. After negotiating traffic on the six-lane interstate facility, motorists must then transition to a four-lane arterial street along Palmdale Road. This street narrows to two lanes just west of the city limits. SR-138 proceeds as a two-lane conventional highway until widening to four lanes in the vicinity of the community of Littlerock. Pearblossom Highway/Fort Tejon Road/47th Street East remains a four-lane facility into Palmdale. Palmdale Boulevard is a four-lane arterial west to approximately 6th Street, where it widens to a six-lane arterial (High Desert Corridor Traffic Study Report, 2014).

Regional Accessibility to Transportation Facilities

Southern California is a major gateway and hub for global international trade. Freight movement within the Los Angeles/Inland Empire region and beyond is highly impacted by international trade moving through its seaports, airports, rail yards, and distribution centers, and by significant volumes of domestic trade on its highly developed transportation network. The movement of goods in the southland region and through southern California is a vital aspect of continued economic development. Fifty to 60 percent of all shipments arriving at ports in southern California must be transported by truck over an already overloaded transportation network to reach their ultimate destination (High Desert Corridor Traffic Study Report, 2014).

Airports

The proposed project alignment lies near three airports: Apple Valley Airport, SCLA and U.S. Air Force Plant 42 (AFP-42)/Los Angeles/Palmdale Regional Airport. The characteristics of each facility are shown in Table 1-7. SCLA and Los Angeles/ Palmdale Regional Airport, each located near one end of the HDC, are public airports that have generated considerable interest as potential centers for future economic growth. AFP-42 is a federal/private airport, co-located with Los Angeles/Palmdale Regional Airport, with facilities for final assembly of high-performance jet aircraft, production engineering, flight test programs, and U.S. Air Force (USAF) acceptance flight tests of jet aircraft. Several private airfields also lie within about 1 mile of the project alignment (see Table 1-7).

Local jurisdictions have developed plans in support of improved access to and visibility of SCLA and Los Angeles/Palmdale Regional Airport. For example, the City of Victorville's *Desert Gateway Specific Plan* states, "Support the development of the HDC as a more efficient means of connectivity with I-15, SCLA, and the Ports of Los Angeles and Long Beach." The City of Adelanto's *Traffic Circulation Improvement Plan* emphasizes "improved access/visibility to Adelanto's primary commercial, business, and industrial sectors, *including a new major airport*" (emphasis added). The City of Palmdale's General Plan Circulation Element states, "Promote and support regional transportation planning for routes serving the airport facility, including SR-14 and SR-138." In the 2012-2035 RTP/SCS, SCAG emphasizes the need to improve the ground access system at outlying airports to encourage airlines to offer new or more services to these facilities.

Table 1-7 Airports Located Near the High Desert Corridor Project

Airport Name	Location	Type	Characteristics
Apple Valley Airport	Town of Apple Valley	Public	Runway 18/36 (6,498 x 150 feet) & Runway 8/26 (4,099 x 60 feet)
SCLA	City of Victorville	Public/ Federal Government	Runway 17/35 (15,050 x 150 feet) & Runway 3/21 (9,138 x 150 feet)
Nichols Farms Airport	County of Los Angeles, 7 miles northeast of Palmdale	Private	Runway 10/18 (2,600 x 100 feet)
Krey Field	County of San Bernardino, 9 miles southwest of Adelanto	Private	Runway 7/25 (3,360 x 100 feet) & Runway 16/34 (2,040 x 100 feet)
Gray Butte Field	County of San Bernardino, 25 miles east of Palmdale	Private	Runway 8/26 (8,000 x 150 feet); airport used for unmanned aircraft operations
Osborne Airport	County of San Bernardino, 4 miles northeast of Victorville	Private	Runway 2/20 (2,600 x 80 feet)
AFP-42/Los Angeles/ Palmdale Regional Airport	City of Palmdale	Federal Government/ Public	Runway 7/25 (12,002 x 200 feet), Runway 4/22 (12,001 x 150 feet) Runway 72/252 (6,000 x 75 feet)

Source: Data collected by Parsons, 2013 and 2014.

Apple Valley Airport

Apple Valley Airport is an 800-acre facility located approximately 3 miles north of the Town of Apple Valley in San Bernardino County. This County-owned general aviation facility has two runways and no air traffic control tower. Currently, the facility experiences about 103 aircraft operations per day.

SCLA

SCLA is a joint-use airport located about 5 miles northwest of Victorville that is owned by the SCLA Authority. The facility has two runways and a control tower. In 2012, the airport experienced about 173 aircraft operations per day, of which 47 percent were military (Army Reserve) flights.

SCLA is an international logistics hub with multimodal capabilities, including ground transportation services. Global Access, a public/private partnership charged with redevelopment of this area, is comprised of the following three development divisions:

- SCLA, a 2,500-acre aviation and air cargo facility serving domestic and international needs;

- Southern California Logistics Centre, a 2,500-acre commercial and industrial complex totaling 60 million square feet of diverse development; and
- Southern California Rail Complex (SCRC), a planned 3,500-acre intermodal rail and multimodal complex including rail-served facilities.

Due to increasing passenger volumes and restricted ground access near Los Angeles International Airport, efforts are underway to develop air cargo operations at one or more deactivated USAF bases in the Inland Empire, potentially including SCLA (Caltrans, 2014).

The SCLA complex in Victorville is the largest single employment concentration in Victor Valley. SCLA provides air cargo services for many companies and can accept any type of commercial or military aircraft. In Fiscal Year 2009, SCLA enplaned 227 metric tons of cargo, compared with 1.95 million metric tons for the Los Angeles region. With the buildout of SCLA as envisioned in Figure 1-6, it is projected that this facility could support about 28,646 jobs by Year 2080.

Victor Valley is strategically situated along I-15, US 395, and the main lines for BNSF Railway Company and Union Pacific Railroad (UPRR). BNSF and the City of Victorville signed an exclusive MOU in January 2007 to explore development of a major intermodal logistics center at the SCRC. Existing east-west transportation facilities through Victor Valley are still deficient, resulting in major issues associated with connectivity, mobility, and congestion, as described above.

Figure 1-6 Southen California Logistics Airport

Source: Global Access/Logistics Airport.

Air Force Plant 42

AFP-42 is a 5,832-acre facility north of Palmdale in Antelope Valley, Los Angeles County that is owned by the USAF. AFP-42 has three runways and a control tower, as well as ground-based navigation transmitters and airfield lighting to allow landings during periods of low visibility. These facilities support an average of about 176 aircraft operations per day (as of 2008), including unmanned aircraft, of which approximately 80 percent are military flights. Aircraft typically use Runway 25, taking off toward the west and landing from the east. A very-high-frequency (VHF) omni-range tactical air navigation transmitter (VORTAC) for en-route civil and military navigation is located on AFP-42.

Several aerospace contractors lease space at AFP-42 to support the military, including Boeing, Lockheed and Northrop-Grumman. The National Aeronautics and Space Administration (NASA) has facilities at AFP-42, and the Federal Aviation Administration's Los Angeles Air Route Traffic Control Center (responsible for controlling and tracking aircraft in the western United States) also is located on AFP-42. Los Angeles World Airports (LAWA) has offices at AFP-42 and owns 17,750 acres to the east of AFP-42 for future development of a large-scale commercial airport. An air terminal building for Los Angeles/Palmdale Regional Airport is located on the west side of the airfield.

Antelope Valley is a center for advanced aerospace research and development, with a focus on unmanned aerial vehicles. The regional economy has suffered from the recent recession; however, recent economic indicators show increases in employment, retail sales, and home values, as well as a reduced crime rate (GAVEA, Economic Roundtable Report, 2013).

Los Angeles/Palmdale Regional Airport

Los Angeles/Palmdale Regional Airport is located on the north side of Palmdale in Los Angeles County. Since 2013, it has been managed by the Palmdale Airport Authority. A 1989 joint-use agreement between USAF and LAWA allows domestic commercial airline services to use the runways at AFP-42; however, no scheduled air carriers have served Palmdale since 2008. Los Angeles/Palmdale Regional Airport is considered a future site for development of aerospace, research and development facilities, and a logistics distribution center (Caltrans, 2014). While no specific plan for the airport exists, a development concept has been proposed for lands to the west and southeast of the airport.

In summary, with the growth of commerce and activity at regional airports in Victorville and Palmdale, each facility is anticipated to serve as an important transportation hub for their respective population centers. The HDC is considered an integral component for the future development of these hub airports, because it would greatly enhance east-west accessibility between major transportation corridors within these cities, and beyond.

High-Speed Rail

Currently, the High Desert region is underserved by transportation facilities connecting communities in both valleys (Antelope and Victor) with California's major commercial and cultural hubs. As mentioned, the highway connectivity and mobility between the major cities is poor, and there is no commercial airline service.

Passengers can board Metrolink trains at Lancaster and Palmdale for travel into the Los Angeles metropolitan area in less than 2 hours. Amtrak is available at Victorville, but one-way travel to Union Station in Los Angeles takes approximately 4 hours. The limited options for direct, fast, and safe connections to the major metropolitan areas isolate the High Desert economically, limit the area from which these communities draw businesses, customers, and employees, and reduce the accessibility of job markets for residents.

Future HSR service is being planned for Victorville and Palmdale, located near the east and west ends of the corridor, respectively. These proposed services are described by the California High-Speed Rail Authority and XpressWest, respectively, as follows:

- **California HSR.** Initially running from San Francisco to Los Angeles/Anaheim via the Central Valley, and later to Sacramento and San Diego, this project involves approximately 800 miles of track and 24 stations, including one near the Palmdale Transportation Center, where interconnections with other transportation modes could be made. As currently proposed, HSR would travel between Los Angeles and San Francisco in less than 3 hours at speeds up to 220 mph.
- **XpressWest (formerly Desert Xpress).** In July 2011, a Record of Decision was issued by the Federal Railroad Administration (FRA) for a privately funded passenger rail project proposed for the I-15 corridor between the cities of Las Vegas and Victorville. This HSR service would travel at a top speed of 150 mph, with a one-way trip duration of approximately 1 hour and 20 minutes. The Victorville station site would be located adjacent to the I-15/Dale Evans Parkway interchange.

HSR service along the corridor would address several needs, as follows:

- An approximately 54-mile future gap in HSR service between Victorville and Palmdale
- Reduced mobility as a result of increasing demand on limited modal connections between major airports, transit systems, and passenger rail
- Increased congestion and unreliability of travel stemming from congestion and associated delays, as discussed above
- The current dearth of shared-ride modes through the corridor from I-15 to SR-14
- Poor and deteriorating air quality within the High Desert basins

Because HSR service is proposed near both ends of the HDC, it is reasonably foreseeable that constructing an extension between the two proposed stations is logical. This would open up future high-speed, limited-stop service between major California cities and Las Vegas. NEPA and CEQA require that reasonably foreseeable alternatives be analyzed for the proposed action.

In addition to providing an option to traveling by automobile or airplane, alternative transit modes, such as HSR, bring several benefits. This mode would provide an efficient transportation option for travelers who either cannot drive or do not wish to drive, such as disabled persons or the elderly. Travel by train is also generally a mode of travel that would provide consistent and predictable travel times between major urban centers and airports, especially considering there would be limited or no at-grade crossings. Transit reduces the number of passenger vehicles operating on the highway network, thus reducing congestion for all vehicles, including trucks, while resulting in measurable noise, air quality, and energy conservation benefits.

Public policy also exists in support of HSR within the corridor. Metro's *North County Combined Highway Corridor Study* (Metro, 2004) was initiated to develop a multimodal transportation plan for the northern Los Angeles County region. The City of Victorville's General Plan Circulation Element refers to recent and projected growth estimates, suggesting the need for the HDC to meet "existing and future travel demands through the movement of people and goods with convenient multimodal alternatives."

Green Energy

According to the U.S. Environmental Protection Agency's (EPA) Green Power Basics (www.epa.gov/oaintrnt/greenpower/basics.htm.), green power (or energy) can be defined as energy from indefinitely available resources and whose generation has zero to negligible environmental impacts, whether through reduced emissions or minimal environmental disruption. Green energy is also referred to as clean, sustainable, or renewable energy. Solar, wind, and geothermal are the predominant sources of green energy.

The use of green energy in California has gradually increased over the past several years. According to the California Almanac (ref. http://energyalmanac.ca.gov/renewables/index.html), not counting large hydroelectric facilities, in 2009, 11.6 percent of all electricity produced in California came from renewable resources such as solar, wind, geothermal, biomass, and small hydroelectric sources. There are several reasons for increased use of green energy. Improvements in energy generation technologies have increased the efficiency and lowered the cost of production, improving the return on investment. Additional supporting information can be found in the Green Energy Feasibility Study Report (June 2014). (With the significant drop in natural gas prices, this is no longer the case in the current environment.) Government and utility company subsidies, tax incentives and rebates can make its use more attractive for the end consumer. The project may be eligible for an incentive from the California Solar Initiative; however, those incentives are allocated on a first-come, first-served basis, and funding for the program may not be available by 2016. Other tax incentives and government programs are available to private entities that may elect to develop installations adjacent to the ROW to support energy needs for businesses that emerge along the ROW. (Sources: California Energy Commission [www.energy.ca.gov/renewables/tracking_progress/#renewable]; www.greentechmedia.com/articles/read/California-Utility-PGE-Exceeds-20-Percent-Renewable-Energy-Standard)

Caltrans Director's Policy 30 (DP-30) Climate Change, approved June 22, 2012, established a Caltrans policy that will ensure coordinated efforts to incorporate climate change into Caltrans' decisions and activities. This policy contributes to Caltrans' stewardship goal to preserve and enhance California's resources and assets. In addition, expanded legal and regulatory requirements have been enacted that encourage efforts to achieve energy efficiency goals. While the development and use of renewable energy resources has been growing for several years, growth in overall energy demand is expected to continue as the economy recovers and expands. Transportation-related activities account for approximately 46 percent of all petroleum products consumed in California (Department of Energy, Petroleum Profile, 2009). California imports more than 50 percent of its crude oil and more than 15 percent of its refined products. The consumption of increasingly expensive nonrenewable energy resources remains high even though federal and State policies, such as the California Low-Emission Vehicle Program (Assembly Bill [AB] 1493, Pavley) and the Federal Energy Policy Act of 1992, are increasing the use of alternative-fuel and low-emission vehicles.

Renewable energy projects provide an option for Caltrans to offset its carbon footprint in support of AB 32 (California Global Warming Solutions Act) and other legislative goals for the reduction of emissions. Lower energy emissions bring sustainable elements, such as reduced public health issues and less contribution to global warming. Consideration of green energy, such as solar energy production, as a component of proposed highway improvements would also be in support of the reduction in demand for nonrenewable fossil fuels from out of state, including foreign countries. (U.S. Energy Information Administration. 2014. California State Profile and Energy Estimates, Profile Analysis. Accessed online at: http://www.eia.gov/state/analysis.cfm?sid=CA. June 19.) Solar energy production as a green energy option for the HDC is a viable option because San Bernardino County has the highest solar index (the rate at which solar energy is produced and converted into useful grid energy) in the state. The plan to install green energy features into the project will create a positive impact. Additionally, the use of any green energy alternatives will help offset the energy necessary to operate the HDC.

Social Demands or Economic Development

Various planning documents regulating development within the area traversed by the HDC alignment emphasize the importance of economic development within the affected communities of Los Angeles and San Bernardino counties. Excerpts from these plans are provided below by jurisdiction (see Section 3.1.1 for a complete discussion of land use policies).

San Bernardino County

The San Bernardino County General Plan, updated in 2007, emphasizes enhanced accessibility and facilitation of the safe and efficient movement of people and goods for current and future economic development needs. The Plan encourages the growth and development of new roads without compromising impacts to open space, aesthetics, natural resources, and air quality. The General Plan, Transportation/

Circulation Element, contains policies and goals that support the identification of long-range transportation corridors, in conjunction with plans of regional transportation agencies to protect sufficient ROW for the development of long-range corridors.

Los Angeles County

Both the Los Angeles County General Plan 2035 and the “Town and Country” 2015 Area Plan for Antelope Valley place heavy emphasis on fostering projects that help facilitate efficient movement of people and goods. The Mobility Element (Chapter 4) of the Los Angeles County General Plan has specially designated land use areas within Palmdale and Los Angeles County unincorporated areas for the HDC Project. Additionally, the Town and Country Plan contains mobility policies in support of the HDC and the California HSR system.

Town of Apple Valley

The proposed action is consistent with the Apple Valley General Plan policy to preserve land for a future transportation corridor that would enhance the movement of motorists and goods. Working closely with land developers and Caltrans, Policy 2.E states, “The Town shall protect ROW for the HDC as determined by Caltrans.”

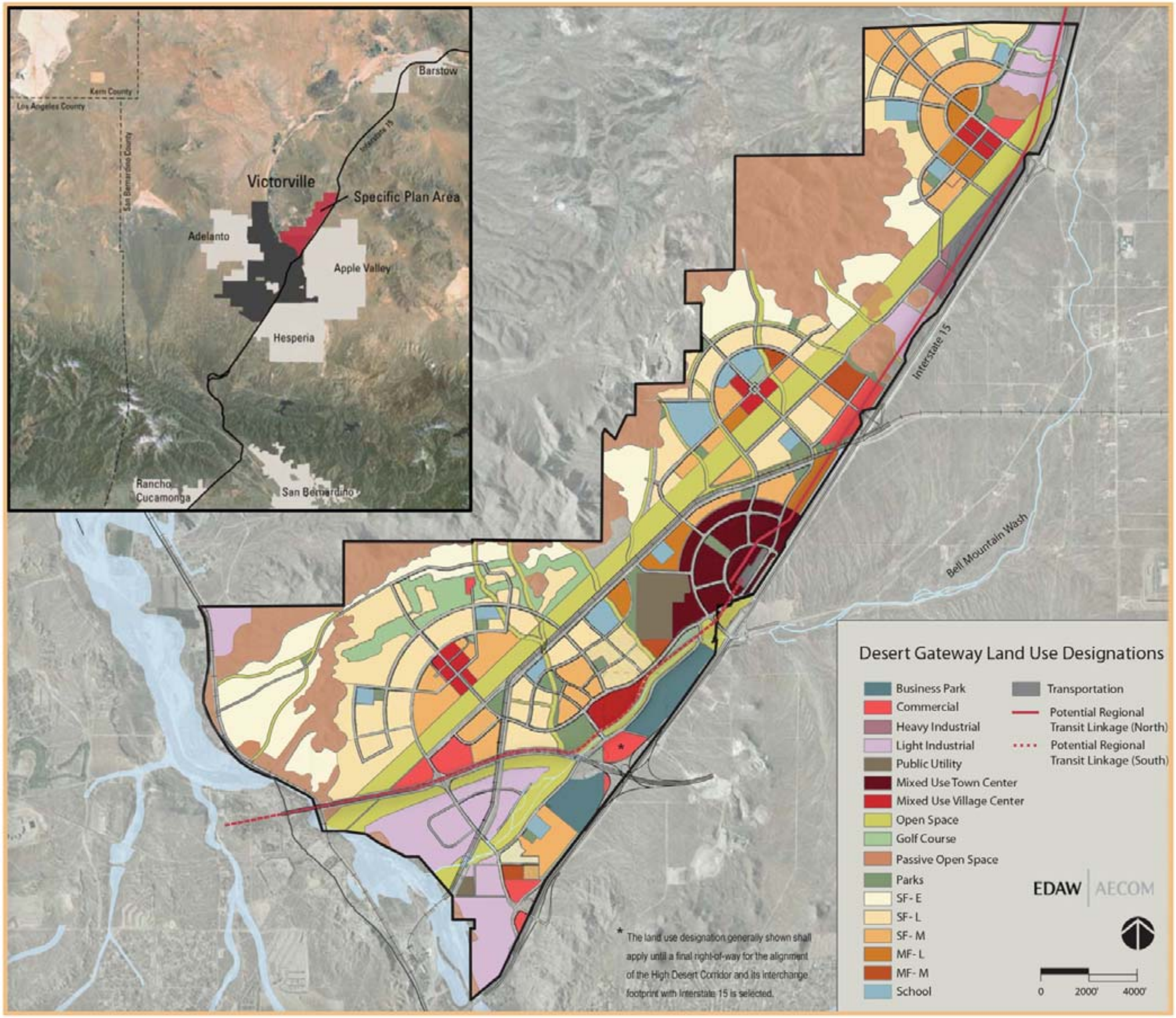
City of Victorville

The policies and objectives of the City’s General Plan Circulation Element demonstrate support for the proposed action. Recent and projected growth estimates suggest the need for the HDC to meet “existing and future travel demands through the movement of people and goods with convenient multimodal alternatives.” The City of Victorville has keen interest in enhancing regional freight access to and from the Ports of Los Angeles and Long Beach. Victorville’s Desert Gateway Specific Plan calls for a freeway and expressway component that would link the Victor and Antelope valleys with I-15, as shown in Figure 1-7.City of Adelanto

The proposed action is described in the City of Adelanto’s Traffic Circulation Improvement Plan. The Plan specifies the need for an improved east-west and north-south circulation system to accommodate the City’s economic growth and development, as well as improved access to SCLA via a “Super Arterial.” The Plan also contains a goal to “Investigate all options for the implementation of a HSR system from the Orange, Riverside, and San Bernardino county areas to a new major airport.”City of Palmdale

The City of Palmdale’s General Plan contains goals and policies in support of the HDC Project. Excerpts from the Circulation Element identify the opportunity to preserve ROW for a future east-west highway and the need to coordinate with Caltrans to reroute the existing SR-138 to a suitable location that would better serve Los Angeles/Palmdale Regional Airport. The Circulation Element specifically supports “A new east-west freeway along the alignment of Avenue P-8, having three lanes in each direction from SR-14 to just east of 90^{th} Street.” The HDC would also be in line with long-term goals outlined in the Palmdale Trade and Commerce Center Specific Plan.

Figure 1-7 Victorville Desert Gateway Specific Plan



City of Lancaster

The City of Lancaster's General Plan of 2030 identifies the HDC as a vital east-west thoroughfare for goods and traffic circulation. The proposed action is consistent with future transportation improvement plans as stated in the Physical Mobility Element of the General Plan. The Physical Mobility Element states, "Promote the creation of a high desert transportation corridor, which will provide a direct connection between I-5 and I-15 to the city of Lancaster."

Legislation

Federal

The proposed HDC was identified in the previous federal transportation law, SAFETEA-LU, which was signed into law by former President George W. Bush on August 10, 2005. This law added several new high-priority corridors, so designated by Congress because they were deemed to be of national importance to the National Highway System. Section 1304 of SAFETEA-LU identified Corridor 71 as "The High Desert Corridor/E220 from Los Angeles, California, to Las Vegas, Nevada, via Palmdale and Victorville, California."

County

Measure R

Measure R was approved by Los Angeles County voters in November 2008. It allowed for an increase in the county sales tax by one-half cent for 30 years to pay for transportation projects and improvements. The HDC Project has received $33 million in Measure R funding for work on the environmental clearance and preliminary design.

Measure I

Measure I authorized a half-cent sales tax increase and was first approved by voters in San Bernardino County in November 1989. The goal was to ensure that needed transportation projects were implemented countywide through 2010. In 2004, voters extended the sales tax increase through 2040. SANBAG administers Measure I revenue and is responsible for determining which projects receive funding. The City of Victorville received $899,268 between 2002 and 2008 for the purpose of conducting the environmental study and preliminary engineering for the eastern section (US 395 to SR-18) of the HDC.

1.2.3 Independent Utility and Logical Termini

FHWA regulations (23 *Code of Federal Regulations* [CFR] 771.111[f]) require that (1) projects have logical limits and be long enough that the environmental analysis has a sufficiently broad scope; (2) projects are usable and a reasonable use of funds even if no additional transportation improvements in the area are made (this is known as "independent utility"); and (3) approval of a project does not restrict consideration of alternatives for other reasonably foreseeable transportation improvements. As discussed below, the HDC Project would comply with these requirements.

Logical Termini

To meet the criteria for "Logical termini," according to FHWA, a project must have (1) rational end points for a transportation improvement, and (2) rational end points for a review of the environmental impacts associated with a proposed improvement.

The highway elements of the proposed project begin in Apple Valley and end in Palmdale, crossing several established and growing communities in between. The project component will begin with a realignment of SR-18 into an expressway in Apple Valley and will transition into a freeway as it crosses Dale Evans Parkway and I-15, ending at SR-14. The highway elements of the project will connect two established freeways, I-15 and SR-14, through construction of freeway-to-freeway interchanges at these junctions.

HSR feeder service is included in two of the four build alternatives. The HSR elements of the proposed project begin in Victorville and end in Palmdale. Future HSR service is being planned for Palmdale and Victorville, located near the west and east ends of the corridor, respectively. As described previously, California HSR service is planned to initially run from San Francisco to Los Angeles/Anaheim via the Central Valley of California. A station is planned for Palmdale at or adjacent to the Palmdale Transportation Center. The initial phase of this service is currently under design and construction in the Fresno area. The HDC rail feeder service would connect to the California HSR at the west end of the HDC corridor via a platform-to-platform transfer (a two-seat ride) or a physical connection of HDC to HSR tracks allowing for a one-seat ride between Los Angeles/Anaheim and San Francisco to the HDC. At the east end of the HDC, a privately funded passenger rail project is proposed for the I-15 corridor between Victorville and Las Vegas. A Record of Decision has been issued by the FRA for this service, which is known as XpressWest (formerly Desert Xpress). This project is currently assembling funding for design and construction. The proposed HDC rail feeder service is assumed to be an extension of the XpressWest service to Las Vegas.

The project will address the growing congestion affecting the movement of traffic, goods, and freight between these cities and transportation deficiencies between the two endpoints. The project is a regional-scale transportation corridor that would facilitate multimodal movement across the High Desert, as well as improve traffic continuity and flow between the concentrated urban centers of Victorville, Palmdale, and Lancaster.

Because HSR service is proposed to serve stations in Palmdale and Victorville near both ends of the HDC, it is reasonably foreseeable that constructing a connection between the two systems would be logical and beneficial to both systems insofar as increasing mobility for their patrons.

Based on the above discussion, the project meets the criteria for "logical termini."

Independent Utility

Because the freeway and expressway components of the project provide an alternate east-west transportation facility in the High Desert that is more efficient and safe than the existing SR-18/SR-138 route, it is expected that the proposed project, upon completion, would be used by motorists and freight haulers currently using SR-18/ SR-138. In addition, because the highway elements of the project would connect several major north-south roadways (e.g., I-15, US 395, and SR-14), the project provides an additional more efficient and safe alternate route to connecting to these highways, besides SR-58 to the north and SR-138 to the south. Thus, the project meets the criteria for "independent utility" because the project is usable and is a reasonable expenditure of public funds without the need for other transportation improvements.

The preferred alternative includes a rail feeder service between Palmdale and Victorville. Palmdale is currently served by Metrolink commuter rail service, which runs between Lancaster, to the north of Palmdale, and downtown Los Angeles (Union Station). Metrolink currently operates 30 passenger trains, and UPRR operates 5 or more freight train daily through this area. A rail feeder service between Victorville and Palmdale would effectively extend Metrolink service to more than 300,000 residents living in Victor Valley cities today and double this number by 2040. Thus, the project meets the criteria for independent utility because the rail service is usable and is a reasonable expenditure of public funds without the need for other transportation improvements.

Restriction of Consideration of Alternatives

Approval of the proposed action would not restrict consideration of alternatives for either this or other reasonably foreseeable transportation improvements. The HDC is being developed in coordination with all of the local and regional transportation authorities in the area. Continuing coordination will avoid potential conflicts with alternatives for this project and for other planned area transportation improvements.

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Chapter 2 Project Alternatives

This chapter describes the proposed action and the project alternatives developed to meet the purpose and need of the project, while avoiding or minimizing environmental impacts. The project is being developed in response to existing and projected traffic demands and development. The alternatives are the Freeway/Expressway Alternative, Freeway/Tollway Alternative, Freeway/Expressway with High Speed Rail (HSR) Feeder Service Alternative, Freeway/Tollway with HSR Feeder Service Alternative, and the No Build Alternative. The Freeway/Tollway with HSR Feeder Service Alternative was selected as the preferred alternative, as discussed in Section 2.1.4.

The project is located in the counties of Los Angeles and San Bernardino on State Route (SR) 138 from SR-14, continuing east to Llano where it connects to the SR-18 in Apple Valley. The total length of the project is approximately 63 miles. Within the limits of the proposed project, most of SR-138 from Avenue T to the SR-138/SR-18 junction has been recently widened to four lanes, with three segments remaining to be widened from two to four lanes. SR-18 varies from two to four lanes, except for the section on Interstate 15 (I-15) that consists of six lanes. The purpose of the proposed project is to improve east-west mobility through the High Desert region of southern California to accommodate existing and future transportation demand, improve travel safety and reliability, improve the regional goods movement network, provide improved access and connectivity to regional transportation facilities, and contribute to state greenhouse gas (GHG) reduction goals.

There have been minor revisions made to the project description since the Draft EIR/EIS was circulated to the public; these revisions were made in response to comments, including requests for clarification, received during the public review period. Continued coordination with regulatory agencies and the affected local jurisdictions involved with the HDC has also resulted in minor refinements to the project description. These refinements, as reflected in the Final EIR/EIS, are not deemed substantive and did not alter the scope of the project's environmental impacts.

2.1 Alternatives

The HDC is divided into three segments, including the Antelope Valley Segment (SR-14 to 90th Street East), the High Desert Segment (90th Street East to United States Highway 395 [US 395]), and the Victor Valley Segment (US 395 to SR-18), as described in Chapter 1 (see Figure 1-2). Recognizing it as a multipurpose corridor with potential to connect to the expanding regional rail system, the project may include a center-median HSR feeder service between Palmdale and Victorville. In addition, a bicycle facility and green energy components would be incorporated into the design features of all alternatives of the corridor evaluated in this environmental document.

A No Build Alternative and four build alternatives have been evaluated in the environmental document, as listed below. Figure 2-1 shows the primary alignment and variations in certain location.

- No Build Alternative
- Freeway/Expressway Alternative
- Freeway/Tollway Alternative
- Freeway/Expressway with HSR Feeder Service
- Freeway/Tollway with HSR Feeder Service

Other alternatives, including a Transportation System Management (TSM) plan and Hybrid Alternative were studied, but they are no longer being considered. They are discussed later in Section 2.7 (Subsections 2.7.6 and 2.7.7) of this chapter.

Selection of a preferred alternative was based on how well each project alternative was able to meet the project purpose and need (discussed in Chapter 1), address impacts to the community and environment, and be cost effective.

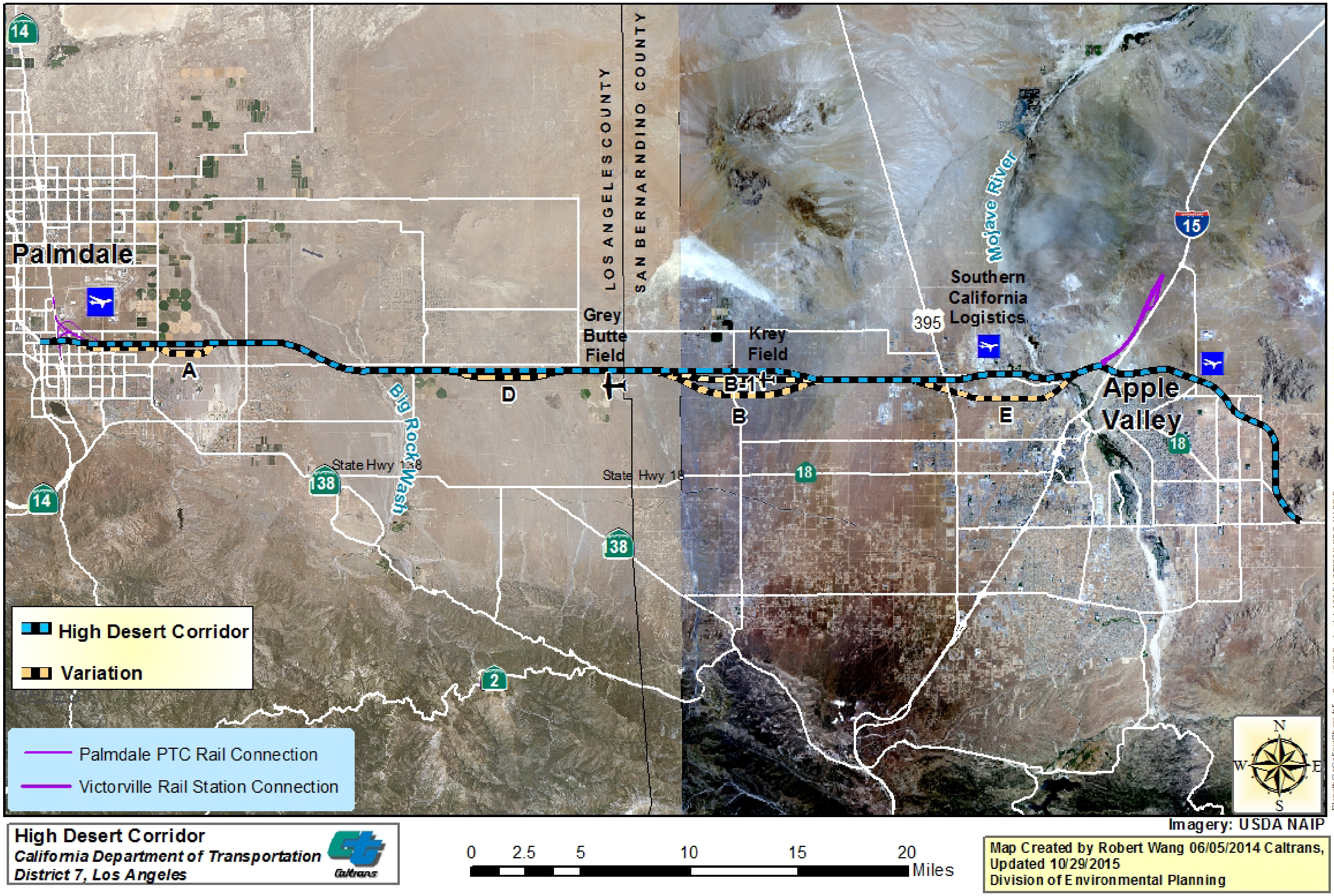
2.1.1 No Build Alternative

Under the No Build Alternative, no new State highway infrastructure would be built within the project area to connect Los Angeles and San Bernardino counties, aside from existing SR-138 safety corridor improvements in Los Angeles County and SR-18 corridor improvements in San Bernardino County. Traffic circulation and congestion currently experienced on Palmdale Boulevard, Pearblossom Highway, Air Expressway, Palmdale Road, and Happy Trails Highway (existing SR-18) would remain from increasing transportation demand. Accident rates on SR-138 would remain high or increase. Flooding would continue to occur along the SR-18/SR-138 corridor during major rain events because most of the area roads are built at grade with no barriers to stop or channel rainwater. The regional movement of goods would be slower due to an overloaded transportation network. Access to regional airports, rail facilities, and other means of transportation would be limited. Opportunities to contribute to State GHG reduction goals resulting from reduction in GHG emissions from the efficient movement of vehicles in the area, as well as green energy facilities that would be part of the HDC Project, would be lost. The No Build Alternative also functions as a baseline for purposes of the National Environmental Policy Act (NEPA) against which all of the proposed build alternatives are compared.

2.1.2 Freeway/Expressway Alternative (Avenue P-8, I-15, and SR-18)

This alternative would construct a combination of a controlled-access freeway and at-grade expressway for a total distance of 63 miles. The corridor from SR-14 to US 395 would be 500 feet wide and from US 395 to SR-18 would be 300 feet wide. The alignment generally follows Avenue P-8 in Los Angeles County and then runs slightly south of El Mirage Road in San Bernardino County. The alignment then extends to Air Expressway near I-15 and curves slightly southeast to terminate at Bear Valley Road near Apple Valley. Between SR-14 and I-15, local streets would cross over the freeway alignment; east of I-15, the expressway and local streets would have at-grade intersections.

Figure 2-1 Alternative Alignments



Four physical alignment variations are being considered. Details of the variations are presented in Section 2.3 of this chapter.

- Variation A: Near Palmdale, the freeway/expressway would dip slightly south of the main alignment, approximately between 15th Street East and Little Rock Wash.
- Variation B: East of the county line, the freeway/expressway would flare out slightly south of the main alignment between Oasis Road and Caughlin Road. Another option for Variation B is called Variation B1, which is shorter than Variation B and would run slightly south of the main alignment.
- Variation D: Near the community of Lake Los Angeles, the freeway/expressway would dip slightly south of the main alignment, just south of Avenue R, approximately between 180th Street East and 230th Street East.
- Variation E: Near Adelanto and Victorville, the freeway/expressway would dip south of the federal prison.

Bicycle facility and green energy components would be incorporated into the design features of this alternative.

The lane configurations for this alternative are presented in Section 2.4.3, Lane Configuration. The anticipated project cost for this alternative in 2014 dollars is $3.70 billion.

2.1.3 Freeway/Tollway Alternative (Avenue P-8, I-15, and SR-18)

This alternative would follow the same route as the Freeway/Expressway Alternative (with variations A, B, D, and E), but it would have sections that operate as a tollway. The segment where toll lanes are proposed, four in each direction, would begin from 90th Street East in Palmdale and end at US 395 in Victorville. The Central Segment would consist of a toll facility, and motorists who choose not to use this segment of the HDC would have the option to exit and use local west-east parallel roads adjacent to the HDC and reenter the freeway segments from either 90th Street East in Palmdale or US 395 in Adelanto. Each toll lane would be 12 feet wide. Between SR-14 and I-15, local streets would cross over the freeway alignment; east of I-15, the expressway and local streets would have at-grade intersections. Bicycle facility and green energy components would be incorporated into the design features of this alternative.

The lane configurations for this alternative are presented in Section 2.4.3, Lane Configuration. The anticipated project cost for this alternative in 2014 dollars is $3.72 billion.

A Public-Private Partnership (PPP) option for funding this alternative would be utilized. A PPP is a joint venture with a level of public control and oversight for private infrastructure investment. PPPs are a creative way to fund highway projects, such as this alternative, through leases, not sales. Title would remain with the public authority, in this case Caltrans or another sponsor, whose responsibility shifts from building and managing transportation facilities to managing contracts with private partners. If this PPP option were chosen, the lessor (private partner) would pay a concession fee and usually keeps the revenue stream from the tolls in return. The lessor would be the party responsible for contracting to design, build, finance, operate, and maintain the toll lanes for the foreseeable future. Dating back to the 19th century, this form of private investment was used to build and operate toll bridges and roads and to finance railroads in the United States.

Under this alternative, some design variations may be required to accommodate the needs of the PPP analysis (see Section 2.3 for variation details).

The toll segment(s) would likely be an all Electronic Toll Collection (ETC) System. The operation would be completely electronic with no toll booths or traffic gates. Collection of tolls would occur at the speed of flowing traffic, which means that motorists never have to slow down; therefore, the traffic would remain free flowing. This would be accomplished by using either transponders (e.g., FasTrak), registered accounts linked to license plates (e.g., ExpressAccount), or billing to the registered vehicle owner (e.g., One-Time-Toll).

2.1.4 Freeway/Expressway Alternative with High-Speed Rail Feeder/ Connector Service

This alternative would be the same route as the Freeway/Expressway Alternative, but it also includes an HSR Feeder Service between Palmdale and Victorville. Variations A, B, D, and E were considered, but Variation A was later determined to be not a viable variation for the alternatives with HSR due to some geometric constraints. Additional elements would include a bikeway and green energy facilities as described under the Freeway/Expressway Alternative. Local streets would cross under the freeway/HSR alignment.

The HSR component of the HDC would operate as a new west to east passenger rail corridor from the existing Metrolink station in Palmdale (Antelope Valley) to Victorville (Victor Valley). This service could also conveniently allow rail passengers to continue on to Las Vegas without having to change trains at Victorville (a one-seat ride). It would fill a gap by providing a crucial missing interregional link between two major rail infrastructure investments currently in the planning stages for southern California, the California HSR and the XpressWest, formerly known as Desert Xpress.

High-Speed Rail Feeder Service Technology and Design Requirements

The HSR Feeder Service would consist of steel wheels on track and would have a maximum design speed of 180 miles per hour (mph) with a maximum operating speed of 125 mph. The HSR Feeder would be built within the HDC right-of-way (ROW). The area needed for this rail facility would be approximately 100 feet wide to accommodate the tracks and associated structures, with the exception of the segment between US 395 and SR-18 where the dedicated 60-foot-wide ROW is required. The rail alignment would primarily run in the median of the HDC freeway. Certain areas would require additional ROW to allow the train to negotiate curves and reach the train station. A 52-foot-wide buffer would be kept from the edge of the ultimate freewaytraveled way to any HSR fixed object for safety and maintenance access.

Facility Options

Under this alternative, Caltrans proposes to connect the HDC with two rail passenger stations, one within Palmdale in Los Angeles County and the other within Victorville in San Bernardino County. These station locations were chosen for their accessibility and close proximity to populated areas.

Victorville Passenger Station

Although the Victorville Station is proposed as part of the HDC, it would not be constructed under the HDC Project. This station would be constructed in conjunction with the XpressWest HSR service between Las Vegas and Victorville as currently planned. The Victorville Station location would be co-located with Victorville Station 3 (VV3) referenced in the Desert Xpress Final EIR and Record of Decision. This is the Agency Preferred Station option. It would be located immediately west of I-15 at Dale Evans Parkway.

Palmdale Passenger Station

The Palmdale Station would be located at or near the Palmdale Transportation Center at Sierra Highway. Caltrans has conducted an alternatives analysis of several rail alignment approaches as part of the HDC effort for future integration with the California HSR station at Palmdale. Rail Option 1C has been selected as the preferred station option at Palmdale.The City of Palmdale has received a grant from the California High-Speed Rail Authority to develop a Multimodal HSR Station Area Plan. This planning effort shall guide the ultimate design of the station and station area, as well as enable the City to promote economic development, encourage station area development, and enhance multimodal connections to the future station. Rail Option 1C is the preferred station option at Palmdale.

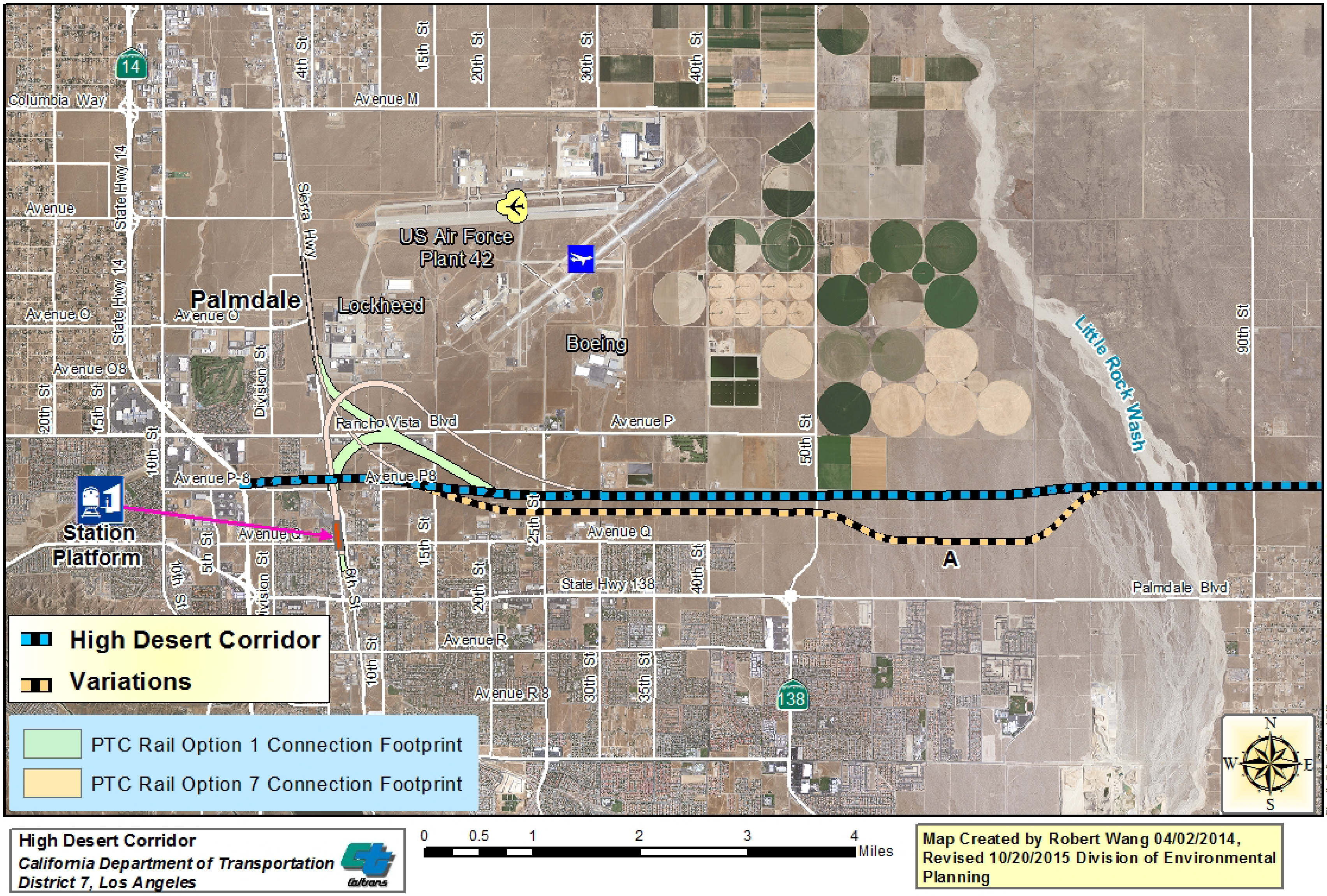
Station Connection

To connect to the Palmdale and Victorville rail stations, ROW would be required for the station connection approaches as the HSR Feeder/Connector alignment curves away from the HDC ROW and to provide overnight storage for the trains. The alignment of the Palmdale and Victorville rail connections is shown in Figure 2-2.

Palmdale Rail Connection

For the Palmdale rail connection, two rail connection approaches are proposed for connecting the HDC to the California HSR network, Options 1 and 7 (see Figure 2-2). Both options allow eastbound and westbound tracks on the HDC to connect to the California HSR network northbound and southbound tracks by using a combination of aerial and cut-and-cover or tunneling structures.

Figure 2-2 Palmdale Rail Connection Options 1 and 7 Alignment



Rail Option 1

Option 1 would shift the existing Palmdale Transportation Center south approximately 800 feet and would require a cut-and-cover box and bored tunnels configuration. This option would run adjacent to the Air Force Plant 42 (AFP-42) parking lot associated with the Los Angeles/Palmdale Regional Airport. The alignment would also cross under commercial development at Rancho Vista Boulevard and 15th Street East. This option would diverge outside of the HDC median and would require only two rail tracks to cross under the HDC westbound lanes, reducing the ROW needed for the HDC. Three station variations are being considered under Rail Option 1, as described below and as shown in Figures 2-3 through 2-5.

Variation A

This variation would place the HDC and Metrolink station platforms on the west side of Sierra Highway inside the Union Pacific Railroad (UPRR) ROW. The HDC platforms would be approximately 20 feet in width and 1,410 feet in length. The Metrolink platforms would be approximately 20 feet in width and 680 feet in length. The HDC platforms would extend from Transportation Drive to about 500 feet south of Avenue Q. Station area parking is proposed at the terminus of 6th Street (UPRR/ Sierra Highway) and would provide 6,200 surface parking spaces. The existing Palmdale Transportation Center would be shifted approximately 800 feet south of its current location.

Variation B

This variation is the same as Variation A with the following exceptions: (1) HDC station platforms would extend from just north of Avenue Q to immediately north of Avenue Q3; and (2) the existing Palmdale Transportation Center would be shifted approximately 1,600 feet south of its current location..

Variation C

This option would place the HDC and Metrolink station platforms on the west side of Clock Tower Plaza East and outside of the UPRR ROW. The HDC platforms would extend from East Avenue Q to East Avenue Q4. Station area parking is proposed at the terminus of 6th Street (UPRR/Sierra Highway) and would provide 6,200 parking spaces (via an above-grade structure). The existing Palmdale Transportation Center would be shifted approximately 2,000 feet south of its current location and 300 feet west of the UPRR ROW.

Station location variations are the same for Rail Options 1 and 7, although the “wye” connections differ, as well as the corresponding details on location and tunnel/aerial configurations.

Figure 2-3 HDC Rail Option 1 Variation A

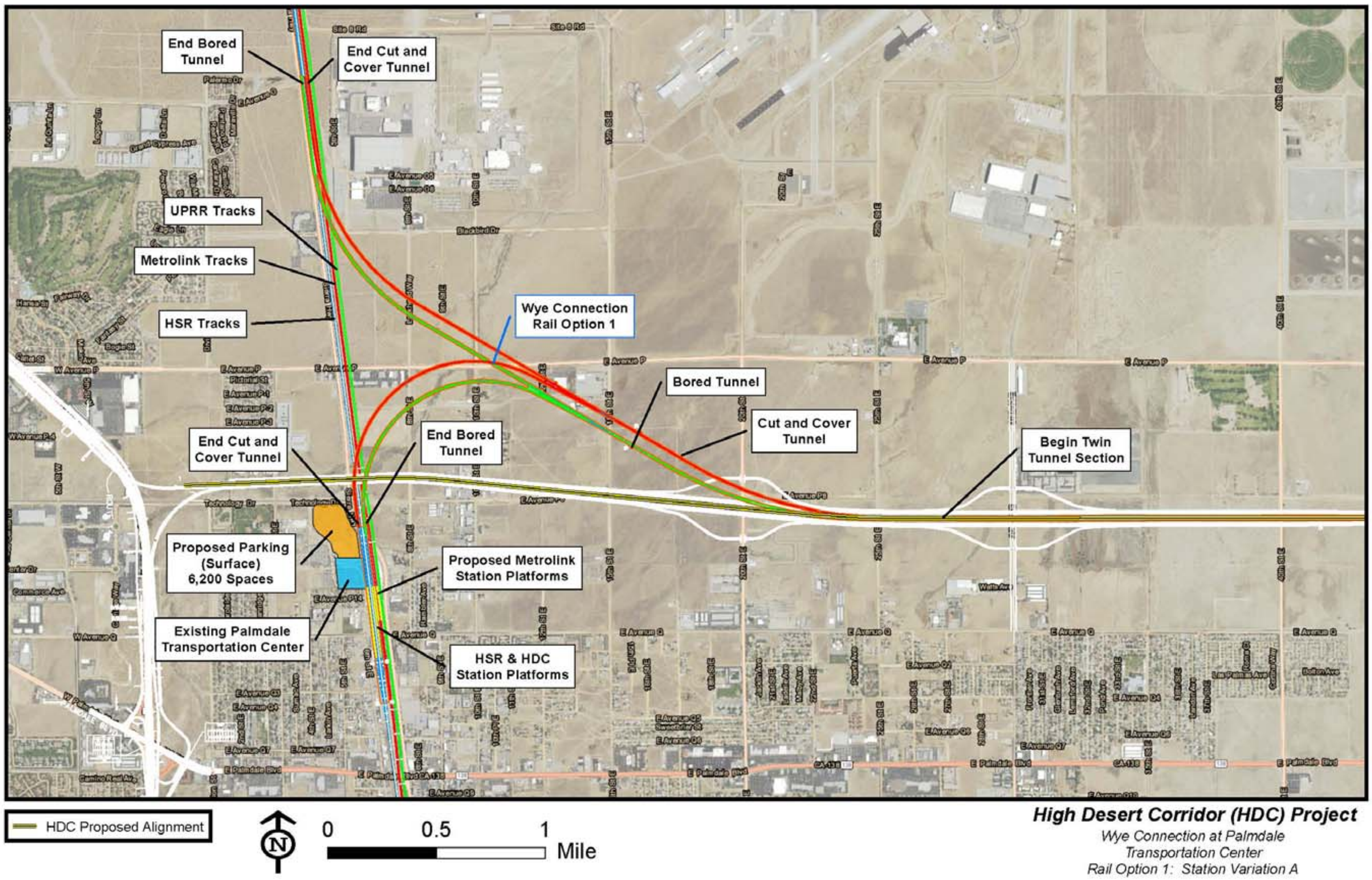


Figure 2-4 HDC Rail Option 1 Variation B

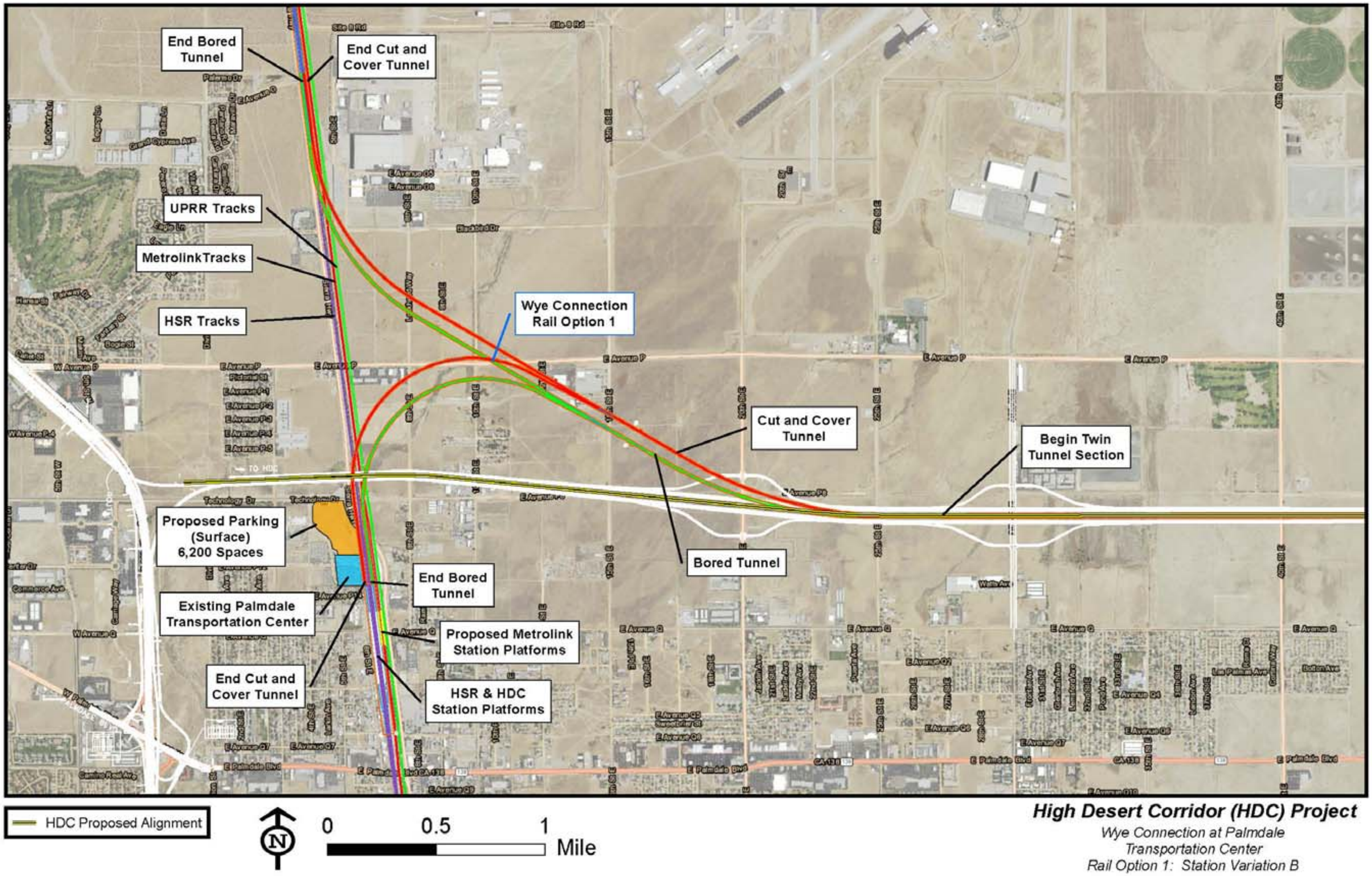
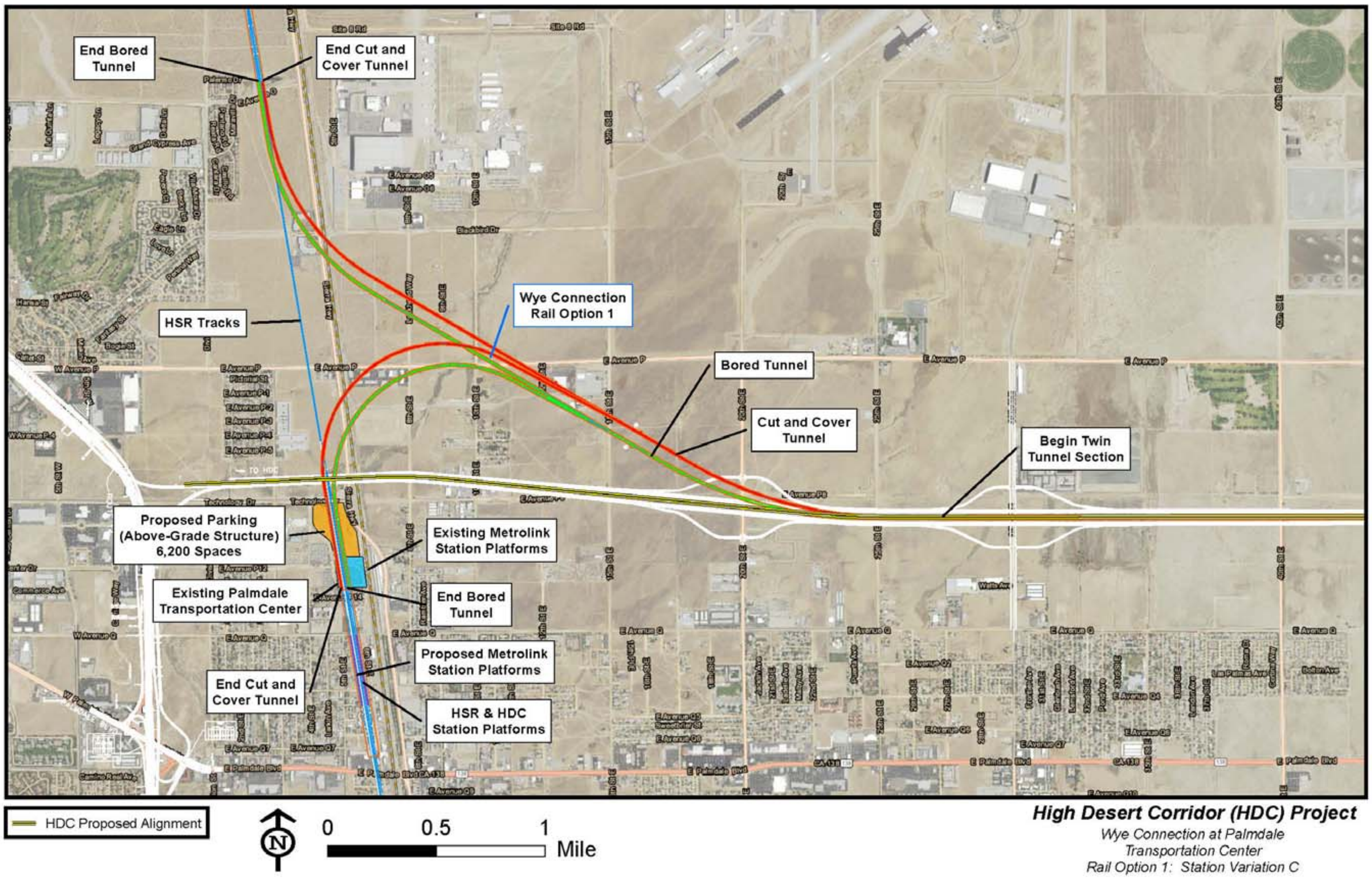


Figure 2-5 HDC Rail Option 1 Variation C



Rail Option 7

Option 7 would require a mix of aerial structures and tunneling, and the Palmdale Transportation Center would also shift farther south. This option would encroach into a small residential area near 10th Street East and would require a four-track section within the HDC median, necessitating a larger ROW section for the HDC in this area.

As with Rail Option 1, three station variations are being considered under Rail Option 7, as described above and as shown in Figures 2-6 through 2-8.

During the public review period, concern was raised about the impact of the wye connection operation on AFP-42. As shown in Figure 2-9, the Accident Potential Zone II (APZ II) is 3,000 feet wide, 7,000 feet long, and extends 15,000 feet from the runway threshold. The Palmdale Transportation Center is 1,000 feet due south of the APZ II. Future HSR station platforms would be located at the existing Palmdale Transportation Center or farther south of the APZ II.

Victorville Rail Connection

Caltrans has evaluated several rail connection approaches for connecting the HDC HSR Feeder/Connector track alignment to the XpressWest rail network at Victorville. Two alignment options are being evaluated in this environmental document, as illustrated in Figure 2-10. The proposed HDC rail tracks would connect to the southernmost limits of the XpressWest Victorville Station tracks. The XpressWest Victorville Station, including the station footprint, would not be part of the HDC Project. Both options would allow eastbound and westbound travel by using a combination of culverts and bridges, as well as fill material.

Variation E Main

Variation E Main would cross over the Mojave River and Quarry Road and gradually curve northeast until it crosses the Variation E Option at Walton Drive. This option diverges outside of the HDC median in a trench and requires only two rail tracks to pass under the HDC westbound travel lanes, HDC on-ramp, and Mojave Railroad, where the connector tracks would be constructed primarily on fill material; bridge structures would be used when the tracks cross over jurisdictional water ways. This option would encroach into three Bureau of Land Management (BLM) parcels. The alignment lies within an area currently identified as a mix of commercial, transportation, open space, and passive open space under the Desert Gateway Specific Plan for the City of Victorville.

Figure 2-6 HDC Rail Option 7 Variation A

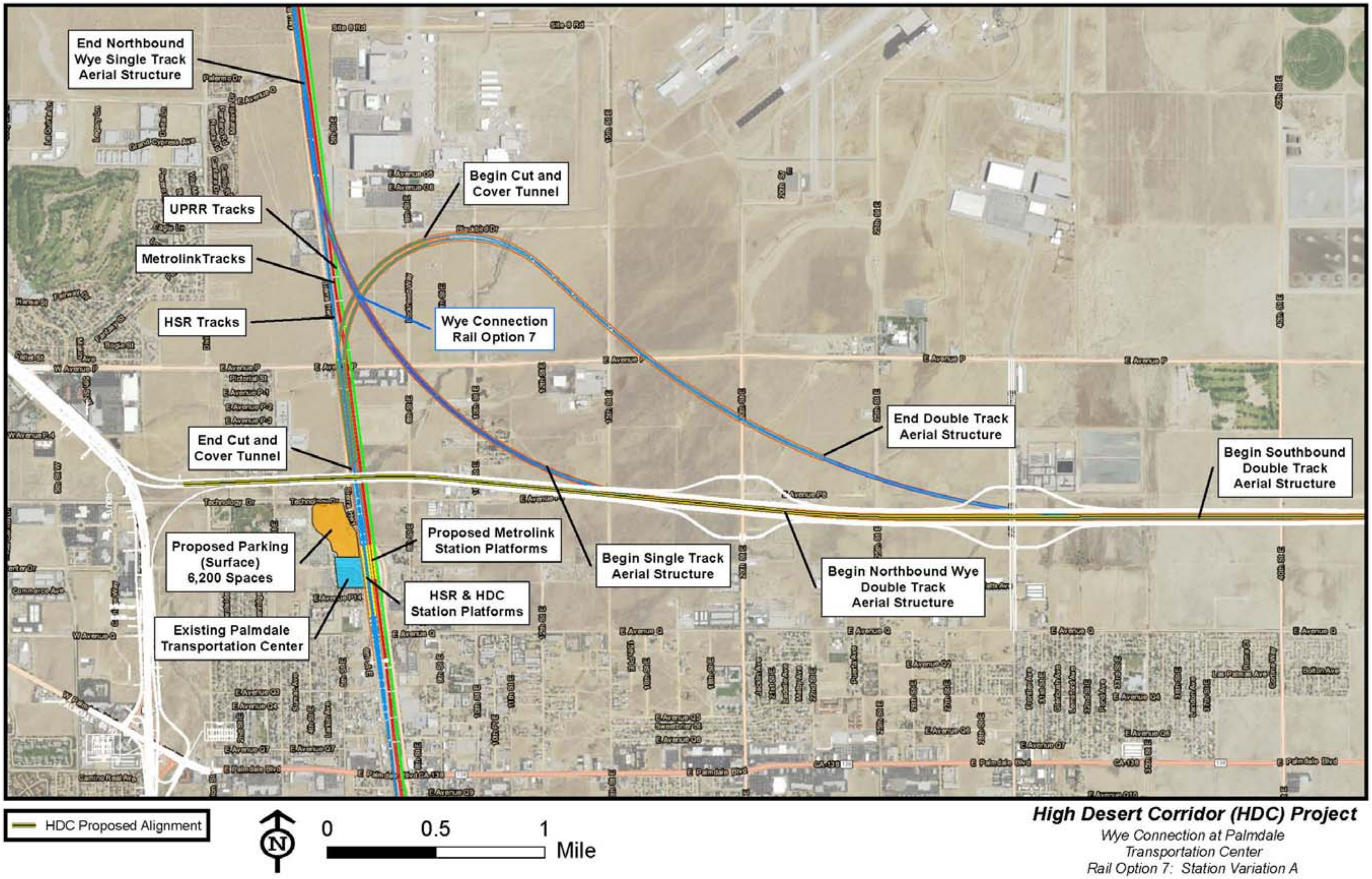


Figure 2-7 HDC Rail Option 7 Variation B

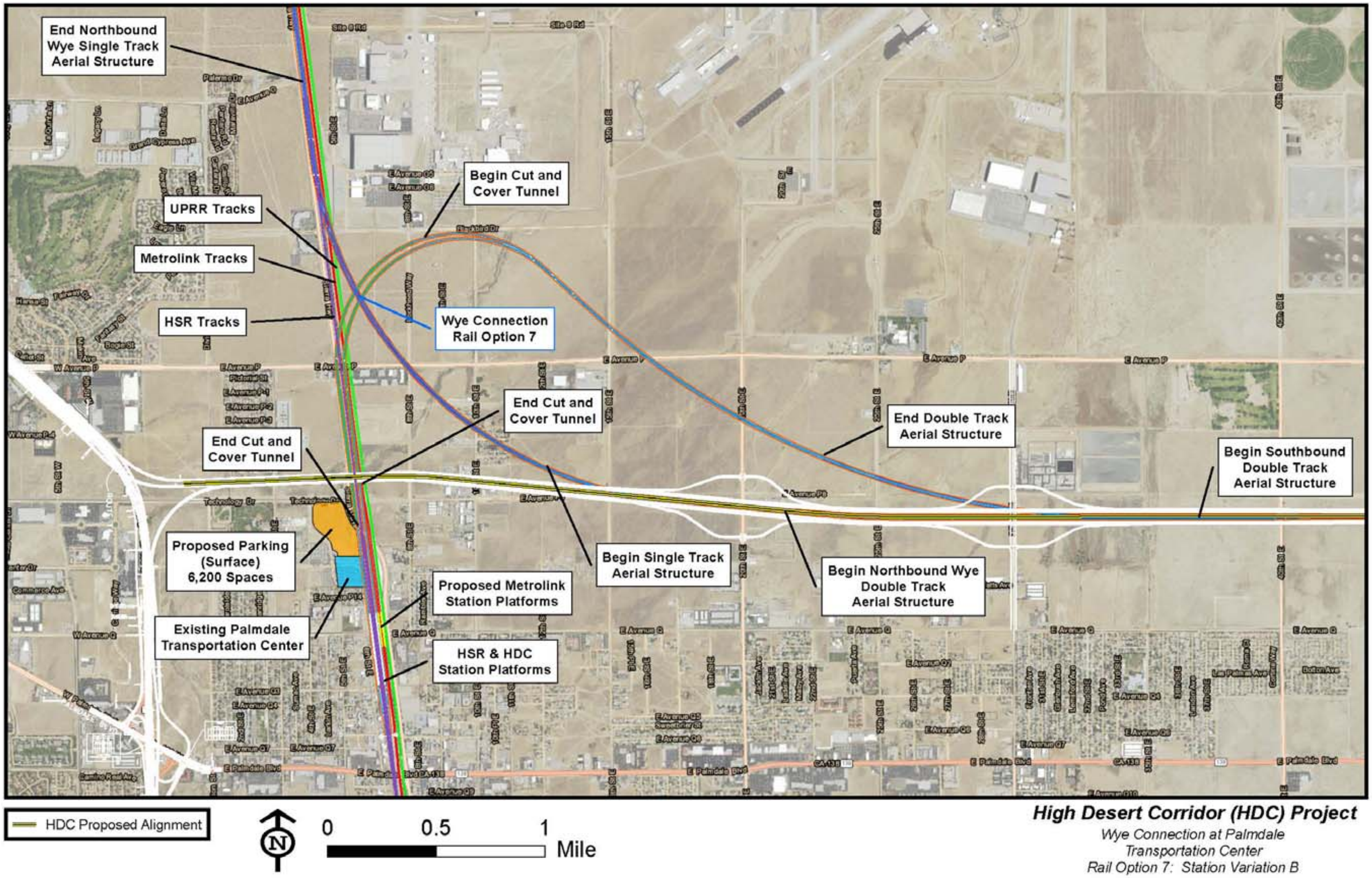


Figure 2-8 HDC Rail Option 7 Variation C

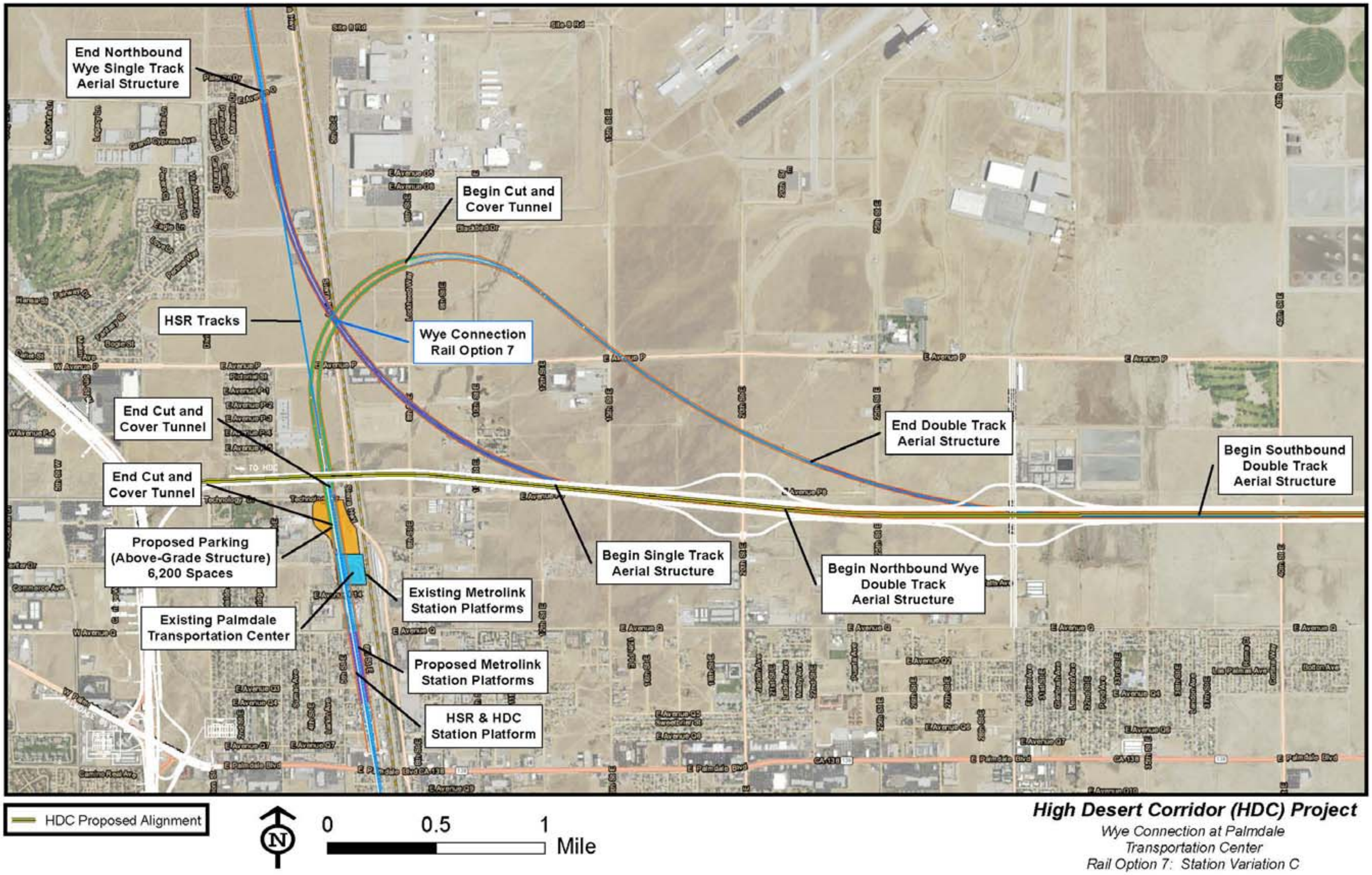
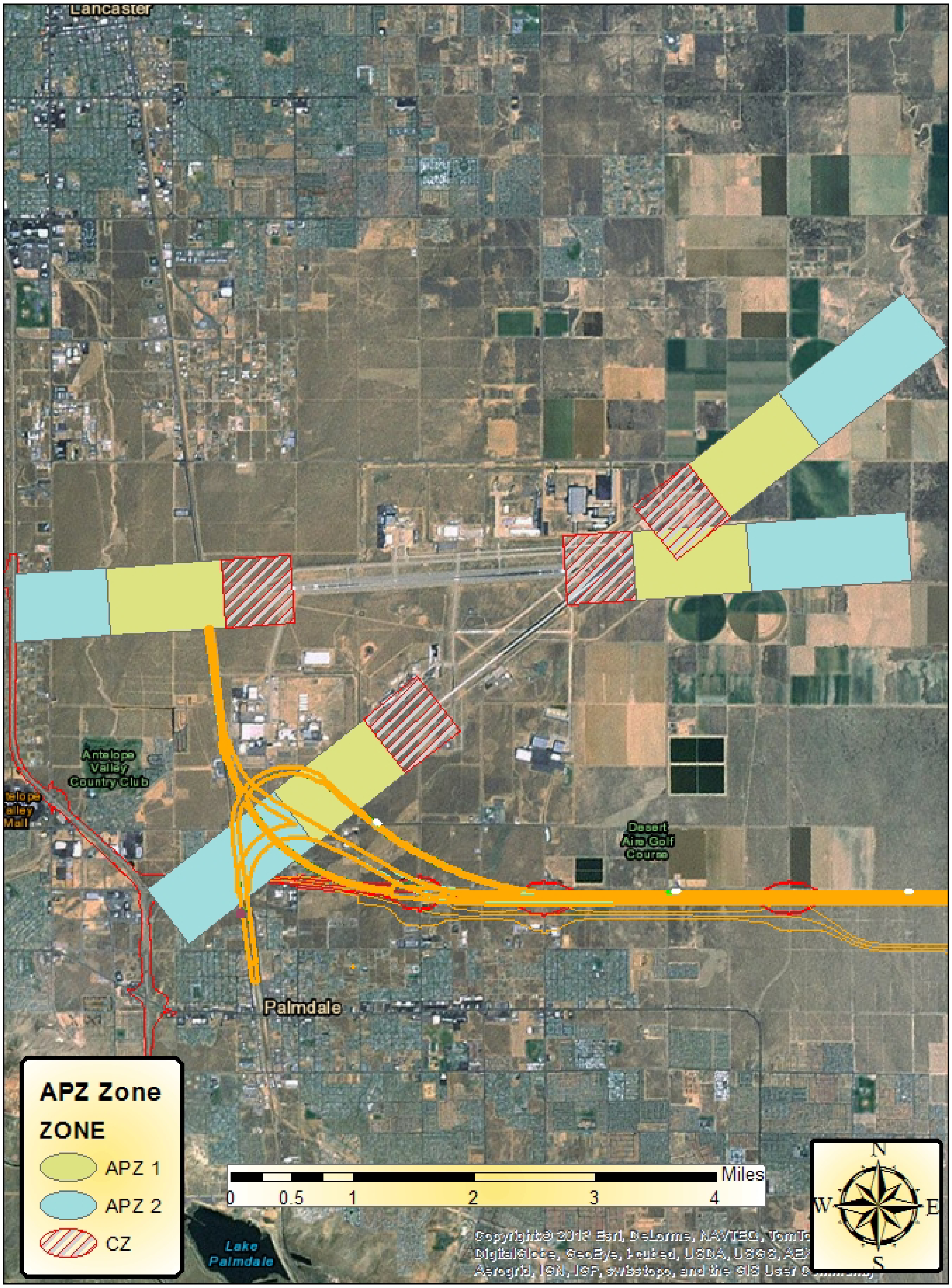
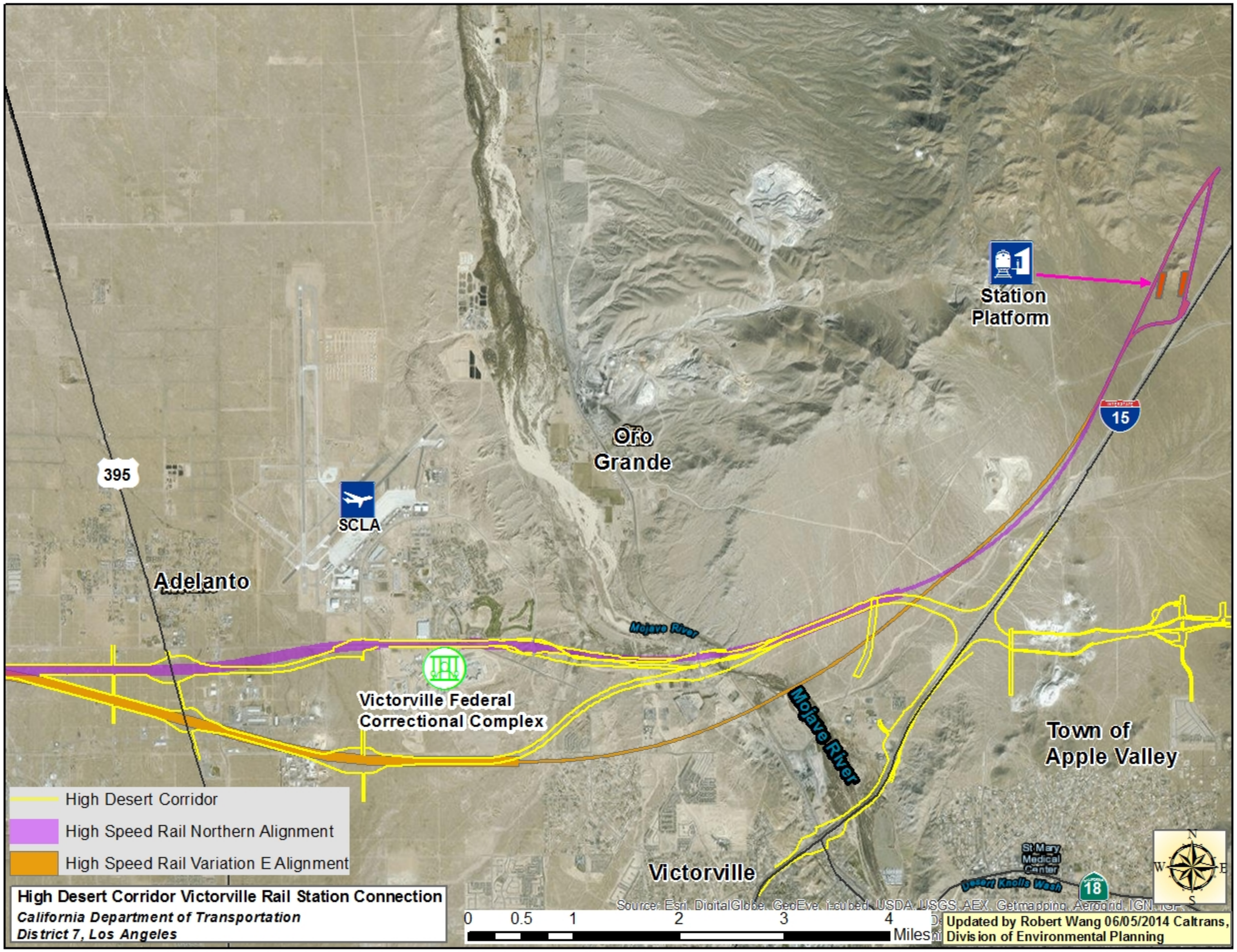


Figure 2-9 HDC Alignment and Air Force Accident Potential Zone



Map Created by Robert Wang, Caltrans Division of Environmental Planning, March 10, 2014

Figure 2-10 Victorville Rail Connection



Variation E Alignment Option

The HSR Variation E Alignment Option spurs off the HDC alignment at East El Evado Road in a northeasterly direction at approximately 0.5 mile south of the Variation E Main by traversing the Mojave River and crossing the Variation E Main at Walton Drive. This option diverges outside of the HDC median and would require only two rail tracks to cross under the HDC westbound and eastbound lanes, and it would be connected to the southernmost limit of the XpressWest tracks. This option would encroach into two BLM parcels and would affect about 10 single-family homes. Under the Desert Gateway Specific Plan, this alignment would lie within an area currently identified as a mix of commercial, transportation, open space, and passive open space.

Technology Options for Trains

Two possible technology options to power the trains for the HSR facility were evaluated – diesel-electric (with a maximum operating speed of 125 mph) and electric (with a maximum operating speed of 125 mph). Both options would require the same amount of rail footprint, except the electric-power option would (a) require guide wires and support posts that would follow the rail tracks, and (b) would need electrical traction power substations (TPSS), switching stations (SWS), and paralleling stations (PS). The TPSS and SWS would be co-located and occupy a total of 32,000 square feet of space, while each PS would occupy 9,200 square feet of space; each facility would be spaced at 10-mile intervals along the rail corridor. The electric power option was determined to be favored because it would be compatible with the proposed XpressWest electric rail system that would run from Victorville to Las Vegas. Accordingly, only the electric train option was carried forward into the impact analysis. This option would also require radio towers that would occupy 1,000 square feet of space and be located approximately 10,000 feet apart.

Alignment

As currently proposed, having the rail run along side the freeway would require a larger footprint at the numerous interchanges along the corridor. Because of this, placement of the rail alignment in the center of the HDC was determined to be more desirable than placement along or parallel to the freeway’s shoulder. If design options or other methods are identified to avoid/reduce impacts, a side running alignment may be reevaluated in the future.

In the urbanized areas the median alignment would minimize any potential land use conflicts within developed areas. Placement of the tracks in the center of the HDC would help minimize impacts to residents and businesses because no addition ROW acquisition would be required. In addition, noise and visual impacts, as well as impacts to property access, would be minimized.

For nonurbanized areas, placing the rail alignment in the center of the HDC would minimize environmental effects to sensitive resources. Those resources include, but are not limited to, threatened and endangered species (including habitat areas), cultural resource sites, hydrological features, and scenic vistas.

Interim Utility Connection

The objective of the High Desert Corridor is to be an energy neutral corridor. However, it is likely that the HSR will be constructed before Green Energy technology advances to a point where that can be achieved. Therefore, it was necessary to identify an interim source of readily available electricity from the existing utility grid that can power the train until the corridor can become energy self-sufficient.

The HSR component of the HDC will be powered on the east side of the project by Traction Power Substation (TPSS 2). The TPSS 2 is located at the end of the HSR alignment in close proximity to the Xpresswest Victorville station. Two substations have been identified within the vicinity of the TPSS that could serve its electrical needs. Additionally, existing utility corridors that cross over the HSR alignment could be used for transmission lines from the electrical substations to the TPSS. These two options are described below and are shown in Figure 2-11.

Option 1, shown in green, would use the Southern California Edison (SCE) Victor substation located at 12601 Palmdale Road, Victorville CA. A 115 kV transmission line would travel north out of the Victor Substation, crossing Palmdale Road. The proposed 115 kV line would be built on an existing power line easement and run northeasterly for approximately 4 miles until it reaches the intersection of Rancho Road and El Evado Road; from there it would run due north for 1.3 miles until it crosses the HDC corridor. The transmission line would then follow the utility easement approximately 8 miles in a northeasterly direction until it connects with the Traction Power Substation. After reviewing the extent of work required for the SCE Utility Corridor, (see the HDC Energy Technical Report for a description of the substation and equipment requirements), it was field reviewed by the HDC team of environmental specialists. Based upon the level of work required, and the field analysis, it was determined that the only substantive activities would occur within the extended, fully analyzed study area of the HDC at the Phantom Road East Interchange. As a result, any impacts associated with this SCE utility corridor have been evaluated within the HDC EIR/EIS.

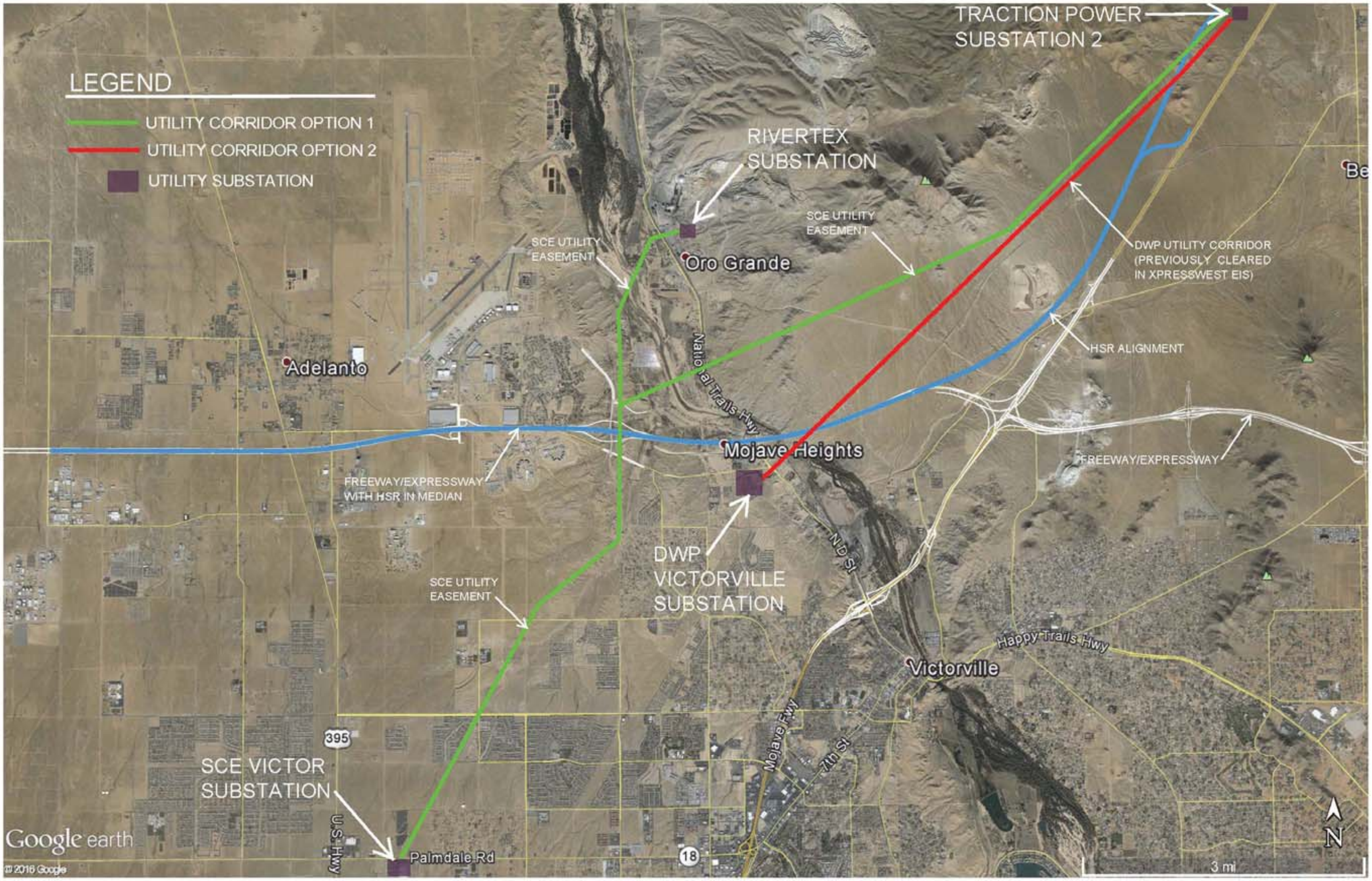
Option 2, shown in red, would use the Los Angeles Department of Water and Power (LADWP) Victorville substation located at the intersection of Air Expressway and National Trails Highway. A proposed 115 kV transmission line would be built on the utility corridor that runs in a northeasterly direction. It would cross the Mojave River and continue for 6.5 miles before it connects with the Traction Power Substation. This utility corridor has been previously evaluated in the EIS for the XpressWest project.

The anticipated project cost for this alternative in 2014 dollars ranges from $3.21 to 4.62 billion for the rail component options and $3.26 billion for the highway component.

2.1.5 Freeway/Tollway Alternative with High-Speed Rail Feeder/ Connector Service

This alternative would follow the same route as the Freeway/Tollway Alternative (including Variations A, D, B and E), but it also includes an HSR Feeder Service between Palmdale and Victorville. Similar to the Freeway/Tollway Alternative, the bicycle facility and green energy components would be incorporated into the design features of this alternative.

Figure 2-11 Location of Electrical Power Substations



The highway lane configuration for this alternative is presented in Section 2.4.3, Lane Configuration. The design requirements for the HSR Feeder Service are the same as those discussed in Section 2.1.2.3. Similar toll system elements, as discussed in Section 2.1.2.3, would be constructed as part of this alternative.

A PPP option for funding this alternative would be utilized, similar to that described in Section 2.1.2.2. The anticipated project cost for this alternative in 2014 dollars is $3.21 to $4.62 billion for the rail component options and $3.28 billion for the highway component.

2.2 Common Design Options for the Build Alternatives

The following design options, Green Energy and Bicycle Access, would be considered for incorporation into each build alternative. In addition, an interpretive pullout (refer to Section 2.2.3 for definition) and two vista points would be incorporated into the build alternatives. The general concept of these design options is described below. More detailed study will be undertaken during the final design of each corridor segment.

2.2.1 Green Energy Facility

All known viable green and sustainable technologies (www.energy.ca.gov/renewables/renewable_links.html) have been reviewed for their feasibility within the HDC. The viable options are proposed for inclusion into the project design. Technologies that have been identified to have potential for incorporation into the HDC are as follows:

Photovoltaic Solar Highways

Photovoltaic (PV) technology is one of the most promising technologies researched and is already in use at some state departments of transportation (DOT) and several international transportation highway facilities. The PV panels are generally fixed in place or on tracking systems designed to optimize the location's solar-generation capability. The PV solar power generated for Caltrans can directly serve loads for lighting and other power requirements on the ROW, or feed into the grid and offset usage through net metering of a larger load requirement along the ROW, such as a Caltrans maintenance facility.

Design Requirements and Locations

Solar generation usually requires significant amounts of land or building roof space, and it is best suited for areas where energy does not have to travel far to connect with an existing utility transmission line. Other ideal locations would be those parcels or areas on flat land that do not have any shading concerns to impede sunlight (refer to Figures 2-12 and 2-13 for proposed solar developments near the HDC). Specific areas that may be suitable for this type of technology may be highway interchanges and/or utility substations. Solar lighting at interchange locations, at the on- and off- ramps, would conserve ROW needed and could be grid-free, not requiring any hard wiring to an existing electric grid. Additional locations that may be considered are median barriers in the center of the HDC or solar panels mounted on soundwalls along the HDC. Mounting solar panels at these locations would not require additional ROW for the highway footprint.

Figure 2-12 Proposed Solar Developments in Los Angeles County near the High Desert Corridor

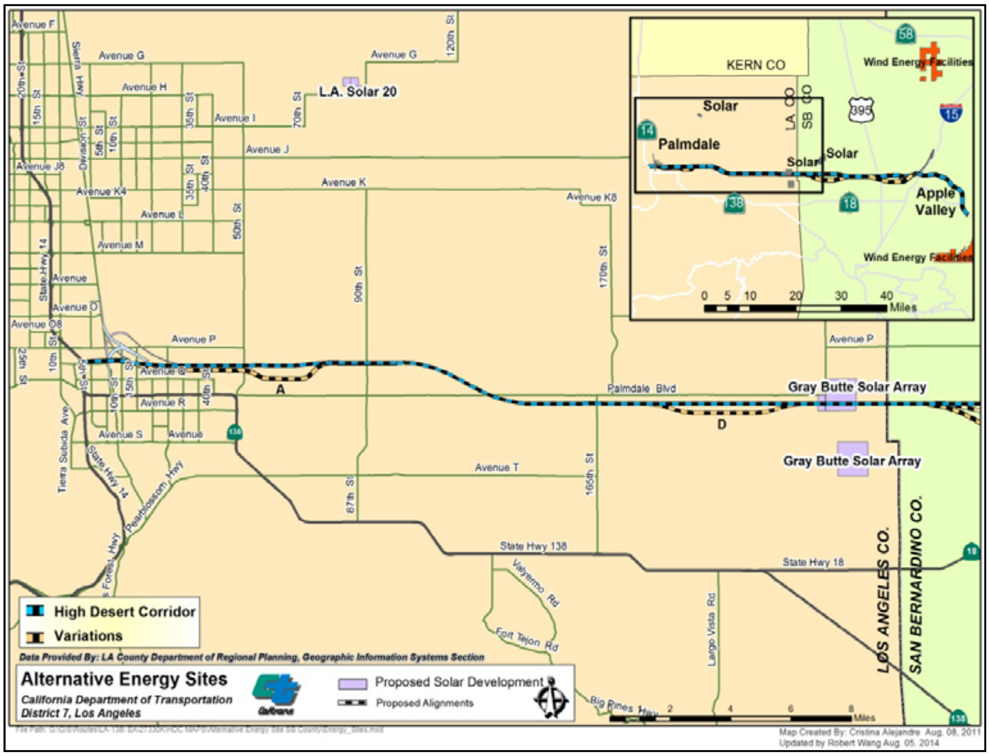
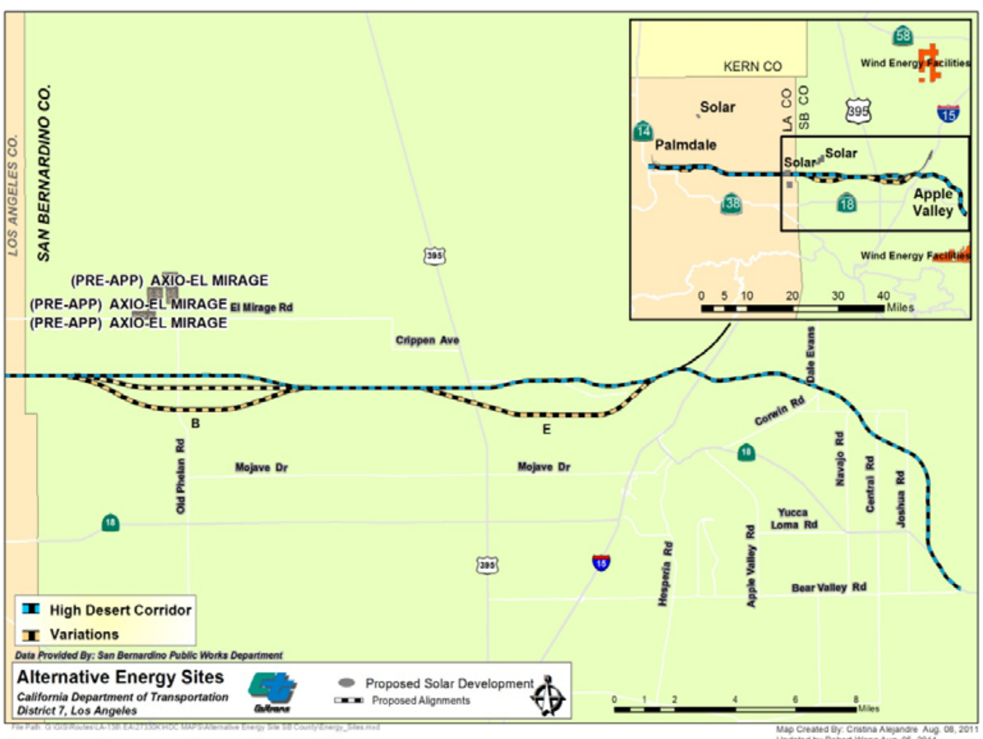


Figure 2-13 Proposed Solar Developments in San Bernardino County near the High Desert Corridor



Non-Fossil Fuel Refueling Stations

Non-fossil fuel refueling stations are more commonly known as Alternative Fueling Stations. The U.S. Department of Energy defines alternative fuels as either alcohol blends, such as ethanol; hydrogen; biofuels (e.g., biodiesel); or natural gas (e.g., propane, compressed natural gas [CNG], and liquefied natural gas [LNG]) (Green Energy Feasibility Study, www.afdc.energy.gov/).

With stricter air quality regulations and fuel efficiency requirements, the demand for “greener” fueling and new vehicle technologies in the future is expected to be higher than at present. Businesses and communities could develop various alternative refueling dispensing facilities such as Electric Vehicle (EV) Charging Station, CNG, and LNG.

Federal and State subsidies have encouraged the development of alternative fuels and technologies that use these alternative fuels. Because electricity can be generated onsite through solar shade structures, the opportunities for creating renewable energy-powered EV stations within the highway ROW are greater than for the installation of other alternative fuels (e.g., hydrogen, biofuels, or natural gas). The HDC presents an opportunity to construct EV charging stations powered by solar shade structures at rest stops and service areas.

Design Requirements and Locations

A typical footprint necessary to construct an Alternative Fueling Station would be relatively small in comparison to a regular gas station. EV charging stations could be conveniently sited within the freeway ROW at or near interpretive pullout locations and rest areas located at or near bicycle and pedestrian paths and trails. At these pullout areas, vehicles could stop and use electricity generated onsite through solar shade structures. Solar shade structures at parking areas, especially in the hot High Desert areas, would be beneficial to freeway motorists who need to access these areas for either recreational or fueling purposes. Figure 2-14 presents a preliminary layout of potential green energy facilities along the HDC.

Opportunity for Utility Utilization of Corridor Right-of-Way

Major electrical utility providers near the HDC include Southern California Edison (SCE) and the Los Angeles Department of Water and Power (LADWP). For gas transmission, Sempra Energy (Southern California Gas Company) and Pacific Gas and Electric are the providers within the HDC area. Several water purveyors may also serve the communities around the HDC. The opportunity exists for these utility companies to utilize the corridor ROW to transmit electricity, natural gas, and water; however, an assessment of the construction and operation plans will have to be undertaken to ensure that the use of this ROW by the utility companies would not adversely affect rail, highway, or bikeway safety. Environmental clearance would need to be obtained by the utility providers prior to the utilization of the corridor ROW.

Figure 2-14 Preliminary Green Energy Facility Layout

Design Requirements and Locations

Transmission lines, depending on their voltage capacity, carry varying amounts of electricity. Most high-voltage lines are 230 kilovolts (kV). The amount of area necessary for transmission lines would depend on how much electricity is transmitted. For high-voltage transmission, the area needed would be limited to the locations of the transmission towers, which typically have four legs on footings and air space for the power lines. Typically, the most cost-effective installation option based on industry standards would be overhead transmission; however, installation and maintenance costs pose a limitation to this option. Some jurisdictions of authority may require the power lines to be buried depending on location and circumstances. On the contrary, for lower-voltage lines, such as those found in residential areas, power poles and airspace for the power lines are needed. Gas lines would require excavation and would need to be buried. Water and sewer main pipes are expected to have similar installation requirements as gas lines. If reclaimed/recycled water is available, installation of those lines would require special piping design per regulatory requirements.

2.2.2 Bicycle Access Facility

Local planning documents within the Victor and Antelope valleys show that existing bicycle facilities within the region are underdeveloped. Both the quantity and connectivity of existing bicycle infrastructure is lacking. There is no existing west-east Class I bike path[2] between the Victor and Antelope valleys. Currently, bicyclists riding between Palmdale and Adelanto/Victorville must contend with high-speed trucks and other vehicles along State highways (SR-18/SR-138) and local roads that present hazardous conditions, according to interviews with local bicyclists.

An interagency meeting was conducted August 15, 2012, between bicycle coordinators from Los Angeles County, Los Angeles County Metropolitan Transportation Authority (Metro), Southern California Association of Governments (SCAG), and Caltrans to obtain input on bicycle design options. The working group determined that the existing bicycle network in Los Angeles and San Bernardino counties could use a parallel bicycle facility to provide continual linkage between the bicycle networks from both counties. The bicycle path concepts and design options are summarized below.

High Desert Segment

Three types of bicycle facilities were considered for the 26-mile High Desert Segment between 20th Street East in Los Angeles County and US 395 in San Bernardino County. The bikeway would traverse the eastern portion of Palmdale and continue eastward through Lake Los Angeles toward El Mirage and terminate within Adelanto. Due to the geometric infeasibility, a direct connection of the bike lane between

[2] Class I Bike Path provides a completely separated ROW for the exclusive use of bicycles and pedestrians with crossflow by motorists minimized (Source: Highway Design Manual, Chapter 1000, Caltrans 2012).

20th Street East and the Palmdale Transportation Center would be cost prohibitive. Caltrans and Metro would provide any necessary financial assistance to the City of Palmdale to improve city streets for the purpose of having a bike route connection between 20th Street East and the Palmdale Transportation Center via the local street network.

Type 1 – Class I Bike Path at the Bottom of Freeway Embankment

A separate Class I Bike Facility (bike path) would be provided on the south side at the bottom of the freeway embankment with at-grade crossings at intersections. This bike path would also be separated by a concrete barrier.

A drawback for using a separated bikeway is that a large street sweeper may not be able to be used to clean the proposed bikeway. A sidewalk sweeper that fits inside the bikeway would have to be used instead or the bikeway would need to be widened to typical traffic lane widths (10 feet minimum).

Type 2 – Class I Bike Path along Freeway Shoulder

A separate Class I Bike Facility (bike path) would be provided on the south side along the freeway shoulder, separated with a concrete barrier.

The creation of a separated bikeway could pose maintenance issues for Caltrans' large street sweepers, which could not be used to clean the proposed bikeway. A sidewalk sweeper that fits inside the bikeway would be able to clean it safely to ensure bicyclists have a clean path. No street parking would be permitted along the HDC freeway/expressway facility.

Type 3 – Class III Bike Route along Eastbound and Westbound of the Freeway

A signed Class III Bike Route[3] would be provided in both directions along the 10-foot-wide shoulder of the freeway. Signs would designate the portion eastbound and westbound of the freeway as a "Bike Route." Access to existing or planned bikeways would be provided using overcrossings.

The drawback of this option would be the wind blast effect to bicyclists, which would be created by high-speed vehicle traffic, particularly large trucks. At freeway speeds, the wind blast from large trucks and buses can increase the risk of falls to bicyclists. The provision of clear shoulder widths with adequate buffer between the freeway travel lanes could minimize the effect by providing greater separation between bicyclists and motor vehicles.

[3] Class III Bikeway (Bike Route) provides for shared use with pedestrian or motor vehicle traffic (Source: Caltrans Highway Design Manual, Chapter 1000, Caltrans 2012).

Victor Valley Segment

A bikeway parallel to the expressway portion in Apple Valley would be provided from approximately Waalew Road to the easterly terminus at Bear Valley Cutoff. Signage would be provided to designate a bike route. Bicyclists would share the expressway with motorists and ride in the 10-foot-wide shoulder area. At South Road and Otoe Road, bicyclists could access two multiuse trails via Waalew Road. Connectivity to these roads would be available via Central Avenue, which is proposed to be an at-grade intersection on the expressway portion of the HDC.

Advance warning signage would be provided to inform bicyclists that bicycling is not permitted north of Waalew Road and that they need to exit.

2.2.3 Multiuse Interpretive Pullout and Vista Points

One multiuse interpretive pullout in Los Angeles County and two vista points in San Bernardino County are proposed along the HDC to provide service to motorists, bicyclists, and pedestrians. A multiuse interpretive pullout is a location leisure travelers (i.e., motorists/bicyclists/pedestrians) can use to obtain information about the area. Interpretive signage could be used. The interpretive signage could include information about the area's geology, the flora and fauna found in the desert, and the history of human development. The signage, which is often placed at waist height so it can be read while standing or seated (i.e., Americans with Disabilities Act [ADA]-accessible), can include a map, diagram, topographic charts, photographs, and/or drawings to illustrate information. A vista point is an area that provides motorists/ bicyclists the opportunity to observe the view from outside or off their vehicles.

Los Angeles

The multiuse interpretive pullout would be located on the north side of the westbound HDC at the 140th Street East on-ramp to provide service to motorists, bicyclists, and pedestrians using the HDC. Facility amenities are conceptually illustrated in Figure 2-15 and are likely to include, but not be limited to:

- Parking lot (5 parking stalls plus an ADA stall) with solar lighting
- Wayfinding signs
- Interpretive sign with structure
- Landscaping
- Temporary irrigation
- Picnic table
- Bike rack
- Drinking fountain
- Shade structure
- Trash can
- Stamped concrete paved area
- Pedestrian solar lighting

Figure 2-15 Multiuse Interpretive Pullout at 140th Street East, Los Angeles County

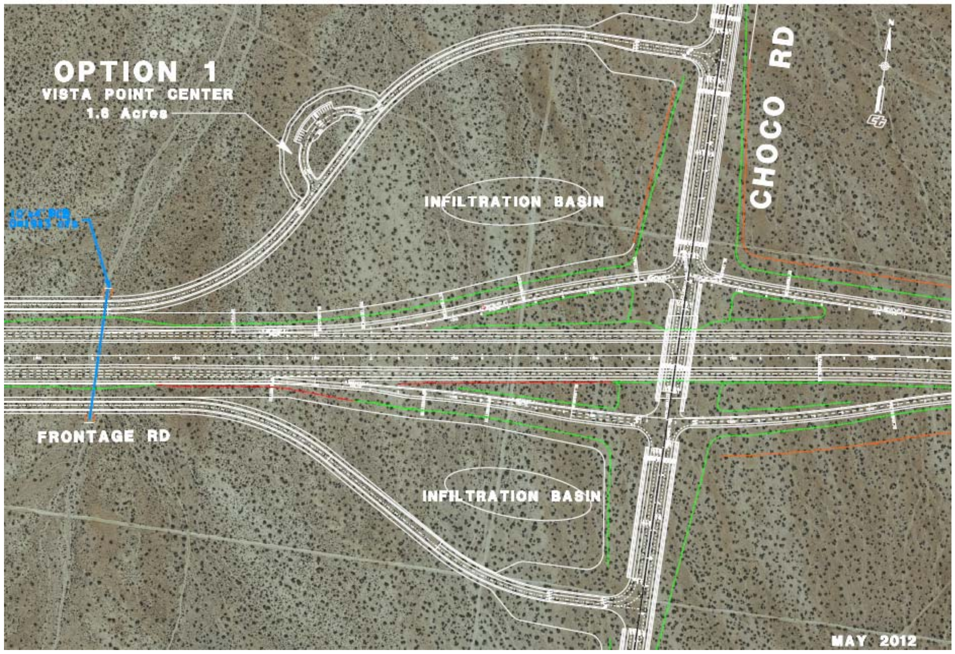
San Bernardino County

Choco Vista Point

A 1.6-acre vista point is proposed near Choco Road on the north side of the HDC at the saddle between Bell Mountain and Little Bell Mountain (see Figure 2-16). This point has an elevation of 2,900 feet above sea level. Vegetation in the hill areas surrounding the vista point is dominated by creosote. Joshua trees and desert scrub are also present in the area. The Town of Apple Valley has designated the adjacent area for recreational activities, such as biking and hiking on the nature trail. The vista point would be enhanced with a natural stone perimeter wall, walkway, solar communications devices for the deaf, and signage with information about the site. Facility amenities are likely to include:

- Parking lot (12 parking stalls plus an ADA stall)
- Accessible walkway
- Interpretive display within the pedestrian areas
- Trash can
- Alternative energy fueling or recharging site

Figure 2-16 Vista Point at Choco Road, Apple Valley, San Bernardino County



Deadman's Point Vista Point

Deadman's Point Vista Point would be located on Bear Valley Road where it intersects with SR-18 in Apple Valley. Overlooking Deadman's Point is a special rock formation and split pillar found 100 feet off the road. It is a locale of legends and Hollywood movies.

Deadman's Point Vista Point has a view of the beautiful open spaces of the desert valley. There are views of horse corrals, the knolls, Bell Mountain, Fairview Mountain, horseman's rock, and natural rock outcroppings. Visitors and the local community are part of the natural environment seen in these open spaces (see Figure 2-17). Facility amenities are likely to include:

- Parking lot (15 regular parking stalls, 4 recreational vehicle [RV] or bus stalls, 2 ADA car stalls, 1 ADA van stall) with ADA-compliant access ramps and bollards for bicycle parking
- View deck (accessible for disabled persons)
- Solar-powered telecommunication devices for the hearing impaired
- Accessible walkway
- Interpretive display within the pedestrian areas
- Natural stone perimeter wall

Figure 2-17 Deadman's Point Vista Point
San Bernardino County

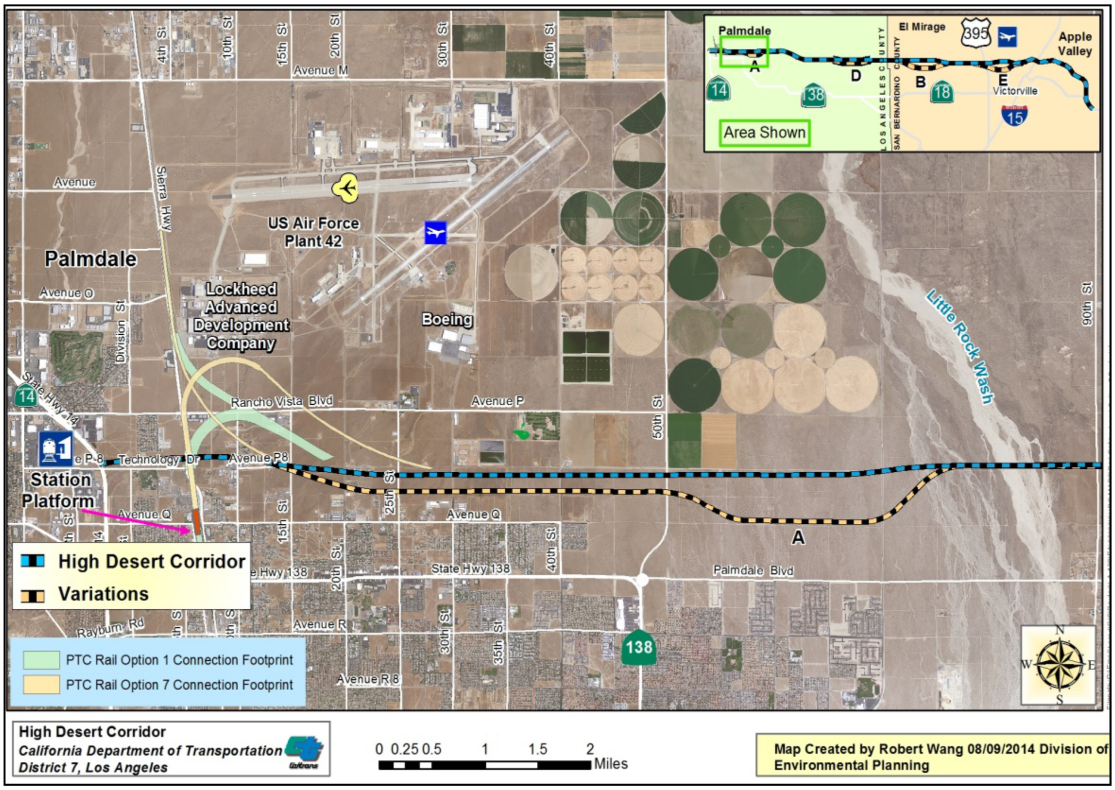
2.3 Build Alternative Variations

Four physical alignment variations (A, B, D, and E) are being considered to avoid or minimize environmental impacts to the community.

2.3.1 Variation A

Near Palmdale, the freeway/expressway would run slightly south of the main alignment, approximately between 15th Street East and Little Rock Wash for a distance of about 5 miles. In this variation, the alignment shift would vary from approximately 800 feet south at 15th Street East to 2,190 feet south from the main alignment near 70th Street East and would follow the original easement that Los Angeles World Airports (LAWA) has agreed to donate to Caltrans (see Cooperative Agreement between Caltrans and City of Los Angeles dated April 13, 2003, in Appendix K – Key Correspondence of Volume 2). This variation allows maximum use of LAWA property without bisecting it. The ROW required would be a 300- to 500-foot corridor for this portion. Figure 2-18 shows the Variation A alignment.

Figure 2-18 Variation A Alignment

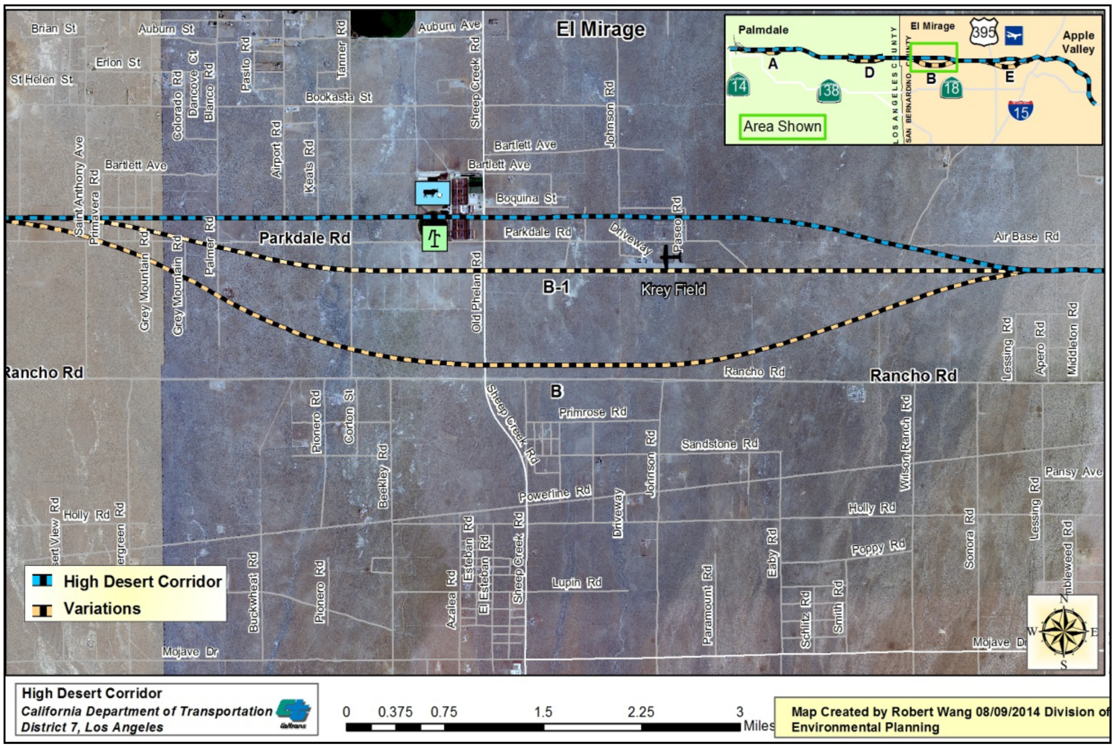


2.3.2 Variation B and Variation B1

East of the Los Angeles/San Bernardino county line, this segment of freeway/ expressway would run slightly south of the main alignment by approximately 0.7 mile between Oasis Road and Caughlin Road. Variation B would have a linear pavement distance of approximately 9.4 miles, while the corresponding segment of the main alignment is approximately 9.2 miles. This alignment variation was introduced to avoid affecting the former Meadowbrook Dairy facility and its associated agricultural plots and dairy cattle holding pens. The ROW required would be a 500-foot corridor for this portion. Figure 2-19 shows the Variation B alignment.

Another option for Variation B is called Variation B1. It is located east of the county line. This segment would avoid the former dairy facility, just as Variation B would, and would run slightly south of the main alignment by approximately 0.4 mile. This alignment is shorter in length (linear distance of 9.18 miles) but introduces an alignment conflict with Krey Airfield and would require property acquisition from the airfield. Figure 2-19 shows the Variation B1 alignment.

Figure 2-19 Variation B and Variation B1 Alignments



2.3.3 Variation D

Near Lake Los Angeles, the freeway/expressway would run slightly south of the main alignment along Avenue R by approximately 1,500 feet, from approximately 190th Street East to 230th Street East. The main alignment segment of Variation D, which is parallel, is 6.18 miles long, while the Variation D segment itself has a linear distance of approximately 6.22 miles. The alignment shift would reduce the amount of community (i.e., residential) impacts. The ROW required would be a 500-foot corridor. Figure 2-20 shows the Variation D alignment.

2.3.4 Variation E

Near the Southern California Logistics Airport (SCLA), this freeway/expressway segment, which is approximately 8 miles in length, would run south of the main alignment to avoid the Victorville Federal Correctional Facility, just south of Rancho Road. It was introduced to avoid potential ROW constraints between the SCLA and correctional facilities under the Freeway/Expressway and Freeway/Tollway alternatives, saving approximately 67 single-family homes; however, under the alternatives with HSR, these residential homes would still be affected. This variation also presents an inconsistency with the land use zoning designation for the SCLA Specific Plan and with Victorville's General Plan; however, it would avoid potential impacts to cultural resources located along the main alignment near Turner Wash. The ROW required for this segment of the corridor would be 500 feet. Figure 2-21 shows the Variation E alignment.

Figure 2-20 Variation D Alignment

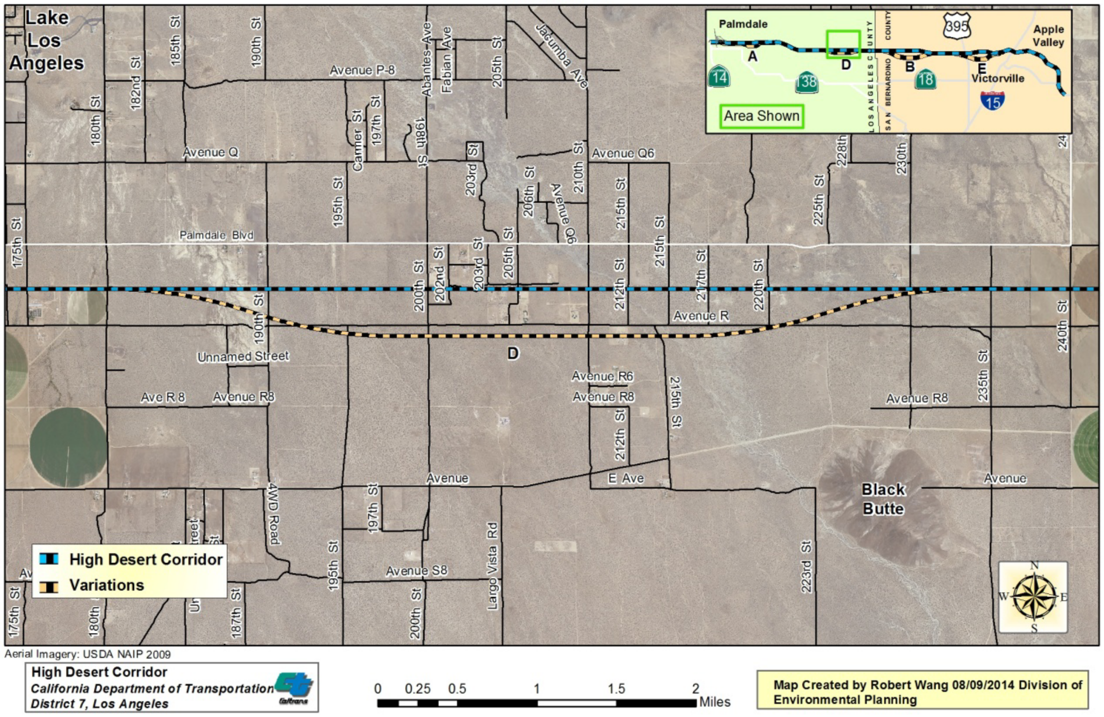
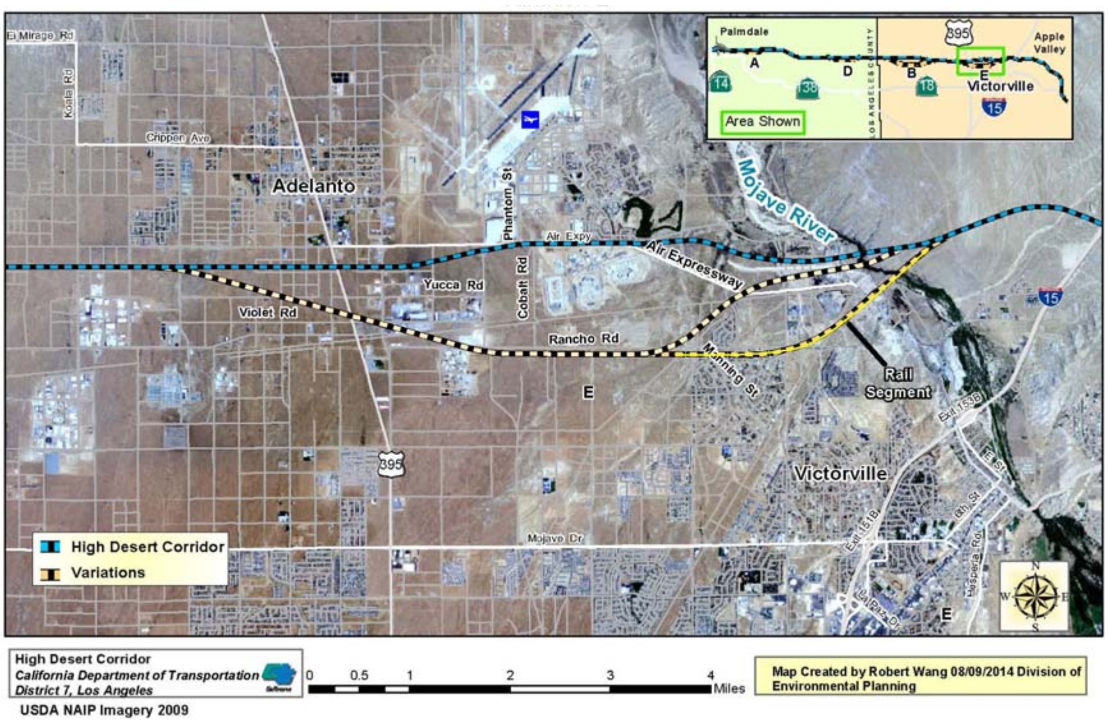


Figure 2-21 Variation E Alignment



2.4 Common Design Features of Build Alternatives

Design standards from the Caltrans Highway Design Manual (HDM, Sixth Edition) were applied to the HDC Project for roadway geometric criteria and standard design features. In addition, design standards from the Surface Transportation Assistance Act of 1982 (STAA) National Network for large trucks were applied. Caltrans design standards require that the minimum interchange spacing shall be 1 mile in urban areas, 2 miles in rural areas, and 2 miles between system interchanges and service interchanges.

2.4.1 Typical Sections

The HDC Project consists of the construction of a highway facility and the associated acquisition/preservation of ROW. Therefore, each alternative is defined by an ultimate cross section to be accommodated within the ROW. The following elements are included in the design concept for the ultimate facility:

- Mixed-flow lanes in each direction for the build alternatives
- Shoulders designed to Caltrans standards for freeways
- Medians designed to Caltrans standards for freeways

The typical sections for the HDC build alternatives range from four lanes per direction in the Palmdale area of Los Angeles County (500 feet wide) to two lanes per direction in the Apple Valley expressway portion of the corridor in San Bernardino County (300 feet wide). The traffic analysis to determine the required typical section (i.e., number of travel lanes required) was based on the *High Desert Corridor Traffic Study* (June 2014).

The alternatives being analyzed include sufficient ROW to accommodate a multimodal transportation facility that includes highway lanes, HSR Feeder Service between Palmdale and Victorville, green energy facilities, and a bike path.

For the rail component, the alignment would run generally in the center of the highway for most of the HDC. Additional ROW would be required for the connection to the proposed Palmdale Station area and the Victorville Station.

In general, the needed ROW varies from 300 to 500 feet in width. The exception to this is the area between the SCLA and the federal prison complex, where the width is constrained to approximately 290 feet. Figures 2-22 and 2-23 show typical sections for the HDC mainlines. The alternatives may require ROW that varies in width as a result of topography (i.e., terrain) requiring cut (i.e., excavation) and fill, features of the natural (i.e., buttes, hills, mountains, washes, creeks, streams) and built environment, and design requirements (e.g., larger turning radius for HSR). Therefore, variations in these cross sections are needed in constrained areas.

Figure 2-22 Future Ultimate Freeway/Expressway Alternatives Typical Section

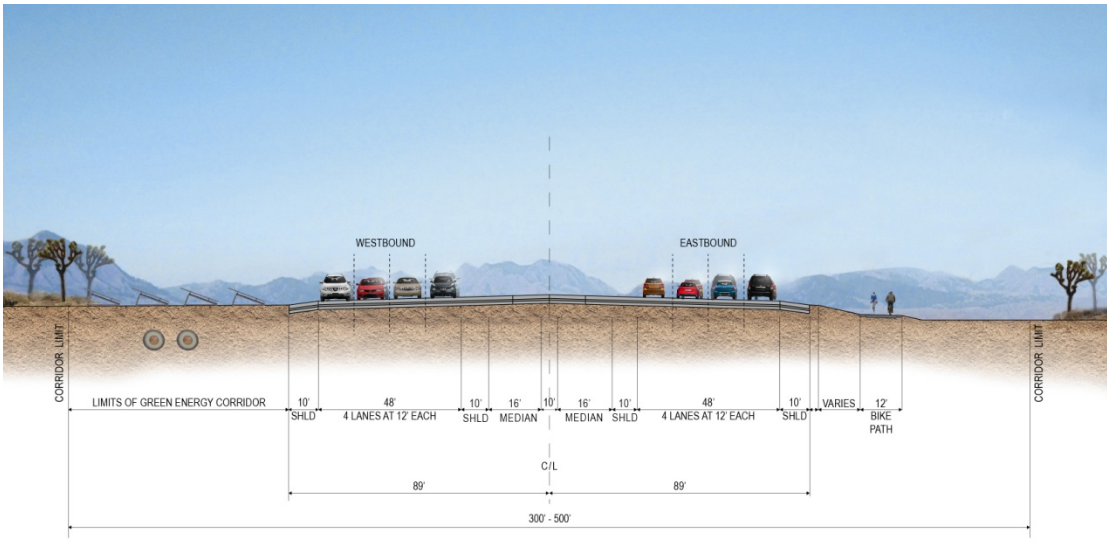
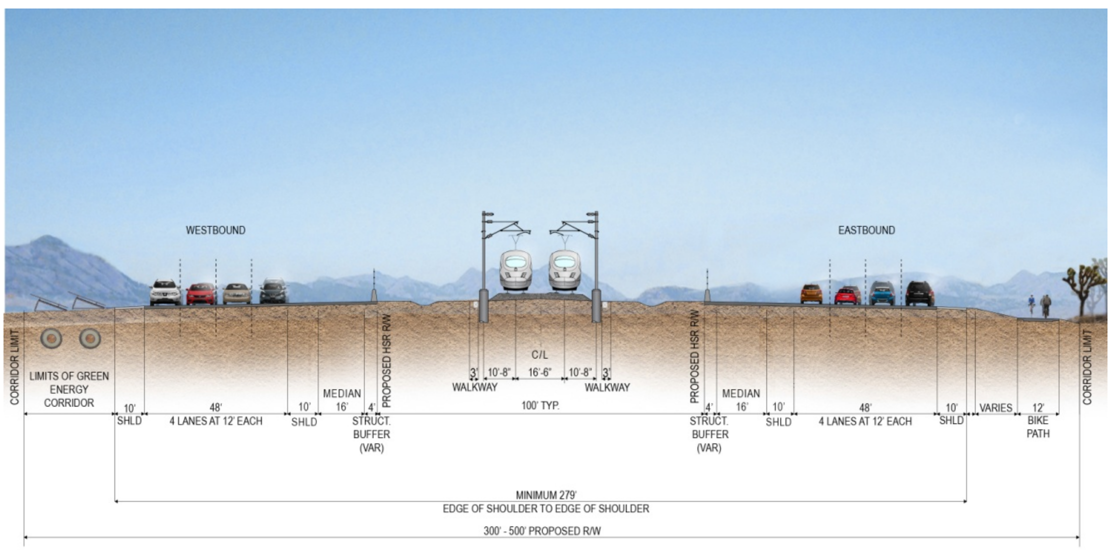


Figure 2-23 Future Ultimate Freeway/High-Speed Rail Alternative Typical Section



2.4.2 Lane Configuration

The typical lane configuration for the HDC highway facility varies from two lanes in each direction to four lanes. Although the ultimate transportation corridor would be able to expand to four lanes plus a high-occupancy vehicle lane (HOV) in each direction, the current facility, based on results of the Traffic Study, proposes the following for all build alternatives:

- From SR-14 to 50th Street East – The HDC would be an eight-lane freeway (four lanes in each direction)
- Between 50th Street East and 210th Street East – The HDC would transition from an eight- to a six-lane freeway (four to three lanes in each direction)
- From 210th Street East to US 395 – The HDC would be a seven-lane freeway (four westbound lanes and three eastbound lanes)
- From US 395 to Choco Road – The HDC would be a six-lane freeway (three lanes in each direction)
- From Choco Road to Dale Evans Parkway – The HDC would be a four-lane freeway (two lanes in each direction)
- From Dale Evans Parkway to SR-18 – The HDC would be a four-lane expressway (two lanes in each direction)

HOV/carpool lanes would not be part of this project; however, ROW would be reserved for their potential addition at a later date. Instead, toll lanes would be proposed for the mid section from 90th Street East in Palmdale to US 395 in Adelanto.

2.4.3 Interchanges

The HDC build alternatives would include interchanges at SR-14 and I-15, and at major arterials in the study area to facilitate travel to and from the HDC, SR-14, US 395, National Trails Highway, SR-18, and area arterials. There are two kinds of interchanges associated with the HDC build alternatives – system interchanges and service interchanges:

- System Interchange – A system interchange is a major freeway-to-freeway interchange that carries traffic from one freeway to another via a network of ramps and connectors. The project calls for two system interchanges: (1) at the HDC and SR-14, and (2) at the HDC and I-15. The HDC/I-15 interchange location would be a four-level interchange.
- Service Interchange – A service interchange connects a freeway with local surface streets or arterials. Service interchange locations will be coordinated with the Cities of Palmdale, Adelanto, Victorville, and Apple Valley, and the County of Los Angeles and San Bernardino General Plan Circulation Elements; there will also be coordination with LAWA.

The build alternatives would also include interchange modifications and improvements as discussed below.

SR-14 Interchange Additions and Modifications

The western terminus of the HDC would have a series of interchanges providing direct connection with SR-14. At their highest points, these interchanges would gradually rise to approximately three to four stories tall. A partial interchange at Avenue P (Rancho Vista Boulevard) on SR-14 would be removed, and a full interchange at 10th Street West would be constructed to provide sufficient merging distance for the two freeways. Several existing ramps along SR-14 would be realigned to accommodate the SR-14 widening between 10th Street West and

Palmdale Boulevard. The westbound Palmdale Boulevard to northbound SR-14 on-ramp would be removed and consolidated into a loop on-ramp to northbound SR-14, serving eastbound and westbound Palmdale Boulevard traffic. Palmdale Boulevard interchange ramps would be realigned as listed below:

- Southbound SR-14 to Palmdale Boulevard
- Westbound Palmdale Boulevard to southbound SR-14
- Westbound Palmdale Boulevard to northbound SR-14
- Eastbound Palmdale Boulevard to southbound SR-14
- Palmdale Boulevard to northbound SR-14

In addition, a direct on-ramp from Palmdale Boulevard to eastbound HDC would be added.

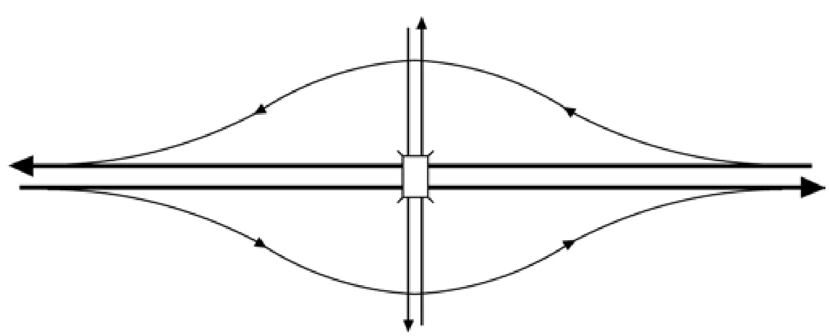
I-15 Interchange Additions

Similar to the HDC system interchange with SR-14, there would be eight ramps, three to four stories tall at their highest points, connecting the HDC with I-15. The interchange would be located approximately midway between the existing service interchanges of I-15 with Stoddard Wells Road north, and Stoddard Wells Road south. Viaduct/bridge structure(s) would be constructed over the Burlington Northern Santa Fe (BNSF) Railway and the Mojave Northern Railroad tracks, and the Mojave River, all to the west of I-15.

Service Interchange (Local Access Locations)

The HDC would include local access service interchanges at intervals of 1 to 5 miles between SR-14 and approximately 3 miles east of I-15, where the freeway transitions to an expressway. For the most part, the local service interchanges would be designed as “spread diamonds,” where the ramps flare away from the freeway mainline because of certain design advantages, such as flatter ramp conditions, which improve sight and stopping distance, greater crossroads storage capacity for vehicles making left turns, and flexibility for future ramp expansion to add loop ramps or roundabouts. Figure 2-24 illustrates the conceptual configuration of a spread diamond interchange.

Figure 2-24 Spread Diamond Interchange Configuration



Source: Caltrans Highway Design Manual, 2012.

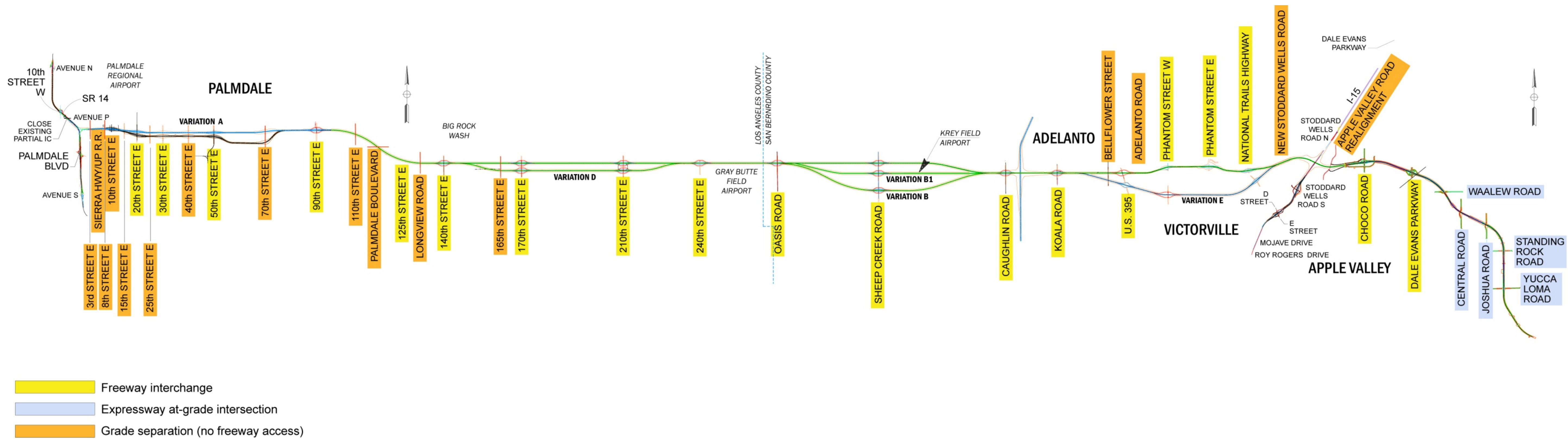
In general, highway interchange spacing policy establishes a minimum spacing requirement of 1-mile separation between each interchange for urban areas and 2-mile separation in rural areas. For the proposed HDC interchanges, the distance between interchanges would vary from a minimum of 1 mile to 5 miles. Interchanges proposed for the freeway/tollway portion of all build alternatives of the HDC are summarized below and illustrated in Figure 2-25.

Los Angeles County
- SR-14
- 20th Street East
- 30th Street East
- 50th Street East
- 90th Street East
- Longview Road/140th Street East
- 170th Street East
- 210th Street East
- 240th Street East

San Bernardino County
- Oasis Road
- Sheep Creek Road
- Caughlin Road
- Koala Road
- US 395
- Phantom Road West
- Phantom Road East
- National Trails Highway
- Choco Road
- Dale Evans Parkway

Ramp meters could be installed at ramps where there is sufficient vehicular traffic to warrant the management of on-ramp access.

Figure 2-25 Proposed Locations of Interchanges, Grade Separations, and At-grade Intersections along the High Desert Corridor



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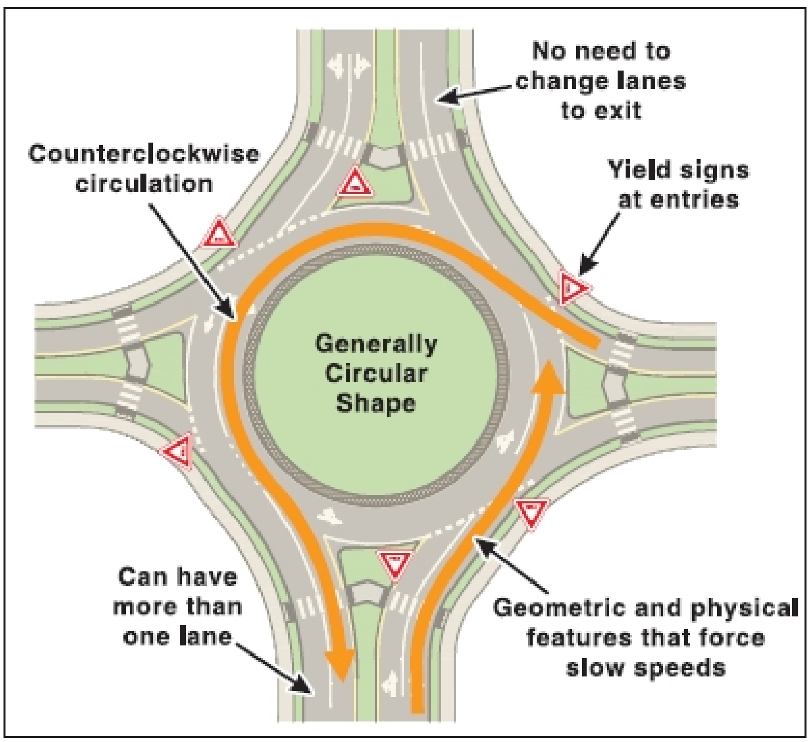
At the ramp intersections in Los Angeles and San Bernardino counties where freeway traffic meets local streets, ROW would be reserved for roundabouts that could be built at a future date. Figure 2-26 illustrates the conceptual configuration of a roundabout that could be constructed at the junction of the interchange on-/off-ramps with the local service road. The locations where future roundabouts could be built are:

- Longview Road/140th Street
- 170th Street
- 210th Street
- 240th Street
- Oasis Road
- Sheep Creek Road
- Caughlin Road
- Koala Road
- Choco Road

Figure 2-26 Sample Roundabout Configuration



Grade Separations

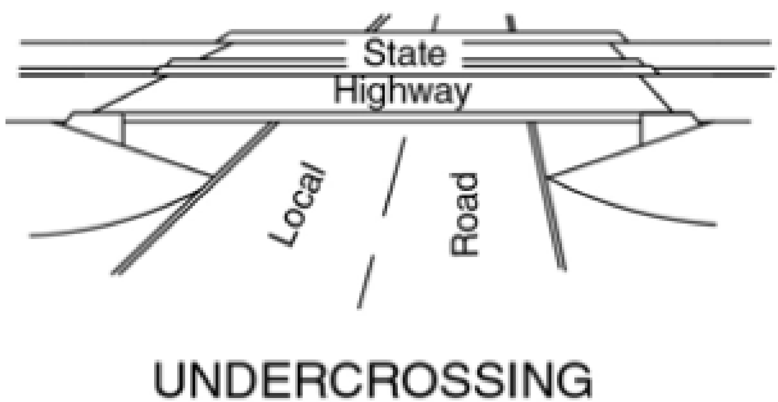
Grade separations facilitate the movement of traffic while minimizing conflict at intersections by providing crossings. These crossings may consist of any combination of the following: two highways, a highway and a local road, or a highway and a railroad that are physically isolated from each other via a structure. Grade separations proposed as local street undercrossings (i.e., structures) are listed below:

Los Angeles County
- 3rd Street East
- Sierra Highway/UPRR
- 8th Street East
- 10th Street East
- 15th Street East
- 25th Street East
- 40th Street East
- 70th Street East
- 110th Street East
- Palmdale Boulevard
- Longview Road
- 165th Street East

San Bernardino County
- Bellflower Street
- Adelanto Road
- New Stoddard Wells Road
- Apple Valley Road (Realignment)

There would be no at-grade intersections in Los Angeles County or San Bernardino County between SR-14 in Palmdale and Dale Evans Parkway in Apple Valley. Figure 2-27 illustrates a typical configuration for a freeway undercrossing.

Figure 2-27 State Highway Undercrossing Configuration



Source: Caltrans Highway Design Manual.

2.4.4 Bridges and Culverts

Bridges would be provided at major crossings of water resources, natural resources, local roads, and railroads to provide access over the HDC Project for vehicle, pedestrian, bicycle, equestrian, and wildlife uses. A combination of bridges and culverts is proposed in many areas to minimize or avoid impacts to water resources. Bridges are also provided to minimize or reduce ROW acquisitions in developed areas and minimize impacts to cultural resources by avoiding construction in the areas that have the potential to encounter them. All bridges will be designed to Caltrans standards. The bridges have been categorized as Water and Natural Resources, Local Roads, Wildlife Crossings, and Other Crossings.

The bridge cross sections would be consistent with the road cross sections on either side of the bridge. For instance, if a bridge were to cross a road segment with four mixed-use lanes (e.g., cars, trucks, motorcycles), then the bridge structure cross section would also provide four mixed-use lanes. The cross sections on bridges would also match the HDC Project cross sections or the General Plan local circulation element facility when possible for local arterial roads crossing the HDC Project.

Bridges for Water

The HDC build alternatives include bridge structures crossing major water bodies at the following locations:

- Little Rock Wash (see graphic showing bridge section in Figure 2-28) – Proposed with precast/prestressed “I” girder concrete structure for the highway bridges and precast/prestressed box girder concrete structure for the HSR bridge.
- Big Rock Wash (see graphic showing bridge section in Figure 2-29) – Proposed with precast/prestressed “I” girder concrete structure for the highway bridges and precast/prestressed box girder concrete structure for the HSR bridge.
- Turner Wash (see graphic showing bridge section in Figure 2-30) – Proposed with precast/prestressed “Bulb Tee” girder concrete structure for the highway bridges and precast/prestressed box girder concrete structure for the HSR bridge.
- Ossum Wash (see graphic showing bridge section in Figure 2-31) – Proposed with precast/prestressed “Bulb Tee” girder concrete structure for the highway bridges and cast-in-place prestressed box girder concrete structure for the HSR bridge.
- Mojave River (see graphic showing bridge section in Figure 2-32) – Proposed with cast-in-place prestressed box girder concrete structure for all three of the highway and HSR bridges.

Figure 2-28 Little Rock Wash Bridge Section (Conceptual)

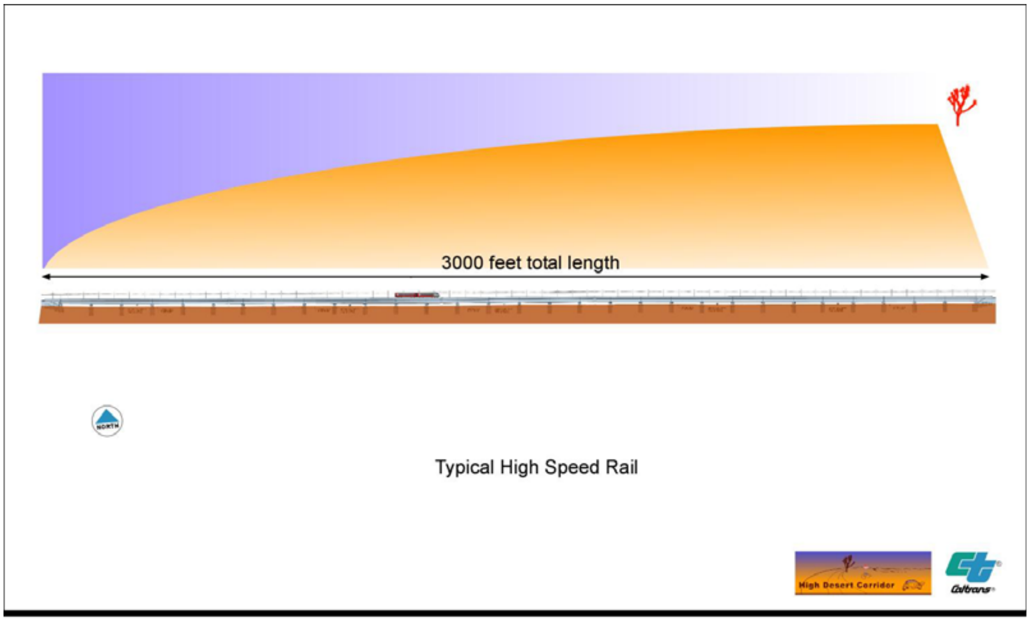


Figure 2-29 Big Rock Wash Bridge Section (Conceptual)

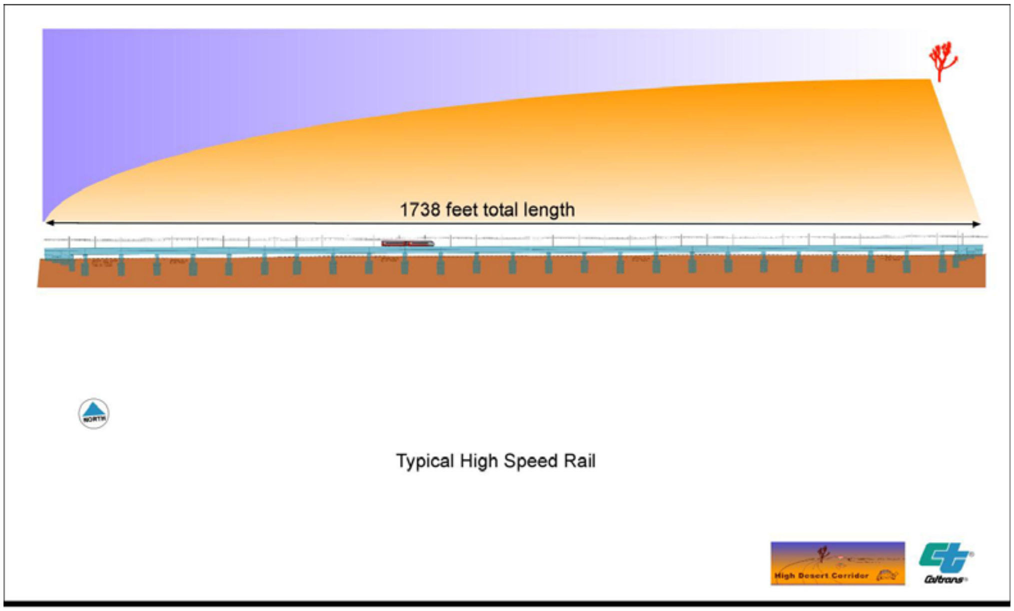


Figure 2-30 Turner Wash Bridge Section (Conceptual)

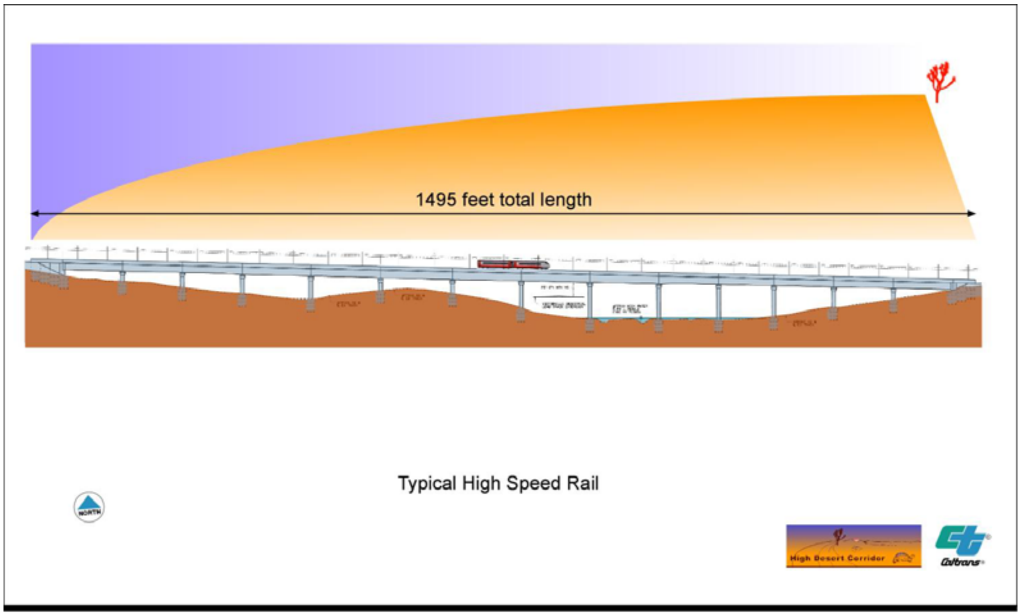


Figure 2-31 Ossum Wash Bridge Section (Conceptual)

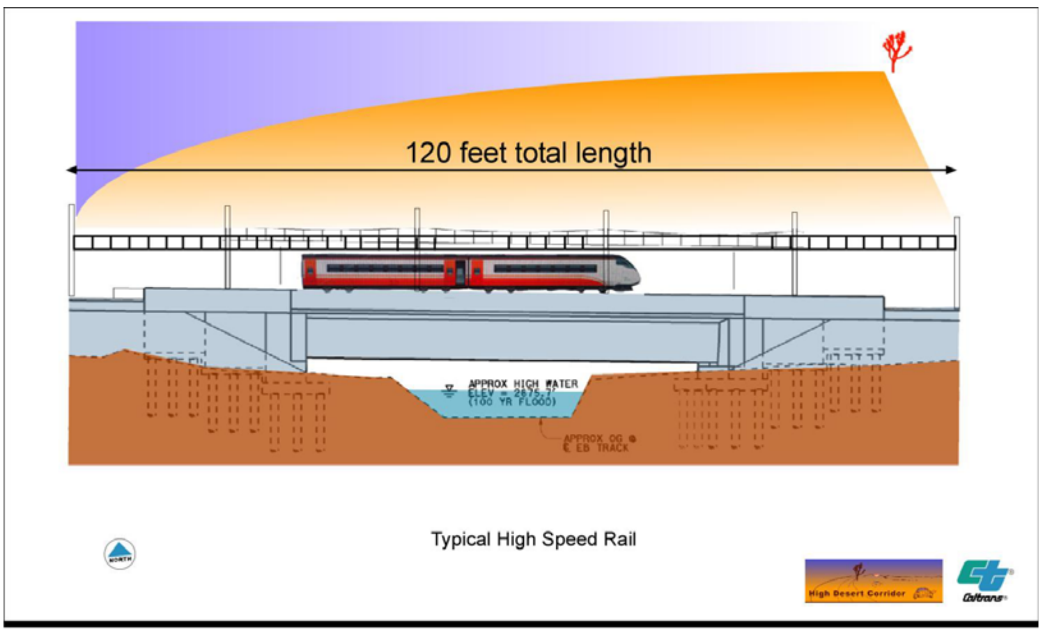
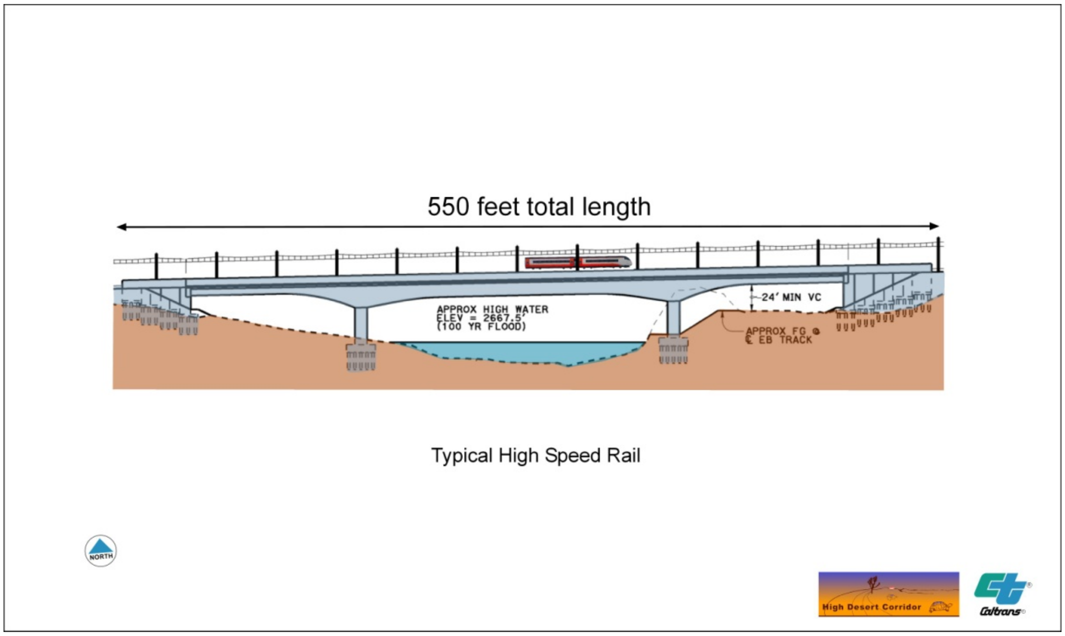


Figure 2-32 Mojave River Bridge Section (Conceptual)



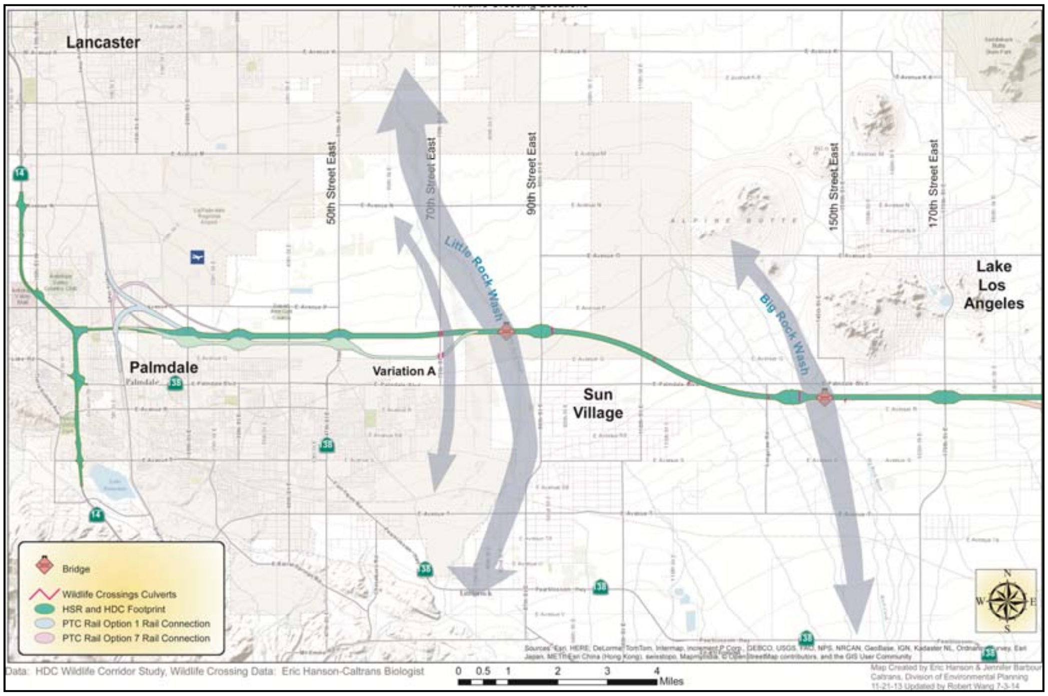
Bridges for Local Road Crossings

The HDC build alternatives would include many undercrossings/underpasses of local roads to allow the HDC Project to pass over those roads without disruption to through traffic on the HDC or the local roads. Section 2.4.1.3 lists the locations along the HDC build alternatives where interchanges and grade separation overcrossings are proposed to span local roads. All of these overcrossings are relatively short to allow the local roads to pass under the HDC roadway and HSR track alignments. Typically, single- or dual-span bridges would be constructed with span lengths of 100 feet or less. One overcrossing at Phantom Road East is considerably longer to accommodate topographic conditions.

Culverts for Wildlife Crossings

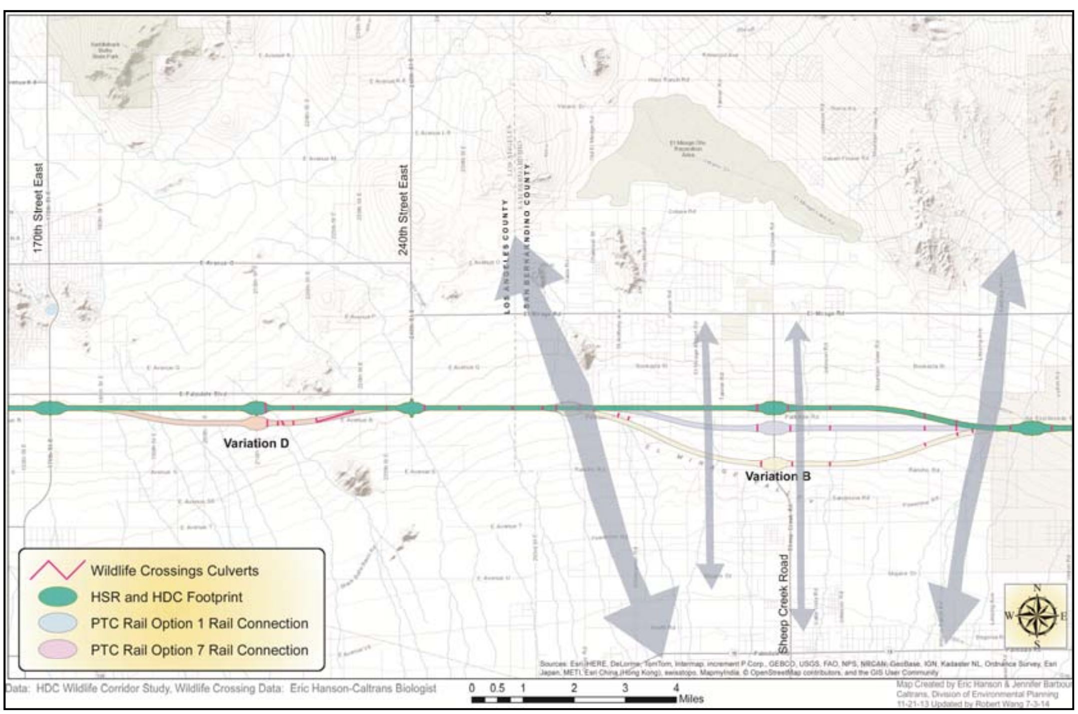
The HDC build alternatives would include dual-purpose culverts. At some locations, the culverts would function as a crossing for water only, while at other locations they would function as a crossing for water and a passage for wildlife. These wildlife crossing culverts are intended to link habitat that would otherwise be separated by the HDC. Those locations selected for the dual-purpose culvert would be modified (i.e., higher and wider culverts) to accommodate wildlife and encourage wildlife to use these culverts. The locations to function as dual-purpose culverts were determined by a Wildlife Movement Study (Final Wildlife Corridor Evaluation, August 2012). Typical culverts would consist of either corrugated steel (i.e., elliptical or circular), articulated interlocking concrete blocks, or concrete box-like structures that would be filled with sand and gravel to mimic a natural earthen bottom and may contain concrete ledges in some locations. Refer to Figures 2-33, 2-34, and 2-35 for locations of wildlife crossings on the HDC, which are shown in grey arrows.

Figure 2-33 High Desert Corridor Wildlife Crossings in Los Angeles County (Palmdale to Lake Los Angeles)



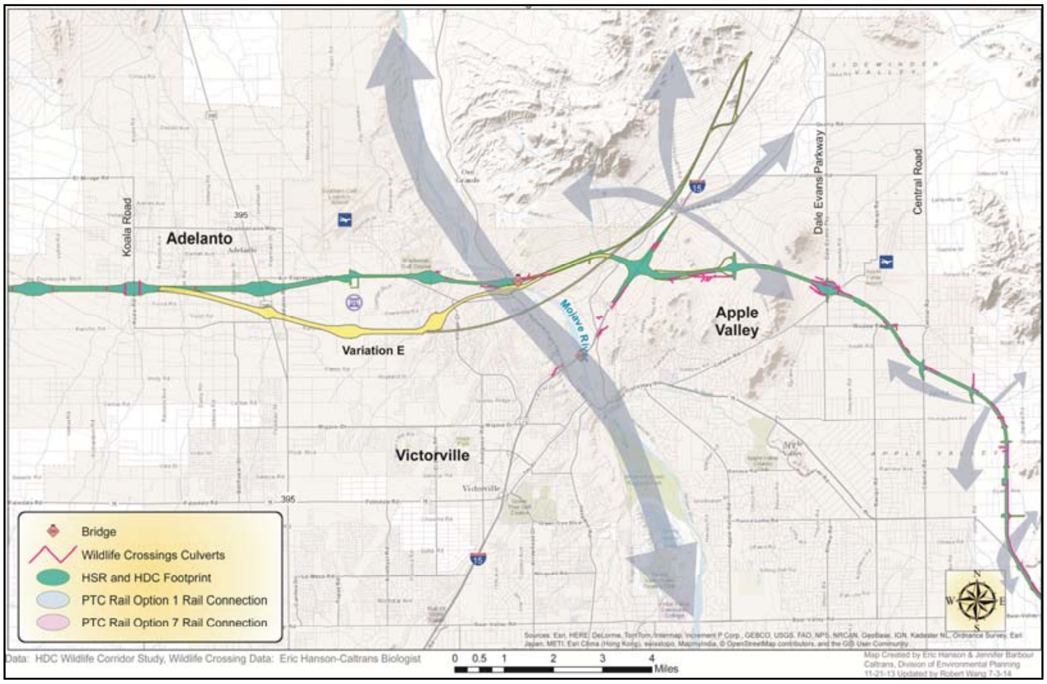
Source: Final Wildlife Corridor Evaluation, Auguat 2012

Figure 2-34 High Desert Corridor Wildlife Crossings from 170th Street (Los Angeles County) to Lessing Avenue (San Bernardino County)



Source: Final Wildlife Corridor Evaluation, Auguat 2012

Figure 2-35 High Desert Corridor Wildlife Crossings in San Bernardino County



Source: Final Wildlife Corridor Evaluation, Auguat 2012

Soft Bottom Concrete Culverts

The design for a soft bottom concrete culvert would allow a small amount of silt buildup on the culvert floor or would be filled with a layer of sand or silt, in most cases about 1 foot deep. The minimum height for each culvert is 3 feet. This ensures the maintainability of culverts should silt buildup occur, while still allowing small wildlife to cross under the HDC alignment. At other locations, certain culverts were increased in height to 5 and 6 feet to allow larger wildlife to cross beneath the HDC.

Table 2-1 provides the list of culverts to be constructed for wildlife crossing purposes within the project corridor.

Table 2-1 High Desert Corridor Wildlife Crossings

Culvert #	Station	Description	Soft Bottom
1	270+75	4 - 7' x 3' RCB	N
2	287+60	3 - 7' x 3' RCB	N
3	329+40	4 - 7' x 3' RCB	N
4	330+90	4 - 7' x 3' RCB	N
5	348+00	4 - 7' x 3' RCB	N
6	352+50	4 - 7' x 3' RCB	N
7	365+00	4 - 7' x 3' RCB	N
8	383+50	7 - 7' x 3' RCB	N

Table 2-1 High Desert Corridor Wildlife Crossings

Culvert #	Station	Description	Soft Bottom
9	385+00	4 - 7' x 3' RCB	N
10	399+40	4 - 7' x 3' RCB	N
11	403+00	4 - 7' x 3' RCB	N
12	420+80	4 - 7' x 3' RCB	N
13	439+20	3 - 7' x 3' RCB	N
14	456+50	4 - 10' x 6' RCB	N
15	473+20	1 - 7' x 3' RCB	N
16	507+80	1 - 7' x 3' RCB	N
17	519+20	1 - 7' x 3' RCB	N
18	532+50	1 - 7' x 3' RCB	N
19	570+33	4 - 7' x 3' RCB	N
20	573+35	4 - 7' x 3' RCB	N
21	691+00	5 - 10' x 5' RCB	N
22	694+00	5 - 10' x 5' RCB	N
23	696+60	5 - 10' x 5' RCB	N
24	699+20	5 - 10' x 5' RCB	N
25	701+80	5 - 10' x 5' RCB	N
26	704+40	5 - 10' x 5' RCB	Y
27	707+00	5 - 10' x 5' RCB	Y
28	710+00	4 - 7' x 3' RCB	Y
29	717+00	4 - 7' x 3' RCB	N
30	722+00	4 - 7' x 3' RCB	N
31	727+50	1 - 10' x 5' RCB	Y
32	762+00	2 - 10' x 5' RCB	Y
33	771+99	5 - 7' x 3' RCB	N
34	782+00	5 - 7' x 3' RCB	Y
35	805+80	1 - 10' x 5' RCB	Y
36	850+00	1 - 10' x 5' RCB	Y
37	907+00	1 - 10' x 5' RCB	Y
38	925+00	1 - 10' x 5' RCB	Y
39	937+00	2 - 7' x 3' RCB	Y
40	970+04	3 - 7' x 3' RCB	Y
41	1019+00	1 - 7' x 3' RCB	Y
42	1052+00	1 - 10' x 5' RCB	Y
43	1072+00	1 - 10' x 5' RCB	Y
44	1099+00	1 - 7' x 3' RCB	Y
45	1115+03	1 - 10' x 5' RCB	Y
46	1150+04	2 - 8' x 6' RCB	Y
47	1162+61	3 - 10' x 8' RCB	Y

Table 2-1 High Desert Corridor Wildlife Crossings

Culvert #	Station	Description	Soft Bottom
48	1172+11	3 - 10' x 8' RCB	Y
49	1180+12	2 - 8' x 6' RCB	Y
50	1191+09	3 - 8' x 6' RCB	Y
51	1196+09	3 - 8' x 6' RCB	N
52	1204+00	1 - 8' x 6' RCB	Y
53	1218+05	2 - 8' x 6' RCB	Y
54	1224+04	2 - 8' x 6' RCB	N
55	1229+05	3 - 8' x 6' RCB	Y
56	1276+00	1 - 6' x 6' RCB	Y
57	1288+00	1 - 6' x 4' RCB	Y
58	1300+00	1 - 6' x 6' RCB	Y
59	1321+00	1 - 7' x 3' RCB	Y
60	1351+00	1 - 7' x 3' RCB	Y
61	1362+05	2 - 10' x 6' RCB	N
62	1367+22	3 - 10' x 8' RCB	Y
63	1378+04	3 - 8' x 6' RCB	Y
64	1388+04	3 - 8' x 6' RCB	Y
65	1402+00	1 - 7' x 3' RCB	Y
66	1441+00	1 - 6' x 6' RCB	Y
67	1476+00	1 - 6' x 6' RCB	Y
68	1515+02	2 - 7' x 3' RCB	Y
69	1551+04	2 - 8' x 6' RCB	Y
70	1575+04	2 - 8' x 6' RCB	Y
71	1606+11	3 - 10' x 8' RCB	Y
72	1619+05	2 - 10' x 6' RCB	Y
73	1629+05	2 - 10' x 6' RCB	Y
74	1637+11	4 - 10' x 6' RCB	Y
75	1651+08	3 - 8' x 6' RCB	Y
76	1675+05	4 - 8' x 4' RCB	Y
77	1690+05	2 - 10' x 8' RCB	Y
78	1698+05	2 - 10' x 8' RCB	Y
79	1716+05	2 - 10' x 8' RCB	Y
80	1727+05	2 - 10' x 8' RCB	Y
81	1756+00	1 - 8' x 6' RCB	Y
82	1791+00	1 - 8' x 6' RCB	Y
83	1873+00	1 - 8' x 6' RCB	Y
84	1905+00	1 - 8' x 6' RCB	Y
85	1944+00	2 - 8' x 6' RCP	Y
86	1958+00	2 - 7' x 3' RCB	Y

Table 2-1 High Desert Corridor Wildlife Crossings

Culvert #	Station	Description	Soft Bottom
87	1981+04	1 - 8' x 6' RCB	Y
88	2045+00	1 - 6' x 6' RCB	Y
89	2080+00	1 - 8' x 6' RCB	Y
90	2096+05	2 - 10' x 6' RCB	Y
91	2116+05	3 - 10' x 6' RCB	Y
92	2135+05	3 - 8' x 4' RCB	Y
93	2148+00	2 - 10' x 6' RCB	Y
94	2167+00	2 - 10' x 6' RCB	Y
95	2178+00	1 - 8' x 4' RCB	Y
96	2236+00	1 - 6' x 6' RCB	Y
97	2256+11	7 - 10' x 8' RCB	Y
98	2271+40	6 - 10' x 8' RCB	Y
99	2284+11	4 - 10' x 8' RCB	Y
100	2292+17	4 - 10' x 8' RCB	Y
101	2321+47	1 - 7' x 3' RCB	Y
102	2325+68	1 - 5' x 3' RCB	N
103	2331+28	1 - 8' x 6' RCB	Y
104	2349+00	1 - 7' x 3' RCB	Y
105	2414+00	1 - 8' x 6' RCB	Y
106	2465+26	5 - 8' x 6' RCB	Y
107	2472+79	5 - 8' x 6' RCB	Y
108	2562+23	1 - 7' x 3' RCB	Y
109	2792+17	9 - 12' x 8' RCB	Y
110	2899+09	5 - 10' x 5' RCB	Y
111	3036+14	3 - 10' x 5' RCB	Y
112	3051+70	2 - 10' x 6' RCB	Y
113	3111+69	4 - 7' x 3' RCB	N
114	3138+26	4 - 7' x 3' RCB	Y
115	3149+59	4 - 7' x 3' RCB	Y
116	3163+47	4 - 7' x 3' RCB	Y
117	3180+89	4 - 7' x 3' RCB	Y
118	3190+27	4 - 7' x 3' RCB	Y
119	3197+82	4 - 7' x 3' RCB	N
120	3207+17	4 - 7' x 3' RCB	N
121	3224+32	4 - 7' x 3' RCB	N
122	3240+97	4 - 7' x 3' RCB	Y
123	3260+40	4 - 7' x 3' RCB	Y
124	3271+71	4 - 7' x 3' RCB	Y
125	3285+51	3 - 7' x 3' RCB	Y

Table 2-1 High Desert Corridor Wildlife Crossings

Culvert #	Station	Description	Soft Bottom
126	3296+99	3 - 7' x 3' RCB	Y
127	3314+16	3 - 7' x 3' RCB	Y
128	3327+31	3 - 7' x 3' RCB	Y
129	3333+51	3 - 7' x 3' RCB	Y
130	3393+17	3 - 7' x 3' RCB	Y
131	3423+54	3 - 7' x 3' RCB	Y
132	3450+74	3 - 7' x 3' RCB	Y
RCB: Reinforce concrete block			

Source: HDC Natural Environment Study Report, 2014

Bridges for Other Crossings

The HDC build alternatives would include many crossings (e.g., crossing of railroads, direct connectors at the system interchanges). System interchange direct connectors are at the HDC and SR-14 interchange in Palmdale (Los Angeles County) and HDC and I-15 interchange in Victorville/Apple Valley (San Bernardino County). These connectors are structures that could range in length from 1,312 to 5,908 feet.

2.4.5 High-Occupancy Vehicle Lanes and Park-and-Ride Facilities

Neither HOV lanes nor park-and-ride facilities are proposed as part of the HDC design year facility; however, the addition of HOV lanes may be considered in the future and could be accommodated by widening within the reserved median. In lieu of HOV lanes, a tollway is proposed from 90th Street East in Palmdale to US 395 in Adelanto.

Park-and-ride facilities are not proposed as part of this project; however, local jurisdictions, along with regional transportation agencies, may choose to add additional park-and-ride lots to supplement the existing ones at a later date. In addition, recent legislation, Senate Bill (SB) 415 allows Caltrans, through the California Transportation Commission (CTC), to relinquish existing park-and-ride facilities to the local jurisdiction and the regional transportation agency. This gives the local jurisdiction more flexibility in operation and maintenance of existing State-owned park-and-ride lots, allowing for possible expansion.

There are five existing park-and-ride lots within Los Angeles and San Bernardino counties near the HDC build alternatives (see Section 3.1.6, Traffic and Transportation/ Pedestrian and Bicycle Facilities, of this environmental document for details).

Los Angeles County

The HDC build alternatives would provide additional access to three park-and-ride lots in the Antelope Valley area of Los Angeles County. One on West Avenue R-8 at Pelona Vista Park is located approximately 2 miles south of the HDC. This location is owned by the City of Palmdale and has 445 parking spaces. The second is located along West Avenue S at Geiger Road, approximately 3 miles south of the HDC to the west of SR-14. This lot has 430 spaces and is owned by the City of Palmdale. A short distance away, to the east of SR-14 along East Avenue S, and adjacent to Lake Palmdale, is the third park-and-ride lot. This lot is owned by the State and has 1,082 spaces.

San Bernardino County

The HDC build alternatives would provide additional access to two existing park-and-ride lots. Both locations are located south of the project alignment. One is located 12 miles south of the HDC within Hesperia at US 395 and has 186 parking spaces. The other lot is located 6 miles south of the HDC at I-15 and Bear Valley Road and has 70 parking spaces.

2.4.6 Utility Relocation

Utility relocation is proposed as part of the HDC build alternatives. Utilities located longitudinally (i.e., parallel to the HDC alignment) in the proposed ROW would be relocated outside of the HDC Project footprint. Subsurface utilities crossing the HDC ROW would be relocated into protected casings across the HDC ROW.

2.4.7 Retaining Walls and Soundwalls

Retaining walls would be constructed at several locations. Retaining walls are used to minimize the amount of grading, avoid or minimize ROW acquisitions in developed areas, and avoid or minimize impacts to sensitive resources. Retaining wall locations would be refined in the final design phase of project development.

Soundwalls would be constructed to provide noise attenuation for existing noise-sensitive land uses, as well as noise-sensitive land uses that are under construction or are fully permitted for development. Proposed soundwall locations are based on the results of the noise study prepared for this project and are provided in Section 3.2.7, Noise, of this environmental document.

2.4.8 Lighting

Caltrans standards require highway safety lighting at particular points in interchange areas to illuminate areas of potential vehicle conflict and to delineate exit ramps, entrance ramps, and island noses. Pole-mounted safety lighting would be provided at the system and service interchanges, ramps, and other areas as required by Caltrans Highway Standards. Electric power for all lighting would be furnished from within the Green Energy component of this proposed project; otherwise, energy to support lighting would need to be provided by the utility company.

All lighting would be shielded and directed to focus downward to illuminate only the HDC Project and connecting roads to minimize light leakage outside the required safety lighting areas. Any existing lighting on SR-14 and I-15 impacted by connection of the HDC Project would be replaced.

There would be no lighting on the HDC mainline. When possible, the HDC Project would follow the “Dark Skies” initiative from Los Angeles County (Town and Country Specific Plan) and San Bernardino County General Plans.

2.4.9 Landscaping

Landscaping would be provided within the HDC ROW and affected ROW of SR-14 and I-15. Replacement planting would be provided for any existing landscaping that is impacted. Landscaping would generally consist of native plant species, particularly in areas adjacent to undeveloped land and existing/proposed habitat areas with native plant species. All plant species would be drought tolerant to minimize the need for irrigation. Highway planting would be provided between the edge of pavement and the cut/fill line and at all water quality Best Management Practice (BMP) stormwater basins that are suitable to the area.

2.4.10 Fencing and Median Barriers

Fencing would be installed along the ROW limits for the entire length of the HDC build alternatives. The height of the fencing would vary, with urban areas at 6 feet and rural areas at 5 feet. The type of fencing may include, but is not limited to, (1) chain link fencing in urban or developed areas and (2) barbed wire and wire mesh fencing in rural areas. The specific locations and fence types and heights would be finalized in consultation between Caltrans and the affected jurisdictions during final design. The current preliminary engineering design-level plans do not provide this level of detail.

The HDC Project mainline would have a combination of concrete barrier and a beam barrier in the center of the median in certain areas. A concrete barrier is comprised of rigid reinforced concrete with a 24-inch-wide base, 36 inches high, narrowing to 6 inches wide at the top. Concrete barriers may require drainage modifications and aesthetic treatment for context-sensitive design. This could include gaps and/or openings for animals to cross if required for certain locations. The thrie beam barrier is more aesthetically compatible with rural and natural areas, and it accommodates small animal crossings. This type of barrier is not visually compatible in metropolitan areas. At the interchange areas where the HDC interfaces with SR-14 and I-15, a concrete barrier would be used in the median.

2.4.11 Runoff Management

The HDC Project would incorporate infiltration basins as Permanent Treatment BMPs to remove pollutants from stormwater runoff prior to discharge to receiving waters. Approximately 67 infiltration basins are being proposed along the corridor (refer to Figures 2-36 through 2-41).

Figure 2-36 High Desert Corridor Infiltration Basin Locations 1 to 12

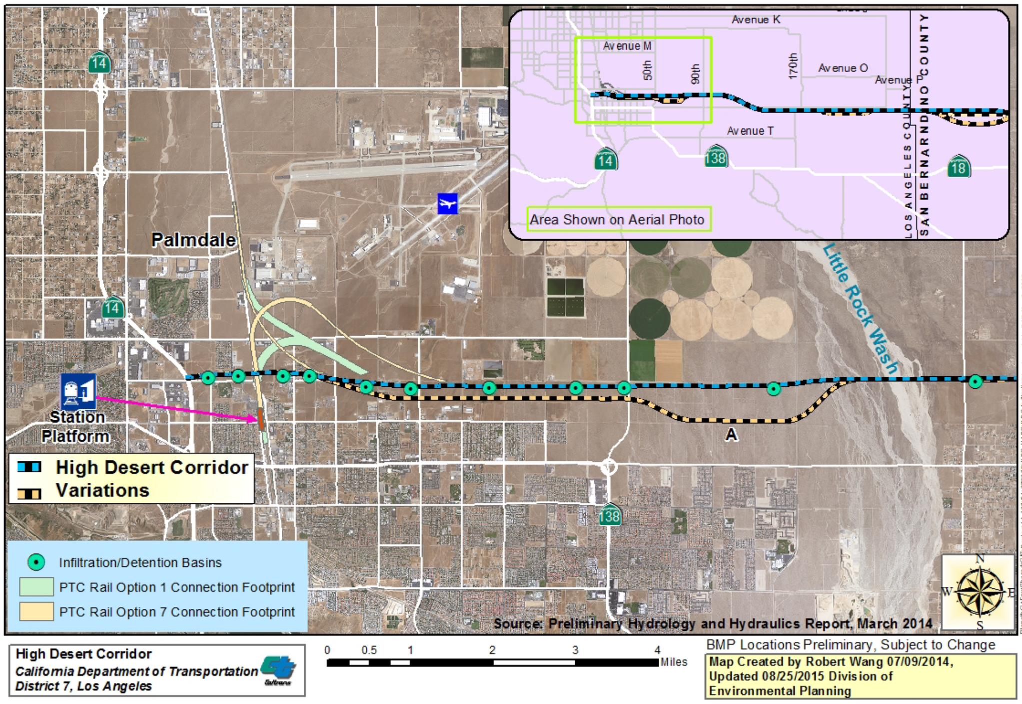


Figure 2-37 High Desert Corridor Infiltration Basin Locations 13 to 22

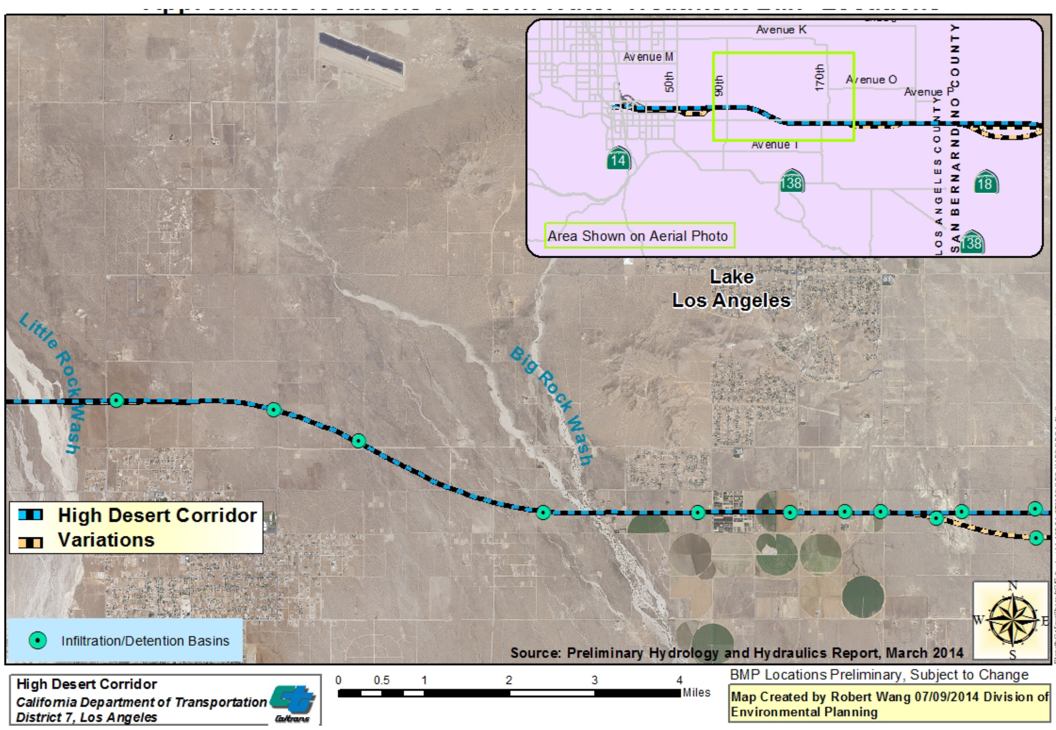


Figure 2-38 High Desert Corridor Infiltration Basin Locations 22 to 33

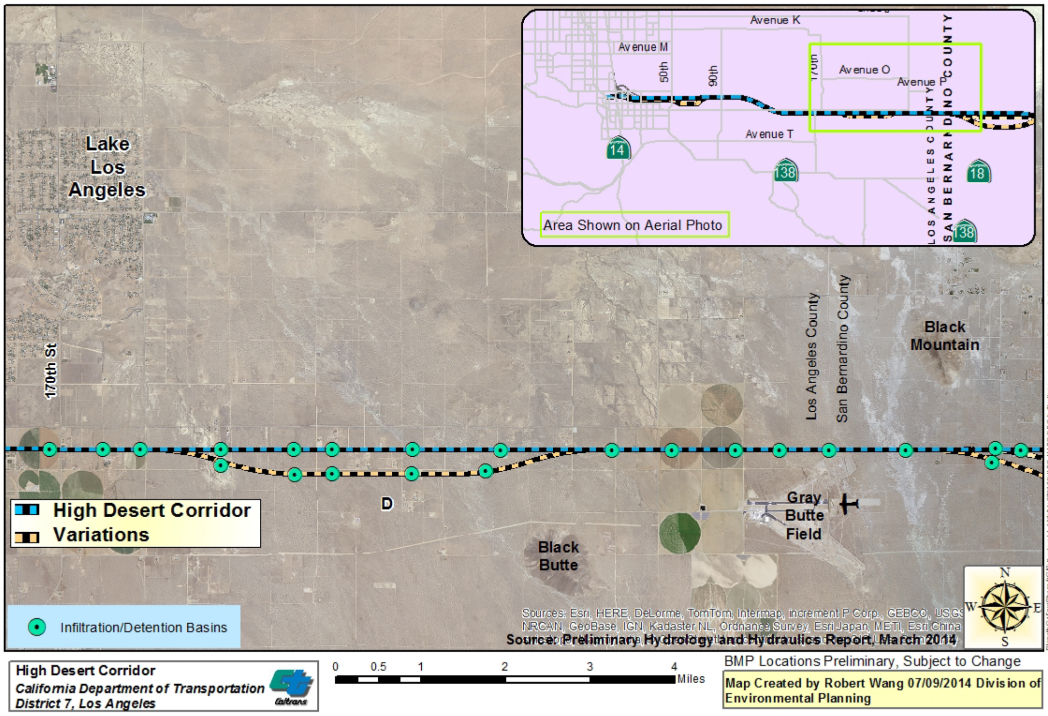


Figure 2-39 High Desert Corridor Infiltration Basin Locations 33 to 39

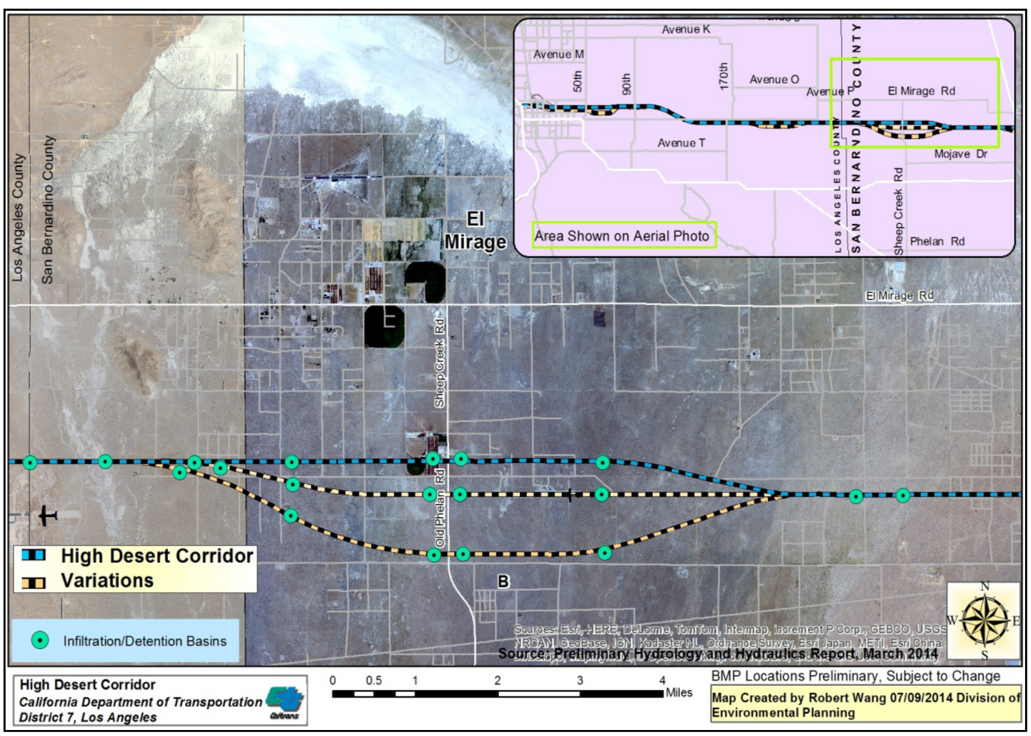


Figure 2-40 High Desert Corridor Infiltration Basin Locations 39 to 49

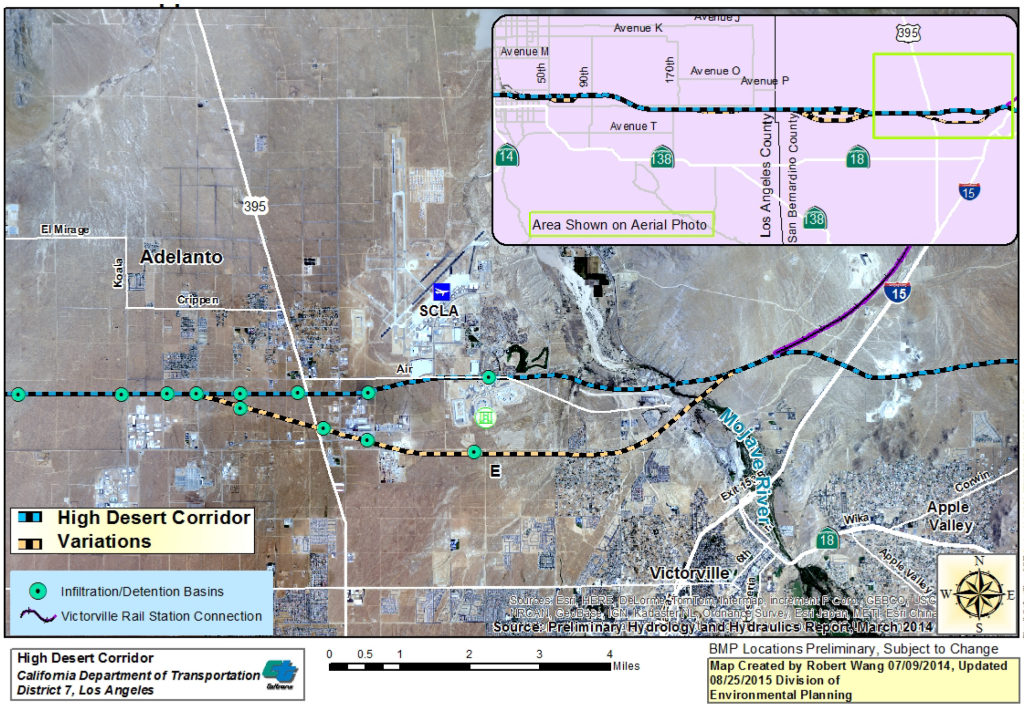
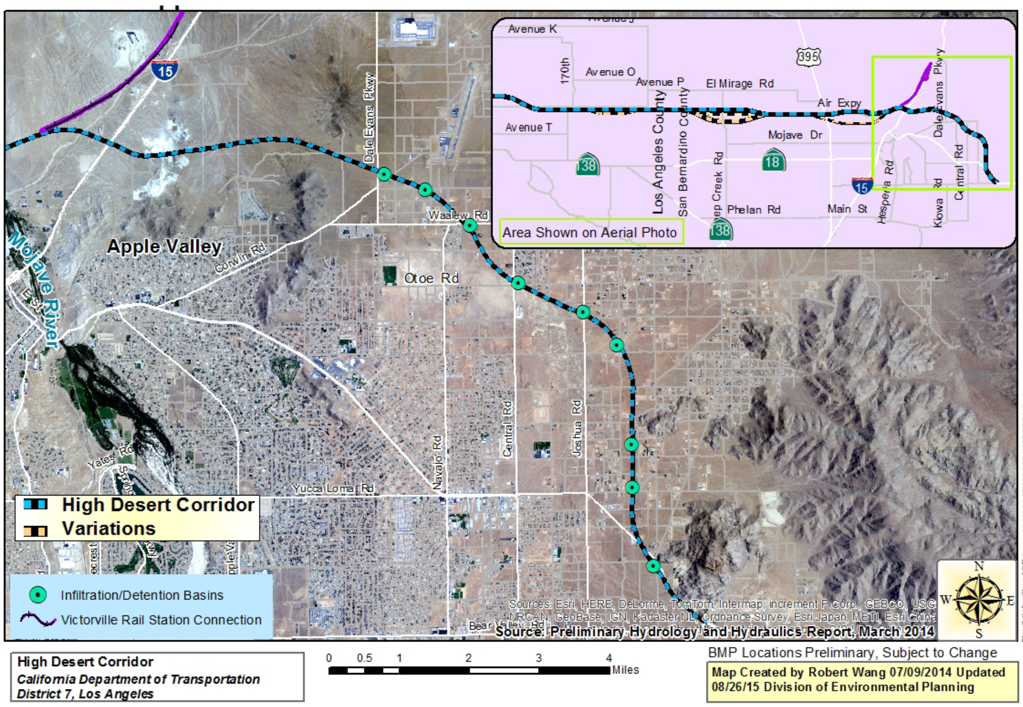


Figure 2-41 High Desert Corridor Infiltration Basin Locations 49 to 67



2.4.12 Grading

All HDC build alternatives would require extensive grading. Most of the HDC would be constructed 6 to 8 feet above ground on fill material. This is necessary because the High Desert region is prone to flash flooding. The project would be designed to reduce the earthwork quantities by engineering the roadway design to closely follow the natural terrain.

2.4.13 Changes to Local Circulation

All HDC build alternatives would result in local street closures adjacent to the proposed alternative alignment.

At-Grade Intersections

There would be no at-grade intersections in Los Angeles County. At-grade intersections in San Bernardino County, specifically in Apple Valley, would be located at:

- Waalew Road
- Central Road
- Joshua Road
- Yucca Loma Road
- Standing Rock Avenue
- Bear Valley Road cutoff

Traffic signals are proposed at the intersections listed above.

Cul-de-Sacs

The proposed HDC alignment has the potential to affect existing east-west and north-south arterial and collector streets. Any connection to local streets that would be affected would be offset with an undercrossing to maintain connectivity within the vicinity of the cul-de-sac streets. The locations of the undercrossings would coincide with the proposed on-/off-ramp locations and grade separations. Those streets that would be closed to thru traffic are identified below by county as shown in Table 2-2.

Table 2-2 Locations and Number of Cul-de-sac Roadways Resulting from HDC Construction

Los Angeles County	Number of Cul-de-Sac Roadways
On Avenue P-8 at 50th Street East, North of HDC	1
San Bernardino County	
On Air Expressway between Phantom Road West and Turner Road	*
On George Boulevard at Air Expressway, North of HDC	1
On Turner Road, near National Trails Highway, North of HDC	1
On Corwin Road, North of HDC; close Corwin Road between HDC and Dale Evans Parkway	1
On Navajo Road, North and South of HDC	2
On Soboba Road, South of HDC	1
On Cahuilla Road, North of HDC	1
On SR-18 East of Valley Vista Road, West of HDC	1
On SR-18 West of Japatel Road, East of HDC	1
On SR-18 East of Joshua Road, West of HDC	1

*Both ends closed.

2.4.14 Railroad Crossings

All HDC build alternatives would involve the transverse crossing of railroad lines that would be grade separated by a structure. These crossings would be located at Sierra Highway in Palmdale, across from Rockview Park and east of the Mojave River in Victorville, at a future SCLA rail spur line that currently stops short of Turner Wash, and west of Stoddard Wells Road. In Palmdale, the HDC would be on an elevated structure that crosses over the train tracks. The railroad lines are owned by UPRR and the Southern California Regional Rail Authority (SCRRA) (also known as Metrolink) in the north-south rail corridor in the Palmdale segment and by BNSF in the Victorville area. No new railroad alignments for these rail lines are proposed. Early railroad notification would be affected due to the lengthy approval process typically encountered with new or modified railroad crossings. Temporary Construction Easements (TCEs) may be needed at these locations, as well as possible footing easements for structural supports, depending on the design.

2.4.15 Geotechnical Borings and Utility Potholing

Geotechnical boring and utility potholing activities would be conducted during final design. The duration of the geotechnical borings would be 1 day or less at any given geotechnical borehole location. Appropriate permits would be obtained from the affected local jurisdiction, and all potholing activities would be conducted in accordance with those permits.

2.4.16 Property Acquisition and Temporary Construction Easement

The HDC Project would require the permanent acquisition of ROW. The numbers of full and partial acquisitions for the HDC build alternatives are summarized in

Section 3.1.4, Community Impacts. Appendix I provides the list of parcels identified for acquisition.

2.4.17 Context-Sensitive Design

During the HDC alternative analysis process, there were opportunities to apply context-sensitive design features. The plans presented in the environmental document were influenced by this environmentally sensitive approach. Context-sensitive design solutions will be an ongoing effort. There will be additional attention to project design in the following areas:

- Evaluation of median versus side rail alignments
- Evaluation of viaduct versus fill applications for rail and highway profiles
- Interchange design selection including deferred construction

Additional integration of context-sensitive design opportunities may result from agency and public comments on the Draft EIR/EIS.

2.5 Construction Phasing of Build Alternatives

Information regarding the phasing of build alternatives is preliminary and dependent on funding availability. Construction of any of the HDC build alternatives would commence after acquisition by Caltrans of the entire ROW. The construction sequence would begin with site clearing of all improvements, including demolition of buildings and structures, followed by utility relocation, facility construction, and landscaping and finishing work. Construction of any of the HDC build alternatives is estimated to take approximately 4 years if the project were to be constructed entirely at one time. For traffic study and emission estimation purposes, project construction is assumed to start in early 2017 and be completed in late 2020, which is the scheduled opening year. This schedule assumes that funding is available from the start to build the entire project. Should funding not be available to construct the entire project at one time, a phasing plan would be developed. The proposed project would then be built incrementally over several years as funding became available.

Several potential construction phasing scenarios were developed and presented in the Draft EIR/EIS (September 2014) in case funding to construct the entire project cannot be immediately obtained. In that event, an analysis of logical termini and independent utility indicates that construction phasing would likely be divided into the following segments:

- Segment 1 (about 9 miles), in Los Angeles County from SR-14 to 90th Street East
- Segment 2 (about 33 miles), the toll section, located in both counties from 90th Street East to US 395
- Segment 3 (about 12 miles) in San Bernardino County, from US 395 to Dale Evans Parkway
- Segment 4 (about 9 miles), located in San Bernardino County, from Dale Evans Parkway to SR-18

It is likely that Segments 1 and 3 would be funded first and would be constructed concurrently. Segment 2 would potentially be built by a Private Developer after completion of Segments 1 and 3. Segment 4 would be the last segment to be constructed.

If the rail component of this project is constructed prior to the highway (due to the availability of rail-specific funding), additional design elements, including locating the rail on a side running alignment, will be considered and evaluated as appropriate.

2.6 Comparison of Alternatives

Table 2-3 provides a comparison of costs between the HDC build alternatives broken down by major funding categories. Table 2-4 provides a comparison of the key features and potential mobility effects of the No Build and build alternatives.

Table 2-3 High Desert Corridor Cost Estimate

Category Engineering	Estimate Cost Breakdown (Billions of Dollars)				
	No Build	Freeway/ Expressway	Freeway/ Tollway	Freeway/ Expressway with Rail	Freeway/ Tollway with Rail
Roadway Items	0	2.382	2.382	2.382	2.382
Rail Items	0	0	0	3.21-4.62	3.21-4.62
Road Structures	0	0.754	0.754	0.876	0.876
Tollway Cost	0		0.023		0.023
Right-of-Way Items	0	0.568	0.568	0.843	0.843
Total Cost	0	3.704	3.724	7.311-8.721	7.334-8.744

Table 2-4 Comparison of Alternatives

Project Mobility Effect	No Build	Freeway/ Expressway	Freeway/ Tollway	Freeway/ Expressway with Rail	Freeway/ Tollway with Rail
Project Purpose and Need/Project Objectives	No	Yes	Yes	Yes	Yes
System Interchanges	No	Yes	Yes	Yes	Yes
Access	No	Yes	Yes	Yes	Yes
Design Variations	No	Yes	Yes	Yes	Yes
Travel Pattern Disruptions (Ranking: 1 Least Impacting, 3 Most Impacting)	1	2	2	2	2

After evaluating all comments received during the public review period of the Draft EIR/EIS, Caltrans has selected a Preferred Alternative and made the final determination of the project’s effect on the environment. Caltrans certifies that the project complies with the California Environmental Quality Act (CEQA), prepared findings for all significant impacts identified, prepared a Statement of Overriding Considerations for impacts that will not be mitigated below a level of significance, and certified that the findings and Statement of Overriding Considerations have been considered before project approval. As required by CEQA, Caltrans will file a Notice of Determination with the State Clearinghouse that will indicate whether the project will have significant impacts, state whether mitigation measures are included as conditions of project approval, that findings were made, and that a Statement of Overriding Considerations was adopted. At least 30 days after publication of the Final EIS, Caltrans, as assigned by the Federal Highway Administration (FHWA), will document and explain its decision regarding the selected alternative, project impacts, and mitigation measures in a Record of Decision, in accordance with NEPA.

2.7 Rationale for Selecting Preferred Alternative

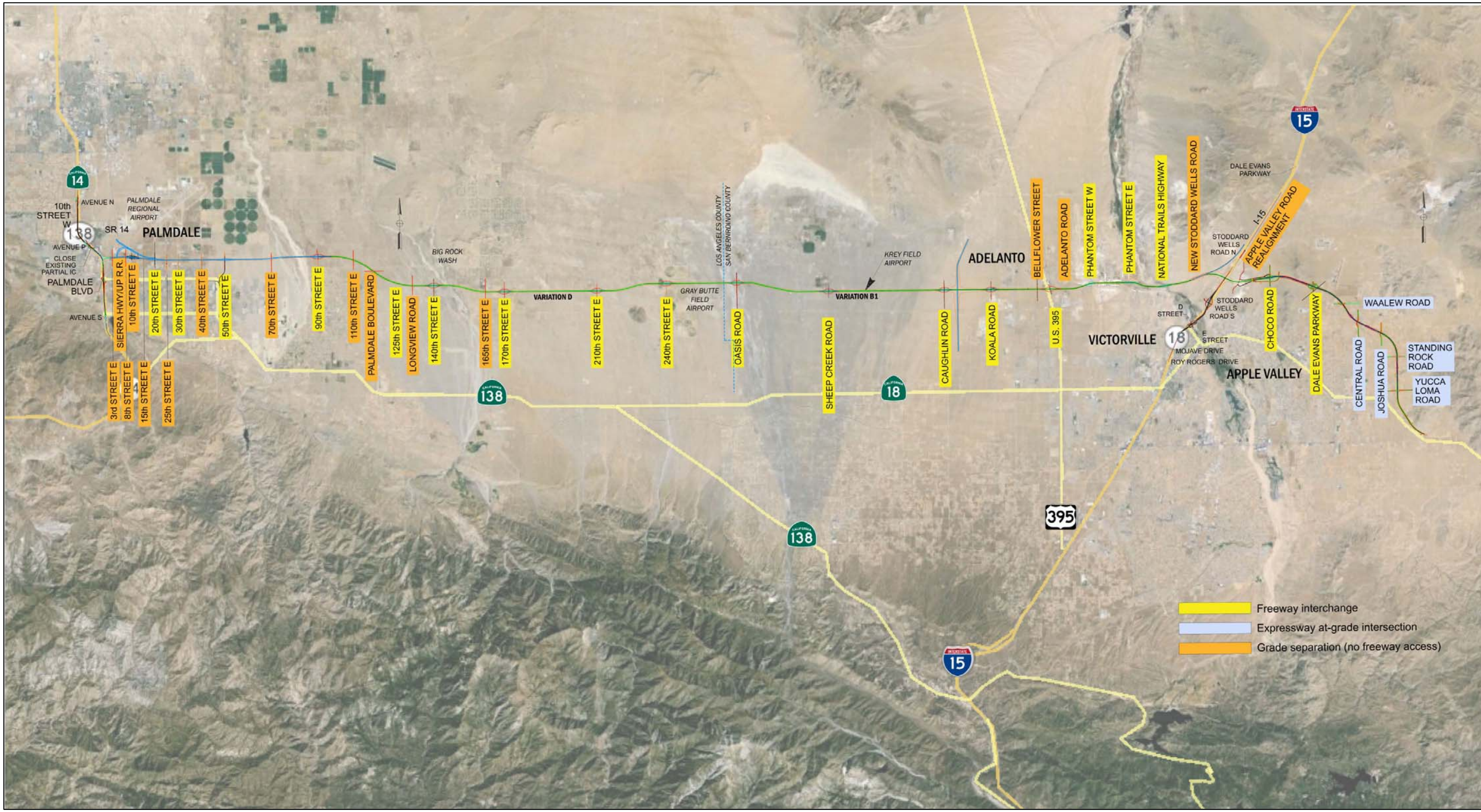
According to FHWA regulations (23 *Code of Federal Regulations* [CFR] 771.125) and Council on Environmental Quality (CEQ) regulations (40 CFR 1502.14), the lead agency should identify a Preferred Alternative in a Final EIS. This is the alternative the lead agency believes would fulfill its statutory mission and responsibilities, giving consideration to social, economic, environmental, technical, and other factors.

Caltrans, as lead agency under NEPA, as assigned by FHWA, and in cooperation with Metro, has identified a Preferred Alternative that consists of the following elements, as shown in Figure 2-42:

- The Freeway/Tollway with HSR Feeder Service Alternative (including Variations D and B1)
- HSR Option 1C to connect to the Palmdale Transportation Center
- HSR main alignment to connect to the XpressWest Victorville rail station
- Bike path between 20th Street East and US 395 (with funding to provide an extension along local streets to the Palmdale Transportation Center)
- Green energy production and transmission facilities within the study area footprint

The Preferred Alternative would meet the project’s Purpose and Need, as discussed in Section 1.2 of this Final EIR/EIS. This alternative would improve traffic operations along the approximate 63-mile length of the corridor, maintain mobility/accessibility, and enhance modal choice while accommodating planned growth in the High Desert region, particularly in the Antelope and Victor valleys. The Preferred Alternative’s surface transportation component with median separations would also help reduce the potential for head-on vehicular crashes and promote safety by introducing more gentle and gradual curves, wider lanes, and other geometric engineering improvements. The Preferred Alternative would also provide a connection to existing and future passenger rail systems, including the California HSR system and the proposed XpressWest HSR system. The proposed Class I bike path at the bottom of the freeway embankment would provide a continuous linkage between Los Angeles and San Bernardino counties. The green and renewable energy component would contribute to a reduction in GHG emissions and reduce energy costs.

Figure 2-42 High Desert Corridor Preferred Alignment



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Please note the following list of factors for supporting the Preferred Alternative is not in order of importance and does not represent all benefits or impacts associated with the Preferred Alternative.

Sustainability Factors

- As discussed in Section 1.2, Need, the green and renewable energy component of the Preferred Alternative would contribute to GHG and energy cost reductions mandated under AB 32.
- The HSR feeder service between Palmdale and Victorville would contribute to a reduction in the use of fossil fuels and GHG emissions.

Natural Resource Factors

- The Preferred Alternative, with its variations, would have fewer impacts on sensitive biological resources, including two protected avian species – the State- and federally listed southwestern willow flycatcher and the least Bell's vireo – than would other build alternatives.
- Variation B1 of the Preferred Alternative shifts the main alignment to avoid impacts on a solar farm (the former Meadowbrook dairy facility) and nearby agricultural parcels.

Community Impact and Local Planning Factors

- The Preferred Alternative is consistent with the land use and community planning goals of the various affected local jurisdictions as framed by their respective general plans and discussed in Section 3.1.1.1, Existing and Future Land Use.
- Variation D of the Preferred Alternative shifts the main alignment 1,500 feet to the south to reduce impacts on the community of Lake Los Angeles.
- Of the six options evaluated in the Draft EIR/EIS, Palmdale Rail Option 1C, included as part of the Preferred Alternative, while requiring relocation of the Palmdale Transportation Center, would avoid conflicts with community parks (Section 4(f) resources), the UPRR line, and AFP-42.
- Community character and livability would be enhanced as a result of incorporating the bicycle path infrastructure into the Preferred Alternative. The bike path would provide adjacent residents with an additional nonmotorized transportation option with its accompanying benefits.
- With its various modes, the Preferred Alternative would provide improved access and linkages between various desert residential communities, businesses, and facilities for a variety of users. The Preferred Alternative would help achieve smart growth goals required by SB 375 by helping to foster higher-density and mixed-use developments, especially near the proposed HSR stations in Palmdale and Victorville.

Economic and Fiscal Factors

- The Preferred Alternative is expected to support local economic development efforts in the High Desert, as discussed in Section 3.1.4.3, Economic Considerations. It would have little or no effect on the major development plans or expansion projects already underway or on regional development trends in general.

- The Preferred Alternative would add capacity to the overall transportation network to accommodate the rapidly growing freight and goods movement industry.
- The use of Tolled Express Lanes, incorporated as the Preferred Alternative from 90th Street East in Palmdale to US 395 in Adelanto, is a way to generate revenue for project construction and is consistent with SCAG's 2012-2035 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS).

Other Factors Considered in the Selection of the Preferred Alternative

- As reflected in Volume 3 of the Final EIR/EIS, comments received from local, State, and federal agencies and other stakeholders during the Draft EIR/EIS public review period generally expressed positive support for the package of multimodal options.
- The HSR feeder service between Palmdale and Victorville provides an additional mode choice that would complement the HDC by connecting the San Francisco, Central Valley, Los Angeles, Las Vegas, and San Diego regions of California.

Least Environmentally Damaging Practicable Alternative

- The Preferred Alternative, which includes Freeway/Tollway with HSR Feeder Service (including Variations D and B1), HSR Option 1C connection to the Palmdale Transportation Center, HSR main alignment connection to the XpressWest Victorville rail station, Bike path between 20th Street East and US 395, and the Green energy production and transmission facilities within the study area footprint, has been identified as the Least Environmentally Damaging Practicable Alternative as described in Section 3.3.2, Wetlands and Other Waters.

2.8 Design Alternatives, Variations, and Options Considered but Eliminated from Further Consideration

2.8.1 Freeway Segments

An Alternative Analysis (AA) and a Value Analysis (VA) were completed for the proposed project in September 2011 and January 2014, respectively. Both of these studies focused on the highway component of the project (a Rail Alternatives Analysis was completed in December 2013). The VA was focused on a small 10-mile segment of the project from SR-14 to 100th Street East, while the more detailed and comprehensive AA evaluated the entire 63-mile corridor, which includes the segment from SR-14 to 100th Street East.

Based on the result of the VA workshop, 11 alternatives were identified that have since been eliminated due to conflicts with mainline and local operations (i.e., city streets) and concerns with environmental impacts, construction impacts, maintainability, and land use compatibility to the extent that they are not considered viable alternatives. One such alternative eliminated was similar to the main alignment and Variation A, except for the portion between 20th Street East and 30th Street East where it bisects the two proposed alternatives. Due to the close proximity of this alternative to Variation A, this alternative was no longer considered. Another alternative proposed was eliminated due to potential impacts to Joshua trees.

In the AA, the alternatives and variations were evaluated relative to environmental and construction effects, traffic, ROW costs, joint development opportunities, and ability to meet regional and local transportation goals. Based on the screening process used, alternatives and variations were withdrawn from consideration that did not meet project objectives, such as meeting local transportation goals or maximizing joint development opportunities (refer to Table 2-5 for HSR alignment options eleiminated from evaluation).

2.8.2 Depressed Freeway

Another rejected alternative dealt with the portion of the HDC between SR-14 and 10th Street East. As proposed, this alternative would have depressed the freeway approximately 27 feet below ground. This alternative presented several problems, including drainage and flooding concerns, additional ROW, a larger project footprint, more impact to railroad crossings, and additional ground or habitat disturbance.

2.8.3 Variation B North and Variation C

A comprehensive AA was completed in September 2011 and, as a result of this analysis, Variation B North and Variation C were eliminated from further study. Variation B North was not selected for further analysis because the alignment would pass through the former Meadowbrook Dairy property off of Sheep Creek Road and affect dairy operations at this facility. Variation C would run slightly southwest of Falchion Road and cross Corwin Road to existing SR-18 (Happy Trails Highway). The AA concluded that Variation C would bisect Apple Valley and result in numerous residential and business impacts; therefore, it was eliminated from further study. This variation was also in conflict with the Town of Apple Valley’s General Plan land use map, which shows an HDC alignment farther north.

2.8.4 Variation D

Variation D North, which runs north of the main alignment between 190th Street East and 230th Street East, was proposed to avoid a large residential property with vineyards. This alignment variation was eliminated because of numerous potential residential impacts and a potential land use conflict. One of the parcels in the path of this variation is zoned under Los Angeles’ County Land Use designation as Open Space and is owned by the BLM.

Table 2-5 HSR Alignment Options Eliminated from Evaluation

	North Wye*			South Wye				
Option	Location	Crossing Type	Double or Single Track	Location	Crossing Type	Double or Single Track	Impacts	Reason for Elimination
1	North of Airport	Over	Single	North of Airport	Under	Single	LAWA Property, Future Power Plant	Power plant impact, at-grade crossing
1A	North of Airport	Over	Double	South of Airport	Over	Double	LAWA Property	South wye connection pushes Palmdale Transit Center farther south
1A1	North of Airport	Over	Double	South of Airport	Over	Double	LAWA Property	Station located south of Palmdale Boulevard
1A2	North of Airport	Over	Double	South of Airport	Over	Double	LAWA Property	Station located south of Palmdale Boulevard
1B	North of Airport	Over	Double	South of Airport	Under	Double	LAWA Property, Water Treatment Plant	Water treatment plant impact, pushes Palmdale Transit Center farther south
1B1	North of Airport	Over	Double	South of Airport	Under	Double	LAWA Property	Impacts encroach into Lancaster, largest impacts of all options would also encroach onto LAWA property
1B2	North of Airport	Over	Double	South of Airport	Under	Double	LAWA Property	Impacts encroach into Lancaster, largest impacts of all options would also encroach onto LAWA property
2	North of Airport	N/A	Single	North of Airport	N/A	Single	LAWA Property, Future Power Plant	Power plant impact, at-grade crossing
3	North of Airport	Over	Single	North of Airport	South of Station Over	Double	LAWA Property, Future Power Plant	Power plant impact and airport impacts
4	South of Airport	Over	Single	South of Airport	South of Station Over	Single	N/A	Impact to structures within loop
5	South of Airport	Over	Single	South of Airport	South of Station Over	Double	N/A	Single track connection, one-seat ride not possible
6	South of Airport	Over	Single	South of Airport	South of Station Over	Double	AFP-42	AFP-42 impact
7	South of Airport	Over	Double	South of Airport	Under	Double	LAWA Property, AFP-42	Impact to AFP-42 southwest corner
7A	South of Airport	Over	Double	South of Airport	Under	Double	N/A	Station located south of Palmdale Boulevard
7A1	South of Airport	Over	Double	South of Airport	Under	Double	N/A	Station located south of Palmdale Boulevard
7B	South of Airport	Over	Double	South of Airport	Under	Double	LAWA Property	Station located south of Palmdale Boulevard

*Wye – a track arrangement with three switches and three legs for reversing the direction of a train.

Variation D was refined to include a shorter shift south. As originally proposed, the project limits of Variation D were from approximately 150th Street East to 230th Street East. To minimize effects to agricultural parcels, the variation was shortened by approximately 3 miles to begin its southerly dip from approximately 190th Street and end at 230th Street East.

2.8.5 Palmdale Transit Center High-Speed Rail Connection Options

A rail alternatives analysis was conducted to determine the viability of certain HDC HSR connections into the existing Palmdale Transit Center. Table 2-5 identifies the rail Option 1 variations that were eliminated for a variety of reasons, such as property impacts, farmland impacts, grade crossing conflicts, and not meeting design criteria.

2.8.6 Side-Running HSR Alignment

An option was considered that would utilize the HSR running along the side of, and parallel to, the freeway rather than in the median. This option was ultimately rejected because, as proposed, it would have required a larger footprint at each of the numerous interchanges in order to avoid conflicts with the on- and off-ramps. This would have resulted in additional impacts to the communities along the corridor (i.e., residential and business acquisitions, noise impacts) and impacts to sensitive species and habitats. If design options or other methods are identified to avoid/reduce impacts, a side running alignment may be reevaluated in the future.

2.8.7 Hybrid Alternative

Recognizing that a wide range of corridor configurations and technology options were to be considered for the HDC, the concept of a Hybrid Alternative was initially articulated by the sponsor agencies. There was also a positive response to this concept heard at some public information meetings; however, because the merits of the primary alternatives had not been subjected to public comment, and also because there were no firm notions regarding which components of those alternatives could or should be combined, there was no defined Hybrid Alternative presented in the Draft EIR/EIS. The possibility had been left open that, following a complete review of the merits of the various components of each of the remaining build alternatives following circulation of the Draft EIR/EIS, including consideration of public and agency comments, that components of one or more of the existing alternatives could be selected to comprise a Hybrid Alternative. It was also recognized that it was highly probable that one of the current alternatives would be selected in its entirety; this is what has occurred. Therefore, the Hybrid Alternative has not been revived for consideration in the Final EIR/EIS.

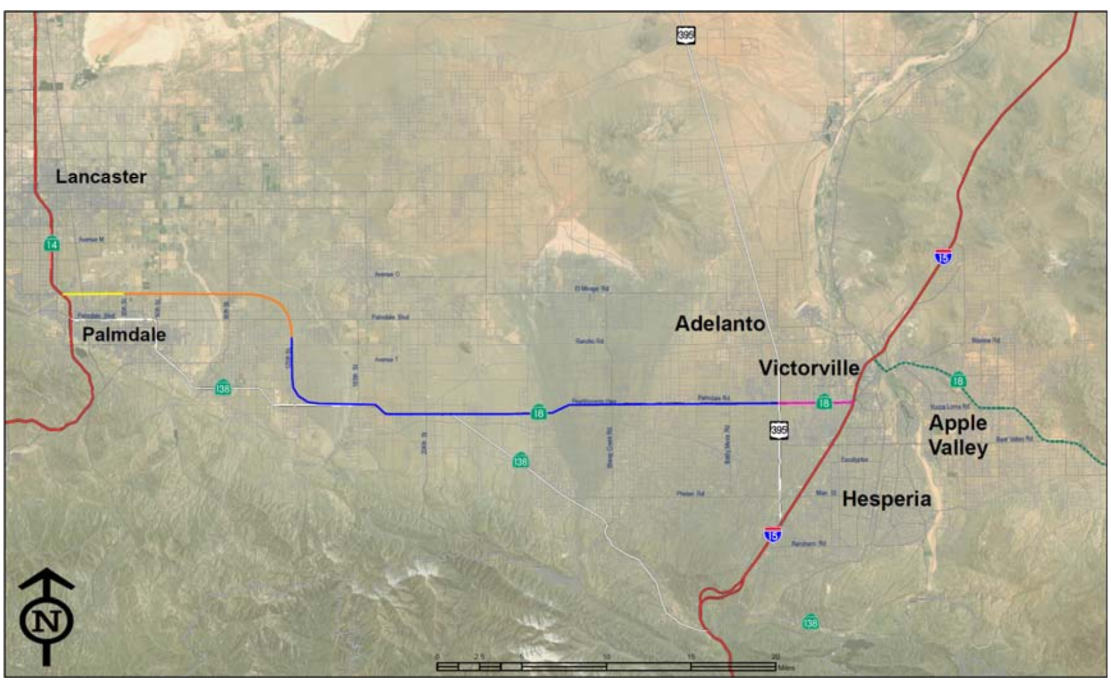
2.8.8 Transportation System Management Feasibility Evaluation

A TSM Alternative was proposed originally as a result of agency and public input during circulation of the Notice of Intent (NOI)/Notice of Preparation (NOP) in 2009 and subsequently amended in 2010. The TSM Alternative was included during the AA in 2011 and evaluated in the Draft Traffic Study technical report (March 2013); it was further evaluated in a TSM Narrative in November 2013.

The TSM approach to addressing transportation issues is typically focused on increasing the capacity of the State and local transportation systems by increasing the number of peak-hour person-trips without major construction and associated capital expenditures. The TSM Alternative attempts to identify to what degree a transportation need can be satisfied with limited financial resources; therefore, it often functions to set a baseline condition against which the performance of more substantial and costly capital improvement options are measured. TSM strategies are intended to first focus on increasing the efficiency of existing facilities; they are actions that increase the number of vehicle trips a facility can carry without a major expansion of capacity. A TSM strategy may include a variety of techniques, including ramp metering, HOV lanes, auxiliary lanes, turning lanes, reversible lanes, and traffic signal coordination. TSM also encourages increased automobile occupancy through ridesharing programs, increased use of public transit systems, and bicycle and pedestrian improvements as elements of a unified urban transportation system.

The initial definition of the TSM/Transportation Demand Management (TDM) Alternative for the HDC therefore included “operational investments, policies, and easily implemented, low-cost improvements aimed at improving goods movement, passenger auto and transit travel, and reducing environmental impacts associated with transportation as they may affect cities and operations in the HDC study area.” As development of the HDC progressed, the TSM/TDM Alternative was modified to enhance the ability of the alternative to address the purpose and need for the HDC Project. This resulted in a definition of TSM components that included some capacity enhancements in addition to pure TSM techniques. The general alignment of the TSM Alternative components is shown in Figure 2-43.

Figure 2-43 Transportation System Management Alternative Alignment



The TSM Alternative considered for evaluation was defined as a mix of lower-cost roadway improvements within and outside the proposed project corridor that could be evaluated against the proposed project alternatives (i.e., build alternatives). Starting off like the build alternatives, the TSM Alternative extended east across mostly open terrain from SR-14 parallel with and near East Avenue P-8. At approximately 110th Street East, the TSM alignment bent to the southeast across East Palmdale Boulevard before proceeding due south in the vicinity of Longview Road to East Avenue T. Extending approximately 0.5 miles farther south (Longview Road currently terminates at East Avenue T), the alignment curved southeast across open terrain to connect with the existing SR-138 east of the community of Pearblossom. From this point east, the TSM improvements would occur along the existing SR-138/SR-18 corridor to an eastern terminus at I-15. Except for a freeway between SR-14 and 30th Street East, the TSM roadway improvements would maintain at-grade intersections with local roads and driveway access. The following five key elements were taken into consideration for defining the TSM Alternative.

1. **New Palmdale Freeway:** To alleviate east-west traffic congestion in Palmdale, the TSM Alternative included ROW acquisition for an eight-lane, 3.4-mile-long, grade-separated freeway parallel with and near Technology Drive/East Avenue P-8 from SR-14 to 30th Street East. Facility improvements along SR-14 required to accommodate the freeway-to-freeway interchange were assumed to be identical to those defined for the build alternatives. New local interchanges would be built at 20th Street East and 30th Street East. The existing partial interchange at SR-14/ Rancho Vista Boulevard would be closed, and a full interchange would be constructed at 10th Street West to provide better weaving distance with the direct connector ramps of the SR-14/HDC interchange. A viaduct would be constructed between Division Street and 10th Street East.

2. **Expressway from 30th Street East to Longview Road:** From the freeway terminus, the TSM Alternative would extend east as an access-controlled, four-lane divided expressway. After passing due east across Little Rock Wash and 100th Street East, the alignment would bend southeast to Palmdale Boulevard, then south-southeast to Longview Road. A viaduct structure could be required across Little Rock Wash.

3. **Highway from Longview Road to US 395:** The north-south portion of this segment would run along or parallel to Longview Road past its terminus at East Avenue T before bending southeast to a new signalized T-intersection at SR-138. Extending east from the community of Pearblossom, this TSM component would involve widening where necessary along the existing SR-138/SR-18 highway to four lanes. A roadway cross section similar to what currently exists along SR-138 (Pearblossom Highway) from Longview Road to 165th Street East was assumed. This cross section would provide standard-width shoulders, two 12-foot-wide travel lanes per direction, and a wide median. A 4- to 20-foot-wide median was assumed to facilitate left-turn movements to cross streets and driveways.

Continuing east, SR-138 was widened to four lanes between Longview Road and 165th Street East in 2006/2007 as part of Caltrans' SR-138 Corridor Improvement Program. This program entails complete widening of SR-138 from Avenue T in Palmdale to the junction of SR-18 in Llano. While technically part of the TSM Alternative, the segment of SR-138 east of Longview Road would not require widening.

4. **Arterial Highway between US 395 and I-15:** From approximately 5 miles east of US 395 (west of Caughlin Road) to I-15, SR-18 (Palmdale Boulevard) would be widened to a six-lane arterial highway in accordance with City of Victorville roadway standards. The City's General Plan circulation map designates this portion of Palmdale Road as a "super arterial" having a 124-foot ROW.

5. **Roadway and Signal Improvements:** The TSM Alternative would also include minor improvements to roadway sections and signals along SR-18 from I-15 to Bear Valley Road. The strategy behind these works would be to focus on improving traffic flow designed to increase average travel speeds while reducing vehicle delay and idling. Specific projects could include traffic signal synchronization and intersection improvements.

Several factors were considered in evaluating the TSM Alternative. These include:

- Meeting the proposed project's purpose and need
- Benefits estimates
- Cost effectiveness

Purpose and Need Evaluation

In evaluating whether the TSM/TDM alternative is meeting the HDC's purpose and need, the following elements were considered.

Route Continuity

The TSM Alternative would not address the need for a continuous, direct east-west connection between the developed areas of the southern Antelope and Victor valleys, because the areas are separated by distances that make connection using existing roads subject to localized conditions that are difficult to overcome without creating a new corridor and developing access restrictions. Except for the freeway/expressway components across Palmdale, the TSM Alternative route follows the existing, circuitous highway routing that currently contributes to traffic congestion on SR-138/SR-18 and adjoining highways and local streets.

The TSM Alternative would require motorists to travel several miles in the wrong direction to reach some destinations. For example, a motorist traveling from Apple Valley to Los Angeles/Palmdale Regional Airport must first travel northwest on SR-18 to I-15, then south on I-15 to SR-18 (Palmdale Boulevard), then west to Pearblossom, then back north and northwest several miles to East Avenue P-8, then west and farther north to the airport. Eastbound travelers intending to access I-15 northbound would also drive several miles out of direction to reach their destinations.

According to the Draft *Traffic Study Report* (Parsons, 2013), the TSM Alternative route is 4 miles longer than the build alternatives. For these reasons, the TSM Alternative would not perform well in terms of route continuity.

Mobility

By building the freeway/expressway component across approximately 3.3 miles of Palmdale, the TSM Alternative would partially address existing mobility issues within the SR-138/SR-18 corridor. For the remaining 60 miles of the corridor, motorists' mobility would be challenged by speed limit changes, signal- and stop-controlled intersections, and direct-access points (e.g., driveways and local roadways) that impede traffic flow. Furthermore, with the TSM Alternative, trucks and other commercial traffic using the corridor would still be required to transition between rural highway, local arterials, and freeway segments. In comparison with freeway travel under the build alternatives at buildout, the TSM Alternative would require travel through more than 30 roadway intersections plus numerous driveway and unpaved road access points between its short freeway terminus in Palmdale and I-15 in Victorville; therefore, in comparison to the build alternatives, the TSM Alternative offers substantially less benefit in terms of mobility.

Level of Service and Congestion

Based on population growth projections for the southern High Desert region, traffic congestion is predicted to get much worse, with 10 of the 55 study rural and urban intersections expected to operate at unacceptable levels of service (LOS) (i.e., LOS E or F) in 2020, 2040, or both years. By comparison, under the build alternatives, 2 or 3 of these same 55 intersections would operate at unacceptable LOS. The TSM Alternative would alleviate existing and future traffic congestion for approximately 3.3 miles across the north side of Palmdale by moving traffic off local streets to a new freeway. Widening along existing State Routes 138 and 18 would allow vehicles to safely pass one another and thereby improve future traffic conditions; however, unlike the build alternatives, the TSM Alternative would not remove the above-mentioned conditions that contribute to traffic congestion (i.e., lower speed limits in urban areas, cross traffic at intersections, direct local roadway and driveway access points) that impede traffic flow. The travel time analysis conducted using SCAG's travel forecast model shows that the TSM Alternative would outperform the No Build Alternative, but it would substantially underperform any of the build alternatives. During the morning (AM) peak period, travel time from Apple Valley to Lancaster is projected to take more than 0.5 hours longer than with the build alternatives. During the afternoon (PM) peak period, the TSM Alternative is projected to take almost 35 minutes longer. Given these considerations, future traffic congestion under a TSM Alternative project would be much worse than conditions under any of the build alternatives.

Safety and Reliability

TSM Alternative improvements would result in safety benefits through development of a controlled-access highway across Palmdale, eliminating all two-lane State highway segments, and making road and signal improvements to improve traffic flow; however, the TSM Alternative would not achieve the level of safety and reliability associated with the build alternatives, because it would retain multiple access points via private driveways, intersections and an at-grade railroad crossing. The frequency of accident occurrence is typically lower on freeways and expressways compared to other types of regional roads and city streets. Data provided in the Draft *Traffic Study Report* (Parsons, 2013, see Table 5-3) for the HDC Project indicate that traffic injury and fatality rates for urban arterials are much higher than for urban freeways.

Due to its location on the desert floor just north of the San Gabriel Mountains, the wide washes and other water courses that traverse north across the SR-138/SR-18 highway can bring flash flooding, especially during summer when heavy localized monsoonal thunderstorms are typical. A new freeway/expressway associated with the build alternatives would not be prone to flooding, because preliminary design entails construction of the new facility approximately 6 to 8 feet above existing grade of the desert floor.

Regional Transportation System Accessibility

By adding a new highway across Palmdale to the community of Pearblossom and widening the existing highway east to I-15, the TSM Alternative would somewhat improve east-west accessibility across the southern High Desert region. This could be beneficial to either the Los Angeles/Palmdale Regional Airport or SCLA, both of which have generated considerable interest as potential centers for future economic growth. The TSM Alternative would also improve access to the Palmdale Transportation Center for regional bus and rail transit, and for potential future HSR transfers.

However, the TSM Alternative would not achieve the high level of accessibility to these transportation systems associated with the build alternatives, because it would rely on an existing indirect and discontinuous route across the region with numerous intersections, while requiring out-of-direction travel to reach connections with major north-south highway facilities. Unlike the build alternatives, the TSM Alternative would not include a direct and continuous new route connecting major north-south highway facilities at freeway-to-freeway interchanges with direct ramp connectors.

While the proposed build alternatives would cross the High Desert along an east-west extension of Air Expressway, providing excellent access to SCLA, the TSM Alternative would extend west from Palmdale Boulevard, located approximately 4.5 miles to the south of SCLA. Motorists trying to access SCLA from Palmdale Boulevard would likely choose to navigate north along US 395, which can experience heavy congestion during peak travel periods.

In Palmdale, both the TSM and build alternative projects include a west-end freeway; thus, local access to the Los Angeles/Palmdale Regional Airport and Palmdale Transportation Center would be similar. However, regional access to these transportation centers would be inferior with the TSM Alternative because of the aforementioned alignment and operational deficiencies.

Greenhouse Gas Emissions

In comparison to the build alternatives, the TSM Alternative would result in lower GHG emissions during construction but much higher emissions over long-term operations. Carbon dioxide (CO_2) and other GHG-contributor emissions during construction of the TSM Alternative would be much less than any of the build alternatives, because it is a considerably smaller project; however, emissions from vehicles during TSM Alternative operations would be much greater due to longer routing, numerous required stops and starts, and increased congestion. The use of green energy technologies is not planned with the TSM Alternative; therefore, this option for reducing GHG emissions would not be available.

Benefits Estimates

Benefits evaluated for the TSM Alternative and discussed below are “user” benefits, revenue transfers, reductions in external costs, and life-cycle benefits. These benefits were calculated for the *Traffic Study Report* (Parsons, Draft 2013 and Final 2014) using FHWA’s Surface Transportation Efficiency Analysis Model (STEAM), 2.0. The TSM Alternative was estimated to accrue benefits totaling $1.67 billion over a 20-year life cycle from 2020 to 2040. By comparison, the build alternatives were estimated to accrue $10.89 billion to $9.97 billion for the freeway/expressway with and without tolls, respectively.

Cost Estimates

Cost estimates were developed by Caltrans for the *Project Report*. The preliminary cost estimate for a 63-mile-long build alternative involving a new freeway/ expressway is approximately $3.704 billion. While the cost estimate for the TSM Alternative (approximately $550 million in ROW acquisition) would be lower than any of the build alternatives, the overall public benefit of the TSM Alternative would be the lowest.

Due to the length (more than 50 miles) and complexity of the project, and due to the need for funding support to be identified, construction of the project would need to be temporally phased, with construction being developed for logically defined segments within the entire corridor. The TSM Alternative would be conducive to such a phased approach, given that it includes lower-cost roadway improvements that can be easily packaged into individual construction contracts; however, the same funding constraints would apply to the build alternatives, so there is no major comparative benefit to the TSM Alternative in this regard. A substantial negative with regard to the TSM Alternative would be to use public funding in support of a project that would result in major out-of-direction travel for eastbound motorists from Palmdale wishing to go north on I-15 and westbound motorists wishing to go south on SR-14.

Based on the above, the TSM Alternative was assessed for potential full analysis in the Draft Environmental Document for the project in comparison to the build alternatives. As discussed above, the TSM Alternative under evaluation was considered to be enhanced and comparable to the build alternatives because it included components that went beyond the typical, relatively low-cost measures (e.g., traffic light synchronization) to improve the operational efficiency of existing highway facilities.

Conclusion

Based on the evaluation presented above and as illustrated in the reasons listed below, the TSM Alternative was not recommended for further analysis in this EIR/EIS. It was ultimately rejected from further study mainly because it did not in any way address the project's purpose and need. The rationale behind this decision is summarized below:

1. Connectivity. The TSM Alternative would not address the need for a continuous, direct east-west connection between the developed areas of the southern Antelope and Victor valleys.
2. Mobility. The TSM Alternative would only partially address the need for improved mobility within the corridor because vehicular traffic would still be required to transition between rural highway, local arterials, expressway, and freeway facilities. As under current conditions, motorists' mobility would be challenged by speed limit changes, traffic signal- and stop-controlled intersections, and direct-access points (e.g., driveways and local roadways) that impede traffic flow.
3. LOS and Congestion. The TSM Alternative would not adequately address systemic conditions that contribute to existing and future traffic congestion.
4. Safety. The TSM Alternative would not address the need for improved safety and reliability across the entire corridor.
5. Regional Transportation System Accessibility. The TSM Alternative would not achieve a high level of accessibility to the regional transportation system because it would rely on an existing indirect and discontinuous route across the region.

2.9 Other Action(s) Related to the Proposed Project

Agreement with LAWA: LAWA is the owner of a substantial amount of land located east of 15th Street East, which includes the current location of the Los Angeles/Palmdale Regional Airport. Caltrans and LAWA have negotiated which portion of LAWA-owned land would be most logical for extending eastward from 15th Street East, the ultimate alignment of the transportation corridor beginning at SR-14 and Avenue P-8. This alignment would generally run east-west along the southern border of LAWA, from 15th Street to 100th Street East. A Cooperative Agreement was signed between Caltrans and LAWA in April 2003 (see Appendix K for a copy of the Cooperative Agreement).

Replacement Parking for Rockview Nature Park: In San Bernardino County, coordination between the City of Victorville and LADWP would be necessary to address Rockview Park's unpaved parking lot. Rockview Park's existing unpaved parking lot is located within an LADWP parcel, which is currently leased from this electric utility. Caltrans would have to coordinate with LADWP about the acquisition of this parcel for the project at a later date. To offset the parking loss, added parking is proposed to help enhance access to Rockview Park to minimize any potential project effects to this park due to the acquisition of LADWP's land for the HDC.

California High-Speed Rail: A Program Draft EIR/EIS was prepared, which identified the California High-Speed Rail Authority as the entity responsible for determining and analyzing the various alternatives (i.e., alignments) for the HSR. Project-specific alignment alternative studies are currently underway for logical segments of the San Francisco/Sacramento to Los Angeles HSR facility. One such alternative proposes a southern mountain crossing where Bakersfield would be linked to the Antelope Valley. An Antelope Valley station stop proposed near the Palmdale Transit Center off Sierra Highway would be a key hub for bus, rail, and commuters. Such a station stop would provide connectivity and accessibility to the Antelope Valley population and would service long-distance commuters to Los Angeles.

XpressWest: The XpressWest High-Speed Passenger Train is a federally approved, private passenger rail service that would provide transportation along a 200-mile-long corridor between Victorville and Las Vegas, Nevada. Records of Decision have been issued by the federal lead and cooperating agencies, including the FRA, BLM and the California and Nevada Divisions of FHWA. Additionally, in October 2011, the Surface Transportation Board issued its decision granting XpressWest the authority to construct and operate the interstate railroad. The project would be constructed with no at-grade crossings on new, exclusive double track primarily running parallel to I-15. A station stop is proposed near Dale Evans Parkway on the west side of I-15 in Victorville. Permits and Approvals Needed

It is anticipated that the proposed project may require the federal approvals and permits listed in Table 2-6.

Table 2-6 Project Permits and Approvals

Agency	Permit/Approval	Status
United States Fish and Wildlife Service (USFWS)	Biological Opinion	Threatened and Endangered Species Act Section 7 consultation was initiated following identification of the Preferred Alternative. The Biological Opinion was obtained on April 6, 2016 and is included in Appendix L of Volume 2.
United States Army Corps of Engineers (USACE)	Jurisdictional Determination (JD) (Preliminary and Approved)	A Preliminary JD was received on April 11, 2016. An Approved JD was received on May 16, 2016.
United States Army Corps of Engineers (USACE)	Clean Water Act (CWA) Section 404 Permit for the discharge of dredge or fill materials into waters of the U.S.	Application to be submitted during the design phase.
Federal Emergency Management Agency (FEMA)	Conditional Letter of Map Revision and Letter of Map Revision	Coordination with FEMA during the design phase to ensure improvements are compatible with the floodplain.

Table 2-6 Project Permits and Approvals

Agency	Permit/Approval	Status
Federal Highway Administration (FHWA)	Air Quality Conformity Determination	FHWA made a finding that the project is consistent with requirements of the Clean Air Act (CAA) on January 4, 2016 (see Appendix M of Volume 2).
Federal Aviation Administration (FAA)	FAA's Obstruction Evaluation/Airport Airspace Analysis process	Coordination with FAA during project design to ensure project features or mitigation measures would not obstruct airport/air space activities.
Department of Interior Bureau of Land Management (BLM)	Paleontological Resource Use Permit	To be submitted for the potential to encounter paleontological resources on BLM property during construction.
California State Water Resources Control Board (SWRCB)	Water Discharge Permit, approval of Notice of Intent (NOI) to comply with General Construction Activity National Pollutant Discharge Elimination System (NPDES) Permit (CWA Section 402)	NOI to be submitted during the design phase.
California Department of Fish and Wildlife (CDFW)	Section 1602 Lake or Streambed Alteration Agreement	Section 1602 Notification is to be submitted and agreement obtained prior to the start of construction.
Region 6, Lahontan Regional Water Quality Control Board (RWQCB)	Water Quality Certification (CWA Section 401)	Certification of compliance will be obtained prior to the start of construction.
State Historic Preservation Officer (SHPO)	Concurrence on the Finding of Affect (FOE) and approval of a Programmatic Agreement (PA)	SHPO concurred with the FOE on March 22, 2016 and approved the PA on March 30, 2016.
Interested Native American Tribes	Section 106 of the National Historic Preservation Act (NHPA) to include, but not be limited to, determinations of eligibility, findings of effect, and future work that includes involvement with the PA, Archaeological Monitoring Plan, and Data Recovery Plan	Native American Consultation for the High Desert Corridor (HDC) is ongoing.
Burlington Northern Santa Fe (BNSF) Railroad Company	Memorandum of Understanding (MOU) and a Construction and Maintenance Agreement between Caltrans and BNSF; approval of the proposed action, based on review of the Construction and Maintenance Agreement between Caltrans and BNSF	Prior to any construction within or above railroad right-of-way (ROW).
California Public Utilities Commission (CPUC)	General Order 131-D for relocation of electrical transmission lines between 50 and 20 kilowatts (kW); Certificate of Public Convenience and Necessity for relocations to electrical transmission lines and gas lines	Prior to relocation of electric utility lines; after certification of Environmental Impact Report (EIR)/Environmental Impact Statement (EIS) and the filing of a Notice of Determination to complete the California Environmental Quality Act (CEQA) process.

Table 2-6 Project Permits and Approvals

Agency	Permit/Approval	Status
Local Air Pollution Control Districts	Dust Control Permit per Antelope Valley Air Quality Management District's (AVAQMD) Rule 403 (Fugitive Dust) and Mojave Desert Air Quality Management District's (MDAQMD) Rule 403.2 (Fugitive Dust Control for the Mojave Desert Planning Area), and South Coast Air Quality Management District's (SCAQMD) Rules 401, 402, and 403.	Permit to be acquired after project approval and prior to construction.
Utilities (e.g., power, water, gas, cable, communication)	Approvals to relocate, protect in place, or remove utility facilities	Prior to any construction activities that would affect utility facilities.
San Bernardino County and Los Angeles County Flood Control Districts	Floodplain Encroachment Permit	During final design.
Southern California Edison (SCE)	Site Plan Review Relocation of Transmission Lines Approval	During final design.
Southern California Regional Rail Authority (SCRRA)/ Metrolink	Temporary Rights-of-Entry Agreements; Design Service Agreements or MOU for plan reviews and approvals; Construction & Maintenance Agreements for future grade separations	During final design.
California Transportation Commission (CTC)	Route Adoption for HDC along Preferred Alternative	Prior to final design.

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Chapter 3 Affected Environment, Environmental Consequences, and Avoidance, Minimization, and/or Mitigation Measures

This chapter discusses project impacts on human, physical, and biological environments within the study area defined for each environmental resource. As part of the design refinement, the variations to Rail Options 1 and 7 under the Freeway/Expressway and Freeway/Tollway Alternatives with High-Speed Rail (HSR) Feeder/Connector Service have been recently introduced, and the impacts of these variations are presented in Appendix M.

Analysis of each environmental factor includes discussion of the affected environment (i.e., existing environmental conditions), environmental consequences (e.g., construction impacts, permanent impacts, cumulative impacts, and indirect impacts), and avoidance, minimization, and mitigation measures for each of the build alternatives and the No Build Alternative. Due to the extent of impacts expected to occur during project construction, a separate section is provided to describe potential construction-related impacts and recommended mitigation measures (Section 3.6, Construction Impacts).

For the California Environmental Quality Act (CEQA), the environmental conditions existing in 2008, when the Notice of Preparation (NOP) was issued and when the traffic counts were conducted, served as the baseline for impact analysis evaluated in this environmental document. For the National Environmental Policy Act (NEPA), the No Build Alternative served as the baseline for determining the project's impacts.

To minimize repetition, when the effects of the build alternatives are the same, they are presented together in the environmental consequences section. When project effects are found to be substantial and adverse, then mitigation measures are developed to reduce the impacts to the extent possible. The Avoidance, Minimization, and/or Mitigation Measures apply to all build alternatives, unless specifically identified as only being applicable to certain alternatives.

As part of the scoping and environmental analyses done for the project, the following environmental issues were considered, but no adverse impacts were identified. Consequently, there is no further discussion of these issues in this document.

- ***Timberlands (forest resources).*** The project is in both urban and rural areas. There is no timberland in the project area.
- ***Coastal Zone.*** The project is not within a coastal zone and is not within the jurisdiction of the California Coastal Commission.

- ***Wild and Scenic Rivers.*** No designated wild and scenic rivers are in the project area (National Wild and Scenic Rivers System map, last updated on August 18, 2011).

3.1 Human Environment

3.1.1 Land Use

3.1.1.1 Existing and Future Land Use

This section addresses potential impacts to existing and planned land uses in the project area that could result from implementation of the project alternatives.

Affected Environment

The information in this section is from the *Community Impact Assessment* (CIA) (April 2016) prepared for this project.

Jurisdictions of the High Desert Corridor (HDC) study area include the City of Palmdale, City of Adelanto, City of Victorville, Town of Apple Valley, and unincorporated areas within Los Angeles and San Bernardino counties. Local, municipal, and general plans provide a roadmap for future growth and location of development through land use designations, goals/policies, and land use/zoning maps. The general plans reviewed for the project include City of Palmdale General Plan (1993), City of Adelanto General Plan (1994), City of Victorville General Plan 2030 (2008), Town of Apple Valley General Plan (2009), Antelope Valley Area Plan (2015), and the County of San Bernardino 2007 General Plan (2007). Specific plans reviewed include the Desert Gateway Specific Plan (2009). Additional resources include land use maps, Geographic Information System (GIS) maps, and consultation with local municipalities.

Palmdale

Vacant land accounts for 79.5 percent of the total 111,528 acres of land in Palmdale, while the U.S. Air Force Plant 42 (AFP-42) occupies about 5 percent of the land. Residential and industrial land uses account for 11.7 and 1.7 percents, respectively.

According to the Land Use Element of the City of Palmdale General Plan (1993), Palmdale's planning area extends east to 120th Street East and towards the south. The City of Palmdale General Plan is dated circa 1993. At the time of the analysis, this was the most recent source available; therefore, field visits were conducted to verify existing land uses and development. The city boundaries traverse along Avenue W (Angeles National Forest) east of State route (SR) 14 and follow an irregular boundary along the Sierra Pelona ridgeline. To the west, the boundary extends out to 90th Street West, and to the north, it extends to Avenues M and L. The city's downtown area is east of SR-14, along Palmdale Boulevard.

As the southernmost community within the Antelope Valley, Palmdale's strategic location serves as a major transportation node due to its direct accessibility to SR-14 and SR-138. It is in close proximity to the Palmdale Metrolink Rail Station and Los

Angeles/Palmdale Regional Airport (PMD). The planning area contains roughly 11 miles of freeway frontage along SR-14, in which a large percentage of the land is undeveloped, thus allowing for potential future development within the area. In addition to the freeway frontage, the planning area includes Los Angeles/Palmdale Regional Airport, a nonoperational commercial air terminal operated by Palmdale Airport Authority on land leased from the 5,844-acre AFP-42 adjacent to its 12,000-foot main runway 7/25. The planning area also includes 17,750 acres south and east of AFP-42 that were acquired by Los Angeles World Airports (LAWA), an agency of the City of Los Angeles, for development of a future “Palmdale International Airport” intended to relieve congestion at Los Angeles International Airport. In addition, the U.S. Air Force (USAF) owns AFP-42, which is adjacent to the LAWA property.

AFP-42 borders Sierra Highway on the west, LAWA property on the east, Lockheed Way/Blackbird Lane and Avenue P on the south, and Avenue M on the north. Several aerospace contractors have aircraft design, testing, and maintenance facilities on AFP-42, including Lockheed-Martin, Northrop-Grumman, and Boeing. AFP-42’s 12,000-foot main runway is one of the most heavily reinforced runways in the world, providing a unique aerospace resource. In addition, AFP-42 has approximately 42 million square feet of industrial space, including the large hangars used for assembly of the National Aeronautics and Space Administration’s (NASA) space shuttles. AFP-42 contractors employ several thousand individuals, and the facility is the largest single source of employment in Palmdale.

Most of the city’s manufacturing and industrial plants are located within the northeast part of Palmdale, which also encompasses Los Angeles/Palmdale Regional Airport and airport-related uses. Within Downtown Palmdale and along Palmdale Boulevard, land use designations include public facilities, downtown commercial, and medium residential. The Palmdale City Hall and retailers, such as Palmdale Honda, Vallarta Supermarkets, and AutoZone, are located along the Palmdale Boulevard corridor.

Towards the west of Palmdale, primary land uses include residential and specific plan designations. To the south, major land uses include single-family residential designations located south of Downtown Palmdale and west of SR-14.

Palmdale Study Area

The total land area within the Palmdale study area is approximately 12.77 square miles or 18 percent of the HDC study area. Planned land uses within the Palmdale study area include industrial, business park, airport, low-density residential, regional commercial, office commercial, community commercial, single-family residential, public facility, commercial manufacturing, open space, and specific plan designations (Figure 3.1.1-1). Based on field reviews, major land uses within the study area include a mixture between industrial, business park, airport, and low-density residential uses.

The western portion of the study area has a mixture of industrial and commercial uses, which include three major regional retail centers and an auto center. The western end of the study area is included in The Palmdale Transit Village Specific

Plan, which calls for the implementation of transit-oriented development (TOD) and includes development of a transit center located north of Avenue Q and west of Sierra Highway. The land in the center of the study area is largely undeveloped or vacant. Most of the project alignment is within the undeveloped land currently owned by LAWA. Land use within the eastern end of the study area primarily includes industrial and low-density residential.

Land use in the area of the High-Speed Rail (HSR) Connector Options 1 and 7 includes airport, public facility, industrial, commercial manufacturing, business park, medium residential, open space, community commercial, and specific plan designations (Figures 3.1.1-2 and 3.1.1-3). Airport and public facility land uses are located towards the eastern end of the study area, while industrial and business park land uses are more centralized along Sierra Highway and Technology Drive. Commercial and residential uses within the study area are less dominant and are spread out along Sierra Highway.

West Palmdale, which includes land to the west of SR-14, primarily includes single-family residential, low-density land uses. West Palmdale also includes open space land uses and mountainous terrain, including Ritter Ranch Park. The Ritter Ranch Specific Plan governs the development of Ritter Ranch. The plan’s objectives are to develop the area as a mixed-use project incorporating residential, open space, public facility, recreational, school, and commercial land uses. In addition, the Census designated place (CDP) of Desert View Highlands is geographically located within West Palmdale; however, it is not considered to be part of the City of Palmdale.

Land uses within the Palmdale rail station area include business park, commercial manufacturing, community commercial, downtown commercial, industrial, other jurisdiction (Los Angeles County), public facility, and specific plan. The total land area within the Palmdale rail station study area is approximately 1.53 square miles. General plan land use designations indicate that the land adjacent to the proposed Wye Connection track split is designated for Industrial and Business Park uses. Most of this land is currently vacant or undeveloped.

Future Land Use Trends

According to the Antelope Valley Area Plan (2015), land use policies have been developed to address the potential of future growth within the Antelope Valley area. Based on the land use policies, the County has called for the redirection of future growth to occur within the cities of Palmdale and Lancaster.

The Palmdale Trade and Commerce Center Specific Plan, adopted May 24, 1990, and amended on August 24, 2010, sets forth an effort to create a diversified employment center within the center of Palmdale. The purpose of the specific plan is to attract job growth within the community and make use of the local diversified workforce within Palmdale and its surrounding community. The Palmdale Trade and Commerce Center is located along SR-14 and is between Rancho Vista Boulevard and Technology Drive. The Palmdale Trade and Commerce Center is within close proximity of the HDC Project area.

Figure 3.1.1-1 Palmdale Study Area Land Use Map

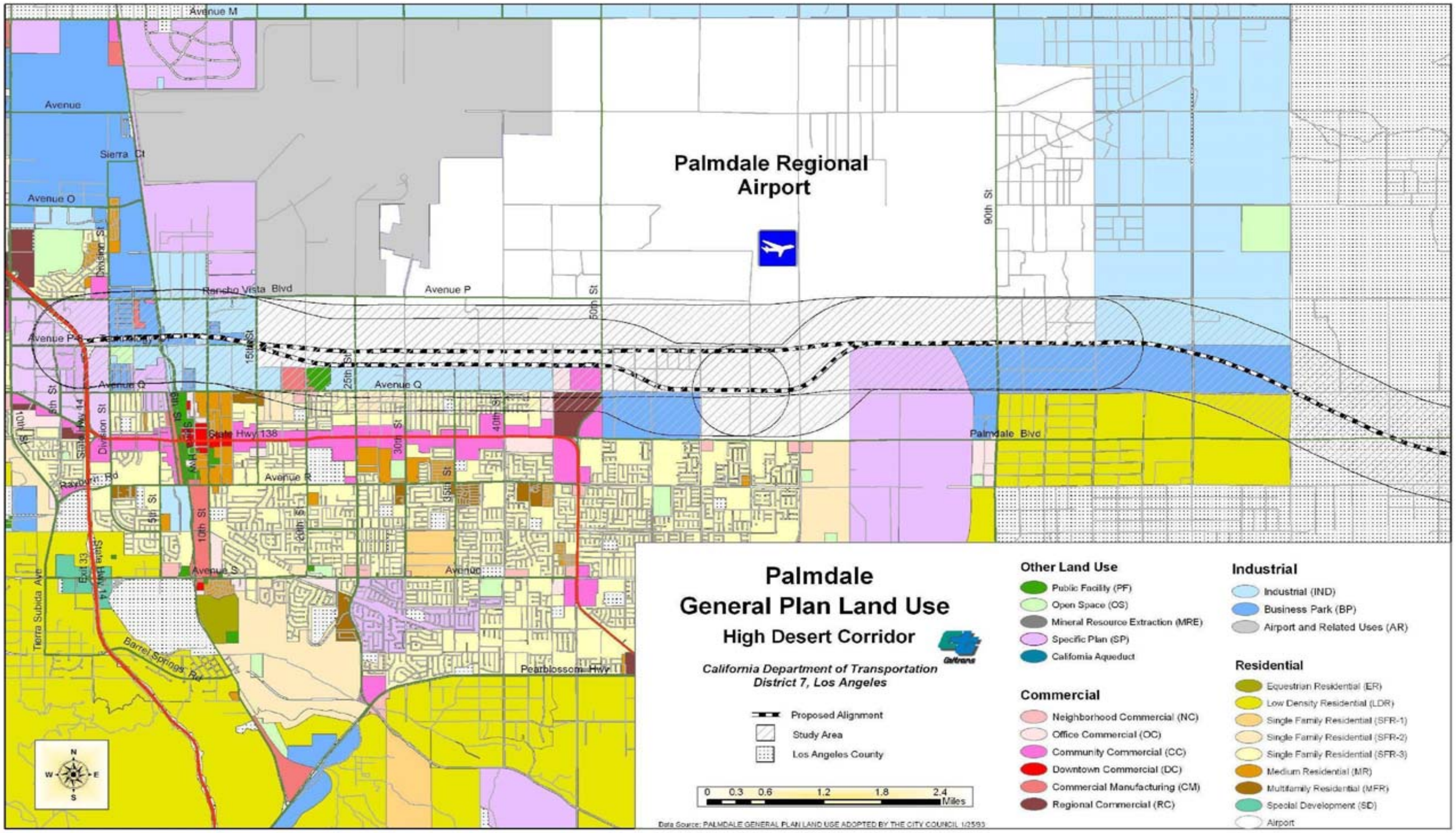


Figure 3.1.1-2 Palmdale Land Use High-Speed Rail Option 1 Map

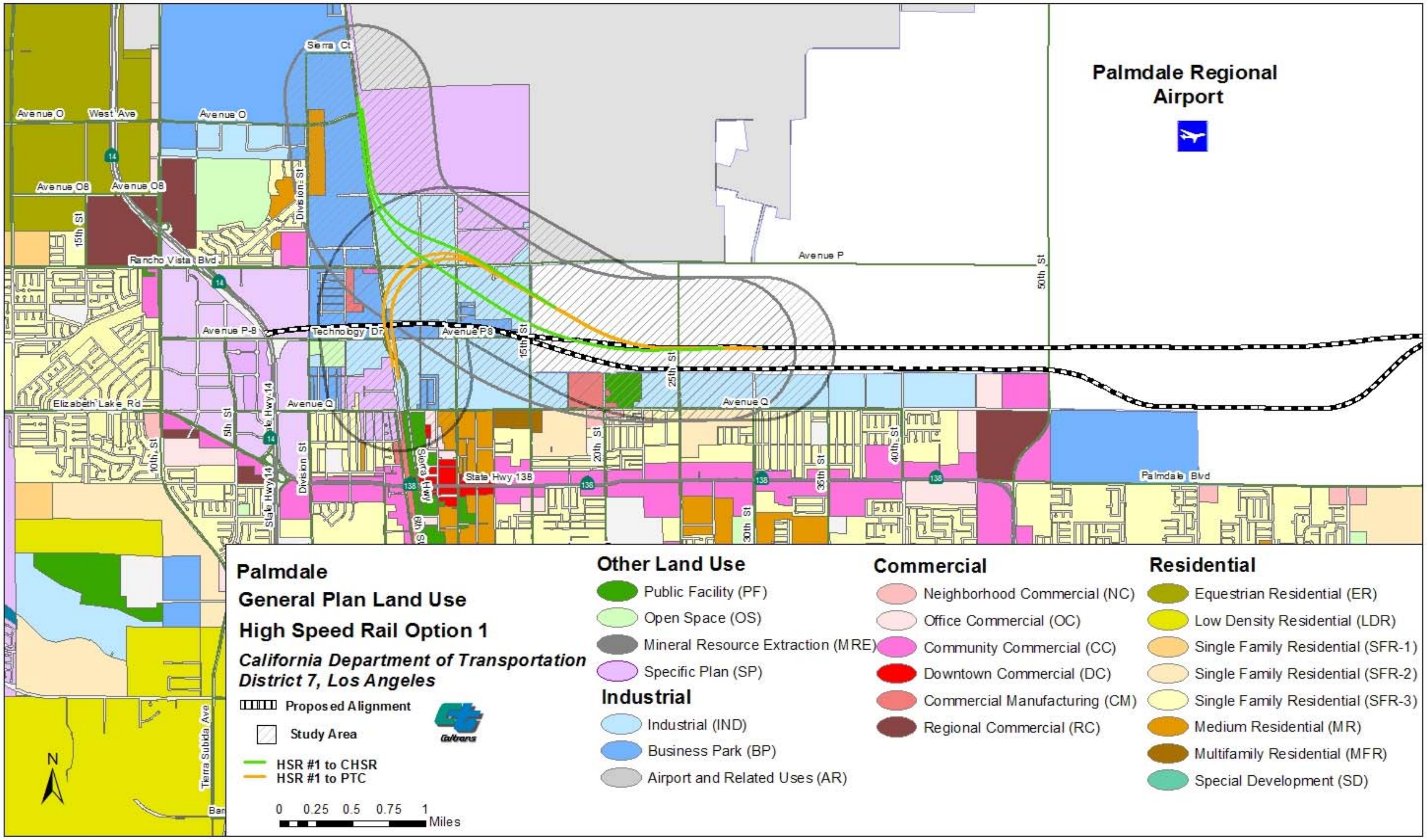
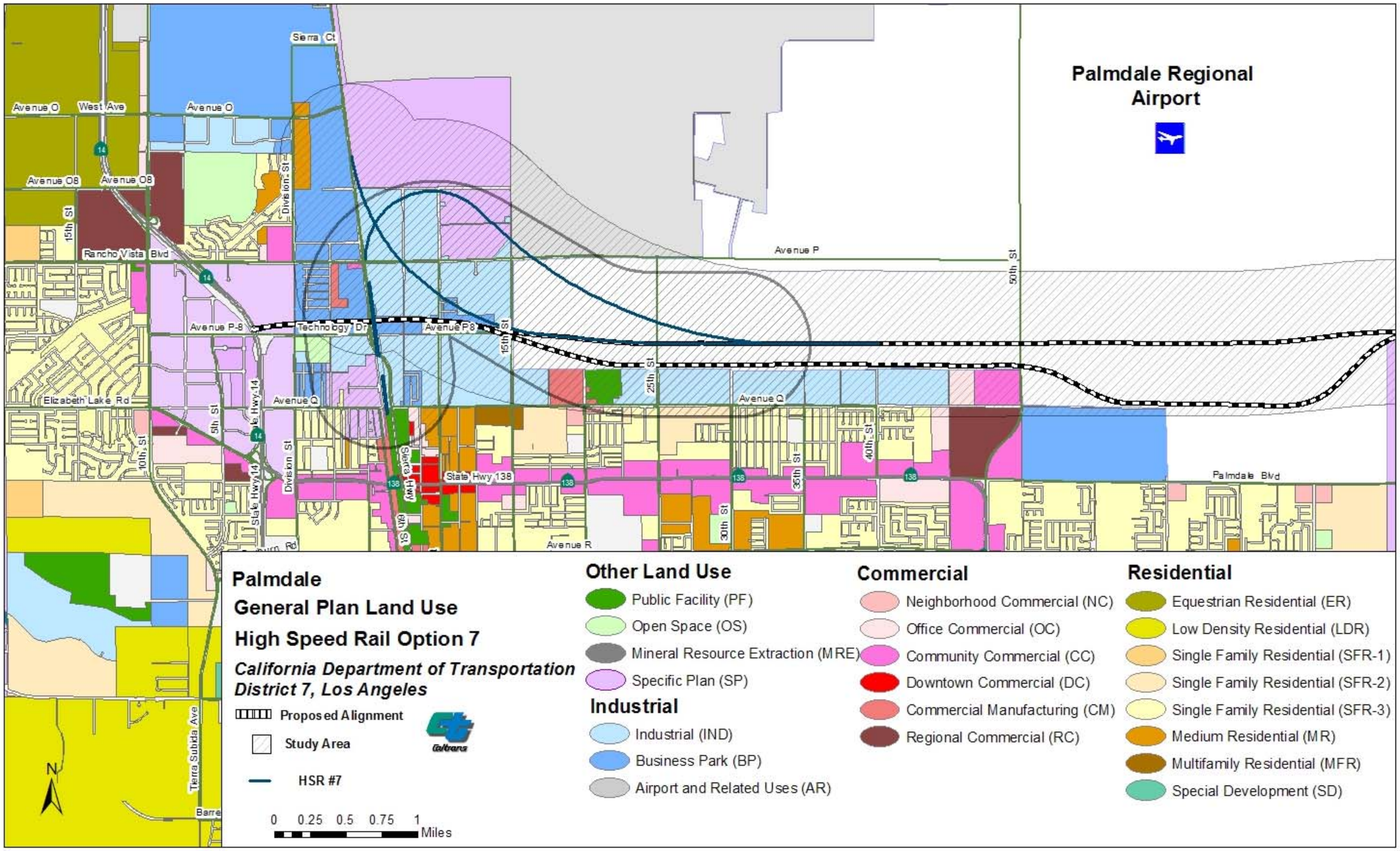


Figure 3.1.1-3 Palmdale Land Use High-Speed Rail Option 7 Map



Future land use trends and development may be further influenced by the City of Palmdale Strategic Plan – 2008-2013 (Strategic Plan). The Strategic Plan outlines the actions the City will take to address community needs and objectives. The local communities expressed concerns over future housing, economic growth, and job creation within the city. According to Action Item ED.1.6, the City proposes to further maintain Enterprise and Foreign Trade Zones to promote business relocation to the city center. By providing financial incentives to relocate to Palmdale, trends toward the future development or relocation of businesses within such zones may occur. In addition, Action Item ED.4.3 proposes to complete construction of a conference center within the city as a way to facilitate further commercial and retail development within the vicinity.

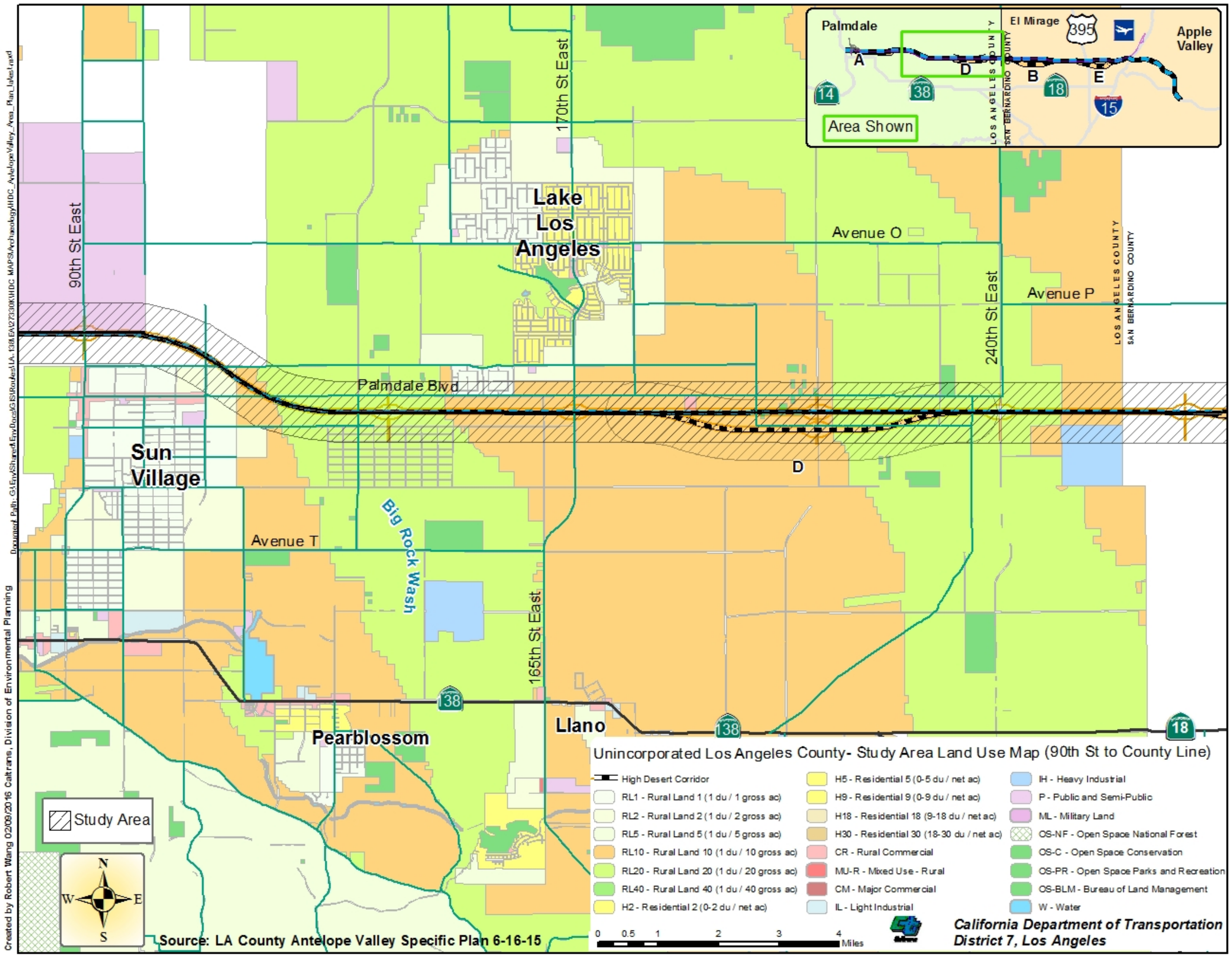
Also according to the Strategic Plan, the community is concerned about the availability of suitable housing for the aging senior population within the city. With the baby-boomer generation close to retirement, accommodations for seniors are a concern. Through Action Items S.2.1 and S.2.2, the City has proposed measures for development of senior housing, including construction of a “multifamily rental senior apartment development.” Also under Action Item S.1.1, the City proposes to review the general plan and zoning ordinance for existing policies, programs, and regulations to promote the development of senior housing and to propose amendments if needed.

Unincorporated Los Angeles County

The proposed HDC Project is situated within the Antelope Valley and traverses through unincorporated areas within Los Angeles County. The unincorporated areas are included in the Los Angeles County “Town and Country” Antelope Valley Area Plan, which consists of the entire Los Angeles County area within Antelope Valley, excluding the cities of Palmdale and Lancaster, with a total area of 1,152,063 acres. The planning area also includes the unincorporated communities of Lake Los Angeles, Sun Village, Pearblossom, and Llano (see Figure 3.1.1-4). Unincorporated communities potentially affected by the HDC Project include Lake Los Angeles and Sun Village. The Antelope Valley Area Plan is a component of the Los Angeles County General Plan and refines countywide goals and policies specific to the Antelope Valley area by providing a blueprint for future development within the area. Most of the existing land uses within the planning area are forest and vacant lands, which account for about 86 percent of the total planning area.

The Antelope Valley Area Plan addresses key elements such as mobility, land use, conservation and open space, public safety, and community-specific land use concepts. The land use and the community-specific land use concept elements of the Antelope Valley Area Plan were used as the basis for analyzing existing land use and future development within the unincorporated communities of the Antelope Valley.

Figure 3.1.1-4 Unincorporated Los Angeles County Study Area Land Use Map



Lake Los Angeles

Lake Los Angeles is situated within close proximity and north of the proposed project. Lake Los Angeles is a CDP located in the eastern portion of the Antelope Valley, approximately 17 miles east of Downtown Palmdale. Similar to other areas of the Antelope Valley, Lake Los Angeles is characterized by low-density development and an open, rural setting. Based on the Antelope Valley Area Plan, land use designations within Lake Los Angeles include residential, rural commercial, rural land, and open space parks and recreation.

Lake Los Angeles is structured around a rural town center located along Avenue O between 167th Street East and 172nd Street East and along 170th Street East between Avenue O and Glenfall Avenue. The rural town center serves as a focal point for its community and provides the daily needs of its citizens, in addition to providing local employment opportunities. The rural town center is designated as rural commercial, to serve the daily needs of residents and provide local employment opportunities.

Some areas outside of the rural town center are also designated as Rural Commercial, which provides additional commercial services for the community. Throughout the community, there are several rural town areas, designated Rural Land 1, 2 or 5, which promotes the existing density and promotes preservation of the current land divisions. The rural town areas serve to promote the existing rural character within the community. The remaining segments within the community are considered rural preserve areas, which call for very low-density parcels and the preservation of current land divisions.

Sun Village

Sun Village is an unincorporated community located within the southeastern portion of the Antelope Valley and south of the proposed project. It is located approximately 8 miles east of Palmdale City Hall. A large portion of the community is either developed or partially developed and provides a wide range of uses, ranging from commercial and retail services to local employment opportunities. The remaining areas within the community are largely undeveloped and lack infrastructure.

The Sun Village rural town center is located along Palmdale Boulevard between Little Rock Wash and 95th Street East, and along 90th Street East between Palmdale Boulevard and Avenue Q-14. The rural town center serves as a focal point within the community and provides a connection to the outer rural town areas. The rural town center area is designated as Rural Commerical and Light Industrial,to serve the daily needs of residents and provide local employment opportunities.

Surrounding the rural town center of Sun Village are several rural town areas located along Avenue Q to the north, Little Rock Wash to the west, Avenue R to the south, and 115th Street East to the east. Land use within rural town areas north of Palmdale Boulevard and west of 105th Street has been designated as Rural Land 1 (1 residential unit per acre of land). Areas east of 105th Street have been designated as Rural Land 2 (1 residential unit per 2 acres of land).

Land uses within rural town areas south of Palmdale Boulevard include Rural Land 1, Rural Land 2, Residential 2, Residential 9, and Residential 5. According to the Antelope Valley Area Plan,such land use designations are intended to promote the existing densities within the community and to avoid further land divisions.

The remaining areas within Sun Village are deemed rural preserve areas. Most of the rural preserve areas are either undeveloped or contain very low-density development with infrastructure constraints. If development were to occur, it would consist of single-family residential units on large lots, light and heavy agricultural use, equestrian and animal keeping use, or other uses that are appropriate for the area. According to the Los Angeles County Antelope Valley Area Plan, such land use designations are intended to promote the existing rural living conditions and to avoid further land divisions.

Other Unincorporated Los Angeles County Study Area

Existing land use within the unincorporated Los Angeles County study area, besides Lake Los Angeles/Sun Village, includes various Rural Land designations, Open Space, Bureau of Land Management (BLM) Open Space Parks and Recreation, Rural Commercial, and Public – Semi Public. Rural Land designaitions account for approximately 95 percent of the total land use within the study area for unincorporated Los Angeles County and is primarily characterized by single-family residential developments in combination with equestrian, animal use, and agricultural-related activities.

Future Development Trends

The Antelope Valley Area Plan establishes Economic Opportunity Areas (EOAs) within the Antelope Valley. The East EOA is located within the eastern part of the Antelope Valley, along the proposed route of the High Desert Corridor. It includes the communities of Lake Los Angeles and Sun Village. Further planning activities for the East EOA may be pursued with the development of the High Desert Corridor Project. The EOAs include areas identified as existing Rural Town Centers, or Rural Town Areas. The EOAs also include areas that have the potential to develop as future Rural Town Areas, as well as Non-Preserve Areas that may be used for a variety of rural uses compatible with the surrounding areas, such as residential, agricultural and open-space uses. Wherever appropriate, these EOAs are designated with land use designations that would allow for a balanced mix of residential, commercial, and light industrial uses, while preserving the rural character and ecological resources of the surrounding areas. A job-housing balance is achieved by using medium-density residential, commercial and industrial land use designations in areas appropriate for development, while designating areas with important ecological resources as open space conservation areas.

Unincorporated San Bernardino County

Unincorporated San Bernardino County encompasses an area of approximately 771,225 acres. The majority of existing land uses within unincorporated San

Bernardino County includes Resource Conservation (about 56 percent) and Rural Living (about 34 percent) of the total area.

The project traverses through various parts of San Bernardino County, including areas of unincorporated San Bernardino County, Adelanto, Victorville, and Apple Valley. San Bernardino County is defined by three planning regions, including the Valley Planning Region, the Mountain Planning Region, and the Desert Planning Region. The HDC Project alignment is located within the Desert Planning Region.

According to the County of San Bernardino 2007 General Plan, the Desert Planning Region is the largest of the planning regions and contains approximately 18,735 square miles or 93 percent of the land within San Bernardino County. The Desert Planning Region is defined as all of the unincorporated lands located north and east of the Mountain Planning Region.

Unincorporated San Bernardino County Study Area

The HDC Project is located within the Desert Planning Region of unincorporated San Bernardino County and accounts for approximately 27 percent of the land area within the study area (see Figure 3.1.1-5). A large percentage of the land use for the study area is designated as Rural Living. A small percentage of Industrial and General Commercial use is located along the eastern and western ends of the study area.

The proposed HSR alignment, which connects to the XpressWest Station at Dale Evans Parkway, traverses through areas of unincorporated land within the county. The rail alignment diverges from the highway alignment beginning at Quarry Road within Victorville and travels northeast towards the XpressWest Station. Existing land uses within this segment of the study area include General Commercial, Neighborhood Commercial, Community Industrial, Institutional, Regional Industrial, Resource Conservation, Rural Living, Rural Living 5 acres, and Rural Living 5 acres with sign (billboard) control overlay designations (see Figure 3.1.1-6).

Future Development Trends

Future development trends within the unincorporated areas of San Bernardino County are dictated in part by land use policies and goals of the County of San Bernardino 2007 General Plan (2007). Specific land use goals and policies have been established specifically for the Desert Planning Region.

Goal D/LU 1 states to maintain the land use patterns in the Desert Planning Region that enhance the rural environment and preserve the quality of life of the residents of the region. In response to Goal D/LU 1, Policy D/LU 1.1 encourages low-density development by retaining Rural Living (RL) zoning within Community Plan areas that are outside the local municipality’s sphere of influence and are removed from more urbanized community core areas. Land use goals and policies and low-density zoning ordinances constrain high-density development within the unincorporated areas. With emphasis on maintaining the existing rural environment, future development and growth is expected to be sensitive to the rural nature of the existing environment.

Figure 3.1.1-5 Unincorporated San Bernardino County Study Area Land Use Map

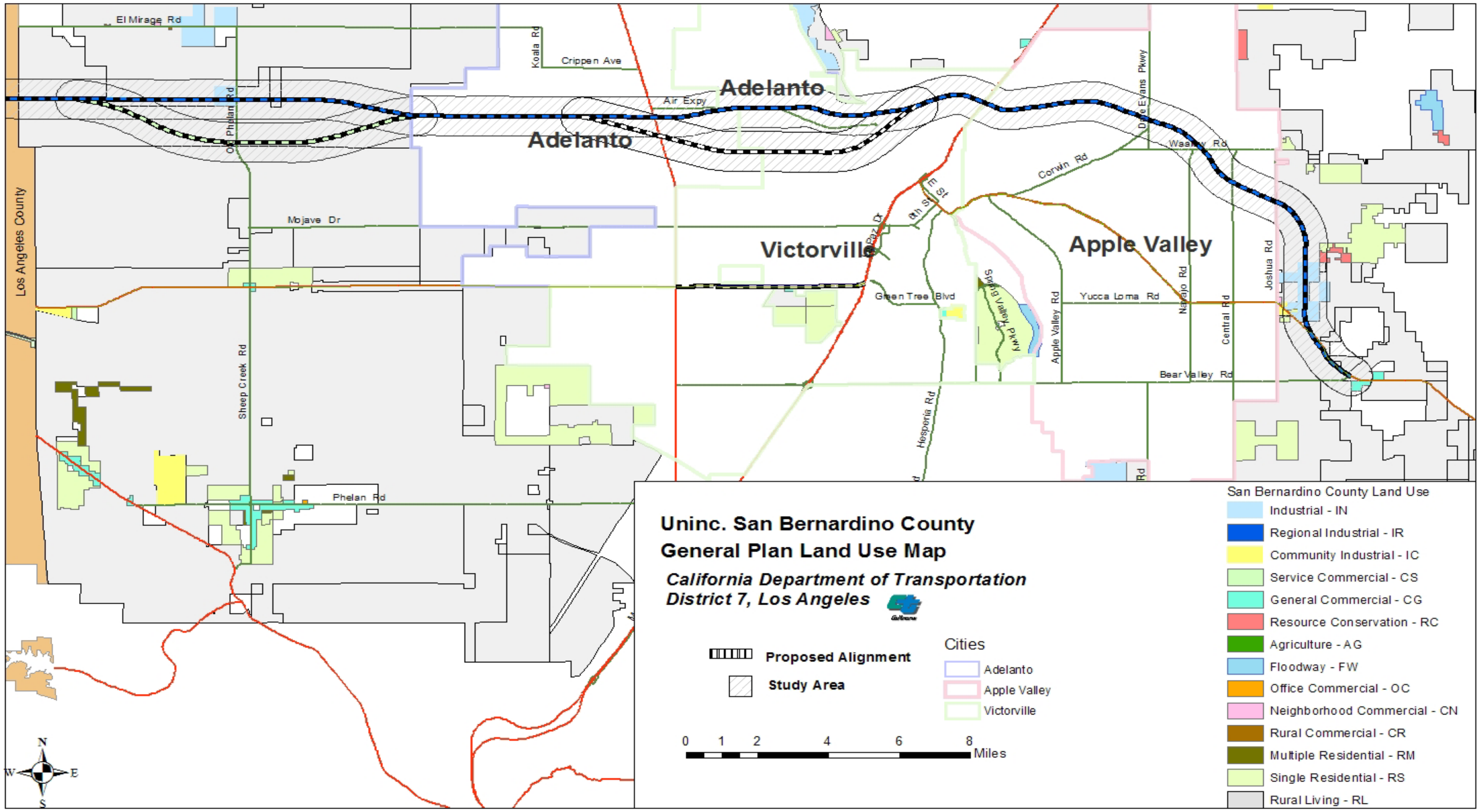
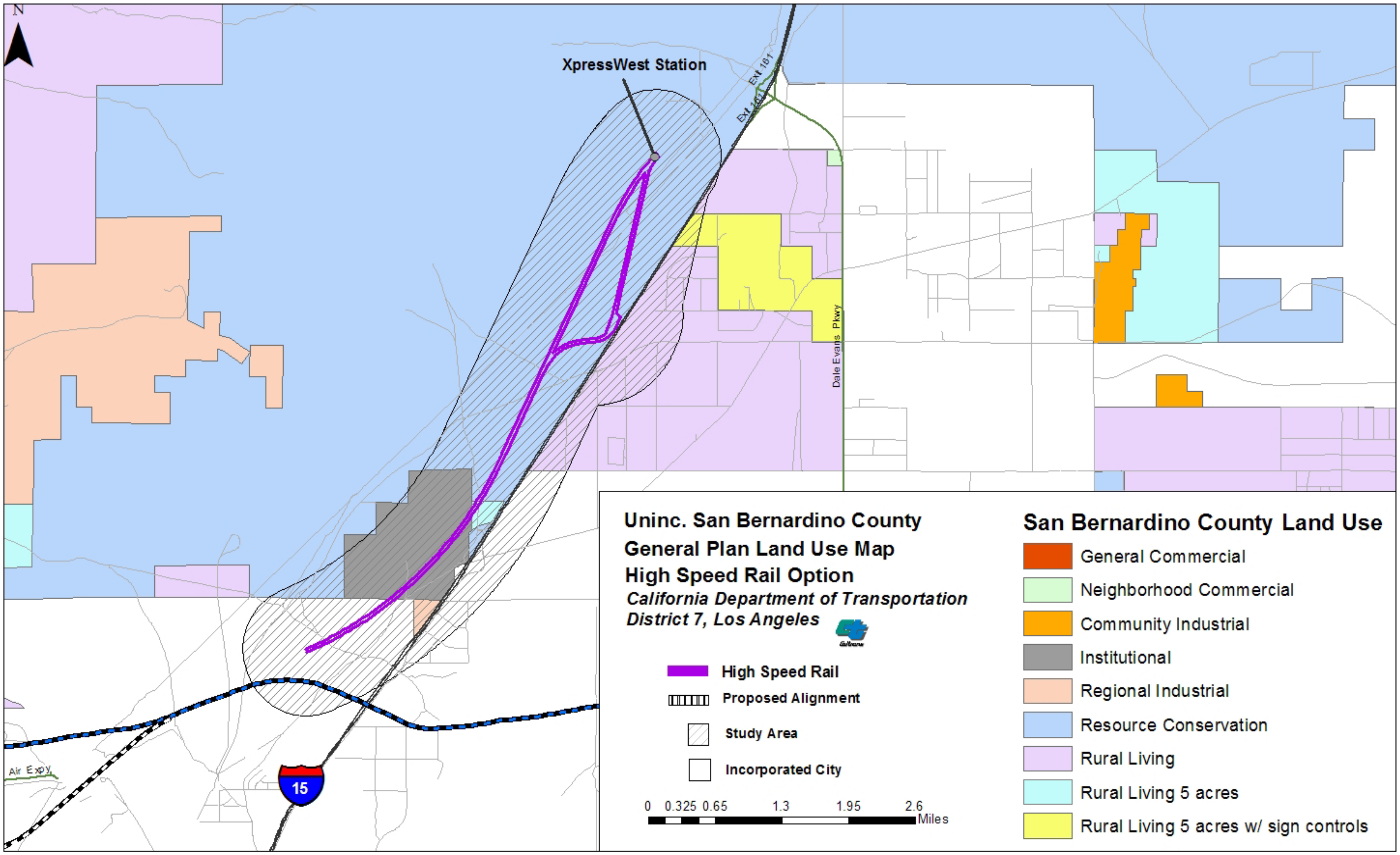


Figure 3.1.1-6 Unincorporated San Bernardino County High-Speed Rail Land Use Map



Future commercial development within the unincorporated areas is dictated in part by Goal LU 3 and Policy D/LU 3.2. Goal LU 3 ensures that commercial and industrial development within the region is compatible with the rural desert character and meets the needs of local residents. As a result, future trends in commercial development may be limited and/or constrained to low-density commercial development. In addition, Policy LU 3.2 avoids strip commercial development along major roadways within the region that would detract from the rural character by encouraging the development or expansion of commercial uses within core areas.

Commercial uses shall be compatible with adjacent land uses and maintain the existing characteristics of the communities within the region. By redirecting development to areas within existing developed areas, commercial development trends would be centered within urbanized areas such as Victorville, Apple Valley, and Adelanto.

Adelanto

Adelanto is located within San Bernardino County, approximately 43 miles east of Downtown Palmdale and 9 miles northwest of Victorville. The city's boundaries extend to Shadow Mountain Road to the north, Amethyst Road to the east, Palmdale Road to the south, and Lessing Avenue towards the west. United States Highway 395 (US 395) runs along the western portion of the city.

The City of Adelanto's planning area is approximately 81,000 acres. This includes 32,196 acres of incorporated area, 17,196 acres within the city's sphere of influence, 25,600 acres between the northern sphere of influence boundary and Shadow Mountain Road, and 5,719 acres of George Air Force Base. The majority of existing land uses comprises of residential (about 49 percent), industrial (about 35 percent), and commercial (about 7 percent).

Within the southern segment of Adelanto south of Air Expressway, major land uses include Manufacturing/Industrial, Single-Family Residential, Commercial, and Airport Park designations. Airport Park use includes the Adelanto Airport, which is surrounded by manufacturing and industrial uses. The Adelanto Airport is located between Rancho Road and Mojave Drive. Manufacturing/Industrial land uses are located primarily between Air Expressway and Mojave Drive, while Single-Family Residential land use is located along the western edge of Adelanto adjacent to Commercial and Manufacturing land uses. Commercial land use is located along the southern and eastern edges of Adelanto.

Major land uses north of Air Expressway include Public Facility, Medium-Density Residential, Single-Family Residential, Desert Living, Open Space, Commercial, and Airport Development District uses. Desert Living use is located within the peripheral ends of Adelanto, while Single-Family and Medium-Density Residential uses are concentrated primarily within the center of Adelanto. Commercial land use is integrated throughout Adelanto and is adjacent to Residential land uses to better serve the local economy. Major Public Facility uses are located at the intersection of Air Expressway and Three Flags Highway (US 395) and include the Adelanto City Hall and Richardson Park. Open Space designations are primarily concentrated along the eastern and western edges of Adelanto, north of Desert Flower Road. Lastly, Airport Development use is located within the eastern end of Adelanto, adjacent to the Southern California Logistics Airport (SCLA).

Adelanto Study Area

The Adelanto study area is located primarily within the central and southern portions of Adelanto (Figure 3.1.1-7). Major land use designations within the study area include Manufacturing and Industrial use, which are primarily located south of the study area. To the north of the study area, major land use designations include a mixture of Desert Living and Single-Family Residential uses.

Future Development Trends

Commercial and industrial development is primarily focused within Manufacturing/ Industrial land use areas located north of Holly Road and south of Air Expressway. Future and existing residential developments are concentrated primarily between Air Expressway and Auburn Avenue, and north of Palmdale Boulevard.

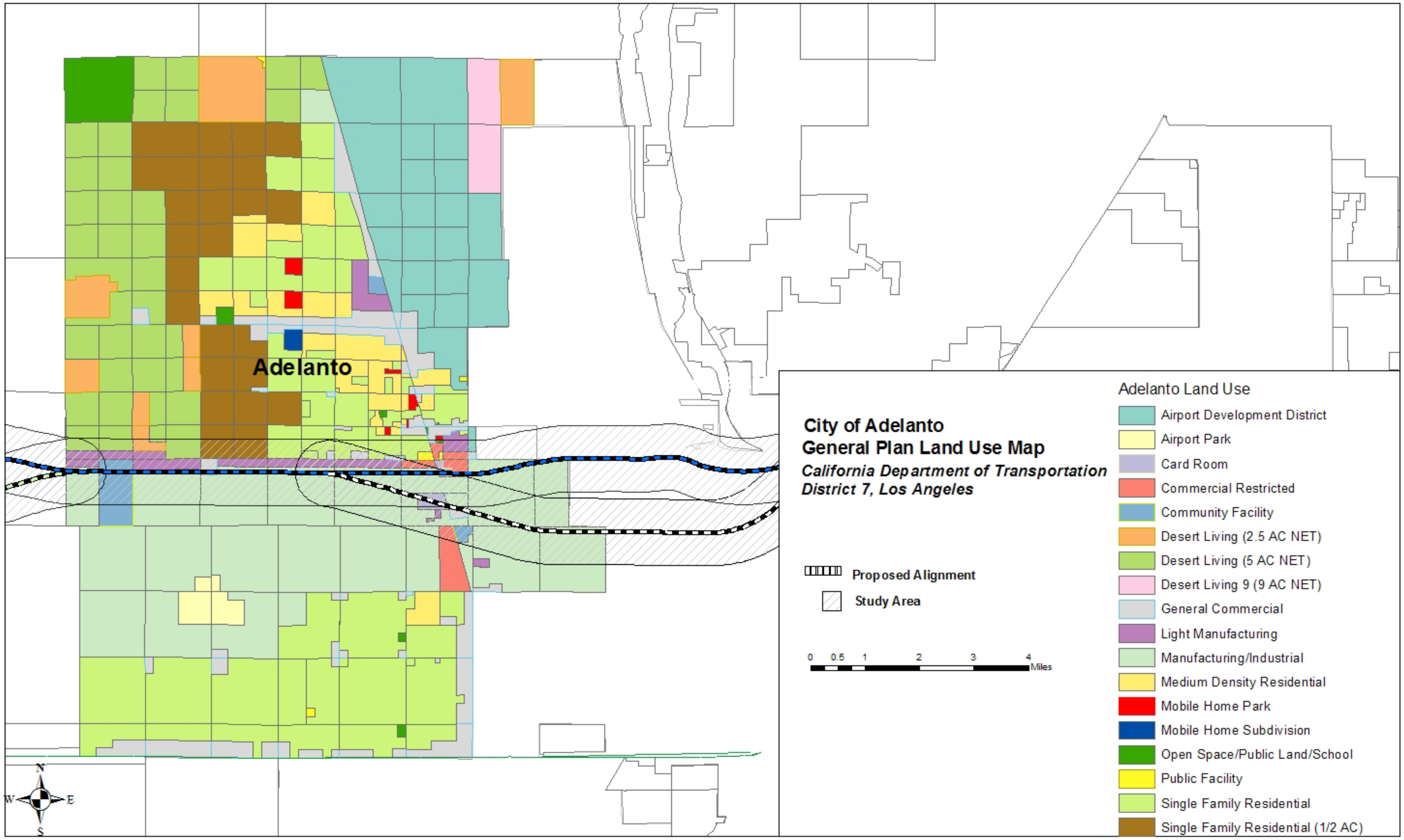
Victorville

Victorville is located within the southwestern end of San Bernardino County and is adjacent to Adelanto and Apple Valley. According to the City of Victorville’s General Plan 2030, the city’s overall planning area is divided into 10 distinct planning areas within its area of jurisdiction, including Baldy Mesa, Central City, East Bear Valley, Golden Triangle, North Mojave, SCLA, Spring Valley Lake, West City, West Bear Valley, and Northern Expansion. The boundaries for the planning areas are defined by topographic features, man-made features, and land use characteristics.

Major land uses within the city include Low and Very Low-Density Residential (about 36 percent), Open Space (about 23 percent), Specific Plan (about 23 percent), and Commercial uses (about 7 percent).

North of Victorville, primary land uses include Specific Plan use, which are described in the SCLA Specific Plan, the North Mojave Specific Plan, the Desert Gateway Specific Plan, and the Northern Expansion Area Specific Plan. With the Mojave River traversing through parts of Victorville, geographical constraints have restricted development for areas adjacent to the river. As a result, Open Space land uses have been designated for such areas. Other primary land uses within this area include Light Industrial, Heavy Industrial, and Commercial. Towards the center of Victorville, primary land uses include Residential and Commercial. Most of the Commercial uses are located along major arterial roads and freeways such as Interstate 15 (I-15), Mojave Drive, and Palmdale Road. Primary Residential uses include Very Low and Low-Density Residential land uses, which are located within the central and southern segments of Victorville.

Figure 3.1.1-7 Adelanto Study Area Land Use Map



Victorville Study Area

The Victorville study area, as shown in Figure 3.1.1-8, is located primarily within the northern and central segments of the city and includes the following land use designations: Community Facility, Manufacturing/Industrial, Light Manufacturing, Desert Living, Single-Family Residential, Medium-Density Residential, High-Density Residential, Office Professional, Commercial, Open Space/Public Lands/ Schools, Specific Plan, and Airport Development Districts. Major land use designations within the study area include Manufacturing/Industrial uses, which are primarily located to the south. North of the study area, major land use designations include a mixture of Desert Living and Single-Family Residential uses.

The proposed HSR alignment would traverse through the northern section of Victorville, where the alignment enters into unincorporated San Bernardino County. Figure 3.1.1-9 shows existing land uses within the study area for Victorville and includes a Specific Plan designation. The Specific Plan designation refers to the area where the Desert Gateway Project is proposed. The Desert Gateway Specific Plan (2009) calls for a new community within Victorville. The Desert Gateway community will be based on TOD principles in which transit will serve as a hub connecting the Town Center with a series of village centers and major employment centers. The HDC Project is referenced within the Specific Plan, in which the plan suggests that the HDC will serve as a catalyst for economic development within the Desert Gateway community.

Future Development Trends

Future development within Victorville includes a mixture of residential, commercial, and transportation-related projects. One major development project within Victorville is the SCLA Redevelopment project. In Phase I, 2.8 million square feet will be developed for use as a fully dedicated logistics industrial park with airport services. The project overall includes more than 6.4 million square feet of industrial space.

The SCLA will serve as a multimodal hub for the transport of goods throughout the Victor Valley area, as well as the greater southern California region. According to the Growth Vision Report, June 2004, prepared by the Southern California Association of Governments (SCAG), the SCLA will not only serve as a regionally significant intermodal facility that will allow for greater efficiency in the transport of goods throughout the region, but it will also prove to be a great economic driver in the creation of jobs within the area.

The Desert Gateway project, located at the intersection of the proposed HDC Project and I-15, includes 10,203 acres at the northern edge of Victorville for the development of residential, commercial, industrial, and mixed use land uses centered on various modes of transit. There will be greater densities in residential units, in addition to the development of various employment centers. New urbanism ideals, such as mixed uses and TOD, are some core features of the Desert Gateway Specific Plan. The HDC will be in close proximity to the development, which will allow various modes of transportation for residents within the area.

Figure 3.1.1-8 Victorville Study Area Land Use Map

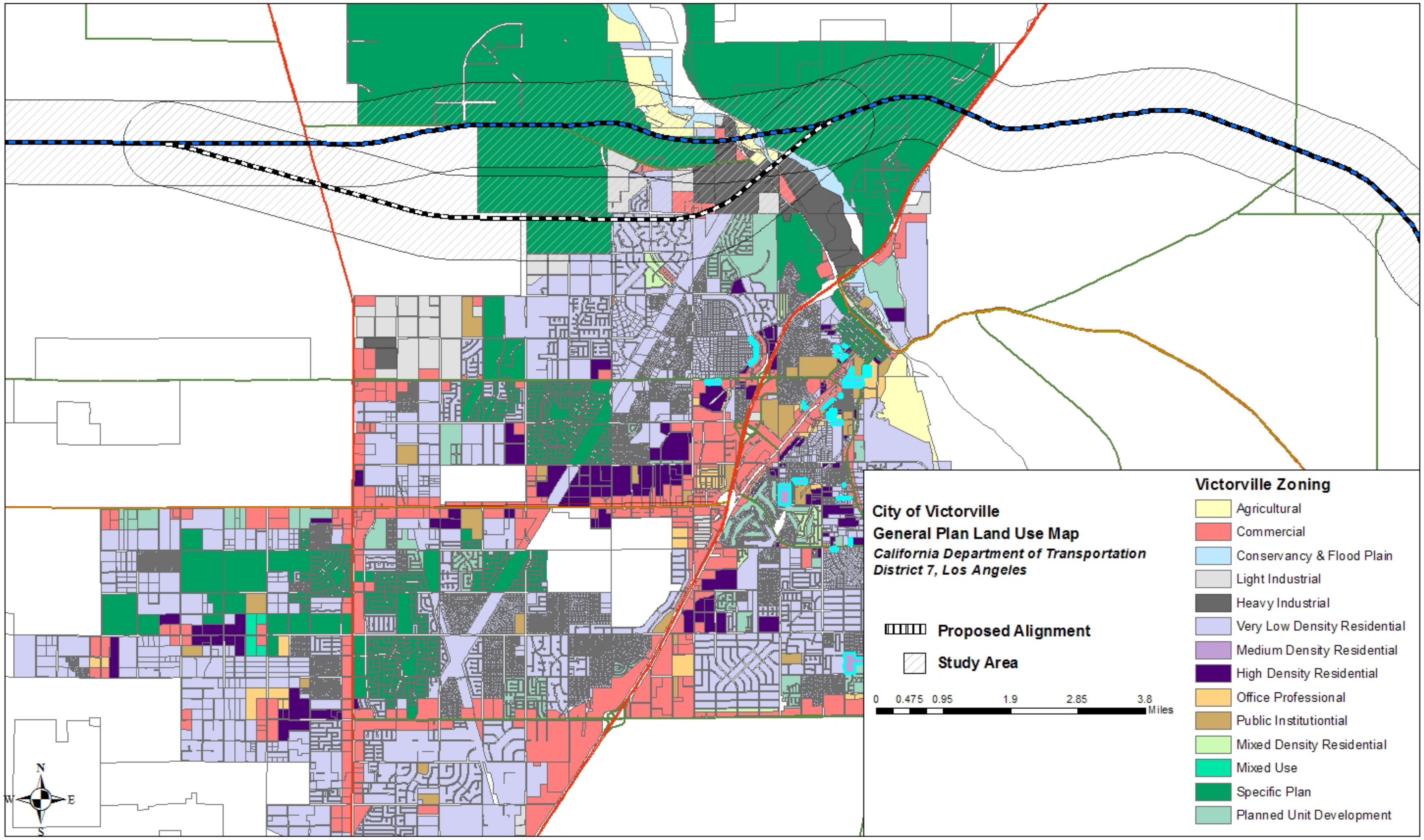
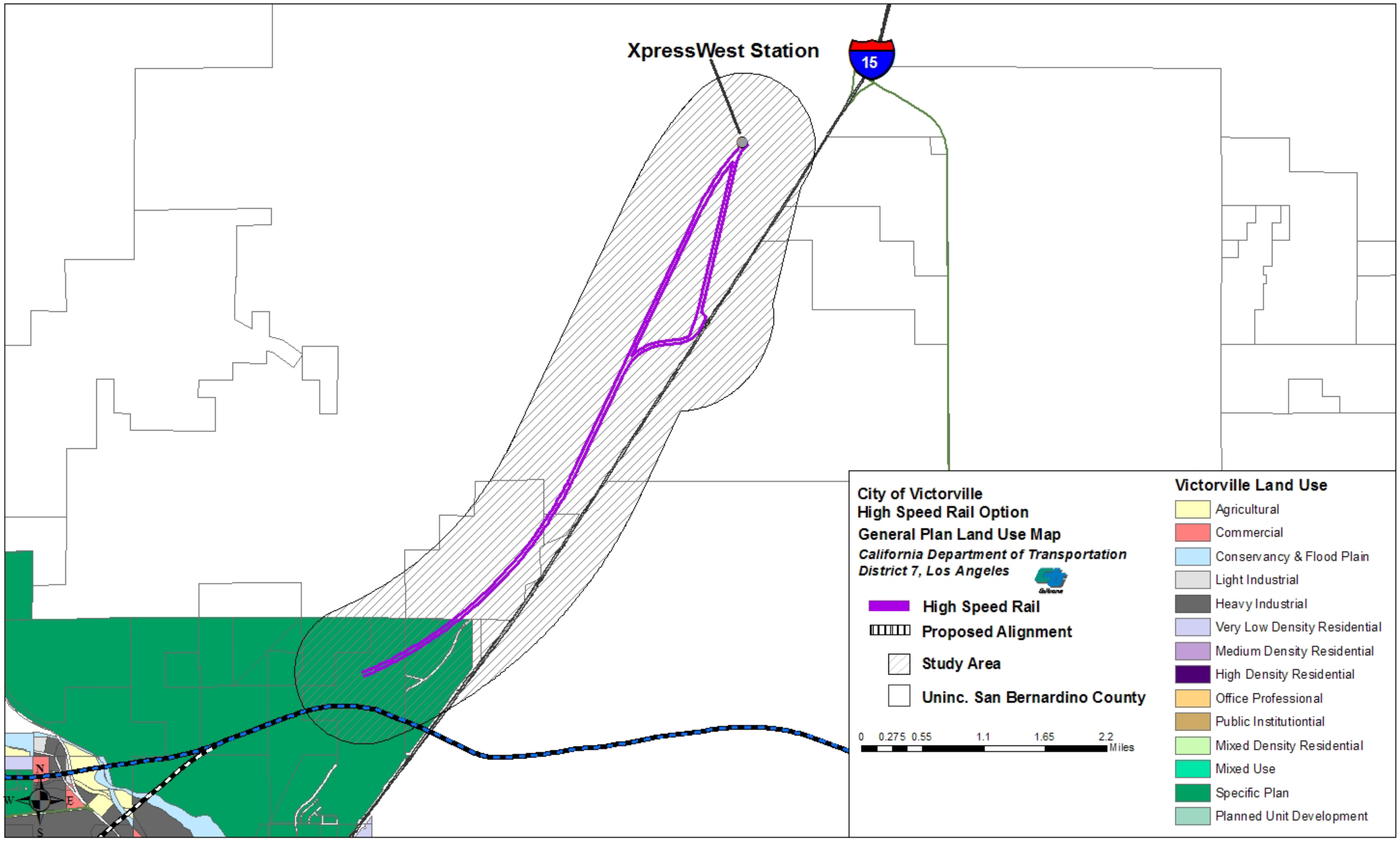


Figure 3.1.1-9 Victorville High-Speed Rail Study Area Land Use Map



Residential development projects within Victorville include development of approximately 270 acres of undeveloped lands into a residential subdivision. When fully developed, this residential subdivision will provide additional single-family homes within Victorville. The potential jobs from redevelopment of the SCLA may result in additional housing development within Victorville and the Victor Valley region.

Apple Valley

Apple Valley, located within the western end of the project limits, is located east of Victorville. According to the Town of Apple Valley General Plan (2009), the planning area for Apple Valley consists of 50,532 acres, in which 46,948.3 acres are within the town area. Two annexation areas totaling 3,583.2 acres were later added to the planning area. Land use categories within the planning area are presented in Figure 3.1.1-10. Major land uses within Apple Valley include Single-Family Residential (about 27 percent), Specific Plan (about 15 percent), Estate Residential (about 14 percent), and a combined Low-Density Residential and Very Low-Density Residential (about 12 percent).

Apple Valley Study Area

The Apple Valley study area is primarily located within the northern fringe of the town and along the existing SR-18, and it includes the following land use designations: Single-Family Residential, Estate Residential, Open Space, Low-Density Residential, Specific Plan, Very Low-Density Residential, Mineral Resources, Regional Commercial, and Office Professional. Major land uses within the study area consist of Specific Plan, Open Space, Regional Commercial, Very Low-Density Residential, and Mineral Resource use (see Figure 3.1.1-10).

The proposed HSR alignment would connect to the XpressWest Station at Dale Evans Parkway and would traverse through portions of unincorporated San Bernardino County and Victorville. As shown in Figure 3.1.1-11, the study area for the HSR alignment includes Regional Commercial and Mineral Resource land uses.

Future Development Trends

Future development within Apple Valley includes a mixture of various commercial development projects, transportation-related projects, and redevelopment projects. Between 2000 and 2005, Apple Valley experienced a dramatic increase in residential development, commercial services, and job opportunities within the area.

Future development trends within Apple Valley are contingent on many factors. The policies and goals of the Town of Apple Valley General Plan strive to maintain a balance between future growth and the preservation of the town’s desert or rural character and quality of life. Program 2.C.2 of the Town of Apple Valley General Plan provides incentives for rehabilitating and remodeling existing development. Program 2.C.2 encourages infill development within the existing boundaries of the town. Incentives provided by the Town may further encourage infill development within existing developed areas.

Figure 3.1.1-10 Apple Valley Study Area Land Use Map

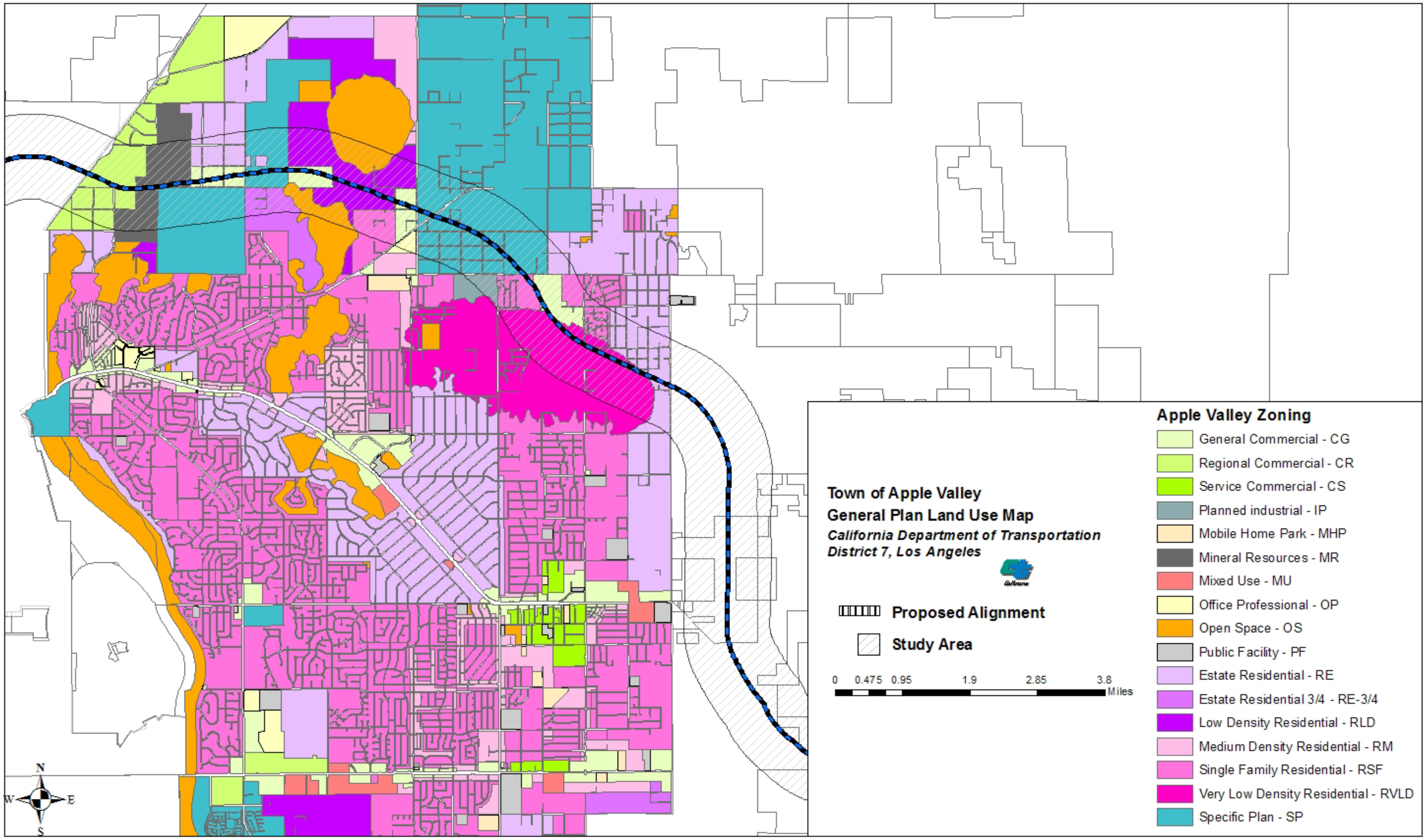
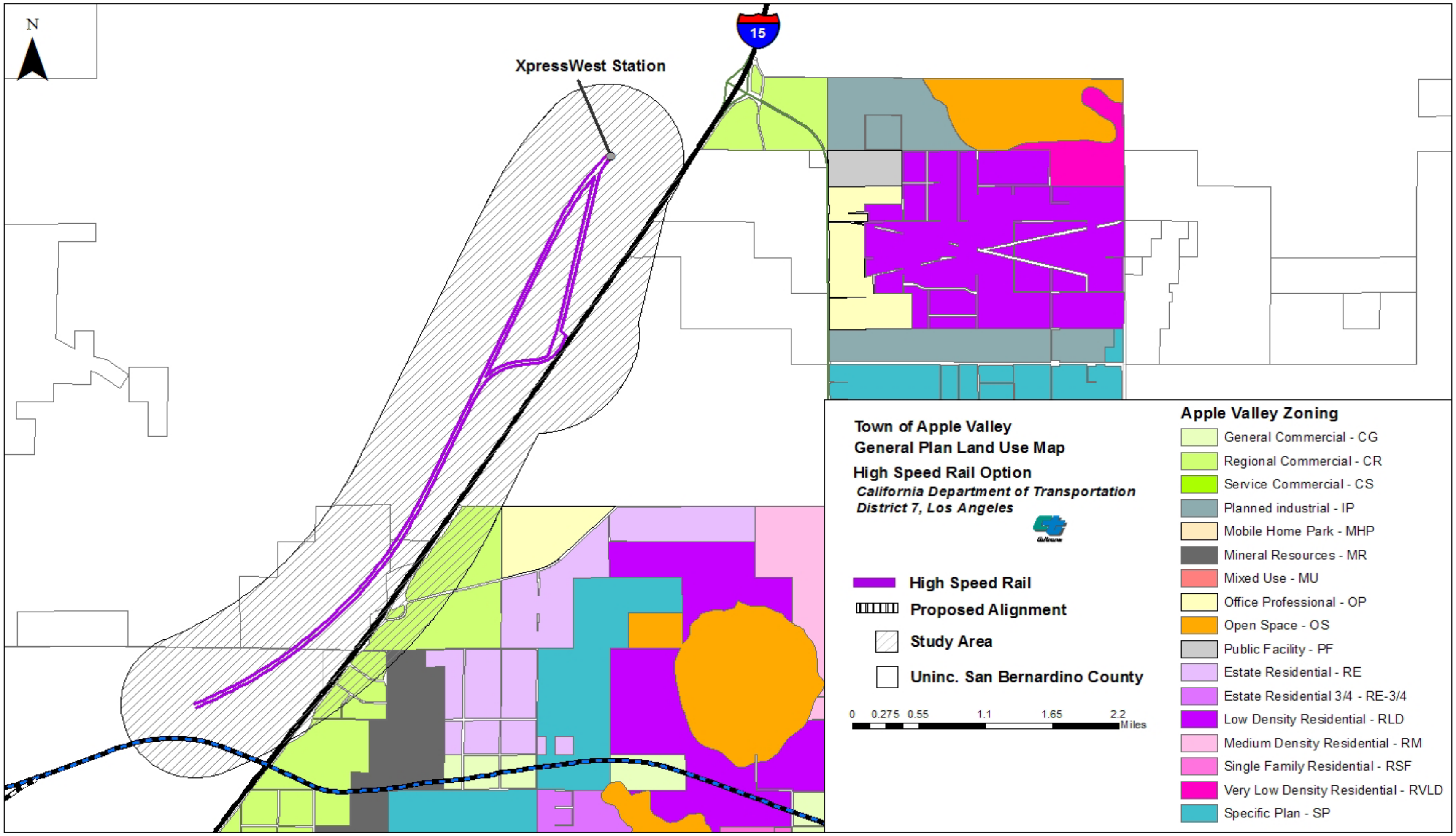


Figure 3.1.1-11 Apple Valley High-Speed Rail Study Area Land Use Map



Program 6.A.1 of the General Plan focuses future development of commercial and retail services along major roadways, such as the SR-18 corridor, the HDC, and I-15 to improve the economic tax base for the town.

Policy 6.C of the General Plan encourages development and redevelopment of the Apple Valley Village Business District, located along SR-18, which was once a small retail village. Over the years, the retail village grew into a large business corridor. The above land use policies direct future development and redevelopment efforts within the Apple Valley Village Business District.

Development related to major transportation projects includes the HDC and the Yucca Loma Road/Yates Road/Greentree Boulevard Transportation Improvement projects. Policy 2.E of the General Plan protects the right-of-way (ROW) for the HDC Project. With the implementation of the HDC, further development may take place along the corridor.

Environmental Consequences

No Build Alternative

Under the No Build Alternative, there would be no direct or indirect land use impacts as a result of the project because the project would not be constructed. In addition, there are no anticipated land use impacts from already programmed transportation projects to be constructed by or before 2040.

Build Alternatives

Potential impacts to land use may occur as a result of the proposed project. Direct land use impacts may occur through the acquisition of ROW required for construction of the project. Because the proposed project is a new facility, existing land uses directly within the project footprint would be converted to transportation-related use. Indirect land use impacts as a result of the project are most likely to occur within close vicinity of access points to the HDC. Access points include points of entry into the facility, which include on- and off-ramp locations and rail station locations. Over a period of time, adjacent land uses at these locations may potentially see changes from existing use towards commercial, business, and/or residential-based land uses; however, development and growth are dependent on market demand. In addition, shifts in land use are expected to occur along interchanges located within developed areas such as Palmdale, Victorville, Adelanto, and Apple Valley. Interchange locations within unincorporated areas within Los Angeles and San Bernardino counties are considered isolated interchange locations in which shifts in existing land use towards commercial, industrial, and residential use are not anticipated, as discussed in Section 3.1.2, Growth. Finally, the proposed project could affect airport-related land uses by acquiring airport land; converting lands designated for aerospace manufacturing or air travel support facilities to ground transportation uses; generating noise, vibration, or electromagnetic energy that interferes with sensitive equipment or processes; or by restricting or inhibiting existing runway operations.

Freeway/Expressway Alternative

Under the Freeway/Expressway Alternative, the acquisition of ROW would be required to construct the HDC alignment. Approximately 4,667 acres, mostly designated as grazing land, would be required for construction of the corridor. The increase in land use conversion between the Draft EIR/EIS and the Final EIR/EIS is due to the use of more precise mapping, which rendered more precise calculations and analysis, and the inclusion of the additional Palmdale rail options.

The project would directly affect existing land use within the local municipalities; however, such changes in land use towards transportation-related use may prove to be beneficial by providing infrastructure for surrounding land uses, improved access, and linkages between various residential communities, businesses, and facilities. The project also has the potential to provide development for local businesses and industries, which may provide local employment opportunities within the community.

In addition, based on the growth analysis in Section 3.1.2, it was determined that there is a potential for existing land uses located along interchange locations within Victorville and Palmdale to shift towards greater commercial and industrial use. For the unincorporated areas located centrally within the project area, existing land uses surrounding isolated interchange locations are anticipated to have minor changes. Based on the general plans for the local municipalities, growth and economic development are encouraged within the incorporated cities. For the unincorporated areas, existing land uses characterized by low-density development are desired to maintain the existing rural character within the area. Therefore, under this alternative, the proposed project is consistent with existing and future land use designations of the local municipalities and should not pose an adverse effect on surrounding existing land uses.

Palmdale

Under this alternative, potential direct land use impacts within Palmdale include the acquisition of ROW beginning at the proposed SR-14/HDC interchange moving east along Avenue P through 120th Street. Within this segment, approximately 653 acres would be acquired to accommodate the 500-foot ROW for construction of the freeway. The following existing land uses would be changed to transportation-related use.

- SR-14/HDC Interchange to 15th Street: Office Commercial, Business Park, Industrial
- 15th Street to 90th Street: Airport
- 90th to 120th Street: Business Park, Industrial

The Palmdale land use most affected directly by the project would be Airport, including AFP-42 and Los Angeles/Palmdale Regional Airport properties.

Indirect impacts affecting existing land use outside of the affected parcels may occur, in which land use shifts towards commercial and industrial use may occur within close proximity to on- and off-ramp locations. The Palmdale Trade and Commerce Center Specific Plan (2004) land use designations may also be impacted.

Under Variation A, within Palmdale, the freeway/expressway would dip slightly south of the main alignment, approximately between 15th Street East and Little Rock Wash. Airport land use would be directly impacted as a result of this variation because it would be acquired and converted to transportation-related use.

The proposed project would have a beneficial indirect effect on adjacent airport uses because converting lands immediately south of AFP-42 and Los Angeles/Palmdale Regional Airport to a transportation use would preclude the development of other uses in this area that might not be compatible with an airport and airport support services. Additionally, the highway facilities provided by the proposed project would enhance access to the airport.

Unincorporated Los Angeles County

Existing land uses directly located within the proposed ROW required for construction of the project, which include Non-Urban 1, Open Space, and Public Service Facilities, would be altered to transportation-related use to accommodate the proposed highway. Indirect impacts affecting land use based on the growth analysis in Section 3.1.2 are not anticipated because the interchanges are located within isolated areas away from development. As a result, the existing rural character within the unincorporated areas would be maintained. Change is anticipated in existing land use within developed areas such as Victorville and Palmdale.

Under Variation D, which begins near the community of Lake Los Angeles, the freeway would dip slightly south of the main alignment, just south of Avenue R approximately between 180th Street East and 230th Street East. Direct impacts to existing land uses include Non-Urban 1, which may be altered towards transportation-related use.

Unincorporated San Bernardino County

Under the Freeway/Expressway Alternative, potential direct land use impacts within unincorporated areas of San Bernardino County include the acquisition of ROW beginning at the Los Angeles and San Bernardino county line moving east towards Lessing Avenue. Within this segment, approximately 1,074 acres would be acquired for construction of the freeway alignment. The ROW width required for this segment of the project is approximately 300 feet. Land uses directly located within the proposed ROW required for construction of the project, which include Rural Living and Industrial, would be converted to transportation-related use. Indirect impacts affecting existing land use under this alternative are not anticipated, as discussed under Section 3.1.2, Growth.

Under Variation B, existing land uses that potentially may be converted to transportation-related use include Rural Living, Industrial, and General Commercial. The proposed alignment under Variation B avoids the acquisition of a dairy farm.

Adelanto

Potential direct land use impacts under the Freeway/Expressway Alternative within Adelanto include the acquisition of ROW beginning at Lessing Avenue moving east towards the intersection of Air Expressway and Phantom Street. Within this segment, approximately 875 acres would be acquired for construction of the freeway alignment. The ROW width required for the project is approximately 300 feet. Land uses directly located within the proposed ROW required for construction of the project include industrial and commercial use, which may be converted towards transportation-related use. The proposed freeway would provide greater access to existing areas, which may provide economic benefits for those particular industries. Greater access can be defined as improved connectivity due to the new facility and improved interchanges. Indirect impacts affecting existing land use include potential shifts towards commercial and industrial use adjacent to interchange locations. The project would support existing land uses

Due to ROW restrictions, Variation E of the main alignment was established. Under Variation E, near Adelanto and Victorville, the freeway/expressway would dip south of the federal prison. Existing land uses that may be converted towards transportation-related use include Manufacturing, Industrial, Desert Living 9, and General Commercial.

Victorville

Potential direct land use impacts within Victorville include the acquisition of ROW beginning at the intersection of Air Expressway and Phantom Street moving east towards I-15. Within this segment, approximately 433 acres would be acquired for construction of the freeway alignment. The ROW width required for this segment of the project is approximately 300 feet. Land uses directly located within the acquired ROW required for construction of the project include the following categories: Specific Plan, Commercial, Heavy Industrial, Agricultural, Conservancy and Floodplain. Indirect impacts to existing land use outside of the affected parcels may occur, in which land use would shift towards commercial and industrial use and may occur within close proximity to on- and off-ramp locations.

Under Variation E, near Adelanto and Victorville, the freeway/expressway would dip south of the federal prison. Direct land use impacts within the proposed ROW of Variation E include Specific Plan, Very Low-Density Residential, Commercial, Heavy Industrial, Conservancy and Floodplain, and Agricultural Use.

Apple Valley

Potential direct land use impacts within unincorporated areas in Apple Valley include the acquisition of ROW beginning at I-15 moving east towards Joshua Road. Within this segment, approximately 519 acres would be acquired for construction of the freeway alignment. The ROW width required for the project is approximately 300 feet. Land uses directly located within the proposed ROW required for construction of the project include Regional Commercial, Mineral Resources, Mobile

Home Park, Office Professional, Specific Plan, Very Low-Density Residential, Single-Family Residential, and Estate Residential.

Freeway/Tollway Alternative

This alternative would follow the same physical alignment as the Freeway/ Expressway Alternative (including Variations A, D, B, and E), but with the inclusion of tolled lanes. As a result, land use direct impacts are similar to the Freeway/Expressway Alternative; however, for indirect impacts, based on Section 3.1.2, Growth, the proposed tollway alignment has the potential to shift local traffic to the existing arterial network.

Freeway/Expressway with HSR Alternative

This alternative would follow the same physical alignment as the Freeway/ Expressway Alternative (including Variations A, D, B, and E), but it would include an HSR Feeder Service between Palmdale and Victorville. The HSR is to be constructed within the centerline of the HDC alignment, except two areas within Palmdale and Victorville in which the rail alignment diverges from the HDC alignment to connect to station locations. As a result, additional ROW would be acquired for construction of the HSR alignment. Land use categories to be impacted by the HSR alignment are as follows:

- Palmdale (HSR Options 1 and 7): Airport, Public Facility, Commercial Manufacturing, Industrial, Medium Residential, and Open Space.
- Victorville: Specific Plan (Desert Gateway).
- Unincorporated areas within San Bernardino County: Neighborhood Commercial, Institutional, and Resource Commercial.

Rail Option 7 would traverse the southwestern corner of AFP-42, requiring acquisition of a portion of that property.

Direct land use impacts discussed under the Freeway/Expressway Alternative are also included under this alternative because the proposed freeway is part of this alternative.

Under this alternative, the project has the potential to directly affect land uses along the main highway alignment, in addition to land uses along the HSR stations connector alignment. The Draft Palmdale Transit Village Specific Plan calls for TOD adjacent to the existing Palmdale Transportation Center along Avenue Q, which would provide workforce and affordable housing for low- and moderate-income households by providing a 121-unit townhome development with related amenities and parking, in addition to 156 units of multi-family rental housing with related amenities and parking. The HSR would provide a connection at the Palmdale Transportation Center. In addition, Palmdale has designated Specific Plan land uses north of Palmdale Boulevard, in which the HSR alignment would be located directly south of the Specific Plan land use designated for Lockheed Martin, an aeronautical contractor located within Palmdale.

As discussed in the Freeway/Expressway Alternative, the project could improve surrounding existing land uses by providing infrastructure and improved access and linkages between communities, businesses, and facilities. Additional direct land use impacts within Palmdale would occur under this alternative; however, existing land uses surrounding the Palmdale Station would be benefited by allowing greater access and multimodal transit options for the surrounding area. Indirect impacts affecting land use include shifting existing land uses to higher densities within a 0.25-mile vicinity of the Palmdale Station, which would provide potential infill development.

The proposed project would have a beneficial indirect effect on adjacent airport uses. Converting lands south of AFP-42 and Los Angeles/Palmdale Regional Airport to a transportation use would preclude the development of other uses that might not be compatible with an airport and airport support services. Additionally, the highway and rail facilities provided by the proposed project would enhance access to the airport.

As for Victor Valley, direct land use impacts would occur within Victorville and parts of unincorporated San Bernardino County. Affected land uses include Specific Plan (Desert Gateway), Neighborhood Commercial, Institutional, and Resource Conservation use, in which segments of existing land uses would be converted towards transportation-related use to accommodate the HSR segment. Indirect impacts affecting land use include shifting existing land uses toward high densities within a 0.25-mile vicinity of the Victorville Station. The area surrounding the proposed Victorville Station is largely undeveloped; however, with the planned development of the proposed Desert Gateway project, the HDC Project can provide infrastructure for the proposed community, providing greater access and linkages to existing communities.

Palmdale Rail Station Study Area

Potential impacts to land use may occur as a result of implementing the proposed design variation under Rail Options 1 and 7. Direct land use impacts may occur through the acquisition of ROW required for construction of the project. Because the proposed Wye Connection is a new facility, existing land uses directly within the project footprint would be converted to transportation-related use.

Indirect land use impacts as a result of the project are most likely to occur within close vicinity of access points to the HDC, such as the proposed Wye Connection. Access points include points of entry into the facility, which include on- and off-ramp locations and rail station locations. Over a period of time, adjacent land uses at these locations may potentially see changes from existing use towards commercial-, business-, and/or residential-based land uses; however, development and growth are dependent on market demand. Shifts in land use are expected to occur along interchanges and other ingress/egress points located within developed areas; however, most of the land adjacent to the proposed Wye Connection and proposed parking location is currently vacant or undeveloped, thereby reducing potential land use impacts through relocation or permanent land use shifts related to existing uses. As growth and development continues in these areas, vacant land will continue to be in adequate supply within close proximity, and shifts in land use are not anticipated to produce significant land use impacts.

The proposed variations would all need several permanent easements to construct the tunnel segment of the proposed Wye Connection.

Rail Option 1 – Station Variation A

Within this segment, approximately 96 acres would potentially be acquired to accommodate the ROW for construction of the rail connection and proposed parking, and relocation of the existing Palmdale Transportation Center and Metrolink rail platforms. Station area parking is proposed at the terminus of 6th Street (Union Pacific Railroad (UPRR)/Sierra Highway) and would require changing land use from Industrial to Transportation-related use. Furthermore, the relocated Metrolink rail platform would require changing land use from Industrial and Other Jurisdiction (Los Angeles County) to Transportation-related use.

Existing general plan land uses would be changed to Transportation-related use, except for those uses already designated as Transportation ROW. Land use categories to be impacted by the HSR alignment are as follows: Industrial, Transportation ROW, and Other Jurisdiction (Los Angeles County). Therefore, the proposed project under this station variation is generally consistent with the local existing and future land use designations, and it is not anticipated to pose an adverse effect on surrounding existing land uses.

Rail Option 1 – Station Variation B

Potential land use and relocation impacts would generally be similar to those under Station Variation A, except for slight differences in ROW impacts associated with the relocated Metrolink rail platform near 6th Street East and East Avenue Q.

Within this segment, approximately 97 acres would potentially be acquired to accommodate the ROW for construction of the rail connection and proposed parking, and relocation of the existing Metrolink rail platforms. Station area parking is proposed at the terminus of 6th Street (UPRR/Sierra Highway) and would require changing land use from Industrial to Transportation-related use. Furthermore, the relocated Metrolink rail platform would require changing land use from Industrial, Other Jurisdiction (Los Angeles County) and Public Facility to Transportation-related use. Uses designated as Transportation ROW would remain designated for Transportation-related uses.

Existing general plan land uses would be changed to Transportation-related use, except for those uses already designated as Transportation ROW. Land use categories to be impacted by the HSR alignment are as follows: Industrial, Transportation ROW, and Other Jurisdiction (Los Angeles County). Therefore, the proposed project under this station variation is generally consistent with the local existing and future land use designations, and it is not anticipated to pose an adverse effect on surrounding existing land uses.

Rail Option 1 – Station Variation C (Part of Preferred Alternative)

Under Rail Option 1 Station Variation C, approximately 102 acres would potentially be partially or fully acquired to accommodate the ROW for construction of the HDC to HSR rail connection and proposed parking, and relocation of the existing Metrolink rail platforms. Station area parking is proposed at the terminus of 6th Street (UPRR/Sierra Highway) and would require changing land use on 9 parcels from Industrial to Transportation-related use. Additionally, relocation of the Metrolink rail platform would require changing land use from Commercial Manufacturing across 11 parcels to Transportation-related use. Similar to Station Variations A and B, the Wye Connection track split portion is proposed under Rail Option 1 as a tunnel segment connecting the HDC to the HSR; therefore, it is not anticipated to result in the permanent acquisition of ROW, with the exception of required permanent underground easements, as discussed below.

Existing general plan land uses would be changed to Transportation-related use, except for uses already designated as Transportation ROW. Land use categories to be impacted by the HSR alignment are as follows: Business Park, Industrial, and Commercial Manufacturing. Because the location of Station Variation C is located to the west of Station Variations A and B, outside the existing UPRR ROW, direct land use impacts would thus differ relative to Station Variations A and B, but they would primarily consist of relocation impacts as well. Therefore, the proposed project under this station variation is generally consistent with the local existing and future land use designations, and it is not anticipated to pose an adverse effect on surrounding existing land uses.

Rail Option 7 – Station Variation A

Under this station variation, approximately 135 acres would potentially be acquired to accommodate the ROW for construction of the rail connection and proposed parking, and relocation of the existing Palmdale Transportation Center and Metrolink rail platforms. Station area parking is proposed at the terminus of 6th Street (UPRR/Sierra Highway) and would require shifting general plan land use from Industrial to Transportation-related use. Furthermore, the relocated Metrolink rail platform would require changing general plan land use from Industrial and Other Jurisdiction (Los Angeles County) to Transportation-related use.

Existing general plan land uses would be changed to Transportation-related use, except for those uses already designated as Transportation ROW according to Palmdale's general plan land use. Land use categories to be impacted by the HSR alignment are as follows: Business Park, Industrial, Other Jurisdiction (Los Angeles County), and Transportation ROW. Therefore, the proposed project under this station variation is generally consistent with the local existing and future land use designations, and it is not anticipated to pose an adverse effect on surrounding existing land uses.

Rail Option 7 – Station Variation B

Within this segment, approximately 126 acres would potentially be acquired to accommodate the ROW for construction of the rail connection and proposed parking, and relocation of the existing Metrolink rail platforms. Station area parking is proposed at the terminus of 6th Street (UPRR/Sierra Highway) and would require shifting general plan land use from Industrial to Transportation-related use. Furthermore, the relocated Metrolink rail platform would require changing general plan land use from Industrial, Other Jurisdiction (Los Angeles County), and Public Facility to Transportation-related use. Uses with a general plan land use designation of Transportation ROW would remain designated for Transportation-related uses.

Existing general plan land uses would be changed to Transportation-related use, except for those uses already designated as Transportation ROW according to Palmdale's general plan land use. Land use categories to be impacted by the HSR alignment are as follows: Business Park, Industrial, Other Jurisdiction (Los Angeles County), Public Facility, and Transportation ROW. In general, land use direct impacts are similar to Station Variation A under Rail Option 7, with the exception of several additional parcels between East Avenue Q and East Avenue Q3, which would be affected by potential ROW acquisition, and currently have general plan land use designations of Public Facility and Transportation ROW. Therefore, the proposed project under this station variation is generally consistent with the local existing and future land use designations, and it is not anticipated to pose an adverse effect on surrounding existing land uses.

Rail Option 7 – Station Variation C

Within this segment, approximately 131 acres would potentially be partially or fully acquired to accommodate the ROW for construction of the HDC to HSR Wye Connection and proposed parking, and relocation of the existing Metrolink rail platforms. Station area parking is proposed at the terminus of 6th Street (UPRR/Sierra Highway) and would require shifting general plan land use on 10 parcels from Industrial to Transportation-related use. Additionally, relocation of the Metrolink rail station platform would require changing general plan land use on 11 parcels from Commercial Manufacturing to Transportation-related use. Similar to Station Variations A and B, the Wye Connection track split portion is proposed under Rail Option 7 with aerial and tunnel segments connecting the HDC to the HSR; therefore, it is not anticipated to result in the permanent acquisition of ROW, with the exception of required permanent aerial and underground easements, as discussed below.

Existing general plan land uses would be changed to Transportation-related use, except for uses already designated as Transportation ROW according to Palmdale's general plan land use. Land use categories to be impacted by the HSR alignment are as follows: Business Park, Industrial, and Commercial Manufacturing. Because the location of Station Variation C is located to the west of Station Variations A and B, outside the existing UPRR ROW, direct land use impacts would thus differ relative to Station Variations A and B, but they would mainly consist of ROW impacts as well, primarily between Technology Drive and approximately 500 feet north of East

Avenue Q3. Therefore, the proposed project under this station variation is generally consistent with the local existing and future land use designations, and it is not anticipated to pose an adverse effect on surrounding existing land uses.

Freeway/Tollway with HSR Alternative (Preferred Alternative)

The preferred alternative would be the same as the Freeway/Tollway Alternative (including Variations D and B1), and it would include an HSR Feeder Service between Palmdale and Victorville. Land use impacts under this alternative are similar to the impacts discussed under the Freeway/Expressway Alternative with HSR Feeder Service Alternative.

Avoidance, Minimization, and Mitigation Measures

Implementation of the following measures would avoid substantial impacts to land use for the build alternatives:

LU-1: Coordinate with local municipalities ensuring that amendments and/or land use changes are prepared and incorporated, if necessary, into the land use element of the general plan for that particular jurisdiction. In addition, ensure that the HDC is incorporated as part of future land use plans for that area.

LU-2: If physical structures and/or properties are within the proposed acquired ROW for the project, provide appropriate Relocation Assistance for those whose property is acquired as part of the project.

LU-3: Coordinate with local municipalities and ensure that the proposed project is consistent with the existing land use within the area.

3.1.1.2 Consistency with State, Regional, and Local Plans

This section provides an analysis of the consistency of the HDC build alternatives with transportation and land use plans and policies included in the general and specific plans for the various jurisdictions within the project limits.

As previously mentioned under Section 1.1.4, the HDC Project has been included in SCAG's 2012-2035 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS), under Project Identification Number 1C0404. The Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) adopted the RTP/SCS on April 4, 2012. The project is also in SCAG's 2013 Federal Transportation Improvement Program (FTIP), which was federally approved on December 14, 2012 (Project Identification Numbers LA962212, LA0G665, and SB20061702).

The relevant policies, along with an evaluation of the project's consistency with the policies, are presented for each jurisdiction in Tables 3.1.1-1 to 3.1.1-6.

Palmdale

Applicable policies and goals of the City of Palmdale General Plan (2011) and consistency of the HDC Project are presented in Table 3.1.1-1.

Table 3.1.1-1 HDC Project Consistency with City of Palmdale General Plan

Policy L2.3.1: Support the rerouting of SR-138 to the vicinity of Avenue P-8, so as to remove regional through traffic from downtown streets.
Consistent. The proposed HDC alignment is along Avenue P-8, north of downtown and south of the Los Angeles/Palmdale Regional Airport.
GOAL C1: Establish, maintain, and enhance a system of streets and highways, which will provide for the safe and efficient movement of people and goods throughout the Planning Area, while minimizing adverse impacts on the community.
Consistent. One of the purposes of the HDC is to improve regional and local transportation infrastructure and provide safe and efficient movement of people and goods. At the same time, the project will be designed in a manner that avoids and minimizes impacts to communities within the project area.
Policy C1.1.2: Cooperate with the California Department of Transportation (Caltrans) and other affected jurisdictions to establish and adopt standards for intra-regional expressways.
Policy C1.2.4: Develop regional arterial links within the community where needed to serve existing and future needs. Coordinate with Caltrans and other affected agencies to expedite rerouting of SR-138 and widening of SR-14.
Policy C1.8.1: Cooperate with other agencies and jurisdictions, including Caltrans, Los Angeles County, and adjacent cities, to evaluate the proposed solutions to regional transportation issues relating to the City of Palmdale.
Consistent. In addition to Caltrans and the Los Angeles County Metropolitan Transportation Authority (Metro), which serves as the regional transportation planning agency for Los Angeles County, the project team includes the HDC Joint Powers Authority (HDCJPA), which encompasses the City of Palmdale among other local jurisdictions.
Objective C2.2: Increase the public transit opportunities available to Palmdale residents in order to reduce traffic impacts on streets and highways and provide travel alternatives.
Policy C2.2.4: Develop regional rail transit serving the Palmdale area.
Consistent. The HDC alternatives, including the HSR option, will include transit station improvements in Palmdale. The new freeway will improve commuter express or similar bus rapid transit (BRT) services and carpool or vanpool options. The HDC alternatives will provide improved access to one park-and-ride facility located near Palmdale.
Policy C5.2.3: Promote and support regional transportation planning for routes serving the airport facility, including SR-14 and SR-138.
Consistent. Implementation of the HDC Project will improve access to the airport.
Environmental Resources Element Policy ER2.1.1: Any development permitted in these areas must consider significant environmental resources and preserve environmental resources to the extent feasible.
Consistent. The project complies with environmental protection laws and regulations under the California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA) to the extent feasible.
Policy ER2.1.4: Preserve natural drainage courses and riparian areas where significant concentrations of ecological resources exist.
Consistent. Where the new facility must go through such areas, bridges or culverts shall be designed with the least project footprint and will include measures to avoid, minimize, and/or mitigate impacts.
Policy ER2.1.5: Preserve and maintain significant Joshua tree woodlands and other significant habitat areas.

Table 3.1.1-1 HDC Project Consistency with City of Palmdale General Plan

Policy ER7.1.3L: New development must protect significant historic, paleontological, or archaeological resources, or provide for other appropriate mitigation.
Implementation Program I (Native Desert Vegetation Ordinance): City Ordinance No. 952, referred to as the Native Desert Vegetation Ordinance, is designed to preserve juniper and Joshua trees, which add to community identity, and to encourage the use of native vegetation in new development landscaping.
Consistent. The HDC Project will be designed to avoid, protect in place, and/or minimize impacts to the resources addressed in the above policies and implementation program to the extent feasible.
Policy PS1.2.5: Design and construct infrastructure to meet ultimate capacity needs, pursuant to a master plan, so as to avoid the need for costly retrofitting.
Policy PS3.1.3: Make use of interim local drainage detention basins to slow stormwater runoff, until such time as permanent drainage facilities are constructed.
Policies PS3.2.1, PS3.2.2, and PS3.2.3: Design drainage facilities (such as detention or retention basins) to promote groundwater recharge, enhance riparian habitats, and combine it with opportunities for recreation such as trails and ball fields.
Consistent. The project team will coordinate with City staff regarding stormwater and placement of drainage infrastructures. Approximately one detention or retention basin is proposed for every 1 mile along the new facility to capture runoff from the new facility.
Parks, Recreation, and Trails Element Policy PRT3.1.2: Provide for access points into open space areas to encourage passive recreation activities such as hiking and nature study.
Consistent. The project is consistent with this policy by improving accessibility in general. In coordination with City staff, additional opportunities could be implemented in support of this policy to the extent feasible. The bike path along the new roadway will encourage hiking and nature study.
Community Design Element Policy CD 1.1.1: Each project should reflect and be integrated with the character and design of the surrounding area.
Policy CD 2.2.7: Landscape and grading plans for new development should limit removal of viable mature trees, and provide for replacement of a sufficient number of trees to safeguard the ecological and aesthetic environment.
Policy CD 4.4.3: Retaining walls exposed to public view shall be of decorative masonry construction.
Consistent. The project team will coordinate with City staff for opportunities in support of the above policies. Structures proposed will be visually compatible with the surrounding community, and architectural detail patterns, color, and materials will match the existing color palette and character of the surrounding area to the extent possible. Native vegetation will be planted in disturbed areas where space and conditions allow.

Source: High Desert Corridor Community Impact Assessment, 2016.

Unincorporated Los Angeles County

Consistency of the HDC Project with the applicable land use policies and goals of The Antelope Valley Area Plan (June 2015) are provided in Table 3.1.1-2.

Table 3.1.1-2 HDC Project Consistency with the Antelope Valley Area Plan (for Unincorporated Los Angeles County Areas)

Policy M 5.1 of the Mobility Element: Support development of the High Desert Corridor and the Northwest 138 Corridor Improvement Project, to provide a route for truck traffic between Interstate 5, State Route 14, and Interstate 15.
Policy M 5.2 through M 5.5: Minimize truck traffic impacts to local community and roads by recommending to designate truck routes with strong pavement sections (i.e., thicker or concrete pavement to withstand heavy trucks), provide rest stop away from residents, prohibit truck traffic on routes, and prohibit trucks parking on local streets.
Consistent. The HDC Project will be designed and constructed to accommodate truck traffic. The HDC will provide an alternative transportation facility that will help reduce the use of local roads for truck traffic. Although this project does not include construction of rest stops or parking for trucks, construction and improvement of direct access points to the freeway/ expressway will improve accessibility to parking and rest facilities without the use of local roads.
Policy M 6.3: Support the development of the HDC to improved interregional transportation connectivity. In addition, Policy M 6.5 supports the development of the California HSR system.
Consistent. The HDC Project is being proposed in line with Policy M 6.3. Two of the HDC Project alternatives include HSR between Victorville and Palmdale, which will be integrated with and complement the California HSR system. Even without the HSR alternatives, the HDC Project would provide support to the California HSR system
Policy COS 3.4 of the Conservation and Open Space Element: Strategically acquire open space to preserve natural streams, drainage channels, or wetlands.
Consistent. Permanent impacts to significant ecological areas, such as areas near Little and Big Rock washes, will be mitigated as part of the project implementation.
Policy COS 2.3: Require onsite stormwater low impact development strategies such as infiltration.
Consistent. Caltrans proposes infiltration basins at approximately 1-mile intervals within the future facility ROW of the HDC to treat and partially contain the onsite pavement runoff from the roadway. Road embankment will be graded to allow sheet flow and native vegetation re-establishment. To the extent feasible, ground and native vegetation disturbance will be minimized during construction by establishing and fencing Environmentally Sensitive Areas (ESA).
Policies COS 4.5 and COS 4.6: Protect wildlife movement and corridors.
Consistent. The HDC Project will accommodate wildlife crossing and movement into its design. The exact locations, corridor dimensions, and design will be determined in the biological studies and in consultation with resource agencies with jurisdiction.
Policy COS 5.1: Protect natural scenic resources and vistas.
Consistent. The HDC Visual Impacts Analysis is prepared to identify scenic resources and address minimization and enhancement measures.
Policy COS 6.2: Implement design standards that would minimize potential conflicts with adjacent agricultural uses.
Consistent. Caltrans will implement design standards such as Best Management Practices (BMPs) for stormwater and dust control and include provisions in contract(s) to minimize spread of invasive species and conflicts with agricultural uses to the extent feasible.

Table 3.1.1-2 HDC Project Consistency with the Antelope Valley Area Plan (for Unincorporated Los Angeles County Areas)

Policy COS 9.5 and COS 9.6: Encourage the use of alternative fuel vehicles and less polluting equipment to improve air quality.
Consistent. If warranted for the HDC Project and based on air quality regional and hot-spot analysis, an incentive program could be implemented to replace old model vehicles and diesel trucks (i.e., truck-buy-back program, tax relief, or financial assistance) that could be offered to local businesses and frequent regional operators. During construction, diesel trucks and equipment would adhere to best industry standards to reduce emissions. In addition, the new facility will include a green energy corridor supporting renewable (i.e., solar) energy production and transmission.
Policy COS 15.3: Replace outdated, obtrusive, and inefficient light fixtures with fixtures that meet dark sky and energy efficiency objectives.
Consistent. As appropriate, dark sky-compliant lighting will be selected to minimize light pollution cast into the sky while maximizing light cast onto the ground.
Policy COS 16.1: New development will minimize removal of native vegetation. Discourage the clear-scraping of land and ensure that a large percentage of land is left in its natural state.
Policy COS 16.2: Native vegetation will be used in all landscaped areas, provided that vegetation meets all applicable requirements of the Fire Department and the Department of Public Works.
Consistent. The HDC Project will be designed to minimize impacts to vegetation to the extent feasible. Vegetation removed as a result of project construction will be replaced with vegetation that complies with all requirements.
Policy COS 18.1: Encourage government agencies and conservancies to acquire lands in ecological sensitive areas and preserve them as permanent open space.
Consistent. The HDC Project includes acquisition of land for mitigation of impacts on ecologically sensitive areas.
Policy PS 5.1 of the Public Safety, Services and Facilities Element: Encourage neighborhood preservation programs, such as graffiti abatement, removal of abandoned or inoperable vehicles, and removal of trash and debris.
Consistent. Caltrans maintenance staff, in coordination with local agencies, will be responsible for graffiti abatement and removal of abandoned/inoperable vehicles, trash, and debris.
Policy PS 8.7: Provide trails, bikeways, and bicycle routes for recreational purposes, as directed in the policies of the Mobility Element.
Consistent. Bicycle facility is one of the components of the HDC Project.
Policy PS 13.4: Support the development of a range of travel options that better connect the Antelope Valley to existing regional trade and employment in other regions, including the HDC, as directed in the policies of the Mobility Element.
Consistent. The HDC Project provides a multimodal transportation facility and improves movement of goods and people.

Source: High Desert Corridor Community Impact Assessment, 2016.

Unincorporated San Bernardino County

Consistency of the HDC Project with the applicable transportation and land use goals and policies of the County of San Bernardino 2007 General Plan (April 2007) are presented in Table 3.1.1-3.

Table 3.1.1-3 HDC Project Consistency with the County of San Bernardino 2007 General Plan

General Plan Land Use Element Goal LU 1: Maintain land use patterns in the Desert Region that enhance the rural environment and preserve the quality of life of the residents of the region.
Transportation and Circulation Element Goals CI 1 and CI 2: A safe, functional, and convenient transportation system that enhances the lifestyles of residents and operates at regional, countywide, community, and neighborhood scales.
Policy CI 2.5: Work with Caltrans on mitigating the impacts of State highway projects on local communities.
Policy CI 2.10: Identify important long-range transportation corridors, in conjunction with plans of regional transportation agencies (e.g., SCAG and San Bernardino Associated Governments [SANBAG]) to protect sufficient ROW for the development of long-range corridors.
Consistent. Implementation of the HDC will provide a safe and functional regional multimodal transportation system. The project is planned in a manner that avoids, minimizes, and mitigates impacts to the local communities to the extent feasible.
Policy CI3.1/Program # 5: Designate existing park-and-ride facilities on the General Plan Circulation Maps, work with Caltrans to identify appropriate future park-and-ride facilities, and develop a program to acquire and develop sites for such facilities in areas where there is an identified need.
Consistent. The HDC alternatives would improve access to two park-and-ride facilities located near Adelanto and US 395).
Policy CI 4.2: Reduce the dependence on the automobile for local trips, integrate transportation and land use planning at the community and regional levels by promoting TOD, where appropriate and feasible."
Consistent. The HDC provides alternative modes of transportation with the implementation of bike paths and HSR as part of the project. The HDC will improve access to transit and BRT services.
Policy CI 8.1: Encourage airports to meet changing needs and demands. Program #1 specifically calls for coordinating the development of air cargo facilities at the SCLA, which will be served by the HDC.
Consistent. Implementation of the HDC will improve access to the airport.
GOAL D/CI 1: Ensure a safe and effective transportation system that provides adequate traffic movement while preserving the rural desert character of the region.
Consistent. The HDC is a multimodal facility subject to State and federal design standards that will provide a safe and effective transportation system. In addition, the project will incorporate context-sensitive solutions and appropriate design of structures and architecture.
D/CI 2.1: Retain the natural channel bottom for all stormwater drainage facilities and flood control channels when such facilities are required for a specific development. This protects wildlife corridors and prevents loss of critical habitat in the region.

Table 3.1.1-3 HDC Project Consistency with the County of San Bernardino 2007 General Plan

Consistent. To enable flood flows to cross the proposed facility, more than 100 cross culverts along the alignment are proposed at existing flow concentration points, mimicking existing flow conditions. Culverts were assumed to be reinforced concrete box (RCB) culverts with a minimum height of 4 feet to reduce clogging potential for sediment buildup. Where flow velocities allow, soft bottom culverts will be used. The HDC will maintain natural drainages and prevent loss of critical habitat to the extent feasible. The three main drainages in San Bernardino County (i.e., Turner Wash, Ossum Wash, and Mojave River) are proposed to retain natural channel bottoms utilizing a bridge design. A Geomorphology Report has been prepared for the HDC Project.
Conservation Element Policy CO 3.1: Identify and protect important archaeological and historic cultural resources in areas of the County that have been determined to have known cultural resource sensitivity.
Consistent. A full cultural resources study has been conducted as part of the project. Measures have been identified to avoid, minimize, and mitigate impacts to cultural resources within the project area. Coordination with relevant agencies having jurisdiction over cultural resources within the project area is ongoing.
GOAL D/CO 1: Preserve the unique environmental features and natural resources of the Desert Region, including native wildlife, vegetation, water, and scenic vistas.
Policy D/CO 1.3: Retain existing native Joshua trees for new development projects and encourage onsite relocation if necessary.
Policy D/CO 1.4: Reduce disturbances to fragile desert soils as much as practicable in order to reduce fugitive dust.
Policy D/CO 1.11: Encourage the retention of specimen sized Joshua trees unless there are no other reasonable alternative for the development of the land. Specimen size trees are defined as meeting one or more of the following criteria: a. Circumference measurement equal to or greater than 50 inches measured at 4 feet from grade. b. Total tree height of 15 feet or greater. c. Trees possessing a bark-like trunk. d. A cluster of 10 or more individual trees, of any size, growing in close proximity to each other.
Consistent. A full biological resources study has been conducted as part of the project. Measures have been identified to avoid, minimize, and mitigate impacts to biological resources within the project area. Coordination with relevant agencies having jurisdiction over biological resources within the project area is ongoing.
GOAL D/CO 3: Preserve the dark night sky as a natural resource in the Desert Region communities.
Consistent. As appropriate, dark sky-compliant lighting will be selected to minimize light pollution cast into the sky while maximizing light cast onto the ground.
Open Space Element OS 5.1 Policy: Consider features for designation as scenic resources, including roadways that provide a vista of undisturbed natural areas.
Consistent. Apple Valley has identified Desert Preservation within the Open Space and Conservation Element of its General Plan. Key scenic resources indentified in the Desert Preservation section include mountains, peaks, ridgelines, knolls, and rock outcroppings. Portions of SR-18 east of the interchange with the HDC proposed facility carry the official designation of “State Scenic Highway.” For a highway to be declared scenic, the government with jurisdiction over abutting land must adopt a "scenic corridor protection program" that limits development, outdoor advertising, and earthmoving. Caltrans must agree to the criteria.

Table 3.1.1-3 HDC Project Consistency with the County of San Bernardino 2007 General Plan

Safety Element Policy S 5.8: Design flood control and drainage measures as part of an overall community improvement program that advances the goals of recreation, resource conservation, preservation of natural riparian vegetation and habitat, and the preservation of the scenic values of the County's streams and creeks.
Consistent. The HDC is designed in a manner to avoid, minimize, and mitigate potential impacts on the listed resources.
Economic Development Policy ED 8.3: Identify the best location for a major new multimodal facility within the County to enhance the concept of an "Inland Port."
Policy ED 11.1: Economic development opportunities in targeted growth areas must meet the County's economic needs and ensure compatibility with the County's long-range economic strategy.
Policy ED 15.2: Facilitate economic development that will improve the overall jobs-housing balance within the major planning regions of the County, including a Mag–Lev/HSR system that links San Bernardino County with other parts of the region.
Policy ED 19.1: Retain and expand trucking, warehousing, and distribution opportunities.
Consistent. The HDC provides a multimodal facility that will improve people's mobility and access and goods movement and link the county to other regions. This will allow economic development of the region and support plans for improving the job-housing balance.
Policy CI 3.1: Work with regional agencies (i.e., SCAG, Caltrans, SANBAG) to develop ridesharing programs, facilities, and various modes of public transit (i.e., local and rapid bus, Metrolink, and high-speed trains).
Consistent. The HDC Project is designed to support various modes of transportation, including public transit. Park-and-ride facilities are also proposed as part of the Traffic Study, although they would not be built by Caltrans as part of this project.

Source: High Desert Corridor Community Impact Assessment, 2016.

Adelanto

Consistency of the HDC Project with certain policies and goals of the City of Adelanto General Plan Update (May 1994) are identified in Table 3.1.1- 4.

Table 3.1.1-4 HDC Project Consistency with the City of Adelanto General Plan Policies and Goals

Policy LU 1.4: Promote architectural designs that give Adelanto a unique, positive community image as it relates to the desert environment.
Policy LU 1.5: Protect sensitive wildlife habitats such as the Mojave River corridor.
Policy LU 2.3: Offer a wide range of development opportunities. Encourage the development of mixed-use projects, providing a balance of homes, jobs, and services.
Policy MI 4.1: Encourage the incorporation of transit options into new development.
Implementation Strategy MI 4.1.1: Retain ROW for super speed train.
Parks and Recreation Element Policy REC 1.18: Promote the establishment of hiking and bicycle tails.

Table 3.1.1-4 HDC Project Consistency with the City of Adelanto General Plan Policies and Goals

Noise Element Policy 1.2: Ensure the design and improvement of future master-planned roadways in the city are accomplished in a matter that minimizes noise impacts on adjacent educational facilities and adjoining neighborhoods.
Consistent. The HDC final design will include aesthetic treatments and context-sensitive design with input from local stakeholders and City planning staff. The HDC will minimize potential impacts to sensitive wildlife habitats and mitigate for significant impacts. The project includes proposals for HSR and a bike path. Noise impacts will be addressed through State and federal Traffic Noise Analysis Protocols.

Source: High Desert Corridor Community Impact Assessment, 2016.

Victorville

Consistency of the HDC Project with the policies and goals of the City of Victorville General Plan 2030 (September 2008) related to transportation and land use in the project area are shown in Table 3.1.1-5.

Table 3.1.1-5 HDC Project Consistency with the City of Victorville General Plan 2030

Land Use Element Policy 1.1.1: Encourage development that does not conflict with or adversely affect other existing or potential developments.
Consistent. Caltrans will adopt context-sensitive design and solutions and coordinate with the HDCJPA and City staff. Adequate compensation will be provided for property acquisitions, including relocation assistance for residents and businesses as required by the law.
Policy 1.2.1: Manage development in a manner that does not conflict with operations of SCLA.
Consistent. Implementation of the HDC will improve access to SCLA. In addition, the roadway will be designed so it will not conflict with the operation and clearance considerations of the airport.
Policy 2.1.1: Encourage development of land uses and infrastructure to support growth of businesses and commerce.
Circulation Element Policy 1.4.3: Support and participate in regional efforts to improve/ expand freight movement via trucks and train services, without increasing conflicts with passenger car traffic and without increasing congestion on the highway and arterial roadway networks.
Consistent. One of the HDC Project purposes is to improve accessibility and mobility of goods and passenger car traffic.
Policy 1.5.1: Review and prioritize Transportation Systems Management (TSM) measures and incorporate into Capital Improvement Programming (CIP) as appropriate.
Policy 3.1.1: Planning and design of new roadways and expansion/completion of existing roadways shall include consideration of water, sewer, storm drainage, communications, and energy facilities that can be co-located within the road ROW.
Policy 3.2.2: Include in the design specifications for public and private streets structural and nonstructural techniques to filter stormwater runoff prior to conveyance to storm drain inlets.

Table 3.1.1-5 HDC Project Consistency with the City of Victorville General Plan 2030

Policy 4.2.1: Prohibit private or public development projects or major infrastructure facilities on land within the Mojave River Corridor, where biological surveys have determined there is habitat that supports rare, threatened, and/or endangered plants or wildlife. Allow minor encroachments into such habitat, for critical public facilities and recreational trails, where reliable assurances are provided that no loss of sensitive species would occur.
Noise Element Policy 1.2.1: Include noise mitigation measures in the design and use of new roadway projects.
Safety Element Policy 1.2.1: Assess site-specific geologic hazards and required mitigation measures prior to granting discretionary approval for a land use plan, development project, or public infrastructure plan or project.
Consistent. The HDC Project will be designed and implemented according to the established standards, protocols, BMPs, and in coordination with resource agencies to prevent conflict with utility infrastructure and services, and to prevent safety and geologic hazards to avoid and minimize impacts to resources.

Source: High Desert Corridor Community Impact Assessment, 2016.

Apple Valley

Consistency of the HDC Project with certain policies and goals of the Town of Apple Valley General Plan (2009) are identified in Table 3.1.1-6.

Table 3.1.1-6 HDC Project Consistency with the Town of Apple Valley General Plan

Land Use Element Policy 1.A: Require low water use through drought tolerant and native desert plants for landscaping.
Consistent. The HDC Project plans will incorporate native and drought-tolerant plant species.
Policy 1.B: New development will be designed to minimize grading, and avoid mass grading to the greatest extent possible.
Policies 1.C and 1.D: Natural drainage channels will be designed with soft bottoms whenever possible and protect areas of biological or aesthetic significance.
Consistent. Where flow velocities allow, soft bottom culverts will be used. The HDC will be designed to maintain natural drainages and prevent loss of critical habitat to the extent feasible.
Policy 2.C: Design quality in all development and redevelopment proposals and encourage the enhancement of existing development.
Consistent. The HDC Project will be designed to follow established standards, protocols, and BMPs in consultation with resource agencies and interested parties.
Policy 2.E: Protect ROW for the HDC as determined by Caltrans.
Program 2.E.:1 New development and redevelopment located in the area of the HDC shall be conditioned to reserve ROW for the future roadway.
Consistent. The HDC Project is generally consistent with the alignment depicted in the circulation element and land use map.
Program 2.E.2: Encourage Caltrans to notify affected owners as early as feasible.

Table 3.1.1-6 HDC Project Consistency with the Town of Apple Valley General Plan

Consistent. Caltrans, in cooperation with Metro, has engaged the public through public meetings and news and Web site updates. Following Caltrans ROW protocols and guidelines, affected owners will be notified as early as feasible.
Policy 5.E: Mixed-use projects that integrate residential land uses and commercial or light industrial land uses are encouraged in The Village, on major roadways, and in close proximity to employment centers.
Consistent: Availability of the HDC will increase capacity of east-west transportation facilities to accommodate existing and future transportation demand, which will in turn accommodate the mixed-use projects.
Policy 1.D: Traffic calming devices shall be integrated into all Town streets to the greatest extent possible.
Policy 1.I: Pedestrian access shall be preserved and enhanced.
Policy 1.J: Implement a coordinated and connected bicycle lane network consistent with the Bicycle Lane Map.
Policy 2.D: Maintain and expand a comprehensive interconnected recreational trails system for bicycles, equestrians, and pedestrians, and provide supporting facilities whenever possible.
Policy 1.F: Support, encourage, and facilitate the development of projects that enhance the use of alternative modes of transportation, including pedestrian-oriented retail and activity centers, dedicated bicycle paths and lanes, and communitywide multi-use trails.”
Consistent. The HDC Project is a multipurpose corridor. It will be designed to meet the State highway standards. The project will also incorporate bicycle and green energy components. Pedestrian facilities will also be provided.
Biological Resources Element Policy 2.B: Support and cooperate with other agencies in establishing multiple use corridors that link open space areas through drainage channels and utility easements, thereby encouraging the connectivity of natural communities.
Consistent. The HDC Project team will coordinate with the Town planning staff to address this policy to the extent feasible. The project will provide a new bike bath that is accessible to pedestrians.
Air Quality Element Policy 1.D: All proposals for development activities within the Town shall be reviewed for their potential to adversely impact local and regional air quality and shall be required to mitigate any significant impacts.
Consistent. An air quality assessment has been prepared for this project that evaluated and addressed short-term (construction) and long-term air quality impacts and corresponding mitigation measures.
Policy 1.F: Support, encourage, and facilitate the development of projects that enhance the use of alternative modes of transportation, including pedestrian-oriented retail and activity centers, dedicated bicycle paths and lanes, and communitywide multi-use trails.
Consistent. With the incorporation of a Class I bike path, proposed park-and-ride facilities, two alternatives with HSR, and transit station improvements in Victorville and Palmdale, the project is envisioned as a multimodal facility that will enhance the use of alternative modes of transportation.
Policy 1.D: Development review and environmental review process shall require all development proposals within the noise impact area of US 395, I-15, SR-18, the HDC, or the railroads to mitigate both noise and vibration to acceptable levels through the preparation of focused studies.

Table 3.1.1-6 HDC Project Consistency with the Town of Apple Valley General Plan

Program 1.D.1: Closely coordinate with Caltrans to encourage the installation of soundwalls, rubberized pavement, and other noise-attenuating measures on roadway improvements for which it is responsible, including US 395, I-15, SR-18, and the future HDC.
Consistent. A Noise Study Report has been conducted based on the current Traffic Noise Analysis Protocols set forth by FHWA, Caltrans, and Federal Railroad Administration (FRA). Noise abatement in terms of soundwalls is proposed to minimize traffic noise along the corridor where noise levels are predicted to approach or exceed the Noise Abatement Criteria.
Hazardous and Toxic Materials Element Policy 1.B: The County Sheriff's Department will work with the Town Engineer, Caltrans, and California Highway Patrol, to regulate the transport of hazardous materials along local roadways, state highways and routes, and interstates in the Town or the vicinity.
Consistent. All hazardous material transporters will be required to be in compliance with current laws and regulations governing hazardous materials and waste transport.

Source: High Desert Corridor Community Impact Assessment, 2016.

As presented and discussed in Tables 3.1.1-1 through 3.1.1-6, the proposed build alternatives are consistent with the various goals and policies of the City of Palmdale General Plan, the Antelope Valley Area Plan (Los Angeles County), the County of San Bernardino 2007 General Plan, the City of Adelanto General Plan Update, the City of Victorville General Plan 2030, and the Town of Apple Valley General Plan. In addition, SCAG and local government officials indicated their support of the HDC Project through letters of support and city council resolutions within various reports and planning documents.

Caltrans, through its Local Development-Intergovernmental Review (LD-IGR), as part of its transportation planning program, reviews and comments on local and tribal land use development proposals and environmental planning documents, as well as general, specific, and community plans, with a purpose to assess potential impacts to the State Highway System. The LD-IGR program staff will coordinate with local and other Lead Agencies on implementing mitigation measures designed to protect the State's transportation facilities, operations, and programs. Caltrans is legally responsible for ensuring that transportation impacts to the State Highway System resulting from nearby land use development activities are either eliminated or reduced to a level of insignificance.

Avoidance, Minimization, and Mitigation Measures

LU-4: Caltrans will coordinate with local governments to ensure that the HDC is constructed in a manner that is consistent with the goals and policies within the general plans for the various local municipalities.

LU-5: Caltrans will coordinate with local governments to ensure that, to the extent possible, future development is compatible with their character and consistent with their general plans and land use policies subject to applicable environmental laws and regulations. The local governments are responsible for carrying out their visions of sustainable and planned growth and development.

LU-6: Once the HDC is constructed and becomes part of the State Highway System, the Caltrans LD-IGR process will ensure ongoing statewide efforts to avoid, eliminate, and reduce any potential adverse environmental and traffic impacts that would result from local developments on or near the State's transportation system.

LU-7 Caltrans will acquire land in ecologically sensitive areas and preserve it as permanent open space to mitigiate for impacts in sensitive areas.

In addition, the following measure listed in Section 3.1.1.1, Existing and Future Land Use, also applies.

LU-1: Coordinate with local municipalities ensuring that amendments and/or land use changes are prepared and incorporated, if necessary, into the land use element of the general plan for that particular jurisdiction. In addition, ensure that the HDC is incorporated as part of future land use plans for that area.

3.1.1.3 Parks and Recreation

Regulatory Setting

This project will affect facilities that are protected by the Park Preservation Act (California Public Resources Code [PRC] Sections 5400-5409). The Park Preservation Act prohibits local and state agencies from acquiring any property that is in use as a public park at the time of acquisition unless the acquiring agency pays sufficient compensation or land, or both, to enable the operator of the park to replace the park land and any park facilities on that land.

Affected Environment

Maps showing park and recreation facilities, as well as other community facilities, in the vicinity of the proposed alignments are shown in Figures 3.1.1-12 through 3.1.1-17.

City of Palmdale and Unincorporated Areas of Los Angeles County – Lake Los Angeles and Sun Village

Twenty-two (22) park and recreational facilities are located throughout the study area in Palmdale and unincorporated areas of Los Angeles County. Two park and recreational facilities – Desert Sands Park and Desert Aire Golf Course – are within 0.5 mile of the proposed project. Only Desert Sands Park is adjacent to the proposed project alignment. Under the HSR alignment, Poncitlán Square (a 4-acre City-owned park), Doctor Robert C. St. Clair Parkway, and Hammack Activity Center/Roller Hockey Rinks (a 29,000-square-foot recreational facility owned and operated by the City) are located within 0.5 mile of the proposed HSR alignment.

Figure 3.1.1-12 Bikeway and Future/Proposed Master Plan Route within Palmdale Study Area

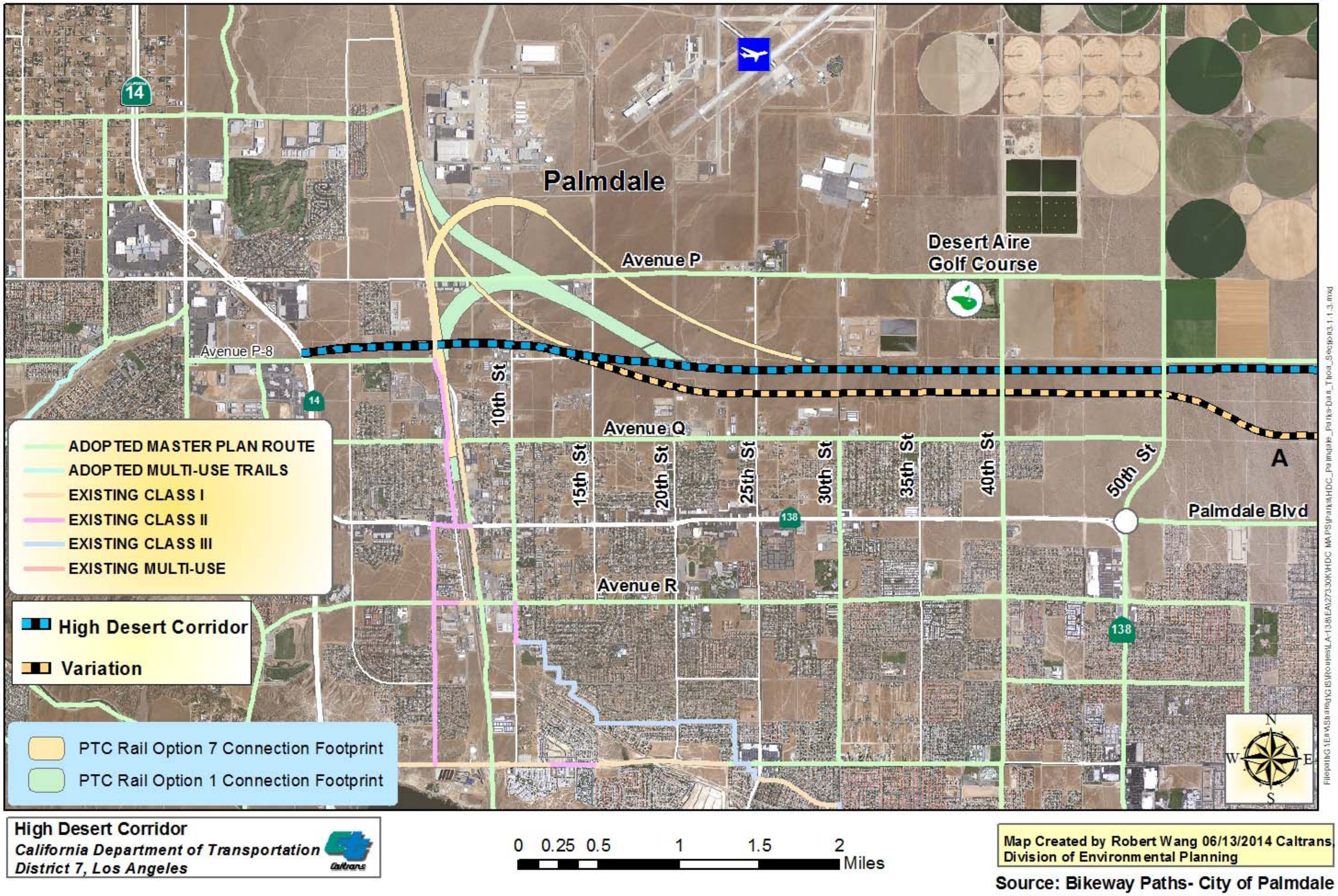


Figure 3.1.1-13 Parkland within Palmdale Study Area

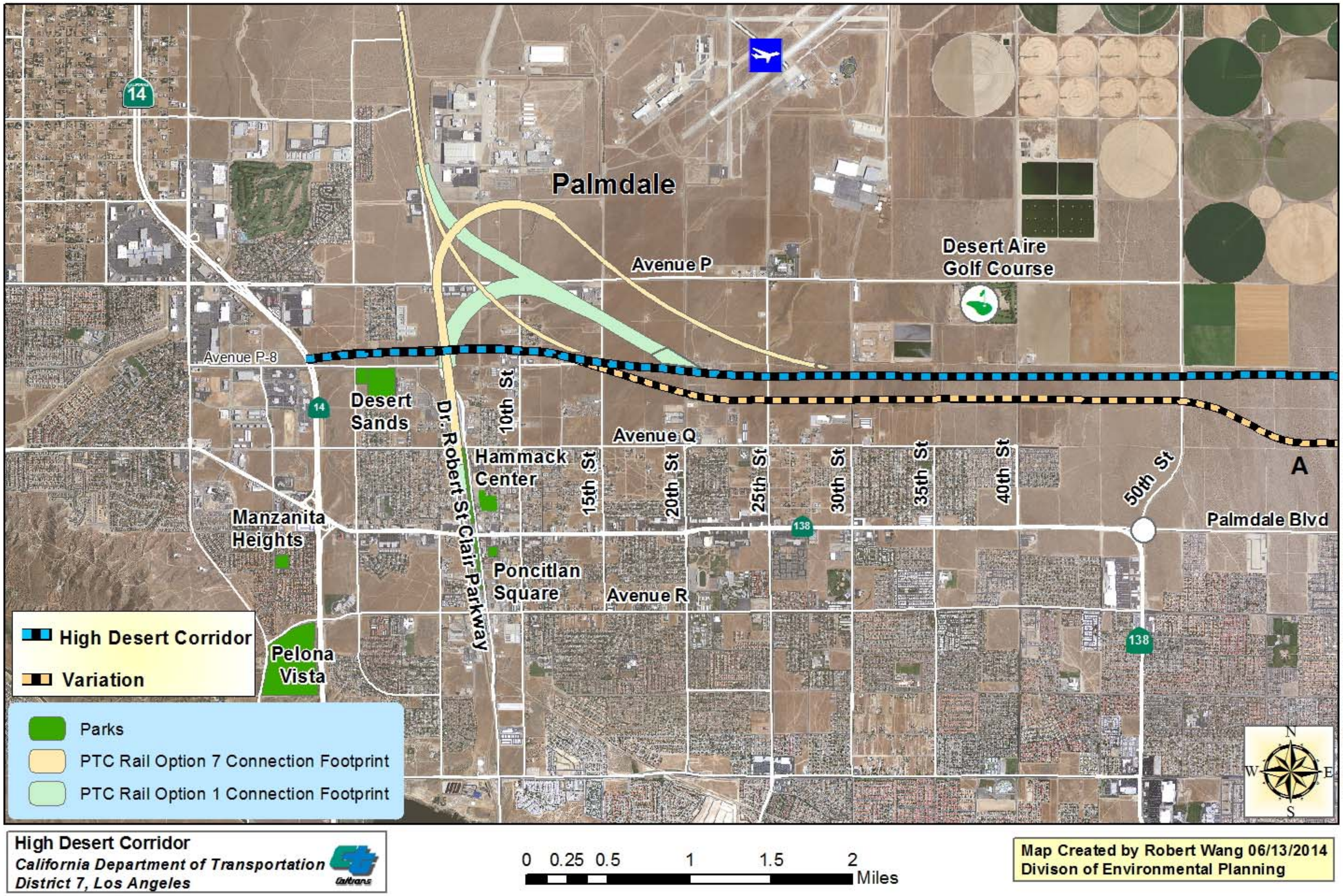


Figure 3.1.1-14 Adopted Trail System within LA County Study Area

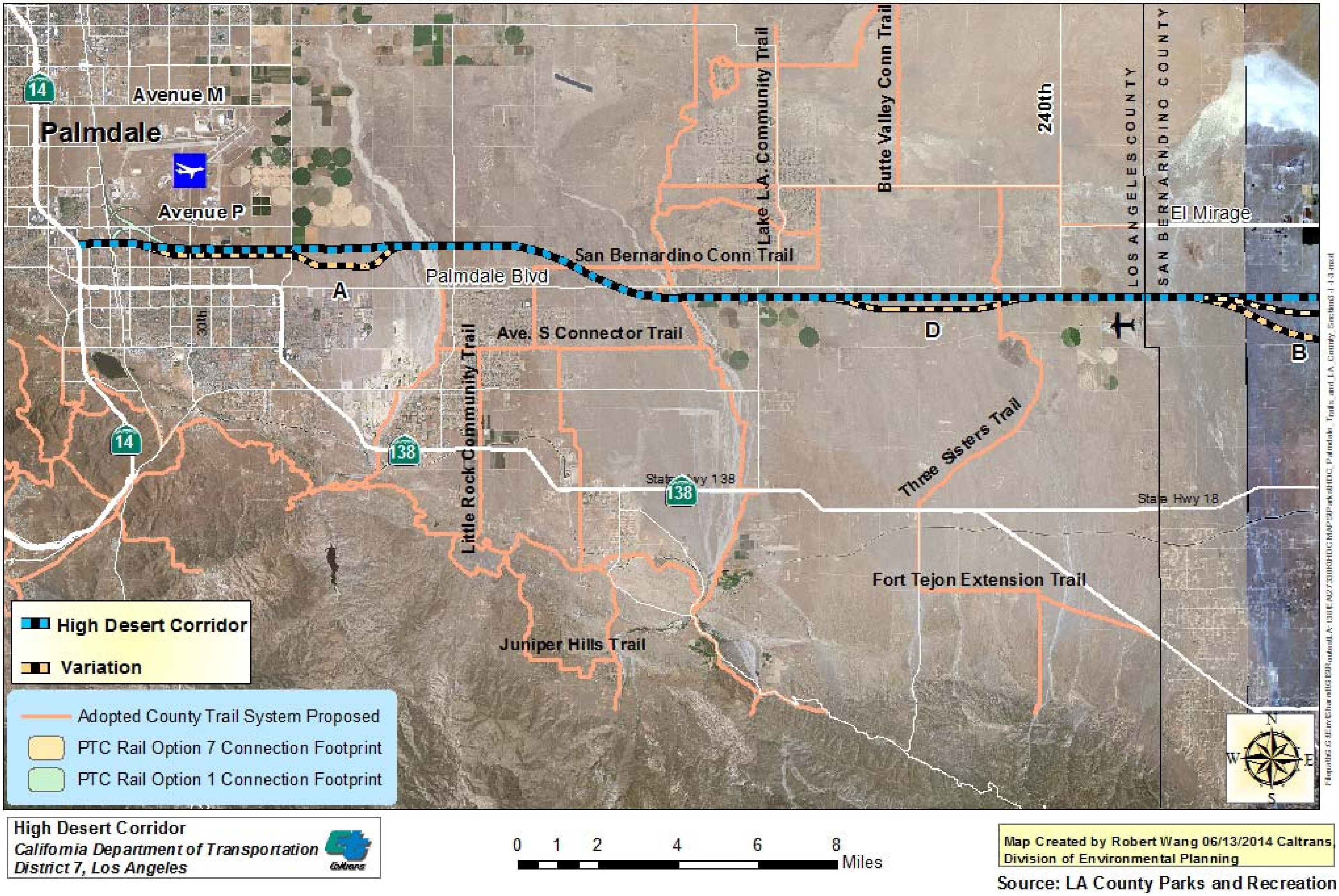


Figure 3.1.1-15 Bikeway and Trails in Apple Valley

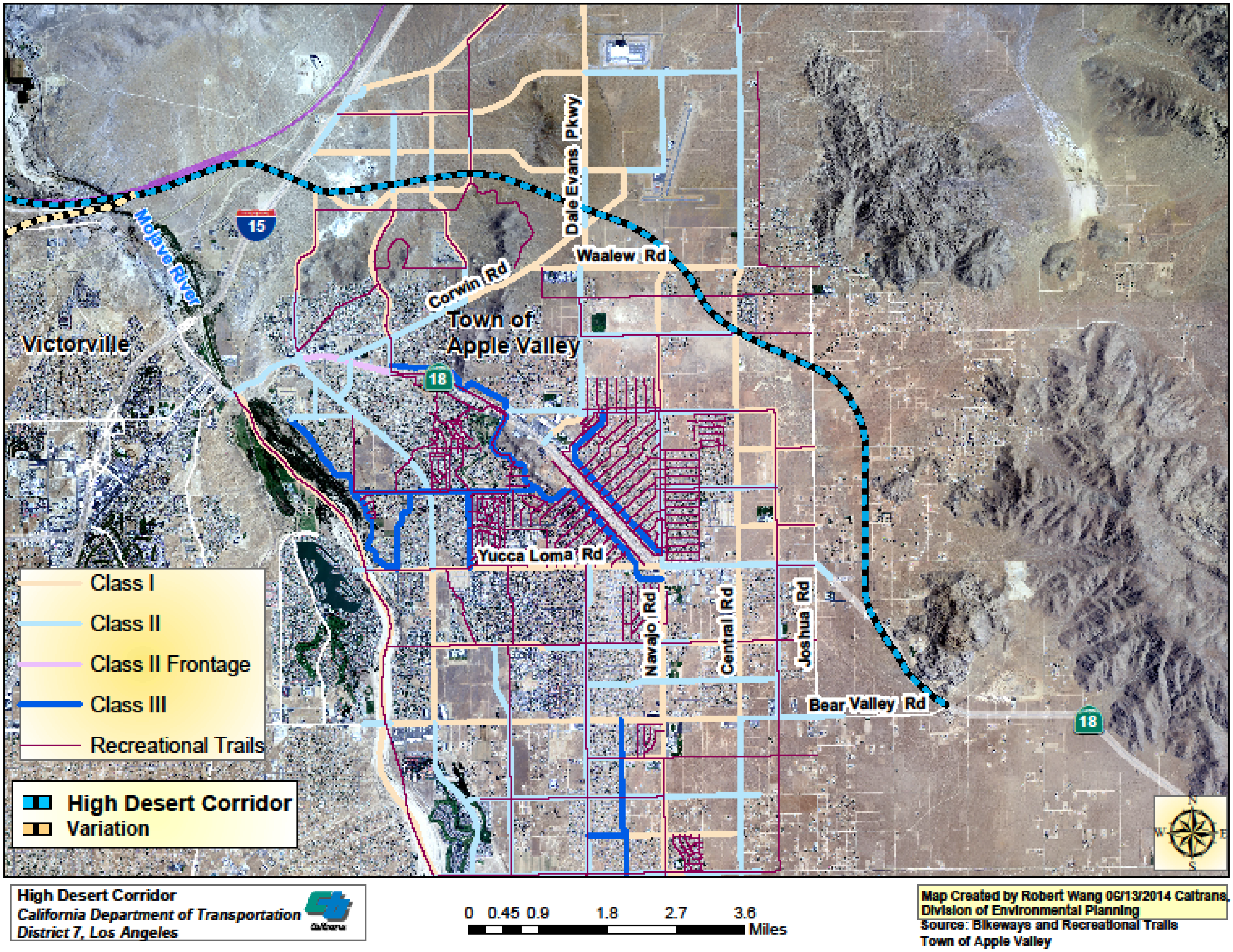


Figure 3.1.1-16 Parkland in Apple Valley Study Area

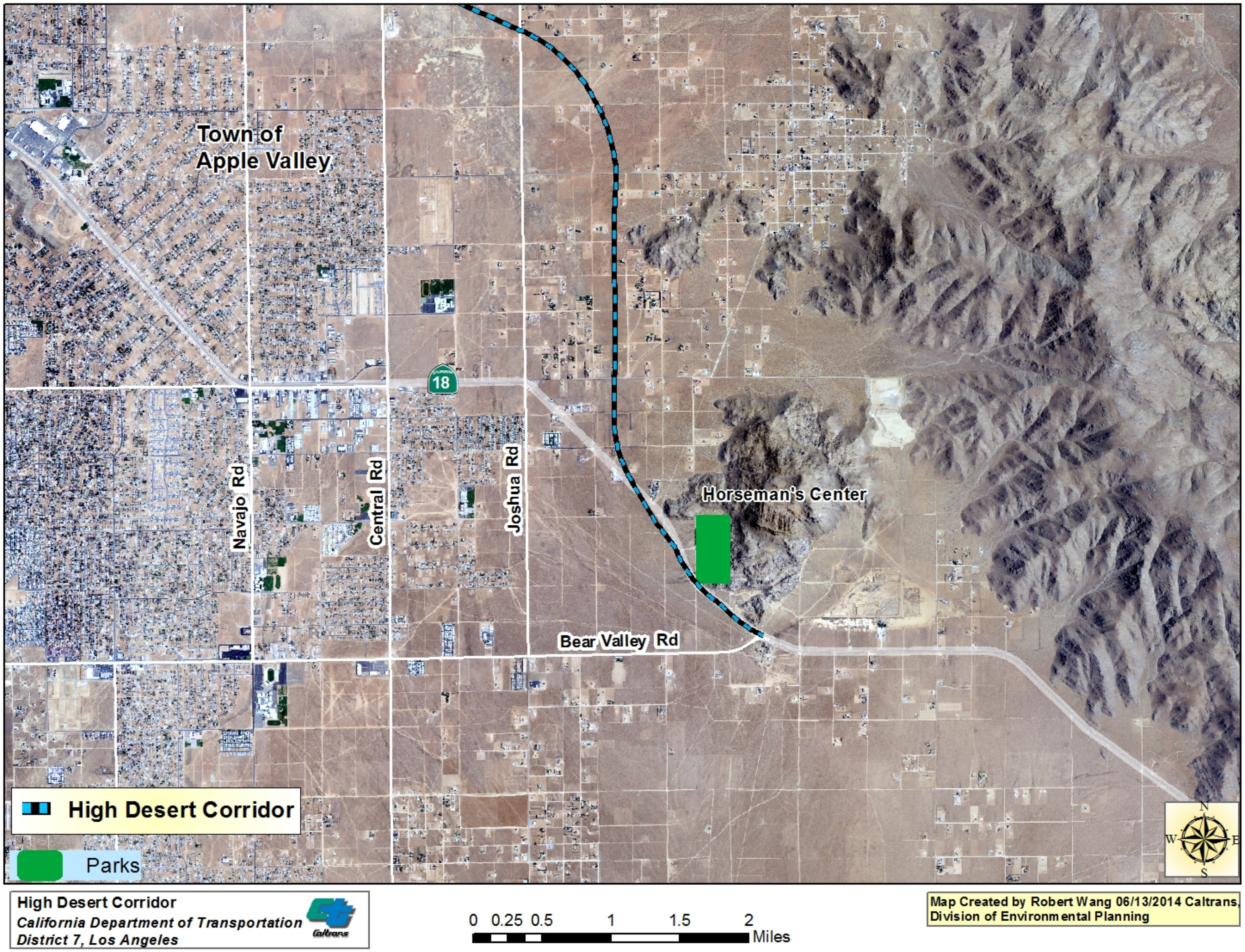
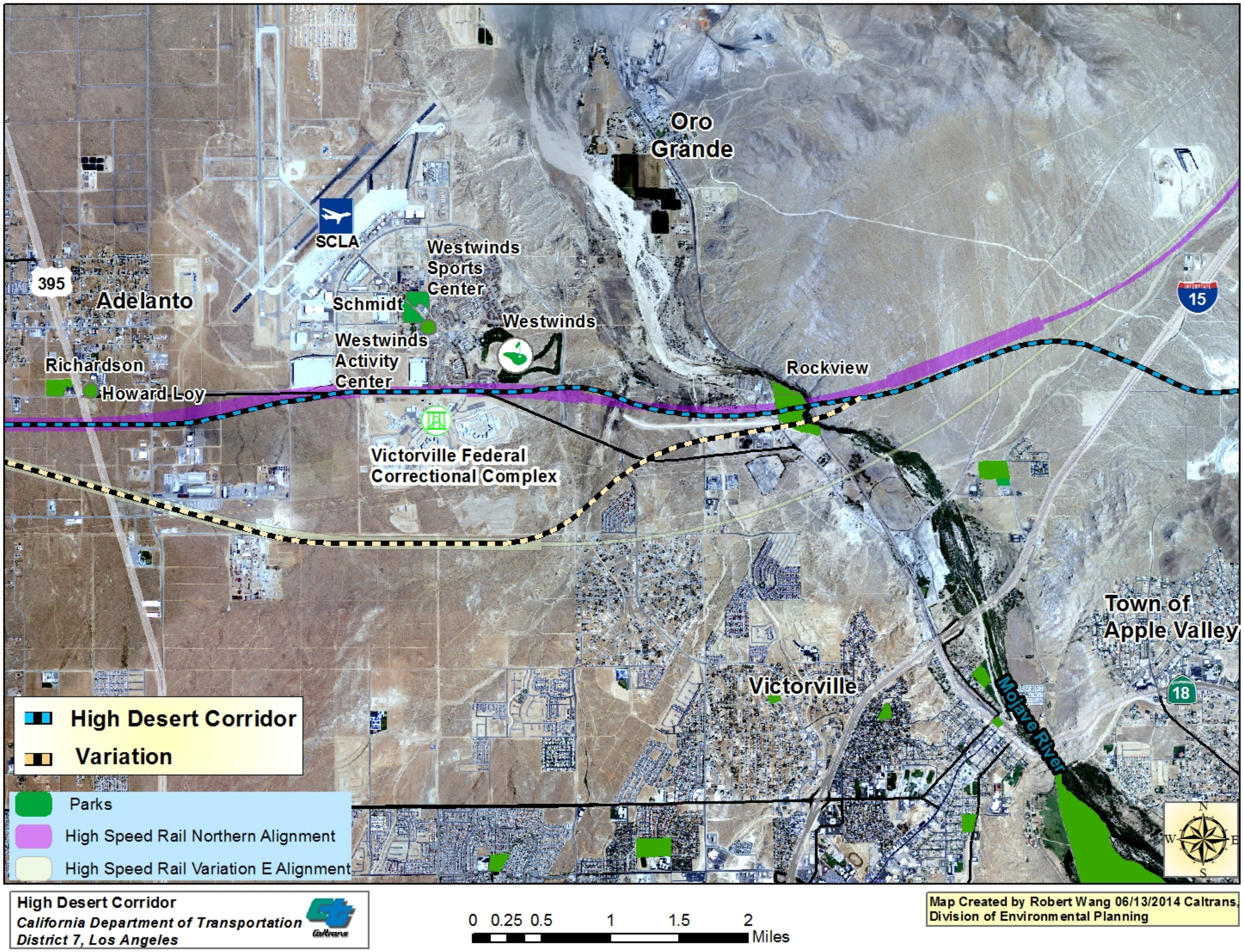


Figure 3.1.1-17 Parkland in Victorville Study Area



Desert Sands Park

The 20-acre, City-owned Desert Sands Park is located approximately 0.08 mile from the project footprint (all alternatives), at 39117 3rd Street East, Palmdale, on the southwest corner of Technology Drive and 3rd Street East. The park includes a walking/jogging trail through natural vegetation; a semi-sheltered picnic area that accommodates up to 250 guests; a playground with swings, slides, fire poles, and climbers; a recreation/meeting building; two softball fields; one soccer field; two tennis courts; two basketball courts; a sand volleyball court; restrooms; and a tot lot. It is open to the public from 8:00 a.m. to 10:00 p.m., 7 days per week.

Desert Aire Golf Course

The Desert Aire Golf Course is a full-length nine-hole golf course located at 3620 East Avenue P within the city of Palmdale. In addition, the facility offers a practice facility, which includes a full-size sand bunker, a practice putting green, and a practice chipping green area. The Desert Aire Golf Course is approximately 0.5 mile from the project footprint (all alternatives).

Poncitlán Square

Poncitlán Square is located at 38315 9th Street East, Palmdale, and is across from City Hall. Poncitlán Square features native vegetation and landscaping, a rose garden, and a bandstand pavilion/gazebo for outdoor concerts, special events, outdoor wedding ceremonies, and reception photos. This park is about 0.4 mile from and southeast of the project limits.

Doctor Robert C. St. Clair Parkway

Doctor Robert St. Clair Parkway is located along Sierra Highway in Palmdale, from Avenue Q to Avenue R. The total acreage of the parkway is approximately 8.7 acres. The parkway includes a 12-foot-wide concrete trail that forms a meandering bikeway. The trail extends along the west side of Sierra Highway from Avenue Q to Palmdale Boulevard and from Palmdale Boulevard to 250 feet south of Avenue Q-12. The parkway/path is owned by the City of Palmdale. It is designated primarily for passive recreation and is open to the public.

Hammack Activity Center/Roller Hockey Rinks

This public recreational facility is located at 815 East Avenue Q-6. None of the project alternatives would permanently incorporate land from or temporarily occupy this park.

Trails and Parkways

There are many areas within the High Desert that provide bicycling opportunities for bicyclists, but few designated trails are available. Several active bicycle clubs ride through portions of the study area on surface roadways and trails that are disconnected, due largely to the rugged terrain and limitations of available access points. Within Palmdale and unincorporated areas of Los Angeles County, there are three trails and parkways that are designated multiuse for pedestrian, bike, and/or equestrian. These trails include Barrel Springs Trail, Joshua Ranch Trail, and Doctor Robert C. St. Clair Parkway. Other pedestrian facilities include walking paths around Domenic Massari Park, Pelona Vista Park, and Marie Kerr Park.

City of Adelanto and Unincorporated San Bernardino County

Six park and recreational facilities are located throughout Adelanto and unincorporated areas of San Bernardino County. Three park and recreational facilities are within 0.5 mile of the proposed project – Adelanto Park, Howard Loy Park, and Richardson Park. None of the three park and recreational facilities are located adjacent to the proposed project.

Adelanto Park

Located off Inca Avenue and adjacent to the Adelanto School Academy of Math and Science, Adelanto Park serves as a recreational facility and is open to the public. Adelanto Park provides open green space for various recreational activities and sports.

Howard Loy Park

Howard Loy Park is located near Air Base Road and US 395, and it is characterized by open spaces with several trees providing ample shade. The park is limited in size; thus, certain recreational activities may not be ideal at this location. However, it is a nice place for picnicking activities.

Richardson Park

Richardson Park is located at the intersection of Air Base Road and Delicious Street. The park offers various activities for children and includes a softball and soccer field. Parking is also provided within the park facility.

Bicycle and Pedestrian Facilities

There are no designated pedestrian or bicycle facilities within Adelanto and unincorporated areas of San Bernardino County. Although no facilities may exist at this time, the goals of the City are to incorporate the design of improved and/or new roadway systems encompassing a complete and effective pedestrian element and to establish a trails network within the open space areas. All major roadways would contain adequate ROW to allow the implementation of sidewalks and bike lanes.

An interagency meeting was conducted August 15, 2012, between bicycle coordinators from Los Angeles County, Metro, SCAG, and Caltrans to obtain input on bicycle design options. The working group determined that the existing bicycle network in Los Angeles and San Bernardino counties would benefit from a parallel bicycle facility to provide continual linkage between the bicycle networks from both counties.

City of Victorville

Twenty-five (25) park and recreational facilities are located throughout Victorville. Two park and recreational facilities – Rockview Nature Park and West Winds Golf Course – are within 0.5 mile of the proposed project.

Rockview Nature Park

Rockview Nature Park includes a Nature Center with a carpeted multipurpose room with approximately 1,900 square feet of gathering space and a kitchen. This park is dedicated to E.Q. and Rosalind Sullivan. Amenities located within the park include the Nature Center, an outdoor amphitheater with a campfire area, two small open grass areas, a gazebo, and play equipment. Rockview Nature Park is open for scheduled uses only.

West Winds Golf Course

West Winds Golf Course is located within Victorville and is a 9-hole golf course open to the public. With the use of multiple tees, the golf course can be played as an 18-hole golf course. This course is available for daily fee or reserved play, special events, and tournaments.

Bicycle and Pedestrian Facilities

There is one designated bike path within Victorville, which begins north of D Street, just southeast of Eva Dell Park. The bike path is separated from the road and travels north, eventually terminating at I-15. Plans for nonmotorized transportation facilities in Victorville can be found in the CIA.

The City has plans to utilize waterways and power line ROW for use by bicyclists, equestrians, and other nonmotorized uses. Safety of these uses is a major concern and requires special attention at street crossings. Trails along the Mojave River and Oro Grande River are considered to be within the City's jurisdiction. The Mojave River walk trail is a 9-mile-long trail along the river from the northern city limits, north of I-15 to the southern city limits near Victor Valley College. Oro Grande Trail is planned as a paved pathway that would run the length of the river and through much of Victorville. It would link the Mall of Victor Valley and downtown, as well as parks and schools, and cross I-15 on a separate bridge near La Mesa Nisqualli Road. Within utility ROW, trail planning requires coordination with utility companies. The *Non-Motorized Transportation Plan* (City of Victorville, 2010) considers connectivity with public facilities, retail establishments, and other points of interest and improvement of accessibility over I-15. Safe bike racks for occasional users and everyday users are also considered for any multimodal facilities within the city. Bicycle parking facilities are also considered and planned at the proposed railroad station for the XpressWest rail station.

Town of Apple Valley

Seventeen (17) park and recreational facilities are located throughout Apply Valley. One park and recreational facility – Horsemen's Center – is within 0.5 mile of the proposed project.

Horsemen's Center

Horsemen's Center is a rural park that is located 3 miles east of Central Road within Apple Valley. The park is approximately 80 acres large and includes various amenities that include two horse show arenas, a BMX park, a children's playground, picnic areas, a hiking trail, and seven campsites. The park is open for use beginning at dusk and closes at dawn.

Bicycle and Pedestrian Facilities

The Town of Apple Valley's master plan is to create a network of bikeways and pathways within an urban environment that would encourage the use of alternative means of transportation. A trails system would be designed to connect the urban and natural environments by providing access to open spaces. Three types of bicycle lanes are proposed in Apple Valley, as described in the Parks and Recreation Element of the Town of Apple Valley General Plan (2009). Bicycle lanes have been expanded to ensure greater connectivity and access throughout the community and promote nonmotorized modes of travel. Bicycle lanes in Apple Valley are also designed to connect to regional bikeways. Continued coordination with the City of Victorville and San Bernardino County will be essential in the ultimate development of an effective regional bikeway system. (See Section 2.2.2, Bicycle Access Option, for bikeway classifications.) A map showing pedestrian and bicycle facilities located in the Town of Apple Valley can be found in the CIA. The City-adopted master plan indicates that no existing or future planned bicycle routes cross the proposed HDC road alignment.

Environmental Consequences

No Build Alternative

The No Build Alternative consists of those transportation projects that are already planned and committed to be constructed by or before 2040 other than the HDC Project. It is not anticipated that implementation of these projects would have an impact on parks and recreational facilities.

Common to All Build Alternatives

No acquisition of any pedestrian or bicycle facilities would occur under the alternatives with or without HSR feeder; however, a portion of the parking lot that serves Rockview Nature Park within the city of Victorville will be directly affected as a result of the ROW acquisition for the HDC construction. The project would not permanently incorporate land from Rockview Nature Park into the transportation ROW. It would incorporate part of the City of Los Angeles Department of Water and Power (LADWP)-owned property, including the southern parking lot and access entrance, part of the trail, and possibly some other temporary recreational facilities, into highway ROW.

Caltrans will coordinate with LADWP regarding the acquisition of their land during the ROW acquisition process. Temporary facilities located within the parcel would be permanently eliminated and no longer used for Rockview Nature Park. To minimize any potential project proximity effects on Rockview Nature Park due to the acquisition of LADWP's property, Caltrans proposes a minimization measure to grade/construct additional parking spaces within Rockview Nature Park. The new parking lot would be a functional equivalent to the existing parking lot on LADWP's property. Detailed design and construction of the parking lot and entrance access to the park will be further discussed between the project team and the City's Community Services Department during the design phase of the project.

Access to the park would be reduced from two access points to one access point through the northern entrance. It should also be noted that the entrance access at LADWP's property was considered a temporary access point according to the agreement between LADWP and the City of Victorville. The current northern access to the park does not currently have a designated turn lane. As an enhancement measure, Caltrans proposes to install/pave a turn lane to the park within the roadway's ROW to enhance safety and access to the park.

In addition, Caltrans would acquire approximately 5 acres of land from the south side of West Winds Golf Course; however, this land is only a small portion of the approximately 139 acres of the golf course's total area. In addition, the land to be incorporated into the project would fall under the vacant portion of the golf course that has no facilities or activities located on it. Therefore, no facilities, functions, or activities of the park are adversely affected. Access to the golf course, via Westwinds Road, is anticipated to be maintained at all times during project construction and operation. West Winds Golf Course is protected under the Park Preservation Act in which just compensation will be provided for the acquisition of land as outlined under the Avoidance, Minimization, and/or Mitigation Measures section.

The proposed project would incorporate bicycle paths along the HDC; therefore, the impact is considered beneficial. Three options were considered for the 26-mile High Desert Segment between 20th Street East in Los Angeles County and US 395 in San Bernardino County, described in Section 2.2.2. The bikeway would traverse the eastern portion of Palmdale and continue eastward through Lake Los Angeles towards El Mirage and terminate within Adelanto. A typical cross section for the bike path is illustrated in Figure 2-6.

Based on the Section 4(f) findings under *Appendix B,* the project build alternatives would result in a *de minimis* finding for West Winds Golf Course and Rockview Nature Park, and no use of the remaining parks. Please refer to Appendix B (Resources Evaluated Relative to the Requirements of Section 4(f) section) for more information about the parks with no Section 4(f) use.

Avoidance, Minimization, and/or Mitigation Measures

The following measures will be implemented to minimize impacts to parklands.

PAR-1: Caltrans may work with the City of Victorville to add parking capacity to the Rockview Nature Park if additional adjacent right of way becomes available and can be obtained.

PAR-2 Caltrans will provide the City of Victorville Department of Community Services an opportunity to review the HDC project design at the location of the Rockview Nature Park during the Design Phase.

PAR-3: Install a right turn lane pocket into Rockview Nature Park at the northern entrance within the roadway's ROW to enhance safety and access to the park. In addition, to minimize HDC impacts on recreational and park lands during the construction phase, no equipment staging will occur within the boundaries of the adjacent parks, golf course and other recreational facilities. Also incorporate the minimization measures listed under other resource impacts below (visual, air quality, noise) into the design and construction of the project at the locations adjacent to the parks and golf course to minimize any impacts to park and recreational facilities. Fencing will be used during project construction to shield the view of construction activities from the parkway users.

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3.1.2 Growth

Regulatory Setting

The Council on Environmental Quality (CEQ) regulations, which established the steps necessary to comply with the National Environmental Policy Act (NEPA) of 1969, requires evaluation of the potential environmental effects of all proposed federal activities and programs. This provision includes a requirement to examine indirect effects, which may occur in areas beyond the immediate influence of a proposed action and at some time in the future. The CEQ regulations (40 *Code of Federal Regulations* [CFR] 1508.8) refer to these consequences as indirect impacts. Indirect impacts may include changes in land use, economic vitality, and population density, which are all elements of growth.

The California Environmental Quality Act (CEQA) also requires the analysis of a project's potential to induce growth. CEQA guidelines (Section 15126.2[d]) require that environmental documents "…discuss the ways in which the proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment…"

Affected Environment

This section uses information from the *Growth-Related, Indirect Impact Analysis Report* (June 2014), which serves as an attachment to the Community Impact Assessment (CIA).

Study Area Boundaries and Timeframe

The study area boundary is defined by the project's sphere of influence as it is related to growth impacts. The High Desert Corridor (HDC) Project is likely to influence residential growth up to 5 miles from its proposed highway interchanges and intersections, and to influence highway commercial and industrial development up to 2 miles from the interchanges. The proposed high-speed rail (HSR) stations in Palmdale and Victorville are likely to influence higher-density mixed-use development within walking distance of the stations, up to 0.25 and 0.5 mile away. Indirect impacts are evaluated within the time limits of the project construction and design years. It is anticipated that the project would be open to traffic by 2020, with 2040 as the design year.

Study Area Communities

As shown in Table 1-4, all affected major cities within the study area (Palmdale and Lancaster in Antelope Valley and Victorville, Apple Valley, Hesperia, and Adelanto in Victor Valley) have experienced rapid population growth over the past several years. Indications are strong that residential growth will continue due in part to relatively low housing prices compared to other urbanized areas in Los Angeles County.

The Antelope Valley cities increased in population from 60,304 to approximately 309,383 from 1980 to 2010. Palmdale's major employment sources are the aerospace industry and other major corporations and industries. Within the area of the proposed

HDC alignment, most of the industrial land uses are located near the Los Angeles/ Palmdale Regional Airport. Highway commercial uses extend east along Palmdale Boulevard (SR-138) from SR-14. There is a potential for manufacturing companies to continue locating to Palmdale as a result of land affordability, proximity to major transportation hubs, and comparably low taxes. In addition, the California High-Speed Rail Authority has initiated preliminary development work on a north-south corridor through the Antelope Valley with segments proposed from Bakersfield to Palmdale and Palmdale to Los Angeles.

The unincorporated study area lands are characterized by a very low-density population pattern and sparse employment opportunities. Lake Los Angeles (population 12,328) and Phelan (population 14,304) are the only communities characterized by the 2010 census as “places.” The remaining unincorporated communities generally have fewer than 2,000 residents.

The Victor Valley cities[6] increased in population from 14,220 to approximately 306,976 from 1980 to 2010. The largest single employment concentration in Victor Valley is the Southern California Logistics Airport (SCLA) in Victorville at the site of the former George Air Force Base. The City of Adelanto, as the smallest city in San Bernardino County, almost tripled in population between 1990 and 2010. Low land and housing prices in Adelanto have contributed to growth. Adelanto is home to the Adelanto Gateway Logistics Center, which is a 400-acre industrial project across from the SCLA and home to some of the largest manufacturing businesses in the Victor Valley region. In the Town of Apple Valley, the largest percentage of developed land is single-family residential. The North Apple Valley Industrial Specific Plan Area at Apple Valley Airport is generally flat, vacant, and has few constraints, making it suitable for a wide range of industrial, commercial, institutional, office, and airport-related uses.

Environmental Consequences

The Caltrans *Guideline for Preparers of Growth-related, Indirect Impact Analysis* provides guidance for conducting growth-related, indirect impact analysis. The potential for the project to influence growth is based on factors that include the project’s accessibility, type of facility, and project location, as well as growth pressure. To determine the project’s influence on growth, a two-phase approach was used to evaluate growth-related impacts. The first phase was a *first-cut screening*, which estimated the likely growth-potential effect and whether further analysis would be necessary. If growth is reasonably foreseeable, then further analysis is required to determine the effect of this growth on resources of concern.

[6] It is noted that the Town of Apple Valley and the City of Adelanto were not incorporated in 1980.

First-Cut Screening Analysis

The first-cut screening analysis for the build alternatives was done by answering the following key questions outlined in the Guidance:

- How, if at all, does the project potentially change accessibility?
- How, if at all, do the project type, project location, and growth-pressure potentially influence growth?
- Determine whether project-related growth is "reasonably foreseeable."
- If there is project-related growth, how, if at all, will that impact resources of concern?

Based on the first phase screening, there is a potential for the project to affect accessibility, influence growth, and impact resources of concern; therefore, a further analysis of the project's growth-related impact was conducted and documented in the *Growth-Related, Indirect Impact Analysis Report* (May 2014).

Growth-Related Impact Analysis

The following steps were used as guidelines for identifying and assessing growth-related impacts of the HDC Project:

- Review previous project information and decide on the approach and level of effort needed for the analysis ("right-size" the analysis).
- Identify the potential for growth for each alternative.
- Assess the growth-related effects of each alternative to resources of concern.
- Consider additional opportunities to avoid and minimize growth-related impacts.
- Compare the results of the analysis for all alternatives.
- Document the process and findings of the analysis.

A combination of analysis methodologies was employed to assess growth effects. A study was conducted of travel time savings that the project would provide to major job centers. Potential changes in land use were studied with the aid of local and regional plans. SCAG data on growth projections for the area were also considered. Lastly, a Delphi Expert Panel was established to assist in estimating the locations and quantity of development that may occur as an indirect effect of the project build alternatives. A detailed analysis and discussion of each step can be found in the *Growth-Related, Indirect Impact Analysis Report* (May 2014), prepared for this project.

No Build Alternative.

The No Build Alternative would not lead to any physical improvements that may induce growth or development in the surrounding area. The existing local roadway and regional highway system would operate at its current level of efficiency, and congested conditions would remain and become worse over time. No growth-related impacts are expected.

Build Alternatives

Based on the results of analysis, the project would not likely cause extensive development at proposed interchanges located in the rural central portion of the alignment corridor. The project alternatives, either with or without a rail component, would tend to shift some future development toward the new interchanges in Palmdale and Victorville/Adelanto.

Freeway/Expressway Alternative

The highway-only project alternatives are not expected to attract new growth beyond that forecasted and planned by local jurisdictions. Most of this growth is expected at the eastern and western termini of the HDC in the Victor and Antelope valleys, respectively, with slightly more growth in the former. Some future highway-oriented development would be expected to shift toward the major project interchanges with State and Interstate highways. The proposed project would help address goals and policies of local general plans to attract investments to balance the current uneven supply of housing with more job-producing uses.

Freeway/Tollway Alternative

This alternative would follow the same physical alignment as the Freeway/Expressway Alternative (including Variations A, D, B, and E), but with the inclusion of tolled lanes. As a result, growth impacts are similar to the Freeway/Expressway Alternative; however, because some vehicle traffic would be expected to not use a toll facility, residential development could potentially follow a somewhat more dispersed pattern along the existing nontolled roadway network.

Freeway/Expressway Alternative with HSR Feeder Service

The alternatives with HSR would tend to foster higher density and mixed-use developments near the proposed rail stations in Palmdale and Victorville. Such density and land use changes would require changes to local planning designations and zoning ordinances. For example, in anticipation of the HDC Project, Victorville prepared a Specific Plan in 2009 for a new town called Desert Gateway with transit-oriented development (TOD) mixed land uses near the proposed rail station and an HDC interchange. The proposed project would help address goals and policies of local general plans to attract investments to balance the current uneven supply of housing with more job-producing uses.

Freeway/Tollway Alternative with HSR Feeder Service (Preferred Alternative)

The preferred alternative is the same as the Freeway/Tollway Alternative (including Variations D and B1) and would include an HSR Feeder Service between Palmdale and Victorville. Growth impacts under this alternative are similar to the impacts discussed under the Freeway/Expressway Alternative with HSR Feeder Service.

The separate State-sponsored California HSR project extending from northern California to Los Angeles via a station at or near the Palmdale Transportation Center would have a transformational effect on growth, much greater than the impact of the HDC. The HSR project would make the High Desert region, especially Palmdale, easily accessible from the Los Angeles Basin – within less than 0.5-hour travel time on the HSR compared to more than 1 hour by car and nearly 2 hours by Metrolink. This increased accessibility, and considering lower housing prices compared with the Los Angeles Basin, should attract new residents to the Palmdale/Lancaster metropolitan area because commutes to jobs in the Los Angeles Basin and San Fernando Valley would be much quicker with HSR than under present conditions. Moreover, this increased accessibility and substantial investment in public transportation infrastructure, coupled with lower land costs and increased market demand, would be expected to also attract new commercial, industrial, and other employment opportunities within the High Desert region, thus helping address the current housing/jobs imbalance. Also from a cumulative perspective, the rail alternatives for the HDC Project would facilitate connections into Palmdale for passengers on XpressWest, a privately proposed HSR project between Las Vegas and Victorville.

Avoidance, Minimization, and/or Mitigation Measures

The proposed project would not individually result in significant impacts due to growth. No avoidance, minimization, and/or mitigation measures are proposed.

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3.1.3 Farmland/Grazing Land

This section addresses potential impacts to farmland and grazing land, including land under Williamson Act contracts, that would result from construction of the High Desert Corridor (HDC) Project.

Regulatory Setting

The National Environmental Policy Act (NEPA) and the Farmland Protection Policy Act (FPPA) (7 United States Code [U.S.C.] 4201-4209, and its regulations, 7 *Code of Federal Regulations* [CFR] Part 658) require federal agencies, such as the Federal Highway Administration (FHWA), to coordinate with the Natural Resources Conservation Service (NRCS) if their activities may irreversibly convert farmland (i.e., directly or indirectly) to nonagricultural use. For purposes of the FPPA, farmland includes prime farmland, unique farmland, and land of statewide or local importance.

The California Environmental Quality Act (CEQA) requires the review of projects that would convert Williamson Act contract land to nonagricultural uses. The main purposes of the Williamson Act are to preserve agricultural land and to encourage open space preservation and efficient urban growth. The Williamson Act provides incentives to landowners through reduced property taxes to discourage the early conversion of agricultural and open space lands to other uses.

The Taylor Grazing Act of 1934 (43 U.S.C. 315) established grazing districts and created the Department of Interior’s Division of Grazing. This division later became the U.S. Grazing Service and, in 1946, the Grazing Service was merged with the General Land Office to become the Bureau of Land Management (BLM). The Taylor Grazing Act was intended to manage public grazing lands by preventing overgrazing and soil deterioration and to provide for their orderly use, improvement, and development. The Taylor Grazing Act was pre-empted by the Federal Land Policy and Management Act of 1976 (FLPMA), which was passed to establish policy for managing BLM-administered public lands. FLPMA authorized 10-year grazing permits. The Act also directed grazing advisory boards to guide BLM in developing allotment management plans.

Affected Environment

This section is summarized from the *Farmland Report for the High Desert Corridor Project*, August 2014. The objectives of the Farmland Report are to describe existing farmlands and grazing lands within the proposed project vicinity, identify impacts on these resources, and recommend avoidance, minimization, and mitigation measures.

Based on 2008 estimates prepared by the California Department of Conservation (DOC), there are approximately 1.17 million acres of farmland and 1.48 million acres of rangeland in the Southern California Association of Governments (SCAG) region. Based on the 2007 U.S. Department of Agriculture (USDA) Census of Agriculture, Los Angeles County had 1,734 farms totaling 108,463 acres (average of 63 acres) in 2007. San Bernardino County had 1,405 farms totaling 514,234 acres (average of

366 acres) in 2007. Leading commodities for Los Angeles County are wooden ornamentals, vegetables, and alfalfa, whereas leading commodities for San Bernardino County are milk, chicken, and cattle.

The California Farmland Mapping and Monitoring Program (FMMP) 2010 data shown in Tables 3.1.3-1 and 3.1.3-2 indicate the presence of 39,812 acres of Important Farmland[8] in Los Angeles County and 22,761 acres in San Bernardino County. Most of the Important Farmland in Los Angeles County is concentrated in the Antelope Valley north of Palmdale and west of Lancaster in close proximity to the California Aqueduct. In San Bernardino County, Important Farmland is located along the Mojave River near and along SR-66 from Victorville heading north to Hinkley Valley/Barstow and farther east near Newberry Springs. The HDC alignment mostly traverses grazing land across rural areas in San Bernardino County.

Farmland maps covering the project study area in Los Angeles and San Bernardino counties are provided in Figures 3.1.3-1 and 3.1.3-2, respectively.

Table 3.1.3-1 Los Angeles County Farmland Change by Land Use, 2008 to 2010

Land Use Category	Total Acreage Inventoried		Acres Lost (-)	Acres Gained (+)	Total Acreage Changed	Net Acreage Changed
	2008	2010				
Prime Farmland	32,406	30,876	2,422	892	3,314	-1,530
Farmland of Statewide Importance	1,228	952	286	10	296	-276
Unique Farmland	1,177	1,129	101	53	154	-48
Farmland of Local Importance	7,193	6,855	412	74	486	-338
Important Farmland Subtotal	*42,004*	*39,812*	*3,221*	*1,029*	*4,250*	*-2,192*
Grazing Land	229,474	231,475	1,048	3,049	4,097	2,001
Agricultural Land Subtotal	*271,478*	*271,287*	*4,269*	*4,078*	*8,347*	*-191*
Urban and Built-up Land	170,864	174,888	270	4,294	4,564	4,024
Other Land	678,251	674,568	4,550	867	5,417	-3,683
Water Area	3,468	3,318	150	0	150	-150
Total Area Inventoried	*1,124,061*	*1,124,061*	*9,239*	*9,239*	*18,478*	*0*

Source: Farmland Report for the High Desert Corridor Project, 2014.

[8] Classified in FMMP as Prime Farmland, Farmland of Statewide Importance, Unique Farmland, or Farmland of Local Importance.

Table 3.1.3-2 San Bernardino County Farmland Change by Land Use, 2008 to 2010

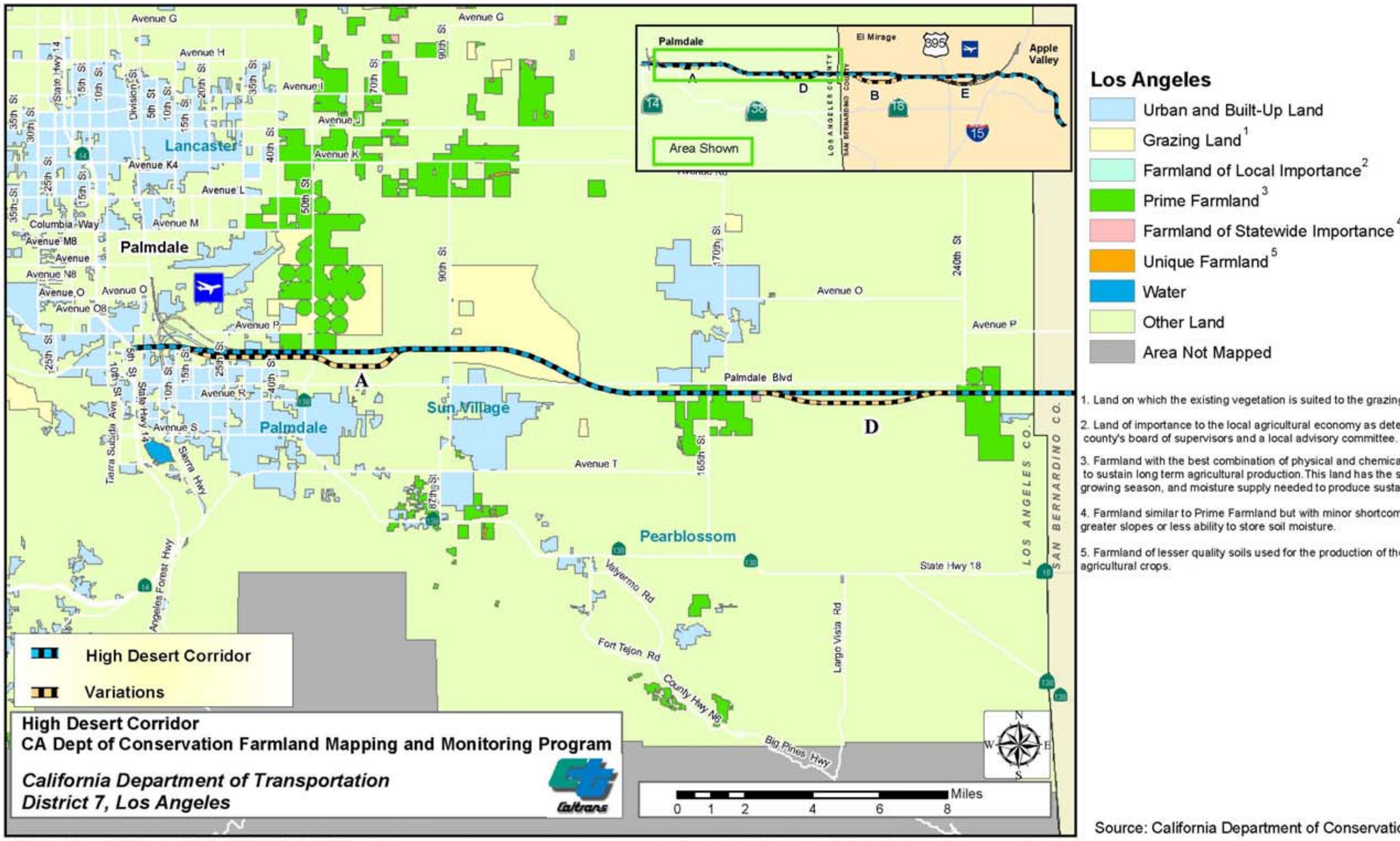
Land Use Category	Total Acreage Inventoried		Acres Lost (-)	Acres Gained (+)	Total Acreage Changed	Net Acreage Changed
	2008	2010				
Prime Farmland	14,090	12,848	1,652	410	2,062	-1,242
Farmland of Statewide Importance	6,747	6,242	546	41	587	-505
Unique Farmland	2,661	2,511	263	113	376	-150
Farmland of Local Importance	1,828	1,160	668	0	668	-668
Important Farmland Subtotal	*25,326*	*22,761*	*3,129*	*564*	*3,693*	*-2,565*
Grazing Land	901,666	902,590	2,121	3,045	5,166	924
Agricultural Land Subtotal	*926,992*	*925,351*	*5,250*	*3,609*	*8,859*	*-1,641*
Urban and Built-up Land	275,695	277,875	473	2,653	3,126	2,180
Other Land	246,413	245,813	1,796	1,196	2,992	-600
Water Area	449	510	0	61	61	61
Total Area Inventoried	*1,449,549*	*1,449,549*	*7,519*	*7,519*	*15,038*	*0*

Source: Farmland Report for the High Desert Corridor Project, 2014.

Between 2008 and 2010, both counties suffered from a net loss of Important Farmland at approximately 5.5 percent for Los Angeles County and 11.3 percent for San Bernardino County. Tables 3.1.3-1 and 3.1.3-2 indicate that the net acreage for each land use category had changed. During this period, population growth and associated urban development drove the loss of Important Farmland; however, losses also can occur if land is used for habitat conservation or confined animal facilities. Gains in Important Farmland can also occur, for example, when grazing land is converted to crop production.

No properties under consideration for the HDC right-of-way (ROW) acquisition are currently under a Williamson Act contract (agricultural preserve) based on information provided by the Los Angeles and San Bernardino county assessor's offices. Most of the Important Farmland within the HDC footprint is classified as vacant or residential. See Tables 3 and 4 of the *Farmland Report for the High Desert Corridor Project* (June 2014) for information on individual agricultural properties potentially affected by the proposed project.

Figure 3.1.3-1 Study Area Farmland Map In Los Angeles County



1. Land on which the existing vegetation is suited to the grazing of livestock.

2. Land of importance to the local agricultural economy as determined by each county's board of supervisors and a local advisory committee.

3. Farmland with the best combination of physical and chemical features able to sustain long term agricultural production. This land has the soil quality, growing season, and moisture supply needed to produce sustained high yields.

4. Farmland similar to Prime Farmland but with minor shortcomings, such as greater slopes or less ability to store soil moisture.

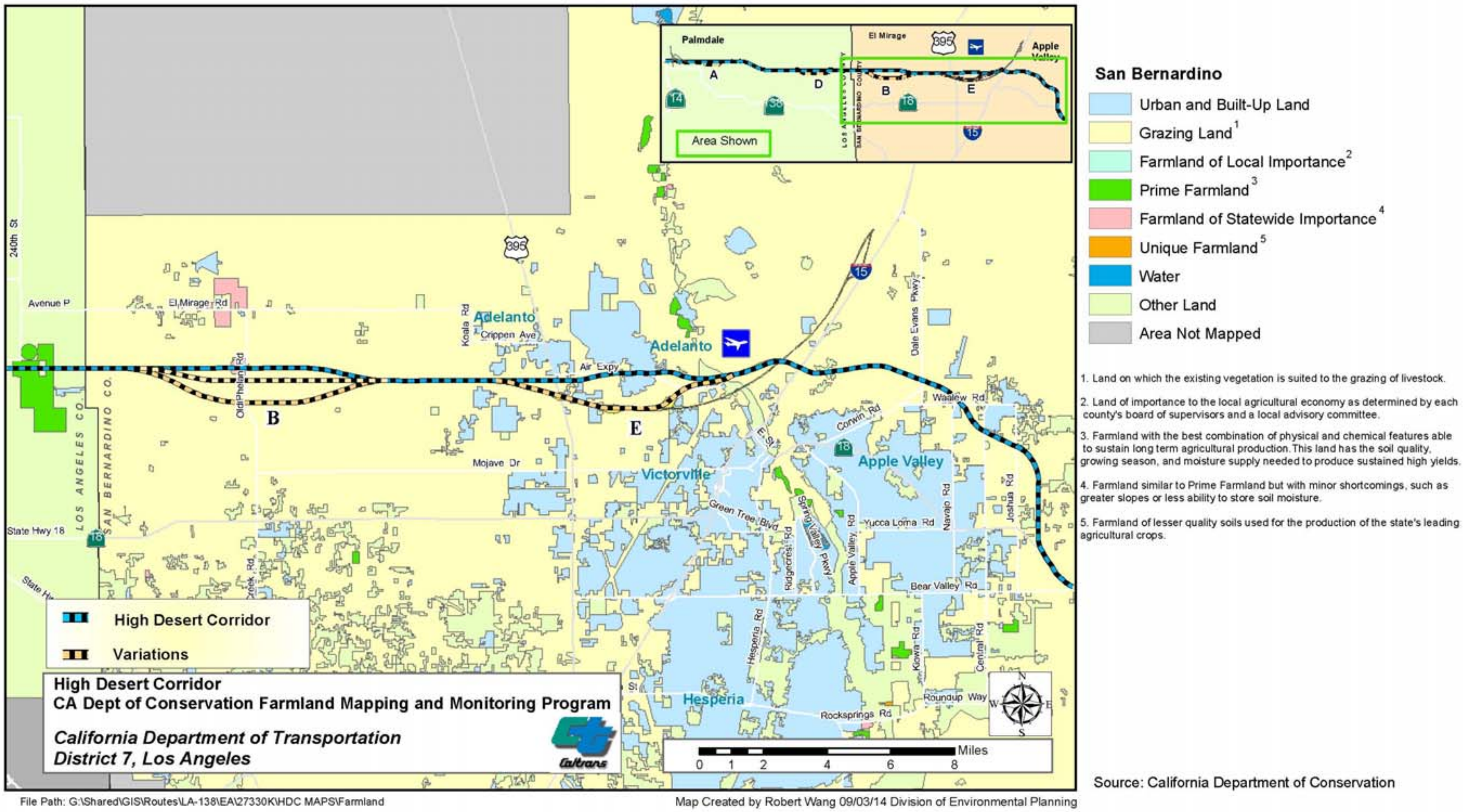
5. Farmland of lesser quality soils used for the production of the state's leading agricultural crops.

Source: California Department of Conservation

File Path: G:\Shared\GIS\Routes\LA-138\EA\27330K\HDC MAPS\Farmland

Map Created by Robert Wang 09/03/14 Division of Environmental Planning

Figure 3.1.3-2 Study Area Farmland Map In San Bernardino County



Under the California Desert Conservation Area (CDCA) Plan of 1980, as amended by the West Mojave Plan of 2006, sheep grazing is permitted on BLM lands under the FLPMA on the Stoddard Mountain Allotment (Middle Unit). The Middle Stoddard Unit is bordered by Interstate 15 (I-15) on the east, National Trails Highway on the west, Victorville on the south, and Lenwood on the north. The current available grazing area in the Middle Stoddard unit is 16,899 acres.

Environmental Consequences

No Build Alternative

The No Build Alternative would not result in any impacts to Important Farmland or land under a Williamson Act contract.

Build Alternatives

All alternatives would require acquisition of land for the proposed HDC ROW. It would directly impact farmland by converting approximately 252 acres of Important Farmland and 2,760 acres of Grazing Land to nonagricultural use, which could be a potentially significant impact. Methods applied to evaluate impacts under NEPA and CEQA are described in the *Farmland Report for the High Desert Corridor Project* (June 2014). They include reviewing available FMMP spatial data for Los Angeles and San Bernardino counties (2010) to identify Important Farmland (i.e., Prime Farmland, Farmland of Statewide Importance, Unique Farmland, and Farmland of Local Importance) and Grazing Land. The county assessor's office and California DOC provided spatial data for agricultural lands protected under Williamson Act and Farmland Security Zone (FSZ) contracts. LandVision™ from Digital Map Products, a land acquisition software solution, provided land use designations for the parcels. Together, with online maps and site visits, this information provided the basis for calculating land use changes.

Farmland

Freeway/Expressway and Freeway/Tollway Alternatives

Table 3.1.3-3 summarizes the HDC Project's direct impacts to Important Farmlands in Los Angeles and San Bernardino counties.

Table 3.1.3-3 Important Farmland Impacts (FMMP 2010)

County	Total Mapped Farmland	HDC Direct Farmland Impact	Percentage
Los Angeles	39,812 acres	235 acres	0.63
San Bernardino	22,761 acres	17 acres	0.08

Source: Farmland Report for the High Desert Corridor Project, 2014.

East of Lancaster and near the Los Angeles/Palmdale Regional Airport, the HDC alignment would pass adjacent to approximately 15,000 acres of irrigated alfalfa and onion fields without any direct impacts. Proceeding to the east, the HDC base alignment would result in the following farmland impacts to 30 parcels:

- **Littlerock Wash to 95th Street:** The HDC would impact a total of 96 acres out of 496 acres of Grazing Land from 15 parcels. No active farming operation would be impacted, and no parcels would be severed.
- **Big Rock Wash to 180th Street:** The HDC would impact a total of 124 acres of Important Farmland out of 470 acres from 11 parcels. One nursery operation, comprised of 4 contiguous parcels, would be impacted. In addition, 2 parcels would be severed. The remaining severed properties would likely continue to be farmed, but the nursery operation could be significantly impacted with parcels located on both sides of the future HDC alignment.
- **235th Street to 255th Street:** The HDC would impact a total of 111.4 acres of Important Farmland out of 720 acres from 3 parcels. Title for all 3 parcels, which are being actively farmed, is held by the same owner. The HDC would bisect the largest of the 3 parcels, potentially impacting the remainder of the parcel due to its current circular irrigation patterns, which may have to be modified to parallel lines. Although this impact would be substantial, it could potentially be lessened if the owner would be willing to purchase and farm adjacent vacant property(ies).
- **El Mirage Road intersection with Sheep Creek Road:** The HDC main alignment would require the acquisition of about 57.5 acres and bisect the recently acquired Meadowbrook dairy farm property into 2 parcels (70 acres and 30 acres out of 158 acres). Within the 57.5-acre proposed acquisition area is about 17 acres of Unique Farmland. The severed and remaining 2 parcels include another 57 acres of Unique Farmland. Variation B, as described in Section 2.3.2, would shift the alignment to the south and avoid bisecting this parcel.

In summary, the extent of ROW required for each individual parcel ranges from 0.6 to 79.6 acres. Partial or full acquisition of 18 parcels, each 5 acres or less, would be required. The remaining 12 parcels affected by partial or full acquisition would be 10 acres or larger.

Of the 30 parcels, 4 parcels would be severed, thus possibly rendering the remainder of these parcels as economically unprofitable for productive agriculture production, including 1 nursery operation shown in Figure 3.1.3-3. In addition, in some of these cases, farmland irrigation might have to be modified from circular irrigation patterns to parallel lines.

Variation B

Variation B of the project shifts the alignment to the base alignment to the south by 500 feet or more (to minimize impacts to buildings and fixed structures). This alignment would minimize impacts to the dairy farm operations – especially when combined with the purchase of replacement land bordering the dairy farm immediately from the north.

Variation D (Part of Preferred Alternative)

Variation D, as shown in Figure 2-1, was originally designed to dip slightly south of the main alignment between 150th Street East and 230th Street East, but it was later shifted to between 180th Street East and 230th Street East to minimize impacts to farmland. This modification reduced the net impact by about 58 acres of Prime Farmland and avoided severing one farmland parcel diagonally.

Freeway/Expressway and Freeway/Tollway with HSR Alternatives (Preferred Alternative)

Under these alternatives, there would be no additional impacts to farmland as to those discussed under the Freeway/Expressway Alternative and Freeway/Tollway Alternative.

Figure 3.1.3-3 Potentially Affected Nursury Operation in Los Angeles County

Source: Farmland Report for the High Desert Corridor Project, 2014.

Grazing Land

Freeway/Expressway and Freeway/Tollway Alternatives

The HDC base alignment would pass through approximately 215 acres of designated Grazing Land in Los Angeles County and 2,360 acres in San Bernardino County. Most of the alignment in San Bernardino County would traverse FMMP-classified "Grazing Land." However, due to availability of abundant Grazing Land, impact from the project's contribution to the incremental loss of Grazing Land is not considered substantial.

The proposed HSR alignment would traverse a designated sheep grazing area in the Stoddard Valley ephemeral sheep allotment (Middle Unit), about 1 mile west of I-15. The area of sheep Grazing Land to be affected is estimated at about 650 acres, which would include 250 acres required for the new tracks and station ROW. The remaining

400 acres is an area locked between the proposed rail tracks and I-15. The HDC impact to designated Grazing Land is estimated at about 0.1 percent of Grazing Land in Los Angeles County and about 0.3 percent in San Bernardino County. These small percentage totals are not considered substantial. Because the impact to the Middle Stoddard Unit is below 25 animal unit month (AUM), the grazing impact is not considered substantial.

Freeway/Expressway and Freeway/Tollway with HSR Alternatives (Preferred Alternative)

With the HDC build alternatives that include HSR, the remaining acreage available for grazing at the Stoddard Valley ephemeral sheep allotment (Middle Unit) would be reduced to 16,249 acres – a reduction of 3.8 percent. An average of 1 band of sheep per year (i.e., 500 to 1,000 ewe-lamb pairs with average size of 800 ewe-lamb pairs) is anticipated to graze when sheep grazing is authorized for this allotment, which amounts to about 160 AUM (amount of forage cattle consumes in 1 month).The carrying capacity could be estimated by dividing 16,899 acres by 160 AUM, which amounts to about 105 acres per 5 ewe-lamb pairs. A reduction of 650 acres of available acreage could potentially reduce the sheep number by about 30 ewe-lamb pairs (i.e., 6 AUM). Because the impact to the Middle Stoddard Unit is below 25 AUM, the grazing impact is not considered substantial.

Avoidance, Minimization, and/or Mitigation Measures

As described in Section 3.1.4.2, Relocation and Property Acquisition, adequate compensation will be provided for property acquisitions, including relocation assistance for residents and businesses as required by the law. Caltrans' ROW agents will work with affected property owners to address issues of concern and negotiate compensation of their property's fair market value and any temporary loss of production due to the project.

The following measures are proposed to address potential impacts to farm and Grazing Land resources:

AG-1: Design and implement the project in a manner that avoids and minimizes ROW requirement impacts, as follows:

- The HDC will be aligned to follow property lines, wherever possible.
- If feasible, utility relocations shall occur within the ROW acquired for the proposed highway rather than on farmland adjacent to the highway.
- In cases where farming is unlikely to continue, the small remainder parcels are to be identified as a farmland conversion, and Caltrans will acquire these property remainders and offer them to adjacent farmland property owners.
- Farmland owners along either side of the HDC near 165th Street shall be advised to consider the purchase of each other's property to consolidate properties along the same side of the HDC.

AG-2: Caltrans will enter into an agreement with the DOC California Farmland Conservancy Program to preserve farmland by placing long-term farmland protection tools on Important Farmland or cause the conversion of Grazing Land into Important Farmland. Caltrans will fund the California Farmland Conservancy Program's work to identify suitable agricultural land for mitigation of impacts to farmland and to fund the purchase of agricultural conservation easements from willing sellers. The performance standards for this measure are to preserve Important Farmland in an amount commensurate with the quantity and quality of the converted farmlands, within the same agricultural regions as the impacts occur, at a replacement ratio of not less than 2:1.

Caltrans and the California Farmland Conservancy Program will develop selection criteria to guide the pursuit and purchase of conservation easements. These will include, but are not limited to, provisions to ensure that the easements will conform to the requirements of Public Resources Code Section (PRC) 10252 and to prioritize the acquisition of willing seller easements on lands that are adjacent to other protected agricultural lands or that would support the establishment of greenbelts and urban separators.

AG-3: Impacts associated with the loss of about 2,965 acres of Grazing Land will be minimized by placing a conservation easement over open space at a replacement ratio of not less than 1:1 in areas where it could meet multiple natural resource conservation objectives including, but not limited to, wetland protection, wildlife habitat conservation, and scenic open-space preservation. Pursuant to 43 CFR 4100, the livestock owner is given 2 years' prior notice before the lease agreement is modified so that alternate livestock management adjustments can be made, including relocating animals and improvements located in the project footprint. Upon approval of the project, and when sufficient design details are known, Caltrans ROW staff will contact any potentially affected livestock owner to discuss how the HDC Project may affect grazing operations and to address compensation strategies as part of the Relocation Assistance Program (RAP). Caltrans will also coordinate with the BLM, the federal agency responsible for managing livestock grazing on federal desert lands, and the California Wildlife Conservation Board, which is designated by the California Legislature to protect the Grazing Lands by promoting the use of conservation easements, to help identify suitable lands.

AG-4: Caltrans will fund a research project targeting farmland restoration and reclamation and soil removal and storage. The budget for this activity will be determined at the final design phase of the project after public input is provided.

AG-5: Within a 100-foot buffer area from future property lines with farmland, disturbed surface areas will be stabilized utilizing native vegetation and soils clear of invasive plant species. Soil amendments, if used, must comply with the requirements in the California Food and Agricultural Codes. Soil amendment must not contain paint, petroleum products, pesticides, or any other chemical residues harmful to animal life or plant growth. The construction contract will include provisions to protect against the spread of invasive species. Also see Mitigation Measures BIN-1 to BIN-10 for provisions to prevent the spread of invasive species.

AG-6: Infill material to be used in the project shall not be obtained from borrow sites comprised of Prime Farmland. When selecting sites for wetland mitigation or infiltration basins, the HDC Project will avoid Prime Farmland to the extent possible. To the extent feasible, infiltration basin sites will also serve wetland mitigation and borrow material purposes to reduce impacts to Prime Farmland and improve farmland conservation efforts.

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3.1.4 Community Impacts

The Caltrans Environmental Handbook Volume 4 Community Impact Assessment (Handbook) defines a community as “a population rooted in one place, where the daily life of each member involves contact with, and dependence on, other members.” The handbook indicates that physical barriers, such as highways, waterways, open spaces, activity centers, sharply different average home values, selected demographic characteristics, and resident perceptions, can delineate communities or neighborhoods. In addition, local planning agency maps and reports define community and neighborhood boundaries.

3.1.4.1 Community Character and Cohesion

Regulatory Setting

The National Environmental Policy Act (NEPA) of 1969, as amended, established that the federal government use all practicable means to ensure that all Americans have safe, healthful, productive, and aesthetically and culturally pleasing surroundings (42 United States Code [U.S.C.] 4331[b][2]). The Federal Highway Administration (FHWA), in its implementation of NEPA (23 U.S.C. 109[h]), directs that final decisions regarding projects are to be made in the best overall public interest. This requires taking into account adverse environmental impacts, such as destruction or disruption of human-made resources, community cohesion, and the availability of public facilities and services.

Under the California Environmental Quality Act (CEQA), an economic or social change by itself is not to be considered a significant effect on the environment. However, if a social or economic change is related to a physical change, then social or economic change may be considered in determining whether the physical change is significant. Since this project would result in physical change to the environment, it is appropriate to consider changes to community character and cohesion in assessing the significance of the project’s effects.

Affected Environment

Information in the Community Impact Assessment (CIA) for the project, completed in April 2016, is the basis of information provided in this section.

The project is situated within the counties of Los Angeles and San Bernardino and traverses the communities of Palmdale, Lake Los Angeles (located within unincorporated Los Angeles County), unincorporated areas of San Bernardino County, Adelanto, Victorville, and Apple Valley. Community character, population, and housing characteristics for the communities mentioned above will be discussed in this section.

Palmdale

Palmdale can be delineated into two areas, with State Route (SR) 14 serving as a dividing point between West and East Palmdale. The community of East Palmdale is bordered by SR-14 to the west and extends east towards 120th Street, while West Palmdale is bordered by SR-14 to the east and extends west towards 90th Street West.

There are several suburban neighborhoods within West Palmdale, including Anaverde, Belle Vista, and Rancho Vista West, while suburban neighborhoods within East Palmdale include The Vineyards, which is located in southeast Palmdale.

Several communities are identified within Palmdale's general planning area sphere of influence, including Little Rock Wash, Community of Acton, and Community of Leona Valley. Two other established rural neighborhoods are located within the planning area; one is located south of Pearblossom Highway between 32nd Street East and Cheseboro Road and the other is located between Avenues M and O-12 and 10th and 30th Street West. Based on the General Plan, Palmdale has noted its intent to remain consistent with the current land use designations currently set for the area.

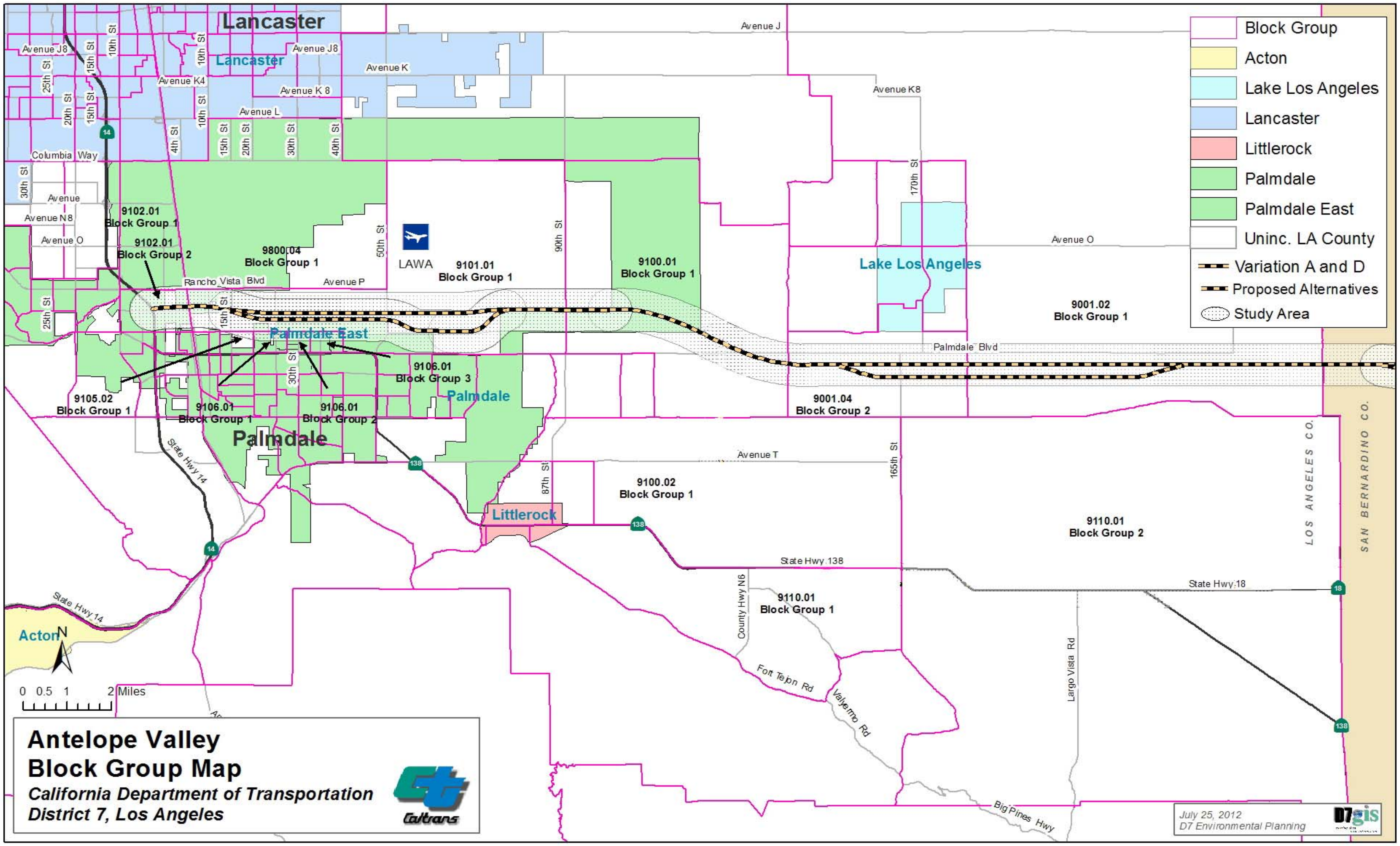
Also within the planning area are several unincorporated territories, which are surrounded by the city and are essentially "islands" under the jurisdiction of the County. Most of the islands were developed as single-family residential tracts. The tracts were developed in the 1950s and 60s under the County's rural standards that did not require curbs, gutters, sidewalks, streetlights, and permitted septic tanks. Cost of rehabilitation of the tract areas has gradually increased with time. The City of Palmdale has plans for annexing the area, which includes 11 of the subdivisions, in an effort to improve conditions within these neighborhoods.

The following subsections describe the study area community and socioeconomic characteristics within Palmdale. Most data were obtained from the U.S. Census 2010 (unless otherwise indicated) at the block group level. When the data at the block group level are not available, the data at the census tract level are used. Six census tracts covering the project study area within Palmdale include Tracts 9102.01, 9101.01, 9100.01, 9800.04, 9105.02, and 9106.01. Table 3.1.4-1 lists the block groups and census tracts contained within the Palmdale study area. The block group map within the Palmdale study is also shown in Figure 3.1.4-1

Table 3.1.4-1 Palmdale Study Area Block Groups (2010 U.S. Census)

Block Groups within the Palmdale Study Area	
9102.01 Block Group 2	9800.04 Block Group 1
9105.02 Block Group 1	9106.01 Block Group 1
9106.01 Block Group 2	9106.01 Block Group 3
9101.01 Block Group 1	9100.01 Block Group 1
9102.01 Block Group 1	

Figure 3.1.4-1 Census Block Group within Palmdale Study Area



Population and Age

Table 3.1.4-2 summarizes race and ethnic composition of population within the Palmdale study area compared with the city of Palmdale and Los Angeles County.

Table 3.1.4-2 Race and Ethnic Composition of Population in Palmdale (2010 U.S. Census)

Category	Palmdale Study Area	Palmdale	Los Angeles County
2000 Total Population	11,367	116,670	9,519,331
2010 Total Population	16,482	152,750	9,818,605
Net Change	(+) 5,115	(+) 36,080	(+) 299,274
Population Growth Rate (2000-2010)	45%	31%	3.1%
Average Annual Growth Rate	4.5%	3.1%	0.3%
2010 Median Age	29.0	29.8	34.8
19 Years and Under	38%	37%	28%
20 to 64 Years	54%	56%	62%
65 Years and Over	8%	7%	11%
Ethnicity and Race			
Hispanic*	63.4%	54.4%	47.7%
White	20.9%	24.5%	27.8%
Asian*	2.01%	4.1%	13.5%
Black *	11.2%	14.1%	8.3%
American Indian and Alaska Native *	0.4%	0.3%	0.2%
Native Hawaiian and Other Pacific Islander *	0.1%	0.1%	0.2%
Some Other Race	0.1%	0.3%	0.3%
Two or More Races	1.6%	2.2%	2.0%
Total Minority	77.3%	73%	69.9%

*"Minority individuals" as defined by the Council on Environmental Quality.

Source: High Desert Corridor Community Impact Assessment, 2016.

Based on the 2010 U.S. Census, the total population within the Palmdale study area is approximately 16,482, which is roughly about 11 percent of the total population of Palmdale, and is within the median age range of 29, similar to the city of Palmdale The population growth rate within the study area is about 4.5 percent, which is slightly higher compared to Palmdale's average annual growth rate of 3.1 percent. Distribution of population within Palmdale is dispersed throughout the city; however, population densities are highest in areas south of the study area in which the proposed project alignment avoids bisecting concentrated communities.

Ethnicity and Race

The ethnic composition within Palmdale is shown in Table 3.1.4-2 and is similar to SCAG's regional population characteristics. When compared to Los Angeles County, Palmdale has a higher percentage of Hispanic population. For the Non-Hispanic Black population, Palmdale displays a higher percentage than the county. Palmdale has a lower percentage of Non-Hispanic White populations and Non-Hispanic Asians, while it has a slightly higher percentage of Individuals classified as Non-Hispanic American Indians and of “Non-Hispanic All Other” population compared to the county.

The Hispanic population is the majority and accounts for 63.4 percent of the population within the Palmdale study area for this project. When compared to Palmdale, there is a higher percentage of Hispanic population within the study area. The Non-Hispanic Asian population accounts for 2 percent of the population within the study area, which is slightly lower than Palmdale. Similarly, the Non-Hispanic Black population is lower compared to Palmdale, while it is unchanged for Non-Hispanic American Indians. For “Non-Hispanic All Others,” there is a decrease in population within the study area compared to Palmdale.

The Council on Environmental Quality (CEQ) has established definitions for NEPA analysis, in which “minority individuals” are defined as members of the following population groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black; or Hispanic. For the study area, the total minority population is approximately 77.3 percent (11,791), as shown in Table 3.1.4-2.

Income

The income level and poverty status of the population within the Palmdale study area compared with the city of Palmdale and Los Angeles County are presented in Table 3.1.4-3. Information regarding income levels was not available from the 2010 U.S. Census at the block group level for the Palmdale study area. As a result, income information at the census tract level was obtained from the 2010 American Community Survey (ACS).

Table 3.1.4-3 Palmdale Income Levels (2010 U.S. Census)

Category	Palmdale Study Area	Palmdale	Los Angeles County
Median Household Income Level	$35,299	$61,076	$55,811
Total Population (Persons)	20,767	152,750	9,818,605
Percentage of Population Determined as Poverty Status	29.1	19.4	17.5
Poverty Status (%) - Under 18 Years	51.4	40.9	34.1
Poverty Status (%) - 18 to 64 Years	45.7	55.1	57.8
Poverty Status (%) - 65 Years and Over	2.7	3.9	7.9

Source: High Desert Corridor Community Impact Assessment, 2016.

As defined by the U.S. Census, poverty status includes individuals who fall below certain monetary threshold levels, which vary by family size and composition. For example, a family of three would be considered at poverty if the annual household income is less than $14,374. According to the 2010 U.S. Census, there are approximately 29,163 persons within Palmdale who are considered of poverty status. Approximately 19.4 percent of the total population within the city is under the poverty threshold level. As shown in Table 3.1.4-3, Palmdale has a lower percentage of persons within the poverty level compared to the county as a whole. More notable is the higher percentage in poverty levels for individuals under the age of 18.

The median household income level within the study area census tracts ranges from $20,686 up to $70,077 per household, with an overall median household income level of $35,299. In comparison to the Los Angeles County median household income level of $55,811, the study area exhibits a lower average household income level.

Within the project study area, there are approximately 6,033 persons considered to have a low-income status, which constitutes about 29 percent of the total population within the study area. The highest percentage was among individuals under 18 years of age, followed by individuals within the age group of 18 and 64. The lowest proportion classified as poverty status was among individuals at age 65 and above.

Community Cohesion

Table 3.1.4-4 summarizes the stability index within the study area compared with the city of Palmdale. About 80 percent of the total housing units within the study area are owner occupied compared to 70 percent in Palmdale. Single-family homes, which are classified as one-unit detached structures, make up about 64 percent of the total housing units in the study area compared to 79 percent in Palmdale. Within the study area, households whose members have lived within the same housing unit prior to the year 2000 consist of about 33 percent of the total households compared to 39 percent in Palmdale. Although the percentage of owner-occupied housing units and single-family homes is relatively high within Palmdale, the number of long-term residents who lived within their current households for 10 years or less is relatively low.

Table 3.1.4-4 Palmdale Stability Index

Indicators	Palmdale	Palmdale Study Area
Percent of Owner-Occupied Housing Units	70.2	80.2
Percent of Single-Family Homes	79	63.9
Percent of Household Members in Same Housing Unit (Prior to Year 2000)	33.4	39

Source: High Desert Corridor Community Impact Assessment, 2016.

Housing

Housing demographics within the study area compared with the city of Palmdale and Los Angeles County are presented in the CIA. The owner-occupied housing in the study area accounts for about 58 percent compared to 68 percent in Palmdale and 48 percent in Los Angeles County. An average home value in the study area is $209,218, compared to $277,700 and $508,800 in Palmdale and Los Angeles County as a whole, respectively. The average household size within the study area is 3.6 persons.

Figure 3.1.4-2 shows the distribution of housing units within the Antelope Valley area, which indicates that most of the population within Palmdale is located in the southern part of the project study area, more specifically south of Palmdale Boulevard.

Unincorporated Los Angeles County

Unincorporated areas within Los Angeles County of the study area within the Antelope Valley are under the jurisdiction of the County. Two communities are located within unincorporated areas of Los Angeles County within the project area, including Lake Los Angeles and Sun Village.

Lake Los Angeles. Lake Los Angeles is located within the eastern portion of the Antelope Valley and is approximately 17 miles east of Downtown Palmdale. Similar to other areas within the Antelope Valley, Lake Los Angeles is characterized by low-density development with an open and rural setting. Lake Los Angeles' rural town center is located along Avenue O between 167th Street East and 172nd Street East, and along 170th Street East between Avenue O and Glenfall Avenue. The rural town center provides various services and employment opportunities, such as the Lake Los Angeles Library, Saddleback Market, Living Springs Foursquare Church, and Saddleback True Value Hardware, for its residents. Residents of Lake Los Angeles wish to maintain the existing rural character of their community.

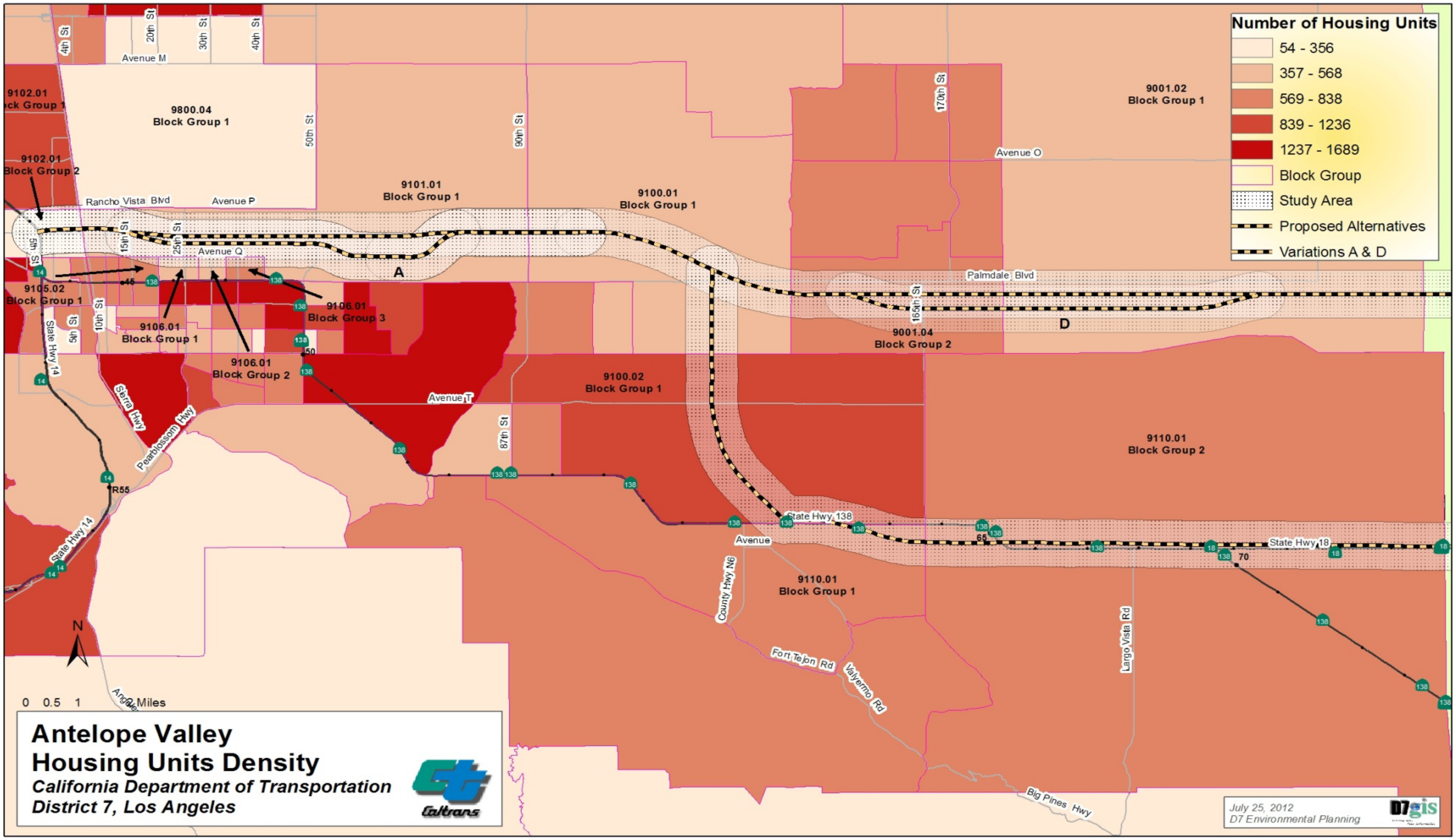
Sun Village. Sun Village is located within the southeastern portion of the Antelope Valley, approximately 8 miles east of Palmdale City Hall. A large portion of the community is either developed or partially developed and provides a wide range of use, including commercial and retail services to local employment opportunities. The remaining areas within the community are largely undeveloped and lacking appropriate infrastructure. Sun Village's rural town center area is located along Palmdale Boulevard between Little Rock Wash and 95th Street East, and along 90th Street East between Palmdale Boulevard and Avenue Q-14. Jack Robinson Park, St. John Ame Church, and Intel Car Wash Consulting are within close proximity of the rural town center.

The following subsections describe the study area community and socioeconomic characteristics within the study area located in unincorporated Los Angeles County. Most data were obtained from the U.S. Census 2010 (unless otherwise indicated) at the block group level. When the data at the block group level are not available, the data at the census tract level are used.

Two census tracts covering the unincorporated Los Angeles County study area include Tracts 9001.04 and 9001.02. Two block groups covering the unincorporated Los Angeles County study area are as follows:

- 9001.04 Block Group 2
- 9001.02 Block Group 1

Figure 3.1.4-2 Antelope Valley Housing Density



Population and Age

Table 3.1.4-5 summarizes race and ethnic composition of population within the unincorporated Los Angeles County study area compared with Los Angeles County. Note that the information for unincorporated Los Angeles County is not available.

Table 3.1.4-5 Unincorporated Los Angeles County Study Area Population Demographics (U.S. Census 2010)

Category	Unincorporated Los Angeles County Study Area	Los Angeles County
2000 Total Population	NA	9,519,331
2010 Total Population	1,970	9,818,605
Net Change	NA	(+) 299,274
Population Growth Rate (2000-2010)	NA	3.1%
Annual Average Growth Rate	NA	0.3%
2010 Median Age	36.3	34.8
19 Years and Under	36%	28%
20 to 64 Years	56%	62%
65 Years and Over	8%	11%
Ethnicity and Race		
Hispanic *	56.5%	47.7%
White	30.5%	27.8%
Asian *	0.3%	13.5%
Black *	9.6%	8.3%
American Indian and Alaska Native *	0.5%	0.2%
Native Hawaiian and Other Pacific Islander *	0.1%	0.2%
Some Other Race	.05%	0.3%
Two or More Races	2.3%	2.0%
Total Minority	68.8%	69.9%
*"Minority individuals" as defined by the CEQ.		

Source: High Desert Corridor Community Impact Assessment, 2016.

Based on the 2010 U.S. Census, the total population within the unincorporated Los Angeles study area is approximately 1,970, which is roughly 0.02 percent of the total population of Los Angeles County. The median age of population within the unincorporated Los Angeles County study area, as of the 2010 U.S. Census, is 36.3.

Ethnicity and Race

For the study area, the Hispanic population is the majority ethnic group, accounting for 56.5 percent of the population, and is about 9 percent higher than compared to Los Angeles County as a whole, as shown in Table 3.1.4-5. Compared to Los Angeles County, the unincorporated area has a slightly higher level of Hispanic Black population and Non-Hispanic White populations, with a much smaller percentage of Non-Hispanic Asians.

The total minority population within the study area is approximately 68.8 percent, which is comparable to the county's total minority percentage of approximately 69.9 percent.

Income

Census information for the average household income level and poverty status for unincorporated Los Angeles as of 2009 was not available; however, sectors that provided the highest paid salaries within unincorporated Los Angeles County include Information Technology (IT), Professional Management, Agriculture, Public Administration, Construction, and Wholesale, with average salary levels above $50,000 per year. Sectors with the lowest paid average salaries include Leisure-Hospitality, Manufacturing, and Retail, with average salaries at or below $32,000 per year.

The median household income level for the study area is $54,995 per year and is similar to the Los Angeles County median household income of $55,811 per year. 2010 U.S. Census information on income levels was not available at the block group level for the study area. Income information at the census tract level was obtained from the 2010 ACS.

Within the study area, there are approximately 1,885 individuals considered to be of low-income or poverty status, which constitutes about 25 percent of the total population within the study area. The highest percentage was individuals under 18 years of age, followed by individuals 18 to 64 years of age. The lowest percentage classified as of poverty status is individuals 65 years and above (refer to Table 3.1.4-6).

Table 3.1.4-6 Unincorporated Los Angeles County Income Levels (U.S. Census 2010)

Category	Unincorporated Los Angeles County Study Area	Unincorporated Los Angeles County	Los Angeles County
Annual Median Household Income Level ($)	$54,995	N/A	$55,811
Total Population (Persons)	7,540*	N/A	9,818,605
Percentage of Population Determined to be of Poverty Status	25	N/A	17
Poverty Status (%) - Under 18 Years	1,012	N/A	579,151
Poverty Status (%) - 18 to 64 Years	769	N/A	982,660
Poverty Status (%) - 65 Years and Over	104	N/A	135,654

*Data was not available at the block group level; therefore, income level information from Census tracts 9001.04 and 9001.02 were used to estimate income levels for the study area.

Source: High Desert Corridor Community Impact Assessment, 2016.

Community Cohesion

As shown in Table 3.1.4-7, about 48 percent of the total housing units within Los Angeles County are owner occupied. Single-family homes, which are classified as single-unit detached structures, make up about 50 percent of the total housing units. Households who have lived within the same housing unit prior to the year 2000 consist of about 42 percent of the total households.

Within the study area, there is a greater percentage of owner-occupied housing units, households in the same housing unit prior to 2000, and percentage of single-family homes. Two of the three indicators for community cohesion are relatively high, which may indicate a high sense of community cohesion.

Table 3.1.4-7 Los Angeles County Stability Index

Community Cohesion Indicators	Los Angeles County	Unincorporated Los Angeles County Study Area
Percent of Owner-Occupied Housing Units	48.2	73.5
Percent of Single-Family Homes	49.9	97.1
Percent of Households in Same Housing Unit (Prior to Year 2000)	41.9	45.6

Source: High Desert Corridor Community Impact Assessment, 2016.

Housing

Housing demographics within the study area compared with unincorporated Los Angeles County and Los Angeles County are presented in the CIA. The owner-occupied housing in the study area accounts for about 68 percent compared to 64 percent in unincorporated Los Angeles County and 48 percent in Los Angeles County. An average home value in the study area is $232,995, compared to $277,700 and $508,800 in Palmdale and Los Angeles County as a whole, respectively. The average household size within the study area is 3.2 persons.

San Bernardino County

San Bernardino County is forecasted to experience substantial population growth in the coming decades. The Southern California Association of Governments' (SCAG) study of growth trends over the last few decades has shown a continued decentralization of population, in which growth has now shifted towards San Bernardino and Riverside counties.

The project traverses various areas of San Bernardino County, including unincorporated areas of San Bernardino County, Adelanto, Victorville, and Apple Valley. Within the unincorporated areas of San Bernardino County, there appears to be a lack of defined community. Most of the communities and housing units are located within the developed areas of Adelanto, Victorville, and Apple Valley.

The boundaries established for census tracts and block groups within San Bernardino County are not delineated by jurisdictional boundaries, but they encompass multiple jurisdictions. As a result, classifying each block group by jurisdiction was not possible, because many of the boundaries cross over into other jurisdictions. For the purpose of population and housing analysis for jurisdictions within San Bernardino County, block groups will be combined into a single project study area called the Victor Valley Study Area. Table 3.1.4-8 lists the block groups within the Victor Valley study area. They are also shown in Figure 3.1.4-3.

Table 3.1.4-8 Victor Valley Study Area Block Groups

Block Groups within the Victor Valley Study Area	
91.10 Block Group 2	97.14 Block Group 1
91.14 Block Group 1	99.05 Block Group 2
91.16 Block Group 4	117 Block Group 1
91.17 Block Group 2	121.01 Block Group 2
97.08 Block Group 1	121.04 Block Group 2
97.12 Block Group 2	97.13 Block Group 2
97.13 Block Group 1	91.17 Block Group 1
9802 Block Group 1	121.01 Block Group 3

Adelanto

Adelanto's planning area according to the *Adelanto General Plan* (May 1994) is approximately 81,000 acres in size and includes all lands contained within its city boundaries, sphere of influence, the former George Air Force Base (GAFB), and lands north of Shadow Mountain Road. There are two distinct residential communities within the city. The community located north of Air Expressway includes various community facilities, such as government buildings, community centers, parks, and schools that serve as local hubs for community activities. The community south of Holly Road is served by several commercial developments located south and east of the community.

Population and Age

Table 3.1.4-9 summarizes race and ethnic composition of population within the Victor Valley study area compared to the city of Adelanto and San Bernardino County.

Based on the 2010 U.S. Census, the total population within the study area is approximately 45,481 persons, which is approximately 1.5 times the total population in Adelanto, and has a median age of 37.5 years, which is higher than Adelanto's median age by 9 years. The annual growth rate within the study area is 3.1 percent, which is lower than Adelanto's overall growth rate of 7.5 percent. The distribution of population within Adelanto is concentrated north of SR-18 along Mojave Drive, in addition to areas south of El Mirage Road. The proposed project alignment is situated along Air Expressway, where the population density is less than those of other areas within the city.

Figure 3.1.4-3 Victor Valley Block Group Map

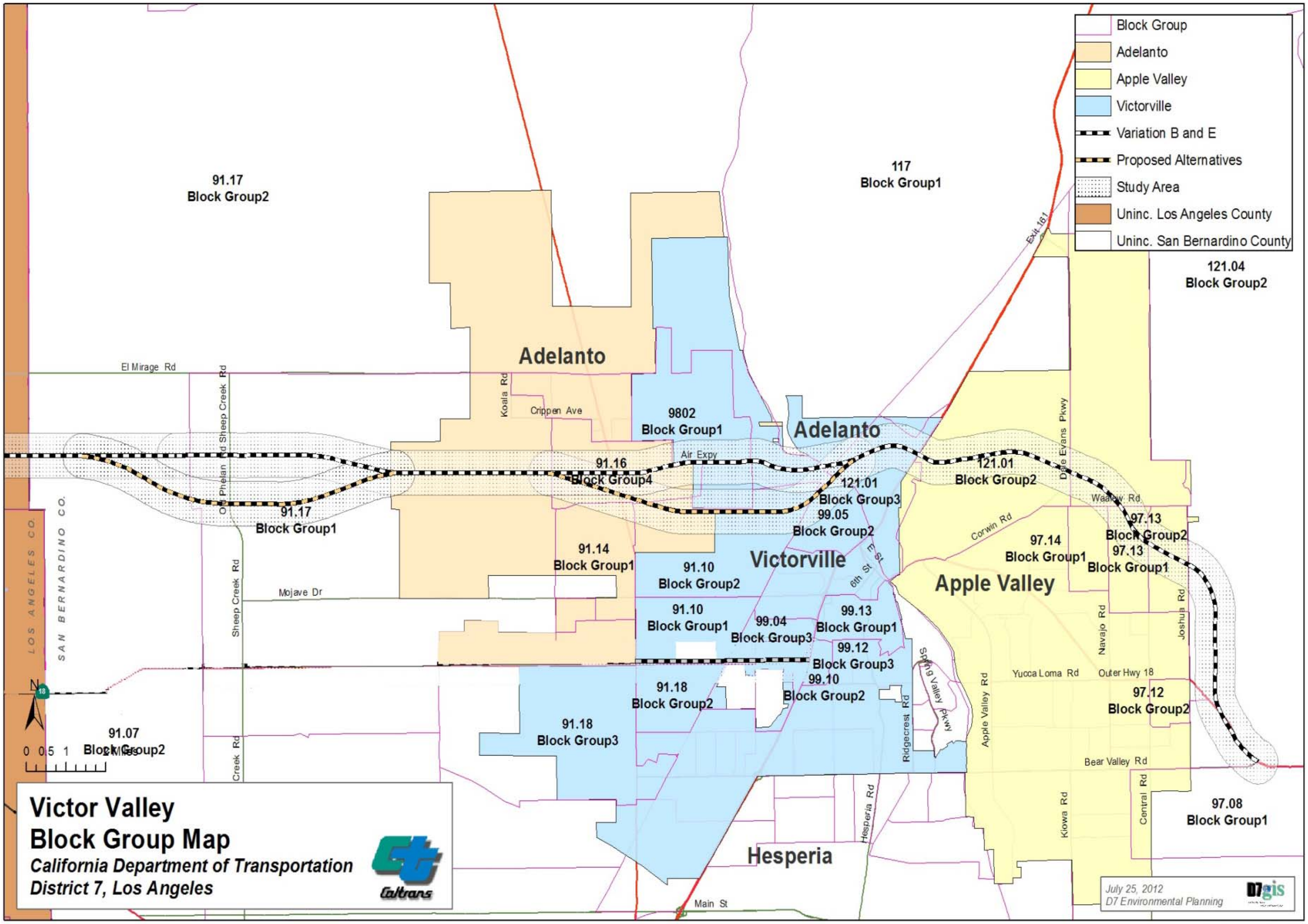


Table 3.1.4-9 Race and Ethnic Composition of Population in Adelanto (2010 U.S. Census)

Category	Victor Valley Study Area	Adelanto	San Bernardino County
2000 Total Population	34,602	18,130	1,709,434
2010 Total Population	45,481	31,765	2,035,210
Net Change	(+) 10,879	(+) 13,635	(+) 325,776
Population Growth Rate (2000-2010)	31.4%	75.2%	19.0%
Annual Average Growth Rate	3.1%	7.5%	1.9%
Total Population (Persons)	45,481	31,765	2,035,210
2010 Median Age (Years)	37.5	27.9	31.2
19 Years and Under	30.7%	41.1%	32.7%
20 to 64 Years	61%	47.6%	58.4%
65 Years and Over	8.3%	4.4%	8.9%
Ethnicity and Race			
Hispanic *	41%	58%	49%
White	37%	17%	33%
Asian *	4%	2%	6%
Black *	14%	20%	8%
American Indian and Alaska Native *	1%	0.3%	0.4%
Native Hawaiian and Other Pacific Islander *	0.4%	1%	0.3%
Some Other Race	0.3%	0.3%	0.2%
Two or More Races	3%	2%	2%
Total Minority	61%	80%	64%
*"Minority individuals" as defined by CEQ.			

Source: High Desert Corridor Community Impact Assessment, 2016.

Ethnicity and Race

Table 3.1.4-9 provides a comparison of ethnicity and race for Adelanto, the study area, and San Bernardino County.

Adelanto has higher percentages of Hispanic and Non-Hispanic Black populations than San Bernardino County. The percentages of Non-Hispanic White, Non-Hispanic Asian, and Non-Hispanic American Indian populations in Adelanto are lower than those of the county. The Non-Hispanic and Other Race Category population percentage is slightly higher for Adelanto compared to that of the county. The population percentage differences within ethnicity groups within Adelanto and the county are highest among the Non-Hispanic White and Non-Hispanic Black populations.

Within the Victor Valley study area, the Hispanic population accounts for 41 percent of the total population, which is lower compared to Adelanto. The Non-Hispanic White population percentage is higher in the study area than in Adelanto. Non-Hispanic Asians account for 4 percent of the population within the study area, which is slightly higher than that of Adelanto. The Non-Hispanic Black population percentage is lower compared to that of Adelanto. For Non-Hispanic American Indians, the percentage is marginally higher in the study area. The total minority population in the study area is approximately 61 percent.

Income

2010 U.S. Census information on income levels was not available at the block group level for the Victor Valley study area; therefore, income information at the census tract level was obtained from the 2010 ACS.

The income and poverty status of the population within the Victor Valley study area compared with the city of Adelanto and San Bernardino County are presented in Table 3.1.4-10. There are approximately 16,867 persons considered to be of low-income or in poverty status within the Victor Valley study area or about 22 percent of the study area total population, as compared to 25.6 percent in Adelanto and 15 percent in San Bernardino County. The highest percentage was among individuals between the ages of 18 and 64, followed by individuals under age 18. Individuals 65 years and above comprise the lowest percentage of the study area population in poverty status.

Table 3.1.4-10 Victor Valley Study Area Income Levels (2010 U.S. Census)

Category	Victor Valley Study Area	Adelanto	San Bernardino County
Annual Median Household Income Level ($)	N/A	41,113	54,750
Total Population (Persons)	75,392	27,631	1,961,244
Percentage of Population Determined as Poverty Status	22.4	25.6	14.8
Poverty Status - Under 18 Years	7,441	11,423	120,971
Poverty Status - 18 to 64 Years	8,781	15,040	154,049
Poverty Status - 65 Years and Over	654	1,168	16,000

*Data was not available at the block group level. Information from census tracts were used to estimate income levels for the study area.

Source: High Desert Corridor Community Impact Assessment, 2016.

Community Cohesion

Figure 3.1.4-4 shows the distribution of housing units within the Victor Valley area. Table 3.1.4-11 summarizes the stability index within the study area compared with the city of Adelanto. About 69 percent of the total housing units within the study area are owner occupied compared to 61 percent in Adelanto. Single-family homes make up 78 percent of the total housing units in the study area compared to 79 percent in Adelanto. Households who have lived within the same housing unit prior to the year 2000 consist of 32.3 percent of the total households within the study area, compared to 24.6 percent in Adelanto. One of the three indicators for community cohesion is somewhat high, which may indicate a moderate sense of community cohesion.

Figure 3.1.4-4 Victor Valley Housing Density

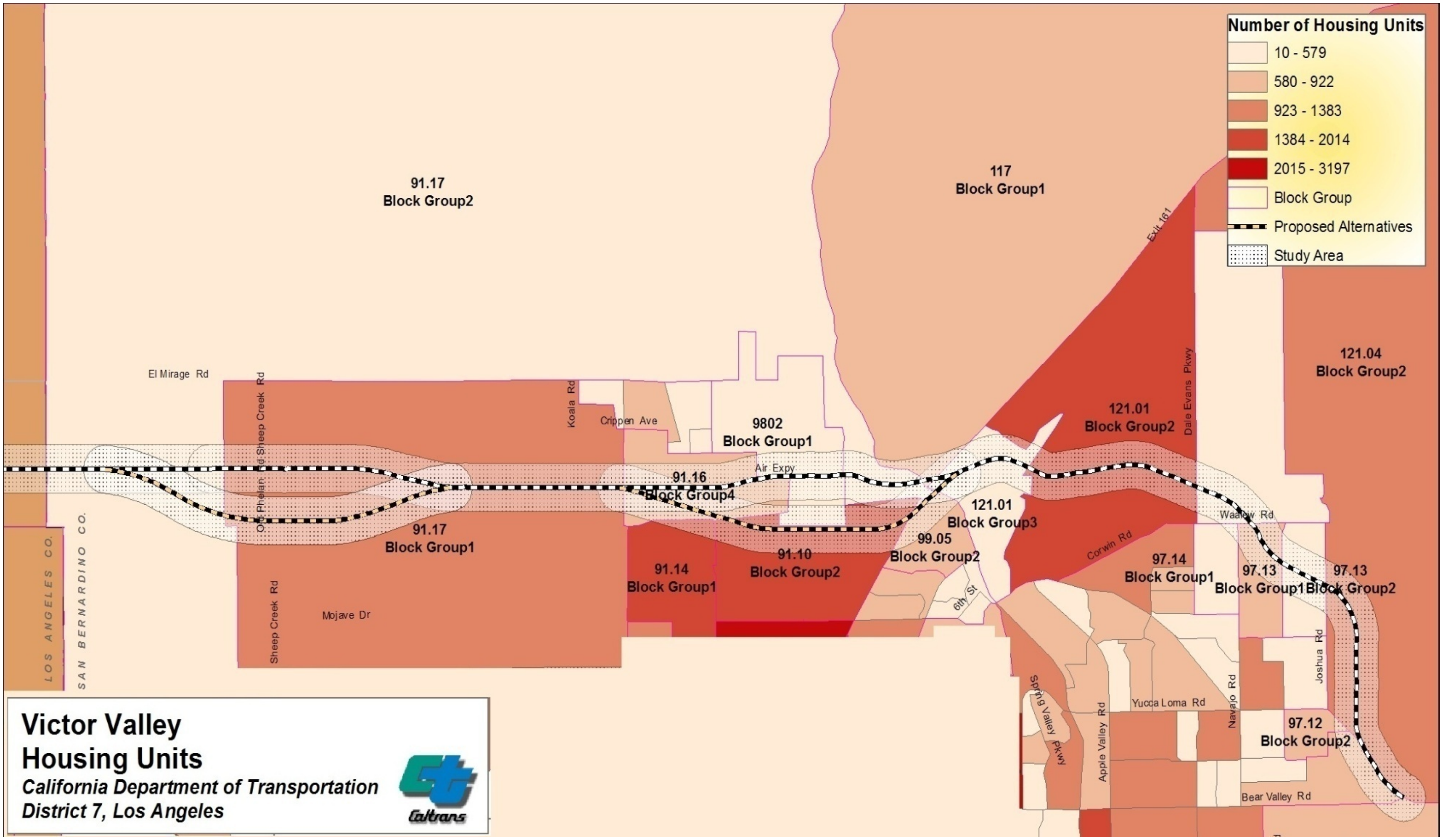


Table 3.1.4-11 Adelanto Stability Index

Indicators	Adelanto	Victor Valley Study Area
Percent of Owner-Occupied Housing Units	61.2	69.2
Percent of Single-Family Homes	79.1	77.9
Percent of Households in Same Housing Unit (Prior to Year 2000)	24.6	32.3

Source: High Desert Corridor Community Impact Assessment, 2016.

Housing

Housing demographics within the study area compared with the city of Adelanto and San Bernardino County are presented in the CIA. The owner-occupied housing in the study area accounts for about 68 percent compared to 61 percent in Adelanto and 63 percent in San Bernardino County. An average home value in the study area is $186,933, compared to $170,500 and $155,000 in Adelanto and San Bernardino County as a whole, respectively. The average household size within the study area is 3.2 persons.

The population within Adelanto is dispersed, with larger concentrations located within residential land use areas located within the northern and southern portions of the city. High residential land uses are located between Air Expressway and Desert Flower Road. Towards the north of Adelanto are high-acreage residential land uses, while towards the south are pockets of single-family residential units.

Victorville

The City's jurisdiction is divided into 10 distinct planning areas. The boundaries for the planning area are defined using topographic features, man-made features, and land use characteristics. The planning areas distinguish the various communities within the city. The planning areas include Baldy Mesa, Central City, East Bear Valley, Golden Triangle, North Mojave, Southern California Logistics Airport (SCLA), Spring Valley Lake, West City, West Bear Valley, and Northern Expansion.

Baldy Mesa is located west of United States Highway 395 (US 395) and south of Palmdale Road. The area consists primarily of low-density and very low-density residential land uses, along with some commercial land uses.

Central City is located east of I-15, north of Yates Road/Green Tree Boulevard, west of the Burlington Northern Santa Fe (BNSF) railroad line, and south of the Mojave River. The community is primarily composed of low-density residential with open space and moderate commercial land uses.

East Bear Valley is located east of I-15, north of Bear Valley Road, west of Ridgecrest Road, and south of Yates Road/Green Tree Boulevard. This area is primarily composed of an even mix of low-density residential and commercial land uses.

Golden Triangle is the southernmost community and is located north of the California Aqueduct, south of Bear Valley Road, east of US 395, and west of I-15. This community is composed largely of low-density residential, along with moderate commercial land uses.

North Mojave is located northeast of the National Trails Highway and northwest of I-15, with a portion of the planning area extending southeast of I-15 and northeast of the Mojave River. This area has a designated specific land use plan and is composed of open space and heavy industrial uses.

SCLA is located within the former GAFB and includes areas north of the existing city boundary. It also includes all lands east towards the Mojave River and along the north side of Air Expressway of the former base. The planned Global Access Victorville multimodal freight transportation hub is located within this planning area, which serves as a major transportation goods movement facility for the greater Antelope Valley. This area has a specific land use plan, specific to the SCLA.

The Spring Valley Lake planning area is located in southeast Victorville and is north of Bear Valley Road, south of and west of the Mojave River, and east of Ridgecrest Road and the Atchison, Topeka and Santa Fe Railroad (ATSF) line. This area is primarily composed of open space, with moderate low-density residential land uses.

West City is located in the central part of the city and is south of Rancho Road, east of US 395, and west of El Evado Road. This community consists of a high concentration of residents, along with a mix of commercial uses serving the community.

West Bear Valley is located south of Palmdale Road, east of US 395, and west of I-15 and Amargosa Road. This area consists of a high concentration of residents, with a variety of low-density and very low-density land uses. Moderate commercial uses are also included within this community.

The Northern Expansion planning area is located in the northernmost region of the city and includes the greatest concentration of low-density residential use within the city. This area also consists of mostly open space, with moderate industrial and commercial uses.

Population and Age

Table 3.1.4-12 summarizes race and ethnic composition of population within the Victor Valley Study area compared with the city of Victorville and San Bernardino County.

Based on the 2010 U.S. Census, the total population within the study area is 45,481 persons, which is approximately 40 percent of the total population of Victorville, and has a median age of 37.5 years, higher by approximately 8 years compared to the median age in Victorville. The annual growth rate within the study area of 3.1 percent is lower than Victorville’s overall growth rate of 8.1 percent. Most of the population is located south of the study area based on the proposed alignment. The alignment is situated mostly within undeveloped lands away from populated areas.

Table 3.1.4-12 Race and Ethnic Composition of Population in Victorville (2010 U.S. Census)

Category	Victor Valley Study Area	Victorville	San Bernardino County
2000 Total Population	34,602	64,029	1,709,434
2010 Total Population	45,481	115,903	2,035,210
Net Change	(+) 10,879	(+) 51,874	(+) 325,776
Population Growth Rate (2000-2010)	31%	81%	19%
Annual Average Growth Rate	3.1%	8.1%	1.9%
2010 Median Age (Years)	37.5	29.5	31.2
19 Years and Under	30.7%	36.1%	32.7%
20 to 64 Years	61%	55.8%	58.4%
65 Years and Over	8.3%	8.1%	8.9%
Ethnicity and Race			
Hispanic *	41%	47%	49%
White	37%	28%	33%
Asian *	4%	3%	6%
Black *	14%	16%	8%
American Indian and Alaska Native *	1%	0.7%	0.4%
Native Hawaiian and Other Pacific Islander *	0.4%	0.3%	0.3%
Some Other Race	0.3%	0.2%	0.2%
Two or More Races	3%	2%	2%
Total Minority	61%	68%	64%
*”Minority individuals” as defined by CEQ.			

Source: High Desert Corridor Community Impact Assessment, 2016.

Ethnicity and Race

Table 3.1.4-12 shows that Victorville has a lower percentage of Hispanic, Non-Hispanic White, and Non-Hispanic Asian populations than San Bernardino County; however, the percentage of the Non-Hispanic Black population in Victorville is twice that of the county. The percentage difference in ethnic groups between Victorville and San Bernardino County is highest among the Non-Hispanic Asian and Non-Hispanic Black populations.

Within the Victor Valley study area, the Hispanic population accounts for 41 percent of the population. When compared to Victorville, the percentage of Hispanic population within the study area is lower. The Non-Hispanic White population percentage is higher than that of Victorville. Non-Hispanic Asian population accounts for 4 percent of the population within the study area, which is slightly higher than that of Victorville. The Non-Hispanic Black population is slightly lower compared to Victorville. The Non-Hispanic American Indian population is marginally higher in the study area than Victorville. For the study area, the total minority population is approximately 61 percent.

Income

The income level and poverty status of the population within the Victor Valley study area compared with the city of Victorville and San Bernardino County are presented in Table 3.1.4-13.

Table 3.1.4-13 Victorville Income Levels (2010 U.S. Census)

Category	Victor Valley Study Area	Victorville	San Bernardino County
Annual Median Household Income Level ($)	N/A	52,165	54,750
Total Population (Persons)	75,392	104,099	1,961,244
Percentage of Population Determined as Poverty Status	22.4	19.4	14.8
Poverty Status (%) - Under 18 Years	44.1	48.7	41.5
Poverty Status (%) - 18 to 64 Years	52	47.1	52.9
Poverty Status (%) - 65 Years and Over	3.9	4.1	5.4

Source: High Desert Corridor Community Impact Assessment, 2016.

The percentage of low-income individuals in Victorville is 19.4 percent, which is higher than that of San Bernardino County but lower than that of the study area. Most of the low-income population is individuals below 18 years, followed by individuals age 18 to 64 years, then individuals 65 years and above. The distribution by age of low-income individuals is relatively uniform within the study area and respective jurisdictions, where the majority is individuals below 18 years and individuals 18 to 64 years of age.

Within the Victor Valley study area, there are approximately 16,867 persons considered to be of low-income or at poverty level, which constitutes about 22 percent of the total population. The highest percentage was among individuals 18 to 64 years of age, followed by individuals under 18 years of age. The lowest level of poverty was among individuals 65 years and above.

Community Cohesion

Table 3.1.4-14 summarizes the stability index within the study area compared with the city of Victorville. It shows about 69 percent of the total housing units within the study area are owner occupied compared with about 65 percent in Victorville. Single-family homes make up about 78 percent of the total housing units in the study area, which is the same as in Victorville. Within the study area, households who have lived within the same housing unit prior to the year 2000 are about 32 percent of the total households, compared with about 29 percent in Victorville.

As indicated in Table 3.1.4-14, two of the three indicators for community cohesion are somewhat high, which may indicate a moderate sense of community cohesion.

Table 3.1.4-14 Victorville Stability Index

Indicators	Victorville	Victor Valley Study Area
Percent of Owner-Occupied Housing Units	64.9	69.2
Percent of Single-Family Homes	79.4	77.9
Percent of Households in Same Housing Unit (Prior to Year 2000)	28.5	32.3

Source: High Desert Corridor Community Impact Assessment, 2016.

Housing

Housing demographics within the study area compared with the city of Victorville and San Bernardino County are presented in the CIA. The owner-occupied housing in the study area accounts for about 68 percent compared to about 62 and 63 percent in Victorville and San Bernardino County, respectively. An average home value in the study area is $186,933, compared to $227,300 and $155,000 in Victorville and San Bernardino County as a whole, respectively. The average household size within the study area is 3.2 persons.

The population within Victorville is dispersed proportionately, with larger concentrations located south of the proposed alignment. Housing densities are localized within residential land use areas, in this case, north of the study area.

Apple Valley

Population and Age

Table 3.1.4-15 summarizes race and ethnic composition of population within the Victor Valley Study area compared with the town of Apple valley and San Bernardino County.

Based on the 2010 U.S. Census, the total population within the study area is approximately 45,481 persons, which is roughly 66 percent of the total population of Apple Valley, and the median age for the study area is 37.5 years, which is slightly higher by 0.5 years than Apple Valley. The annual growth rate within the study area is 3.1 percent, which is higher than Apple Valley’s overall growth rate of 2.8 percent.

Ethnicity and Race

Table 3.1.4-15 shows that the town has a lower percentage of Hispanics and a higher percentage for Non-Hispanic Whites compared to those of the county. The Non-Hispanic Asian population declined, while the remaining ethnic group population changes were marginal. When compared to the county, the most notable differences in population changes occurred in the Hispanic and Non-Hispanic White populations.

Table 3.1.4-15 Race and Ethnic Composition of Population in Apple Valley (2010 U.S. Census)

Category	Victor Valley Study Area	Apple Valley	San Bernardino County
2000 Total Population	34,602	54,239	1,709,434
2010 Total Population	45,481	69,135	2,035,210
Net Change	(+) 10,879	(+) 14,896	(+) 325,776
Population Growth Rate (2000-2010)	31%	27.5%	19%
Annual Average Growth Rate	3.1%	2.8%	1.9%
Total Population (Persons)	45,481	69,135	2,035,210
2010 Median Age (Years)	37.5	37	31.2
19 Years and Under	30.7%	31.1%	32.7%
20 to 64 Years	61%	53.4%	58.4%
65 Years and Over	8.3%	15.4%	8.9%
Ethnicity and Race			
Hispanic *	41%	29%	49%
White	37%	55%	33%
Asian *	4%	3%	6%
Black *	14%	9%	8%
American Indian and Alaska Native *	1%	0.5%	0.4%
Native Hawaiian and Other Pacific Islander *	0.4%	0.3%	0.3%
Some Other Race	0.3%	0.2%	0.2%
Two or More Races	3%	3%	2%
Total Minority	61%	41%	64%
*"Minority individuals" as defined by CEQ.			

Source: High Desert Corridor Community Impact Assessment, 2016.

The Hispanic population accounts for 41 percent of the population within the study area, which is higher than that of Apple Valley. The Non-Hispanic White population is lower than that of Apple Valley. Non-Hispanic Asians account for 4 percent of the population within the study area and is higher compared to Apple Valley's percentage. The Non-Hispanic Black population percentage is higher than that of Apple Valley. For Non-Hispanic American Indians, there is a marginal increase in percentage between the study area and Apple Valley, and for Non-Hispanic Some Other, there is a marginal increase within the study area compared to Apple Valley. The percentage of Individuals of Two or More Races is about the same as that of Apple Valley. For the study area, the total minority population is approximately 61 percent.

Income

The income level and poverty status of the population within the Victor Valley study area compared with the town of Apple Valley and San Bernardino County are presented in Table 3.1.4-16. Apple Valley, in comparison to San Bernardino County, has a higher percentage (17.9 percent) of individuals classified as low-income;

however, when compared to the study area, Apple Valley has a lower percentage. The majority group classified as low-income is individuals 18 to 64 years of age, followed by individuals below 18 years of age, and by individuals 65 years and above. The distribution by age of low-income individuals is relatively uniform within the study area and respective jurisdictions where the majority is individuals below 18 years and individuals 18 to 64 years of age.

Table 3.1.4-16 Apple Valley Income Levels

Category	Victor Valley Study Area	Apple Valley	San Bernardino County
Annual Median Household Income Level ($)	N/A	48,491	54,750
Total Population (Persons)	75,392	67,075	1,961,244
Percentage of Population Determined as Poverty Status	22.4	17.9	14.8
Poverty Status (%) - Under 18 Years	44.1	41.3	41.5
Poverty Status (%) - 18 to 64 Years	52	52.9	52.9
Poverty Status (%) - 65 Years and Over	3.9	5.7	5.4

Source: High Desert Corridor Community Impact Assessment, 2016.

Within the study area, there are approximately 16,867 persons considered to be of low-income or poverty status, which constitutes about 22 percent of the total population. The highest percentage was among individuals 18 to 64 years of age, followed by individuals under 18 years of age. The lowest percentage of the population considered in poverty status is individuals 65 years and above.

Community Cohesion

Table 3.1.4-17 summarizes the stability index within the study area compared to the town of Apple Valley. About 69 percent of the total housing units within the study area are owner occupied compared with about 71 percent in Apple Valley. Single-family homes make up about 78 percent of the total housing units in the study area compared with about 76 percent in Apple Valley. Households who have lived within the same housing unit prior to the year 2000 consist of about 32 percent of the total households in the study area, compared with about 36 percent in Apple Valley. Within the study area, Apple Valley shows the highest percentage of households in the same housing unit since the year 2000.

Table 3.1.4-17 Apple Valley Stability Index

Indicators	Apple Valley	Victor Valley Study Area
Percent of Owner-Occupied Housing Units	70.7	69.2
Percent of Single-Family Homes	76.2	77.9
Percent of Households in Same Housing Unit (Prior to Year 2000)	36	32.3

Source: High Desert Corridor Community Impact Assessment, 2016.

Housing

Housing demographics within the study area compared with Apple Valley and San Bernardino County are presented in the CIA. The owner-occupied housing in the study area accounts for about 68 percent compared to 69 percent in Apple Valley and 63 percent in San Bernardino County. An average home value in the study area is $186,933, compared to $262,100 and $155,000 in Apple Valley and San Bernardino County as a whole, respectively. The average household size within the study area is 3.2 persons.

Environmental Consequences

No Build Alternative

No impacts would occur under the No Build Alternative.

Build Alternatives

Freeway/Expressway and Freeway/Tollway Alternatives

The Freeway/Expressway and Freeway/Tollway Alternatives share the same physical alignment and, as a result, both alternatives share the same impacts, which are discussed below. Note that the acquisition data presented in this section of the report is based on the information presented in the Draft Relocation Impact Report (DRIR) (2014), which analyzed right-of-way (ROW) impacts to residential and nonresidential properties on all alternative alignments, and the Final Relocation Impact Report (FRIR) (2015), which focused on the impacts of the Preferred Alternative (see more detailed information in Section 3.1.4.2, Relocation and Property Acquisition subsection).

Palmdale

The proposed Freeway/Expressway and Freeway/Tollway Alternatives project alignments are located within the fringe of Palmdale and within semi-developed areas. Palmdale, in relation to other communities within the study area, is generally more developed and urbanized in character. The majority of the population within the Palmdale study area is concentrated south of the proposed project within more developed areas, while a smaller portion of the population is situated within the edges of the city. Direct impacts that may affect community character are not likely to occur. The proposed project alignment has been designed to avoid negative effects on existing neighborhoods and communities within the project area. The proposed project alignment was designed to be sensitive to the existing communities and, as a result, avoids bisecting existing established neighborhoods.

The Freeway/Expressway and Freeway/Tollway Alternative alignments would have notable impacts, defined as displacements that would require significant lead time and substantial financial allocations due to three Palmdale School District properties located within the ROW of the main alignment. Based on the DRIR (2014), it was determined the acquisition and relocation of these school facilities would require considerable lead time and substantial financial resources. Caltrans would provide adequate replacement properties for the displaced Palmdale School District administrative and operational facilities. The functional replacement process may take up to 8 years to complete due to the complexity of the property; temporary facilities may be utilized in the interim.

Construction of the proposed main alignment would require partial and full acquisition of residential and nonresidential properties, as presented under Section 3.1.4.2, Relocation and Property Acquisition. The affected residential properties consist of single-family homes built between the mid 1950s and mid 1980s, in which the condition of the homes ranges from fair to good; however, the study indicated that there is adequate replacement housing within the area for those displaced, and the relocation of residents would not pose an impact on the community. All displacees would be treated in accordance with the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended.

Under the Freeway/Expressway and Freeway/Tollway Alternatives, indirect impacts as a result of the project may include changes to existing access and circulation, increased urbanization, growth, and quality of life. Based on the preliminary engineering design, four freeway interchanges would be constructed within Palmdale at the intersection of SR-14 and the proposed HDC, 20th Street East, 50th Street East, and 90th Street East. Access points to the proposed HDC from local arterial streets would provide increased circulation. In addition, as discussed in the growth analysis, increased development of commercial/industrial units may take place along areas adjacent to interchange locations.

Proposed community enhancements under the Freeway/Expressway and Freeway/ Tollway Alternatives include construction of a bike path/lane adjacent to the HDC, which would provide the community with additional mobility options. The proposed bike path/lane would begin at the Palmdale Metrolink Station and would continue east towards San Bernardino County. The bike path/lane would provide a link for communities within Los Angeles and San Bernardino counties. The bike path would promote community character by improving connectivity within the community and allow greater use of active transportation for community members as a means of transportation within the local community. In addition, as previously discussed in Chapter 2, a multiuse interpretive pullout for use by bicyclists, pedestrians, and motorists would also be constructed. The multiuse interpretive pullout would serve as a resting point for bicyclists and pedestrians.

Variation A

Under the Freeway/Expressway and Freeway/Tollway Alternatives, the alignment would dip slightly south of the main alignment, approximately between 15th Street East and Little Rock Wash. Under Variation A, the proposed alignment would be shifted slightly south of the main alignment, affecting an industrial property (Assessor’s Parcel Number [APN] #3022012029), which has been identified as a salvage yard. Based on the DRIR (2014), this would result in a partial acquisition in which there is adequate supply of industrial replacement properties within the area for those displaced, and the relocation of such would not pose an impact on the community. All displacees would be treated in accordance with the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970.

Unincorporated Los Angeles County

The proposed Freeway/Expressway and Freeway/Tollway Alternative alignments are located within rural and undeveloped areas of Los Angeles County within close proximity to the existing community of Lake Los Angeles. The proposed alignments are approximately 2 miles south of Lake Los Angeles and do not bisect the community; however, the community of Lake Los Angeles is characterized by a more rural environment and lifestyle compared to other communities within the study area. As a result, the community character of Lake Los Angeles may be indirectly affected by the project.

The project would result in greater access and mobility in previously isolated areas; however, based on the existing low-density land use designations as identified within the study area and the results of growth analysis presented in Section 3.1.2 of this environmental document, growth in this area is expected to be limited *(Preliminary Draft Antelope Valley Area Plan*, 2011).

Construction of the proposed main alignment would require partial and full acquisition of residential and nonresidential properties, as presented under Section 3.1.4.2, Relocation and Property Acquisition. The affected residential properties consist of single-family homes built in the 1950s, in which the condition of the homes ranges from fair to good. It was determined that there is adequate replacement housing within the area for those displaced, and the relocation of residents would not have a noticeable impact on the community at large.

It is reasonable to assume that displaced persons would seek replacement housing that is similar in location, cost, and character to their displaced homes. This would allow displaced persons to preserve their community ties, send their children to the same schools, and reduce disruption to their employment and personal activities; however, actual relocations may vary according to personal preferences and market conditions at the time of displacement.

Relocation assistance payments and counseling would be provided to persons and businesses in accordance with the Uniform Relocation Act and Real Property Acquisition Policies Act of 1970, as amended, to ensure adequate relocation and decent, safe, and sanitary housing for displaced residents. All eligible displacees would be entitled to moving expenses.

In addition, the proposed Freeway/Expressway and Freeway/Tollway Alternative alignments would impact the Meadowbrook Dairy Farm located at the northwest corner of the Sheep Creek Road/Parkdale Road intersection; however, it has been confirmed that the dairy farm is no longer in business.

Proposed community enhancements as a result of the project include construction of a bike path/lane adjacent to the HDC, which would provide the communities within unincorporated Los Angeles additional mobility options. The proposed bike lane/ path, which begins at the Palmdale Metrolink and continues east towards San Bernardino County, would provide greater connectivity for residents within unincorporated Los Angeles and encourage the use of active transportation modes within the area. The bike path/lane would also provide a link for communities within unincorporated Los Angeles to Palmdale and Adelanto.

Indirect impacts as a result of the Freeway/Expressway and Freeway/Tollway Alternatives may affect existing circulation and access and quality of life. Under the proposed Freeway/Expressway and Freeway/Tollway Alternatives, five freeway interchanges would be constructed within the unincorporated areas of Los Angeles County and are located at the intersection between 170th Street East and the proposed HDC, 210th Street East, 240th Street East, Oasis Road, and Sheep Creek Road. Access points to the proposed HDC from local arterial streets would provide increased circulation and access. As discussed in the growth analysis, development within the unincorporated areas within Los Angeles County would be composed of low-density developments to maintain the rural character of the area *(Preliminary Draft Antelope Valley Area Plan,* 2011). The community of Lake Los Angeles has voiced concerns over construction of the HDC and its impact on quality of life. In addition, concerns were expressed during a community meeting over light and glare from the project. Caltrans will implement measures to offset indirect impacts as a result of light glare on the rural communities within unincorporated areas within Los Angeles County.

Variation D (Part of Preferred Alternative)

Variation D, developed in part by public outreach efforts and community input, would reduce potential impacts to the community of Lake Los Angeles by realigning the proposed alignment farther south away from the community. Variation D poses less of an impact on the community character of Lake Los Angeles because the associated noise, lighting, and other proximity effects from the new facility would become more distant. The community of Lake Los Angeles is a small, rural town by nature; by realigning the freeway farther away from the community, the rural character of the community can be preserved. Indirect impacts may include changes to existing access and circulation, and quality of life. Light glare, which has been voiced by the community as a concern, may be further offset under Variation D by creating a greater distance between the Freeway/Expressway and Freeway/Tollway facility and the community.

Victor Valley (Unincorporated San Bernardino County, Adelanto, Victorville, and Apple Valley)

Most of the population within the study area is mainly concentrated south of the proposed Freeway/Expressway and Freeway/Tollway Alternative alignments and is located within incorporated areas (i.e., Adelanto, Victorville, and Apple Valley). Based on the proposed alignment, established communities would not be bisected as a result of the project.

Variation B

Under Variation B, the proposed alignment would be shifted south of the main alignment to avoid acquisition of the former Meadowbrook Dairy Farm at the northwest corner of the Sheep Creek Road/Parkdale Road intersection; however, the dairy farm is no longer in business.

Adelanto

Within Adelanto, the major concentrations of populations are located within the northern and southern segments of the city. The area in between is largely undeveloped, with mostly scattered developments and vacant land. The proposed Freeway/Expressway and Freeway/Tollway Alternative alignments are situated within this particular area. As a result, the proposed alignment under the Freeway/Expressway and Freeway/Tollway Alternatives would not bisect densely populated areas; therefore, they would have no impacts on community cohesion.

Construction of the proposed Freeway/Expressway and Freeway/Tollway Alternative alignments would require partial and full acquisition of residential and nonresidential properties, as presented under Section 3.1.4.2, Relocation and Property Acquisition. As indicated in the FRIR (2015), there is adequate replacement housing within the area for those displaced, and the relocation of residents would not pose an impact on the community.

Relocation assistance payments and counseling would be provided to persons and businesses in accordance with the Uniform Relocation Act and Real Property Acquisition Policies Act of 1970, as amended, to ensure adequate relocation and decent, safe, and sanitary housing for displaced residents. All eligible displacees would be entitled to moving expenses.

The proposed Freeway/Expressway and Freeway/Tollway Alternatives include a proposed bike path/lane adjacent to the HDC that begins at the Palmdale Metrolink Station and continues east towards San Bernardino County. The bike path/lane would provide a link for communities within Adelanto to other communities located within Los Angeles and San Bernardino counties.

Mobility within the community would be enhanced as a result of the proposed bike path/lane in which the incorporation of a bike path would provide the community with additional mobility options. Community character and livability would be enhanced as a result of the proposed bike path/lane. Studies have highlighted the social benefits of paths that can accommodate pedestrians and bicycles, including contributing to healthier lifestyles, spaces to encounter neighbors, and enhanced civic pride. Incorporation of a bike path would provide the community with an additional transportation option.

In addition, the HDC Project would provide safer transportation routes and greater accessibility to jobs and activities for the communities within the proposed lane limits.

Indirect impacts as a result of the Freeway/Expressway and Freeway/Tollway Alternatives may affect existing circulation and access, increased urbanization, growth, and quality of life. Under the proposed Freeway/Expressway and Freeway/Tollway Alternatives, three freeway interchanges would be constructed within Adelanto and are located at the intersection between Caughlin Road and the proposed HDC, Koala Road, and US 395. Access points to the proposed HDC from local arterial streets would provide increased circulation. In addition, as discussed in the growth analysis, increased development of commercial/industrial units may take place along areas adjacent to interchange locations.

Victorville

The proposed Freeway/Expressway and Freeway/Tollway Alternative alignments are within the northern fringe of the city. Based on the study area for this particular area, the area consists of largely undeveloped and vacant land, and it is situated away from established communities. Within the study area within Victorville is a community of homes located on the SCLA property that were once part of military family housing on the former GAFB. Based on field visits, the units are vacant and uninhabitable, in various states of disrepair, and have been left unattended for many years. As a result, community character would not be directly affected as a result of the HDC Project. According to the U.S. Environmental Protection Agency (EPA), the GAFB is listed as a superfund site. A superfund site, as defined by EPA, is an uncontrolled or abandoned place where hazardous wastes are located, possibly affecting local ecosystems and people. Cleanup efforts are currently ongoing.

Under the proposed Freeway/Expressway and Freeway/Tollway Alternatives, the proposed alignment would be cutting off an access/entrance point to the federal prison facility located on Phantom Road East. As a result, Caltrans would provide an alternative access point by relocating the entrance point to the eastern segment of the prison facility.

The proposed Freeway/Expressway and Freeway/Tollway Alternative alignments would require partial and full acquisition of residential and nonresidential properties, as presented under Section 3.1.4.2, Relocation and Property Acquisition. The affected residential properties consist of former military family housing located on the SCLA that are in disrepair. According to a source from the SCLA, the units have been closed since 1992, and they are not considered part of the current local housing stock. All displacees would be treated in accordance with the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970.

Proposed community enhancements as a result of the project include construction of a bike path/lane adjacent to the HDC, which would provide the residents within Victorville with additional mobility options. The proposed bike path/lane would begin at the Palmdale Metrolink Station and would continue east towards San Bernardino County. The bike path/lane would provide a link for residents within Victorville to other communities in Los Angeles and San Bernardino counties. Community character and livability would be enhanced as a result of the proposed bike path. Studies have highlighted their benefits, including contributing to healthier lifestyles, spaces to encounter neighbors, and enhanced civic pride. Incorporation of a bike path would provide the community with an additional transportation option.

Indirect impacts as a result of the Freeway/Expressway and Freeway/Tollway Alternatives may affect existing circulation and access, increased urbanization, growth, and quality of life. Under the proposed Freeway/Expressway and Freeway/ Tollway Alternatives, three freeway interchanges would be constructed within Victorville and are located at the intersection between Phantom Road East, Phantom Road West, National Trails Highway, and the proposed HDC. Access points to the proposed HDC from local arterial streets would provide increased circulation and access for motorists. In addition, as discussed in the growth analysis, increased development of commercial/industrial units may occur along areas adjacent to interchange locations.

Variation E

Under Variation E, the proposed alignment would be shifted south of the main alignment to provide greater distance from the federal prison; however, based on the DRIR (2014), as a result of the shift in alignment, it was determined that the acquisition and relocation of 10 industrial/manufacturing properties would be required. The industrial/manufacturing properties affected are located along Rancho Road and Violet Road and include the USA Company Inc.; USA Services Inc.; Robertson Ready Mix Co.; Apex Bulk Commodities; Holliday Rock Co.; Cal-Silica; and Northwest Pipe Company. Based on the DRIR (2014), significant lead time and resources would be required to relocate such properties.

Relocation assistance payments and counseling would be provided to persons and businesses in accordance with the Uniform Relocation Act and Real Property Acquisition Policies Act of 1970, as amended, to ensure adequate relocation and decent, safe, and sanitary housing for displaced residents. All eligible displacees would be entitled to moving expenses.

Apple Valley

The proposed Freeway/Expressway and Freeway/Tollway Alternative alignments are within the northern fringe of Apple Valley. Based on the study area for this particular area, the area is largely undeveloped and vacant. As a result, direct impacts on the community character of Apple Valley are not anticipated.

Construction of the proposed Freeway/Expressway and Freeway/Tollway Alternative alignments would require partial and full acquisition of residential and nonresidential properties, as presented under Section 3.1.4.2, Relocation and Property Acquisition. The affected residential properties consist of single-family homes built between the 1940s and mid 1950s. The condition of the units ranges from average to fair. Based on the FRIR (2015) it was determined that there is adequate replacement housing within the area for those displaced, and the relocation of residents would not have an impact on the community. All displacees would be treated in accordance with the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970.

Proposed community enhancements as a result of the project include construction of a bike path/lane adjacent to the HDC, which would provide the residents of Apple Valley with additional mobility options. The proposed bike path/lane would begin at the Palmdale Metrolink Station and would continue east towards San Bernardino County. The bike path/lane would provide a link for Apple Valley residents to adjacent communities within Los Angeles and San Bernardino counties. In addition, two vista points would be constructed in Apple Valley located along the Choco Road and Bear Road off-ramps. Vista points are informal pullouts where motorists can safely view scenery or park and relax, but they do not have restrooms. The vista point at Choco Road would provide a scenic view with an overlook of the Town of Apple Valley, while the vista point located at Bear Road would provide a scenic view of Deadman's Point.

Indirect impacts as a result of the Freeway/Expressway and Freeway/Tollway Alternatives may affect existing circulation and access, increased urbanization, and growth. Under the proposed Freeway/Expressway and Freeway/Tollway Alternatives, two freeway interchanges would be constructed within the Town of Apple Valley and are located at the intersection between Choco Road, Dale Evans Parkway, and the proposed HDC. Access points to the proposed HDC from local arterial streets would provide increased circulation and access for motorists. In addition, as discussed in the growth analysis, increased development of commercial/industrial units may take place along areas adjacent to interchange locations.

Freeway/Expressway and Freeway/Tollway with HSR Alternatives (Preferred Alternative)

Under the proposed Freeway/Expressway and Freeway/Tollway Alternatives with High-Speed Rail (HSR), the HSR alignment is to be constructed within the centerline of the main HDC alignment, with exclusions within Palmdale and Victorville in which the rail alignment diverges from the main HDC alignment to connect to station locations in Palmdale and Victorville. As a result, additional ROW would be acquired for construction of the HSR alignment within Palmdale and Victorville. The impacts, as previously discussed under the Freeway/Expressway and Freeway/Tollway Alternatives, will be included under the Freeway/Expressway and Freeway/Tollway Alternatives with HSR. Please see Appendix I for a list of the parcels proposed for partial and full acquisitions associated with the Preferred Alternative and a map depicting the affected parcels.

Palmdale

Under the proposed Freeway/Expressway and Freeway/Tollway Alternatives with HSR within Palmdale, a station location would be developed as part of this project. The existing Palmdale Metrolink station would be expanded to accommodate future HSR patrons. Additional parking would also be provided. The proposed station location would provide transit connections to the existing Palmdale Transit Center and would allow greater transit options for Palmdale residents in addition to a greater sense of connectivity within the region.

The HSR alignment has the potential to affect community character, in which increased development and growth may occur through transit-oriented development (TOD). Based on the growth analysis, Palmdale would most likely revise its planning and zoning near the rail stations to encourage TOD to realize, among other benefits, increased walk-in ridership and conversion of some land uses for development. Such TOD would be transformational for this region because it emphasizes higher densities, mixed uses, pedestrian and bicycle use, feeder bus service, and reduced parking, which is not evident at present. Moreover, TOD impacts would be expected to be concentrated between 0.25 and 0.5 mile from station areas (i.e., easy walking distance).

Palmdale Rail Option 1 – Variation A

Rail Option 1, Variation A would result in full and partial acquisition of nonresidential properties within Palmdale and unincorporated Los Angeles County, as presented under Section 3.1.4.2, Relocation and Property Acquisition. The affected nonresidential properties include various commercial businesses, ranging from auto repair to storage facilities and industrial companies. The government parcel facilities to be impacted include the Lockheed Martin facility located on a federally owned parcel at Sierra Highway and Lockheed Way; the Palmdale Transit Center/Metrolink Station located at Sierra Highway and Technology Drive; and two parking lots owned by the City of Palmdale located at Sierra Highway and Technology Drive. Impacts to the Lockheed Martin facility would involve relocation of its parking lot. There are no potential residential impacts under Rail Option 1, Variation A.

Nonresidential properties subject to acquisition include Allen Recycling, Lusk Machine Products, and 3 other industrial buildings and structures, and 8 to 10 mid-size businesses, which include auto repair shops and warehouses. Heavy machinery and equipment associated with such facilities would require a substantial amount of time and relocation costs.

As stated in the FRIR (2015), although there is an adequate supply of replacement business properties, relocations of businesses are more complex compared to residential relocations. Because businesses serve a particular clientele that is specific to a particular area, potential relocations of businesses may disrupt services received by that particular clientele. In addition, businesses may suffer from economic impacts due to a potential loss of clientele as a result of the relocation.

Although direct impacts to residential parcels could be avoided, indirect impacts, such as noise and visual impacts, could impact the quality of life. Mitigation measures would be implemented to minimize these indirect impacts to area residents.

During the public review period of the Draft EIR/EIS prepared for this project, EPA raised a concern about the “island effect” on some area residences. Rail Option 1, Variation A would not cause an “island effect,” or potential isolation, on the residences located along 10th Street East in Palmdale or anywhere along the proposed corridor because the rail connection would use a tunnel configuration. In addition, neither 10th Street East nor Avenue Q would be closed or obstructed.

Relocation assistance payments and counseling would be provided to persons and businesses in accordance with the Uniform Relocation Act and Real Property Acquisition Policies Act of 1970, as amended, to ensure adequate relocation and decent, safe, and sanitary housing for displaced residents. All eligible displacees would be entitled to moving expenses.

Palmdale Rail Option 1 – Variation B

Rail Option 1, Variation B would result in full and partial acquisition of nonresidential properties within Palmdale and unincorporated Los Angeles County, as presented under Section 3.1.4.2, Relocation and Property Acquisition. The affected nonresidential properties include various commercial businesses ranging from auto repair to storage facilities and industrial companies. The affected government parcel facilities would include the Lockheed Martin facility located at a federally owned parcel at Sierra Highway and Lockheed Way; the Palmdale Transit Center/Metrolink Station located at Sierra Highway and Technology Drive; and two parking lots owned by the City of Palmdale located at Sierra Highway and Technology Drive. Impacts to the Lockheed Martin facility would involve relocation of its parking lot.

Nonresidential properties subject to acquisition include Allen Recycling, Lusk Machine Products, and 3 other industrial buildings and structures, and 8 to 10 mid-size businesses, which include auto repair shops and warehouses. Heavy machinery and equipment associated with such facilities would require a substantial amount of time and cost to relocate.

As stated in the FRIR (2015), though there is an adequate supply of replacement business properties, relocations of businesses are more complex in comparison to residential relocations. Because businesses serve a particular clientele, which are specific to a particular area, potential relocations of businesses may disrupt services received by that particular clientele. In addition, individual businesses may suffer from economic impacts due to a potential loss of clientele as a result of the relocation.

Although direct impacts to residential parcels could be avoided, indirect impacts, such as noise and visual impacts, could impact quality of life. Mitigation measures would be implemented to minimize these indirect impacts to area residents.

Similar to Rail Option 1, Variation A, Variation B would not cause an “island effect,” or potential isolation, on the residences located along 10th Street East in Palmdale or anywhere along the proposed corridor because the rail connection would use a tunnel configuration. In addition, neither 10th Street East nor Avenue Q would be closed or obstructed.

Relocation assistance payments and counseling would be provided to persons and businesses in accordance with the Uniform Relocation Act and Real Property Acquisition Policies Act of 1970, as amended, to ensure adequate relocation and decent, safe, and sanitary housing for displaced residents. All eligible displacees would be entitled to moving expenses.

Palmdale Rail Option 1 – Variation C (Part of Preferred Alternative)

Implementation of Rail Option 1, Variation C (Preferred Alternative) would result in full and partial acquisition of residential and nonresidential properties within Palmdale and unincorporated Los Angeles County, as presented under Section 3.1.4.2, Relocation and Property Acquisition. Please see Appendix I for a list of the parcels proposed for partial and full acquisitions associated with the Preferred Alternative and a map depicting the affected parcels.

Most of the residential properties subject to acquisition include single-family homes and a multi-unit duplex. Nonresidential properties subject to acquisition include various commercial businesses ranging from auto repair to storage facilities and industrial companies. Relocations include 5 industrial warehouses located south of Rancho Vista Boulevard and 14 industrial warehouses located south of East Avenue Q and west of Sierra Highway. Additionally, 12 commercial properties located south of East Avenue Q and west of Sierra Highway would be impacted. Heavy machinery and equipment associated with such facilities would require a substantial amount of time and cost to relocate.

As stated in the FRIR (2015), though there is an adequate supply of replacement business properties, relocations of businesses are more complex in comparison to residential relocations. Because businesses serve a particular clientele, which are specific to a particular area, potential relocations of businesses may disrupt services received by that particular clientele. In addition, an individual business may suffer from economic impacts due to a potential loss of clientele as a result of the relocation.

Although direct impacts to residential parcels could be avoided, indirect impacts, such as noise and visual impacts, could impact quality of life. Mitigation measures would be implemented to minimize these indirect impacts to area residents.

Similar to Rail Option 1, Variations A and B, Variation C would not cause an “island effect” for the residences located along 10th Street East in Palmdale or anywhere along the proposed corridor because the rail connection would use a tunnel configuration. In addition, neither 10th Street East nor Avenue Q would be closed or obstructed.

Relocation assistance payments and counseling would be provided to persons and businesses in accordance with the Uniform Relocation Act and Real Property Acquisition Policies Act of 1970, as amended, to ensure adequate relocation and decent, safe, and sanitary housing for displaced residents. All eligible displacees would be entitled to moving expenses.

Palmdale Rail Option 7 – Variation A

Rail Option 7, Variation A would require full acquisition of 5 residential properties and 14 nonresidential properties, and partial acquisition of 12 residential properties and 87 nonresidential properties. Residential properties subject to acquisition include single-family homes and a multi-unit duplex. As mentioned in the FRIR (2015), there is a sufficient supply of replacement residential and nonresidential properties within the replacement area. All displacees would be treated in accordance with the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970.

Nonresidential properties subject to acquisition include industrial, warehouse, commercial, auto repair, and government facilities. Under Option 7, Variation A, the following facilities would be impacted: a water test center/utility owned by the City of Palmdale, located at the corner of Rancho Vista Boulevard (Avenue P) and 20th Street, the Lockheed Martin facility located on a federally owned parcel at Sierra Highway and Lockheed Way; the Palmdale Transit Center/Metrolink Station located at Sierra Highway and Technology Drive; and two parking lots owned by the City of Palmdale located at Sierra Highway and Technology Drive. Impacts to the Lockheed Martin facility would involve relocation of its parking lot.

Palmdale Rail Option 7 – Variation B

Palmdale Rail Option 7, Variation B would require full and partial acquisition of residential and nonresidential properties within Palmdale and unincorporated Los Angeles County, as presented under Section 3.1.4.2, Relocation and Property Acquisition. Most of the residential properties subject to acquisition include single-family homes and a multi-unit duplex.

Nonresidential properties subject to acquisition include industrial, warehouse, commercial, auto repair, and government facilities. Under Option 7, Variation B, the following facilities would be impacted: a water test center/utility owned by the City of Palmdale, located at the corner of Rancho Vista Boulevard (Avenue P) and 20th Street; the Lockheed Martin facility located at a federally owned parcel at Sierra Highway and Lockheed Way; the Palmdale Transit Center/Metrolink Station located at Sierra Highway and Technology Drive; and two parking lots owned by the City of Palmdale located at Sierra Highway and Technology Drive. Impacts to the Lockheed Martin facility would involve relocation of its parking lot.

Palmdale Rail Option 7 – Variation C

Palmdale Rail Option 7, Variation C would require full and partial acquisition of residential and nonresidential properties within Palmdale and unincorporated Los Angeles County, as presented under Section 3.1.4.2, Relocation and Property Acquisition. Most of the residential properties subject to acquisition include single-family homes and a multi-unit duplex. As mentioned in the FRIR (2015), there is a sufficient supply of replacement of residential and nonresidential properties within the replacement area. Relocation assistance payments and counseling would be provided to persons and businesses in accordance with the Uniform Relocation Act and Real Property Acquisition Policies Act of 1970, as amended, to ensure adequate relocation and decent, safe, and sanitary housing for displaced residents. All eligible displacees would be entitled to moving expenses.

Nonresidential properties subject to acquisition include industrial, warehouse, commercial, auto repair, and government facilities. Under Option 7, Variation C, the following facilities would be impacted: a water test center/utility owned by the City of Palmdale, located at the corner of Rancho Vista Boulevard (Avenue P) and

20th Street; the Lockheed Martin facility located at a federally owned parcel at Sierra Highway and Lockheed Way; the Palmdale Transit Center/Metrolink Station located at Sierra Highway and Technology Drive; and two parking lots owned by the City of Palmdale located at Sierra Highway and Technology Drive. Impacts to the Lockheed Martin facility would involve relocation of its parking lot.

Victorville

Under the proposed Freeway/Expressway and Freeway/Tollway Alternatives with HSR, the HSR alignment diverges from the main alignment to connect with the proposed Victorville XpressWest Station in Victorville. It would be located immediately west of I-15 at Dale Evans Parkway. This station would be constructed in conjunction with the XpressWest HSR service between Las Vegas and Victorville, as currently planned. Construction of this station is not part of the HDC Project. The proposed HSR alignment in Victorville would be located in an undeveloped, vacant area away from nearby existing communities. The Victorville XpressWest rail connection, both Main line and Variation E, would require full and partial acquisitions of residential and nonresidential properties, as presented under Section 3.1.4.2, Relocation and Property Acquisition.

As mentioned in the FRIR (2015) there is a sufficient supply of replacement of residential and nonresidential properties within the replacement area. Relocation assistance payments and counseling would be provided to persons and businesses in accordance with the Uniform Relocation Act and Real Property Acquisition Policies Act of 1970, as amended, to ensure adequate relocation and decent, safe, and sanitary housing for displaced residents. All eligible displacees would be entitled to moving expenses.

Avoidance, Minimization, and/or Mitigation Measures

The following standard conditions will be implemented to avoid and minimize impacts to communities within the project area in addition to measures provided in other sections of this report.

SC-COM -1: The project will be designed to be sensitive to the existing environment in which it is constructed. Early coordination with local jurisdictions and community members will be conducted during the design of the project to identify local community interests.

SC-COM -2: The project will be designed to conform to local, general, and specific plans.

SC-COM -3: The project will be designed in a manner that will reduce light glare within rural areas, more specifically in compliance with the Rural Outdoor Lighting District Ordinance of Los Angeles County.

3.1.4.2 Relocation and Property Acquisition

Regulatory Setting

Caltrans' Relocation Assistance Program (RAP) is based on the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (as amended) and Title 49 *Code of Federal Regulations* (CFR) Part 24. The purpose of the RAP is to ensure that persons displaced as a result of a transportation project are treated fairly, consistently, and equitably so that such persons will not suffer disproportionate injuries as a result of projects designed for the benefit of the public as a whole. Please see Appendix D for a summary of the RAP.

All relocation services and benefits are administered without regard to race, color, national origin, or sex in compliance with Title VI of the Civil Rights Act (42 U.S.C. 2000d, *et seq.).* Please see Appendix C for a copy of Caltrans' Title VI Policy Statement.

Affected Environment

During preparation of the Draft EIR/EIS for this project, a DRIR was completed by the Caltrans ROW Division in August 2014. The DRIR analyzed potential ROW acquisition impacts on residential and nonresidential properties within the project footprint under various alternative alignment and variations. The project corridor is 500 feet wide between SR-14 and US 395 and 300 feet wide between US 395 and SR-18; the rail connections are somewhat narrower. It passes through moderately developed areas at either end, with most of the central area being sparsely developed. Because there is currently no existing facility in place, every property along the corridor would be subject to either full or partial acquisition. See the Land Use and Community Cohesion sections of this report for a full description of the existing characteristics of each town and community along the corridor.

As the project development process has proceeded, ROW impacts have been updated and refined. After the Preferred Alternative alignment was selected (see Section 2.7 for detailed information about the Preferred Alternative selection), an FRIR was prepared for the Preferred Alternative alignment and variation in August 2015. Based on the FRIR, a list of affected parcels subject to relocation has been prepared; it is included in Appendix I.

Environmental Consequences

No Build Alternative

No relocation impacts would occur under the No Build Alternative.

Build Alternatives

All of the build alternatives would result in full acquisitions, partial acquisitions, permanent easements, and temporary construction easements (TCEs). It is important to note that the Freeway/Expressway and Freeway/Tollway alternatives share a common footprint; therefore, the impacts will be the same. The Freeway/Expressway with HSR and Freeway/Tollway with HSR alternatives also share a common footprint (and impacts). For comparison purposes, the impacts from the alternatives with and without HSR are discussed together. A list of all properties that may be acquired is included in Appendix I, which identifies all forms of acquisitions, including partial and temporary, required for each of the alternatives.

In evaluating the impacts associated with the build alternatives, the following comparisons are made:

- The build alternatives against each other (the areas that are shared by all four build alternatives);
- The variations against the corresponding segment of the main alignment;
- The Palmdale rail connection options against each other; and
- The XpressWest rail connection options against each other.

The following discussion provides a summary of these four points of comparison and is based on the data presented in Tables 3.1.4-18 and 3.1.4-19. These tables provide an estimate of the number of permanent full and partial acquisitions and associated relocations that would result from the proposed project, categorized by alternative, variation, rail option, and community. Figure 3.1.4-5 shows the areas along the alignment that correspond to the rows in the tables.

Note that the acquisition data presented in the FRIR were obtained from the SCAG Land Use Data Set, 2008. If 70 percent or more of the parcel would be acquired by the project, it was considered to be a full acquisition in terms of analysis. The relocation impact data (Table 3.1.4-19) was obtained using ROW Land Vision Software, which is continuously updated for new information. These two data sets are not consistent in how they categorize parcels in different municipalities. For example, some parcels are classified as being located in Palmdale in one data set, while in the other data set the parcel is classified as being located in unincorporated Los Angeles County. This classification difference, along with the relative age of the data sets, accounts for the discrepancies between the acquisition data (Table 3.1.4-18) and the relocation data (Table 3.1.4-19).

Tables 3.1.4-18 and 3.1.4-19 show that the Freeway/Expressway and Freeway/ Tollway alternatives would result in 22 full residential and 255 full nonresidential acquisitions in the common areas of the main alignment compared to 19 full residential and 282 full nonresidential acquisitions for the two HSR alternatives. Additionally, the Freeway/Expressway and Freeway/Tollway alternatives would result in 34 residential and 33 nonresidential relocations in the common areas of the main alignment compared to 36 residential and 20 nonresidential relocations for the two HSR alternatives. However, the actual number of displacees would be higher and would depend on which combination of variations is selected; as can be noted, impacts associated with the variations and the corresponding sections of the main alignment are very similar, with one exception for Variation E (for the HSR alternatives), where the main alignment has 41 relocations (39 residential and 2 nonresidential) compared to 15 relocations (1 residential and 14 nonresidential).

Figure 3.1.4-5 Key Relocation Map to Tables 3.1.4-18 and 3.1.4-19

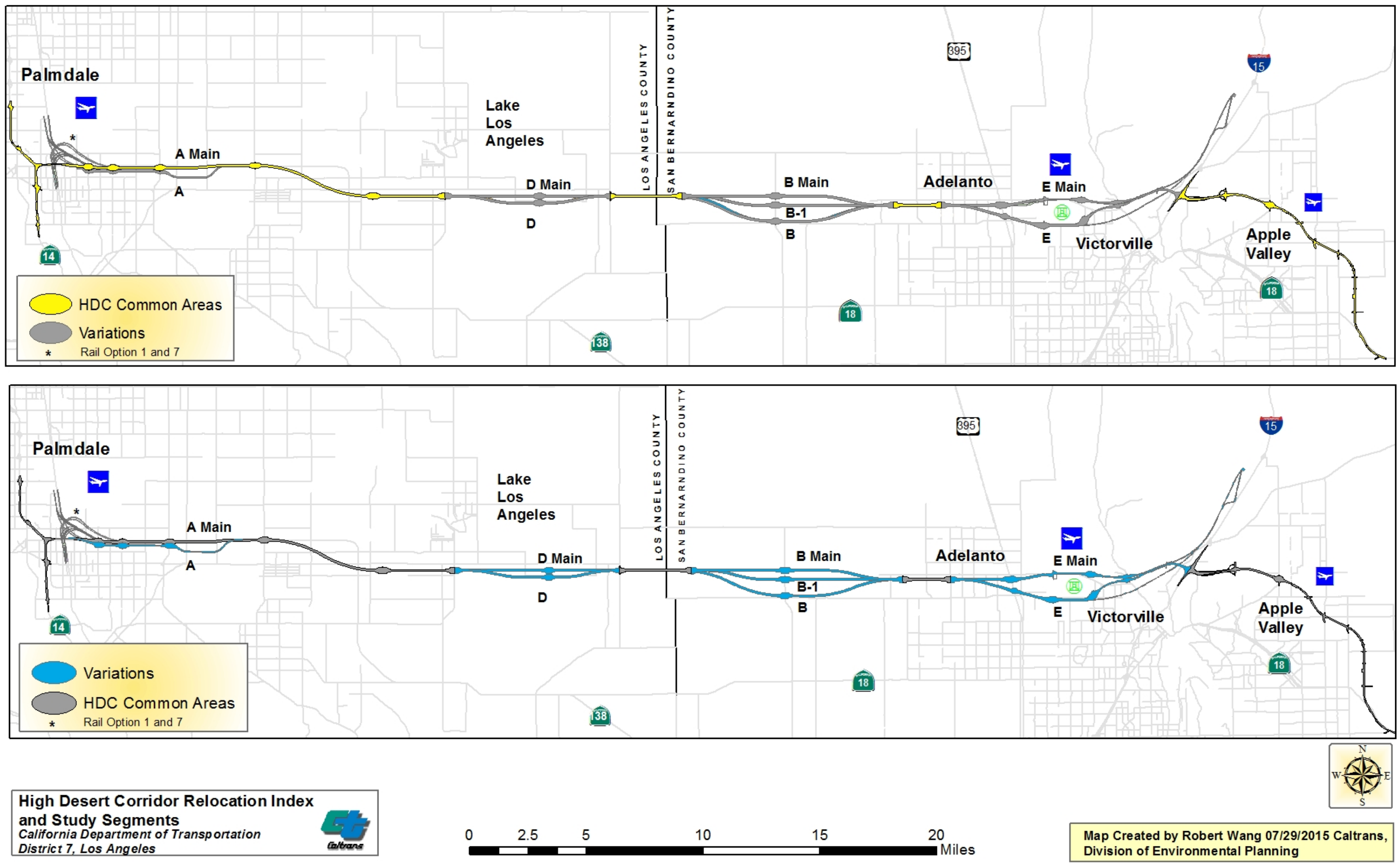


Table 3.1.4-18 Affected Residential and Nonresidential Properties

Alignment/ Variations	Freeway/Expressway & Freeway/Tollway Alternatives			Freeway/Expressway Freeway/Tollway with HSR Alternatives		
	Full Acquisition (Residential)	Full Acquisition (Non-Residential)	Partial Acquisition	Full Acquisition (Residential)	Full Acquisition (Non-Residential)	Partial Acquisition
Main Alignment/Common Areas						
Adelanto	0	38	76	0	47	83
Apple Valley	7	51	339	2	47	255
Unincorporated San Bernardino County	1	28	75	1	28	75
Lake Los Angeles	5	93	304	5	95	298
Palmdale	0	14	140	0	17	152
Unincorporated Los Angeles County	0	18	51	0	31	45
Victorville	9	13	66	11	17	73
Variation A Main Alignment						
Palmdale	0	5	25	n/a	n/a	n/a
Unincorporated Los Angeles County	0	24	44	n/a	n/a	n/a
Variation A*						
Palmdale	0	9	53	n/a	n/a	n/a
Unincorporated Los Angeles County	0	18	33	n/a	n/a	n/a
Variation B Main Alignment						
Adelanto	0	3	2	0	3	2
Unincorporated San Bernardino County	1	27	52	1	28	57
Variation B						
Adelanto	0	3	2	0	3	3
Unincorporated San Bernardino County	0	17	82	0	19	78
Variation B1						
Adelanto	0	3	2	0	3	2
Unincorporated San Bernardino County	0	32	67	0	35	67

Table 3.1.4-18 Affected Residential and Nonresidential Properties

Alignment/ Variations	Freeway/Expressway & Freeway/Tollway Alternatives			Freeway/Expressway Freeway/Tollway with HSR Alternatives		
	Full Acquisition (Residential)	Full Acquisition (Non-Residential)	Partial Acquisition	Full Acquisition (Residential)	Full Acquisition (Non-Residential)	Partial Acquisition
Variation D Main Alignment						
Lake Los Angeles	5	48	187	5	52	189
Variation D						
Lake Los Angeles	5	36	106	5	45	108
Variation E Main Alignment**						
Adelanto	0	32	56	0	40	63
Apple Valley	0	0	1	0	0	35
Victorville	9	11	47	11	17	73
Variation E						
Adelanto	0	31	81	0	42	79
Apple Valley	0	0	1	0	0	34
Victorville	0	22	54	7	36	133
Palmdale Rail Option #1A						
Palmdale	n/a	n/a	n/a	0	14	74
Unincorporated Los Angeles County	n/a	n/a	n/a	0	0	15
Palmdale Rail Option #1B						
Palmdale	n/a	n/a	n/a	0	9	91
Unincorporated Los Angeles County	n/a	n/a	n/a	0	0	15
Palmdale Rail Option #1C						
Palmdale	n/a	n/a	n/a	7	31	127
Unincorporated Los Angeles County	n/a	n/a	n/a	0	0	15

Table 3.1.4-18 Affected Residential and Nonresidential Properties

Alignment/ Variations	Freeway/Expressway & Freeway/Tollway Alternatives			Freeway/Expressway Freeway/Tollway with HSR Alternatives		
	Full Acquisition (Residential)	Full Acquisition (Non-Residential)	Partial Acquisition	Full Acquisition (Residential)	Full Acquisition (Non-Residential)	Partial Acquisition
Palmdale Rail Option #7A						
Palmdale	n/a	n/a	n/a	5	14	73
Unincorporated Los Angeles County	n/a	n/a	n/a	0	0	26
Palmdale Rail Option #7B						
Palmdale	n/a	n/a	n/a	4	1	104
Unincorporated Los Angeles County	n/a	n/a	n/a	0	0	26
Palmdale Rail Option #7C						
Palmdale	n/a	n/a	n/a	12	32	143
Unincorporated Los Angeles County	n/a	n/a	n/a	0	0	18
XpressWest Rail Connection Main Alignment						
Victorville	n/a	n/a	n/a	11	17	73
XpressWest Rail Connection Variation E						
Victorville	n/a	n/a	n/a	7	36	133

* Variation A was not considered a viable option for alternatives with HSR; therefore, no study of affected properties under Variation A was performed.

** There are many abandoned military housing properties in this section of the main alignment. These are not included here because they are unoccupied and would not require tenant relocation.

The acquisition parcel data (Table 3.1.4-18) was obtained from the SCAG Land Use Data Set, 2008. If 70 percent or more of the parcel would be acquired by the project, it was considered a full acquisition. The relocation impact data (Table 3.1.4-19) was obtained using ROW Land Vision Software, which is continuously updated for new information. These two data sets categorized parcels as being located in different municipalities. For example, some parcels were classified as being located in Palmdale in one data set, while in the other data set, the parcel was classified as being located in unincorporated Los Angeles County. This classification difference, along with the relative ages of the data set, account for the discrepancies in the data between Tables 3.1.4-18 and 3.1.4-19.

Please see Appendix I for a list of the parcels proposed for partial and full acquisitions associated with the Preferred Alternative and a map depicting the affected parcels. For a comparison of the preliminary affected property counts, see Draft EIR/EIS Section 3.1.4 and Appendix I.

Source: High Desert Corridor Final Relocation Impact Report, 2015.

Table 3.1.4-19 Residential and Nonresidential Properties Subject to Relocation

Alignment/Variations	Freeway/Expressway & Freeway/Tollway Alternatives		Freeway/Expressway Freeway/Tollway with HSR Alternatives	
	Residential Relocation	Non-residential Relocation	Residential Relocation	Non-residential Relocation
Main Alignment/Common Areas				
Adelanto	0	2	0	2
Apple Valley	11	5	11	5
Unincorporated San Bernardino County	0	4	0	2
Lake Los Angeles	6	4	7	4
Palmdale	17	17	18	6
Unincorporated Los Angeles County	0	0	0	0
Victorville	0	1	0	1
Variation A Main Alignment				
Palmdale	1	8	1	8
Unincorporated Los Angeles County	0	0	0	0
Variation A*				
Palmdale	2	6	n/a	n/a
Unincorporated Los Angeles County	0	0	n/a	n/a
Variation B Main Alignment				
Adelanto	2	0	2	0
Unincorporated San Bernardino County	1	4	1	2
Variation B				
Adelanto	1	0	1	0
Unincorporated San Bernardino County	1	0	0	0
Variation B1				
Adelanto	0	0	0	0
Unincorporated San Bernardino County	0	1	1	0
Variation D Main Alignment				
Lake Los Angeles	1	1	1	1
Variation D				
Lake Los Angeles	1	1	1	1
Variation E Main Alignment**				
Adelanto	0	1	0	1
Apple Valley	0	0	0	0

Table 3.1.4-19 Residential and Nonresidential Properties Subject to Relocation

Alignment/Variations	Freeway/Expressway & Freeway/Tollway Alternatives		Freeway/Expressway Freeway/Tollway with HSR Alternatives	
	Residential Relocation	Non-residential Relocation	Residential Relocation	Non-residential Relocation
Victorville	39	1	39	1
Variation E				
Adelanto	1	9	0	11
Apple Valley	0	0	0	0
Victorville	1	9	0	11
Palmdale Rail Option #1A				
Palmdale	n/a	n/a	1	5
Unincorporated Los Angeles County	n/a	n/a	0	0
Palmdale Rail Option #1B				
Palmdale	n/a	n/a	1	19
Unincorporated Los Angeles County	n/a	n/a	0	0
Palmdale Rail Option #1C				
Palmdale	n/a	n/a	54	34
Unincorporated Los Angeles County	n/a	n/a	0	0
Palmdale Rail Option #7A				
Palmdale	n/a	n/a	1	16
Unincorporated Los Angeles County	n/a	n/a	0	0
Palmdale Rail Option #7B				
Palmdale	n/a	n/a	36	14
Unincorporated Los Angeles County	n/a	n/a	0	0
Palmdale Rail Option #7C				
Palmdale	n/a	n/a	63	35
Unincorporated Los Angeles County	n/a	n/a	0	0
XpressWest Rail Connection Main Alignment				
Victorville	n/a	n/a	0	1
XpressWest Rail Connection Variation E				
Victorville	n/a	n/a	24	2

* Variation A was not considered a viable option for alternatives with HSR; therefore, no study of affected properties under Variation A was performed.

** There are many abandoned military housing properties in this section of the main alignment. These are not included here because they are unoccupied and would not require tenant relocation.

Source: High Desert Corridor Final Relocation Impact Report, 2015.

When comparing the Palmdale rail connection options, Option 1, Variation A and Option 7, Variation A would result in the relocation of the fewest properties (1 residential and 5 nonresidential; 1 residential and 16 nonresidential, respectively). Option 1, Variation C and Option 7, Variation C would require relocation of the most properties (54 residential and 34 nonresidential; 63 residential and 35 nonresidential, respectively). Option 1, Variation B and Option 7, Variation B are in the middle group and would require relocation of 1 residential and 19 nonresidential properties and 36 residential and 14 nonresidential properties, respectively. Likewise, the Variation E rail connection to the XpressWest station would result in substantially more residential displacements than would the connection that follows the main alignment.

Based on the FRIR (2015), there are sufficient residential, commercial, industrial, and agricultural properties available in the replacement area for all properties affected under all of the build alternatives, including variations and rail options. The Last Resort Housing Program (a program established to assist in situations where a displacee cannot be relocated because of lack of available comparable replacement housing) will not be necessary because the residential housing stock in the replacement area is ample; however, should the housing market improve and prices increase, the Last Resort Housing Program would be available to assist any residential displacees unable to afford comparable replacement housing.

Similarly, according to the FRIR (2015), current commercial, industrial, and agricultural real estate markets confirm that most of the nonresidential properties impacted by all alternatives, variations, and rail options would have sufficient replacement property available for lease/purchase and or raw land for development. In addition, most of the nonresidential properties that may be acquired appear to be of the type commonly found in the area and would not be expected to pose extraordinary relocation issues. A few exceptions are noted as follows:

All Build Alternatives

The Palmdale School District

All of the build alternatives would require full acquisition of 3 Palmdale School District properties that house administrative and operational facilities essential to the day-to-day operations for the school district's 22,500 enrolled students. Replacement stock for these 3 facilities is not readily available, and the acquisition of land, architectural design, and construction of new facilities would require a significant outlay of time (estimated at 8 years) and money. Due to the complexity of the property type, temporary facilities may need to be utilized in the interim. Please see Appendix I for a list of the parcels proposed for partial and full acquisitions associated with the Preferred Alternative and a map depicting the affected parcels.

The Boys and Girls Club of Victor Valley (17537 Montezuma Street, Adelanto)

All of the build alternatives would require full acquisition of this 3-acre property. This facility provides year-round and after-school social and recreational programs to disadvantaged youth in the region. It is anticipated that finding a suitable replacement property in a location that serves the target audience may be a challenge.

Variation E

Industrial/Manufacturing Properties in Adelanto

All of the build alternatives that include Variation E have the potential to impact several companies in Adelanto that handle hazardous chemicals (DRIR, 2014). The properties include APN 0459461730000, 0456461740000, and 0459461750000, which are owned and operated by USA Services. APN 0459461340000 and 0459461280000 are owned and operated by the APEX Bulk Transportation Company and produce and/or transport various materials such as waste byproducts, borax, manganese, ore, and limestone. It may be difficult to relocate with challenging zoning and operational requirements.

Palmdale Rail Option 1 (Preferred Alternative)

Under HSR Options 1A, 1B, and 1C, there would be 5, 19, or 34 nonresidential relocations, respectively, which involve various commercial businesses ranging from auto repair to storage facilities and industrial companies. HSR Options 1A and 1B would require relocation of 1 residential property, while Option 1C would involve relocation of 54 residential properties.

Allen Recycling, Lusk Machine Products, and three other industrial properties would be impacted by rail options 1A, 1B, and 1C. The heavy machinery and equipment associated with these facilities would require more time and resources for relocation than a typical commercial property.

Palmdale Rail Option 7

Options 7A, 7B, and 7C would require relocation of 1, 36, or 63 houses, respectively, located along 10^{th} Street East. Most of these housing units are single-family residences, with one multi-unit duplex. In addition, between 14 and 35 nonresidential properties would require relocation, including exclusive nonresidential parcels and government facility parcels.

Partial acquisition of several government facilities would be required for rail options 7A, 7B, and 7C. These include a portion of the parking lot at the Lockheed Martin facility, located on a federally owned parcel at Sierra Highway and Lockheed Way; the Palmdale Transportation Center/Metrolink Station located at Sierra Highway and Technology Drive; a water test center/utility owned by the City of Palmdale, located at the corner of Rancho Vista Boulevard (Avenue P) and 20^{th} Street; and two parking lots owned by the City of Palmdale, located at Sierra Highway and Technology Drive.

Avoidance, Minimization, and/or Mitigation Measures

Avoidance and minimization measures shall include the following:

COM-1: Provide relocation assistance and counseling to displaced persons and businesses in accordance with the Federal Uniform Relocation Assistance and Real Properties Acquisition Polices Act, as amended, to ensure adequate relocation for displaced persons and businesses. All eligible displacees will be provided moving expenses. All benefits and services will be provided equitably to all relocatees without regard to race, color, religion, age, national origins, and disability as specified under Title VI of the Civil Rights Act of 1964.

COM-2: Provide ROW agents who are bilingual or have translators to assist with the diverse population within the area during the relocation process.

COM-3: Assist displaces, to the extent possible, in locating replacement areas that are homogenous to the displacement areas and are comparable in terms of amenities, public utilities, and accessibility to public services, transportation, and shopping.

COM-4: Utilize the Last Resort Housing Program, if necessary, to relocate residential households within the Los Angeles or San Bernardino county area.

COM-5: Establish a designated office to assist displacees during the relocation process.

COM-6: Construct replacement facilities, when possible, before demolishing displaced facilities.

COM-7: As part of the project design, provide landscape and streetscape improvements in the displacement areas and the remaining areas adjacent to the new corridor as project compatibility features following extensive and collaborative community involvement and context-sensitive solution approaches.

COM-8: Give special attention to the three Palmdale School District properties, if acquired, to ensure an effective acquisition and relocation process that minimizes disruption to the school district.

COM-9: Provide additional lead time for the relocation process for the handling of all industrial and manufacturing businesses affected by the project. Lead time will be required to assess the environmental condition of these properties and secure suitable replacement properties.

3.1.4.3 Economic Considerations

Affected Environment

The information presented in this section was obtained from the HDC CIA (2016). All pertinent data can be found in the CIA report.

Employment

For the Antelope Valley Area, the major employment centers are the Antelope Valley Mall, Air Force Plant 42 (AFP-42), and Edwards Air Force Base (EAFB). Together, these centers employ 29,644 employees, or 25 percent of the Antelope Valley Area labor force population. The aerospace industry is represented by Scaled Composites, Boeing, Lockheed Martin, and Northrop Grumman. Two military bases are within the Greater Antelope Valley: the EAFB located north of Lancaster near the border of Kern and Los Angeles counties, and the China Lake Naval Reserve near Ridgecrest Street. EAFB is located within this regional study area and has slightly more than 10,610 employees, of whom 80 percent are civilians. Lancaster and Palmdale also have several business and industrial parks, including Fox Field Industrial Corridor (5,000 acres) in Lancaster and Palmdale Trade & Commerce Center (746 acres) in Palmdale.

For the Victor Valley area, the major employment centers are the SCLA (located on the former GAFB), the Wal-Mart Distribution Center, and Apple Valley Unified School District. There is also a large industrial base in Victor Valley due to the availability and relatively affordable prices of land. SCLA employs 2,073 people, Apple Valley Unified School District employs 1,705 people, and the Wal-Mart Distribution Center employs 1,100 people. Together, these employment centers account for 6 percent of the labor force population.

Based on the report published by California Employment Development Department (EDD) in 2011, the unemployment rate for both areas has increased significantly over the past 4 years, with the largest increase occurring since 2000. The 2010 unemployment rates for both the Antelope Valley area (15.0 percent) and Victor Valley area (13.9 percent) are higher than the State of California’s (12.4 percent). Los Angeles County and San Bernardino County have 2010 unemployment rates of 12.6 and 14.2 percent, respectively. For the Antelope Valley area, the community with the lowest unemployment rate has historically been Acton, with the highest being Lake Los Angeles. For the Victor Valley area, the community of Mountain View Acres has historically had the lowest unemployment rate, with Adelanto having the highest. The California EDD does not have unemployment information at the census tract level, and unemployment rates can only be summarized for the Antelope Valley and Victor Valley areas accordingly.

Per Capita Income

The U.S. Census Bureau derives per capita income by dividing the total income of all people 15 years old and over in a geographic area by the total population in the area, including people less than 15 years of age. Per capita income is typically reported in units of currency per year and is often used as a measurement to determine the wealth of a selected population. The per capita income for the United States in 2000 was $21,893. The 2010 U.S. Census has not yet released per capita income data for the census tracts located in the project study area.

Based on the U.S. Census 2000, the project study area per capita income was $15,501, compared to $16,879 and $16,162 in the Antelope Valley and Victor Valley areas, respectively.

Labor Force Characteristics

2010 U.S. Census information on labor force characteristics has not yet been released for the census tracts located in the project study area. According to the 2000 Census, the Antelope Valley area had a population of 290,406, with a labor force of 119,608 persons, which was approximately 67 percent larger than the Victor Valley area.

Business Activity and Fiscal Conditions

As described in the land use section, a variety of residential, industrial, agricultural, and commercial land uses are found within the project study area. Businesses are primarily concentrated at the west and east ends of the project study area, with few business located in the center portion. In Palmdale, there are several establishments, smaller businesses, and retail shops located within the project study area near the intersections of SR-14/Technology Drive and 30th Street/Avenue Q, and along Palmdale Boulevard. Near the eastern portion of the project study area, most business activity occurs along SR-18 within the city limits of Victorville and Apple Valley. Other major businesses exist around SCLA in Victorville, as well as along US 395 and Air Expressway.

According to the U.S. Census Bureau Economic data for 2007, the highest concentration of business establishments, with the highest sales and employees, is in the area of retail trades for the cities of Lancaster, Palmdale, and Victorville. The highest concentration for Adelanto is in the area of manufacturing. Palmdale has the highest concentration of manufacturing establishments, followed by Victorville. Health care and social assistance employment has its highest concentration in Lancaster, followed by Victorville. Lancaster has by far the highest concentration of wholesale trade.

Property taxes are levied on the assessed value of a privately owned property. Property taxes for the parcels that lie within the boundaries of the affected cities are collected by the County of Los Angeles or the County of San Bernardino, as appropriate, and a percentage is turned back over to the respective city. Of the taxes collected through the property tax system, the public school system receives the largest portion, with the remainder going to local government agencies and special districts.

Based on the projected property taxes for fiscal years 2011-2012 and 2012-2013 of cities and counties within the study area, the property tax dropped in fiscal year 2012-2013 in all of the study area cities and county areas, except in Adelanto and Apple Valley. However, the median home sale price in fiscal year 2009-2010 shifted direction to increase at various rates in all of the cities within the project area except for Lancaster. The trend for home sale prices, as presented in SCAG's profile reports for cities and communities within the study area, shows that prices reached a level that is equivalent to the early 2000s in the fiscal year 2009-2010.

Environmental Consequences

No Build Alternative

The No Build Alternative includes projects that are planned and included in the current Regional Transportation Plan (RTP). These projects consist of improvements of the existing facilities, and most likely will not affect access or cause any change to the regional and local economic conditions because such impacts under the No Build Alternative are not anticipated. Because there would be no project construction, no impacts associated with employment and income, business activities, and fiscal conditions within the project study area would occur. However, in absence of the proposed HDC Project, the east-west transportation linkages would not be enhanced; thus, the economic growth and interregional/intraregional trade and goods movement may not be improved as planned.

Build Alternatives

Freeway/Expressway and Freeway/Tollway Alternatives

These alternatives would improve mobility at the local and regional levels, and provide safer travel conditions. Several new interchanges would be constructed as part of these alternatives. The interchanges would maintain access points of the present roadway system; however, the proposed interchanges would provide improved facilities that enhance mobility and connectivity along the corridor. The improved mobility, connectivity, and safety conditions are expected to have a positive impact on the overall economic conditions at the local and regional levels. Specifically, access between the Los Angeles/Palmdale Regional Airport on one side and SCLA and I-15 in Victorville on the other side would be improved by providing a direct connection between the two areas. The impact is considered beneficial because it would improve mobility and connectivity between the two airport facilities.

Design variations to these alternatives avoid and minimize impacts to various businesses, including the airport facilities and land designated for future airport facility development. The variations also avoid and minimize impacts to farmland and associated businesses. According to the FRIR (2015) prepared for this project, several commercial, industrial, and agricultural establishments would be acquired to provide the needed ROW for construction of the project. The FRIR (2015) indicates that a sufficient number of properties are available for lease, purchase, and development within similar locations in the communities where these businesses are located. These impacted businesses would be provided compensation and relocation assistance as required by law. As a result, it is not anticipated that the relocation of businesses would have negative impacts on the regional economy. Furthermore, the construction-related employment and procurement associated with the project would have a positive incremental gain to the local and regional economy.

For the Freeway/Tollway Alternative, sections of the facility that are outside the city limits of Palmdale and Victorville would operate as a tollway. Details of this operating feature are still being evaluated as part of the ongoing public-private partnership (PPP) analysis. Direct impacts on business development may vary depending on the operational features of the tollway, but variations from the main alignment are not expected to be substantial. It is anticipated that this alternative would have similar impacts on the economy at the local and regional levels as those of the Freeway/Expressway Alternative.

Freeway/Expressway and Freeway/Tollway with HSR Alternatives (Preferred Alternative)

These alternatives include an HSR element with one new rail station in Palmdale. Rail service would contribute further to regional and interregional connectivity. The HSR within the project area would eventually connect the project area with the northern and southern regions of the state, and with Las Vegas and Nevada through the XpressWest. Major transportation centers would be constructed in Palmdale and Victorville to accommodate highway and HSR travel, as well as transit and nonmotorized travel. These alternatives would create opportunities for growth of the local and regional economy through potential jobs created as a result of the increased development and growth that may occur with expanded mobility and connectivity.

Employment and Income

All Build Alternatives

Major employers in the region include several military bases, aerospace industries, logistic airports and distribution centers, and other business and industrial parks. All project alternatives would improve mobility and enhance goods movement, and they would increase the viability of the project area as a base for such economic activities. All of the build alternatives include an element of the freeway/expressway, freeway/tollway, and/or HSR, in which either one of these elements, per the purpose and need of the project, would improve access and connectivity among transportation systems. The HDC Project build alternatives would construct freeway-to-freeway “system” interchanges at I-15 and SR-14; local “service” interchanges at north–south crossings of arterial streets; grade separations (i.e., overcrossings or undercrossings) of local streets having no freeway access; and at-grade, traffic signal-controlled intersections along the expressway portion of the project east of Dale Evans Parkway. The locations of the interchanges, grade separations proposed for initial construction, and at-grade signalized intersections currently proposed as part of the HDC build alternatives are illustrated in Figure 3.1.6-5 in Chapter 2 (Project Alternatives).

Construction of the HDC Freeway/Expressway or Freeway/Tollway, with or without HSR in the median, would potentially sever many primarily north–south running local roads that are planned for future development. Some of these restrictions may temporarily slow development of vacant parcel sites or hamper access to current industrial and other business operations, and hence employment opportunities, but this appears to be unlikely. For the most part, these severed roads are “paper streets,” which appear on tract maps and are located in relatively undeveloped areas between

Palmdale and Victorville. Local roads running parallel to the HDC would provide access to north–south roads identified for interchanges or grade separations. A controlled-access freeway/tollway would have fewer access points with the local roadway network. The HDC would include interchanges to service local access needs that would be located at intervals of 1 to 5 miles between SR-14 in Los Angeles County and approximately 3 miles east of I-15 in San Bernardino County. As roundabouts have become more popular with communities as a context-sensitive solution, Caltrans would reserve the future ROW to design and build roundabouts at many on- and off-ramp interchange locations, including Longview Road/140th Street, 170th Street, 210th Street, 240th Street, Oasis Road, Sheep Creek Road, Caughlin Road, Koala Road, and Choco Road.

If the Freeway/Tollway Alternative were to be implemented, some redistribution of traffic is anticipated to occur, though that traffic would be expected to go on the closest east-west major parallel arterial rather than into more circuitous routes into neighborhoods.

Final designs would be optimized after extensive community involvement with the objective of providing the appropriate access points throughout the freeway/tollway segment, while maintaining the overall integrity of the system. Input from the affected communities will also be used to assist in identifying other specific mitigation measures.

Business Activity and Fiscal Conditions

Freeway/Expressway and Freeway/Tollway Alternatives

The project alignment is located approximately 1 to 2 miles north of Palmdale Boulevard in Palmdale, and SR-18 in Victorville and Apple Valley. Several small businesses, such as restaurants, gas stations, convenience stores, and offices, are located along these two major local roads. There is the potential that a change in traffic patterns as a result of construction of the new facility would affect businesses along these local roadways by reducing their proximity and visibility to users.

Impacts associated with a reduction in passby vehicular traffic can vary according to the type of business involved. A destination business is often unaffected or in some cases even positively affected by reduced through traffic, whereas a convenience or impulse business relies to a greater degree on passby traffic (i.e., drivers stopping at a business on their way to another primary destination); therefore, it may be more adversely affected. For example, according to the Institute of Transportation Engineers, *Trip Generation Handbook*, passby traffic generates, on average, only 36 percent of business activity of a supermarket, while a fast-food restaurant with a drive-up window may derive up to almost half of its business from passby traffic. In contrast, a tire store draws only about 25 percent of its customers from passby traffic. In other words, some purchases are made somewhat on impulse and others are more deliberate; therefore, some types of businesses are more likely to be impacted by changes in proximity and visibility. The potential loss of business from passby drivers who are less likely to patronize a particular establishment because it is no longer as easy a stopping point or is no longer visible cannot be precisely quantified in advance; however, sufficient studies have been conducted to allow for some generalizations.

Businesses that largely cater to nearby residents, such as drug store pharmacies, banks, and grocery stores, are generally not impacted by a diversion of traffic and, in fact, some studies indicate for some such businesses, economic activity may even improve. This would also generally be true of medical services, legal services, and industrial and warehouse operations.

The potential impact is not expected to be substantial because the additional 1 to 2 miles to the businesses from the proposed HDC would not be so great an inconvenience for travelers needing to access various available services. In addition, the project would improve and maintain accessibility to these businesses by the construction of several interchanges that are directly connected to the existing roadway system. Improving traffic circulation and level of service (LOS) on the local roads by providing an alternative route for intra-regional and long-distance travelers, including trucks, would also encourage nearby residents to utilize the local roads for their business trips because of reduced congestion and improved traffic conditions. Additional measures, such as placing informational signs at strategic locations on the new facilities, would encourage nonlocal traffic to utilize local businesses. Such businesses could include hotels/motels, restaurants, gas stations, and convenience stores.

For the Freeway/Tollway Alternative, sections of the facility that are outside the city limits of Palmdale and Victorville would operate as a tollway. Depending on the operation features of the tollway, direct impact on business development of the Freeway/Tollway Alternative may vary slightly. Details of the operating features are still being evaluated as part of the ongoing PPP analysis. Direct impacts on business development may vary depending on the operational features of the tollway, but variations from the main alignment are not expected to be substantial. It is not highly likely that a business enterprise will make a decision on where to place its facilities on the presence or absence of a tollway, nor are most employees likely to eschew an employment opportunity if it meant a tollway was part of the transportation corridor route needed to get to their job.

One effect of instituting a tollway system may be a diversion of passenger car and truck traffic off of the roadway prior to entering the tolled facility and onto the nearby local roadway system to avoid paying tolls. This would have the potential effect of creating more passby traffic for local businesses. A tollway may also impact business access by physically preventing vehicles from getting off (or on) at certain locations because of the need to limit the entrance/exit points of the facility to maintain efficiencies. Research studies sponsored by FHWA have shown the overall levels of retail sales in a community were not significantly affected by introduction of a new transportation corridor, nor did businesses that depend on local customers or repeat customers tend to experience a drop off in economic activity; therefore, it is anticipated that the Freeway/Tollway Alternative would have similar impacts on the economy at the local and regional levels as those of the Freeway/Expressway Alternative.

It is estimated that implementation of the project alternatives would relocate 48 commercial, industrial, nonprofit, and agricultural business establishments. Proposed Variation E to the project alignment, which is located near Victorville, is planned to avoid the Victorville Federal Correctional Facility. This alignment variation would impact 14 business establishments. It is estimated that this project would affect almost 18 percent of agricultural land use in the project area. Other southern variations of this alternative are proposed to avoid impacts to existing businesses, including airports in Palmdale and Victorville and associated land uses, as well as some agricultural business and dairy facilities. Impacts due to partial acquisition that affects business parking and other facilities would be compensated by providing replacement properties adequate for the intended use.

Direct impacts to businesses would be addressed by providing relocation and compensation benefits as required by law. In this alternative, according to the FRIR (2015) prepared for this project, there are sufficient available replacement locations within the city limits for commercial, industrial, and agricultural properties affected by ROW requirements for all of the build alternatives; therefore, no direct loss of business and tax revenue generation to the cities within the project study area cities or Los Angeles and San Bernardino counties would be expected as a result of the project. A *National Business Relocation Study* sponsored by FHWA (2002) found that about 18 percent of business properties in California were not re-established after displacement due to a perceived financial hardship, and another 22 percent of those businesses that were relocated closed within the first 2 years of operation, though the cause was not always clearly established. Relocation impacts, particularly financial impacts, tend to be more of a concern for small family-owned businesses or businesses that cater to a specific clientele within the study area and usually not the larger industrial enterprises such as the ones more likely to be affected by the HDC Project. Therefore, though the FRIR (2015) indicated an adequate supply of comparable commercial and industrial properties is available for lease and purchase in the displacement/replacement area, it concluded it is likely that some percentage of the properties will likely not be contributing to the local tax base following HDC Project implementation.

It is not anticipated that the displacement and relocation of residential properties or businesses under any of the alternatives would have substantial impacts on the local tax base and fiscal conditions for the communities within the project area.

When properties are permanently acquired for new ROW, the property tax base is reduced. The removal of residences and business operations and the acquisition of ROW for the proposed action under any of the build alternatives would result in the loss of property tax revenue for the affected cities and two counties. These are considered minor in the context of overall revenue collection. As every displaced residential property will be accommodated through the RAP and residents will be provided decent, safe and sanitary and comparable housing, it is not anticipated there would be any permanent loss of property taxes to state or local county government revenue from residential displacements. However, though adequate housing stock exists in each community, prospective displacees could move from one city jurisdiction to another.

The fiscal impacts due to full acquisitions of nonresidential properties to Palmdale, Los Angeles County, and the Town of Apple Valley in San Bernardino County would be adverse, but small, based on the relatively minor amounts of full acquisitions of nonresidential properties and the wide distribution of revenue efforts among agencies. Based on the current assessed value of the private properties that would likely be fully acquired under the Freeway/Expressway Alternative, assessed valuations would be reduced by $7.6 million in Palmdale and $350,000 in Apple Valley. These reductions in assessed valuation would result in a total loss of $324,000 in annual combined property tax revenue. These numbers are preliminary, and individual property appraisals will be conducted by the Caltrans ROW team once a preferred alignment is chosen. These are a worst-case scenario, as most properties are expected to be re-established within their respective city or unincorporated county area.

It is anticipated that the proposed variations to the main corridor of the Freeway/Expressway and Freeway/Tollway alternatives would result in some different impacts on businesses and fiscal conditions. Variation A would necessitate acquisition of a salvage yard at 2235 E Avenue in Palmdale. Variation E would involve full acquisitions of five additional industrial properties located in Adelanto: USA Services, Inc., Robertson Ready Mix Co., Apex Bulk Commodities, Holliday Rock Co., and Cal-Silica. Based on the estimated assessed value of the properties, Variation E would reduce assessed valuations by about $3 million and would result in the total loss of approximately $8,000 in tax revenue for Adelanto were these businesses not to be re-established.

Freeway/Expressway and Freeway/Tollway with HSR Alternatives (Preferred Alternative)

Fiscal impacts from the alternatives with HSR would in general be similar to the alternative without HSR as described above, with some additional impacts arising from the proposed rail connection in Palmdale (including Option 1 and Option 7) and Victorville, as discussed below.

Rail Option 1 (Preferred Alternative)

Under HSR Options 1A, 1B, and 1C, there would be 5, 19, or 34 nonresidential relocations, respectively, including various commercial businesses, ranging from auto repair to storage facilities and industrial companies, including Allen Recycling, Lusk Machine Products, and 3 other industrial buildings and structures in Palmdale. Please see Appendix I for a list of the parcels proposed for partial and full acquisitions associated with the Preferred Alternative and a map depicting the affected parcels.

Rail Option 7

Options 7A, 7B, and 7C would involve relocation of 16, 14, and 35 nonresidential properties, respectively. This would include a full ROW acquisition from United Refrigeration in Palmdale and possibly one other industrial parcel.

It is anticipated that the HSR element associated with this alternative, as well as the two new stations in Palmdale and Victorville, would create opportunities for the establishment of additional businesses that would serve users of the two station facilities. These businesses would be developed in addition to the existing businesses and are not anticipated to replace any existing businesses. Rail stations generate substantial traffic and parking demand independent of surrounding land uses because they serve as transportation hubs for the greater region. Research studies sponsored by the Transportation Research Board and American Public Transportation Association, conducted on other major rail infrastructure projects seem to indicate that this project would be a catalyst for additional private development investment and increased economic opportunity and market demand as the areas around station locations become attractive for development. Visitor-serving uses, including facilities for lodging and restaurant establishments, as well as retail and commercial space for shops, are expected to be generated in areas close to new stations. The two station areas in Palmdale and Victorville would have a positive overall effect on property values and tax revenue.

Common to All Alternatives

All of the build alternatives (main alignment, common area) would also affect sales tax revenues received by the City of Palmdale and Los Angeles County, although these effects are expected to be negligible and most of the nonresidential parcels that would be affected by the HDC Project are not involved in direct (taxable) sales. The proposed improvements in the main alignment would require the relocation of three commercial properties in Palmdale: a fast food restaurant, a florist shop, and a bingo supply wholesaler. Of the three properties, only the fast food restaurant (Original Tommy's Hamburgers) in Palmdale would appear to generate substantial sales tax revenue from direct sales of goods and services. Based on average sales by limited-service eating places as reported in the 2012 U.S. Economic Census, the sales tax lost to the City of Palmdale through the displacement of this business would probably not exceed $12,000. In addition, the florist shop likely does not contribute more than $2,500 in sales tax. It is not known how much the bingo supplier is likely to contribute in local sales tax. A propane supplier in the Town of Apple Valley also likely contributes less than $10,000 in local sales tax.

As a result, though the tax rolls would see a reduction, and in certain jurisdictions as discussed above, there would be some further revenues lost to jurisdictions due to sales tax loss, the total amount of anticipated combined assessed value loss associated with any of the build alternatives would be imperceptible on local government revenues.

Improving mobility and accessibility, however, would advance conditions for growth of existing businesses and foster the establishment of new businesses by allowing greater access to such establishments, which would in turn improve the tax base and overall fiscal conditions. In addition, it is anticipated that overall property values would be increased as a result of the improved economic conditions in general, but specifically the increase would occur within the economic sphere of influence or in close proximity of the proposed interchanges. The sphere of influence is considered to be within 2 miles for commercial developments and 5 miles for residential developments (see Section 3.1.2, Growth). It is anticipated that by improving mobility and overall regional economic viability of the region, overall impacts on businesses and fiscal conditions in the area would be positive as a result of this alternative.

Avoidance, Minimization, and/or Mitigation Measures

The following measures would be implemented to minimize economic related impacts:

COM-10: Compensation for the loss of vacant land from the Westwinds Golf Course property will be made through the Caltrans right of way acquisition process before project construction. Prior to construction, coordination with the City of Victorville and utility companies will commence to resolve any utility conflicts within the area. This measure is applicable to all build alternatives except alternatives with Variation E.**COM-11**Prepare a staging plan that will ensure that access to homes, businesses and parking, is available at all times and with minimal disruption of traffic flow and increase in delays.

COM-12: Design a public education campaign through which the public is well advised of construction plans that may have impacts on traffic.

COM-13: Coordinate with the affected utility companies to ensure that services to homes, community facilities, and businesses are not interrupted.

COM-14: Prepare a Comprehensive Traffic Management Plan (TMP) to minimize traffic inconveniencies due to construction activities. (Refer to CI-T-1 to CI-T-2 in Section 3.6, Construction Impact, Traffic and Transportation/Pedestrian and Bicycle Facilities)

COM-15: Conform to all Caltrans construction required measures for dust control and air pollution control. (Refer to CI-AQ-1 to CI-AQ-3 in Section 3.6, Construction Impacts, Air Quality.)

COM-16: Implement sound-control measures to minimize noise impacts during construction. (Refer to CI-NOI-1 to CI-NOI-4 in Section 3.6, Construction Impacts, Noise.)

COM-17: Provide business information signage at appropriate locations on the new facility, if necessary.

In addition, the following measure previously listed is also applicable.

COM-1: Provide relocation assistance and counseling to displaced persons and businesses in accordance with the Federal Uniform Relocation Assistance and Real Properties Acquisition Polices Act, as amended, to ensure adequate relocation for displaced persons and businesses. All eligible displacees will be provided moving expenses. All benefits and services will be provided equitably to all relocatees without regard to race, color, religion, age, national origins, and disability as specified under Title VI of the Civil Rights Act of 1964.

3.1.4.4 Environmental Justice

Regulatory Setting

All projects involving a federal action (funding, permit, or land) must comply with Executive Order (EO) 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, signed by President William J. Clinton on February 11, 1994. This EO directs federal agencies to take the appropriate and necessary steps to identify and address disproportionately high and adverse effects of federal projects on the health or environment of minority and low-income populations to the greatest extent practicable and permitted by law. Low income is defined based on the Department of Health and Human Services poverty guidelines. For 2012, this was $23,050 for a family of four.

All considerations under Title VI of the Civil Rights Act of 1964 and related statutes have also been included in this project. Caltrans' commitment to upholding the mandates of Title VI is evidenced by its Title VI Policy Statement, signed by the Director, which can be found in Appendix C of this document.

Affected Environment

An analysis of environmental justice was included in the HDC CIA (2016). The HDC CIA determined the presence of low-income and minority populations through the use of U.S. Census of Population and Housing data, and through field observations. Demographic data was obtained for the various block groups within the study area. Census data for the block groups were compared to the local city and countywide demographics to help determine where disproportionate impacts on low-income and minority residents may occur. Minority individuals, as defined by the Council on Environmental Quality (CEQ), include members of the following population groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black; or Hispanic.

Palmdale, Unincorporated Los Angeles County, Adelanto, Victorville, and Apple Valley Minority Populations

Table 3.1.4-20 summarizes the combined percentages of minority populations within the study area and communities compared to their respective city and county (see additional tables with demographic composition breakdowns in Section 3.1.4.1). Based on the table, a high percentage of minority populations exist within the study area; however, in comparison to the overall local city demographics and dual countywide data for minority populations, the share of minorities within the study area is fairly representative of the overall counties and cities, and the differences in percentage numbers are not substantively different, with the exception of Palmdale, where there is a higher percentage of minorities compared to the other local jurisdictions and the overall county averages. Data on the exact location of minority populations is not provided by the U.S. Census Bureau or collected by any local jurisdictions in the study area at a scale in which parcels can be specifically identified.

Table 3.1.4-20 Summary of Minority Population Demographics

Location	Total Minority Population		
	Study Area	City/Town	Los Angeles County
Palmdale	77%	74%	71%
Unincorporated Los Angeles County	69%	N/A	71%
	Victor Valley Study Area	City/Town	San Bernardino County
Adelanto	61%	80%	64%
Victorville	61%	68%	64%
Apple Valley	61%	41%	64%

Source: High Desert Corridor Community Impact Assessment, 2016.

Palmdale, Unincorporated Los Angeles County, Adelanto, Victorville, and Apple Valley Low-Income Populations

Table 3.1.4-21 summarizes the percentage of low-income populations within the study area and communities compared to their respective city and county (see additional tables with breakdowns by income level in Section 3.1.4.1). As seen in the table below, the levels of low-income populations within the study area were consistently greater in comparison to the overall counties and cities, with the exception of Adelanto. Adelanto was the only jurisdiction in which the project study area located within Adelanto displayed a lower percentage of low-income populations in comparison to the overall city.

Table 3.1.4-21 Total Low-Income/Poverty Status Population Demographics

Location	Low-Income Status Population		
	Study Area	City/Town	Los Angeles County
Palmdale	29%	19%	18%
Unincorporated Los Angeles County	25%	N/A	18%
	Victor Valley Study Area	City/Town	San Bernardino County
Adelanto	22%	26%	15%
Victorville	22%	19%	15%
Apple Valley	22%	18%	15%

Source: High Desert Corridor Community Impact Assessment, 2016.

Environmental Consequences

As detailed in the description of the affected environment, the percentages of minority populations in the study area largely mirror that of the larger county areas. The discussion of environmental justice consequences that follows has been prepared in accordance with the applicable guidance for addressing environmental justice, including U.S. DOT EO 5610.2 (USDOT 1997; 2012), FHWA Order 6640.23 (FHWA 1998), FHWA Western Resource Center Interim Guidance (1999), and the Caltrans Environmental Handbook Volume 4 (Community Impact Assessment). Consistent with this guidance, this analysis determines if any disproportionately high and adverse effects from any of the HDC alternatives would be predominantly borne by a minority or low-income populations, or would be appreciably more severe or greater in magnitude to minority or low-income populations compared to the effects on nonminority or non-low-income populations.

The analysis below examines the ways in which impacts associated with the various alternatives, including the No Build Alternative, may affect minority and low-income populations, and a determination is then made whether any alternative results in disproportionately high and adverse effects.

No Build Alternative

Given the absence of new transportation infrastructure, certain impacts would be less substantial than the effects described below for the build alternatives; however, certain adverse effects on minority or low-income populations in the study area would arise as a result of transportation needs left unmet by the No Build Alternative. These effects would include direct impacts and indirect effects that are typically caused by traffic congestion and impaired mobility, longer travel times on local roadways, and increased air pollution and noise. The economic benefits associated with implementation of the HDC would also not be realized. Because these effects would not be concentrated in any particular location, minority and low-income and nonminority and non-low-income populations would be affected. Therefore, impacts associated with the No Build Alternative would not be predominantly borne by a minority or low-income population, nor would these impacts be appreciably more severe or greater in magnitude than those experienced by nonminority or non-low-income populations.

Build Alternatives

Although minority populations exist within the project area, the overall percentage of total minority populations within the greater Los Angeles and San Bernardino counties in comparison to the percentage of total minority populations within the communities located within the project area is similar. Based on the analysis contained in the various chapters within this EIR/EIS, each of the HDC Build Alternatives would impact some members of minority and low-income population groups, as they would nonenvironmental justice populations, resulting from displacements/relocations, air quality violations of particulate matter less than 10 microns in diameter (PM_{10}), noise impacts, and changes in visual/aesthetics.

Because the demographics are similar to the county averages, the HDC Project is not expected to disproportionately affect a particular high minority population.

Table 3.1.4-21 shows low-income/poverty status populations exist within the project area, and when compared to the respective county averages, the project area generally exhibits a higher percentage.

Measures to assist low-income/poverty status populations that may potentially be affected by the proposed project are listed under the *Avoidance, Minimization, and/or Mitigation Measures* section.

Although the effects of the project would occur in an area having a population that is largely minority and low income, these effects cannot reasonably be considered disproportionately high and adverse under the circumstances. Noise, visual, and air quality impacts associated with the various build alternatives would affect area residents along the entire 63-mile corridor length, not solely the areas with minority and low-income populations. Because these impacts would be distributed similarly throughout the corridor, impacts would not fall disproportionately on low-income and minority populations. All Census block groups in the project study area, except 9102.01, 9101.01, 9100.01, 9800.04, 9105.02, and 9106.01, are composed of substantial portions of minority and low-income populations; however, only a relatively small linear portion of the proposed HDC Project would actually be located within the direct impact area, and most of the residents within the Census block groups through which the project would traverse are not likely to be affected by the proposed HDC Project. Due to the small population within each block group (9102.01, 9101.01, 9100.01, 9800.04, 9105.02, and 9106.01), encompassed within a rather large geographical size, and often one that is rural in character, the minority and low-income populations are not highly concentrated in a central location but are dispersed throughout the area of the Census block groups.

With the exception of those properties that may require relocation (a list of all the properties potentially displaced appears in Appendix I), most of the residences dispersed throughout these large block groups are located far from the proposed HDC Project alignments and would not be affected any more so than the other community members. As indicated in Section 3.1.4.2, Relocations and Acquisitions, the difference between the HDC Freeway/Expressway and Freeway/Tollway alternatives with variations is narrow. Effects on neighborhood integrity and community cohesion would be generally similar for the community populations.

As it would for other community members who are not members of the minority or low-income population groups, the HDC Project build alternatives would also provide benefits for the minority and low-income populations within the study area. Goals of the project are to improve travel safety and reliability in the High Desert region, improve traffic operations, and provide improved access and connectivity to regional transportation facilities, including airports and future passenger rail systems. These benefits would be shared among all of the study area populations.

Freeway/Expressway Alternative

Under this alternative, impacts to minority and low-income/poverty status populations would be minimal. As discussed above, the demographics of minority and low-income populations in the area in comparison to the two counties are similar. In Palmdale, most of the full-property residential displacements that are anticipated are located on Calle Street/10th Street East. Outside the city limits, houses on Palmdale Boulevard, 170th Street East, and East Avenue Q12 would also be acquired under any of the alternatives. Most of the other potential full single-family residential acquisitions occurring in a concentrated neighborhood area would occur in the Town of Apple Valley on Waalew Road and Cuyama Road. The neighborhoods from which ROW acquisitions would occur consist of minority/low-income and nonminority/non-low-income populations. Impacts would not result in a deterioration of the overall neighborhood. Most of the other potential displacements for the Freeway/Expressway Alternative, however, are widely distributed and located in unincorporated areas on semirural parcels and individual streets that are not part of any established neighborhoods (see Appendix I for a table of the affected properties subject to relocation).

The proposed improvements would require the relocation of three commercial properties in Palmdale, a fast food restaurant, a florist shop, and a bingo supply wholesaler. There are also several nonprofit properties slated for full ROW acquisition, with the FRIR indicating these provide services that include media services, equipment storage, a warehouse, and a fuel pumping station. Industrial and manufacturing parcels contain warehouses and garages. None of these enterprises were specifically identified as being minority owned by the Caltrans FRIR (2015), nor is there evidence to suggest that these businesses have any particular connection to a minority community or provide employment, goods, and/or services uniquely important to a particular minority population group. However, the Boys and Girls Club of Victor Valley, situated on a 3-acre parcel in Adelanto (as discussed in Section 3.1.4.2) would be acquired under this and all of the project build alternatives, and because it primarily serves the needs of the area's youth of minority populations and low-income households, it should be considered a significant community resource. According to the FRIR, adequate replacement properties are available for all relocations under each of the alternatives.

The effects of increased noise and changes in visual character are not confined to limited areas but rather dispersed over the length of the project and are not in themselves expected to affect the overall character of the environmental justice areas. The project's Noise Study (see Section 3.2.7) indicated that, other than for single-family residences, a church (Unity Church of Antelope Valley) and a school (Palmdale Learning Plaza School), both located in Palmdale, were sensitive receptors and would be eligible for sound abatement in terms of construction of soundwalls. Based on available online research, while the church does not appear to serve a predominantly minority population among its constituent members, the school, with an interdisciplinary, multicultural approach to learning, does appear to have a student body that reflects the largely diverse local demographic base.

Each build alternative was analyzed to assess the degree of potential project effects to existing visual features. In many areas, construction of the HDC Project would occur within existing road ROWs or on rural parcels and would have minimal to moderate effects on current viewer experiences. In some instances, because of construction of soundwalls, bridges, grade separations, and other structures, or the location of the facility into open or rural adjacent areas that create a more urban experience, some people would experience a higher degree of visual effect or aesthetic impact as certain open views of landscape vistas would be blocked or diminished. These impacts would be distributed along the length of the corridor and, as a result, would not be experienced disproportionately among low-income or minority populations. The visual analysis concluded that the introduction of retaining walls, soundwall barriers, and new bridges would have a moderate visual effect on residents living adjacent to the corridor, which statistically include a large percentage of minority and/or low-income household populations. Retaining walls and noise barriers would shield residences from the transportation facility, lessening its visual impacts. Further discussion of visual/aesthetic resources is provided in Section 3.1.7, Visual/Aesthetics.

Mitigation measures have been developed to reduce impacts identified above; however, alternatives that would completely avoid or completely eliminate adverse effects on the low-income and minority populations are not likely practicable as it is not possible to route either the Freeway/Expressway or the Freeway/Tollway alternative completely around these populations because the demographics in the project area are similar to the county averages, and other people meeting a similar demographic profile would likely experience the project impacts. That is, for the project to meet the purpose, the transportation system must provide effective and efficient east-west movement between Palmdale and Victorville/Apple Valley. In looking at the U.S. Census data, it becomes apparent that it is not possible to find census tracts that do not contain large percentages of minority and low-income populations because the entire area is comprised of people who meet the definition of environmental justice populations. In addition, impacts would be distributed along the length of the corridor and, as a result, would not be experienced disproportionately among low-income or minority populations.

Freeway/Tollway Alternative

With the exception of potential economic impacts on low-income households, the Freeway/Tollway Alternative would have the same effects as that of the Freeway/Expressway Alternative discussed above because of the same physical project footprint upon which it would be built.

Impacts would be distributed along the entire length of the transportation corridor; therefore, impacts would not fall disproportionately on minority populations. However, the one distinction this alternative has compared to the Freeway/ Expressway Alternative is that the low-income/poverty status populations in the area may be impacted by an increased financial burden as a result of the tolling option that would be implemented under these alternatives.

Because a fare must be paid to utilize the tollway, financial access to a tolling facility is an issue that often emerges when such options are considered. To use the new tolled express lanes, tollway users would be required to pay for their travel. The segment in which tolling is being considered for implementation is located between 90th Street East in Palmdale and US 395 in Adelanto. The extent to which the tollway would affect low-income populations would vary depending on the final toll rate, which would change based on the congestion level at different times. As a result, these alternatives may affect low-income populations. By requiring a toll to utilize the facility, low-income/poverty status populations would be less able to afford the toll required and may need to utilize local arterial roads when commuting between Antelope Valley and Victor Valley. However, not only because travel options would continue to exist, but by absorbing some percentage of the traffic onto the new toll facility, those same people using the existing local road system would benefit from having less congestion on these general purpose roads than would be so without a toll facility.

Currently, there is no generally accepted understanding of the effects of tolling on transportation equity, and methodologies to measure such effects are not well established. Studies conducted on tolling in California showed that economically disadvantaged drivers use toll lanes voluntarily and are not necessarily excluded, although more frequent use is often exhibited by higher-income drivers. The studies revealed that low-income drivers approved of the express toll concepts, similar to opinions of higher-income households. Case studies on two toll facilities – I-680 in the San Francisco Bay Area and SR-91 in southern California – revealed no substantive differences of opinion on tolling among members of the public based on their ethnic or income breakdown, nor was equity a critical issue identified by stakeholder focus groups or in surveys conducted for either tolling project. Most users, even those from higher-income households, choose the express lanes judiciously when they need to benefit most from bypassing reduced congestion. Legislation enables the Los Angeles County Metropolitan Transportation Authority (Metro) and Caltrans to work together and in cooperation with a PPP to determine tolling programs. An Equity Assessment Analysis will be conducted during the design phase, and options for alternative purchasing of tolling transponders and other creative solutions will be considered prior to inauguration and construction of the tollway. Public involvement will be a cornerstone to future decision making concerning pricing. Therefore, impacts to minority populations would be minimal after avoidance and minimization measures are taken into account under this build alternative.

Freeway/Expressway with HSR Alternative

In addition to the impacts to environmental justice and low-income populations noted with the Freeway/Expressway Alternative, this alternative, with the inclusion of the HSR feeder service, would result in greater impacts to minority populations under Rail Connection Option 7 because the total number of full acquisition of residential properties is higher. A tract of 20 to 73 residential houses within Palmdale would be displaced as a result of the proposed HSR alignment. While the U.S. Census does not allow a direct correlation of specific demographic or income data to be tied to any specific households or physical property addresses, given the percentage of minorities within the community, there is a high probability that approximately 15 of these 20 houses are the residences of members of minority population groups, particularly likely of Hispanic background. None of the rail options (1A, 1B, 1C or 7A, 7B, 7C) would cause an "island effect" for the residences located along 10th Street East in Palmdale or anywhere along the proposed corridor because the rail connection would use either a tunnel or an aerial structure configuration. In addition, neither 10th Street East nor Avenue Q would be closed or obstructed. Although conveniently located to transportation facilities, it is not likely that all residents would consider the noise, ROW fencing, and other activities associated with the HSR operational traffic to be of mutual benefit. On the positive side, property that becomes more accessible to the HSR alignment may increase the property's economic value.

Whereas Rail Connection Option 7 (A, B, and C) would have greater impacts on residential properties in terms of residential displacements, Rail Connection Option 1 (A, B, and C) would entail a greater impact on nonresidential industrial and manufacturing properties both in sheer number and size, but these would not be expected to have a similar impact on environmental justice population groups. Though employee composition details are not known, it is probable, however, that several of the industries that would be displaced also employ members of minority population groups.

Freeway/Tollway with HSR Alternative (Preferred Alternative)

Under this alternative for the HSR, as it is with the Freeway/Expressway Alternative described above, under Rail Connection Option 7, a considerably higher percentage of minority populations would likely be affected within Palmdale as a result of the 20 to 73 residential relocations for the proposed HSR alignment. This alternative would also affect low-income populations as a result of the proposed tollway facility.

Outreach to Minority and Low-income Populations

EO 12898 requires federal agencies to ensure effective public participation and access to information. Consequently, a key component of compliance with EO 12898 is outreach to the potentially affected minority and/or low-income population to discover issues of importance that may not otherwise be apparent. As Chapter 5 provides in detail, a concerted effort by Caltrans and Metro to conduct community outreach on the HDC Project was made to all population segments, which included the use of bilingual direct mail. Public meeting notices, in both English and Spanish, were posted at all of the public library kiosks in the project area. Scoping notices were also published in six local newspapers, including the region's major Spanish-language newspaper, *La Opinion*. In addition to the legally required scoping and public hearing meetings required as part of CEQA and NEPA, in which a Spanish-language interpreter was present, all informational handouts available at the meetings were provided in English and Spanish, and at some meetings, Korean. In addition, public information meetings/open houses were also held during preparation of the environmental documents. The community meetings were spread out geographically to make it convenient for stakeholders along the linear project study area to participate.

Avoidance, Minimization, and/or Mitigation Measures

Based on the above discussion and analysis, the Freeway/Expressway Alternative and the Freeway/Tollway Alternative with variations or with the HSR Rail Connection Options 1 or 7 will not cause disproportionately high and adverse effects on any minority or low-income populations as per EO 12898 regarding environmental justice.

Although the project would not cause disproportionately high and adverse effects on any minority or low-income populations, the following measures and other measures proposed elsewhere in this environmental document would minimize impacts on all of the local communities, including low-income and minority neighborhoods.

COM-18: Involve low-income and minority status populations, through public outreach efforts, throughout the various phases of the project to address their concerns and needs.

COM-19: An Equity Assessment Analysis will be conducted during final design. Depending on assessment results, implementation of an Equity Program to alleviate cost burdens on low-income commuters on the facility will be considered. Low-income poverty status populations will be considered in decisions concerning toll pricing options.

COM-20: Incorporate community enhancement features such as landscaping and pedestrian amenities during the final design to minimize impacts and add benefits for low-income populations.

COM-21: Collaborate with communities and local jurisdictions on aesthetics of the project facilities in order to minimize impacts to residential areas.

COM-22: During the relocation period, the Boys and Girls Club of Victor Valley will, if feasible, be allowed to continue to operate temporarily at their present location after acquisition by the State, under a lease agreement with the State. This would allow for continued operation until such time as a replacement site is located or until the property is actually required for construction of the HDC Project.

3.1.5 Utilities/Emergency Services

This section addresses potential impacts to public utilities and emergency services that would result from construction of the High Desert Corridor (HDC) Project. Short-term construction impacts to public utilities and emergency services are addressed in Section 3.6.

Regulatory Setting

California Code of Regulations Streets and Highways Code Sections 700-711 discuss utility relocation policies and procedures. Public Resources Code (PRC) 21083, 21087, and California Environmental Quality Act (CEQA) Guidelines Section 15126.2(a) require lead agencies to assess the impact of a proposed project by examining alterations in the human use of land, including public services. Compliance with California Public Utilities Commission (CPUC) General Order (GO) 131-D is required if power lines or substations operating at 50-kilovolt (kV) or higher are to be relocated.

Affected Environment

This section was based, in part, on the HDC Project Community Impact Assessment (CIA, April 2016), on data collected by the project consultants, and on information provided by local public agencies.

For purposes of discussion, the study area is broken down into the project areas within Los Angeles and San Bernardino counties.

Los Angeles County

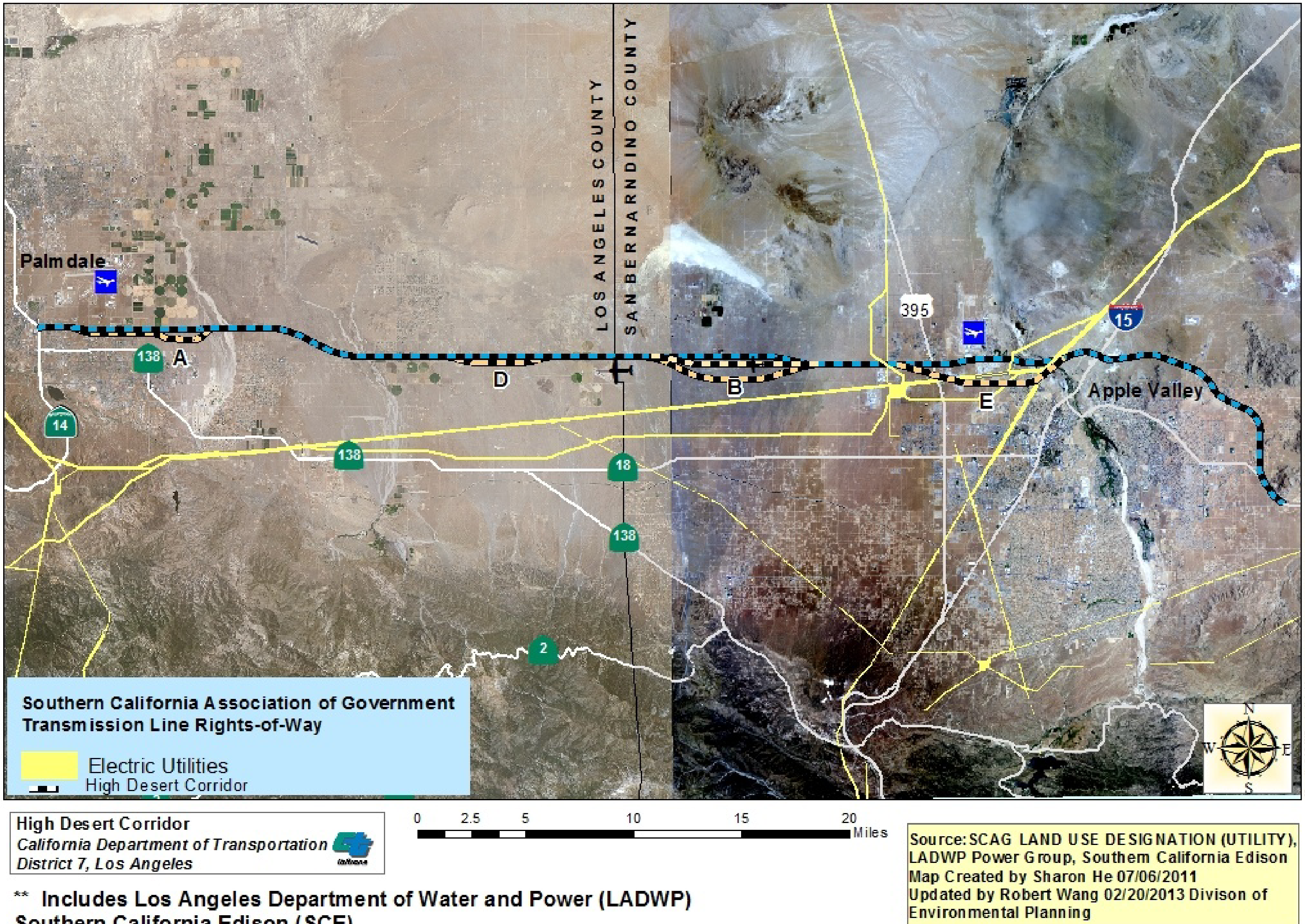
Public and Private Utilities

Public utilities include electrical power, natural gas, telephone service, cable television services, and communication services. Electricity is provided by Southern California Edison (SCE) to the Los Angeles County portion of the project area (refer to Figure 3.1.5-1). The Southern California Gas Company provides gas service to Palmdale and the surrounding communities (refer to Figure 3.1.5-2). Telephone services are provided by AT&T. Time Warner Cable provides services to Lancaster and Palmdale and the unincorporated areas of Lake Los Angeles and Sun Village. The Palmdale Water District and the Littlerock Creek Irrigation District provide water in the area.

Sewer service to Palmdale is provided by the Los Angeles County Sanitation District Number 20 (refer to Figure 3.1.5-3). Water treatment is provided by the Palmdale Water District treatment plant. Six disposal companies that use the Antelope Valley Landfill for solid waste disposal serve the City of Palmdale

Table 3.1.5-1 lists utility providers whose facilities either cross the project corridor or are within the Los Angeles County portion of the study area.

Figure 3.1.5-1 Power Transmission Lines along the High Desert Corridor



** Includes Los Angeles Department of Water and Power (LADWP)
Southern California Edison (SCE)
Intermountain Power Agency

Figure 3.1.5-2 Natural Gas Lines in the Los Angeles County Portion of the High Desert Corridor

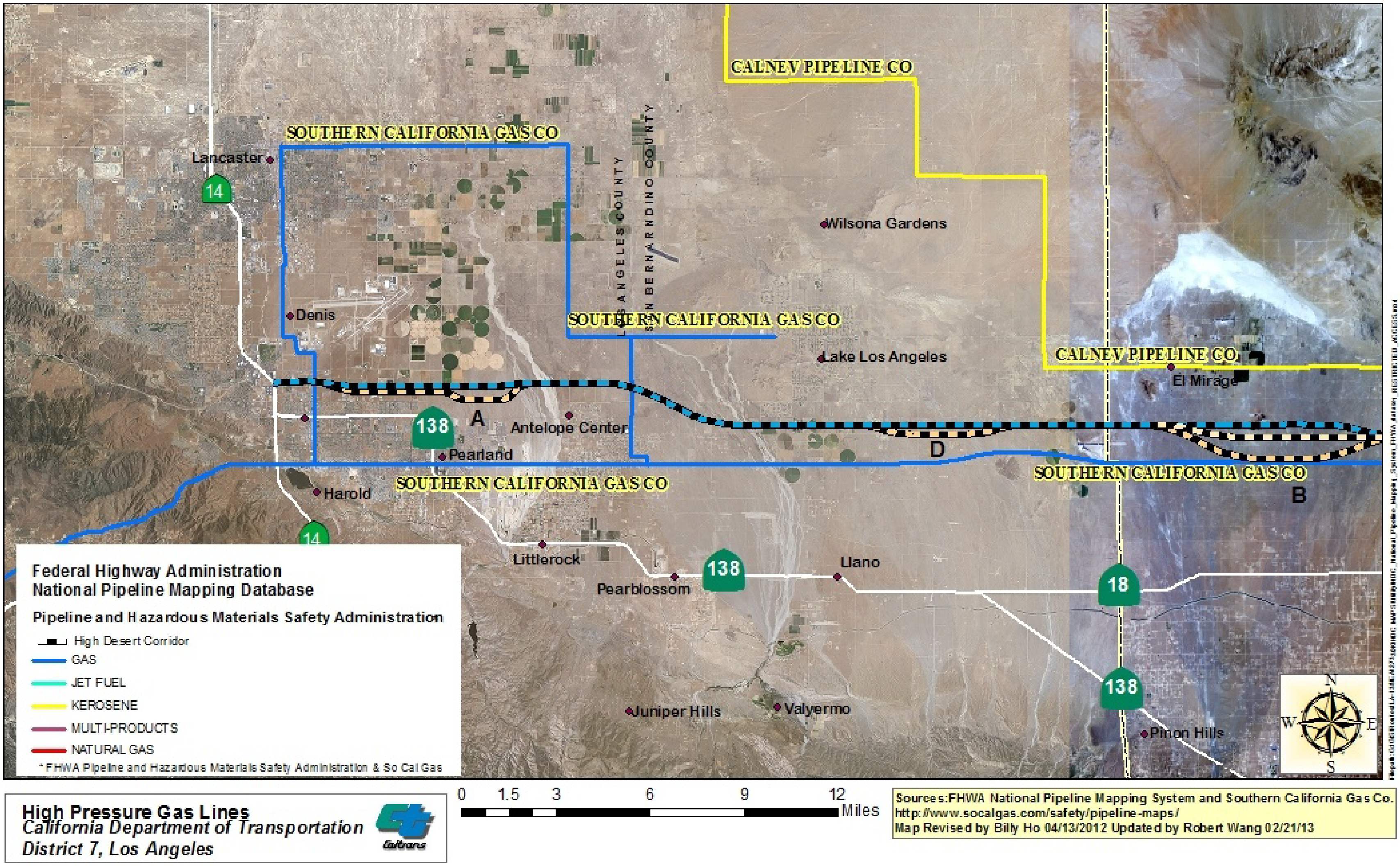


Figure 3.1.5-3 Sewer Lines in the Los Angeles County Portion of the High Desert Corridor

Source: Los Angeles County Sanitation District

Table 3.1.5-1 Utilities within Los Angeles County Portion of the High Desert Corridor

Utility Company	Category	Utility Description
Antelope Valley East Kern County	Water	24-inch Water Line
AT&T	Telephone	Telephone/Telecommunications Line
Los Angeles County Sanitation District 20 and City of Palmdale	Sewer	8-inch Sewer Line, 39-inch Sewer Line, 33-inch Sewer Line
Los Angeles County Sanitation District 20 and City of Palmdale	Sewer	15- and 18-inch Sewer Lines
Level 3 Communications	Communications/Internet	6-2" HDPE Conduits/Fiber-Optic Line
Palmdale Water District	Water	12-inch Water Line
SCE	Electricity	Overhead Power Lines (approximately 66 kV to 500 kV)
Southern California Gas Company	Gas	4- and 6-inch Gas Lines
Sprint	Telephone	Fiber-Optic Line
Time Warner Cable	Cable	Cable

Source: Appendix J, Utility Conflict Matrix.

Fire Protection and Emergency Services

Hospital service is provided by Palmdale Hospital Medical Center, which provides 24-hour emergency service. The Los Angeles County Fire Department provides fire protection services for the project area from five fire stations.

- Headquarters, Station Number 24 located in Palmdale at 1050 West Avenue P
- Station Number 37 located in Palmdale at 38318 9th Street East
- Station Number 131 located in Palmdale at 2629 East Avenue S
- Station Number 93 located in Palmdale at 5624 East Avenue R
- Station Number 92 located in Littlerock at 8905 East Avenue U

Figure 3.1.5-4 shows the locations of fire protection, emergency, and police protection services. Figure 3.1.5-5 shows the location of fire hydrants in the Los Angeles County portion of the project area.

Police Protection Services

Police protection is provided by the Los Angeles County Sheriff’s Department, with additional services provided by the California Highway Patrol (CHP). The CHP provides traffic enforcement for the unincorporated area and will provide emergency assistance with respect to general law enforcement when necessary. The closest police station to the project area is the Los Angeles County Sheriff’s Station located at 750 East Avenue Q, near the intersection of Sierra Highway and Avenue Q, approximately 1 mile south of the HDC. The CHP Antelope Valley Office is located approximately 12 miles north of the project at 2041 West Avenue I in Lancaster. Refer to Figure 3.1.5-4 for locations of police protection facilities.

Figure 3.1.5-4 Fire Protection, Emergency, and Police Protection Services Locations in Los Angeles County Portion of the High Desert Corridor

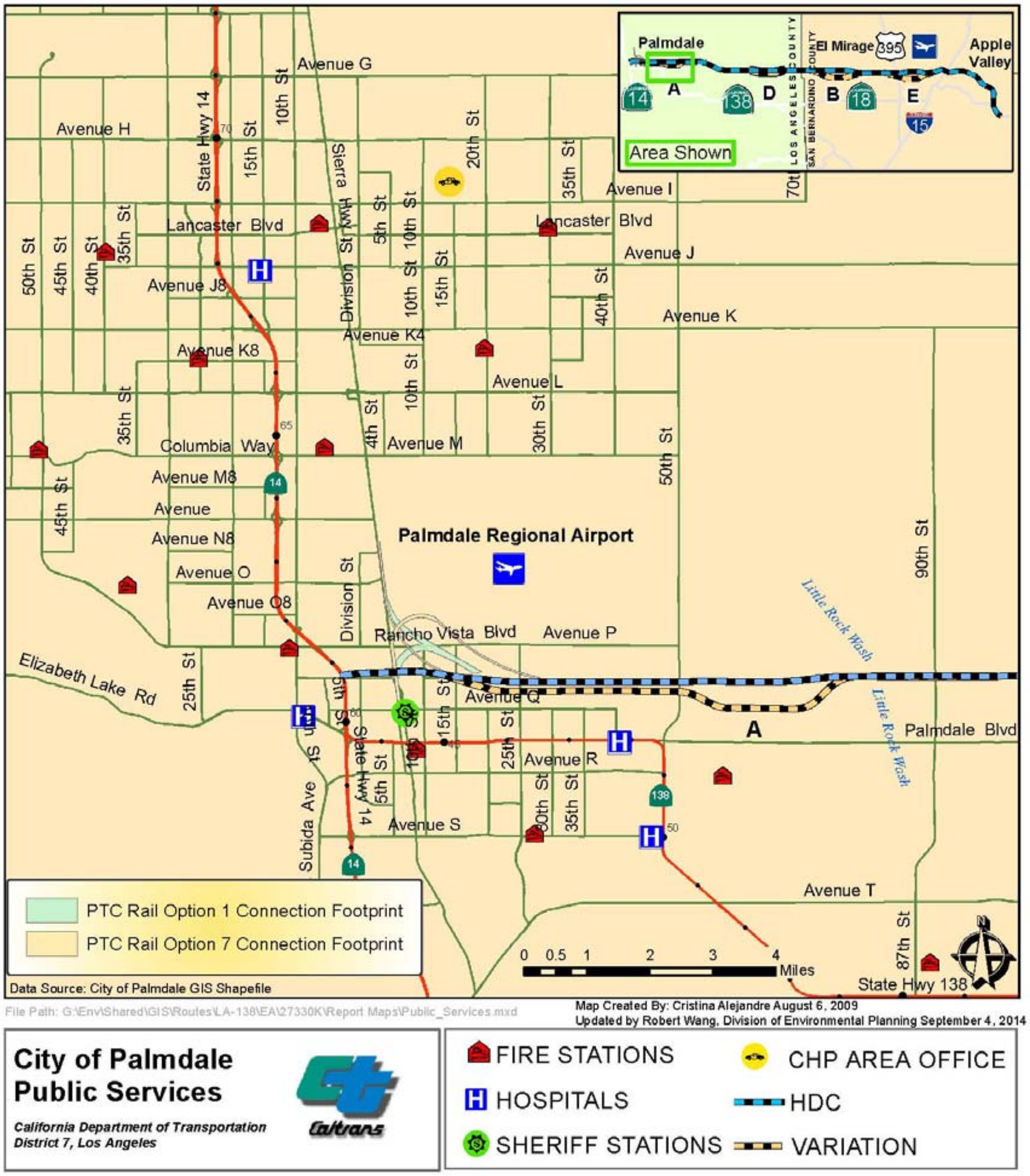
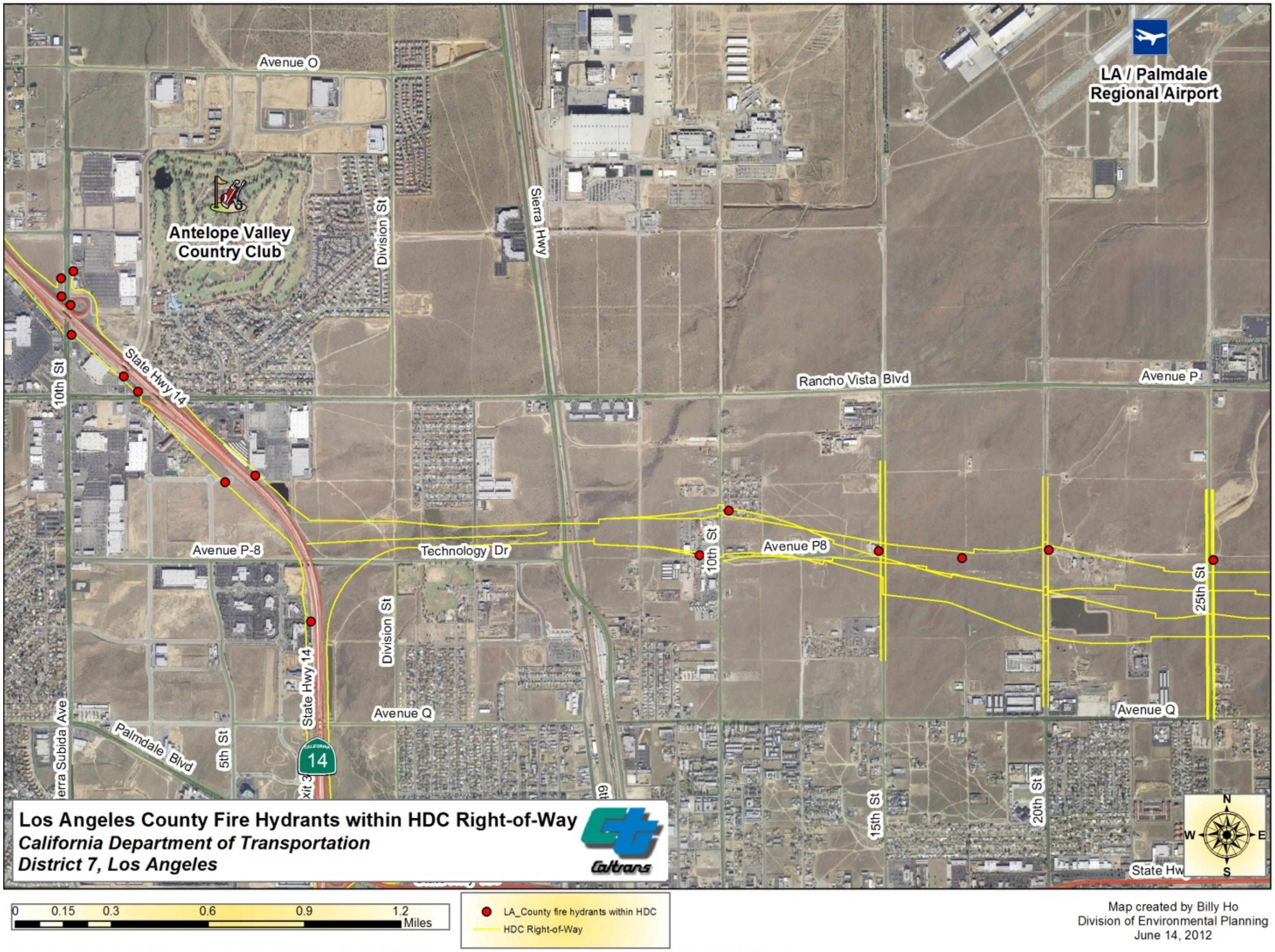


Figure 3.1.5-5 Fire Hydrant Locations in Los Angeles County Portion of the High Desert Corridor



G:\Env\Shared\GIS\Routes\LA-138\EA\27330K\HDC MAPS\LA County Fire Hydrants within HDC R-W.mxd

San Bernardino County

Public and Private Utilities

Electricity to the San Bernardino County portion of the project area is provided by SCE (refer to Figure 3.1.5-6). The Southern California Gas Company and Southwest Gas Corporation provide gas service to Adelanto, Victorville, Apple Valley, and surrounding communities (refer to Figure 3.1.5-7). Telephone services are provided by AT&T. Golden State Water provides the water service to Apple Valley residents. Sewer service to Adelanto, Victorville, and Apple Valley is provided by Victor Valley Wastewater Reclamation Authority. Water treatment is provided by Victorville Water District and Golden State Water and Apple Valley Ranchos Water District for Apple Valley. San Bernardino County provides solid waste disposal at its Victorville Landfill facility.

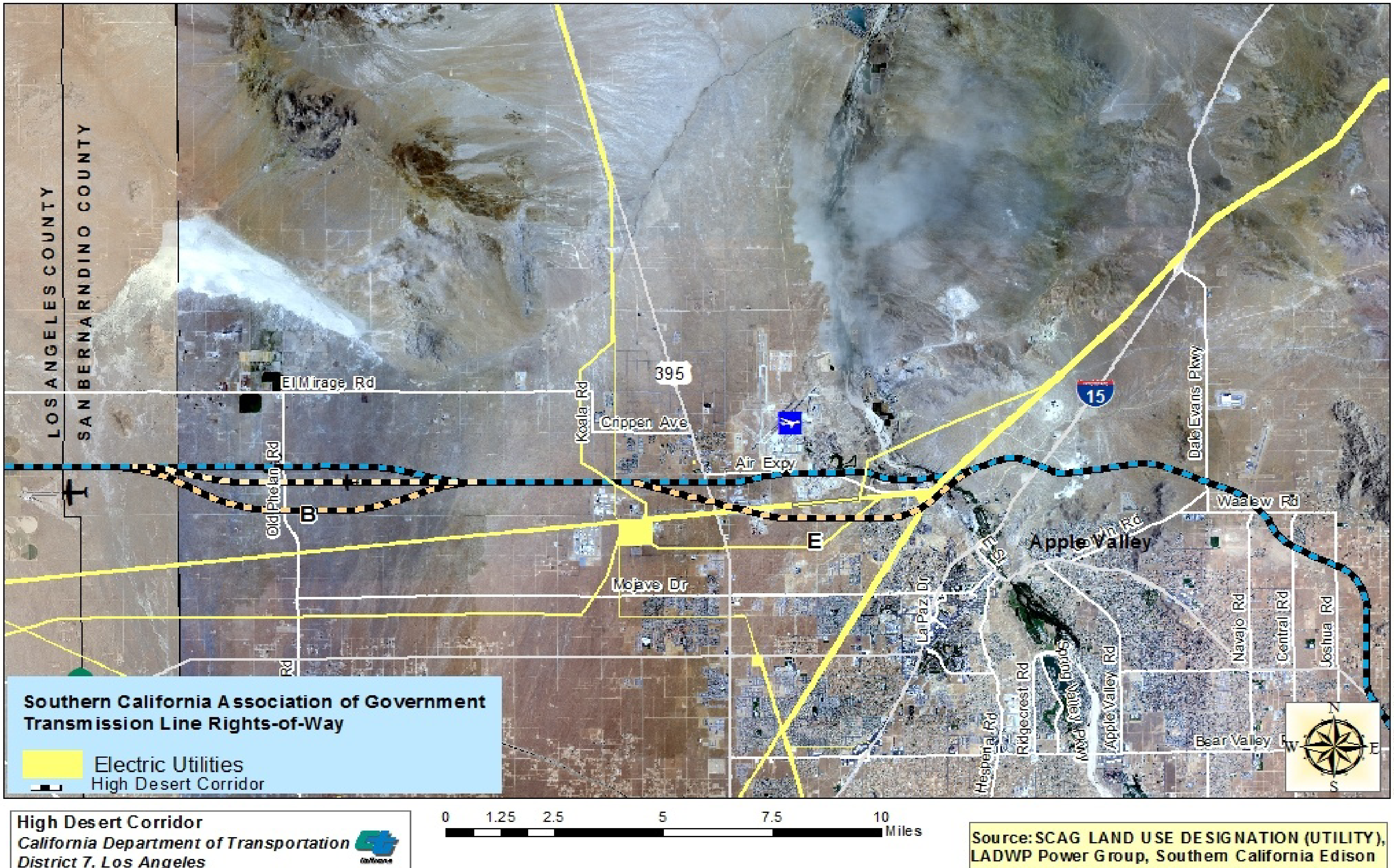
Table 3.1.5-2 lists utility service providers (and other entities) whose facilities either cross the project corridor or are within the San Bernardino County portion of the project area.

Table 3.1.5-2 Utilities within San Bernardino County Portion of the High Desert Corridor

Utility Company	Category	Utility Description
Antelope Valley East Kern County	Water	24-inch Water Line
AT&T	Telephone	Telephone/Telecommunications Line
CalNev	Oil	4- and 6-inch Oil Lines
City of Adelanto	Sewer	12-inch PVC Sewer Line
City of Adelanto	Water	8-inch PVC line, 18-inch Water Line
City of Victorville	Sewer	18- and 27-inch Sewer Lines
City of Victorville	Water	4- and 8-inch Water Lines
Continental Telecommunications Company	Telephone	Telephone/Telecommunications Line
Kinder Morgan	Gas	8- and 14-inch High Pressure Petroleum Pipes
Level 3 Communications	Communications/ Internet	6-2" HDPE Conduits/Fiber-Optic Line
Los Angeles Department of Water and Power	Electricity	Overhead Power Lines (approximately 66 kV to 500 kV)
Mojave Water Agency	Water	48-inch Water Line
SCE	Electricity	Overhead Power Lines (approximately 66 kV to 500 kV)
Southern California Gas Company	Gas	4-, 6-, and 30-inch Gas Lines
Southwest Gas	Gas	Distribution Line/High-Pressure Line
Sprint	Telephone	Fiber-Optic Line
Time Warner Cable	Cable	Cable/Telecommunications Duct Bank
Victorville Water	Water	16-inch Water Line

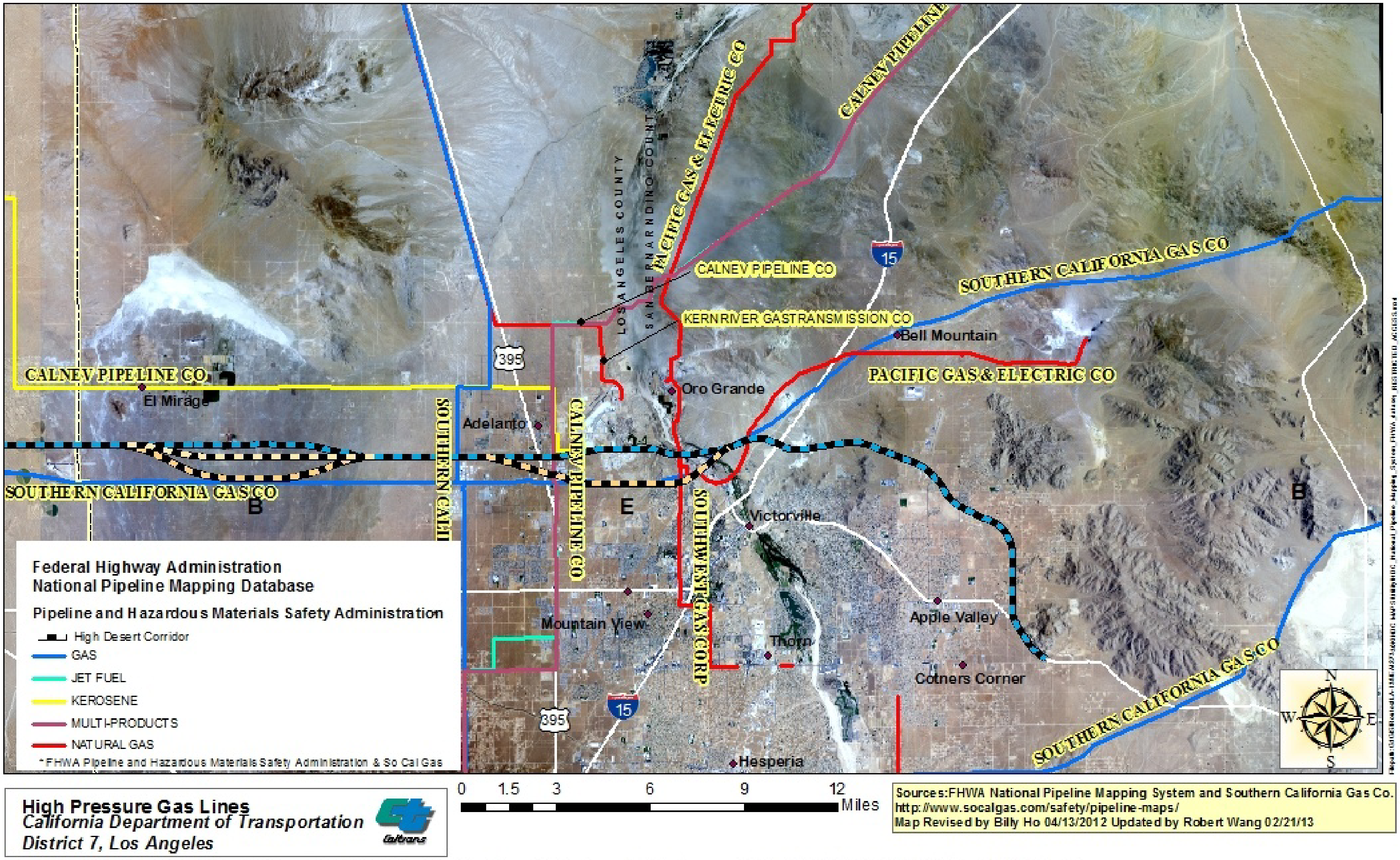
Source: Appendix J, Utility Conflict Matrix.

Figure 3.1.5-6 Power Transmission Lines in San Bernardino County Portion of the High Desert Corridor



** Includes Los Angeles Department of Water and Power (LADWP)
Southern California Edison (SCE)
Intermountain Power Agency

Figure 3.1.5-7 Natural Gas Lines in San Bernardino County Portion of the High Desert Corridor



Fire Protection and Emergency Services

Hospital service is provided by Victor Valley Community Hospital, which provides 24-hour emergency service. The San Bernardino County Fire Department provides fire protection for the project area from three San Bernardino County fire stations.

- Station 11 located in El Mirage at 2929 El Mirage Road
- Station 321 located in Adelanto at 1741 Hardy Avenue
- Station 322 located in Adelanto at 10370 Rancho Road

Six Apple Valley Fire District stations also serve the project area.

- Station 331 (Headquarters) located in Apple Valley at 22400 Headquarters Drive
- Station 332 located in Apple Valley at 18857 Highway 18
- Station 334 located in Apple Valley at 12143 Kiowa Road
- Station 335 located in Apple Valley at 21860 Tussing Ranch Road
- Station 336 located in Apple Valley at 19235 Yucca Loma Road
- Station 337 located in Apple Valley at 19305 Jess Ranch Parkway

Figure 3.1.5-8 shows the locations of fire protection, emergency, and police protection services. Figures 3.1.5-9 through 3.1.5-12 show the locations of fire hydrants that are within the proposed HDC right-of-way (ROW) in San Bernardino County.

Police Protection Services

Police protection is provided by the San Bernardino County Sheriff's Department, with additional services provided by the CHP. The CHP provides traffic enforcement for the unincorporated area and will provide emergency assistance with respect to general law enforcement when necessary. The closest Sheriff's station to the project area is located at 14931 Dale Evans Parkway, north of the intersection of Thunderbird Road and 1 mile west of Happy Trails Highway. The CHP Victorville Office is located approximately 4 miles south of the project at 14210 Amargosa Road.

Environmental Consequences

Potential impacts to public utilities and services were determined by inventorying those facilities that were within 0.5 mile of the HDC. The assessment was based on such factors as safety, circulation, accessibility, and disruption of operation during construction and operation of the proposed project. Facilities were evaluated to determine which ones would be directly or indirectly affected by the HDC.

Utilities

No Build Alternative

The HDC would not be built with the No Build Alternative; therefore, there would be no impacts to utilities, including relocation of facilities.

Figure 3.1.5-8 Fire Protection, Emergency, and Police Protection Services Locations in San Bernardino County Portion of the High Desert Corridor

Figure 3.1.5-9 Fire Hydrant Locations in San Bernardino County Portion of the High Desert Corridor Project (Section 1)

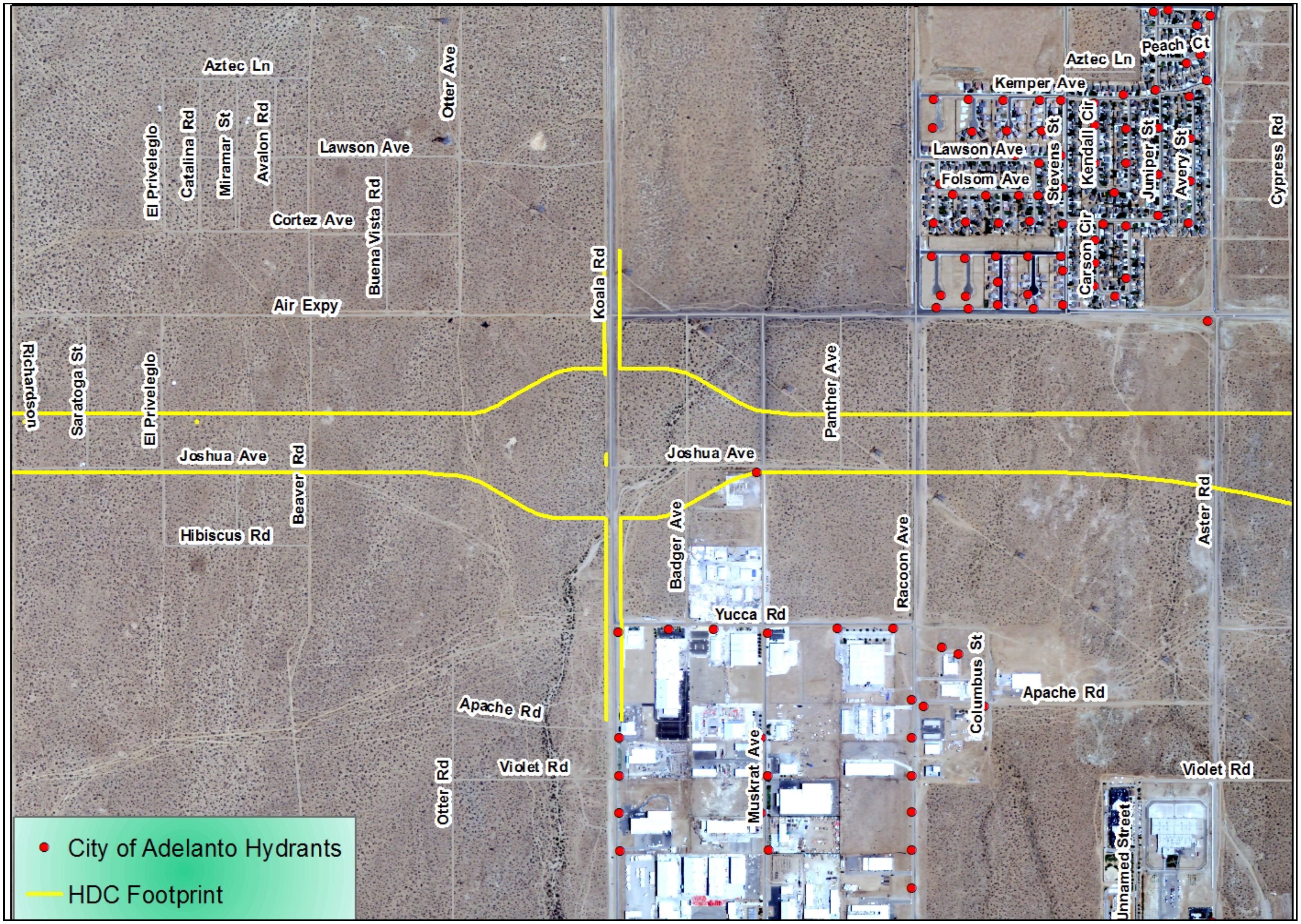


Figure 3.1.5-10 Fire Hydrant Locations in San Bernardino County Portion of the High Desert Corridor Project (Section 2)

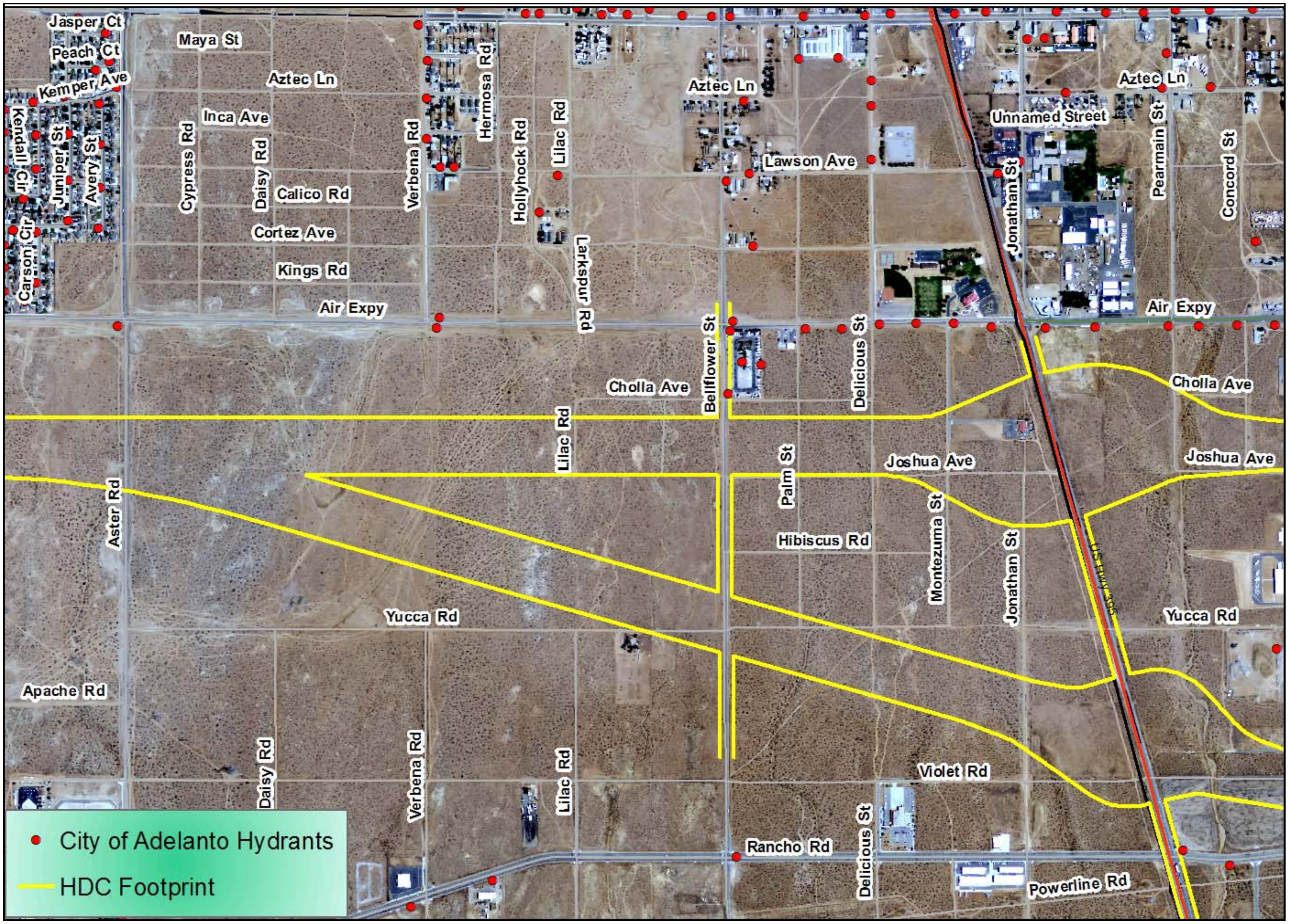


Figure 3.1.5-11 Fire Hydrant Locations in San Bernardino County Portion of the High Desert Corridor Project (Section 3)

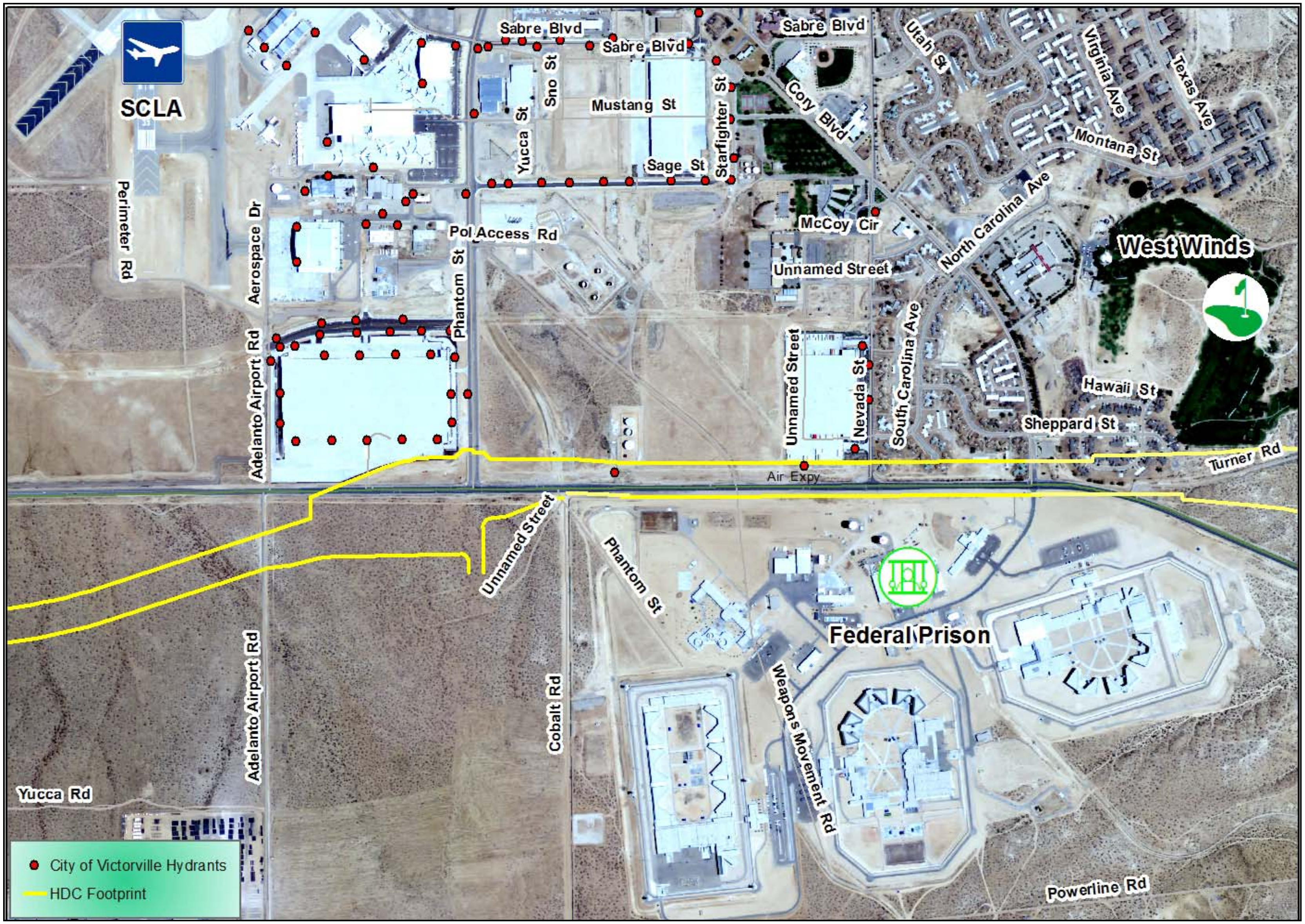
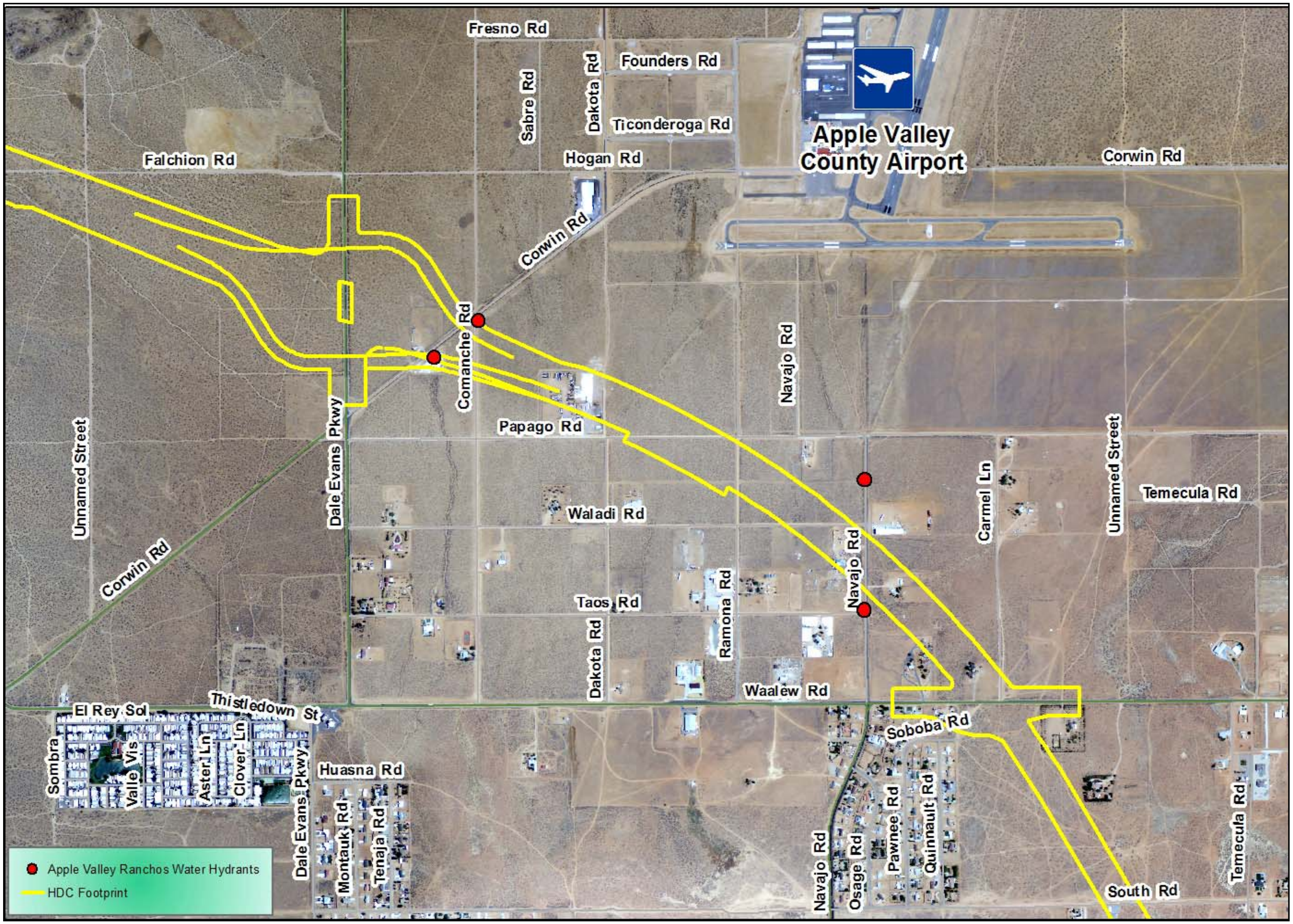


Figure 3.1.5-12 Fire Hydrant Locations in San Bernardino County Portion of the High Desert Corridor Project (Section 4)



Common to All Build Alternatives

Utilities are allowed in Caltrans ROW with an encroachment permit. Utility facilities (e.g., water lines, sewer laterals, electrical connections/lines/poles, natural gas service lines, streetlights, fire hydrants, and cable television lines and utility boxes) in the ROW would be subject to abandonment, removal, relocation, or replacement as a result of project construction.

Coordination with utility companies is a standard procedure during the design phase. Utility companies would be given enough notice to relocate their facilities before construction or at a later stage of construction as appropriate. Utility relocation would be done using standard engineering practices to avoid substantial service disruption.

It is estimated that the highway-only alternatives would have an impact on utilities at approximately 300 locations and the highway-plus-rail alternatives would have an impact on utilities at approximately 400 locations within the different communities along the alignment. CPUC GO 131-D exempts from permitting requirements (and thus from CEQA review) those relocations of power transmission and distribution lines that are less than or equal to 2,000 linear feet. Of the more than 100 potential power line relocations identified in the utilities conflict matrix prepared as part of the environmental document, all but about 8 relocations would be less than 2,000 feet.

Some power lines would require modifications to avoid conflicts with the project. Such modifications would consist chiefly of increasing the height above ground of the lines passing over the HDC to maintain consistency with CPUC GO #95. The HDC would be elevated above the existing terrain by approximately 12 feet, so some power lines (and power line towers) may need to be increased in height by up to 12 feet. These modifications could have incremental visual impacts and could trigger Federal Aviation Administration (FAA) notification (FAA Form 7460-1) and marking and lighting requirements pursuant to 14 *Code of Federal Regulations* (CFR) Part 77.

Appendix J provides information on the owners, type of utility, and the general location of the utility affected by the project build alternatives.

Emergency Services

No Build Alternative

The HDC would not be built with the No Build Alternative; therefore, there would be no immediate impacts to emergency services. In the future, as levels of service on local roads deteriorate, response times of emergency response vehicles may increase.

Common to All Build Alternatives

The proposed project would not result in direct impacts to medical facilities, or fire or police stations. It is likely the proposed project may improve response times for emergency services to other areas that do not currently have direct access to a major travel route. The project may improve response times by allowing current traffic to access a different route, which would reduce congestion on existing local roadways.

The project could create a need for additional personnel and equipment in the areas of CHP and possibly emergency services to serve the project alignment, but these impacts are expected to be less than significant.

Avoidance, Minimization, and/or Mitigation Measures

Major impacts to utilities and facilities, as well as emergency services, will be avoided as part of the project design. Implementation of standard conditions of approval and close coordination with the utilities/emergency service providers will further minimize impacts to utilities and facilities. Because there would be no substantial impacts to utility systems or emergency services over the long term, no mitigation measures are required.

SC-UT-1 Caltrans will coordinate with all affected private and public service utilities during the design stage to identify any potential conflicts with existing utilities. This process will include evaluation of ways to avoid utility relocations by refining the project design and/or protecting existing utilities in place. After seeking approval from utility providers, final relocation/protection in place measures will be incorporated into the final plans and specifications. Per Caltrans requirements, all linear underground utilities within Caltrans' ROW will be encased from ROW to ROW in either steel or concrete.

SC-UT-2 A signed Method of Service (MOS) agreement will be obtained during the final design phase of the project. Caltrans and/or the Los Angeles County Metropolitan Transportation Authority (Metro) will contact SCE at that time for additional information and an estimated cost of the MOS.

SC-UT-3 The selection of appropriate green energy facilities, including types and locations, will be made during the final design phase of the project. Caltrans and Metro will coordinate with all utility providers to obtain necessary approval if encroachment or uses of the respective utility facilities are required.

SC-UT-4 It is Caltrans' and Metro's goal to construct the HDC in a way that does not impair SCE's ability to access, maintain, and operate its facilities. Caltrans and Metro will work closely with SCE and will provide SCE with about the preferred alternative (i.e., detailed maps and scaled drawings of the highway, expressway, tollway, and rail alignments; elevations, plans and profiles, grading and drainage plans, and access information) so that any potential constraints can be identified and addressed to the satisfaction of all parties.

SC-UT-5 Caltrans and Metro will coordinate with SCE to ensure that all aspects of the HDC comply with GO-95 clearance requirements. In addition, the FAA clearance requirements for tower locations will be evaluated; coordination with FAA will be done as needed.

3.1.6 Traffic and Transportation/Pedestrian and Bicycle Facilities

This section addresses potential impacts to vehicular traffic and circulation. Impacts to the transit system, pedestrian and bicycle facilities, and parking are also addressed.

Regulatory Setting

The California Department of Transportation (Caltrans), as assigned by the Federal Highway Administration (FHWA), directs that full consideration should be given to the safe accommodation of pedestrians and bicyclists during the development of federal-aid highway projects (23 *Code of Federal Regulations* [CFR] 652). It further directs that the special needs of the elderly and the disabled must be considered in all federal-aid projects that include pedestrian facilities. When current or anticipated pedestrian and/or bicycle traffic presents a potential conflict with motor vehicle traffic, every effort must be made to minimize the detrimental effects on all highway users who share the facility.

In July 1999, the U.S. Department of Transportation (DOT) issued an Accessibility Policy Statement pledging a fully accessible multimodal transportation system. Accessibility in federally assisted programs is governed by DOT regulations (49 CFR part 27) implementing Section 504 of the Rehabilitation Act (29 U.S.C. 794). FHWA has enacted regulations for the implementation of the 1990 Americans with Disabilities Act (ADA), including a commitment to build transportation facilities that provide equal access for all persons. These regulations require application of the ADA requirements to federal-aid projects, including Transportation Enhancement Activities.

Affected Environment

The traffic and circulation impact analysis in this section is based on the results of the *High Desert Corridor Traffic Study Report* (June 2014).

The project corridor is divided into three segments as follows:

- **Antelope Valley Segment:** From State Route (SR) 14 to 100th Street East in Palmdale, a distance of approximately 10 miles.
- **High Desert Segment:** From Palmdale city limits to Adelanto city limits in unincorporated Los Angeles and San Bernardino counties, a distance of approximately 26 miles.
- **Victor Valley Segment:** From west of Caughlin Road in Adelanto to SR-18 east of Joshua Road in Apple Valley, a distance of approximately 27 miles.

The traffic analysis study area runs west to east along the proposed corridor from SR-14 in Palmdale on the west to east of Joshua Road in Apple Valley on the east, for a total length of 64 miles. In the north-south direction on the west end, the study area covers the area from the intersection of SR-14 and West Avenue N on the north to the intersection of SR-14 and East Avenue S on the south. On the east side, the study area covers the area from the interchange of Interstate 15 (I-15) and Dale Evans Parkway on the north to Bear Valley Road on the south.

This section summarizes the characteristics of the existing roadway network in the study area, traffic volumes, truck traffic, and current operating conditions of the roadway network. Future traffic forecasts for the build alternatives and the No Build Alternative are presented in the Environmental Consequences section that follows.

Existing Roads and Highways

Antelope Valley

Regional Roadway Network

State Route 14. SR-14 is a north–south State highway in southern California, approximately 116.6 miles in length. The southern portion of the highway is signed as Antelope Valley Freeway. The route connects I-5, near Santa Clarita, with United States Highway 395 (US 395), near Inyokern. Rapid suburban growth in Santa Clarita, Lancaster, and Palmdale has made the Antelope Valley Freeway one of the most congested in southern California.

State Route 138. SR-138 is an east–west State highway generally following the northern foothills of the San Gabriel Mountains of southern California from its junction with I-5 south of Gorman eastward to Mount Anderson Junction, its eastern junction with SR-18 south of Crestline in the San Bernardino Mountains. The route is approximately 105.4 miles long.

Interstate 5. Within California, I-5 is a major north–south route of the Interstate Highway System. This highway links the major California cities of San Diego, Los Angeles, Sacramento, and Redding. From its junction with SR-14, just south of Santa Clarita, I-5 crosses over the Newhall Pass through the Santa Susana Mountains into the San Fernando Valley. Between the Los Angeles Civic Center and SR-14, motorists traverse 28.7 miles of heavily used roadway.

State Route 58. SR-58 is a 241-mile, east–west highway across the southern San Joaquin Valley, the Tehachapi Mountains, and the Mojave Desert. It runs between its western terminus at the junction of United States Highway 101 (US 101) and its eastern terminus at Barstow (junction I-15). It has junctions with SR-14 in Mojave and US 395 north of Adelanto. SR-58 is the only freeway/expressway to cross the Sierra Nevada range south of I-80, the only other freeway to cross the Sierra.

Local Roadway Network

State Route 138 (Palmdale Boulevard). Palmdale Boulevard, also known as SR-138 from 10th Street West to 50th Street East, runs perpendicular to SR-14 (also known as the Antelope Valley Freeway). West of SR-14, Palmdale Boulevard is a four-lane regional arterial with a speed limit of 50 miles per hour (mph) from 10th Street West to 5th Street West, and 45 mph from 5th Street West to the SR-14 southbound ramp terminal intersection. Just east of the SR-14 northbound ramp terminal intersection, the speed limit drops to 40 mph.

Other substantial local roadways and their surrounding land uses were examined and include Avenue Q, Avenue P, 50th Street East, 40th Street East, 30th Street East, 25th Street East, 20th Street East, 10th Street East, Sierra Highway, and 10th Street West.

High Desert

Regional and Local Roadway Network

The High Desert portion of the corridor is currently served by a sparse network of county and local roads that are typically two lanes in width (one through travel lane per direction). Sporadic, short sections of roadway have been widened along frontages of newer land developments as a condition of approval.

Few of these roadways are continuous throughout the High Desert region. East Palmdale Boulevard, a Los Angeles County Town and County master plan route, is one of the longest east–west roadways, extending from Palmdale to 240th Street East; continuing east as El Mirage Road/East Avenue P. Sheep Creek Road is one of the longest north–south roadways, extending from SR-138 in Phelan to just north of El Mirage Road. The proposed project build alternatives would construct a new freeway through the High Desert portion of the study area connecting Palmdale and Adelanto, just south of and roughly parallel to Palmdale Boulevard.

Victor Valley

Regional Roadway Network

Interstate 15 (Mojave Freeway). I-15 is a north–south freeway that divides the vicinity of Victorville into east and west sides for about 14 miles through the study area from Bear Valley Road on the south to Dale Evans Parkway on the north. Within this study segment, I-15 is also called the Mojave Freeway. For about 3.5 miles at the southern end of the study area, I-15 and Historic Route 66 share the same road, until reaching Palmdale Road (SR-18), where Route 66 continues on its own alignment to the northeast. At this same interchange, I-15 shares its designation with SR-18 for another 3.5 miles north until its interchange with Route 66 (National Trails Highway).

U.S. Route 395. US 395 generally runs in the north–south direction with its southern terminus at I-15 near Hesperia and its northern terminus at the border of Canada. US 395 forms the western border of this portion of the study area for approximately 7 miles. The southern end of the route consists of a few areas with residential frontage and property walls, but the land use is mostly vacant, rural land along the frontage with some scattered residential use set back behind the frontage. US 395, north of the Palmdale Road intersection, creates the western border of Victorville.

Historic Route 66. Historic Route 66 was constructed in 1926 and passed through Victorville. Currently, the route follows I-15 for about 3.5 miles from Bear Valley Road north to the Palmdale Road interchange and then separates to what is known as 7th Street and continues until just south of the Mojave River, where the route turns northwest and becomes known as the National Trails Highway.

State Route 18. SR-18 begins its northwest end at SR-138 near Llano, approximately 24 miles west of I-15, and continues around and then south to SR-210 in San

Bernardino. Within this study area, SR-18 has a western and an eastern segment. From the western terminus, SR-18 heads east named as Pearblossom Highway until becoming Palmdale Road and crossing US 395 in Adelanto where the Victor Valley portion of the study area begins, 4 miles west of I-15. Through Apple Valley and within the study area of Victor Valley, SR-18 becomes an expressway (Happy Trails Highway). It joins with I-15 in Victorville at the Palmdale Road interchange, continuing north to the Route 66 interchange. The expressway begins again east of I-15, heading east and crossing over the Mojave River. It continues east and then south reaching the intersection of Yucca Loma and Navajo roads.

Local Roadway Network

Many local roadways exist within the project study area, including Adelanto Road, Air Expressway, Village Drive, Stoddard Wells Road, Apple Valley Road, Dale Evans Parkway, Corwin Road, Waalew Road, Yucca Loma Road, Bear Valley Road, Navajo Road, Central Road, and Joshua Road.

Existing Traffic Volumes

Existing traffic volume information was collected along state routes and at representative intersections located throughout the study area. Traffic volumes along state routes are crucial, as the proposed High Desert Corridor (HDC) would funnel traffic to and from SR-14 and I-15 at a focused location and would divert traffic away from local service interchanges along existing and future proposed east–west roadways. Traffic volumes along local east–west and north–south local roads would also shift directional patterns, as traffic flows to the new HDC (and away from Palmdale Boulevard and Palmdale Road) to take advantage of its higher speeds and to avoid traffic signal delays.

State Route 14

Table 3.1.6-1 summarizes traffic volumes on SR-14 within Los Angeles County, compiled by Caltrans' Division of Traffic Operations, Office of System Planning Management Traffic Data Branch for the year 2011. Annual average daily traffic (AADT) is shown for selected locations along SR-14, with the segments within the focused study area highlighted. These counts represent total vehicles, passenger vehicles and trucks, averaged over 365 days of the year. Peak-month and peak-hour volumes are also reported. All volumes are two-way (northbound plus southbound combined).

As part of the traffic study prepared for this project, Caltrans also conducted vehicle counts during all hours of the day and all days of the month during February and March 2009, and in 2011. These counts were collected at milepost (MP) 59.803, located at the SR-138/Palmdale Boulevard interchange.

The results of the balanced traffic volume along SR-14 within the focused study area are presented in Figure 2-23 of the *High Desert Corridor Traffic Study Report Volume I.*

Table 3.1.6-1 Traffic Volume along SR-14 (Los Angeles County), 2011

	South			North		
Off-Ramp or Intersection Location	**Peak Hour**	**Peak Month**	**AADT**	**Peak Hour**	**Peak Month**	**AADT**
Angeles Forest Highway interchange	7,500	99,000	96,000	5,500	72,000	70,000
Palmdale, Avenue S interchange	5,500	72,000	70,000	6,400	81,000	79,000
Palmdale, south junction SR-138, Palmdale Boulevard	6,400	81,000	79,000	7,100	89,000	86,000
Palmdale, 10th Street West interchange	7,100	89,000	86,000	7,200	89,000	86,000
Palmdale, Avenue N interchange	7,200	89,000	86,000	7,700	94,000	91,000
Lancaster, Columbia Way/ Avenue M interchange	7,700	94,000	91,000	7,500	92,000	88,000
Lancaster, Avenue L interchange	7,500	92,000	88,000	6,300	76,000	73,000
Lancaster, Avenue K interchange	6,300	76,000	73,000	5,000	60,000	58,000
Lancaster, Avenue J-8/ 20th Street interchange	5,000	60,000	58,000	3,550	42,000	40,500
Lancaster, Avenue J interchange	3,550	42,000	40,500	4,100	48,500	46,500
Lancaster, Avenue I interchange	4,100	48,500	46,500	3,500	40,500	39,000
Lancaster, Avenue H interchange	3,500	40,500	39,000	3,600	38,000	37,500
Avenue G interchange	3,600	38,000	37,500	3,600	38,000	37,000
Avenue F interchange	3,600	38,000	37,000	3,450	36,500	35,500
North Junction SR-138; Avenue D interchange	3,450	36,500	35,500	3,300	34,000	33,500
Los Angeles/Kern County Line, Avenue A interchange	3,300	34,000	33,500	3,000	31,000	30,000

Source: High Desert Corridor Traffic Study Report, 2014.

Interstate 15

Table 3.1.6-2 summarizes traffic volumes on I-15 within San Bernardino County, compiled by Caltrans' Division of Traffic Operations for the year 2011. AADT is shown for selected locations along I-15, with the segments within the focused study area highlighted.

As part of the traffic study prepared for this project, vehicle counts were conducted. The balanced traffic volumes for the focused study area along I-15 are presented in Figure 2-27 of the *High Desert Corridor Traffic Study Report Volume I*.

Table 3.1.6-2 Traffic Volume along I-15 (San Bernardino County), 2011

Off-Ramp or Intersection Location	South			North		
	Peak Hour	Peak Month	AADT	Peak Hour	Peak Month	AADT
Junction Route 138	11,200	160,000	152,000	9,000	137,000	132,000
Oak Hill Road	9,000	137,000	132,000	8,400	129,000	124,000
Junction US 395	8,400	129,000	124,000	7,100	105,000	101,000
Joshua/Palm Avenue	7,100	105,000	101,000	9,700	114,000	104,000
Hesperia, Phelan/Main	9,700	114,000	104,000	9,200	108,000	98,000
Bear Valley	9,200	108,000	98,000	7,900	93,000	85,000
Junction SR-18 South	7,900	93,000	85,000	8,000	94,000	86,000
Victorville, Mojave	7,800	91,000	83,000	7,500	88,000	80,000
Victorville, Junction SR-18	7,500	88,000	80,000	5,600	66,000	60,000
Victorville, E Street	5,600	66,000	60,000	5,600	66,000	6,000
Stoddard Wells Road	5,600	66,000	60,000	6,000	64,000	56,000
N. Junction Stoddard Wells Road	6,000	64,000	56,000	5,900	63,000	55,000
Boulder Road (Dale Evans Boulevard)	5,900	63,000	55,000	5,900	63,000	55,000

Source: High Desert Corridor Traffic Study Report, 2014.

Local Roads

Average daily traffic volumes on avenues and street segments located within the focused study portion of Antelope Valley were assembled by the City of Palmdale traffic engineering staff from a variety of sources on different days of the week and months of the year. Note that these traffic volumes are not “balanced” from one segment to the next; therefore, they may include anomalies.

At a representative “screenline,” just west of 15th Street, each of the major arterials, East Avenue P, Palmdale Boulevard, East Avenue R, and East Avenue S, all carry similar volumes of daily traffic, ranging from 25,000 to 30,000 vehicles per day (vpd). The north–south streets carry much less traffic, plus or minus 10,000 vpd along the screenline segments just south of Palmdale Boulevard. The highest daily traffic flows occur along 10th Street West, in the vicinity of the Antelope Mall, and along Sierra Highway to the north of East Avenue P.

The average daily traffic volumes on street segments located within the Victor Valley portion of the focused study area were obtained from the *Victor Valley Area Transportation Study*, prepared by Kimley-Horn and Associates, Inc., in March 2008. Bear Valley/Duncan Road between US 395 and Apple Valley is a heavily traveled roadway section with up to nearly 56,000 daily trips. Other segments with significant traffic include Lemon/Tussing Ranch/Desert View between Mojave Street and Mojave Drive (over 28,000 daily trips), Hesperia Road between Eucalyptus and Nisqualli (nearly 40,000 daily trips), Phelan Road/Main Street between US 395 and Cottonwood (over 47,000 daily trips), and Happy Trails Highway (SR-18) between Stoddard Wells and Dale Evans Parkway (over 52,000 daily trips).

Furthermore, the traffic analysis prepared for this project included the acquisition for peak-period traffic counts at all signalized intersections at all freeway ramp connections to local streets and at numerous representative intersections throughout much of the study area (over 150 in total). The location of these facilities is depicted in Figure 3.1.6-1. AM and PM Existing Condition traffic counts can be found in Table 2-8 of the *High Desert Corridor Traffic Study Report Volume I.*

Truck Traffic and Volumes

Truck drivers predominantly choose SR-58 (Tehachapi) or I-5 (the Grapevine) to access Los Angeles and San Bernardino counties from Kern County and points north. Grades along the Grapevine are relatively steady at 6 percent both up to and down from Tejon Pass. Along SR-58, the grades approaching Tehachapi Pass are less steep, ranging between 2.4 and 2.8 percent along the adjacent railroad line.

If a trucker is traveling between Bakersfield (on I-5 or SR-99) and Lancaster, the route choice following SR-58 to SR-14 presents less of a gradient than following I-5 up and down the Grapevine to SR-138. In the winter, SR-58 is less subject to closure due to inclement weather than the Grapevine segment of I-5.

Relative to other State highway facilities in the Inland Empire region, truck volumes on east–west highways between I-5 and I-15 in the High Desert region are very low. The 2009 Caltrans truck count report shows an average daily volume of 1,940 four- and five-axle trucks on SR-14 west of the interchange with Pearblossom Highway (3 percent of the AADT); 616 four- and five-axle trucks on SR-18 west of US 395 (3 percent of the AADT); and 461 four- and five-axle trucks on SR-138 west of the interchange with SR-14 (12 percent of the AADT).

Additional vehicle classification counts were conducted in the HDC study area to supplement the truck volume data compiled by Caltrans. The results generally correspond to the Caltrans truck data presented above.

Existing Intersection Levels of Service

Efficiency of traffic operations on a transportation facility is measured in terms of level of service (LOS), with LOS A representing the best operating conditions and LOS F the worst. This is graphically shown in Figure 1-3 of Section 1.2, Purpose and Need.

Freeway operational performance was measured using computer software developed by FHWA. To determine freeway LOS, the number of passenger cars per lane over mile-long freeway segments was calculated using computer software and then compared to the criteria listed in Figure 1-3. In addition, the intersections at the end of freeway interchange ramps were evaluated using the same computer software. The LOS criteria for intersections are shown graphically in Figure 1-3 in Section 1.2, Purpose and Need. Figure 3.1.6-1 shows the locations of study intersections.

Figure 3.1.6-1 Locations of Study Intersections (page 1 of 3)

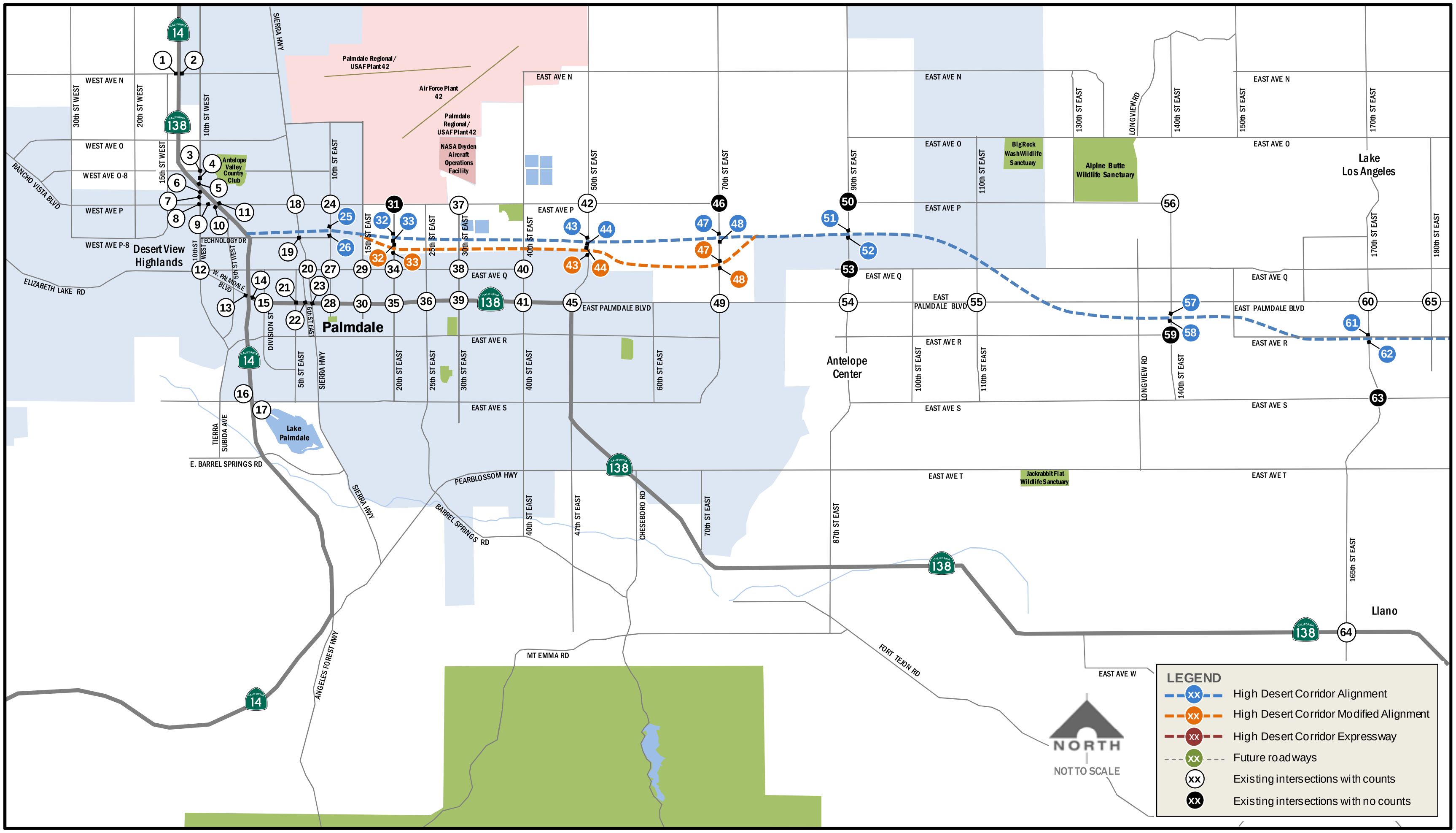


Figure 3.1.6-1 Locations of Study Intersections (page 2 of 3)

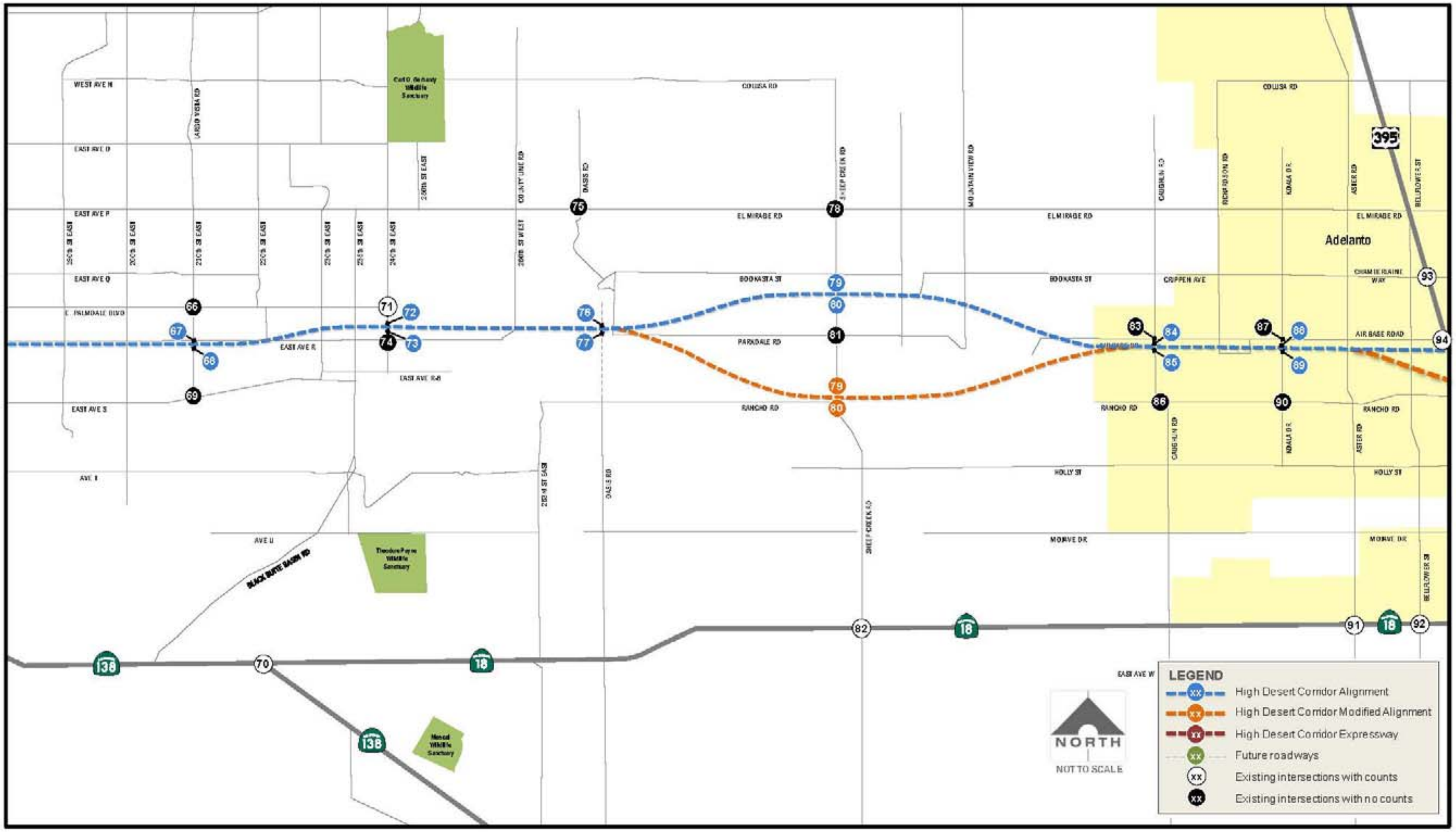
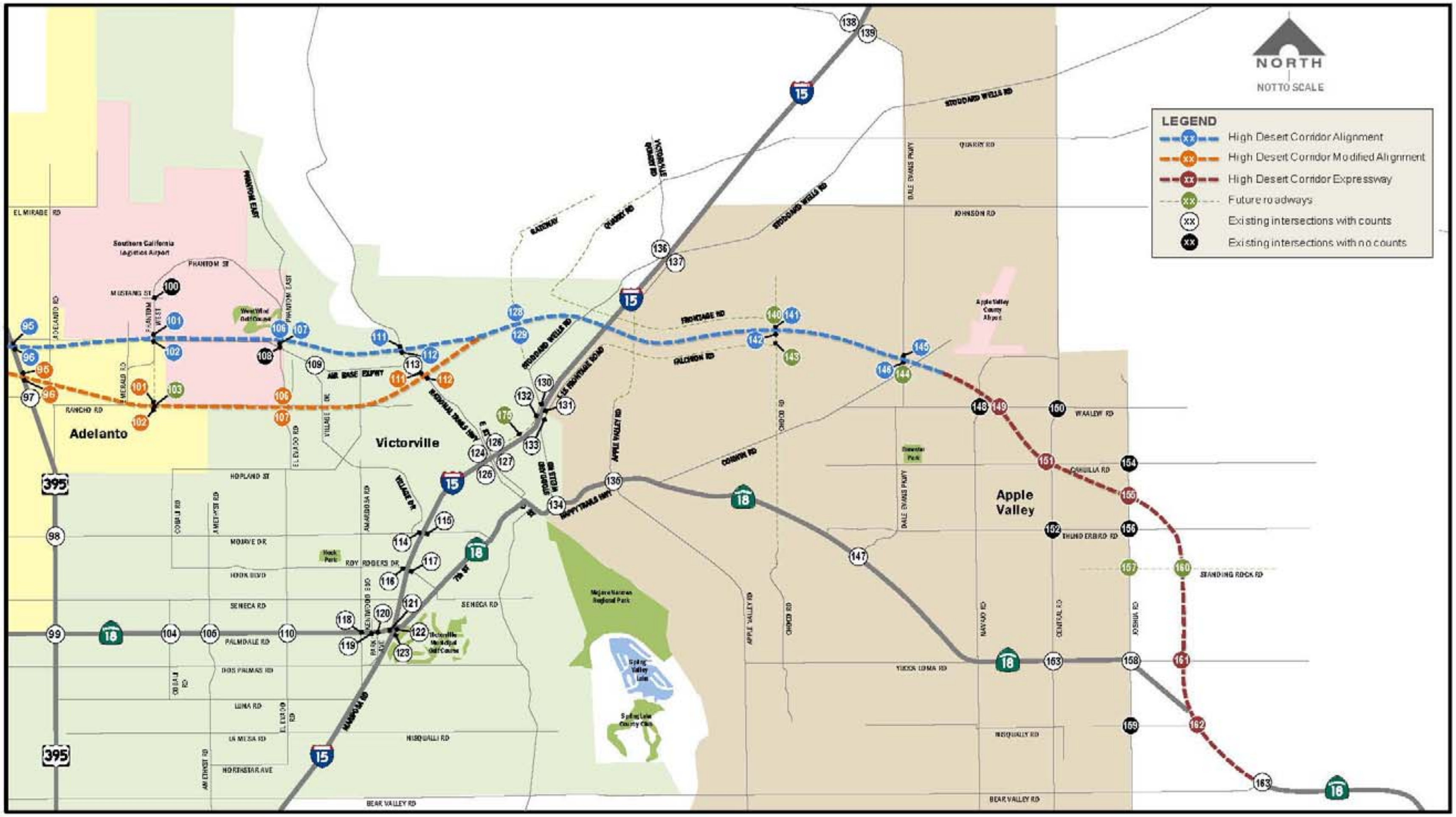


Figure 3.1.6-1 Locations of Study Intersections (page 3 of 3)



The LOS analysis for SR-18/SR-138 indicates, with three exceptions, that the current road network operates adequately in support of existing conditions. All signalized study area intersections operate at LOS D or better during peak hours. Three stop sign controlled intersections operate at LOS E or F as follows (see more detailed information in the Environmental Consequence section below):

- Rancho Vista Boulevard/East Avenue P and 10th Street East — LOS E (AM) and LOS F (PM)
- Palmdale Boulevard and 15th Street East — LOS E (PM)
- Palmdale Boulevard and 70th Street East — LOS F (AM)

In addition, field observation of traffic conditions indicates that the intersection of 10th Street West and West Avenue P, adjacent to the Antelope Valley Mall in Palmdale, is also congested during afternoon peak hours.

Traffic Accident Data

Caltrans maintains a traffic safety database called the Traffic Accident Surveillance and Analysis System (TASAS). The database tabulates crash rates for all highways in California, identified by post miles (PM). Data is reported based on the number of lanes, whether the crash occurred on wet or dry pavement, whether it occurred during the night or day, and whether the crash resulted in fatalities. Data collected between 2008 and 2011 indicate that the crash rate for mainline SR-14 between PM 58.17 and PM 63.67 is lower than the statewide average accident rate for similar facilities. Most of the ramps accessing this segment of SR-14 have accident rates lower or comparable to the statewide average accident rate for similar facilities; however, four of the ramps that provide access to and from SR-138 have accident rates at least 1.6 times higher than the statewide average. Most of the accidents on the off-ramps to SR-138 are rear-end collisions and broadside collisions.

The crash rate for SR-138 between PM 43.42 and PM 57.18 is 15 percent higher than the statewide average accident rate for similar facilities. The report indicates that 27 percent of the accidents are broadside accidents, mainly associated with movements through intersections and with left-turn movements in and out of driveways. Furthermore, 39 percent of the accidents are rear-end collisions and 13 percent are sideswipe collisions, and both are associated with traffic congestion. The crash rate for I-15 between PM 43.0 and PM 49.0 is approximately 50 percent of the statewide average rate for similar facilities, insofar as total accidents.

Parking Facilities

Much of the developed study area is characterized by typical commercial and suburban residential neighborhoods, with on-street and off-street parking in residential areas and generally plentiful off-street surface parking in commercial lots. Parking conditions vary along the major arterials within the study area.

Park-and-ride lots are used to encourage carpooling. Caltrans has developed a park-and-ride program that supports transit service and carpooling. The goals of the program include increasing the person throughput on the State Highway System, decreasing the number of vehicle trips, decreasing the greenhouse gas (GHG) and air pollution associated with transportation, and decreasing congestion on transportation facilities.

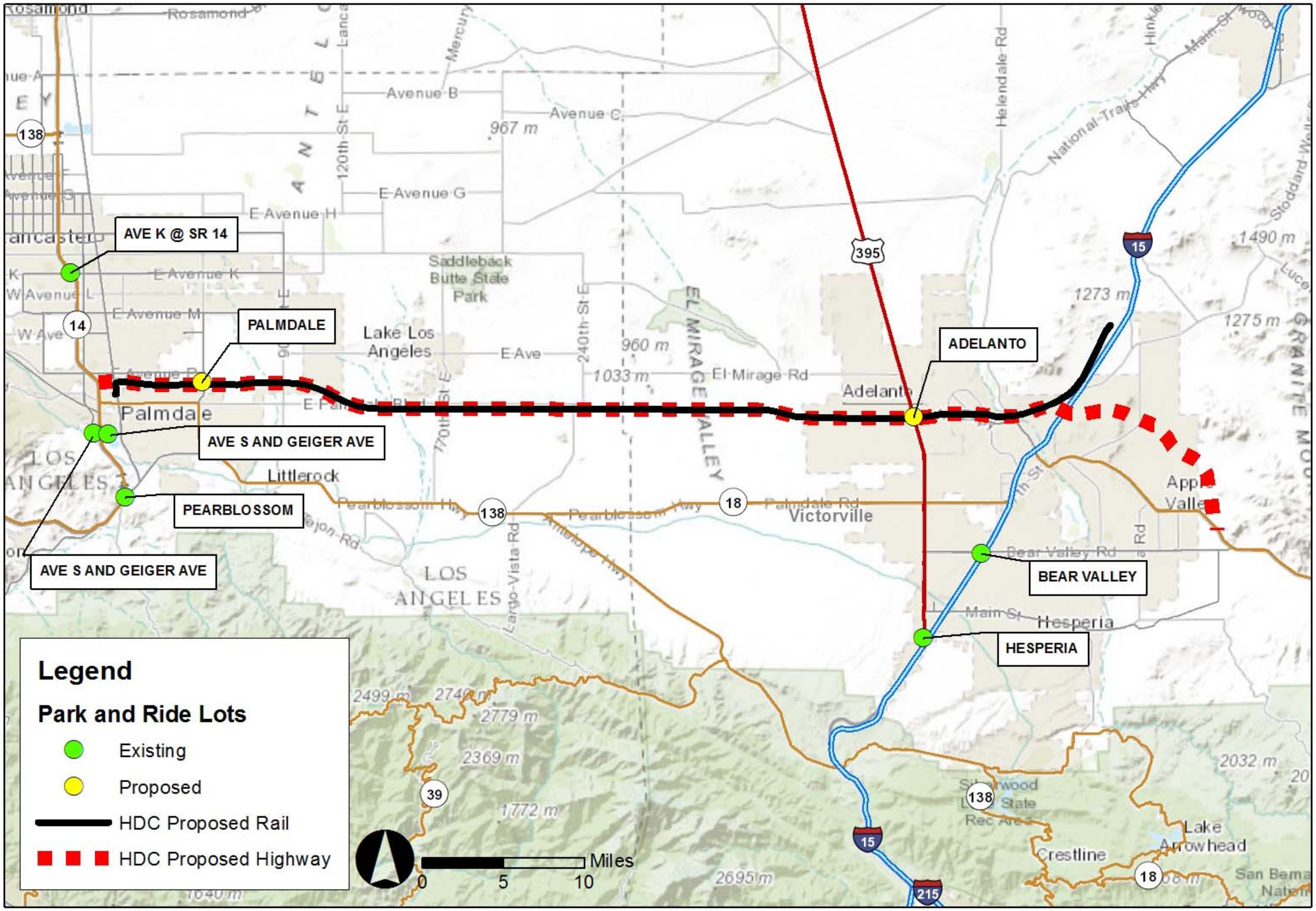
The location of park-and-ride facilities located throughout Caltrans Districts 7 and 8 are illustrated in Figure 3.1.6-2, with lots located within the HDC highlighted on the accompanying inventory of facilities.

- Lot ID #10 District 7 is located within the SR-14 interchange with Sierra Highway, adjacent to the southbound on-ramp and the northbound off-ramp. The lot is owned by the State and has 213 spaces.
- Lot ID #11 District 7 is located along West Avenue S at Geiger Road. The facility has 430 spaces and is owned by the City of Palmdale. A short distance away, along East Avenue S, at 2nd/3rd Street East, a 1,082-space park-and-ride lot is situated. This lot is owned by the City of Palmdale. A third park-and-ride lot is located on West Avenue R-8 at Pelona Vista Park. This facility provides 445 spaces.
- Lot ID #12 District 7 is located at SR-14 and West Avenue K, within the southbound loop on-ramp. The lot has 118 spaces and is owned by the State.
- Lot ID #31 District 8 is located at the I-15 interchange with Bear Valley Road. The 70-space lot is well utilized and is accessed from Amargosa Road, adjacent to the southbound I-15 on-ramp. The lot is owned by the State.
- Lot ID #34 District 8 is located adjacent to US 395 at Joshua Street in Hesperia, immediately west of I-15. The 186 spaces in this lot are routinely well utilized. The City of Hesperia and the State own and operate the lot.

In addition to the above auto-to-auto mode transfer facilities, auto to transit park-and-ride facilities are located at the Victor Valley Transit Center in Victorville, along D Street east of I-15, and the Palmdale Transportation Center, located north of East Palmdale Boulevard.

As an add-on element to the HDC Project, two park-and-ride lots are proposed for construction by others in conjunction with the build alternatives. One of these lots is proposed to be located in Palmdale adjacent to the HDC interchange at 50th Street East, and the second lot is proposed to be located in Adelanto near the HDC interchange at US 395. Caltrans' *Park and Ride Program Resource Guide*, 2010, would be consulted by local sponsoring agencies, such as the Los Angeles County Metropolitan Transportation Authority (Metro), to advance the development of these proposed add-on elements to be constructed by others. The two proposed park-and-ride lots illustrated in Figure 3.1.6-2 are not part of the project.

Figure 3.1.6-2 Locations of Park-and-Ride Facilities



Public Transit Service

Antelope Valley

The Antelope Valley Transit Authority was created in 1992 by Los Angeles County and the cities of Lancaster and Palmdale to provide transit service to residents of Antelope Valley communities. The Antelope Valley Transit Authority provides three services: local fixed-route buses (including school routes), on-demand “Dial-A-Ride” paratransit vehicles, and longer distance commuter coach service. Public transportation services revolve around the Palmdale Transportation Center as the major transfer center in Palmdale and Lancaster City Park as the major transfer center in Lancaster. Figure 3.1.6-3 shows the Antelope Valley Transit Authority bus lines.

Local Bus

The Antelope Valley Transit Authority’s local bus service operates five bus routes within the Antelope Valley area from East Avenue P, Technology Drive, Sierra Highway, and Carriage Way to Palmdale Transportation Center.

To the east, the Lake L.A. Express route, which operates on 60-minute headways, crosses the proposed freeway alignment at 40th Street East.

Commuter Bus

The Antelope Valley Transit Authority provides commuter bus service to Los Angeles and the San Fernando Valley. Commuter bus routes serve three locations from Palmdale Transportation Center, including Downtown Los Angeles, West Los Angeles, and West San Fernando Valley.

Commuter Rail

Rail service is available from the Antelope Valley to Santa Clarita, the San Fernando Valley, and Los Angeles Basin cities on Monday through Saturday by Metrolink.

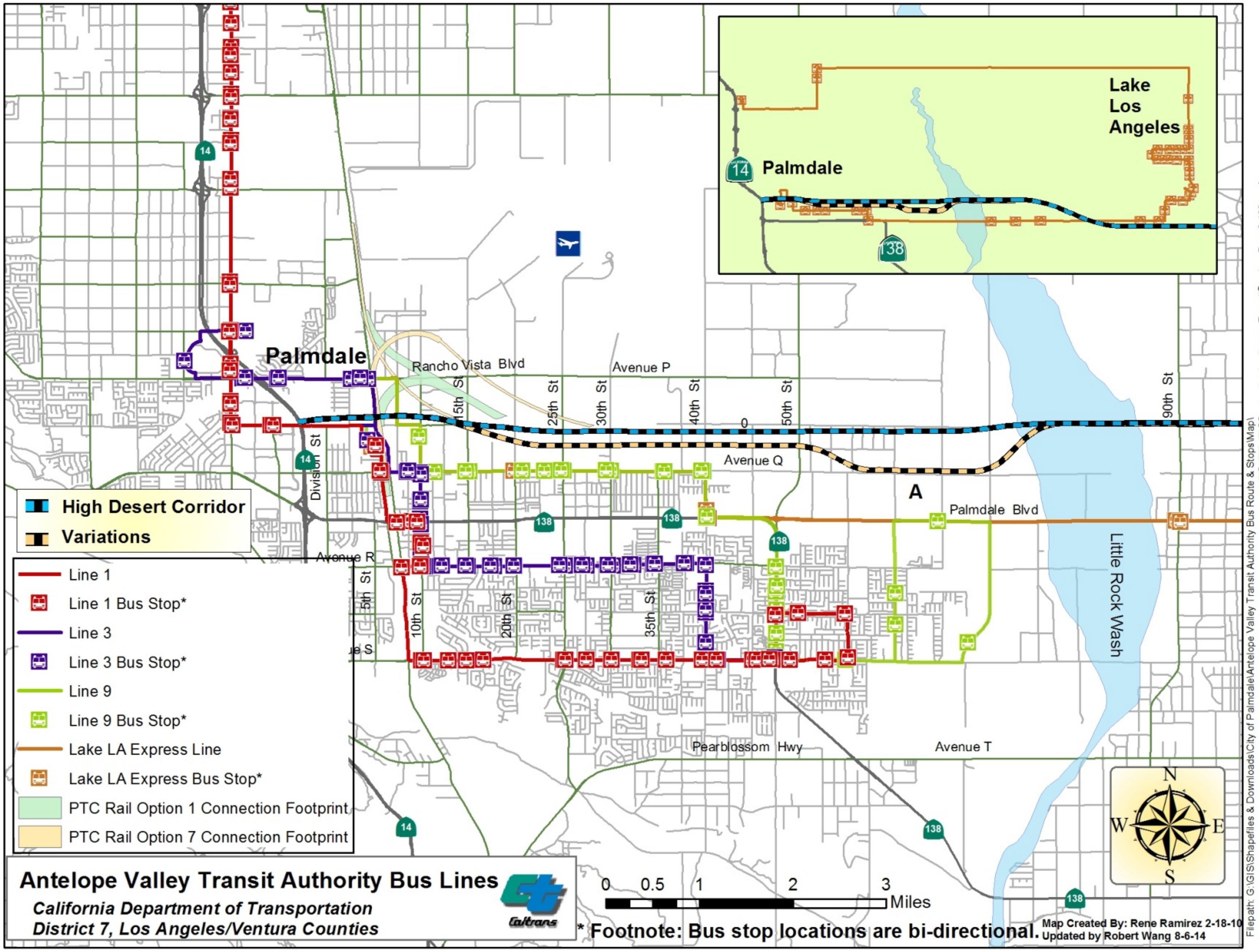
Victor Valley

The Victor Valley Transit Authority (VVTA) provides local bus service for the communities of Adelanto, Apple Valley, Hesperia, Victorville, and San Bernardino County. Most of the public transportation servicing the Victor Valley area revolves around the Victor Valley Transit Center. The VVTA was established through a Joint Powers Authority in 1991. The Joint Powers Authority includes the four cities of Adelanto, Apple Valley, Hesperia, and Victorville and certain unincorporated portions of San Bernardino County, including Oro Grande, Helendale, Lucerne Valley, Phelan, Pinon Hills, and Wrightwood. Service is also provided to Barstow and Fort Irwin. Figure 3.1.6-4 shows the VVTA bus lines.

Local Bus

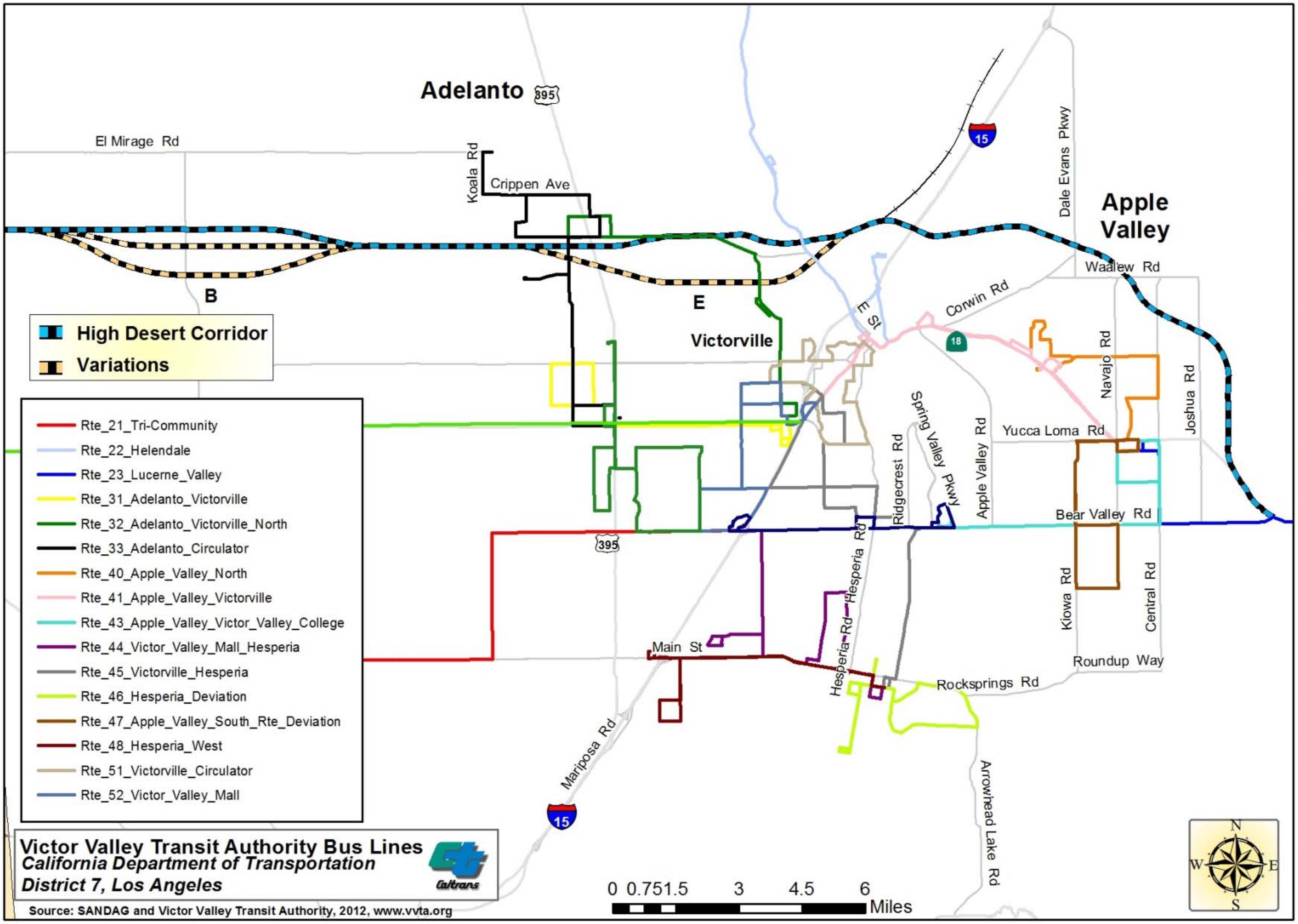
The VVTA operates public bus service throughout Victor Valley. A total of 18 different bus routes running Monday through Saturday are being operated.

Figure 3.1.6-3 Antelope Valley Transit Authority Bus Lines



Source: Robert Keys - Antelope Valley Transit Authority Feb. 3, 2010, www.avta.com

Figure 3.1.6-4 Victor Valley Transit Authority Bus Lines



Commuter Bus

The NTC Commuter Route is a relatively new service provided by the Victor Valley Transportation Authority with a Monday through Friday schedule between Victorville and Fort Irwin. The Victor Valley Transportation Authority also offers the B-V (Barstow to Victor Valley) Link Lifeline Services, which links Fort Irwin, Barstow, Apple Valley, Victorville, and San Bernardino Valley. The current service operates on Monday, Wednesday, and Friday.

Pedestrian and Bicycle Facilities

The Los Angeles County Bicycle Master Plan map identifies many proposed north-south and east-west Class II Bike Lanes and Class III Bike Routes within the Antelope Valley. Within the proposed HDC study area, the adopted master plan routes cross the proposed HDC alignment along Sierra Highway, 40th Street East, 50th Street East, and 90th Street East.

There are many bicycling opportunities for High Desert bicycle riders but not a significant number of specified trails. The popularity of cycling continues to grow, and there are several active bicycle clubs that ride through the High Desert portion of the study area on surface roadways and on several disconnected trails, due largely to the rugged terrain and available access points.

According to the San Bernardino County Non-Motorized Transportation Plan, there are no existing bike paths near the Adelanto area. There are future Class II facilities planned for US 395 from approximately Holly Road to south of Bear Valley Road. Additional Class II facilities are planned for Mojave Drive, both east and west of US 395. The adopted master plans indicate that no existing or future planned proposed bicycle routes, lanes, or paths cross the proposed HDC alignment along US 395, Phantom East, and National Trails Highway, all of which would be grade separated.

Environmental Consequences

This analysis addresses the build alternatives and No Build Alternative during the opening year (2020) and the 20-year design life (2040) of the project. The project analysis evaluates the changes in traffic patterns as a result of the HDC. The traffic conditions for the future years are also compared against the baseline 2011 conditions.

The HDC will function as part of the collective transportation system serving local and regional travel needs in north Los Angeles County and San Bernardino County. The corridor will accommodate substantially increased vehicle capacity demands in the future. The geographic location of the proposed project makes it an alternate corridor with potential to avoid congestion in the Los Angeles Basin by routing traffic around congested freeways located immediately south of the San Gabriel Mountains.

Using projected future traffic volume data in combination with the design layouts for each project alternative, a series of traffic operations analyses were performed for freeway segments and ramp facilities on SR-14 and I-15 and more than 160 intersections and freeway ramp termini (see Figure 3.1.6-1). In addition to the previous existing conditions analysis, operating LOS were measured for a no-build and various build alternatives. The results of these analyses provide the data upon which effectiveness and efficiency of the project alternatives are measured.

The no-build was analyzed for opening year (2020) and design year (2040) traffic demand conditions using the CORSIM (corridor simulation) traffic simulation model. Consistent with the evaluation of existing conditions, model output was extracted on a link-by-link and ramp basis to include demand volumes, operationally constrained (CORSIM served) volumes, travel time, delay time, speed, density, and LOS. Freeway and ramp traffic operational analysis was conducted for 11 network alternatives under Southern California Association of Governments (SCAG) land use assumptions and 1 network alternative under local land use assumptions as a sensitivity test.

The same analysis as described under the No Build Alternative was performed for the Freeway/Expressway and Freeway/Tollway Alternatives.

Two of the alternatives proposed for the HDC would provide high-speed rail (HSR) feeder service between Palmdale and Victorville with trains continuing to Las Vegas. The hours of operation are assumed to run between 6:00 a.m. and 12:00 midnight. Train frequencies would be 20 to 60 minutes and service would operate 365 days per year. Electric multiple unit (EMU) propulsion technology would be utilized, providing a top speed of 125 mph. A typical one-way trip by high-speed train between Palmdale and Las Vegas is assumed to require 105 to 110 minutes of travel time, including station dwell time in Victorville.

Initial ridership forecasts for the high-speed passenger rail service between Victorville and Las Vegas were prepared for the project sponsor by URS Corporation in 2005 and modified in early 2008 by Cambridge Systematics, Inc., as part of a peer review commissioned by the Federal Railroad Administration (FRA). Both sets of forecasts were based on population and Las Vegas visitation growth projections, reflecting trends predating the 2007–2010 economic recession. In consideration of these events, the ridership forecasts were reviewed and revised by Infraconsult for the purpose of a “Public-Private Partnership Feasibility Evaluation” of the HDC. These updated forecasts were based on the revised operating parameters, which reduced the Victorville to Las Vegas travel time assumption from 100 minutes to 80 minutes, and more recent growth projections of population, tourism, and traffic for the corridor.

Table 3.1.6-3 presents the annual rail passenger ridership for the Palmdale to Victorville segment of the high-speed train service, with this service continuing to Las Vegas. The ridership volumes reflect round trips.

Table 3.1.6-3. Palmdale to Victorville Rail Ridership (Annual Round Trips)

Year	Ridership Volumes *(Round Trips)*
2020	2,910,000
2030	3,390,000
2040	3,870,000
2050	4,300,000

Source: Public–Private Partnership Feasibility Study; High Desert Multipurpose Corridor, Infraconsult LLC, December 2012.

A two-seat ride between Los Angeles and Las Vegas, whereby a transfer would be required between Metrolink and XpressWest trains at the Palmdale Transportation Center, was assumed for the purpose of the HDC assessment of traffic-related impacts. Day-by-day traffic data collected at the California/Nevada border, by direction, was used to distribute passengers by day of the week and direction. Table 3.1.6-4 presents these daily forecasts for the opening year of the freeway facility, 2020, and the 2040 design year.

Table 3.1.6-4. Daily Distribution of Palmdale to Victorville HSR Ridership

Day	2020		2040	
	North/ Eastbound	South/ Westbound	North/ Eastbound	South/ Westbound
Monday	6,329	8,355	8,417	11,111
Tuesday	5,886	5,933	7,826	7,891
Wednesday	6,134	5,844	8,156	7,770
Thursday	7,076	6,423	9,410	8,543
Friday	11,541	7,933	15,352	10,549
Saturday	10,099	7,381	13,430	9,817
Sunday	8,743	13,939	11,628	18,538
Weekly Total	55,808	55,808	74,219	74,219
Annual	2,910,000	2,910,000	3,870,000	3,870,000

Note: Reflects individual riders.
Source: High Desert Corridor Traffic Study Report, 2014.

Passenger trips diverted from auto and bus modes to rail will reduce traffic volumes on the HDC freeway/tollway between SR 14 and I-15. Approximately 13.4 percent of the rail ridership is forecast to be diverted from the air transportation mode, and these riders will not affect vehicular use of the HDC.

Approximately 81.2 percent of the ridership will be diverted from the auto mode, and approximately 5.3 percent of the rail passenger ridership is forecast to be diverted from intercity bus. Taking all three modes (i.e., air, auto, and bus) into account, the number of rail passengers can be converted to vehicles removed from the HDC using a rate of 2.454 passengers per vehicle, excluding reductions due to passenger trips diverted from the air mode.

The resulting day-by-day and peak-hour vehicle reductions on the HDC freeway/ tollway alternatives are reported in Table 3.1.6-5.

Table 3.1.6-5. Year 2040 Vehicle Reductions on HDC Resulting from Rail Feeder Service between Palmdale and Victorville

Day	Eastbound			Westbound		
	Peak Hour			Peak Hour		
	AM (0700)	PM (1700)	Daily	AM (0700)	PM (1700)	Daily
Monday	125	150	2,916	140	208	3,848
Tuesday	122	92	2,711	85	156	2,733
Wednesday	130	119	2,825	75	170	2,691
Thursday	140	130	3,260	80	169	2,959
Friday	181	255	5,317	69	230	3,654
Saturday	293	177	4,652	105	187	3,400
Sunday	169	201	4,027	96	437	6,421

Note: Reflects individual vehicles.
Source: Parsons, 2014.

Traffic Operation Performance Results for Build Alternatives

The traffic operations analysis conducted for this project considers the overall performance of the highway network and the performance of the freeways (specifically SR-14, the new HDC, and I-15), local street intersections, and local traffic circulation to be affected by the project build alternatives.

Freeway Mainline and Ramp Segment Analysis Results

Freeway segments and ramp facilities that do not meet an acceptable level of LOS D or better are listed in Tables 3.1.6-6 and 3.1.6-7 for year 2020 and in Tables 3.1.6-8 and 3.1.6-9 for year 2040 results.

No Build Alternative

The No Build Alternative clearly has more segments along SR-14 operating at LOS E or F, compared to the build alternative(s), by 2040. A southbound auxiliary lane from the West Avenue N on-ramp(s) to the 10th Street West off-ramp, along with a northbound auxiliary lane from the East Avenue S on-ramp to the Palmdale Boulevard off-ramp, would address most of the congestion issues associated with the No Build Alternative.

Table 3.1.6-6 Year 2020 Freeway Mainline Level of Service Analysis Results Summary (Segments Operating at LOS E or Worse)

	Freeway Segment (LOS)		
	No-Build	**Build***	**Build Toll***
AM Peak			
SR-14 NB	None	None	None
SR-14 SB	SR-14 from north end of the network to West Avenue N off-ramp (F) West Avenue N off-ramp to West Avenue N loop on-ramp (F) West Avenue N loop on-ramp to West Avenue N direct on-ramp (F) West Avenue N direct on-ramp to 10th Street West off-ramp (F)	East Avenue S on-ramp to Angeles Forest Highway off-ramp (E overall; F mixed flow)	East Avenue S on-ramp to Angeles Forest Highway off-ramp (E)
HDC EB	Not Applicable	None	None
HDC WB	Not Applicable	None	None
I-15 NB	None	None	None
I-15 SB	None	None	None
PM Peak			
SR-14 NB	South end of network to East Avenue S off-ramp (F)	None	None
SR-14 SB	None	None	None
HDC EB	Not Applicable	None	None
HDC WB	Not Applicable	None	None
I-15 NB	None	None	None
I-15 SB	None	None	None

*Note: Performance of the freeway system is virtually unchanged when comparing the no HSR feeder service alternatives with those that include HSR feeder service.

Source: High Desert Corridor Traffic Study Report, 2014.

Table 3.1.6-7 Year 2020 Weaving and Ramp Merging/Diverging Level of Service Analysis Results Summary (Segments Operating at LOS E or Worse)

	Segment (LOS–Type)		
	No-Build	**Build***	**Build Toll***
AM Peak			
SR-14 NB	None	None	None
SR-14 SB	West Avenue N loop (E–merging) West Avenue N direct (E–merging) West Rancho Vista Boulevard (E–merging) West Avenue N (E–merging) 10th Street West (E–diverging)	None	None
HDC EB	Not Applicable	None	None
HDC WB	Not Applicable	None	None
I-15 NB	None	None	None
I-15 SB	None	None	None
PM Peak			
SR-14 NB	None	None	West Avenue N (E–diverging)
SR-14 SB	None	None	None
HDC EB	Not Applicable	None	None
HDC WB	Not Applicable	None	None
I-15 NB	None	Palmdale Road (E–diverging)	Palmdale Road (E–diverging)
I-15 SB	None	None	None

*Note: Performance of the freeway system is virtually unchanged when comparing the no HSR feeder service alternatives with those that include HSR feeder service.

Source: High Desert Corridor Traffic Study Report, 2014.

Table 3.1.6-8 Year 2040 Freeway Mainline Level of Service Analysis Results Summary (Segments Operating at LOS E or Worse)

	Segment (LOS/Type)		
	No-Build	**Build**	**Build Toll**
AM Peak			
SR-14 NB	None	None	None
SR-14 SB	SR-14 from north end of the network to West Avenue N off-ramp (F) West Avenue N off-ramp to West Avenue N loop on-ramp (F) West Avenue N loop on-ramp to West Avenue N direct on-ramp (F) West Avenue N direct on-ramp to 10th Street West off-ramp (F) East Avenue S on-ramp to SR-14 southbound south end of the network (E overall; F mixed flow)	East Avenue S off-ramp to East Avenue S on-ramp (F) East Avenue S on-ramp to Angeles Forest Highway off-ramp (F overall and mixed flow; E HOV)	East Avenue S on-ramp to Angeles Forest Highway off-ramp (F overall and mixed flow; E HOV)
HDC EB	Not Applicable	West end of the network to SR-14 northbound on-ramp (E)	West end of the network to SR-14 northbound on-ramp (E)
HDC WB	Not Applicable	None	None
I-15 NB	None	None	None
I-15 SB	None	None	None
PM Peak			
SR-14 NB	Pearblossom Highway direct on-ramp to East Avenue S off-ramp (F) East Avenue S off-ramp to East Avenue S on-ramp (F) East Avenue S on-ramp to West Palmdale Boulevard off-ramp (F)	Pearblossom Highway direct on-ramp to East Avenue S off-ramp (F overall and mixed flow; E HOV)	Pearblossom Highway direct on-ramp to East Avenue S off-ramp (F overall and mixed flow; E HOV)
SR-14 SB	West Avenue N direct on-ramp to 10th Street West off-ramp (E) HDC off-ramp to 10th Street West on-ramp (F)	None	None
HDC EB	Not Applicable	West end of the network to SR-14 NB on-ramp (E)	West end of the network to SR-14 NB on-ramp (E)
HDC WB	Not Applicable	Southbound off-ramp to SR-138 west end of network (E)	Southbound off-ramp to SR-138 west end of network (E)
I-15 NB	South end of network to Palmdale Road off-ramp (E)	South end of network to Palmdale Road off-ramp (F)	South end of network to Palmdale Road off-ramp (F)
I-15 SB	None	None	None
I-15 SB	None	None	None

*Note: Performance of the freeway system is virtually unchanged when comparing the no HSR feeder service alternatives with those that include HSR feeder service.

Source: High Desert Corridor Traffic Study Report, 2014.

Table 3.1.6-9 Year 2040 Weaving and Ramp Merging/Diverging Level of Service Analysis Results Summary (Segments Operating at LOS E or Worse)

	Segment (LOS–Type)		
	No-Build	**Build***	**Build Toll***
AM Peak			
SR-14 NB	None	None	None
SR-14 SB	West Avenue N loop (E–merging) West Avenue N (E–diverging) West Avenue N direct (E–merging) 10th Street West (E–diverging) East Avenue S (E–merging)	East Avenue S (E–merging)	East Avenue S (E–merging)
HDC EB	Not Applicable	None	None
HDC WB	Not Applicable	None	None
I-15 NB	None	None	None
I-15 SB	None	None	None
PM Peak			
SR-14 NB	East Avenue S (E–merging) West Palmdale Boulevard (E–diverging) East Avenue S (E–diverging)	East Avenue S (E–diverging)	East Avenue S (E–diverging)
SR-14 SB	West Avenue N direct (E–merging) 10th Street West (E–diverging) West Rancho Vista Boulevard (E–merging) West Palmdale Boulevard (E–diverging)	None	None
HDC EB	Not Applicable	None	None
HDC WB	Not Applicable	None	US 395 (E–diverging) SR-14 SB (E–diverging)
I-15 NB	Mojave Drive (E–merging) Stoddard Wells Road S (E–merging) Palmdale Road (E–diverging)	Palmdale Road loop (E–merging) Mojave Drive (E–merging) Palmdale Road (E–diverging)	Palmdale Road loop (E–merging) Mojave Drive (E–merging) Palmdale Road (E–diverging)
I-15 SB	None	None	None

*Note: Performance of the freeway system is virtually unchanged when comparing the no HSR feeder service alternatives with those that include HSR feeder service.

Source: High Desert Corridor Traffic Study Report, 2014.

Freeway/Expressway and Freeway/Tollway Alternatives

Traffic operation under these build alternatives would generally meet the LOS D or better design standard for all segments with few exceptions. The one notable exception is southbound SR-14 during the AM peak period assuming the SCAG land use projection. Under this scenario, traffic spills back from the uphill grade, which begins south of the Avenue S interchange, approaching the Pearblossom Highway interchange. The uphill grade slows traffic, which when combined with on-ramp traffic, increases vehicle density.

Freeway/Expressway with HSR Alternative and Freeway/Tollway with HSR Alternative (Preferred Alternative)

The results of the traffic operational analysis indicate that the performance of the freeway system is virtually unchanged when comparing the no HSR feeder service alternatives with those that include HSR feeder service. These results reflect weekday, morning (7:00 to 8:00 a.m.), and afternoon (5:00 to 6:00 p.m.) time periods. Rail ridership for the Palmdale–Victorville–Las Vegas XpressWest service is projected to be significantly higher during the midday, on Fridays, weekends, and holidays. The performance of the highway system is not addressed for those higher rail ridership times of the day and day of the week periods.

Ramp Termini and Study Area Intersection Analysis Results

The location of the ramp termini and study area intersections included as part of the analysis of opening year (2020) conditions were illustrated previously in Figure 3.1.6-1. For these future years, the number of intersections analyzed was expanded from the 89 investigated as part of the existing conditions to 164. Ramp termini and intersections that are not expected to operate at LOS D or better for years 2020 and 2040 and for each alternative are reported in Tables 3.1.6-10 and 3.1.6-11.

No Build Alternative

Based on the results of the traffic operational analysis at studied intersections, the No Build Alternative performs poorly when compared to the build alternatives. For the No Build 2020 opening year scenario, 115 intersections were analyzed. During the AM peak hour, 9 intersections (8 percent) are projected to operate at LOS E or F. During the PM peak hour, this number increases to 20 intersections, equal to 17 percent of the intersections studied.

Freeway/Expressway Alternative

All ramp termini intersections perform at LOS D or better for Year 2020, except for stop sign-controlled intersections at the I-15 and Stoddard Wells Road south interchange. The LOS improves to LOS A or B with the installation of traffic signals at these locations. For the ramp termini intersections reported in Year 2040, all ramp intersections for the build alternatives perform at LOS D or better, assuming that traffic signals are installed at the I-15 and Stoddard Wells south interchange.

Table 3.1.6-10 Year 2020 High Desert Corridor Intersection Level of Service Summary

ID No.	Intersection	Type of Control	Existing Condition				Open Year 2020 No-Build Condition				Open Year 2020 Build Alternative				Open Year 2020 Build Alternative with Tolls			
			AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak	
			LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
19*	Sierra Highway and Technology Drive	Signal	B	14.3	B	16.8	D	43.6	E	78.5	B	13.1	B	16.7	B	13.1	B	16.7
23*	Sierra Highway and East Palmdale Boulevard	Signal	C	25.5	C	27.3	D	39.8	E	71.4	C	26.8	C	29.6	C	26.9	C	29.4
24	10th Street East and East Avenue P	Existing–stop NB/SB; future–signal	E*	39.0	F*	>300	B*	16.6	B*	19.8	C	29.4	C	28.5	C	22.1	C	30.8
30*	15th Street East and East Palmdale Boulevard	Stop NB/SB	D	25.2	E	36.1	F	>300	F	>300	F	>300	F	>300	F	>300	F	>300
35*	20th Street East and East Palmdale Boulevard	Signal	B	19.9	C	22.9	C	32.6	E	58.0	C	25.7	D	39.4	C	25.7	D	39.4
38*	30th Street East and East Avenue Q	4-way stop; future–signal	B	11.6	B	11.6	C	18.6	F	70.0	C	29.9	C	29.3	C	31.7	C	30.1
45*	50th Street East and East Palmdale Avenue	Roundabout	B	14.0	A	8.9	F	132.4	F	96.1	F	52.9	F	95.7	F	138.4	F	141.8
49*	70th Street East and East Palmdale Boulevard	Stop NB/SB	F	>300	C	20.9	F	>300	F	>300	B	12.0	C	22.9	B	13.3	C	16.1
56	140th Street and East Palmdale Boulevard	Stop EB/WB	A*	9.3	A*	9.6	C*	15.2	E*	42.3	A	8.9	A	5.6	B	14.1	F	>300
59	140th Street and East Avenue R	Stop EB/WB	Does not exist				B*	11.4	C*	17.5	A	2.7	A	4.2	B	11.4	E	39.2
64*	165th Street East and SR-138	Signal	C	20.6	C	21.7	E	57.2	D	38.9	C	31.4	C	24.9	D	44.9	C	31.7
70*	SR-138 and SR-18	Stop WB, yield EB	B	10.0	B	11.7	F	104.7	F	>300	C	21.0	F	>300	C	24.6	F	>300
71	240th Street and East Palmdale Boulevard	Stop EB/WB	A*	8.7	A*	8.8	F*	>300	F*	>300	A	3.3	A	4.4	C	24.4	B	13.0
78	Sheep Creek Road and El Mirage Road	Stop NB/SB	Does not exist				E*	40.5	F*	>300	A	3.5	A	5.8	A	9.4	C	18.5
82*	Sheep Creek Road and SR-18	Existing–stop NB/SB; future–signal	B	12.8	C	19.7	F	>300	F	>300	C	32.9	D	35.5	C	33.6	C	34.5
86	Caughlin Road and Rancho Road	Stop EB/WB	Does not exist				C*	16.1	E*	39.1	A	3.9	A	4.1	A	6.6	A	9.4

Table 3.1.6-10 Year 2020 High Desert Corridor Intersection Level of Service Summary

ID No.	Intersection	Type of Control	Existing Condition				Open Year 2020 No-Build Condition				Open Year 2020 Build Alternative				Open Year 2020 Build Alternative with Tolls			
			AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak	
			LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
92*	Bellflower Street and SR-18	Existing–stop NB/SB; future–signal	C	20.8	D	27.4	E	45.5	F	176.0	B	17.2	B	15.7	B	15.8	B	14.2
99*	US 395 and SR-18	Signal	C	34.0	D	36.5	D	47.0	E	68.1	D	39.7	D	49.4	D	39.8	D	49.4
118*	Amargosa Road and SR-18	Signal	C	28.2	D	39.9	D	35.4	F	88.3	C	24.8	C	32.4	C	25.0	C	33.1
130	I-15 southbound off-ramp and Stoddard Wells Road	Existing–stop NB/SB	A	2.6	A	2.7	C	23.5	F	>300	F	>300	F	>300	F	>300	F	>300
		Improvements–signal	N/A	N/A	N/A	N/A	B	14.0	A	9.1	A	9.3	B	17.6	B	10.3	B	18.6
131	I-15 northbound on-ramp and Stoddard Wells Road/Frontage Road	Existing–stop EB/WB	A	3.7	A	3.7	A	5.9	A	4.9	F	>300	F	>300	F	>300	F	>300
		No-build–stop EB/WB; improvements–stop EB/WB**	N/A	N/A	N/A	N/A	A	5.8	A	4.8	A	7.0	A	7.1	A	6.5	A	5.6
132	I-15 southbound on-ramp and Stoddard Wells Road	Existing–stop EB/WB	A	3.0	A	2.1	B	13.2	E	42.0	F	>300	F	>300	F	>300	F	>300
		Improvements–signal	N/A	N/A	N/A	N/A	B	14.9	B	10.8	B	13.5	A	8.3	B	10.0	A	5.0
133	Stoddard Wells Road and I-15 Frontage Road	Existing–stop EB/WB	A	5.6	A	1.2	D	30.7	E	48.0	F	>300	F	>300	F	>300	F	>300
		Improvements–signal	N/A	N/A	N/A	N/A	C	23.3	C	26.1	B	13.8	B	14.0	B	16.3	B	15.6
137	I-15 northbound off-/on-ramps and Stoddard Wells Road (north)	Existing–stop NB/SB; future–4-way stop	A	4.3	A	2.3	C	15.6	F	134.9	A	2.5	A	3.4	A	4.6	A	5.1

Notes:
1. Proposed additional geometry improvements.
2. Two-way stop control LOS reported for worst approach.
3. 4-way stop reported for overall LOS.
4. Intersection LOS calculations are based on HCM 2000, excepted where noted with *.
*Intersection LOS was calculated using TRAFFIX software.
LOS E
LOS F

Source: High Desert Corridor Traffic Study Report, 2014.

Table 3.1.6-11 Year 2040 High Desert Corridor Intersection Level of Service Summary

ID No.	Intersection	Type of Control	Existing Condition				Design Year 2040 No-Build Condition				Design Year 2040 Build Alternative				Design Year 2040 Build Alternative with Toll			
			AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak	
			LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
1	SR-14 southbound off-ramp and West Avenue N	Existing–stop NB/SB; future–signal	A	7.2	B	12.6	A	5.4	E	69.7	A	5.6	A	6.0	A	5.6	A	5.3
8	10th Street West and West Avenue P	Signal	C	31.3	C	30.3	C	32.7	E	74.8	C	29.0	C	28.7	C	28.1	C	33.1
9	Lowe's Driveway and West Avenue P	Signal	B	10.2	C	29.1	B	18.2	E	65.7	B	19.3	B	15.5	B	19.8	B	18.9
10	SR-14 southbound on-ramp and West Avenue P	Existing–stop NB/SB; future–signal	A	1.4	A	1.0	A	1.7	E	43.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
11	SR-14 northbound off-ramp and West Avenue P	Signal	B	14.3	C	20.6	A	8.5	E	55.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
15*	Division Street and East Palmdale Boulevard	Signal	C	27.9	C	28.0	E	64.1	E	71.4	C	29.4	C	31.1	C	27.9	C	31.1
16	SR-14 southbound off-ramp and West Avenue S	Signal	C	28.7	C	30.3	D	38.1	B	19.1	D	48.5	C	27.8	E	65.1	C	28.5
18*	Sierra Highway and East Avenue P	Signal	C	33.4	C	34.6	D	45.1	E	58.5	D	36.5	D	51.9	C	34.5	D	42.1
19*	Sierra Highway and Technology Drive	Signal	B	14.3	B	16.8	D	50.9	F	115.4	B	14.1	B	18.0	B	13.9	B	17.7
22*	6th Street East and East Palmdale Boulevard	Signal	C	20.7	C	25.3	E	55.7	E	78.0	C	29.4	C	32.3	C	28.7	C	30.5
23*	Sierra Highway and East Palmdale Boulevard	Signal	C	25.5	C	27.3	F	82.1	F	94.6	C	29.7	C	32.2	C	30.9	D	35.1
24	10th Street East and East Avenue P	Existing–stop NB/SB; future–signal	E*	39.0	F*	>300	B*	16.3	C*	20.8	C	27.1	C	30.2	C	21.1	C	22.2
28*	10th Street East and East Palmdale Boulevard	Signal	B	17.2	C	20.0	C	31.3	D	50.6	C	32.3	E	60.8	C	29.1	D	49.5
30*	15th Street East and East Palmdale Boulevard	Stop NB/SB	D	25.2	E	36.1	F	>300	F	>300	F	>300	F	>300	F	>300	F	>300
35*	20th Street East and East Palmdale Boulevard	Signal	B	19.9	C	22.9	C	34.1	E	63.8	C	31.6	D	43.2	C	26.4	D	42.7

Table 3.1.6-11 Year 2040 High Desert Corridor Intersection Level of Service Summary

ID No.	Intersection	Type of Control	Existing Condition				Design Year 2040 No-Build Condition				Design Year 2040 Build Alternative				Design Year 2040 Build Alternative with Toll			
			AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak	
			LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
36*	25th Street East and East Palmdale Boulevard	Signal	C	26.2	C	30.9	D	42.2	E	64.5	C	34.9	D	41.0	C	33.2	D	36.2
38*	30th Street East and East Avenue Q	4-way stop	B	11.6	B	11.6	E	46.0	F	145.3	C	31.0	C	28.9	C	18.2	F	51.8
40*	40th Street East and East Avenue Q	Stop EB/WB	C	16.2	C	16.0	D	34.4	F	98.6	C	21.9	D	26.8	C	19.3	C	22.7
41*	40th Street East and East Palmdale Boulevard	Signal	C	21.9	C	23.7	D	39.1	E	71.6	C	29.4	D	38.3	C	28.4	D	35.4
45*	50th Street East and East Palmdale Avenue	Roundabout	B	14.0	A	8.9	F	>300	F	>300	F	>300	F	>300	F	119.5	F	56.7
49*	70th Street East and East Palmdale Boulevard	Stop NB/SB	F	>300	C	20.9	F	>300	F	>300	C	15.6	F	60.1	B	14.0	E	35.0
54*	90th Street East and East Palmdale Boulevard	Signal	C	23.9	C	24.1	D	46.3	E	76.2	D	35.2	D	36.8	C	34.8	D	35.0
56	140th Street and East Palmdale Boulevard	Stop EB/WB	A*	9.3	A*	9.6	C*	24.9	F*	>300	A	6.8	A	6.2	A	8.3	B	13.2
60	170th Street East and East Palmdale Boulevard	Existing–4-way stop; future–stop EB/WB	A*	7.6	A*	8.1	B*	13.5	F*	70.0	A	2.4	A	4.7	A	4.5	E	36.2
64*	165th Street East and SR-138	Signal	C	20.6	C	21.7	F	109.7	E	56.8	D	36.6	C	29.5	D	54.0	D	52.9
70*	SR-138 and SR-18	Stop WB, yield EB	B	10.0	B	11.7	F	>300	F	>300	D	30.2	F	>300	E	39.1	F	>300
71	240th Street and East Palmdale Boulevard	Stop EB/WB	A*	8.7	A*	8.8	F*	>300	F*	>300	A	4.4	A	6.9	F	>300	E	38.7
74	240th Street East and East Avenue R	Stop EB/WB	Does not exist				E*	41.7	F*	183.1	A	2.4	A	2.7	B	12.9	C	22.9
75	Oasis Road and El Mirage Road	Stop EB/WB	Does not exist				F*	>300	F*	>300	A	2.4	A	3.5	A	3.5	A	6.3
78	Sheep Creek Road and El Mirage Road	Stop NB/SB	Does not exist				F*	132.2	F*	>300	A	4.3	A	5.3	B	12.1	C	19.2
82*	Sheep Creek Road and SR-18	Existing–stop NB/SB; future–signal	B	12.8	C	19.7	F	>300	F	>300	D	36.6	D	46.9	D	54.4	F	291.0

Table 3.1.6-11 Year 2040 High Desert Corridor Intersection Level of Service Summary

ID No.	Intersection	Type of Control	Existing Condition				Design Year 2040 No-Build Condition				Design Year 2040 Build Alternative				Design Year 2040 Build Alternative with Toll			
			AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak	
			LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
86	Caughlin Road and Rancho Road	Stop EB/WB	Does not exist				E*	35.8	F*	58.8	A	6.3	B	14.0	A	5.1	A	7.2
92*	Bellflower Street and SR-18	Existing–stop NB/SB; future–signal	C	20.8	D	27.4	F	89.2	F	>300	C	30.2	C	30.3	C	27.2	C	30.0
94	US 395 and Air Base Road	Signal	C*	30.3	C*	34.9	D*	45.6	E*	75.0	C	25.4	C	30.4	C	21.8	C	24.4
97	US 395 and Rancho Road	Signal	C*	24.6	C*	26.4	D*	48.2	F*	107.7	C	23.2	C	31.3	C	20.9	D	43.5
99*	US 395 and SR-18	Signal	C	34.0	D	36.5	E	61.1	F	90.6	D	42.2	E	64.1	D	39.7	D	47.0
104*	Topaz Road and SR-18	Signal	D	43.3	C	27.5	F	97.3	F	160.2	D	42.2	E	59.5	D	39.7	D	49.1
105*	Amethyst Road and SR-18	Signal	C	28.8	C	30.4	D	48.9	F	108.3	C	34.5	D	42.6	C	33.9	D	37.7
110*	El Evado Road and SR-18	Signal	C	28.0	C	28.1	D	40.9	F	80.9	D	39.0	D	46.6	D	37.5	D	39.3
118*	Amargosa Road and SR-18	Signal	C	28.2	D	39.9	F	84.9	F	200.0	C	27.3	D	36.9	C	26.4	D	36.6
130	I-15 southbound off-ramp and Stoddard Wells Road	Existing–stop NB/SB	A	2.6	A	2.7	F	>300	F	>300	F	>300	F	>300	F	>300	F	>300
		Improvements–signal	N/A	N/A	N/A	N/A	B	12.7	B	10.9	B	10.9	B	10.1	B	12.2	A	9.7
131	I-15 northbound on-ramp and Stoddard Wells Road/Frontage Road	Existing–stop EB/WB	A	3.7	A	3.7	C	15.1	D	33.9	F	>300	F	>300	F	>300	F	>300
		Improvements–stop EB/WB**	N/A	N/A	N/A	N/A	A	7.3	A	8.3	A	9.5	A	9.8	B	10.6	B	11.5
132	I-15 southbound on-ramp and Stoddard Wells Road	Existing–stop EB/WB	A	3.0	A	2.1	B	10.2	D	29.4	F	>300	F	>300	F	>300	F	>300
		Improvements–signal	N/A	N/A	N/A	N/A	B	12.6	A	8.9	B	10.0	A	4.9	A	9.2	A	4.6
133	Stoddard Wells Road and I-15 Frontage Road	Existing–stop EB/WB	A	5.6	A	1.2	F	118.2	F	>300	F	>300	F	>300	F	>300	F	>300
		Improvements–signal	N/A	N/A	N/A	N/A	B	15.6	B	16.5	B	14.5	B	14.5	B	14.3	B	14.9
134*	Stoddard Wells Road and SR-18	Signal	B	12.7	C	23.2	B	17.7	F	87.2	B	12.5	D	41.0	B	10.4	C	26.0

Table 3.1.6-11 Year 2040 High Desert Corridor Intersection Level of Service Summary

ID No.	Intersection	Type of Control	Existing Condition				Design Year 2040 No-Build Condition				Design Year 2040 Build Alternative				Design Year 2040 Build Alternative with Toll			
			AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak	
			LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
135*	Apple Valley Road and SR-18	Signal	C	33.1	D	40.2	F	81.3	F	150.3	D	50.0	E	72.2	D	42.4	D	51.2
147*	Dale Evans Parkway and SR-18	Signal	B	17.8	C	21.0	C	30.2	E	78.2	C	22.5	D	43.5	C	21.5	D	35.5
156	Joshua Road and Thunderbird Road	Stop EB/WB	Does not exist				C*	18.6	F*	127.5	A	5.4	B	12.9	A	6.5	C	19.6
158	Joshua Road and Yucca Loma Road	Existing–stop NB/SB; future–4-way stop	B*	10.3	A*	9.5	F*	61.2	F*	276.1	A	3.7	C	17.4	A	3.7	C	15.5
159	Joshua Road and Nisqually Road	4-way stop	Does not exist				C*	15.9	E*	46.2	A	2.5	A	3.8	A	2.5	A	3.9

Notes:
Proposed additional geometry improvements.
Two-way stop control LOS reported for worst approach.
4-way stop reported for overall LOS.
Intersection LOS calculations are based on HCM 2000, excepted where noted with *.
*Intersection LOS was calculated using TRAFFIX software.
LOS E
LOS F

Source: High Desert Corridor Traffic Study Report, 2014.

The Freeway/Expressway Alternative performs much better at the studied intersections when compared to the no-build condition. Only 2 of the 164 intersections studied perform at LOS E or F during the AM peak hour, while 5 intersections perform poorly during the PM peak hour. These poorly performing intersections are listed below.

- 15th Street East and East Palmdale Boulevard (AM, PM)
- 50th Street East and East Palmdale Boulevard (AM, PM)
- 140th Street East and East Palmdale Boulevard (PM-Toll Alternative)
- 140th Street East and East Avenue R (PM-Toll Alternative)
- SR-138 and SR-18 (PM)

Freeway /Tollway Alternative

The same finding is the case with respect to the Freeway/Tollway Alternative, except that Intersection 16, the southbound SR-14 off-ramp termini at West Avenue S, performs at LOS E during the AM peak hour.

Insofar as overall performance for the No Build Alternative and build alternatives under design year (2040) conditions, the number of study intersections projected to operate at LOS E or F is summarized in Table 3.1.6-12.

Table 3.1.6-12 Summary of Study Intersection Year 2040 Level of Service Performance

	No Build		Build		Build with Tolls	
	AM	PM	AM	PM	AM	PM
Number of intersections studied	116		159		159	
Intersections performing at LOS E or F	23	45	2	8	5	7
Percent performing at LOS E or F	20	39	1	5	3	4

Source: High Desert Corridor Traffic Study Report, 2014.

Freeway/Expressway with HSR Alternative and Freeway/Tollway with HSR Alternative (Preferred Alternative)

The operational performance for most intersections under the HSR feeder service alternatives is the same as reported for the build alternative and the build alternative with tolls; however, key study intersections located near the Palmdale and Victorville train stations would be affected.

Tables 3.1.6-13 and 3.1.6-14 list the key study intersections in the immediate vicinity of the Palmdale Transportation Center and the proposed Victorville XpressWest station.

Table 3.1.6-13. Year 2020 Intersection Level of Service near Palmdale and Victorville High-Speed Train Stations

ID NO.	INTERSECTION	TYPE OF CONTROL	EXISTING CONDITION				OPEN YEAR 2020 NO-BUILD CONDITION				OPEN YEAR 2020 BUILD ALTERNATIVE				OPEN YEAR 2020 BUILD ALTERNATIVE WITH TOLL				OPEN YEAR 2020 BUILD ALTERNATIVE WITH RAIL				OPEN YEAR 2020 BUILD ALTERNATIVE WITH TOLL AND RAIL			
			AM PEAK		PM PEAK		AM PEAK		PM PEAK		AM PEAK		PM PEAK		AM PEAK		PM PEAK		AM PEAK		PM PEAK		AM PEAK		PM PEAK	
			LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY
13*	SR 14 SB off-/on-ramps and West Palmdale Boulevard	Signal	B	11.3	B	11.1	C	26.7	C	24.3	A	7.4	B	14.5	A	7.5	B	15.1	A	8.0	B	14.3	A	7.4	B	15.2
14*	SR 14 NB off-/on-ramps and East Palmdale Boulevard	Signal	A	7.4	B	10.1	B	11.3	B	10.8	C	27.3	C	23.7	C	29.0	C	22.4	C	27.6	C	23.6	C	28.7	C	22.6
15*	Division Street and East Palmdale Boulevard	Signal	C	27.9	C	28.0	D	37.8	D	38.0	C	22.5	C	24.7	C	22.3	C	24.6	C	23.0	C	25.1	C	22.9	C	25.0
19*	Sierra Highway and Technology Drive	Signal	B	14.3	B	16.8	D	43.6	E	78.5	B	13.1	B	16.7	B	13.1	B	16.7	B	14.0	B	16.8	B	14.0	B	16.8
20*	Sierra Highway and East Avenue Q	Signal	B	16.0	B	15.4	B	14.1	B	15.2	B	16.0	B	15.3	B	16.0	B	15.3	B	16.0	B	15.3	B	16.0	B	15.3
21*	5th Street East and East Palmdale Boulevard	Signal	C	22.1	C	23.8	B	17.9	C	24.0	C	23.1	C	26.3	C	22.8	C	26.5	C	23.2	C	26.0	C	23.2	C	26.8
22*	6th Street East and East Palmdale Boulevard	Signal	C	20.7	C	25.3	D	39.9	D	44.4	C	27.9	C	28.2	C	27.7	C	28.2	C	27.7	C	28.3	C	27.7	C	28.3
23*	Sierra Highway and East Palmdale Boulevard	Signal	C	25.5	C	27.3	D	39.8	E	71.4	C	26.8	C	29.6	C	26.9	C	29.4	C	31.0	C	29.6	C	26.9	C	29.4
27*	10th Street East and East Avenue Q	Existing–4-way stop Future–signal	B*	10.3	B*	12.6	C*	22.0	C*	23.2	C	32.8	C	23.2	C	31.9	C	25.5	C	24.7	C	26.1	C	25.6	C	26.0
28*	10th Street East and East Palmdale Boulevard	Signal	B	17.2	C	20.0	C	28.4	D	37.6	C	27.3	C	28.4	C	29.9	C	26.9	C	31.0	D	40.3	C	25.7	C	33.3
32*	20th Street East and WB High Desert Corridor ramps	Signal	Does not exist				Does not exist				C	27.0	C	24.4	C	27.6	C	25.5	C	33.6	C	23.0	C	31.1	C	24.9
33*	20th Street East and EB High Desert Corridor ramps	Signal	Does not exist				Does not exist				C	31.0	D	40.3	C	25.7	C	33.3	C	27.6	C	28.2	C	29.9	C	26.2
138*	I-15 SB off-/on-ramps and Dale Evans Parkway	Existing–stop NB/SB Future–signal	A	4.7	A	3.1	A	7.2	B	10.3	C	21.0	C	22.9	C	20.5	C	22.9	A	7.2	C	20.3	A	6.9	C	15.5
139*	I-15 NB off-/on-ramps and Dale Evans Parkway	Existing–stop NB/SB Future–signal	A	4.3	A	3.1	A	8.6	A	8.2	C	20.3	B	16.3	C	20.2	B	16.4	A	8.3	B	11.8	B	11.8	A	7.2

Notes:
1. Two-way stop control level of service reported for worst approach.
2. 4-way stop reported for overall level of service.
3. Intersection level of service calculations are based on HCM 2000, except where noted with *.

*Intersection level of service was calculated using TRAFFIX software.

Level of service E

Level of service F

Source: High Desert Corridor Traffic Study Report, 2014.

Table 3.1.6-14. Year 2040 Intersection Level of Service near Palmdale and Victorville High-Speed Train Stations

ID NO.	INTERSECTION	TYPE OF CONTROL	EXISTING CONDITION				DESIGN YEAR 2040 NO-BUILD CONDITION				DESIGN YEAR 2040 BUILD ALTERNATIVE				DESIGN YEAR 2040 BUILD ALTERNATIVE WITH TOLL				OPEN YEAR 2040 BUILD ALTERNATIVE WITH RAIL				DESIGN YEAR 2040 BUILD ALTERNATIVE WITH TOLL AND RAIL			
			AM PEAK		PM PEAK		AM PEAK		PM PEAK		AM PEAK		PM PEAK		AM PEAK		PM PEAK		AM PEAK		PM PEAK		AM PEAK		PM PEAK	
			LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY
13*	SR 14 SB off-/on-ramps and West Palmdale Boulevard	Signal	B	11.3	B	11.1	C	27.6	C	30.1	A	8.0	B	16.2	A	7.3	B	11.6	A	8.6	B	16.0	A	8.0	B	14.8
14*	SR 14 NB off-/on-ramps and East Palmdale Boulevard	Signal	A	7.4	B	10.1	A	7.6	B	17.3	C	29.6	C	26.5	A	8.6	B	14.4	C	29.7	C	29.4	C	29.1	C	26.2
15*	Division Street and East Palmdale Boulevard	Signal	C	27.9	C	28.0	**E**	64.1	**E**	71.4	C	29.4	C	31.1	C	27.9	C	31.1	C	31.3	C	32.2	C	29.3	C	29.9
19*	Sierra Highway and Technology Drive	Signal	B	14.3	B	16.8	D	50.9	**F**	115.4	B	14.1	B	18.0	B	13.9	B	17.7	B	14.7	B	17.7	B	14.6	B	16.8
20*	Sierra Highway and East Avenue Q	Signal	B	16.0	B	15.4	B	15.0	B	15.3	B	17.1	B	16.0	B	16.9	B	15.8	B	17.7	B	15.8	B	17.5	B	15.3
21*	5th Street East and East Palmdale Boulevard	Signal	C	22.1	C	23.8	C	21.4	C	31.4	C	25.4	C	28.7	C	25.0	C	27.3	C	25.5	C	28.7	C	24.9	C	26.0
22*	6th Street East and East Palmdale Boulevard	Signal	C	20.7	C	25.3	**E**	55.7	**E**	78.0	C	29.4	C	32.3	C	28.7	C	30.5	C	29.4	C	32.3	C	28.8	C	28.3
23*	Sierra Highway and East Palmdale Boulevard	Signal	C	25.5	C	27.3	**F**	82.1	**F**	94.6	C	29.7	C	32.2	C	30.9	D	35.1	C	29.7	C	32.2	C	27.5	C	29.6
27*	10th Street East and East Avenue Q	Existing–4-way stop Future–signal	B*	10.3	B*	12.6	C*	22.7	C*	29.3	C	28.1	C	24.8	C	26.3	C	26.5	C	25.3	C	27.5	C	24.5	C	26.1
28*	10th Street East and East Palmdale Boulevard	Signal	B	17.2	C	20.0	C	31.3	D	50.6	C	32.3	**E**	60.8	C	29.1	D	49.5	C	32.3	D	52.2	C	30.3	D	40.3
32*	20th Street East and WB High Desert Corridor ramps	Signal	Does not exist				Does not exist				D	39.2	C	24.6	D	40.1	C	29.9	D	38.3	C	24.9	D	37.3	C	28.8
33*	20th Street East and EB High Desert Corridor ramps	Signal	Does not exist				Does not exist				C	25.6	C	26.6	C	26.5	C	24.7	C	26.2	C	27.0	C	28.3	C	28.1
138*	I-15 SB off-/on-ramps and Dale Evans Parkway	Existing–stop NB/SB Future–signal	A	4.7	A	3.1	C	28.2	C	24.8	C	23.7	C	26.7	C	23.9	C	25.4	C	29.4	C	30.9	C	29.2	C	30.9
139*	I-15 NB off-/on-ramps and Dale Evans Parkway	Existing–stop NB/SB Future–signal	A	4.3	A	3.1	B	13.1	B	12.8	C	22.5	B	17.7	C	21.7	B	18.3	B	14.7	A	8.5	B	18.7	A	9.1

Notes:
1. Two-way stop control level of service reported for worst approach.
2. 2-way stop reported for overall level of service.
3. Intersection level of service calculations are based on HCM 2000, except where noted with *.

*Intersection level of service was calculated using TRAFFIX software.

Level of service E

Level of service F

Source: High Desert Corridor Traffic Study Report, 2014.

Local Roadway Access Modifications and Circulation Impacts

The HDC Project build alternatives would construct freeway-to-freeway “system” interchanges at I-15 and SR-14, local “service” interchanges at north–south crossings of arterial streets, grade separations (i.e., overcrossings or undercrossings) of local streets having no freeway access, and at-grade, traffic signal-controlled intersections along the expressway portion of the project east of Dale Evans Parkway. The locations of the local service interchanges, grade separations proposed for initial construction, and at-grade signalized intersections currently proposed as part of the HDC build alternatives are illustrated in Figure 3.1.6-5.

Construction of the HDC freeway/expressway would potentially sever many primarily north–south running local roads that are planned for future development. For the most part, these severed roads are “paper streets,” which are located in relatively undeveloped areas. Local roads running parallel to the HDC would provide access to north–south roads identified for interchanges or grade separations. Additional grade separations may be proposed and constructed at a later date when land development warrants additional north–south circulation capacity.

Table 4-41 of the *High Desert Corridor Traffic Study Report* catalogs the proposed interchanges, grade separations, and signalized intersections along the HDC freeway/expressway build alternative. The same table also lists the candidate grade separations identified in the *High Desert Corridor Traffic Study Report*. These candidate locations may or may not be constructed at a later date when land development and local circulation needs warrant. The table also lists local roads that would be severed by the project.[10] Many of these local roads are “paper streets,” as noted above. Cul-de-sac turnarounds would be constructed for most of the street closures. New frontage roads may also be constructed in a limited number of cases to mitigate street closures.

Transit Service Impacts

Antelope Valley Transit Authority Routes 3 and 10 would cross the proposed HDC at 10th Street East and Sierra Highway, respectively. Grade-separated crossings are provided, as the freeway is on a viaduct structure; therefore, the route alignments would not be affected. The Lake Los Angeles Express route would also cross the proposed HDC in the viaduct section and on Palmdale Boulevard in the vicinity of 120th Street East. This crossing of Palmdale Boulevard would be grade separated so the route alignment would not be affected.

VVTA Routes 22, 32, 33, and the B–V Link would also cross the proposed HDC alignment. Route 22, Helendale, runs along National Trails Highway, which would be grade separated. Route 33, Adelanto Circulator, would cross the proposed HDC alignment along Bellflower Street, which would also be grade separated. The B–V

[10] The local roads to be severed vary by alignment alternative. Aerial photographs of the freeway alignment, included in the appendix, should be examined for clarification of which roads would be potentially impacted.

Link connects Fort Irwin and Barstow with the San Bernardino Valley and runs along I-15. None of these routes would be impacted by the alignment of the proposed HDC.

Route 32, Adelanto–Victorville North, would be impacted by the proposed alignment of the HDC. A portion of the route running along Air Expressway Boulevard west of the Victorville Federal Correctional Complex would need to be rerouted if the HDC follows the Air Expressway alignment passing between the Correctional Complex and the Southern California Logistics Airport (SCLA). If alignment Variation E is selected for the freeway, running along the south side of the correctional complex, the HDC alignment would cross over Village Drive on a viaduct structure, and the route would not be affected.

Freeway Access Modifications

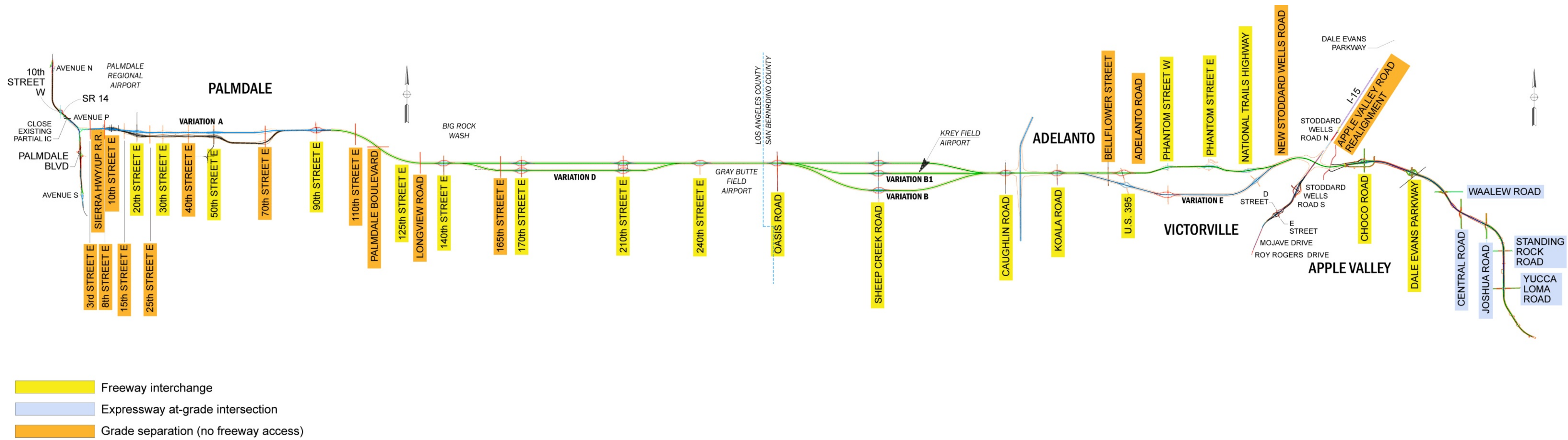
The build alternatives would entail construction of new and revised interchange access points along I-15 and SR-14. Along I-15, a new freeway-to-freeway "system" interchange is proposed to connect the HDC with I-15. The interchange would be located in Victorville, north of Stoddard Wells Road, subject to approval by FHWA. Along SR-14, a new freeway-to-freeway system interchange is proposed to connect the HDC with SR-14. The interchange would be located in Palmdale, north of Palmdale Boulevard (existing SR-138), subject to approval by the California Transportation Commission (CTC).

This system interchange is physically located 1 mile north of Palmdale Boulevard and 1 mile south of 10th Street West. A system of collector-distributor roads and braided ramps extends the operational spacing of the interchange to 2 miles or more in both northbound and southbound directions. To achieve this 2-mile spacing, a design guideline for the proximity of system to local interchanges, the on- and off-ramps serving the partial interchange at Rancho Vista Boulevard (West Avenue P), would need to be relocated.[11] The geometric layout plans for SR-14 indicate that the northbound off-ramp and the southbound on-ramp would be relocated from Rancho Vista Boulevard to 10th Street West. The 10th Street West and Rancho Vista Boulevard (West Avenue P) intersection is in close proximity to the adjacent Antelope Valley Regional Shopping center.

The intersection LOS analysis indicates that the proposed relocation of ramps would maintain and/or improve LOS performance at the study intersections located in close proximity to the Antelope Valley Mall. The general improvement of traffic conditions, between the build versus no-build alternatives, results from Antelope Valley Mall-related traffic being able to avoid the intersection of 10th Street West and Rancho Vista Boulevard when traveling to and from the south on SR-14.

[11] While the ramp braids and collector-distributor roads would address traffic operational issues, the interchange spacing remains nonstandard, requiring a mandatory design exception fact sheet.

Figure 3.1.6-5 Proposed Locations of Interchanges, Grade Separations, and At-Grade Intersections along the High Desert Corridor



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Travel Times

Projected travel speeds are forecast to be increasingly slower over time. It is projected during the design year (2040) that motorists would average approximately 33 to 34 mph using existing highways. The freeway/expressway alternatives would result in substantial travel time savings in comparison with travel times for the future condition without the project. Without a new facility, travel times across a 70.6-mile-long route during the AM and PM peak periods are projected to be 123 minutes and 127 minutes, respectively. With a new freeway/expressway facility, travel times for the same periods across a more direct 67.0-mile-long route are projected to be approximately 77 minutes and 75 minutes, respectively. Travel times using the Palmdale to Victorville HSR facility would be generally less, under 30 minutes, based on HSR operating speeds being higher than freeway/expressway operating speeds.

Pedestrian and Bicycle Facility Impacts

Overall, the project would be designed to retain existing pedestrian and bicycle travelways to the extent feasible. The project build alternatives would incorporate a bicycle facility in both Los Angeles and San Bernardino counties along the proposed corridor, as outlined in Chapter 2 of this Draft Environmental Impact Report (EIR)/ Environmental Impact Statement (EIS). The impact is considered beneficial. In addition, the project will be designed to comply with all applicable ADA requirements.

Parking Impacts

The project would not displace existing parking supplies. The project could place additional demand for existing park-and-ride lots located in Palmdale. Existing park-and-ride lots in Victor Valley are located 6 and 12 miles away from the HDC and would not be impacted. Two new park-and-ride lots are proposed adjacent to the HDC at 50th Street East in Palmdale and at US 395 in Adelanto. These proposed lots are not part of the project and would need to be constructed by others as add-on elements.

Two of the project build alternatives include the provision of HSR service between Palmdale and Victorville, with service continuing to Las Vegas. Within the High Desert region, the service would include new stations at Palmdale, in the vicinity of the Palmdale Transportation Center, and in Victorville, to the west of I-15 at the Dale Evans Parkway interchange. (The Victorville Station is not part of the HDC Project.) Both stations would have parking constructed as part of the HSR service. Preliminary plans call for the provision of approximately 6,000 parking spaces at the Palmdale Station to serve Palmdale to Las Vegas HSR patrons. This parking supply would be in addition to existing parking supplies serving the Palmdale Transportation Center patrons and new parking supplies that would be constructed to serve riders of the proposed California HSR service between northern and southern California.

Avoidance, Minimization, and/or Mitigation Measures

No impacts to traffic operations are anticipated; therefore, no mitigation is required.

The project would incorporate bicycle facility components. The impact is beneficial; hence, no mitigation is required.

Additional parking would be required as a result of the inclusion of the HSR service between Palmdale and Victorville, with service continuing to Las Vegas. Adequate parking supplies would be provided as part of the HSR station design; therefore, impacts to parking are not anticipated, and no further mitigation is required.

Impacts to public transit services will be mitigated by having close coordination with VVTA during the final design to determine the modified route and notify the users well in advance of the change.

T-1: If the HDC freeway following the Air Expressway alignment passing between the Correctional Complex and the SCLA is selected, Caltrans and Metro shall coordinate with VVTA during the final design to request and comply with applicable procedures for any required route relocation or other disruptions to transit service during construction.

Standard conditions to minimize traffic impacts during project construction are provided in Section 3.6, Construction Impacts.

3.1.7 Visual/Aesthetics

The information in this section is based on the *HDC Project Visual Impact Assessment* (VIA) (August 2015), which was prepared following the methodology prescribed in the publication *Visual Impact Assessment for Highway Projects* (FHWA, 1981).

Regulatory Setting

The National Environmental Policy Act (NEPA) of 1969, as amended, establishes that the federal government use all practicable means to ensure all Americans safe, healthful, productive, and *aesthetically* (emphasis added) and culturally pleasing surroundings (42 United States Code [U.S.C.] 4331[b][2]). To further emphasize this point, the Federal Highway Administration (FHWA) in its implementation of NEPA (23 U.S.C. 109[h]) directs that final decisions on projects are to be made in the best overall public interest taking into account adverse environmental impacts, including among others, the destruction or disruption of aesthetic values.

The California Environmental Quality Act (CEQA) establishes that it is the policy of the state to take all action necessary to provide the people of the state "with…enjoyment of aesthetic, natural, scenic and historic environmental qualities" (CA Public Resources Code [PRC] Section 21001[b]).

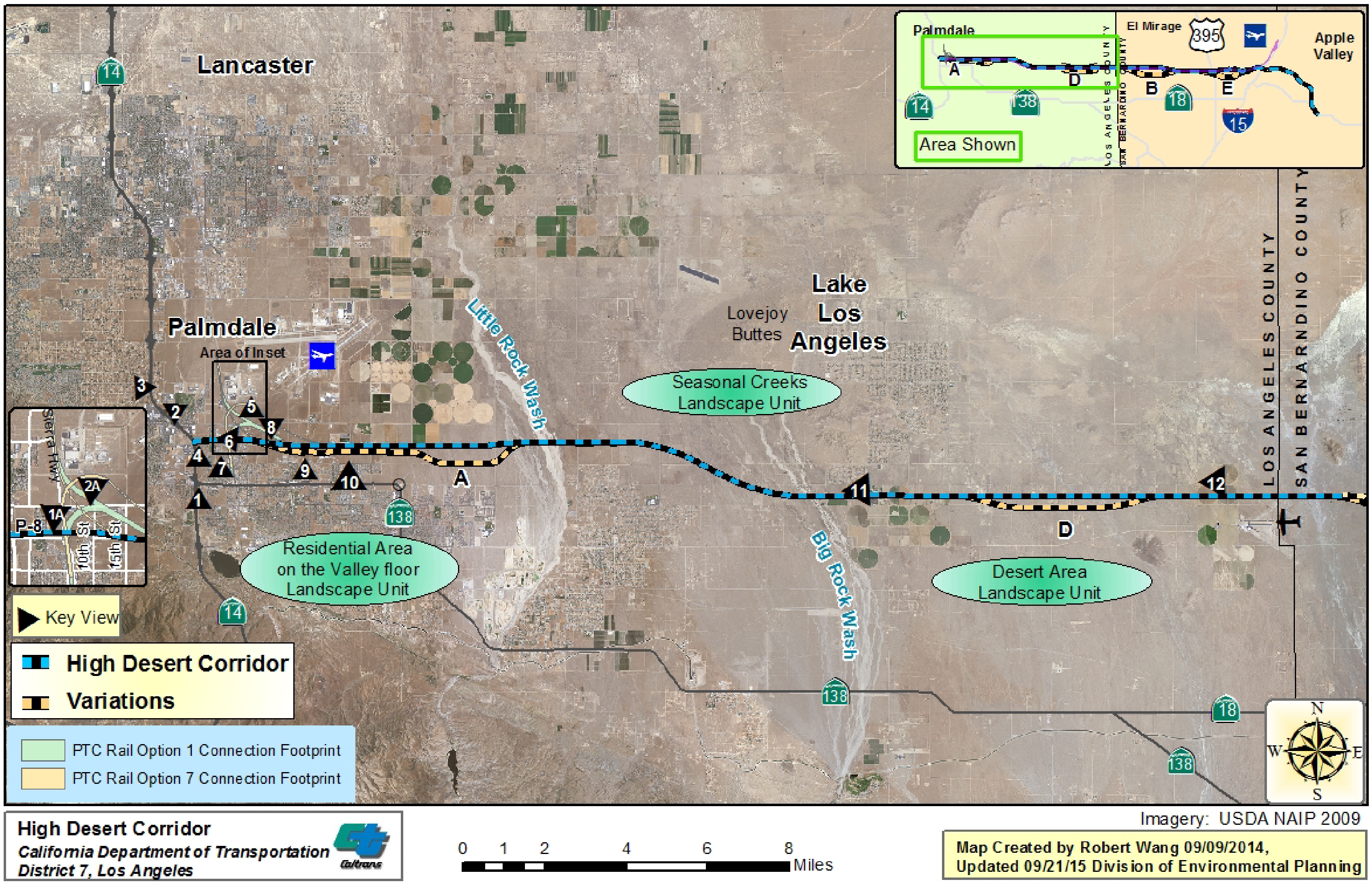
Affected Environment

The entire project is located in the Mojave Desert of southern California. The existing visual context is characterized by low-density residential, rural desert, and commercial developments of various sizes spread throughout the area. The landscape is characterized by desert chaparral consisting of desert scrub, Joshua trees, and California junipers. The land use within the corridor is primarily rural and suburban residential, but it also includes areas of commercial, industrial, recreational, open space, and agricultural land uses throughout. No scenic resources have been identified within the project area. No portion of the project is within an officially designated scenic highway.

Landscape Units

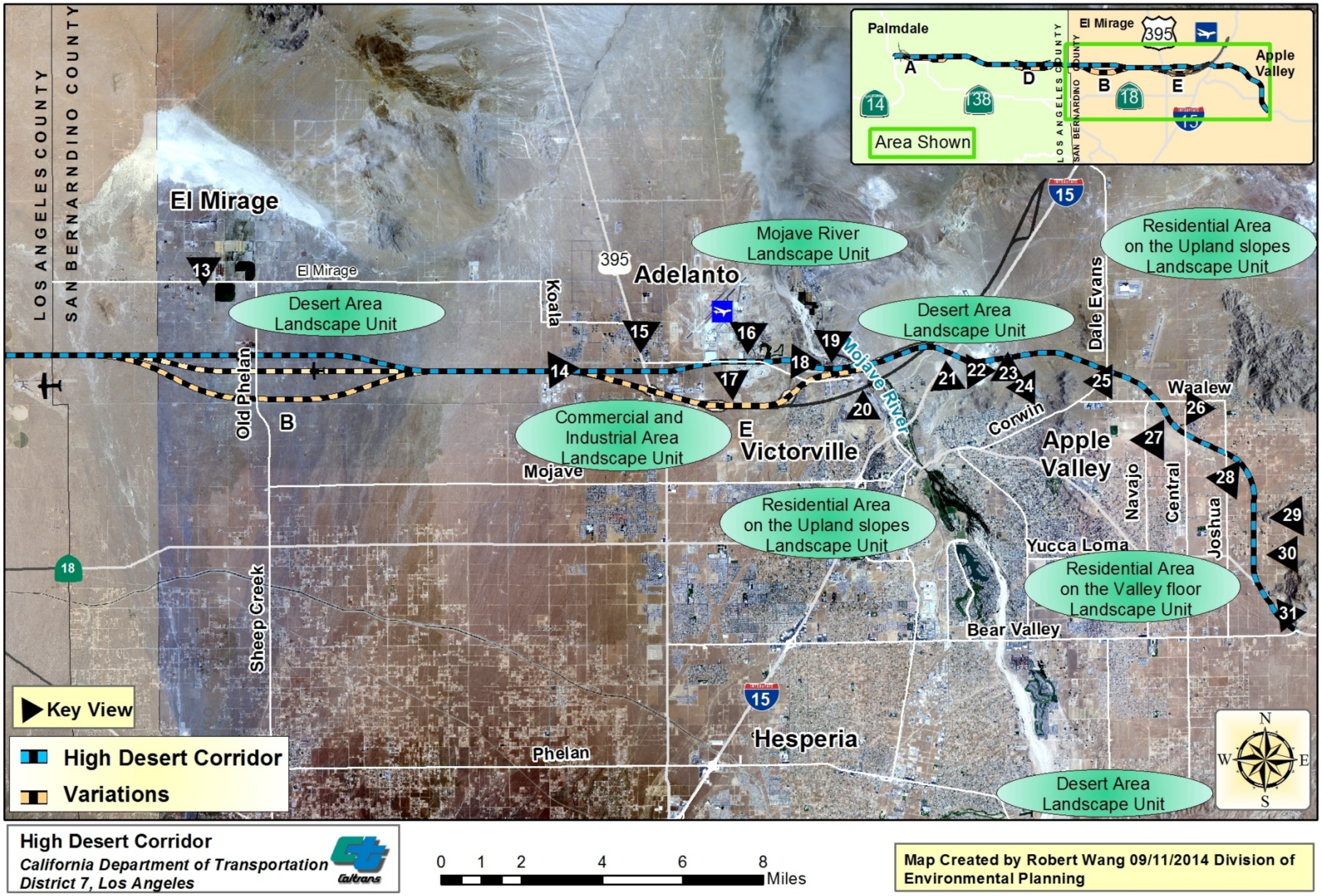
A landscape unit is a portion of the regional landscape and can be thought of as an outdoor room that exhibits a distinct visual character. They also make it easier to comprehend a large study area. The following landscape units were defined within the study area: Residential Area on the Valley Floor, Residential Area on the Upland Slopes, Commercial and Industrial Area, Desert Area, Seasonal Creeks, and Mojave River. Figures 3.1.7-1 and 3.1.7-2 identify the landscape units selected for the proposed project.

Figure 3.1.7-1 Landscape Units and Key Views (Los Angeles County)



Source: Visual Impact Assessment, 2015.

Figure 3.1.7-2 Landscape Units and Key Views (San Bernardino County)



Source: Visual Impact Assessment, 2015.

Key Views

Key views within the various landscape units were selected to best demonstrate the possible changes in the project's visual resources. Because it is not feasible to analyze all of the views in which the proposed project would be seen, it is necessary to select a number of key views associated with the visual assessment units that would most clearly demonstrate the change in the project's visual resources.

A total of 33 key views, 31 original key views plus 2 supplemental key views resulting from the analysis of the Palmdale Rail Station variation, were selected within the study area as identified in Figures 3.1.7-1 and 3.1.7-2, including:

- KV #1 – From State Route (SR) 14 looking north
- KV #1a – Looking south on Sierra Highway at Technology Drive (supplemental view for Palmdale Rail Station variation)
- KV #2 – SR-14 southbound where soundwall is proposed
- KV #2a – Looking south at East Avenue P and 10th Street (supplemental view for Palmdale Rail Station variation)
- KV#3 – Avenue N looking east toward SR-14
- KV#4 – P-8 and 8th looking north toward the High Desert Corridor (HDC)
- KV#5 – Looking north at HDC from east Avenue P-4 and 10th Street
- KV #6 – SR-14/Avenue P-8 interchange from Avenue P-8 looking west
- KV #7 – View from Desert Sands Park at 3rd Street East in Palmdale looking north
- KV #8 – Carolside Avenue looking south
- KV #9 – 20th Street looking north
- KV #10 – 35th Street looking north
- KV #11 – Crossing at Big Rock Wash looking west
- KV #12 – HDC at 240th Street looking west
- KV #13 – Panoramic view just east of San Bernardino county line looking south from El Mirage Road
- KV #14 – HDC looking east under utility wires along Air Expressway
- KV #15 – Looking south on United States Highway 395 (US 395) towards HDC
- KV #16 – Phantom Road East and Turner Road looking from Westwinds Golf Course south towards HDC
- KV #17 – Village Drive and Rancho Road looking south
- KV #18 – Looking east from Rockview Park
- KV #19 – Looking South on National Trails Highway toward HDC bridge
- KV #20 – Looking north on National Trails Highway toward high-speed rail (HSR) bridge
- KV #21 – HDC and Interstate 15 (I-15) interchange looking north from northbound I-15
- KV #22 – Looking north along Choco Road alignment
- KV #23 – Choco Road looking north
- KV #24 – Looking northeast at Dale Evans Parkway
- KV #25 – Looking northeast at Waalew Road
- KV #26 – Looking southwest at Central Road

- KV #27 – Looking northeast at Joshua and Zuni Road
- KV #28 – Looking northeast at Thunderbird Road and Shirwaun Road
- KV #29 – Looking west at Moccasin Road
- KV #30 – Yucca Loma Road looking west
- KV #31 – Deadman's Point Vista Point, looking north

Visual impacts of the build alternatives were determined by assessing the characteristics and quality of the existing visual resources and their future changes due to the HDC Project, and predicting viewer response to that change. The degree of visual quality in a view was evaluated using the following FHWA descriptive terms:

- **Vividness** is the extent to which the landscape is memorable and is associated with distinctive, contrasting, and diverse visual elements.
- **Intactness** is the integrity of visual features in the landscape and the extent to which the existing landscape is free from nontypical visual intrusions.
- **Unity** is the extent to which all visual elements combine to form a coherent, harmonious visual pattern.

In the existing corridor, the view of the distant mountains, which are snowcapped most of the time, adds to the visual vividness. Intactness is high due to the lack of visually intrusive, tall, vertical manmade features in the landscape. The unity of the desert vegetation and color of the desert soil and rock is an important element of the existing visual quality.

The levels of visual impact are defined relative to the change from existing visual quality and are described as follows:

- **Low –** Minor change to the existing visual resource, with low viewer response to change in the visual environment. May or may not require mitigation.
- **Moderate –** Moderate change to the visual resource with moderate viewer response. Impact can be mitigated within 5 years using conventional practices.
- **High –** A high level of change to the resource or a high level of viewer response to visual change such that design treatments cannot mitigate the impacts. Viewer response level is high. An alternative project design may be required to avoid highly adverse impacts.

Visual Character

Visual character includes attributes, such as form, line, color, and texture, and it is used to describe, not evaluate. These attributes are neither considered good nor bad. A change in visual character can be evaluated when it is compared with the viewer response to that change. Changes in visual character can be quantified by identifying how visually compatible a proposed project would be with the existing visual condition by using visual character attributes as an indicator.

The visual character of the proposed project would be somewhat compatible with the existing visual character of the corridor in terms of form. The project corridor consists of flat, open desert and is mostly rural with various levels of manmade intrusion.

Views are far-reaching due to its open, generally flat to gently rolling topography. Therefore, there is a moderate to moderate-high rating in terms of form and line. There are distant views of the surrounding mountains, which influence visual dominance and scale. At night, the sky is usually starry and is visible here because of the lack of city light pollution. This starry sky adds much to the visual character of color (i.e., light and dark). The existing vegetation adds texture to the existing visual character. Diversity is low due to the likeness of color and mostly flat terrain. The most significant visual character attribute is continuity (i.e., uninterrupted flow of form, line, color, or textural pattern) that the existing desert provides.

Viewer Groups

The following sensitive viewer groups were evaluated within the study area, including:

- Highway neighbors (views to the road): This group includes residents, pedestrians, recreational area users, commercial, and workers
- Highway users (views from the road): This group includes motorists, HSR passengers, and bicyclists

Context-Sensitive Solutions (CSS)

To address local values, Caltrans uses “Context-Sensitive Solutions” as an approach to plan, design, construct, maintain, and operate its transportation system. These solutions use innovative and inclusive approaches that integrate and balance community, aesthetic, historic, and environmental values with transportation safety, maintenance, and performance goals. CSS are reached through a collaborative, interdisciplinary approach involving all stakeholders.

Environmental Consequences

Visual impacts are determined by assessing changes to the visual resources and predicting viewer response to those changes. These impacts can be positive or negative. Because it is not feasible to analyze all of the views in which the proposed project would be seen, it is necessary to select a number of key views associated with the visual assessment units that would most clearly demonstrate the change in the project’s visual resources. Key views also represent the viewer groups that have the highest potential to be affected by the project considering viewer’s exposure and sensitivity.

The following subsection describes and illustrates visual impacts at each Key View, compares existing conditions to the proposed alternatives, and includes the predicted viewer response. The predicted view with the project alternatives was done through visual simulation. A quantitative visual impact analysis was performed in the VIA prepared for this project, and the results of that analysis are presented here in terms of low, moderate, and high, as described above. All existing and simulated views presented in this section were excerpted from the VIA prepared for this project. A summary of impacts by alternative is provided following the Key View analysis section.

Key View (KV) #1 – From SR-14 looking north

The existing view, depicted in Figure 3.1.7-3, shows an undeveloped area of Palmdale with buildings in the background. It is moderate-low in visual quality based on vividness, intactness, and unity. The open foreground includes elements of the Desert Area Landscape Unit and a wide expansive view that is unique to the visual character of the desert landscape.

Viewer Response

There would be more than 100,000 motorist viewers affected by this visual change for short durations. Mid-ground views of the undeveloped area would be changed with the insertion of a freeway-to-freeway interchange with a connector ramp, large flyover, and the eight-lane HDC running perpendicular to the existing SR-14, as shown in Figure 3.1.7-4. Viewer response is expected to be moderate.

Figure 3.1.7-3 KV #1 Existing View

Figure 3.1.7-4 KV #1 Simulated Project View – Build Alternatives

Resource Change

The proposed HDC and SR-14 freeway-to-freeway interchange would negatively affect visual intactness and unity, while slightly increasing the vividness of the view. This would result in a slight lowering of the visual quality. The expansive horizontal character would be changed to include more vertical elements. New sources of light from headlights that are elevated on the flyovers, as well as lighting for the interchange, would adversely affect nighttime views in the area. This contrast of horizontal and vertical elements would be an incompatible change in visual character in the proposed view. The overall resource change would be a low negative change.

KV #1a – Looking South on Sierra Highway at Technology Drive (Supplemental View for Palmdale Rail Station Variation)

The existing view of the intersection of Technology Drive and Sierra Highway looking south is of an undeveloped parcel, existing rail facilities, and commercial buildings in the foreground (Figure 3.1.7-5). Mid-ground views are of the existing Palmdale Transportation Center. Distant views are of the mountains. The overall view is low to moderate in visual quality.

Viewer Response

Motorist Viewer Group – The viewer response of the motorist viewer group would be low due to the short duration of exposure. The foreground view would change from undeveloped desert to a view of the bridge over the railway. The mid-ground and distant views of the existing Palmdale Transportation Center and mountains would be blocked by the realigned Sierra Highway over the rail facilities.

Rail Passenger Group – The viewer response of the rail passenger group would be low to both Rail Options 1 and 7, and Station Variations A, B, and C. Rail Option 1, Station Variation A is depicted in Figure 3.1.7-6.

Figure 3.1.7-5 KV #1a Existing View

Figure 3.1.7-6 KV #1a Simulated Project View – Build Alternatives (Palmdale Rail Station Variation)

Resource Change

The proposed rail station design variation would negatively affect visual intactness and unity while slightly increasing the vividness of the view. This would result in a slight lowering of the visual quality. The expansive horizontal character would be changed to include more vertical elements. Views of the mountain would be blocked by the bridge. New sources of light from headlights that are elevated on the bridge would adversely affect nighttime views in the area. This contrast of horizontal and vertical elements would be an incompatible change in visual character of the proposed view. The overall resource change would be a low negative change.

KV #2 – SR-14 Southbound where Soundwall is Proposed

The existing view, depicted in Figure 3.1.7-7, of a residential neighborhood and hotels in Palmdale and mountains in the distance is moderate in visual quality based on vividness, intactness, and unity. The wide expansive view is unique to the visual character of the desert landscape.

Viewer Response

There would be more than 100,000 motorist viewers affected by this visual change for short durations. Mid-ground views of the trees, hotel buildings, and houses would be blocked by the soundwall, as shown in Figure 3.1.7-8. Viewer response is expected to be moderate.

Figure 3.1.7-7 KV #2 Existing View

Figure 3.1.7-8 KV #2 Simulated Project View – Build Alternatives

Resource Change

The proposed soundwall would negatively affect visual intactness and unity while slightly increasing the vividness of the view. This would result in a slight lowering of the visual quality. The expansive horizontal character would be changed to include more vertical elements. This contrast of horizontal and vertical elements would be incompatible with the visual character of the proposed view. The overall resource change would be a low negative change.

***KV #2a** – Looking South at East Avenue P and 10th Street (Supplemental View for Palmdale Rail Station Variation)*

The existing view of the intersection of 10th Street East/East Avenue P shows undeveloped desert and a local roadway (Figure 3.1.7-9). Mountain views are in the distance. This viewpoint is seen by residents traveling to and from their homes located adjacent to 10th Street East, south of East Avenue P. The overall view is low to moderate in visual quality.

Viewer Response

Resident Viewer Group – The viewer response of the resident viewer group would be moderate to high. For Rail Option 1, Station Variations A, B, and C, the response would be moderate because the rail facility would be below existing grade.

The viewer response for Rail Option 7, Station Variations A, B, and C, would be moderate-high with the addition of a 40-foot-high rail structure. Distant views of the mountains and sense of openness would be blocked by the rail structure (Figure 3.1.7-10).

Resource Change

The proposed 40-foot-high rail structure would negatively affect visual intactness, unity, and vividness of the view. This would result in a lowering of the visual quality. The view of the mountains would be mostly blocked. The addition of rectilinear elements would be incompatible with the visual character of the proposed view. The overall resource change would be a negative change.

Figure 3.1.7-9 KV #2a Existing View

Figure 3.1.7-10 KV #2a Simulated Project View – Build Alternatives (Rail Option 7, Station Variations A, B, and C)

KV #3 – Avenue N looking East toward SR-14

The existing view from a neighborhood arterial (Avenue N) in Palmdale, depicted in Figure 3.1.7-11, has a mid-ground view of SR-14 with the cars and trucks driving by and treetops and mountains in the distance. The overall view is moderate in visual quality based on vividness, intactness, and unity.

Viewer Response

There would be a small number of resident viewers affected by this visual change for long durations. There would be a higher number of motorist viewers affected by this visual change for short durations. A small number of trees and houses would be removed from the view, as shown in Figure 3.1.7-12. Viewer response is expected to be moderate.

Resource Change

The proposed realigned on-ramp would lightly increase visual vividness, intactness, and unity of the view. This would result in a slight heightening of the visual quality. Visual character elements, such as form, line, and diversity, decrease in compatibility while dominance and scale increase. This would make the visual character of the proposed view slightly less compatible from existing. The overall resource change would be a low positive change.

Figure 3.1.7-11 KV #3 Existing View

Figure 3.1.7-12 KV #3 Simulated Project View – Build Alternatives

KV #4 – P-8 and 8th looking North toward HDC

The existing landform at this viewpoint, depicted in Figure 3.1.7-13, is flat with open desert landscape and manmade elements. In the background is the Los Angeles/ Palmdale Regional Airport. The overall view is moderate-low in visual quality based on vividness, intactness, and unity.

Viewer Response

There would be a small number of resident viewers affected by this visual change for long durations. Distant views of the mountains and sense of openness would be blocked by the new bridge and roadway, as shown in Figures 3.1.7-14 (for Option 1 of HSR Wye Connection) and 3.1.7-15 (for Option 7 of HSR Wye Connection). Viewer response is expected to be moderate.

Figure 3.1.7-13 KV #4 Existing View

Figure 3.1.7-14 KV #4 Simulated Project View – All Freeway w/ HSR Alternatives/Option 1 of HSR Wye Connection

Figure 3.1.7-15 KV #4 Simulated Project View – All Freeway w/ HSR Alternatives/Option 7 of HSR Wye Connection

Resource Change

The proposed bridge would positively affect visual vividness but negatively affect intactness and unity of the view. This would result in a slight heightening of the visual quality. Visual character of the proposed view would decrease in compatibility. The overall resource change would be a low negative change.

KV #5 – Looking North at HDC from East Avenue P-4 and 10th Street

The existing view from a residential neighborhood in Palmdale, depicted in Figure 3.1.7-16, which has a distant view of the hills in the distance, is moderate-low in visual quality based on vividness, intactness, and unity.

Viewer Response

There would be resident viewers affected by this visual change for long durations. Distant views of the mountains and sense of openness would be blocked by the large

HSR bridge, as shown in Figure 3.1.7-17. Viewer response is expected to be moderate-high.

Figure 3.1.7-16 KV #5 Existing View

Figure 3.1.7-17 KV #5 Simulated Project View – All Freeway w/ HSR Alternatives/Option 7 of HSR Wye Connection

Resource Change

The proposed HSR bridge would negatively affect visual intactness and unity of the view while vividness would increase, especially in terms of manmade elements. Many houses and trees would need to be removed. This would result in a lowering of the visual quality. Visual character of the proposed view would decrease in compatibility. The overall resource change would be a low negative change.

KV #6 – SR-14/Avenue P-8 Interchange from Avenue P-8 looking West

The existing view, depicted in Figure 3.1.7-18, shows an undeveloped area of Palmdale with an SR-14 freeway overcrossing in the distance. It is moderate-high in visual quality based on vividness, intactness, and unity. The open foreground includes the elements of the Desert Area Landscape Unit and a wide expansive view that is unique to the visual character of the desert landscape.

Viewer Response

There would be more than 100,000 motorist viewers affected by this visual change for short durations. Mid-ground views of the undeveloped area would be changed with the widening of the existing road to eight lanes and the background altered by the insertion of a freeway-to-freeway interchange with a connector ramp, as shown in Figure 3.1.7-19. Viewer response is expected to be moderate.

Figure 3.1.7-18 KV #6 Existing View

Figure 3.1.7-19 KV #6 Simulated Project View – Build Alternatives

Resource Change

The proposed HDC and SR-14 freeway-to-freeway interchange would negatively affect visual vividness, intactness, and unity of the view. This would result in a lowering of the visual quality. The color and texture of the desert landscape would be changed to include more smooth, paved elements. This lack of color or texture would be incompatible with the visual character of the proposed view. The overall resource change would be a moderately low negative change.

KV #7 – View from Desert Sands Park at 3rd Street East in Palmdale looking North

The existing view from Desert Sands Park, depicted in Figure 3.1.7-20, shows an undeveloped area of Palmdale with trees and houses in the distance. It is moderate in visual quality based on vividness, intactness, and unity. The open area includes elements of the Desert Area Landscape Unit. There is a lot of vegetation that adds to intactness and unity of the view.

Viewer Response

There would be recreational area users from Desert Sands Park and American Indian Little League baseball fields affected by this visual change. A small number of resident viewers would be affected by this visual change for long durations. Distant views of the trees and houses would be somewhat blocked by the new roadway, as shown in Figure 3.1.7-21. Viewer response is expected to be moderate.

Figure 3.1.7-20 KV #7 Existing View

Figure 3.1.7-21 KV #7 Simulated Project View – Build Alternatives

Resource Change

The proposed roadway alignment would be 20 feet above existing grade and would negatively affect visual intactness and unity of the view by blocking some of the vegetation. Vividness would remain the same. This would result in a slight lowering of the visual quality. Visual character of the proposed view would decrease in compatibility. The overall resource change would be a low negative change.

KV #8 – Carolside Avenue looking South

The existing view from a residential neighborhood in Palmdale, depicted in Figure 3.1.7-22, shows empty lots in the mid-ground and trees and mountains in the distance. It is moderate-low in visual quality based on vividness, intactness, and unity.

Viewer Response

There would be a small number of resident viewers affected by this visual change for long durations. Distant views of the trees, most of the mountains, and the sense of openness would be blocked by the soundwall, as shown in Figure 3.1.7-23. Viewer response is expected to be moderate.

Figure 3.1.7-22 KV #8 Existing View

Figure 3.1.7-23 KV #8 Simulated Project View – Build Alternatives

Resource Change

The proposed soundwall would negatively affect visual intactness, vividness, and unity of the view. This would result in a lowering of the visual quality. Visual character of the proposed view would decrease in compatibility. The overall resource change would be a low negative change.

KV #9 – 20th Street looking North

The existing landform at this viewpoint is flat with open desert landscape and manmade elements, as shown in Figure 3.1.7-24. In the background is the Los Angeles/Palmdale Regional Airport. The existing view is moderate-low in visual quality based on vividness, intactness, and unity.

Viewer Response

Primarily motorist viewers would be affected by this visual change for short durations. Mid-ground views of the undeveloped area would be changed with the insertion of an overcrossing bridge structure and local interchange with on- and off-ramps, as shown in Figure 3.1.7-25. Viewer response is expected to be moderate.

Figure 3.1.7-24 KV #9 Existing View

Figure 3.1.7-25 KV #9 Simulated Project View – Build Alternatives

Resource Change

The proposed overcrossing bridge structure and local interchange with on- and off-ramps would negatively affect visual intactness and unity while slightly increasing the vividness of the view. This would result in a slight lowering of the visual quality. The horizontal character would be changed to include more vertical elements. This contrast of horizontal and vertical elements would be incompatible with the visual character of the proposed view. New sources of light from headlights that are elevated on the bridge, as well as lighting for the interchange, would adversely affect nighttime views in the area. The overall resource change would be a low negative change.

KV #10 – 35th Street looking North

The existing view from the neighborhood, depicted in Figure 3.1.7-26, shows an undeveloped area of Palmdale, trees, and houses with mountains in the distance. It is moderate in visual quality based on vividness, intactness, and unity. The open area includes elements of the Desert Area Landscape Unit. There is a lot of open area that adds to the intactness and unity of the view.

Viewer Response

There would be a small number of resident viewers affected by this visual change for long durations. Desert Air Golf Course is located in this area, and there would be recreational area users from that facility that would be affected by this visual change. Distant views of the trees and mountains would be somewhat blocked by the new roadway, as shown in Figure 3.1.7-27. Viewer response is expected to be moderate.

Figure 3.1.7-26 KV #10 Existing View

Figure 3.1.7-27 KV #10 Simulated Project View – Build Alternatives

Resource Change

The proposed roadway alignment would be 6 feet above existing grade and would negatively affect visual intactness and unity of the view by blocking some of the vegetation. Vividness would decrease slightly. This would result in a slight lowering of the visual quality. Visual character of the proposed view would decrease slightly in compatibility. The overall resource change would be a low negative change.

KV #11 – Crossing at Big Rock Wash looking West

The existing view of Big Rock Wash, depicted in Figure 3.1.7-28, has large riparian trees as its most vivid element. There is water and sand in the foreground and mid-ground. The visual quality based on vividness, intactness, and unity is moderate. The area is in the Seasonal Creeks Landscape Unit. There is a lot of open area that adds to intactness and unity of the view.

Viewer Response

The primary viewers of the change at this location would be motorists, rail passengers (for alignments with HSR feeder), and bicyclists. Manmade elements would become dominant in this mostly natural location. Views of the trees and water would be obstructed and overwhelmed by the new roadway, bridge, train tracks, and bike path, as shown in Figure 3.1.7-29. Viewer response is expected to be moderate.

Figure 3.1.7-28 KV #11 Existing View

Figure 3.1.7-29 KV #11 Simulated Project View – Build Alternatives (with HSR Feeder)

Resource Change

The proposed bridge structure with roadway, train tracks (for alignments with HSR feeder), and bike path would negatively affect visual vividness, intactness, and especially unity of the view. The cars and trains would add new sources of light and glare that would adversely affect day and nighttime views in the area. This would result in a slight lowering of the visual quality. The natural character would be changed to include more manmade elements. This introduction of large manmade elements would be incompatible with the visual character of the proposed view. The overall resource change would be a moderately low negative change.

KV #12 – HDC at 240th Street looking West

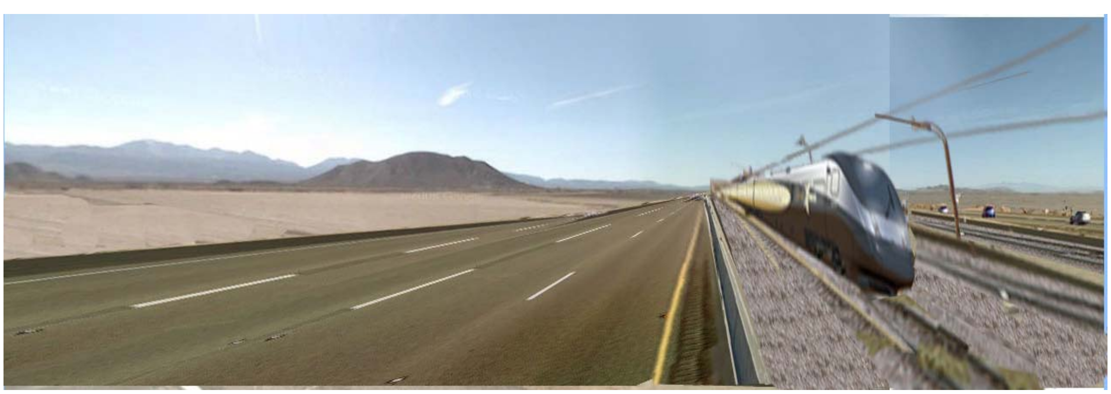
The existing view of the desert, depicted in Figure 3.1.7-30, has large buttes in the mid-ground and mountains in the background. Based on vividness, intactness, and unity, the visual quality rating is moderate. The buttes and the mountains are the most vivid elements in this view. The large amount of open area adds to intactness and unity of the view.

Viewer Response

The primary viewers of the change at this location would be motorists, rail passengers (for alignments with HSR feeder), and bicyclists. Manmade elements would become dominant in the mostly natural location. Views of the buttes and open land would be obstructed and overwhelmed by the new roadway, train tracks, and bike path, as shown in Figure 3.1.7-31. Viewer response is expected to be moderate.

Figure 3.1.7-30 KV #12 Existing View

Figure 3.1.7-31 KV #12 Simulated Project View – Build Alternatives (with HSR Feeder)



Resource Change

The proposed roadway, train tracks (for alignments with HSR feeder), and bike path would negatively affect visual vividness, intactness, and especially unity of the view. The cars and trains (for alignments with HSR feeder) would add new sources of light and glare that would adversely affect day and nighttime views in the area. This would result in a slight lowering of the visual quality. The natural character would be changed to include more manmade elements. This introduction of large manmade elements would be incompatible with the visual character of the proposed view. The overall resource change would be a low negative change.

KV #13 – Panoramic View just East of San Bernardino County Line looking South from El Mirage Road

The existing view of the desert, depicted in Figure 3.1.7-32, shows sagebrush vegetation with two residential lots in the mid-ground and mountains in the background. Based on vividness, intactness, and unity, the visual quality rating is moderate-high. The mountains are the most vivid elements in this view. The large amount of open area adds to intactness and unity of the view.

Viewer Response

The primary viewers of the change at this location would be motorists, rail passengers (for alignments with HSR feeder), bicyclists, and a small number of residents. Manmade elements would become dominant in the mostly natural location. Views of the vegetation open land would be obstructed and overwhelmed by the new roadway, train tracks, and bike path, as shown in Figure 3.1.7-33. Viewer response is expected to be moderate.

Figure 3.1.7-32 KV #13 Existing View

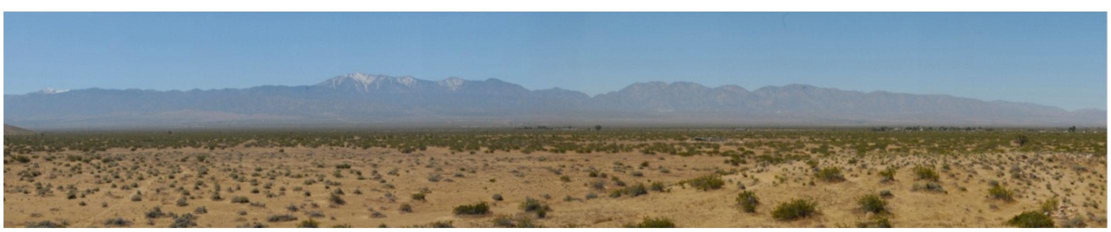
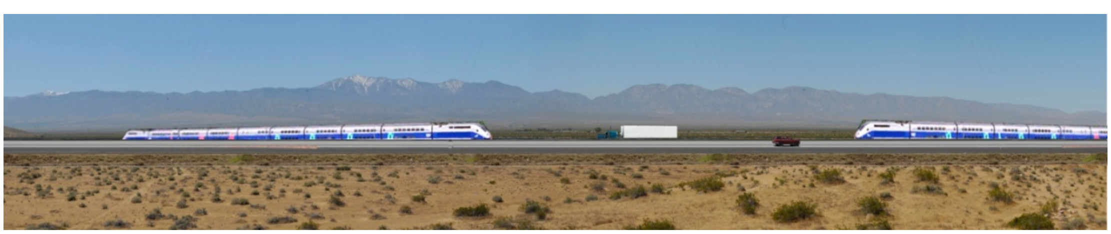


Figure 3.1.7-33 KV #13 Simulated Project View – Build Alternatives (with HSR Feeder)



Resource Change

The proposed roadway, train tracks, and bike path would negatively affect visual vividness, intactness, and unity of the view. The cars and trains (for alignments with HSR feeder) would add new sources of light and glare that would adversely affect day and nighttime views in the area. This would result in a slight lowering of the visual quality. The natural character would be changed to include more manmade elements. This introduction of large manmade elements would make the visual character of the proposed view greatly decrease in compatibility. The overall resource change would be a moderately low negative change.

KV #14 – HDC looking East under Utility Wires along Air Expressway

The existing view of the desert, depicted in Figure 3.1.7-34, has sagebrush and Joshua trees, high-voltage electrical power lines, and mountains in the far off background. Based on vividness, intactness, and unity, the visual quality rating is moderate.

Viewer Response

The primary viewers of the change at this location would be motorists, rail passengers (for alignments with HSR feeder), bicyclists, and a small number of residents. Though manmade elements currently exist, more manmade elements would become dominant in this location. Views of the vegetated open land would be obstructed and overwhelmed by the new roadway, train tracks, and bike path, as shown in Figure 3.1.7-35. Viewer response is expected to be moderate.

Resource Change

The proposed roadway, train tracks (for alignments with HSR feeder), and bike path would negatively affect visual intactness and unity of the view. This would result in a slight lowering of the visual quality. The visual character would be changed to include more manmade elements. This introduction of large manmade elements would make the visual character of the proposed view slightly decrease in compatibility. The overall resource change would be a low negative change.

Figure 3.1.7-34 KV #14 Existing View

Figure 3.1.7-35 KV #14 Simulated Project View – Build Alternatives

KV #15 – Looking South on US 395 towards HDC

The existing view of US 395 looking south, depicted in Figure 3.1.7-36, has sagebrush vegetation and mountains in the background. Based on vividness, intactness, and unity, the visual quality rating is moderate. The mountains are the most vivid elements in this view. The large amount of open area adds to intactness and unity of the view.

Viewer Response

There would be recreational area users from Richardson Park and Howard Loy Park affected by this visual change. Other viewers of the change at this location would be motorists, bicyclists, and a small number of residents. Manmade elements would become more dominant in the location. Views of the vegetated open land would be obstructed and overwhelmed by the new bridge, roadway, train tracks (for alignments with HSR feeder), and bike path, as shown in Figure 3.1.7-37. Viewer response is expected to be moderate.

Resource Change

The proposed roadway with on- and off-ramps, bridge structure, train tracks (for alignments with HSR feeder), and bike path would negatively affect visual intactness and unity of the view. This would result in a slight lowering of the visual quality. The visual character would be changed to include more manmade elements. This introduction of large manmade elements would make the visual character of the proposed view slightly decrease in compatibility. New sources of light from headlights that are elevated on the bridge, as well as lighting for the interchange, would adversely affect nighttime views in the area. The overall resource change would be a low negative change.

Figure 3.1.7-36 KV #15 Existing View

Figure 3.1.7-37 KV #15 Simulated Project View – Build Alternatives (with HSR Feeder)

KV #16 – Phantom Road East and Turner Road looking from Westwinds Golf Course South towards HDC

The existing view, depicted in Figure 3.1.7-38, shows Phantom Road East at Turner Road looking south with short hills and high-voltage electrical wires and towers in the mid-ground and mountains in the background. Based on vividness, intactness, and unity, the visual quality rating is moderate. The chaparral plants and a small bunch of green trees are the most vivid elements in this view. The large amount of open chaparral area adds to intactness and unity of the view.

Viewer Response

The primary viewers of the change at this location would be motorists and recreational area users from Schmidt Park and Westwinds Sports Center and Golf Course. The project would not be visible from most of these recreational areas due to topography. Manmade elements would become much more dominant in the location. Views of the mountains would be obstructed and overwhelmed by the new bridge, roadway, and train tracks (for alignments with HSR feeder), as shown in Figure 3.1.7-39. Viewer response is expected to be moderate.

Figure 3.1.7-38 KV #16 Existing View

Figure 3.1.7-39 KV #16 Simulated Project View – Build Alternatives (with HSR Feeder)

Resource Change

The increased roadway width and bridge would negatively affect visual vividness, intactness, and unity of the view. This would result in a lowering of the visual quality. The visual character would be changed to include more manmade elements. The mountains and existing green trees are blocked from view by the new facilities. This introduction of large manmade elements would be incompatible with the visual character of the proposed view. The overall resource change would be a moderate negative change.

KV #17 – Village Drive and Rancho Road looking South

The existing view from a residential neighborhood in Victorville, depicted in Figure 3.1.7-40, shows a distant view of the hills and is moderate in visual quality based on vividness, intactness, and unity.

Viewer Response

There would be a small number of resident viewers affected by this visual change for long durations. Distant views of the mountains and sense of openness would be blocked by the new overcrossing, as shown in Figure 3.1.7-41. Viewer response is expected to be moderate.

Figure 3.1.7-40 KV #17 Existing View

Figure 3.1.7-41 KV #17 Simulated Project View – Build Alternatives (with HSR Feeder Variation E)

Resource Change

The proposed overcrossing bridge would negatively affect visual intactness and unity of the view, while vividness would remain the same. This would result in a slight lowering of the visual quality. The visual character of the proposed view would slightly increase in compatibility. The overall resource change would be low negative change.

KV #18 – Looking East from Rockview Park

The existing view of the desert, depicted in Figure 3.1.7-42, has sagebrush, the Mojave River canyon, high-voltage electrical power lines, and mountains in the far off background. Based on vividness, intactness, and unity, the visual quality rating is moderate.

Viewer Response

The primary viewers of the change at this location would be motorists, rail passengers (for alignments with HSR feeder), and recreational area users from Rockview Park. Although the project would not be visible from most of Rockview Park due to topography, it would be visible from a viewing area located on a high bluff. Though manmade elements currently exist, more manmade elements would become dominant in the location. Views of the vegetated open land would be obstructed and overwhelmed by the new bridge, as shown in Figure 3.1.7-43. Viewer response is expected to be moderate.

Figure 3.1.7-42 KV #18 Existing View

Figure 3.1.7-43 KV #18 Simulated Project View – Build Alternatives (with HSR Feeder)

Resource Change

The large bridge would negatively affect vividness, intactness, and unity of the view. This would result in a lowering of the visual quality. The visual character would be changed to include more manmade elements. The mountains are blocked from view by the bridge. The horizontal character of the existing view has been greatly affected by the addition of the vertical pillars of the bridge. This introduction of more manmade elements would make the visual character of the proposed view slightly decrease in compatibility. New sources of light from headlights that are elevated on the bridge would adversely affect nighttime views in the area. The overall resource change would be a low negative change.

KV #19 – Looking South on National Trails Highway toward HDC Bridge

The existing view, depicted in Figure 3.1.7-44, shows the desert with sagebrush, the National Trails Highway, high-voltage electrical power lines, and mountains in the far off background. Based on vividness, intactness, and unity, the visual quality rating is moderate.

Viewer Response

The primary viewers of the change at this location would be motorists and recreational area users from Rockview Park. Although the project would not be visible from most of Rockview Park due to topography, it would be visible from a viewing area located on a high bluff. Though manmade elements currently exist, more manmade elements would become dominant in the location, as shown in Figure 3.1.7-45. South-facing views would be obstructed and overwhelmed by the new bridge. Viewer response is expected to be moderate.

Figure 3.1.7-44 KV #19 Existing View

Figure 3.1.7-45 KV #19 Simulated Project View – Build Alternatives

Resource Change

The large bridge would negatively affect visual vividness, intactness, and unity of the view. This would result in a lowering of the visual quality. The visual character would be changed to include more manmade elements. The mountains are blocked from view by the bridge. This introduction of more manmade elements would make the visual character of the proposed view slightly decrease in compatibility. The overall resource change would be a low negative change.

KV #20 – Looking North on National Trails Highway toward HSR Bridge

The existing view, depicted in Figure 3.1.7-46, is of the desert with sagebrush, the National Trails Highway, the café, and mountains in the far off background. Based on vividness, intactness, and unity, the visual quality rating is moderate.

Viewer Response

The primary viewers of the change at this location would be motorists, café patrons and staff, and workers at the transportation management company located northeast of the bridge. Though manmade elements currently exist, more manmade elements would become dominant, as shown in Figure 3.1.7-47. Views would be obstructed and overwhelmed by the new bridge. Viewer response is expected to be moderate.

Figure 3.1.7-46 KV #20 Existing View

Figure 3.1.7-47 KV #20 Simulated Project View – Build Alternatives (with HSR Feeder Variation E)

Resource Change

The large bridge would negatively affect visual vividness, intactness, and unity of the view. This would result in a lowering of the visual quality. The visual character would be changed to include more manmade elements. The mountains are blocked from view by the bridge. This introduction of more manmade elements would make the visual character of the proposed view slightly decrease in compatibility. The overall resource change is a low negative change.

KV #21 – HDC and I-15 Interchange looking North from Northbound I-15

The existing view of I-15 looking north, depicted in Figure 3.1.7-48, is dominated by the roadway pavement in the foreground, a sign and telephone poles in the mid-ground, and mountains and hills in the background. Based on vividness, intactness, and unity, the visual quality rating is moderate. The mountains and hills are the most vivid elements in this view. The large amount of open area adds to intactness and unity of the view.

Viewer Response

The primary viewers of the change at this location would be motorists. More manmade elements would be added to this location, as shown in Figure 3.1.7-49. Viewer response is expected to be moderate-low.

Resource Change

The increased roadway width and the HDC interchange would negatively affect visual vividness, intactness, and unity of the view. This would result in a slight lowering of the visual quality. The visual character would decrease in compatibility with more manmade elements. Some of the hills and mountains are blocked from view by the overpass. The horizontal character of the existing view would be greatly affected with the addition of the vertical elements of the interchange. New sources of light from headlights that are elevated on the bridge, as well as lighting for the interchange, would adversely affect nighttime views in the area. The overall resource change would be a low negative change.

Figure 3.1.7-48 KV #21 Existing View

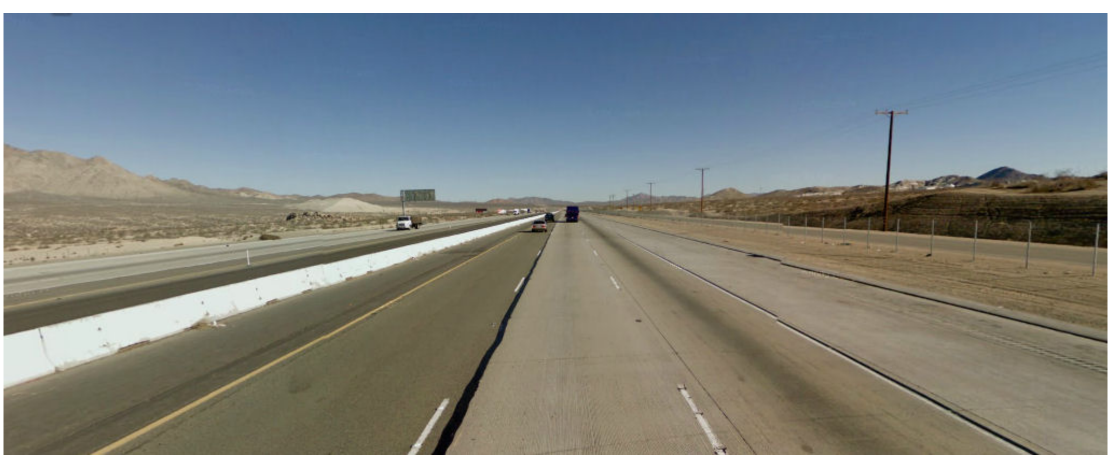


Figure 3.1.7-49 KV #21 Simulated Project View – Build Alternatives

KV #22 – Looking North along Choco Road Alignment

The undulating mountain ridgeline in the background, depicted in Figure 3.1.7-50, dominates and defines the viewshed limit and surrounds the vast scale of the sloping desert plain landform in the foreground. The coarse texture of the desert landscape consists of a mostly homogenous, sparsely and uniformly spaced vegetated cover of muted green and brown native plants, reddish brown rocks, and a deposit of tan-colored fine alluvial soils. Seasonal changes in color are expected in the spring as vegetation puts on new growth and low grasses and plants grow and bloom, decreasing as temperatures rise. Daytime light and glare are absorbed by the desert landscape cover, and nighttime light and glare are nonexistent with the exception of headlights in the distant middle ground along I-15. Based on vividness, intactness, and unity, the visual quality rating is high.

Viewer Response

There are no roads or motorists along this part of the proposed alignment. The viewer groups visibly present at the time of the field investigation are pedestrians and cyclists, as well as residents from a new residential community on Choco Road that looks north over this section of desert. Manmade elements would be added to this location, as shown in Figure 3.1.7-51. The residents would have frequent and long durations of exposure to the Choco Road interchange, and their present view is of a highly intact desert landscape. Hikers and mountain bike riders, like the residential group, are accustomed to the intact landscape and would be sensitive to change. Viewer response is expected to be moderate-high.

Resource Change

The proposed HDC alignment runs in a west to east orientation and does not encroach or disturb the integrity of the ridgeline; however, the south to north alignment of Choco Road divides the sloping desert plain into two distinct units left and right of the road. The change is primarily due to the long linear alignment of Choco Road competing with the ridgeline for dominance, change to the texture and color of the desert landscape caused by the width and color of the pavement, and less overall continuity with the addition of this element. Increased light at night is anticipated with the addition of traffic signals, roadway lighting, and vehicle headlights. This location has been designated to receive a Vista Point because of its view of the natural open spaces of the desert valley. An increase in daytime glare is anticipated with the addition of reflective materials for signs, pavement, and vehicles. The overall resource change would be a low negative change.

Figure 3.1.7-50 KV #22 Existing View

Figure 3.1.7-51 KV #22 Simulated Project View – Build Alternatives

KV #23 Choco Road looking North

The view, depicted in Figure 3.1.7-52, is oriented east over the rising desert mesa to the horizon at the saddle ridge, which is dominated and framed by the distinctive "Bell Mountain" and "Little Bell Mountain" formations. The coarse texture of the desert landscape consists of a homogenous, sparsely and uniformly distributed vegetated cover of muted green and brown native plants, reddish brown rocks, and a deposit of tan-colored fine alluvium soils. Seasonal changes in color occur in the spring as vegetation puts on new growth, and low-growing perennial plants grow, bloom, and turn brown as temperatures increase. There is no existing source of light and glare at nighttime or daytime. At night, stars fill the nighttime sky. Based on vividness, intactness, and unity, this view has high visual quality because it is undisturbed and highly intact.

Viewer Response

There are no roads or motorists along this part of the proposed alignment. The viewer groups visibly present at the time of the field investigation are pedestrians and cyclists. Hikers and mountain bike riders are accustomed to the intact landscape and would be sensitive to change. Manmade elements would be added to this location, as shown in Figure 3.1.7-53. Viewer response is expected to be moderate.

Figure 3.1.7-52 KV #23 Existing View

Figure 3.1.7-53 KV #23 Simulated Project View – Build Alternatives

Resource Change

The HDC roadway introduces long linear lines in the form of pavement markings and roadside edges. The new lines run perpendicular to the ridgeline and compete with mountain peaks for dominance. The scale of the desert landscape is reduced within the viewshed as the road interrupts the existing undisturbed landscape. Roadway views terminate at the horizon with large vertical cuts through the saddle ridgeline. The road cuts would expose rocks and soil that do not have the same colors as the surrounding weathered material. The continuity of the Bell Mountain ridgeline has been divided by the roadway into segmented parts and decreases the overall visual unity.

A vista point would be located at the saddle between Bell Mountain and Little Bell Mountain because this point, at an elevation of 2,900 feet above sea level, has a view of the open spaces of the desert valley, dominated by creosote, Joshua trees, and desert scrub. The overall resource change would be a moderately low negative change.

KV #24 – Looking Northeast at Dale Evans Parkway

Dale Evans Parkway dominates the foreground views and becomes less significant as the pavement and roadway lines converge at the distant ridgeline horizon of the Bell Mountain and Fairview Hills complex mountain range in the background, as shown in Figure 3.1.7-54. The sparsely vegetated south-facing shoulder and ridgeline of Bell Mountain and the Fairview Hills are tan in color and define the viewshed of the valley floor. The muted green and brown vegetation in the middle and foreground are coarse in texture and contrast with the fine pavement and disturbed soil of the roadway shoulder. The vast scale of the vegetated valley floor hides or screens the manmade land cover of single- and two-story residential and commercial structures. Light and glare from manmade land uses are absorbed into the desert landscape cover. Based on vividness, intactness, and unity, the visual quality rating is moderate-high.

Viewer Response

The viewer groups are motorists, pedestrians, cyclists, commercial, and residential users. Residents from a residential community approximately 1 mile south, near Corwin and Waalew roads, look north to the proposed HDC and Dale Evans Parkway overcrossing, as shown in Figure 3.1.7-55. Due to the lengthy distance, the residents would have infrequent durations of exposure to the Dale Evans Parkway interchange. The commercial users around Waalew Road and the Apple Valley Airport are at a distance of 1 mile, which lowers their sensitivity to change. Hikers and mountain bike riders that use the local roads or nearby open spaces are few in number. The motorist viewers are primarily local residents and commuters. The motorists have regular, yet short duration, views. Viewer response is expected to be moderate-low.

Resource Change

Dale Evans Parkway and the HDC dominate the middle and foreground view. There is an increase in pavement and new slopes built for the overcrossing. The continuity of the desert landscape is highly disturbed as the east-to-west oriented HDC traverses the valley floor and passes under Dale Evans Parkway. The new Dale Evans Parkway overpass structure and appurtenances (i.e., lighting, traffic signals, and increased signage) visually encroach into the prominent and sweeping ridgeline and otherwise dark nighttime sky beyond the horizon. The overall resource change would be a low negative change.

Figure 3.1.7-54 KV #24 Existing View

Figure 3.1.7-55 KV #24 Simulated Project View – Build Alternatives

KV #25 – Looking Northeast at Waalew Road

The scale of the flat, gently sloping valley floor dominates the foreground and is emphasized by the Deadman's Point Mountain and the distant San Bernardino Mountains, as shown in Figure 3.1.7-56. There is little to no continuity within the existing view due to the disturbed desert landscape. The disturbed landscape is caused by the random line pattern of numerous tan-colored dirt trails that crisscross the muted green and brown-colored landscape cover. Based on vividness, intactness, and unity, the visual quality rating is moderate.

Viewer Response

Viewers include motorists, off-road trail riders, horseback riders, pedestrians, and residents from the adjacent neighborhood. Local motorists have a low number of users on the existing road and short duration views of the intersection. Pedestrians, horseback riders, and off-road trail riders have a relatively low number of users. The duration of exposure for this group is somewhat higher than the motorist group because, although they view the area for a longer period of time, their use is less frequent. The residents fall into two similar groups – those that face Waalew Road and those that have views from their backyards across the open desert landscape. The homes on Waalew Road face an existing road, and the view does not change significantly; however, residents with backyards that face the open desert are expected to view the project for longer periods and a change to the current condition, as shown in Figure 3.1.7-57. Viewer response is expected to be moderate.

Figure 3.1.7-56 KV #25 Existing View

Figure 3.1.7-57 KV #25 Simulated Project View – Build Alternatives

Resource Change

The realignment of Waalew Road to the new alignment of the HDC increases the scale and dominance of the roadway. The influence of manmade elements increases the continuity of the view due to the unifying and strong linear orientation of the roadway and organization of space. The overall resource change would be a low negative change.

KV #26 – Looking Southwest at Central Road

The view looking south is dominated by the vast scale of the broad, flat dry lake basin and framed by the peak of Deadman's Point to the east, low hills to the west, and the undulating line of the San Bernardino Mountains in the distant background, as shown in Figure 3.1.7-58. With limited diversity within the basin, continuity is high because little to no development is present. The fine texture of the basin's tan soil and muted green- and brown-colored vegetation becomes coarse at its edges as residential development and vegetated cover increase. Based on vividness, intactness, and unity, the visual quality rating is moderate.

Viewer Response

Viewers include motorists, pedestrians, and residents from the adjacent neighborhood. Local motorists have a low number of users on the existing road and a short duration to which they view the intersection. Few pedestrians use the existing road, and the duration of exposure for this group is somewhat higher than the motorist group because, although they view the area for a longer period of time, their use is less frequent. The residents have views from their backyards across the open desert and dry lake.

Looking south, the flat dry lake basin in the foreground would be interrupted by the long horizontal line and fill slopes of the elevated roadway, as shown in Figure 3.1.7-59. While driving along the elevated roadway, motorists on the HDC would have a more acute awareness of the dry lake due to their superior position above the basin floor. Viewer response is expected to be moderate.

Figure 3.1.7-58 KV #26 Existing View

Figure 3.1.7-59 KV #26 Simulated Project View – Build Alternatives

Resource Change

The HDC has an overall moderately low compatibility level with the existing view. The proposed alignment lies in proximity to the current Central and Cahuilla Road intersection; however, the existing vehicular circulation land use is much lower than the proposed traffic volumes anticipated for the HDC, and the additional light and glare from automobiles, trucks, signs, traffic lights, and roadway lighting would be higher. The new alignment would be elevated and partially block views to the mountains in the distant background, and the exposed fill material would have a different color. The overall resource change would be a low negative change.

KV #27 – Looking Northeast at Joshua and Zuni Road

The Fairview Mountains dominate the view above the sweeping, flat, gently sloping valley floor, as shown in Figure 3.1.7-60. The primary land cover is a coarse texture of muted green and brown desert vegetation and some more vibrant green ornamental plants surrounding the more established residences of the rural community. There is a moderate level of diversity consisting of manmade and natural elements, which creates continuity that is expected and typical of a rural residential landscape. Based on vividness, intactness, and unity, the visual quality rating is moderate-low.

Viewer Response

Viewers include motorists, horseback riders, pedestrians, and residents from the adjacent rural residential neighborhoods. Local motorists have a low number of users on the existing road and a short duration to which they view the intersection. Pedestrians and horseback riders also have a relatively low number of users, and the duration of exposure for this group is somewhat higher than the motorist group because, although they view the area for a longer period of time, their use is less frequent. The residents fall into two similar groups – those within 0.25 mile and those greater than 0.25 mile from the proposed project corridor. The exposure is slightly different due to the proximity to the project and the time exposed to the project. The views do not change significantly for those homes on Joshua Road, which face an existing road; however, the residents on Zuni Road with backyards that face the open desert are expected to view the project for longer periods and would change the current condition of the view, as shown in Figure 3.1.7-61. Viewer response is expected to be moderate.

Figure 3.1.7-60 KV #27 Existing View

Figure 3.1.7-61 KV #27 Simulated Project View – Build Alternatives

Resource Change

The Fairview Mountains remain the dominant feature within this view; however, the decrease of diversity caused by the increased manmade influence of the HDC's pavement and the loss of typical native land cover lowers the overall visual quality of the rural residential character. The overall resource change would be a low positive change.

KV #28 – Looking Northeast at Thunderbird Road and Shirwaun Road

The existing visual character, depicted in Figure 3.1.7-62, is that of a mostly intact natural desert landscape across the northern edge of a dry lake that rises gently along the sloping drainage of nearby mountains. The rural residential area in the middle ground is situated at the base of the mountains that rise in the background 300 feet above the valley floor. The viewshed has high continuity with mountains that dominate the desert landscape. Based on vividness, intactness, and unity, the visual quality rating is moderate-high.

Viewer Response

Viewers include motorists, horseback riders, pedestrians, and residents from the adjacent rural residential neighborhoods. Local motorists have a moderately low exposure and sensitivity to change due to the low number of users on the existing road and the short duration to which they view the intersection. Pedestrians and horseback riders have a moderate exposure due to the relatively low number of users. The duration of exposure for this group is somewhat higher than the motorist group because, although they view the area for a longer period of time, their use is less frequent. This group also has a moderate sensitivity due to change because they expect a higher level of enjoyment from their use of the area. The residents fall into two similar groups – those within 0.25 mile and those greater than 0.25 mile from the HDC. Although their sensitivity to change is high, the exposure is slightly different due to the proximity to the project and the time exposed to the project. The view does not change significantly for those homes on Thunderbird Road, which face an existing road; however, the residents on Shirwaun Road with backyards that face the open desert are expected to view the project for longer periods, and there will be a change to the current condition of the view, as shown in Figure 3.1.7-63. Viewer response is expected to be moderate. Mitigation Measure 14 would enhance views that include Bell Mountain, Prominent Cliffs, and massive outcroppings in the area that may be interrupted by the new interchange, bridges, and roadways.

Figure 3.1.7-62 KV #28 Existing View

Figure 3.1.7-63 KV #28 Simulated Project View – Build Alternatives

Resource Change

The visual character of the dominant roadway in the foreground has a high contrast of color with the surrounding desert landscape. The roadway is elevated on fill soil above the gently rising valley floor. There is little continuity of the roadway with the surrounding desert landscape. Changes to the pattern elements and pattern character have an overall moderately negative impact. The overall resource change would be a moderately low negative change.

KV #29 – Looking West at Moccasin Road

Situated on the gently sloping southwest-oriented alluvial fan and unique rock outcroppings of the Bell Mountain, the rural residential estates look across the flat horizontal plain of the valley floor to the undulating ridgeline of the San Bernardino Mountains in the distant background, as shown in Figure 3.1.7-64. The tan to reddish brown native soils are covered by muted green and brown vegetation with vibrant springtime bloom of flowers and other short-lived desert plants and grasses. Wide sweeping vistas across the valley dominate the foreground of a mostly intact desert landscape with little manmade influence. Based on vividness, intactness, and unity, the visual quality rating is moderate.

Viewer Response

The local motorists are also local residents who frequently travel the narrow paved and unpaved local roads, as shown in Figure 3.1.7-65. The local residents' exposure to the proposed road alignment is frequent, and the duration of views is extended. They are sensitive to change due to the sense of ownership that has developed among the rural residential community. Based on the number of pedestrians and horseback riders, their exposure to change is slightly less than the local motorists and residents. Viewer response is expected to be moderate.

Figure 3.1.7-64 KV #29 Existing View

Figure 3.1.7-65 KV #29 Simulated Project View – Build Alternatives

Resource Change

The HDC is incompatible with the existing condition due to changes in visual character and pattern character. Pattern element changes by the HDC include a change in color with increased dark pavement and an increase in reflective materials from vehicles, signs, signals, and light poles. Textural changes to the vegetated land cover become increasingly smoother by pavement. Another contributing factor to the visual character changes are attributed to changes in pattern character. The proposed HDC introduces the hard edges of a wide and elevated roadway of dark-colored pavement and highly reflective materials from signs and vehicles that highly contrast with the natural vegetative cover of the flat valley floor. The HDC dominates the foreground, and the continuity of the desert landscape is greatly reduced. The overall resource change would be a low negative change.

KV #30 – Yucca Loma Road looking West

The vast scale of the flat, gently sloping valley floor is emphasized by the visually dominant stand of evergreen trees in the middle ground and the undulating ridgeline of the San Bernardino and Angeles national forests in the distant background, as shown in Figure 3.1.7-66. The tan to reddish-brown native soils are covered by muted green and brown vegetation with vibrant springtime bloom of flowers and other short-lived desert plants and grasses, as well as non-native vegetation planted for ornamental and functional uses. Wide sweeping vistas across the valley dominate the foreground of the disturbed desert landscape with some manmade influence. The natural landforms and land cover lack unique natural scenic resources and are interrupted by the stand of evergreen trees around the residential structure in the middle ground. Based on vividness, intactness, and unity, the visual quality rating is moderate.

Viewer Response

Viewers include motorists, pedestrians, and residents from the adjacent rural residential neighborhood, as well as horseback riders and hikers in and around the nearby Milpas Highlands and the Horseman's Equestrian Center. Local motorists have a low number of users on the existing paved Yucca Loma Road. Pedestrians, hikers, and horseback riders have a relatively low number of users. The duration of exposure for this group is higher than the motorist group because they view the area for a longer period of time, as well as from a superior viewing position from the rock outcroppings and highland slopes. The residents are sensitive to change because of their proximity to the project. The homes facing Yucca Loma Road face an existing road, and the view does not change significantly; however, the residents with side and backyards that face the open desert are expected to view the project for longer periods, so it would be a change to the current condition of the view, as shown in Figure 3.1.7-67. Viewer response is expected to be moderate.

Figure 3.1.7-66 KV #30 Existing View

Figure 3.1.7-67 KV #30 Simulated Project View – Build Alternatives

Resource Change

At this location, the HDC replaces the dominance of the stand of evergreen trees with a wide divided roadway that would be visible to local residents, horseback riders, and hikers. The influence of manmade elements increases the continuity of the view due to the unifying and strong linear orientation of the roadway. The unifying effects of the HDC's pattern character are offset by the increase in day and nighttime glare from the roadway pavement, signage, vehicles, and lighting. The pavement also contrasts significantly with the color and texture of the existing landscape cover.

This location has been designated to receive a vista point because of its view of the beautiful open spaces of the desert valley. There is Horseman's Rock, horse corrals and views of the knolls, Bell Mountain, Fairview Mountain, and natural rock outcroppings. The overall resource change would be a low negative change.

KV #31 – Deadman's Point Vista Point, looking North

Deadman's Point Vista Point is located on Bear Valley Road, where it intersects with SR-18 in Apple Valley, as shown in Figure 3.1.7-68. Overlooking Deadman's Point, there is a special rock formation and split pillar found 100 feet from the road. Deadman's Point has been depicted in legends and Hollywood movies.

Deadman's Point Vista Point has a view of the beautiful open spaces of the desert valley. There is Horseman's Rock, horse corrals, and views of the knolls, Bell Mountain, Fairview Mountain, and the natural rock outcroppings. Visitors and the local community are part of the natural environment seen in these open spaces. Based on vividness, intactness, and unity, the visual quality rating is moderate-low.

Viewer Response

Viewers include motorists, pedestrians, and residents from the adjacent rural residential neighborhood, as well as horseback riders and hikers in and around the nearby Highlands and the Horseman's Equestrian Center. Local motorists have a low number of users on the existing paved Bear Valley Road. Pedestrians, hikers, and horseback riders have a relatively low number of users. The duration of exposure for this group is higher than the motorist group because they view the area for a longer period of time, as well as from a superior viewing position from the vista point. The users are sensitive to change because of their proximity to the project, as shown on Figure 3.1.7-69. Viewer response is expected to be moderate.

Resource Change

The influence of manmade elements increases the continuity of the view due to the unifying and strong linear orientation of the roadway. The unifying effects of the HDC's pattern character are offset by the increase in day and nighttime glare from the roadway pavement, signage, vehicles, and lighting. The pavement also contrasts significantly with the color and texture of the existing landscape cover.

This location has been designated to receive a vista point because of its natural boulder formations with multiple color hues and views of the open spaces of the desert valley. The overall resource change would be a low negative change.

Figure 3.1.7-68 KV #31 Existing View

Figure 3.1.7-69 KV #31 Simulated Project View – Build Alternatives

Visual Impacts of Other Proposed Elements

Infiltration Basins

Infiltration basins are proposed at various locations throughout the proposed project corridor. Because of their large size and strong regular geometry, the visibility of these facilities has been identified as a potential source of negative visual impacts. Basins and other water quality treatment facilities should be designed with undulating outlines and a variety of appropriate plant and inert material to blend with the surrounding terrain and landscape, rather than creating basins that require screening. The facilities would be placed as low beneath finish grade as possible to minimize the visible profile or a berm would be placed around the facilities to minimize visual impact. Basins and other water quality treatment facilities within communities with design standards should be designed consistent with those community design standards.

Green Energy Option and/or Utility Transmission Facilities

Several green energy technologies would be incorporated into the project build alternatives to minimize impacts to energy and to meet the green corridor concept. The specific technologies have not been finalized. Once the technologies are identified, the design team will be working in coordination with Caltrans Landscape Architecture staff to ensure that the impacts to surrounding visual resources are minimized.

Some power lines would require modifications to avoid conflicts with the project. Such modifications would consist chiefly of increasing the height above ground of the lines passing over the HDC to maintain consistency with California Public Utilities Commission (CPUC) General Order (GO) #95. The HDC would be elevated above the existing terrain by approximately 12 feet, so some power lines (and power line towers) may need to be increased in height by up to 12 feet. These modifications could have incremental visual impacts and could trigger Federal Aviation Administration (FAA) notification (FAA Form 7460-1) and marking and lighting requirements pursuant to 14 *Code of Federal Regulations* (CFR) Part 77.

Palmdale Rail Connection

For the build alternatives with HSR feeder, an HSR station is proposed to be combined with the existing train station in Palmdale. Two rail connection approaches were considered, including Option 1 and Option 7. As part of Option 7, the existing station is to be expanded to include the HSR. Option 1 would shift the Palmdale station approximately 800 feet to the south of the existing station. With a station design that is consistent with the existing one and visually compatible with the landscape unit, impacts to visual resources would not be substantial.

Victorville Rail Connection

For the build alternatives with HSR feeder, two rail connection approaches are proposed for connecting the HDC HSR feeder/connector track alignment to the XpressWest rail network in Victorville. The proposed HDC rail tracks would connect to the southernmost limits of the XpressWest Victorville Station tracks. The Victorville XpressWest station, including the station footprint, would not be part of the HDC Project. The tracks would add more urban elements to the desert area that currently has the six-lane I-15 and existing freight train tracks. Viewers of this feeder connection are primarily motorists traveling at a high rate of speed on I-15, so they have low exposure and sensitivity to the visual resource being affected; therefore, the visual impact would not be substantial.

High-Speed Rail Traction Power Substation and Radio Tower Sites

Traction power substation (TPSS) and radio tower sites with 20-foot-wide access roads for each site are proposed in conjunction with the HSR. The TPSS would be designed to be consistent with the other substations along the alignment. Radio towers would be painted or stained with a color that is dominant in the area (e.g., tan in the desert area) to lessen the visual impact. Locations for the TPSS and radio tower sites would be in areas where visual intactness and unity are not greatly affected. With these design concepts incorporated, impacts to visual resources would not be substantial.

Traffic Control Cabinets, Irrigation Controller Cabinets, Electrical Systems Cabinets

Traffic control cabinets, irrigation controller cabinets, and electrical systems cabinets are proposed at various locations throughout the proposed project corridor in conjunction with all of the alternatives. Because of their utilitarian aesthetic, the visibility of these facilities has been identified as a potential source of negative visual impacts. Effort should be taken to place cabinets, to the extent practicable, so that they are not in direct view of the public.

Summary of Visual Impacts

No Build Alternative

The No Build Alternative proposes that no new corridor be built; therefore, no impacts to visual and aesthetics would be realized by the viewer groups. The No Build Alternative represents future travel conditions without the HDC Project and is the baseline against which the other alternatives are measured.

Freeway/Expressway and Freeway/Tollway Alternatives

The introduction of large-scale manmade elements would alter the visual character of the project area. Due to both the new roadway facility and roadway widening, the color and texture of the desert landscape would be changed to include more un-natural smooth paved, manmade elements. The proposed 6-foot-high elevated roadway alignment would negatively affect visual intactness and unity of the view by removing some of the native vegetation and blocking the views of the open desert landscape. Views of the open land, native vegetation, and seasonal water would be obstructed and overwhelmed by the proposed bridges. The expansive horizontal character of the existing views would be impacted with the addition of the vertical elements, such as pillars for bridges and walls. Soundwalls would block views of native vegetation and mountains and reduce the sense of openness that is a major characteristic of the desert region. Depending on the time of day, viewer location, and viewer movement, construction and operation of the proposed project would create new sources of light and glare that would adversely affect day and nighttime views in the area. Variations A, B, and D have similar visual impacts to what was just described. Variation E has similar visual impacts as the other variations described above with the additional impact of two bridges over the National Trails Highway. The horizontal character of the existing views would be impacted with the addition of the bridges. The bridges would block views of mountains, native vegetation, and a sense of wide open views.

Based on the qualitative and quantitative analyses performed, viewer sensitivity and response to change is expected to be moderate. In combination with the various viewer groups' moderate sensitivity and response to change, the overall visual impact is characterized as moderate.

Freeway/Expressway and Freeway Tollway with HSR Alternatives

This alterative has similar visual impacts as the Freeway/Expressway and Freeway/ Tollway alternatives described above. With the consideration of rail connection, the overall visual impact is characterized as moderate.

Avoidance, Minimization, and/or Mitigation Measures

This section describes avoidance, minimization, and/or mitigation measures to address specific visual impacts. These will be designed and implemented with concurrence of the District Landscape Architects.

V-1: To the extent practicable, develop final design details in a way that preserves existing vegetation through thoughtful alignment of the route so that large areas of vegetation are not in the alignment's path. During construction, take care to minimize disturbance of and protect in place the existing native vegetation, such as native riparian vegetation, California juniper, and Joshua trees, as much as possible.

V-2: To the extent practicable, use a light fixture that casts enough light so that the project can reduce the number of lighting standards required to minimize visual intrusion.

V-3: Use context-sensitive street lighting designs. The project's lighting design shall be consistent with Caltrans, County, and City lighting guidelines and standards and will be developed in coordination with Caltrans Landscape Architecture staff for areas within State right-of-way (ROW), as well as with City and County staff.

V-4: Use dark-sky-compliant lighting to minimize light pollution cast into the sky while maximizing light cast onto the ground, as appropriate, to preserve the dark night sky as a natural resource in the desert region communities.

V-5: Consolidate signs to minimize visual clutter. Lack of visual obstructions, such as wires and billboards, is desirable.

V-6: To the extent practicable, place traffic control cabinets, irrigation controller cabinets, electrical systems cabinets, etc., so that they are not in direct view of the public.

V-7: Grading shall appear natural through slope rounding that facilitates a smooth and seamless transition from existing to new slopes.

V-8: To the extent practicable, keep elevated structures, such as bridges over waterways and overpasses, viaducts for the roadway, and the HSR line, as low as possible or design to integrate them within the surrounding environment.

V-9: Use context-sensitive aesthetic treatments on structures and architecture. Bridges will be aesthetically pleasing, incorporating CSS, including features that provide an expression of the "sense of place" for the HDC communities, for the structures to meet the desired goals of the cities of Palmdale, Lake Los Angeles, Adelanto, and Victorville, the Town of Apple Valley, Los Angeles County, San Bernardino County, and Caltrans.

V-10: The HDC interchange with the National Old Trails Highway will incorporate context-sensitive features that pay homage to Historic Route 66, including the incorporation of form liner motifs on the retaining walls of the interchange and use of light standards that keep to the aesthetic traditions of Historic Route 66.

V-11: Provide context-sensitive design through color incorporated into the project elements. The aesthetic features shall be developed in coordination with the Caltrans Landscape Architecture.

V-12: Plant trees to soften structures, including walls and bridges. Tree planting could help bring down the scale of these large urbanized structures.

V-13: Texture and color the walls (i.e., soundwalls/retaining walls) facing public use areas (i.e., streets, private yards, or recreation) with a mid-range to dark recessive color compatible with adjacent (i.e., native) soil to minimize glare and reduce their visual disruption. This will minimize community impacts by enhancing context-sensitive design.

V-14: Plant vines to soften the appearance of soundwalls and to deter graffiti.

V-15: Make improvements to the following vista points within the project areas to enhance views that include Bell Mountain, Prominent Cliffs, and massive outcroppings in the area that may be interrupted by the new interchange, bridges, and roadways, including:

- Enhance Choco Vista Point with natural stone perimeter wall, walkway, solar telecommunications devices for the deaf, and signage with information about the site.

- At Deadman's Point, provide a view deck accessible for disabled persons with a safe viewing platform at the vista point and provide natural stone perimeter wall circling the area. Provide interpretive signage to make the site meaningful and educational for visitors.

V-16: Plant native vegetation to replace the vegetation that will be removed or affected by construction activity within the Desert Area Landscape Unit, Seasonal Creeks Landscape Unit, and Mojave River Landscape Unit.

V-17: Plant vegetation that is consistent with the character of the adjacent community landscape in the Residential Areas Landscape Units and the Commercial and Industrial Area Landscape Unit.

V-18: Where feasible, plant vegetation between roadway and communities, in the urban areas, to provide a more natural visual buffer.

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3.1.8 Cultural Resources

This section summarizes steps to identify archaeological, historic, and architectural resources within the designated Area of Potential Effects (APE) and to address potential impacts to these resources. The APE includes areas that may be directly or indirectly affected by construction of the project alternatives. An indirect impact occurs when the project could cause a change in character or use of historic properties, but would not directly encroach on the property. Only those properties situated within the APE are included in the discussion and impact analysis below. The APE extends for approximately 63 linear miles from State Route (SR) 14 in Palmdale to SR-18 in Apple Valley. In Palmdale, the APE parallels Avenue P-8 for a distance of approximately 10 miles to 100th Street East. From 100th Street East, the APE curves south and continues east parallel to East Palmdale Boulevard. In San Bernardino County, the APE parallels Air Expressway Boulevard and then crosses the Mojave River and Interstate 15 (I-15) and enters Apple Valley. In Apple Valley, near Corwin Road, the APE turns south and terminates at SR-18. The vertical limits of the APE will vary depending on location along the right-of-way (ROW). In most areas of the APE, grading to prepare for fill and paving would be limited to 5 to 10 feet below the existing ground surface. At bridge abutments, construction could extend up to depths of 40 feet for bent and pile construction and 60 feet for cast-in drilled-hole (CIDH) piles. The APE study boundary for these studies was defined by setting up a 250-foot buffer that used the centerline of the proposed alternative alignments as the starting point for the buffer.

Regulatory Setting

The term "cultural resources," as used in this document, refers to all "built environment" resources (e.g., structures, bridges, railroads, water conveyance systems), culturally important resources, and archaeological resources (both prehistoric and historic), regardless of significance. Laws and regulations dealing with cultural resources are explained below.

The National Historic Preservation Act of 1966 (NHPA), as amended, sets forth national policy and procedures for historic properties, defined as districts, sites, buildings, structures, and objects included in or eligible for listing in the National Register of Historic Places (NRHP). Section 106 of the NHPA requires federal agencies to take into account the effects of their undertakings on historic properties and to allow the Advisory Council on Historic Preservation (ACHP) the opportunity to comment on those undertakings, following regulations issued by the ACHP (36 *Code of Federal Regulations* [CFR] 800). On January 1, 2004, a Section 106 Programmatic Agreement (PA) between the ACHP, Federal Highway Administration (FHWA), California State Historic Preservation Officer (SHPO), and Caltrans went into effect for Caltrans projects, both state and local, with FHWA involvement. In January 2014, the First Amended Section 106 PA went into effect. The PA implements the ACHP's regulations, 36 CFR 800, streamlining the Section 106 process and delegating certain responsibilities to Caltrans. FHWA responsibilities under the PA have been assigned to Caltrans through the National Environmental Policy Act (NEPA) Assignment (23 United States Code [U.S.C.] 327) Memorandum of Agreement (MOA), which became effective October 1, 2012.

Historic properties may also be covered under Section 4(f) of the U.S. Department of Transportation Act, which regulates the "use" of land from historic properties. See Appendix B for specific information about Section 4(f).

Historical resources are considered under the California Environmental Quality Act (CEQA), as well as California Public Resources Code (PRC) Section 5024.1, which established the California Register of Historical Resources (CRHR). PRC Section 5024 requires State agencies to identify and protect State-owned resources that meet the NRHP listing criteria. It further specifically requires Caltrans to inventory State-owned structures in its ROWs. Sections 5024(f) and 5024.5 require State agencies to provide notice to and consult with the SHPO before altering, transferring, relocating, or demolishing State-owned historical resources that are listed on or are eligible for inclusion in the NRHP or are registered or eligible for registration as California Historical Landmarks.

Affected Environment

The following documents provide information on historic properties within the APE and serve as the basis for the analysis in this section:

- Historic Property Survey Report (HPSR), 07-LA-SBD, High Desert Corridor, Post Miles SR-14 to SR-18. August 2014
- Historical Resources Evaluation Report (HRER) for the Proposed High Desert Corridor Freeway/Expressway, Los Angeles & San Bernardino Counties, California. August 2014
- Archaeological Survey Report (ASR) for High Desert Corridor/SR-138 Widening Project, December 2013 with Supplemental ASR completed in August 2014
- Extended Phase I Testing Report (XPI) P-19-004366, P-36-000066 (CA-SBR-66), P-36-000182 (CA-SBR-182), and P-36-012609 (CA-SBR-12336) High Desert Corridor Project. August 2014
- Extended Phase I (XPI) Testing and Phase II Archaeological Evaluation (AE) Report for 23 Phased Sites for the High Desert Corridor from SR-14 to SR-18, July 2015 (Internal Draft)
- Finding of Adverse Effect for the High Desert Corridor Project from SR-14 to SR-18, Los Angeles and San Bernardino Counties, California. December 2015
- Letter from SHPO to Caltrans regarding: Continuing Consultation on the Finding of Adverse Effect for the High Desert Corridor (HDC) Project SR-14 to SR-18, Los Angeles and San Bernardino Counties, California. March 22, 2016

Record Searches

For the portion of the project alternatives lying within Los Angeles County, record searches performed at the South Central Coastal Information Center (SCCIC) in January 2009, September 2011, and April 2013 revealed that 106 cultural resource surveys have been conducted within a 1-mile radius of the project APE. In total, 41 cultural resources were previously recorded within 1 mile of the APE, including 3 multicomponent sites, 6 prehistoric sites, 8 archaeological historic sites, 18 built environment resources, 2 prehistoric isolates, and 4 historic archaeology isolates. No

Points of Historical Interest, California Historical Landmarks, CRHR, NRHP listed, or Historic Resources Inventory listings were identified within a 1-mile radius of the project APE portion located within Los Angeles County.

For that portion of the project area that lies within San Bernardino County, record searches performed at the San Bernardino Archaeological Information Center in September 2011 and October 2012 revealed that 174 cultural resource surveys have been conducted within a 1-mile radius of the project APE. In total, 213 resources were identified within a 1-mile radius of the project APE, with 37 within the APE. There are 9 NRHP-eligible properties and 3 California Historic Landmark listings located within a 1-mile radius of the project APE portion located within San Bernardino County.

The record searches conducted for San Bernardino County indicated the presence of five properties previously determined eligible for listing in the NRHP to be located within the project's APE:

- National Old Trails Highway (CA-SBR-2910H/P-36-002910)
- Atchison, Topeka and Santa Fe Railroad (ATSF) (CA-SBR-6793H/P-36-006793)
- Boulder Dam Transmission Lines 1, 2, & 3 and Towers (BDTL) (CA-SBR-7694H/P-36-007694)
- Edison Company Boulder Dam–San Bernardino Transmission Lines and Towers (CA-SBR-10315H/P-36-010315)
- SCE Kramer-Victor and Victor-Roadway 115-kilovolt (kV) Transmission Lines and Towers (CA-SBR-10316H/P-36-012609)

Native American Consultation

The Native American Heritage Commission (NAHC) was first contacted regarding the project in February 2009, and again in November 2013 concerning their Sacred Lands File (SLF). The NAHC staff indicated on both occasions that no Native American traditional cultural places are located within the APE according to their search of the SLF. The NAHC provided a contact list of Native American groups and individuals who might have knowledge of Native American cultural resources in the HDC Project area. Those individuals identified by the NAHC were contacted by Caltrans, as was a second group of individuals who were identified as potentially interested but not on the NAHC's contact list. Based on ethnographic research conducted for the project, the study area was traditionally occupied by the Kawaiisu and Vanyume/Serrano peoples. Early in the cultural resources investigation, the most likely descendants of the Kawaiisu and Vanyume/Serrano, based on the list provided by the NAHC, were contacted to elicit general concerns regarding the proposed project and to identify specific sites that may hold special concerns for them. Letter contacts were made, and follow-up telephone calls were placed with messages left, where possible. In November and December 2013, Caltrans again solicited views regarding the identification of sensitive Native American cultural resources, such as Traditional Cultural Properties or other sensitive resources within the vicinity of the APE from 13 Native American groups/individuals of whom several responded.

On August 28, 2014, Caltrans sent a letter updating all Native American contacts of the project status, listing sites present, and requesting any additional information on cultural resources. As part of planning additional excavation activities, the San Manuel Band of Mission Indians was requested to recommend a tribal monitor.

Cultural resources documents were sent to the San Manuel Band of Mission Indians for their review on September 21, 2014. These documents included the project HPSR, HRER, ASR, and XPI of 2014, and the XPI/AE Work Plan for the planned excavations.

San Manuel Band Cultural Resources Field Manager, Ms. Ann Brierty, and the tribe's Consulting Archaeologist, Ms. Joan Schneider, Ph.D., visited the field crew at prehistoric site CA-SBR-12336 to examine artifacts recovered during excavations on November 22, 2014. They visited again November 25, 2014, to observe excavations at prehistoric sites CA-SBR-66 and CA-SBR-182. An in-person meeting took place on December 14, 2014, at the San Manuel Band of Mission Indians Reservation. This meeting included Ms. Sherri Gust, of Cogstone; Alex Kirkish and Caprice (Kip) Harper, Caltrans Environmental Planners (Archaeology); Daniel McCarthy, Director of Cultural Resources; Ann Brierty; and Joan Schneider, Ph.D. Coordination of upcoming work was discussed. It was agreed that Steven Brierty would again monitor the upcoming XPI/AE field work.

On December 2, 2014, Caltrans received comments (SC-72) from Dr. Schneider expressing concerns about the Adelanto-to-Victorville segment of the Undertaking, its proximity to the ethnographic village of *Topipabit*, and the results of records searches, and tribal and historical society consultations. Caltrans responded to Dr. Schneider's comment on December 2, 2014, by stating that the City of Victorville rejected an alternative that would have avoided the archaeologically sensitive area. Caltrans' response then went on to discuss Native American consultation to date.

The San Manuel Band received copies of the progress reports for the excavations on December 12, 2014, and January 14, 2015, following completion of each field rotation, and a copy of the internal draft XPI/AE Report on July 7, 2015. Caltrans received comments from Dr. Schneider on the internal draft XPI/AE Report, dated September 17, 2015.

Several attempts were made to contact William Madrigal of the Morongo Band of Mission Indians, John Valenzuela of the San Fernando Band of Mission Indians, and Caitlin Gulley of the Fernandino Tataviam Band of Mission Indians between October 8 and 16, 2015. Telephone calls and e-mails to Mr. Madrigal and Mr. Valenzuela were unanswered during this period.

Alex Kirkish, Caltrans Environmental Planner (Archaeology), spoke with Ms. Caitlin Gulley of the Fernandeno/Tataviam Band of Mission Indians on October 20, 2015, and informed her that as other documents are finalized, they will be forwarded to her. Ms. Gulley asked about the status of the project and requested a copy of the ASR. Later she replied with an e-mail expressing no concerns with the project.

In addition to the Native American consultation documented in the project's HPSR and Finding of Effect (FOE), several contacts with Native American groups have taken place, representing an ongoing process that will continue throughout the life of the project. On December 12, 2014, an in-person meeting was held with tribal representatives (at the San Manuel Reservation) to answer questions and discuss several aspects of the proposed archeological work. Overall, the meeting was successful, and all potential concerns and issues were resolved. During the meeting, the San Manuel tribe requested copies of all completed documents, including the HPSR, HRER, ASR and the XPI/Phase II plan. These were sent to the tribe the day after the meeting. Caltrans received no comments on these documents.

The most recent consultation was with the San Manuel tribe on February 4, 2016, with Mr. Daniel McCarthy by telephone. Several items were discussed, including eligibility criteria for the historic district (see above), the proposed project-level PA, the proposed treatment and data recovery plan, post-review discoveries, and artifact repatriation. The results of these discussions are listed below:

- The tribe feels that both Criterion A and Criterion D should apply to the district.
- The tribe wishes to sign the PA.
- The tribe has no qualms concerning data recovery as mitigation for the proposed treatment of the historic district.
- The tribe would like a post-review plan to be put in place and asked that the plan be part of the PA.
- The tribe would like to repatriate artifacts that they consider to have a high patrimonial value.

The results of the Native American consultation are explored more fully in Section 1.4.2 and the Finding of Adverse Effect, Native American Consultation. Consultation is ongoing.

Archaeological Resources under All Build Alternatives

The project's APE for archaeological resources was delineated to include all areas that could potentially be directly or indirectly affected by the proposed Undertaking, including all potential road or rail alignments, staging areas, temporary construction easements, and vertical areas of disturbance. Permanent ROW acquisitions would be needed to accommodate the improvements. In most areas of the APE, the depth of work would be limited to about 5 to 10 feet. This depth would allow the project to cut, grade, and prepare the existing ground surface for fill and paving. At bridge abutments, construction could extend up to depths of 40 feet for bridge and pile construction and 60 feet for CIDH piles.

Archaeological sensitivity varies along the corridor. Generally, most of the high and medium probability zones are located on Holocene alluvial fan surfaces where low-energy alluvium regularly accumulates and accounts for over half of the APE. Buried archaeological sites have been found in similar settings outside of the APE area in the western Mojave. Most of the areas with low or very low to no potential for buried sites are located in mountainous areas of the Transverse Ranges where soil is not accumulating, or on Pleistocene landforms or older surfaces.

The archaeological field survey was conducted in the APE from September to November 2011 and from April 2012 to October 2013. As a result of the record searches and surveys, a total of 24 archaeological sites were documented as being located within the APE: 7 prehistoric archaeological resources, 4 multicomponent sites with both historic and prehistoric components, and 13 historic archaeological resources (Table 3.1.8-1). Of these 24 sites, 3 prehistoric archaeological resources were determined individually eligible for listing in the NRHP under Criterion D for values associated with prehistoric deposits. The sites, P-36-012609 (CA-SBR-12336), P-36-000182 (CA-SBR-182), and P-36-000066 (CA-SBR-66), make up one archaeological district, the *Topipabit* Archaeological District. Caltrans assumes eligibility for the district under Criterion D. Additional research also suggests that the district is eligible under Criterion A. Evaluation and determination of eligibility of the district will be phased.

Three additional resources (one prehistoric rock art site, one multicomponent site, and one historic-era archaeological resource) are assumed eligible for listing in the NRHP by Caltrans for the purposes of this project in accordance with the Section 106 PA Stipulation VIII.C.4.

Project alternative refinement has resulted in the elimination of eight of the previously assumed eligible and phased resources (two prehistoric, four multicomponent, and three historic-era archaeological resources) from the APE.

Nine archaeological sites within the area of direct impacts (ADI) (one prehistoric, two multicomponent, and six historic-era archaeological sites) were determined ineligible for the NRHP and are not discussed further.

Topipabit Archaeological District

The *Topipabit* Archaeological District is composed of three prehistoric archaeological sites (CA-SBR-66 [P-36-000066], CA-SBR-182 [P-36-000182], and CA-SBR-12336 [P-36-012609]). Each of the archaeological sites was determined individually eligible under Criterion D (information important to prehistory), and the SHPO concurred with these findings on September 29, 2014. Caltrans assumes eligibility for the district under Criterion D. Additional research also suggests that the district is eligible under Criterion A. The formal evaluation and determination of eligibility of the district will be phased, as will reevaluation of the determination of eligibility for each of the three sites under Criterion A, as per PA Section XII.

These three sites are all within a short distance of one another (the maximum distance between CA-SBR-12336 [P-36-012609] and CA-SBR-182 [P-36-000182] is 912 feet; the maximum distance between CA-SBR-182 [P-36-000182] and CA-SBR-66 [P-36-000066] is 919 feet), near the Mojave River in an area called Turner Springs after the nearby historic period ranch belonging to the Turner family. The three sites all occupy a narrow point overlooking the Mojave River at a natural crossing.

Table 3.1.8-1 Archaeological Resources in the APE

Primary	Trinomial	Description	Time Period	Eligibility	Preferred Alternative	Non-Preferred Alternative
Pending	Pending	*Topipabit* Archaeological District (CA-SBR-66, CA-SBR-182, and CA-SBR-12336)	Prehistoric/ Ethnohistoric	Assumed eligible, phased	X	X
P-36-000066	CA-SBR-66	Prehistoric residential site--contributor to *Topipabit* Archaeological District	Prehistoric	Eligible	X	X
P-36-000182	CA-SBR-182	Prehistoric residential site--contributor to *Topipabit* Archaeological District	Prehistoric	Eligible	X	X
P-36-012609	CA-SBR-12336	Prehistoric residential site with burials--contributor to *Topipabit* Archaeological District	Prehistoric	Eligible	X	X
P-19-004362	CA-LAN-4362H	Historic residential site and agriculture water features	1920s-1960s	Assumed eligible, phased	X	X
P-36-000158	CA-SBR-158	Petroglyph site	Prehistoric	Assumed eligible, phased	X	X
P-36-026769	CA-SBR-16916H	Engelbrecht historic residential and workshop site	1920s-1960s	Assumed eligible, phased	X	X
P-19-004189	CA-LAN-1489H	Historic residential site and refuse scatter	1950s-1960s	Ineligible	X	X
P-19-004361	CA-LAN-4361H	Historic residential foundation and sparse refuse	1920s	Ineligible	X	X
P-19-004364	CA-LAN-4364H	Historic residential site	1950s	Ineligible	X	X
P-19-004365	CA-LAN-4365H	Historic residential site and refuse scatter	1950s-1960s	Ineligible	X	X
P-36-006317	CA-SBR-6317H	Historic granite quarry, Leahy & Turner	1870s-1920s	Ineligible	X	X
P-36-010392	CA-SBR-10392/H	Lithic scatter and roadside refuse dump	Prehistoric & 1970s-present	Ineligible	X	X
P-36-021470	CA-SBR-13782/H	Lithic scatter and roadside refuse dump	Prehistoric &1960s-1980s	Ineligible	X	X
P-36-026764	CA-SBR-16911	Lithic scatter	Prehistoric	Ineligible	X	X
P-36-026772	CA-SBR-16918H	Agricultural water system remnants	1920s-1950s	Ineligible	X	X
P-19-004187	CA-LAN-4187H	Historic residential site and refuse scatter	1930s-1970s	Assumed eligible		X

Table 3.1.8-1 Archaeological Resources in the APE

Primary	Trinomial	Description	Time Period	Eligibility	Preferred Alternative	Non-Preferred Alternative
P-19-04359	CA-LAN-4359	Lithic scatter	Prehistoric	Assumed eligible		X
P-19-004367	CA-LAN-4367H	Historic residential site and refuse scatter	1950s-1970s	Assumed eligible		X
P-36-006312	CA-SBR-6312	Lithic scatter with hearths	Prehistoric	Assumed eligible		X
P-36-010960	CA-SBR-10960H	Historic residential site	1920s-1940s	Assumed eligible		X
P-36-026768	CA-SBR-16915H	Historic residential site and refuse scatter	1900s-1920s	Assumed eligible		X
P-36-026773	Pending	Historic granite quarry	1930s-1960s	Assumed eligible		X
P-36-026832	Pending	Historic residential site and refuse scatter	1920s	Assumed eligible		X

A series of trails, routes, railways, and highways have used this same area for crossing the Mojave River, including bridges for both the National Trails Highway and Burlington Northern Santa Fe Railway that are located slightly downstream. The site's geographic location compares well with early historic, late 18th/early 19th century accounts of the Native American villages along the Upper Mojave River. In particular, this location, marked by the Mojave River crossing point, compares well with the historic winter village (and satellite communities) of *Topipabit.* The feeling of place has been preserved despite – or arguably because – of 19th and 20th century Euro-American development of the area.

Based on the results of the ethnographic research, the district is assumed eligible for listing in the NRHP under Criterion A. Given the site's preservation in terms of the feeling of place, the locale represents an area important to Native Americans and Californians in general, conveying the importance of location. The upper Mojave River settlements of the Vanyumé in particular appear to have been strategically located, along not only a critical crossing point on the east-west axis to the Colorado River and Southwest trade route, but also in local terms, with freshwater and acorn supplies (from upland oak stands) large enough to maintain a village population larger than other Serrano villages on lower-lying parts of the Mojave River farther into the desert. The ecological niche occupied by these sites and their place within the Mojave River linear oasis/exchange corridor in the village are key elements in understanding and, moreover, appreciating why the *Topipabit* village and surrounding clan territory were occupied. Research has demonstrated that the site is associated with events (circa late 18th/early 19th centuries) that are important to the ethnic heritage of Mojave Heights.

P-36-012609 (CA-SBR-12336)

CA-SBR-12336 is a large (19.5-acre) prehistoric habitation site containing four discrete, moderate to dense loci of cultural materials indicative of residential use. An abundance of diverse cultural material has been recovered from the surface of the site and from intact, buried deposits during two phases of subsurface testing. Cremated human remains were also recovered from the site surface at one location, suggesting cremation. Artifacts suggest the site was occupied from the Gypsum Period (approximately 4000–1500 B.P.) and into the Late Period (800–300 B.P.). As the site boundary is currently mapped, 7.8 acres in the southern portion of this 19.5-acre site (approximately 40% of the total) are located within the Direct APE. This portion of the site includes the entirety of Loci 1 and 2. Overall, the condition of the site remains good, with human-caused disturbances and natural erosion processes occurring outside the central loci of residential activity. The main portion of the site retains intact, buried deposits and sufficient integrity likely to yield important information adding to the knowledge of the prehistory of this region. Because this site has integrity, has previously and continues to yield important prehistoric information, and is located within close geographic proximity to other prehistoric sites, it was determined individually eligible under Criterion D. The SHPO concurred on September 29, 2014. It is also likely a contributor to the proposed *Topipabit*

Archaeological District under Criterion A by means of its association with the ethnohistoric village of *Topipabit*.

P-36-000182 (CA-SBR-182)

This prehistoric resource consists of a large, complex habitation and burial site and appears to be associated with the ethnohistoric Vanyumé Serrano site of *Topipabit*. Originally recorded in 1941 and mapped incorrectly for years in the area where resource P-36-012609 (CA-SBR-12336) is now identified, P-36-000182 (CA-SBR-182) was updated and mapped in its current location in 2006 and updated again in 2012 as a result of the survey for the current Undertaking. The site contains five loci defined by moderate to dense concentrations of lithic artifacts, fire-altered rock, and burned faunal remains. Three hearth features, one possible house pit depression, and one large pit feature were also identified. One possible Lake Mojave point suggests the area may have been utilized as early as 10,000 years ago. The original site record indicates more than 25 burial features were reported to have been excavated in the 1940s. During the survey for the HDC Project in 2012, all features and loci recorded were relocated in the accessible portions of the site. A new locus of artifacts was located on a slope above a wash. Artifacts observed included quartzite cobble, flaked stone, flakes, fire-affected rocks, and mammal bone. The overall condition of the site ranges from poor to good. A graded dirt road and power line running through the site are the only disturbances observed in the surveyed portion of the site. The initial XPI study indicated that scant cultural materials were found in the upper 40 centimeters, but no intact, buried deposits or features were found. A second XPI study revealed significant amounts of artifacts subsurface, but these were fragmentary and intermixed with historic-era and modern debris. As currently mapped, approximately 25 percent of this 27-acre site is located within the Direct APE. This site retains integrity and has yielded, and is likely to yield, additional information important to our knowledge and understanding of the prehistory of this region. Therefore, Caltrans has determined that CA-SBR-182 is individually eligible for listing in the NRHP under Criterion D. The SHPO concurred on September 29, 2014. It is also likely a contributor to the proposed *Topipabit* Archaeological District under Criterion A through its association with the ethnohistoric village of *Topipabit*.

P-36-000066 (CA-SBR-66)

This prehistoric resource consists of a small scattering of flaked stone material located immediately above the Mojave River floodplain along the edge of a gently sloping ridgeline. Originally recorded in 1949, artifacts noted included mano fragments, rubbing stones, side scrapers, blade rejects, metate fragments, abalone bead, and hammerstones. The resource record was updated in 1982 with the site identified as having a light density of chipped stone debitage, fire-altered rock, and groundstone. The resource record was updated again in 2006 with a Phase II testing of the resource in support of the Southern California Logistics Airport Rail Service Project. The site was described as a very sparse scatter of lithic debitage, containing two loci. Artifacts noted during this update included debitage, a fire-altered ground stone fragment, and fire-altered rock. The site likely represents an ephemerally used satellite activity area associated with the two large habitation sites, CA-SBR-182 and

CA-SBR-12336, which are located approximately 0.25 to 0.5 mile to the west, respectively. The resource was updated once again in 2012 as a result of the survey for the HDC Project and described as a small, low-density lithic scatter with fire-affected rocks. The boundary of the site was revised based on survey of the portion of the site within the APE only. The condition of the site is good, although it is continuing to be disturbed by natural erosion processes, particularly in the northern portion of the Direct APE where there are deep, water-eroded channels located down the slope toward the Mojave River to the north. The Direct APE traverses prehistoric archaeological site CA-SBR-66 on an east-west bearing. The width of the Direct APE crossing the site is 300 feet. This site retains integrity and appears to be associated with the ethnohistorically attested Desert Serrano village of *Topipabit* and has yielded, and is likely to yield, additional information important to our knowledge and understanding of the prehistory of this region. Therefore, Caltrans has determined that CA-SBR-66 is individually eligible for listing in the NRHP under Criterion D. The SHPO concurred on September 29, 2014. It is also likely a contributor to the proposed *Topipabit* Archaeological District under Criterion A through its association with the ethnohistoric village of *Topipabit*.

P-36-000158 (CA-SBR-158)

This prehistoric resource, located adjacent to the Rockview Nature Park, Victorville, consists of two small petroglyphs located at the mouth of a small cave in low granitic hills along the Mojave River. Soils consist of Colluvial sand and granite bedrock. Vegetation consists of sagebrush and mesquite. This resource was originally recorded in 1964 and described as having design elements consisting of a bisected circle and two diamonds joined vertically. P-36-000158 was relocated and updated in 2014 with a finding that only the bisected circle design element remains. An in-field determination by two archaeologists was that weathering and spalling had destroyed the two diamonds design element, as evidenced not only on the rock art panel but also the granitic rocks in the area. A search of the ground around the site for evidence of the two diamonds proved negative. The surrounding rock faces were also inspected for additional petroglyphs, but none were located. The site integrity is good except for weathering and spalling of rock faces. Caltrans is assuming NRHP-eligibility as an individual property under Criterion A and/or Criterion D.

P-19-004362 (CA-LAN-4362H)

This historic archaeological resource consists of a historic homestead that includes six features: an earthen reservoir; two concrete foundations/pads; one well pad with well head and a concrete well pump foundation; a water tank; two concrete hollow column irrigation pipes; and an associated refuse scatter. The artifacts associated with the site include concrete irrigation pipe and a refuse scatter that consists of hole-in-top cans, glass fragments (green, brown, and clear), miscellaneous metal fragments, and earthenware fragments dating from the late 1950s to early 1960s. In 1919, Fielding P. Bowland and Fannie May Wells acquired 320 acres from the General Land Office, and the site lies within that acreage. Caltrans is assuming NRHP eligibility under Criterion D as an individual property.

P-36-026769 (CA-SBR-16916H)

This historic archaeological resource consists of the remnants of a large homestead, including eight foundations, two animal pens, and multiple refuse scatters. The five refuse scatters of varying sizes include approximately 500 cans, including sanitary, church-key opened beverage, oil, coffee, food, gasoline, and a few steel and aluminum beverage cans. Also present are terracotta pipe fragments; bottle glass fragments in green, colorless, brown, and sun-altered amethyst; ceramic fragments; porcelain fragments; ceramic pipe; porcelain bathroom fixtures; bricks; a bucket; milled wood; and other artifacts. Together, they suggest deposition between the 1920s and the early 1960s. The structures were labeled “Engelbrecht Place” on the 1942 United States Geological Survey (USGS) quadrangle map. A review of historic aerial photographs shows the structures there in 1953 and 1968. Caltrans is assuming NRHP eligibility under Criterion D as an individual property.

P-36-010392 (CA-SBR-10392/H)

This multi-component site consists of a prehistoric lithic scatter and a historic domestic refuse deposit located on a recently deposited low relief alluvial plain. Originally recorded in 2001, the site consists of a prehistoric lithic scatter including debitage flakes, a core fragment, a small stone anvil, as well as historic-era slag glass, ceramics, and metal cans. The site was tested (shovel test pits) in 2001 and lithic material collected. The results of the subsurface testing are not described in the site record. The site record update of 2011 reports one flake and a historic debris scatter near an adjacent access road, encompassing cans. Caltrans is assuming NRHP eligibility under Criterion D as an individual property.

P-19-004187 (CA-LAN-4187H)

The site consists of debris from a demolished residence and two nearby roadside dumps. The site includes a well-type feature; remnants of a fence line, which includes T-bars and wood posts with chicken and barb wire; numerous irrigation pipes; fragments of wood, brick, and concrete; cobble piles; and a few pieces of cut mammal bone. This historic resource has been heavily disturbed. Four juniper trees were originally recorded in 2009, but only one currently stands on the site. The residential structure area appears to have been demolished and bulldozed, and no foundations remain. Four juniper trees were originally recorded in 2009, but only one currently stands on the site. Caltrans is assuming NRHP eligibility under Criterion D as an individual property. As a result of project alternative refinement, this resource is within the Indirect APE and no longer within the Direct APE. The site lies far enough outside the Direct APE that direct or indirect effects are not expected. As such, the site requires no further study.

P-19-004189 (CA-LAN-4189/H)

This historic resource consists of remnants of what appears to be a bulldozed concrete foundation, cobble piles, irrigation pipe remnants, a sewer pipe, and cut cottonwood trees. General Land Office records indicate that the quarter section encompassing this site was granted to an individual, William G. Mcauslan, as a timber patent, on December 17, 1898. The site location was owned by an individual, M. Penn Phillips, when it was acquired by the City of Los Angles in 1970. No other ownership information has been found.Caltrans is assuming NRHP eligibility under Criterion D as an individual property.

P-19-004359 (CA-LAN-4359)

This prehistoric resource is a small lithic scatter located in open desert floor. The soils consist of sediments of light-brown sand; vegetation within the site environment consists of a Creosote scrub community. The site was newly identified during a pedestrian survey within the APE for this project in 2012, consisting of a lithic scatter containing approximately thirty-three cryptocrystalline silicate (CCS) secondary flakes and one biface. Caltrans is assuming NRHP eligibility under Criterion D as an individual property. As a result of project alternative refinement, this resource is within the Indirect APE and no longer within the Direct APE. The site lies far enough outside the Direct APE so that direct or indirect effects are not expected. As such, the site requires no further study.

P-19-004367 (CA-LAN-4367H)

This historic archaeological resource consists of a concrete building pad, remnants of a wood structure/building, and a barbed-wire fence. Also present throughout the site is a low-density refuse scatter. A concrete pad constructed of fine-grained aggregate is located in the northwest portion of the site. The milled wood remnants of a small structure/building are located in the southeast portion of the site, with nearby remnants of a barbed wire fence. The refuse scatter is dispersed throughout the site and consists of approximately 500 cans (church key-opened beverage, bi-metal beverage, paint, sanitary food [uncorrugated and corrugated], sardine), thousands of fragments of bottle glass (colorless, green, brown, milk, Ball jar), milled wood, rubber hoses, and shoes, among other refuse. The site is overall in poor condition due to modern ground disturbance including pothunting. Historical imagery depicts two buildings at the site, both constructed between 1959 and 1968. Caltrans is assuming NRHP eligibility under Criterion D as an individual property. As a result of project alternative refinement, this resource is within the Indirect APE and no longer within the Direct APE. The site lies far enough outside the Direct APE so that direct or indirect effects are not expected. As such, the site requires no further study.

P-36-006312 (CA-SBR-6312)

This prehistoric resource consists of a temporary camp located on a high terrace on the north side of the Mojave River. The site was originally recorded in 1989 and described as consisting of nine fire-cracked rocks, one bifacial mano fragment, one possible metate fragment, and one disturbed hearth. The resource was updated in 1991 when a Phase II evaluation was conducted. This investigation relocated all of the 1989 surface artifacts. The excavations unearthed beads, cores, debitage, ground stone fragments, hammerstones, manos, metate fragments, and pestle fragments. Two of the test units and the approximate northern third of one of the backhoe trenches included portions of the current APE. The site was redesignated as a food processing station with an enlarged boundary. No artifacts were identified as a result of the survey in the portion of the site within the HDC APE. In the 2013 site record update, the site boundary was altered to exclude the portion of the site within the APE. P-36-006312 was updated in 2014 with the sole purpose of restoring the original boundaries. With further investigations, it is possible portions of this site not previously tested may contain intact, NRHP-eligible deposits or features. Caltrans is assuming NRHP eligibility under Criterion D as an individual property, but as a result of project alternative refinement, this resource has been determined to be within the Indirect APE and no longer within the Direct APE. The site lies far enough outside the Direct APE that direct or indirect effects are not expected. As such, the site requires no further study.

P-36-010960 (CA-SBR-10960/H)

This historic resource is a possible historic homestead site. The site consists of remnants of a concrete and cobblestone building. Segments of three walls are present that envelope a concrete floor. A single piece of sun-colored amethyst glass was found in the northeast corner of the building along with modern metal cans. Modern refuse was also found along the southern border of the site. No other associated artifacts were present, possibly due to the fact that grading activities for flood control occurred in the area between 2006 and 2012. Caltrans is assuming NRHP eligibility under Criterion D as an individual property. As a result of project alternative refinement, this resource is within the Indirect APE and no longer within the Direct APE. The site lies far enough outside the Direct APE that direct or indirect effects are not expected. As such, the site requires no further study.

P-36-026768 (CA-SBR-16915H)

This historic archaeological resource consists of the remnants of a foundation and an associated refuse scatter. Composed of cobbles and concrete, one wall has been destroyed, and fragments of the walls lay near the foundation. A large depression is located in the middle of what would have been the floor of the foundation. The refuse scatter includes crushed and shot up steel beverage cans. Scattered around the area were pieces of milled lumber and white earthenware fragments. A review of historic aerial photographs indicates the house was gone by 1968. Caltrans is assuming NRHP eligibility under Criterion D as an individual property. *As a result of project alternative refinement, this resource is within the Indirect APE and no longer within the Direct APE. The site lies far enough outside the Direct APE that direct or indirect effects are not expected. As such, the site requires no further study.*

P-36-026773

This historic resource consists of a quarry with one bedrock outcrop that shows a quarried face and several partially hewn blocks. The outcrop and hewn blocks contain drill holes. The only associated artifact consists of a metal bucket. The age of the site is unknown; however, the quarrying of granite blocks and limestone became a major industry in Victorville in the 1890s and 1900s and continues into the present. There are also two similar sites in the area, P-36-006317 (CA- SBR-6317H) and CA-SBR-12133H. Caltrans is assuming NRHP eligibility under Criterion D as an individual property. As a result of project alternative refinement, this resource is within the Indirect APE and no longer within the Direct APE. The site lies far enough outside the Direct APE that direct or indirect effects are not expected. As such, the site requires no further study.

P-36-026832 (CA-SBR-16915H)

This historic resource consists of a plank platform with sparse refuse. This site was recorded in 2013 and described as building remnants and an associated low-density refuse scatter. The building remnants are comprised of a milled wood (plank) floor in very poor condition. No foundation was visible, though several large cobbles located in the vicinity of the floor may be displaced remnants of a foundation. The associated refuse scatter surrounds the wood floor remnants and consists of two cans, one large fragment of decorated terra cotta, a “Phoenix” metal button cover, 10 fragments of sun-affected amethyst bottle glass, and approximately 20 fragments of colorless bottle glass. Historical imagery and topographic maps dating as early as 1937 do not depict any buildings at the location of the site. As such, the site may or may not represent the location of a former homestead. Caltrans is assuming NRHP eligibility under Criterion D as an individual property. As a result of project alternative refinement, this resource is within the Indirect APE and no longer within the Direct APE. The site lies far enough outside the Direct APE that direct or indirect effects are not expected. As such, the site requires no further study.

Historic and Architectural Built Environment Resources for All Build Alternatives

The Secretary of the Interior sets standards for evaluating historic resources for their potential eligibility to the NRHP. For this study, historic resources fewer than 50 years of age were evaluated to take into consideration their potential significance at the time project construction begins, which may be several years beyond when the architectural history survey was conducted.

A survey of the area was conducted in the field to evaluate all buildings, structures, and objects found within the APE. The built environment fieldwork was conducted on September 6 and 8, 2011, October 17 and 23, November 20, and December 5, 2013. Additional surveys were completed in July and August 2014. In addition, building and alteration permits for each parcel within the APE were collected in December 2013 and used to prepare State of California DPR 523 forms, which were incorporated into the HRER.

The overarching themes that influenced the development and growth of the Antelope Valley and Victor Valley through which the HDC traverses are discussed in detail in the HRER, as is a brief history profile of the several smaller cities and towns located within the two valleys: Lancaster and Palmdale within the Antelope Valley, and Victorville, Apple Valley, and Adelanto within the Victor Valley. Some themes, such as that related to the emergence of aerospace and aviation industries, though reflecting major local and regional historical events that significantly influenced development of the area, do not have a direct association with the extant property types identified in the APE and formally evaluated as part of the HRER. Mining, agriculture, and the presence of military base establishments all contributed to the growth of the desert areas.

The built environment within the APE reflects the historical evolution of the desert area of northern Los Angeles and San Bernardino counties. Postwar tract-style houses are the predominant building type identified within the project alternative study areas. A great percentage of the houses reflect one of three common and homogeneous architectural styles: Minimal Traditional, Ranch, and Contemporary. Commercial buildings are also a dominant building type within the APE. Several linear resources, including former roads and trails, transmission lines, and railroads are also located within the project area.

A total of 30 formal evaluations of built environment properties, including buildings, groups of buildings, structures, and other parcels with historic era cultural resources, were completed and are included as part of the HRER. Of the 30 properties located in the APE, none appear eligible for the NRHP and are not considered historical resources for the purposes of CEQA. However, there are six linear properties that were previously determined eligible for the NRHP located in the APE. The remaining historic-era resources within the APE were found to have met the criteria of Attachment 4 of the Section 106 PA (Properties Exempt from Evaluation), which do not require preparation of DPR 523 forms. Six previously identified NRHP-eligible built environment linear historic era properties within the Project's APE, all located in San Bernardino County, are described briefly in Table 3.1.8-2 and in greater detail in the following subsections.

Table 3.1.8-2 Linear Historic Properties in APE Subject to Effects

Primary	Trinomial	Description	Time Period	Eligibility	Preferred Alternative	Non-Preferred Alternative
P-36-002910	CA-SBR-2910H	National Old Trails Highway	Prehistoric trail, historic	Eligible	X	X
P-36-003033	CA-SBR-3033/H	Mohave Trail, Mojave Road, Government Road	Prehistoric and historic	Eligible	X	X
P-36-006793	CA-SBR-6793H	Atchison, Topeka and Santa Fe Railroad	Historic	Eligible	X	X
P-36-007694	CA-SBR-7694H	Boulder Dam Transmission Lines 1, 2, & 3 and Towers	Historic	Eligible	X	X
P-36-010315	CA-SBR-10315H	Edison Company Boulder Dam-San Bernardino 115-kV Transmission Lines/ Towers	Historic	Eligible	X	X
P-36-010316	CA-SBR-10316H	SCE Kraemer-Victor and Victor-Roadway 115-kV Transmission Line/ Towers	Historic	Eligible	X	X

National Old Trails Highway (CA-SBR-2910H; P-36-002910)

The National Old Trails Highway was determined eligible for listing in the NRHP in 1990 under Criteria A and C. The segment of the National Old Trails Highway within the APE is a portion of former U.S. Highway 66. The period of significance for U.S. Highway 66 in California is 1926-1974, beginning when the route was first designated as a U.S. Highway and extending to the time when the last portion of the route was bypassed by the interstate highway system in California. U.S. Highway 66 was originally cobbled together from a network of roads built in the early 1900s that ran from Chicago across the country to Santa Monica. When first designated, the highway consisted of graded dirt and gravel roads. The road was completely paved by 1938. In 1985, U.S. Route 66 was removed from the federal highway system, becoming SR 66. The specific segment of the National Old Trails Highway/Route 66 located in the APE (Figure 3.1.8-1) is not listed in the NRHP. The road is significant as a representative example of important state and local trends in 20th century transportation development and highway design and construction. U.S. Highway 66 had its origins in one of the earliest cross-country automobile routes (the National Old Trails Road) before being designated as one of 13 U.S. highways in California. Portions of the route continue to convey a strong sense of time and place harking to an earlier era of highway travel, prior to construction of the mid-20th century Interstate Highway System, and provide a vivid reminder of the challenges faced by motorists in crossing expanses of desert and high mountain passes on their way to Los Angeles.

Figure 3.1.8-1 National Old Trails Highway/Route 66

View looking north at segment of National Old Trails Highway/Route 66 in the APE. Rockview Nature Park is to the right (east side of the road).

The length of the segment of the linear resource that runs north/south within the APE measures approximately 965 feet, or one-sixth of a mile. The highway with paved and unpaved shoulders is a segment of the National Old Trails Highway. It is a contiguous segment of a longer, two- to four-lane, paved highway that stretches between the community of Oro Grande and Mojave River to the north and Turner Road, Air Expressway, and I-15 toward the south. At the point where the National Old Trails Highway intersects with the north boundary of the APE, the National Old Trails Highway is two lanes wide and measures approximately 36 feet wide with narrow shoulders on both sides. Approximately 150 feet from the point where the APE intersects with the National Old Trails Highway, the road widens to four lanes to a width of approximately 76 feet, and this width continues for the length of the road segment within the APE.

A segment of the National Old Trails Highway located immediately south of the APE was recently widened and repaved to construct an undercrossing for the repurposed rail spur line from the ATSF line to the former George Air Force Base (GAFB). The new rail spur will service a new intermodal/multimodal facility planned by the City of Victorville. The section of the National Old Trails Highway that is in the current APE was substantially altered by this previous road widening project, which involved building new curbs and curb cuts leading to a bridge overcrossing. Approximately 85 percent of the segment of National Old Trails Highway within the APE was altered by widening the original two-lane roadway to a four-lane highway.

Mohave Trail, Mojave Road, Government Road (CA-SBR-3033/H; P-36-003033)

This multicomponent linear resource, the Mojave Trail, Mojave Road, and Government Road, is located along the National Old Trails Highway from I-15 to the Mojave River. The prehistoric Mojave Trail, which followed the river, was used by several tribes for trade. It became a route for trappers and Mexican trade caravans in the 1830s and 40s. It was developed into a wagon road for immigrants, mail, wagon freighting, and military travel in the 1850s. In 1913, it was officially opened as part of the National Old Trails Highway. In the 1930s, it was paved and became U.S. Highway 66.

The Mojave Trail, Mojave Road, and Government Road is one of the earliest trails in the region and is associated with both the Mojave Trail (prehistoric) and the National Old Trails Highway (historic). It retains a functional integrity and a consistent role in local, state, and national history under the themes of settlement, trade, farming/ ranching, and commerce. Caltrans has determined that CA-SBR-3033H is eligible for listing in the NRHP under Criterion A, and the SHPO has concurred.

Atchison, Topeka and Santa Fe Railroad (CA-SBR-6793H; P-36-006793)

The ATSF rail line was determined eligible for listing in the NRHP in 1998 under Criterion A. The period of significance for the ATSF is considered to be from 1883 to 1910. The segment of the ATSF in the APE is a portion of the original Needles-Barstow-San Bernardino line constructed from 1883 to 1886. The ATSF was chartered in 1859 and became one of the largest railroad systems in the United States. The ATSF entered California at Needles in 1883 and quickly became a competitor to the Southern Pacific Railroad, which had up to that time provided the only freight and passenger service connections to the Midwest and East Coast. The ATSF had most of its trackage in the American southwest. The ATSF is also significant for its contribution to the citrus industry in southern California. In the early 1880s, the ATSF constructed new routes into those areas, especially Orange County, where the Southern Pacific Railroad did not provide rail service. The ATSF provided refrigerated freight cars to transport the perishable citrus fruit to East Coast markets. The ATSF also brought countless new residents into southern California and, with its low passenger ticket prices, helped spur what has been long called the Great Boom of the Eighties.

The specific segment of the ATSF located in the APE (Figure 3.1.8-2) has not been formally evaluated and does not appear to be a contributing element of the historic property due to a loss of integrity through alterations that have occurred to the original rail line over the years. Beyond the replacement of the original iron rails, wood ties, and ballast due to continual maintenance of the line, it appears the rail bed itself has been relocated from its first location along the Mojave River following major rain/flood events in the area, especially in 1938, and a parallel rail line as a double track also installed. While the overall linear resource of the ATSF in California has been determined eligible for listing in the NRHP, the specific segment of the railroad within the APE does not appear to be eligible due to changes in the property and its setting that have occurred over time from its original construction in 1883-1886.

Figure 3.1.8-2 Atchison, Topeka, and Santa Fe Railroad

The two sets of ATSF/BNSF tracks are situated along the east bank of the Mojave River.

View looking east from National Old Trails Highway/Route 66.

Within the APE, the ATSF runs along the east side of the Mojave River. The length of the segment of the ATSF rail lines that run north/south within the APE measure approximately 440 feet, and the width of the ATSF ROW measures approximately 50 feet. Two sets of steel rail with wood cross ties are situated parallel to one another on a raised ballast bed of red stone believed to be fairly contemporary and certainly well outside of the period of significance (1883-1910). It is a contiguous segment of the rail line that runs from Barstow through the Cajon Pass to San Bernardino.

Boulder Dam Transmission Lines 1, 2, and 3, and Towers (CA-SBR-7694H; P-36-007694)

The Boulder Dam Transmission Lines 1, 2, and 3, and Towers (BDTL) (Figure 3.1.8-3) were constructed from 1933 to 1936. The BDTL was determined eligible for listing in the NRHP in 1994 under Criteria A and C. The period of significance for the BDTL has been determined to be from 1936 to 1953. The property is significant under Criterion C as a prime example of a point-to-point long-distance high-voltage transmission system and represents a significant engineering achievement in California. In addition, the BDTL is significant under Criterion A because of its association with construction of Boulder (Hoover) Dam and its role in the development of metropolitan Los Angeles.

Figure 3.1.8-3 Boulder Dam Transmission Lines 1, 2, and 3, and Towers

View looking east across building on National Old Trails Highway/Route 66.

The BDTL, a linear historic resource, is comprised of two sets of steel lattice towers that run between Hoover Dam and the city of Los Angeles. The BDTLs were constructed from 1933 to 1936 to augment the electric power being sent to southern California from Boulder (Hoover) Dam. The lines leaving from Hoover Dam are mounted on parallel rows of steel transmission towers. The towers are comprised of four "legs" supporting a Y-frame tower. The towers on the BDTL are 109 feet in height and spaced approximately 400 feet apart with three conductors and two overhead (OH) ground wires attached to the frames. The transmission lines run from Hoover Dam to the switching station at Victorville. From Victorville, the BDTLs were run to Upland, where the power was then stepped down and run into Watts, Los Angeles. The segment of the BDTL that crosses the APE is comprised of the power lines from Nevada to the Victorville switching station supported by single-circuit bridge-type steel lattice towers, located outside of the APE. Only the OH transmission lines of the BDTL are located within the boundaries of the APE for the proposed Undertaking. The segment of the linear resource in the APE has not lost its original qualities of craftsmanship and retains a high level of integrity.

Edison Company Boulder Dam–San Bernardino 115-kV Transmission Lines and Towers (CA-SBR-10315H; P-36-010315)

The Edison Company Boulder Dam–San Bernardino 115-kV Transmission Lines and Towers (BDSBL), also known today as the Ivanpah-Baker-Coolwater-Dunn Siding-Mountain Pass 115-kV Transmission Lines and Eldorado-Ivanpah No. 1 and No. 2 220-kV Transmission Lines and the Southern California Edison (SCE) San Bernardino Transmission Line, was determined eligible for listing in the NRHP in 1993 under Criterion A due to its association with construction of Hoover Dam and the development of energy in the West. The property is also potentially eligible under Criterion C for its engineering achievements. The period of significance for this historic property is 1930 to 1937.

The historic property, a linear resource, consists of electrical transmission lines with associated towers. Seven towers of the BDSBL are located in the APE corridor, interspersed with four towers located immediately adjacent (but outside) the APE boundary east of the Mojave River and north of I-15. Constructed in 1930-1931 by the Southern Sierras Power Company, the original line carried electrical power from San Bernardino to Boulder City and the Boulder Dam project site for powering the activities associated with construction of the dam. With dam construction complete in 1937, the power was reversed, and the line transmitted power to San Bernardino and the city of Los Angeles.

The transmission towers (Figure 3.1.8-4) are constructed of steel-lattice "legs" that were fabricated at a central construction site so that they could be quickly assembled in the field. Between the span legs are 34-foot steel angle cross arms. The continuous series of towers spanned 193 miles between San Bernardino and the Boulder Dam site, set at the interval of seven towers in a mile over the hostile desert and mountainous terrain. Research conducted as part of the current HDC cultural resources survey effort revealed that the original set of towers and lines associated with the BDSBL have been removed from outside Hoover Dam to the Nevada border. Construction of the Ivanpah Solar Electric Generating System Project required the removal/demolition of the towers situated in the approximately 28-mile corridor between the Eldorado Valley, south of Boulder City, Nevada, and the Ivanpah Valley in California in 2010.

Figure 3.1.8-4 Edison Company Boulder Dam-San Bernardino 115-kV Transmission Lines and Towers

View looking west from County Refuse Disposal Site Road (off of Stoddard Wells Road).

SCE Kramer-Victor and Victor-Roadway 115-kV Transmission Lines and Towers (CA-SBR-10316H; P-36-010316)

The SCE Kramer-Victor and Victor-Roadway 115-kV Transmission Lines and Towers (Tower Line) linear historic property was determined eligible for listing in the NRHP in 1995 under NRHP Criteria A and C. The period of significance for the Tower Line is from 1913 to 1919. The Tower Line consists of a series of connected 115-kV transmission lines: the Kramer-Victor, Kramer-Roadway, and Victor-Roadway; of the three segments, the HDC would only cross the Kramer-Victor and Victor-Roadway lines. Originally constructed by the Southern Sierras Power Company in 1911-1913, the transmission line was acquired by SCE in 1964. Measuring 238 miles from Bishop to San Bernardino, with substations at Lone Pine, Inyokern, Randsberg, and Victorville, the line was the longest in the world when completed in 1913. The service road for the Tower Line was purchased by San Bernardino County in 1919, which later became US 395. The Tower Line is believed to have been determined eligible as part of a Section 106 regulatory action when SCE initiated a plan in the mid-1990s to rebuild the line and replace all of the existing towers. The original towers were replaced using the same footprint between 1995 and

2008. The segment of the Tower Line that crosses the APE has been modernized and updated with the installation of a double-circuit tubular steel pole to replace the original lattice steel towers (Figure 3.1.8-5). The segment of the historic linear property segment in the APE has lost its original qualities of craftsmanship, and its historic integrity has been compromised to a great extent.

Figure 3.1.8-5 Southern California Edison Kramer-Victor and Victor-Roadway 115-kV Transmission Lines and Towers

View looking south from intersection of Air Expressway Boulevard and US 395.

Environmental Consequences

No Build Alternative

Cultural Resources

The No Build Alternative would not impact any cultural resources.

Archaeological Resources

The No Build Alternative would not impact any archaeological resources.

Historic and Architectural Built Environment Resources

The No Build Alternative would have no effect on historic or historic/architectural resources because no construction would occur. The No Build Alternative would not use a Section 4(f) historic property.

Build Alternatives

Cultural Resources

All of the HDC build alternatives will result in a finding of Adverse Effect in accordance with the Section 106 PA Stipulation X.C.2 and 36 CFR 800.5(d)(2). An undertaking is considered to have an adverse effect when *any* aspect of an undertaking meets one or more of the Criteria of Adverse Effect. An undertaking may have no effect on some properties, but an adverse effect on others. In this situation, the finding for the undertaking would be "Adverse Effect." For the undertaking as a whole, there is one finding of effect.

Project effects to historic properties/historical resources are determined to assess if the proposed undertaking would adversely affect the qualities that make each eligible for the NRHP/CRHR. A historic property could either be not affected, not adversely affected, or adversely affected, depending on the resource type and the nature of project impacts to that resource. Not affecting a historic property means the project is avoiding the resource completely. Not adversely affecting means the project might be impacting the resource in some way, but that the impact is not so severe as to diminish the qualities that make the resource significant and no longer eligible for the NRHP. Adversely affecting a resource means the project is severely impacting all or some of the characteristics that make that resource significant, usually as a consequence of destruction, demolition, or relocation.

Historic properties convey their significance through their integrity. The aspects of integrity are location, design, setting, materials, workmanship, feeling, and association. Simply being visible from the historic property may not cause an adverse effect. It is necessary to evaluate the anticipated changes that the new project will introduce, physically and visually, to the historic property and its surrounding setting, features and, where applicable, open space.

Caltrans finds that there are 9 historic properties within the project APE that have been previously determined eligible for listing in the NRHP. These 9 properties include segments of 6 linear historic properties, all of which were previously determined eligible for listing in the NRHP, and 3 prehistoric archaeological sites that comprise an assumed-eligible district. In addition, Caltrans finds that there are 11 properties that are assumed eligible for the NRHP, including an assumed-eligible archaeological district. As a result, an analysis of their potential to experience adverse effects due to the proposed Undertaking is required.

Caltrans has determined that the HDC Project will have an Adverse Effect on known historic properties pursuant to Section 106 PA Stipulation X.C and is consulting SHPO regarding the resolution of adverse effects, pursuant to Section 106 PA

Stipulation XI and 36 CFR §800.6(a) and §800.6(b)(1). The effects of the Project on the 21 known properties are summarized below in Table 3.1.8-3, with the analysis supporting those determinations following.

Properties with No Historic Properties Affected Determinations under All Build Alternatives

Caltrans assumed NRHP eligibility for the following eight properties (i.e., two prehistoric and six historic-era) in accordance with Section 106 PA Stipulation VIII.C.4. These properties were subject to effects from an alignment variation that has since been discarded. These sites lie far enough outside the ADI so that direct or indirect effects are not expected. In accordance with Section 106 PA Stipulation IX.A.2, the Undertaking will not affect eight assumed eligible historic properties.

- CA-LAN-4187H (Historic archaeological site)
- CA-LAN-4359 (Prehistoric archaeological site)
- CA-LAN-4367H (Historic archaeological site)
- CA-SBR-6312 (Prehistoric archaeological site)
- CA-SBR-10960H (Historic archaeological site)
- CA-SBR-16915H (Historic archaeological site)
- P-36-026773 (Historic archaeological site)
- P-36-026832 (Historic archaeological site)

Properties with No Adverse Effect Determinations

The Undertaking will affect segments of six linear historic properties, but the effects will not be adverse. A finding of No Adverse Effect is found for six historic properties within the APE:

- National Old Trails Highway
- Mojave Trail-Mojave Road – Old Government Road
- ATSF Railroad
- Boulder Dam Transmission Lines 1, 2, & 3 and Towers (BDTL)
- Edison Company Boulder Dam–San Bernardino Transmission Lines and Towers (BDSBL)
- National Old Trails Highway SCE Kramer-Victor and Victor-Roadway 115-kV Transmission Lines and Towers

Properties with Adverse Effect Determinations under All Build Alternatives

An Adverse Effect finding as a result of the project alternatives is found for four historic properties in the APE:

- *Topipabit* Archaeological District
- CA-SBR-66 (Prehistoric archaeological site)
- CA-SBR-182 (Prehistoric archaeological site)
- CA-SBR-12336 (Prehistoric archaeological site)

Table 3.1.8-3 Historic Properties within HDC/HSR APE and Effects Determination

Primary	Trinomial	Description	Time Period	Eligibility	Preferred Alternative	Non-Preferred Alternative	Effects
Linear Historic Properties on the Preferred Alternative							
P-36-002910	CA-SBR-2910H	National Old Trails Highway	Prehistoric trail, historic	Eligible	X	X	Direct Effect – Not Adverse
P-36-003033	CA-SBR-3033/H	Mohave Trail, Mojave Road, Government Road	Prehistoric and historic	Eligible	X	X	Direct Effect – Not Adverse
P-36-006793	CA-SBR-6793H	Atchison, Topeka and Santa Fe Railroad	Historic	Eligible	X	X	Direct Effect – Not Adverse
P-36-007694	CA-SBR-7694H	Boulder Dam Transmission Lines 1, 2, & 3 and Towers	Historic	Eligible	X	X	Direct Effect – Not Adverse
P-36-010315	CA-SBR-10315H	Edison Company Boulder Dam-San Bernardino 115-kV Transmission Lines/Towers	Historic	Eligible	X	X	Direct Effect – Not Adverse
P-36-010316	CA-SBR-10316H	SCE Kraemer-Victor and Victor-Roadway 115-kV Transmission Line/Towers	Historic	Eligible	X	X	Direct Effect – Not Adverse
Historic Properties on the Preferred Alternative							
Pending	Pending	*Topipabit* Archaeological District (CA-SBR-66, CA-SBR-182 & CA-SBR-12336)	Prehistoric/Ethnohistoric	Assumed eligible, phased	X	X	Direct Effect, Partial Avoidance/ESA – Adverse
P-36-000066	CA-SBR-66	Prehistoric residential site – contributor to *Topipabit* Archaeological District	Prehistoric	Eligible	X	X	Direct Effect, Partial Avoidance/ESA – Adverse
P-36-000182	CA-SBR-182	Prehistoric residential site – contributor to *Topipabit* Archaeological District	Prehistoric	Eligible	X	X	Direct Effect, Partial Avoidance/ESA – Adverse
P-36-012609	CA-SBR-12336	Prehistoric residential site with burials – contributor to *Topipabit* Archaeological District	Prehistoric	Eligible	X	X	Direct Effect, Partial Avoidance/ESA – Adverse
P-19-004362	CA-LAN-4362H	Historic residential site and agriculture water features	1920s-1960s	Assumed eligible, phased	X	X	Direct Effect – Potentially Adverse
P-36-000158	CA-SBR-158	Petroglyph site	Prehistoric	Assumed eligible, phased	X	X	Avoidance/ESA – Not Adverse
P-36-026769	CA-SBR-16916H	Engelbrecht historic residential and workshop site	1920s-1960s	Assumed eligible, phased	X	X	Direct Effect, Partial Avoidance/ESA – Potentially Adverse
Historic Properties not on the Preferred Alternative							
P-19-004187	CA-LAN-4187H	Historic residential site and refuse scatter	1930s-1970s	Assumed eligible		X	No Effect (by the Preferred Alternative), Avoidance
P-19-04359	CA-LAN-4359	Lithic scatter	Prehistoric	Assumed eligible		X	No Effect (by the Preferred Alternative), Avoidance
P-19-004367	CA-LAN-4367H	Historic residential site and refuse scatter	1950s-1970s	Assumed eligible		X	No Effect (by the Preferred Alternative), Avoidance
P-19-006312	CA-SBR-6312	Lithic scatter with hearths	Prehistoric	Assumed eligible		X	No Effect (by the Preferred Alternative), Avoidance
P-36-010960	CA-SBR-10960H	Historic residential site	1920s-1940s	Assumed eligible		X	No Effect (by the Preferred Alternative), Avoidance
P-36-026768	CA-SBR-16915H	Historic residential site and refuse scatter	1900s-1920s	Assumed eligible		X	No Effect (by the Preferred Alternative), Avoidance
P-36-026773	pending	Historic granite quarry	1930s-1960s	Assumed eligible		X	No Effect (by the Preferred Alternative), Avoidance
P-36-026832	pending	Historic residential site and refuse scatter	1920s	Assumed eligible		X	No Effect (by the Preferred Alternative), Avoidance

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Properties with Potentially Adverse Effect Determinations under All Build Alternatives

Caltrans' preliminary findings assumed NRHP eligibility for the following three properties in accordance with Section 106 PA VIII.C. 4. Sites highlighted in **bold** below can be avoided with the establishment and enforcement of an Environmentally Sensitive Area (ESA) designation. In accordance with Section 106 PA Stipulation XII.A, Caltrans will continue to phase the evaluation and application of Criteria of Adverse Effect for these resources as the project alternatives are refined prior to project implementation:

- CA-LAN-4362H (Historic archaeological site)
- **CA-SBR-158 (Prehistoric petroglyph site)**
- **CA-SBR-16916H (Historic archaeological site)**

Caltrans initiated consultation with the SHPO on the effects determinations in October 2014. Caltrans submitted the FOE to SHPO on December 23, 2015. On February 2, 2016, SHPO concurred with Caltrans' overall finding that the undertaking as a whole will have an adverse effect on historic properties pursuant to Stipulation X.C. of the Section 106 PA. SHPO concurred with many of the specific effects findings but disagreed with the findings for several resources. Caltrans staff conducted a field review with SHPO staff on March 9, 2016, to discuss outstanding discrepancies. On March 16, 2016, Caltrans requested continuation of consulation regarding the undertaking. On March 22, 2016, Caltrans received SHPO concurrence on all outstanding issues. Caltrans and SHPO executed a project-level PA on March 30, 2016; therefore, the Section 106 process is complete. The project-level PA outlines how Caltrans will proceed pursuant to 36 CFR § 800.6(a)(1)(i)(C) to complete the final identification and evaluation of potential historic properties and provide for the resolution of any adverse effects on historic properties within the APE subsequent to its approval of the Undertaking. The agreement document between Caltrans and SHPO defines the roles and responsibilities of each agency involved in the Undertaking, describes how Caltrans will treat the historic properties during project implementation, and provides an opportunity for one concurring party to be a signatory to the document.

Section 4(f) of the Department of Transportation Act of 1966, states that "it is the policy of the United States Government that special effort should be made to preserve the natural beauty of the countryside and public park and recreation lands, wildlife and waterfowl refuges, and historic sites." A brief discussion of Section 4(f) as it relates to the historic properties under the build alternatives is included below. See Appendix B for an evaluation of Section 4(f) properties.

Archaeological Resources

All of the HDC build alternatives have the following archaeological properties within their immediate or adjacent footprint, and the impacts would be similar for all.

Topipabit Archaeological District (Comprised of Prehistoric Archaeological Sites P-36-012609 [CA-SBR-12336], P-36-000182 [CA-SBR-182], and P-36-000066 [CA-SBR-66])

The potential *Topipabit* Archaeological District is composed of three prehistoric archaeological sites (CA-SBR-66 [P-36-000066], CA-SBR-182 [P-36-000182], and CA-SBR-12336 [P-36-012609]). The presence of intact buried cultural deposits and the lack of substantial disturbance by natural or human processes indicates these habitation sites on the desert landscape have not been significantly altered since the cultural material was originally deposited during the prehistoric period. Although these three sites have been determined eligible separately for the National Register under Criterion D, they are being treated as one historic property. These archaeological resources are important because of what can be learned by data recovery and have minimal value for preservation in place.

Caltrans has determined that the Undertaking would have an **Adverse Effect** on the assumed eligible district and each of the three individually NRHP-eligible archaeological sites because portions of all three sites would be physically destroyed by the proposed construction of an HDC/HSR multimodal transportation corridor within the Direct APE. Portions of each of the three sites that will not be physically destroyed by the Undertaking will be protected from direct or indirect project-related impacts by the establishment and enforcement of ESAs.

Caltrans has determined that the three archaeological properties that make up the *Topipabit* Archaeological District are exempt from Section 4(f) because of what can be learned through data recovery <u>and</u> have minimal value for preservation in place. This assumes that by retrieving the information from the affected site areas (i.e., data recovery), and then analyzing, documenting, and curating the archaeological materials, impacts to the resources would be mitigated. This also assumes that nothing would be found in the affected site areas that would require preservation in place. Caltrans has determined the exception at §774.13(b) applies because the loss of intangible values can be mitigated through a Historic Property Treatment Plan (HPTP) being developed as part of the project-specific PA.

P-19-004362 (CA-LAN-4362H)

Site P-19-004362 (CA-LAN-4362H) is assumed to be eligible for the NRHP under Criterion D because of the presence of intact buried cultural deposits, and because the lack of substantial disturbance by natural or human processes indicates this habitation site has not been significantly altered since the cultural material was originally deposited during the historic period.

Caltrans has determined that the Undertaking has the potential for an **Adverse Effect** on P-19-004362 (CA-LAN-4362H) because the site would be physically destroyed by the proposed construction of an HDC/HSR multimodal transportation corridor within the Direct APE. This archaeological resource is important because of what can be learned by data recovery and has minimal value for preservation in place.

Caltrans has determined that P-19-004362 (CA-LAN-4362H) is exempt from Section 4(f) because of what can be learned through data recovery and has minimal value for preservation in place. It also assumes that by retrieving the information from the affected site areas (i.e., data recovery), and then analyzing, documenting, and curating the archaeological materials, impacts to the resources would be mitigated. This also assumes that nothing would be found in the affected site area that would require preservation in place. Caltrans has determined the exception at §774.13(b) applies because the loss of intangible values can be mitigated through an HPTP being developed as part of the project-specific PA.

P-36-000158 (CA-SBR-158)

Caltrans has determined that the Undertaking has the potential to have an Adverse Effect on CA-SBR-158, which is assumed to be eligible for the NRHP under Criteria A and/or D, and subject to phased analysis of effects; however, the site is far enough away from the Direct APE that direct effects are not anticipated, and the site can be protected by establishment and enforcement of an ESA. The site will be affected indirectly, but the effects are presumed to result in a finding of **No Adverse Effect**.

P-36-026769 (CA-SBR-16916H)

Site P-36-026769 (CA-SBR-16916H) is assumed to be eligible for the NRHP under Criterion D because of the presence of intact buried cultural deposits and because the lack of substantial disturbance by natural or human processes indicates this habitation site has not been significantly altered since the cultural material was originally deposited during the historic period.

Caltrans has determined that the Undertaking has the potential for an **Adverse Effect** on P-36-026769 (CA-SBR-16916H) because a significant portion of the site would be physically destroyed by the proposed construction of an HDC/HSR multimodal transportation corridor within the Direct APE. This archaeological resource is important because of what can be learned by data recovery and has minimal value for preservation in place. The portion of the site that will not be physically destroyed by the Undertaking will be protected from direct or indirect project-related impacts by the establishment and enforcement of an ESA.

Caltrans has determined that P-36-026769 (CA-SBR-16916H) is exempt from Section 4(f) because of what can be learned through data recovery and has minimal value for preservation in place. It also assumes that by retrieving the information from the affected site areas (i.e., data recovery), and then analyzing, documenting, and curating the archaeological materials, impacts to the resources would be mitigated. This also assumes that nothing would be found in the affected site area that would require preservation in place. Caltrans has determined the exception at §774.13(b) applies because the loss of intangible values can be mitigated through an HPTP being developed as part of the project-specific PA.

Historic and Architectural Built Environment Resources

All of the HDC build alternatives have the following six historic properties (linear resources) within their immediate or adjacent footprint, and the impacts would be similar for all, except as noted.

Edison Company Boulder Dam-San Bernardino 115-kV Transmission Lines and Towers (BDSBL) (CA-SBR-10315H; P-36-010315)

The APE traverses the BDSBL (which, as noted earlier, is itself shorthand for the Ivanpah-Baker-Coolwater-Dunn Siding-Mountain Pass transmission lines and Eldorado-Ivanpah No.1 and No.2 transmission lines) after the proposed new highway and rail alignments separate near I-15. The width of the APE beneath the historic transmission lines varies, depending on the specific alternative alignment. Along the HDC alignment, the width of the APE is 805 feet. The width of the APE along the HSR alignments varies between 420 and 1,830 feet. Seven transmission line towers are located within the APE. One tower that would need to be removed is located within the HDC alignment, and six towers that would need to be removed are located within the HSR alignment. Four other transmission towers are located nearby but outside the HDC APE and would not be directly affected by any of the alternatives being proposed.

The Finding of Adverse Effect Report determined that a finding of **No Adverse Effect** is appropriate. While the HDC/HSR project build alternatives would relocate up to seven towers, this represents a small portion of the entire line that extends over 125 miles to the California/Nevada border. The resultant change would not alter the resource to the degree that it no longer conveys its historic significance. The overall effect would not result in the transmission lines being considered ineligible for listing in the NRHP.

National Old Trails Highway (CA-SBR-2910H; P-36-002910)

The APE traverses the National Old Trails Highway in an east-west orientation. The width of the APE crossing the historic route is approximately 965 feet. A grade separation is planned with the HDC/HSR crossing under the historic roadway. The linear alignment or elevation of the existing historic roadway would not be modified, although the roadway in essence would become a bridge. The bridge abutments supporting the roadway are anticipated to be concrete. On- and off-ramps from the new freeway/expressway are planned for northbound and southbound access to the historic roadway. The length of the excavation for the trench under the roadway may reach up to 1,000 feet. It is anticipated the ultimate central multimodal six-lane alignment would have an estimated undercrossing dimension of 500 feet in length and a width of 295 feet.

The Finding of Adverse Effect Report determined that as a result of the previous loss of integrity experienced by the segment of the historic National Old Trails Highway within the APE, due to being substantially altered over the years with various road improvement projects (discussed earlier under Affected Environment), combined together with the conversion of a section of the roadbed into a bridge deck over a new railroad corridor immediately south of the APE, that a finding of **No Adverse Effect** should be made for project effects under any of the HDC Project build alternatives.

Atchison, Topeka and Santa Fe (ATSF) Railroad (CA-SBR-6793H; P-36-006793)

The APE traverses the ATSF rail line, a linear historic-era property, in an east-west orientation. The width of the HDC APE crossing the railroad is approximately 350 to 440 feet. Plans are to construct a viaduct/bridge OH as part of the HDC Project over the railroad tracks. The linear configuration of the rail line would not be modified and would not cause physical alterations to the railroad tracks within the APE. The OH structure would likely be constructed of concrete and would incorporate a context-sensitive earthen color palette scheme to better harmonize with desert hues. The dimensions of the new OH structure are anticipated to be approximately 500 feet long and 305 feet wide to accommodate the central multimodal six-lane alignment. Vertical clearance from the tracks and bridge soffit would be approximately 28 feet.

The segment of the ATSF linear feature within the APE has lost its original rural setting and the earliest physical components that would have otherwise contributed to the segment’s ability to convey its historic significance as a railroad in its period of significance, the 1883 to 1910 time period. While the overall design and function of the historic property still remain with steel rails attached to cross ties, and set on a long linear path, individual components of the railroad tracks in the APE have been replaced and modernized over time. The general setting of the historic property segment in the APE has also been compromised with the later introduction of buildings, structures, and roads.

There would be no physical ROW acquisition or physical effects to any portion of the rail line associated with any of the build alternatives. Nor would the project alternatives physically affect any of the character-defining features of the historic linear property in a manner that would diminish its integrity. Construction of the new OH bridge structure would not alter the rail line in any way, and therefore would not have an adverse effect. The project would, however, have an indirect effect on the historic property by the introduction of visual, audible, and atmospheric elements. Consistency with the Secretary of the Interior’s Standards for the Treatment of Historic Properties to design sympathetic architectural elements for the bridge that would carry the HDC/HSR multimodal alignment over the ATSF line and for the corridor that would pass under the BDTL transmission lines would ensure adverse effects would be avoided. Even with construction of an OH bridge over the path of the railroad and the HDC/HSR alignment under the BDTL transmission lines, the Undertaking would not adversely affect the integrity of either linear resource as a whole or diminish the ability of the individual resource’s features to convey its historic use and connection with the ATSF as the continuity of the linear resource would be maintained. The project would not diminish the integrity of the property’s significant historic attributes and would not alter the characteristics that qualify it for inclusion in the NRHP under Criterion A. Therefore, Caltrans has determined in its Finding of Adverse Effect Report that a finding of **No Adverse Effect** would be made under any of the project build alternatives for this historic property.

Boulder Dam Transmission Lines (BDTL) 1, 2, and 3, and Towers (CA-SBR-7694H; P-36-007694)

The BDTL traverses the APE diagonally on a northeast-southwest bearing. The width of the APE crossing the historic property is approximately 628 feet. None of the transmission line towers of this resource are located within the APE for the HDC alignment, so no towers would need to be relocated for construction of the proposed project. As a result, there would be no direct effects to the linear historic property. One transmission line tower is located southwest of and approximately 50 feet outside the APE at its closest point.

Only the OH transmission lines of the BDTL are located within the boundaries of the APE for the proposed Undertaking. None of the proposed project activities under any of the build alternatives require the destruction of, or damage to, the OH transmission lines of the BDTL in the APE. The towers supporting the transmission lines are located outside of the APE and would not be physically impacted by project activities. The segment of the BDTL within the APE is an important component of the historic linear resource and continues to strongly convey a sense of time and place. While individual components of the towers and power lines have been replaced and modernized over time, the overall design of the BDTL still remains largely intact with the towers and transmission lines all arranged on a long linear path that crosses the APE. The continuity of the linear resource will be maintained.

Construction of a multimodal transportation corridor to pass under the segment of the BDTL within the APE would introduce visual, audible, and atmospheric elements that were not previously experienced at that site. The visual, audible, and atmospheric elements introduced by construction of the HDC/HSR alignment, which will be located below the transmission lines of the BDTL, however, do not diminish the integrity of the property’s significant historic attributes as a whole and would not alter the characteristics that qualify the linear resource for inclusion in the NRHP under Criteria A and C. Therefore, Caltrans has determined in its Finding of Adverse Effect Report that a finding of **No Adverse Effect** could be made under any of the project build alternatives for this historic linear resource property.

SCE Kramer-Victor and Victor-Roadway 115-kV Transmission Lines and Towers (CA-SBR-10316H; P-36-010316)

The APE traverses what was originally recorded as the SCE Kramer-Victor and Victor-Roadway 115-kV Transmission Lines and Towers (which as noted earlier, consist of three transmission lines: Kramer-Victor, Kramer-Roadway, and Victor-Roadway; the HDC would only cross the Kramer-Victor and Victor-Roadway segments), which align in a north-south orientation west of US 395. The width of the APE beneath the OH historic transmission lines extends to 1,456 feet, which would accommodate the proposed six-lane multimodal alignment and would include construction of cloverleaf on- and off-ramps for accessing US 395. Two transmission line towers, which would be considered character-defining features, are located within the APE but would not require displacement or relocation as part of the project. As the HDC would cross under these transmission lines, however, the towers may require modification to ensure compliance with vertical and horizontal clearances. The continuity of the linear resource will be maintained. None of the qualities that qualify the historic property for NRHP eligibility under Criterion A and C would be diminished under any of the build alternatives. Therefore, Caltrans has determined that a finding of **No Adverse Effect** is applicable to the SCE Kramer-Victorville Power Lines and Towers historic property for anticipated effects under any of the HDC alternatives under consideration.

Mojave Trail, Mojave Road, and Government Road P-36-003033 (CA-SBR-3033/H)

Approximately 0.34 miles of this multicomponent linear resource is within the HDC APE. It is intersected by the HDC Alignment, the HDC + HSR Alignment, and the HDC + HSR Footprint Variation E.

None of the qualities that qualify the overall property for NRHP eligibility under Criterion A would be diminished; alterations of this segment of the road would not modify or change the characteristics of the resource that make it eligible for the NRHP. The continuity of the linear resource will be maintained. Caltrans has determined that a finding of **No Adverse Effect** is applicable to the Mojave Trail, Mojave Road, and Government Road historic property for anticipated effects under any of the HDC alternatives under consideration.

The potential of encountering buried cultural material varies along the corridor and can be broken down by relative sensitivity (i.e., low, medium, and high). While most of the corridor has moderate potential to contain buried deposits, the Mojave River area, due to its high site density and resident soil type (Holocene soils), possesses high potential to contain subsurface cultural resources. If these buried resources are encountered during excavation (after construction has commenced), they will be treated under the standard Caltrans PA stipulation for post-review discovery.

In conclusion, Caltrans has determined that because there are no adverse effects to any of the six historic properties that qualify as protected under Section 4(f) (i.e., those properties which are eligible for the NRHP for other than Criterion D), there would be no use of Section 4(f) properties. Therefore, the Section 4(f) use of the historic property under any of the build alternatives is proposed as *de minimis* because they would not result in an adverse effect or diminish the qualities or character-defining features that qualify these resources for the NRHP/CRHR. The SHPO was notified in a letter in September 2014 and again in January 2016 that a *de minimis* finding is being proposed.

Avoidance, Minimization, and/or Mitigation Measures

Mitigation Measure

CUL-1: Caltrans has developed a PA (executed March 30, 2016) in consultation with the SHPO to identify mitigation measures for purposes of reducing potential impacts to NRHP-eligible archaeological sites. Caltrans will prepare an HPTP in consultation with SHPO to plan for additional fieldwork, including phased archaeological evaluation of the sites, data recovery of some sites, and post-review discovery and monitoring for areas with high archaeological sensitivity. The HPTP will include sections that provide an archaeological context, including prehistoric and historic-era research themes and questions appropriate to the known site types; the proposed archaeological evaluation work at each of the sites; general field, laboratory, curation, and documentation methods; an ESA Action Plan; Data Recovery Plan (DRP); and a Post-Review Discovery and Monitoring Plan that includes delineation of Archaeological Monitoring Areas (AMAs). Additional mitigation, if identified during preparation of the HPTP and in consultation with SHPO, would also be incorporated. Specifically, the HPTP will address the following:

1. Three phased sites are assumed eligible for the purposes of this Undertaking. These properties consist of one prehistoric archaeological site and two historic-era archaeological sites (i.e., P-19-004362 [CA-LAN-4362H], P-36-000158 [CA-SBR-158], and P-36-026769 [CA-SBR-16916H]). Evaluation and treatment of the three phased historic properties will continue as the project is refined, and SHPO consultation on the eligibility and any revised findings of effect will continue throughout phasing.
2. Continue to phase evaluation of the assumed eligible *Topipabit* Archaeological District to obtain SHPO concurrence on determinations of eligibility under Criterion A for the district and its three contributing archaeological sites (i.e., P-36-000066 [CA-SBR-66], P-36-000182 [CA-SBR-182], and P-36-012609 [CA-SBR-12336]) for their association with the area's ethnic history.
3. The HPTP will address whether the July 2015 research design will be employed to evaluate the phased sites or whether a revised research design is necessary due to conflicting information in the December 2015 FOE. Evaluations of P-19-004362 (CA-LAN-4362H) and P-36-026769 (CA-SBR-16916H) should clearly demonstrate how the collected artifacts and surface artifacts answer or fail to answer research questions posed in the research design. Evaluation of P-36-000158 (CA-SBR-158) should clearly demonstrate whether the site is eligible under Criterion A and/or Criterion D. The revised evaluation of P-36-000158 (CA-SBR-158) should clearly argue how/why the resource contains or is likely to contain data potential under Criterion D.
4. Develop an ESA Action Plan to protect portions of the *Topipabit* Archaeological District and portions of the three contributing archaeological sites (i.e., P-36-000066 [CA-SBR-66], P-36-000182 [CA-SBR-182], and P-36-012609 [CA-SBR-12336]). The portions of these three sites that will not be directly affected will be protected by establishment and enforcement of an ESA Action Plan that will

prevent inadvertent effects to remaining portions of these historic properties. The ESA Action Plan will also include protection measures to protect rock art site P-36-000158 (CA-SBR-158) in its entirety, and to protect and avoid a portion of P-36-026769 (CA-SBR-16916H), which is adjacent to the Direct APE/ADI.

5. A DRP will be implemented to mitigate the effects to the portions of the *Topipabit* sites within the Direct APE/ADI that will be adversely affected. If any additional phased sites are determined eligible as a result of phasing, a DRP or additional research will be implemented for those sites as appropriate. The DRP will include a Burial Treatment Plan if burials are encountered.
6. Prepare a Geoarchaeological Sensitivity Analysis/Study of the soils within the ADI in relationship to proximity to water sources, known archaeological resources, and likelihood for the presence of buried deposits to plan for as of yet unknown buried historic archaeological properties that may be present in the ADI. A soils analysis study and a ground-penetrating radar study prepared for previous draft project documents indicate that the ADI has a high potential to encounter an unknown number of buried sites during project-related ground disturbance.
7. Develop a Post-Review and Monitoring Plan that includes delineation of AMAs that would include, but not be limited to, the portions of the *Topipabit* sites within the ADI, during the construction phases. Develop a Post-Review Discovery and Monitoring Plan in the areas with the highest geoarchaeological sensitivity. The Post-Review Discovery and Monitoring Plan may include ground truthing with trenching in areas of the highest sensitivity.
8. In consultation with CSO and SHPO, District will consider planning for educational and/or interpretive programs based on the findings of the DRP in accordance with Attachment 6 of the Section 106 PA.
9. The District, in coordination with CSO, shall submit the HPTP to the SHPO for review and concurrence. The SHPO shall respond within 30 days of the receipt of the submission. If the SHPO does not respond within 30 days after receipt, Caltrans may either extend the review period in consultation with the SHPO or proceed to the next step prescribed in Stipulation II.A. The District shall also provide a submittal to concurring parties and appropriate Native American consulting parties (as identified in Stipulation III) for review and comment, concurrently with the SHPO submittal.

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3.2 Physical Environment

3.2.1 Hydrology and Floodplain

Regulatory Setting

Executive Order (EO) 11988 (Floodplain Management) directs all federal agencies to refrain from conducting, supporting, or allowing actions in floodplains unless it is the only practicable alternative. The Federal Highway Administration (FHWA) requirements for compliance are outlined in 23 *Code of Federal Regulations* (CFR) 650 Subpart A.

To comply, the following must be analyzed:

- The practicability of alternatives to any longitudinal encroachments.
- Risks of the action.
- Impacts on natural and beneficial floodplain values.
- Support of incompatible floodplain development.
- Measures to minimize floodplain impacts and to preserve/restore any beneficial floodplain values affected by the project.

The base floodplain is defined as "the area subject to flooding by the flood or tide having a one percent chance of being exceeded in any given year." An encroachment is defined as "an action within the limits of the base floodplain."

Affected Environment

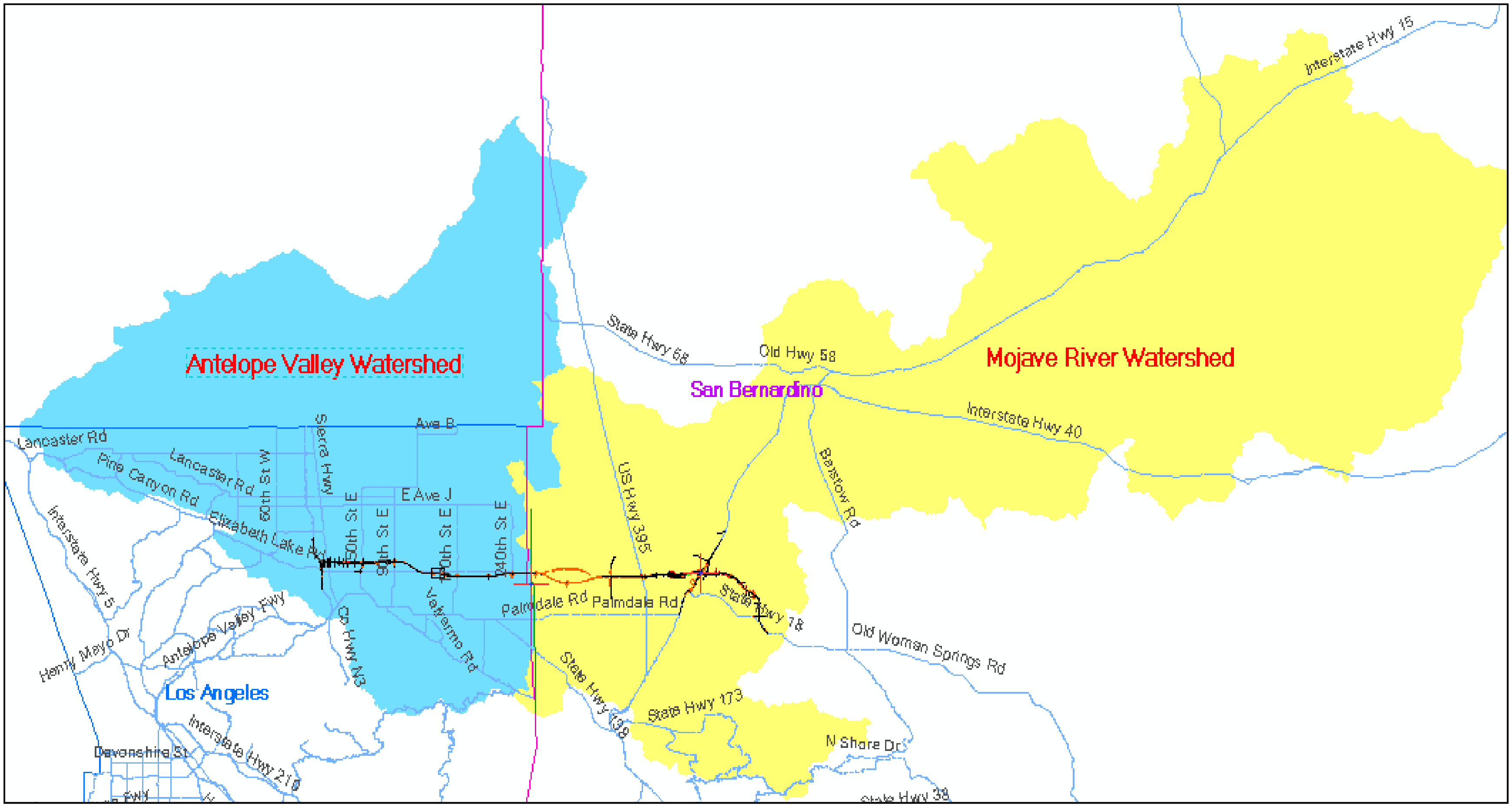
Existing data sources used to prepare this section were taken from the *Preliminary Hydrology and Hydraulics Report* (January, 2016) and the *Final Preliminary Geomorphology Report* (June 2014).

The High Desert Corridor (HDC) traverses two watersheds (Antelope Valley and Mojave River) (see Figure 3.2.1-1).The western portion of the project area is located in the Antelope Valley watershed. This watershed encompasses approximately 1,220 square miles within Los Angeles County and 143 square miles in San Bernardino County. Numerous streams originating in the mountains and foothills flow across the valley floor and eventually pond in several dry lakes to the north, including Rosamond Lake and Rogers Lake.

The eastern portion of the project area is located in the Mojave River Watershed. The Mojave River includes perennial low-flow channels along the streambed, and it supports extensive riparian vegetation along its banks and adjacent areas.

In general, the hydrologic regime along the entire corridor exhibits the characteristics of an alluvial fan, with several incised streams and channels that cross the project alignment, including Mojave River, Bell Mountain Wash, Fremont Wash, Mescal Wash, Big Rock Creek, and Little Rock Creek. These are considered the largest waterways within the project area and, with the exception of Bell Mountain Wash, generally flow northerly across the HDC site.

Figure 3.2.1-1 Antelope Valley and Mojave River Watersheds



The HDC area has a High Desert-type climate, characterized by long, dry, hot summers and cold and windy winters. Most of the precipitation occurs between October and May. Primarily, precipitation occurs as rainfall, with snow common in the high mountains. The proposed project crosses the following hydrologic areas/hydrologic subareas: Lancaster/626.50, Rock Creek/626.80, El Mirage/628.10, and Upper Mojave/628.20. Lands within the project watersheds are largely undeveloped, and most of the terrain is brush-covered. Some of the undeveloped land is used for rangeland or agricultural purposes. Sand and gravel deposits are found extensively in floodplains and stream channels located north of the San Gabriel Mountains in the Little Rock and Big Rock wash areas.

Soils are classified into four hydrological soil groups: A, B, C, and D, where Type A is the most pervious with low runoff potential (e.g., sand and gravel), and Type D is the least pervious with high runoff potential (e.g., clay soils). In the project area, Types A and B generally follow the alluvial deposits along the creeks and along the alluvial fan of major streams such as Little Rock Wash, Big Rock Wash, and the Mojave River. Types C and D are generally located along the hillsides, in the upper watersheds of Little Rock, Big Rock, Mescal, and Fremont washes, and in the vicinity of the Mojave River. Along the alignment, most of the soil is characterized as Type A or B.

Flood Insurance Rate Map (FIRM) panels are provided in the *Preliminary Hydrology and Hydraulics Report* and are summarized in Table 3.2.1-1.

Table 3.2.1-1 Flood Insurance Rate Map Panels within the HDC

Flood Map No.	General Area	Flood Zone
06037C0700F, 06037C0659F, and 06037C0657F	Division Street to Sierra Highway, and between Avenue P-4 and Avenue P-8	AO
06037C0701F	70th Street E and east of Little Rock Wash	A
06037C0750F	East from E. Palmdale Boulevard to Big Rock Wash	A
06037C775H and 06071C5750H	East of the Los Angeles/San Bernardino county line to Richardson Road	D
06071C5805H	Adelanto Airport Road to Phantom E.	D
	Turner Wash and Ossum Wash	A
	The Mojave River	AE
06071C5810H	Bell Mountain Wash to the west of I-15	A
06071C5820H	Mojave River in the vicinity of I-15	AE
06071C5830H	I-15 to Waalew Road	D
06071C5845H	South of S Road to Candlewood Road	A
	Joshua Road to where the project terminates at SR-18	D

Source: HDC Preliminary Hydrology and Hydraulics Report, 2014.

Near the western terminus of the project, the proposed roadway is located in Flood Zone AO (i.e., an area inundated by shallow 100-year flooding usually in the form of sheet flow on sloping terrain), for which average depths have been determined (see Figure 3.2.1-2). Flood depths range from 1 to 3 feet from Division Street to Sierra Highway and between Avenue P-4 and Avenue P-8. At these locations, the project alignment would be elevated more than 6 feet above grade.

The alignment between State Route (SR) 14 and Division Street is located within Zone X (i.e., an area determined to be outside the 500-year floodplain). The alignment from Sierra Highway east to 53rd Street E also traverses Zone X. As shown in Figure 3.2.1-2, the project alignment between 70th Street E and east of Little Rock Wash is within Flood Zone A (an area inundated by 100 year flooding, for which no base flood elevations [BFEs] have been established). The alignment is located within Zone X from Little Rock Wash to 90th Street E.

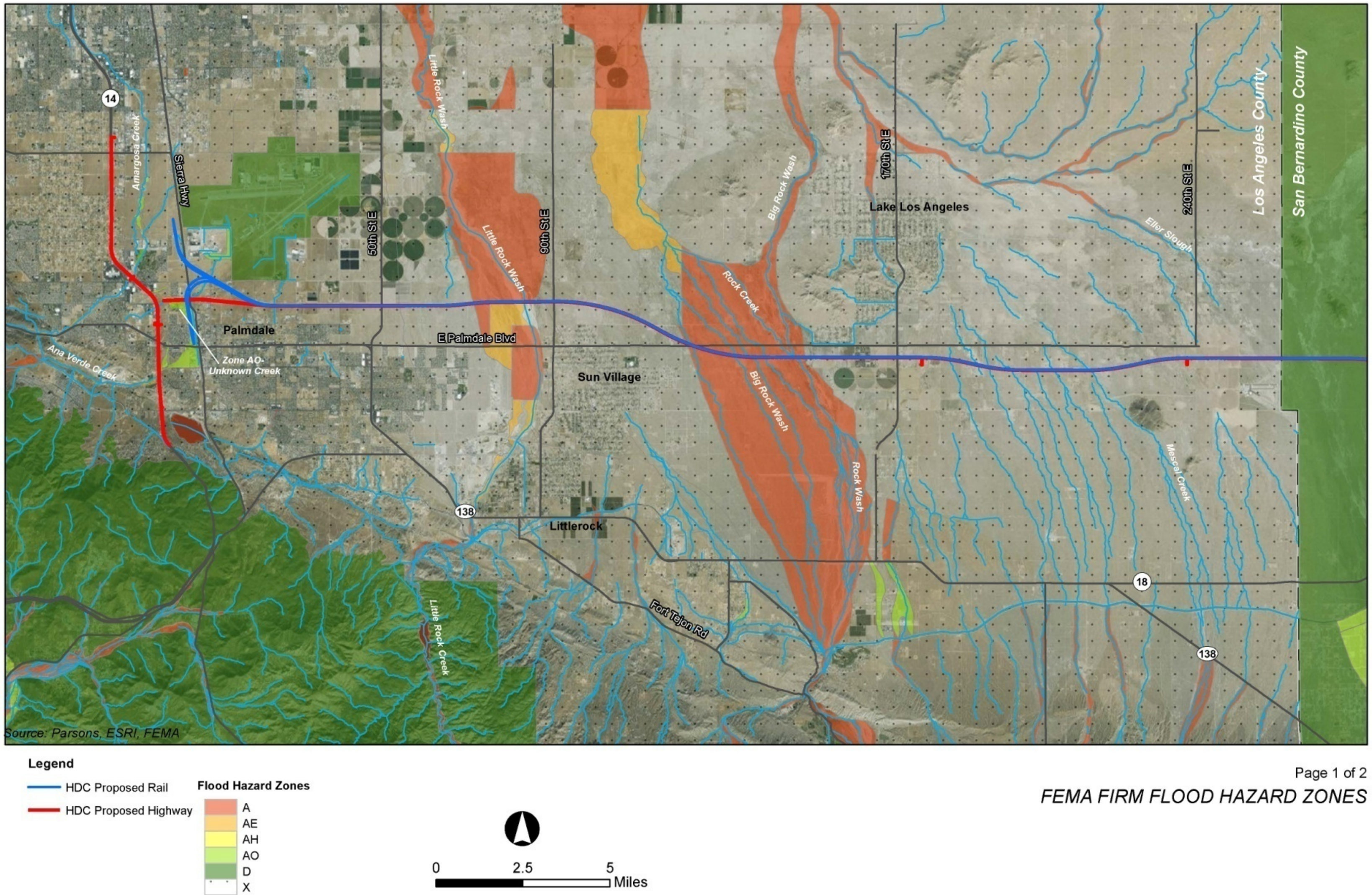
As shown in Figure 3.2.1-2, the project alignment extending east from south of E. Palmdale Boulevard to Big Rock Wash is located within Zone A. The alignment east of the Los Angeles/San Bernardino county line to Richardson Road is within Zone D (i.e., an area of undetermined but possible flood hazards).

The alignment from Richardson Road to Adelanto Airport Road is within Zone X. The alignment from Adelanto Airport Road to Phantom E is within Zone D. As shown in Figure 3.2.1-3, the project alignment crosses Turner Wash and Ossum Wash, designated as Zone A. The area where the alignment crosses the Mojave River is designated as Zone AE (i.e., a Special Hazard Area inundated by 100-year flooding, for which BFEs have been established). As shown in Figure 3.2.1-3, the project alignment from the Bell Mountain Wash to the west of I-15 is within Zone A. Figure 3.2.1-3 shows the project alignment along I-15 where direct connectors would be constructed as part of the proposed freeway-to-freeway interchange. The alignment crosses the Mojave River within Zone AE in the vicinity of I-15. The alignment from I-15 to Waalew Road is within Zone D.

At the eastern terminus of the project, the alignment from south of S Road to Candlewood Road (west of Joshua Road) encroaches upon the north side of Apple Valley Lake, which is a closed basin designated as Zone A (see Figure 3.2.1-3). The alignment from Joshua Road to where the project terminates at SR-18 is within Zone D.

Portions of the watershed tributary to the HDC are located upstream of the California Aqueduct, which traverses the south side of the Antelope Valley. This facility is generally placed above grade, which causes it to act as a dam to some of the flows generated upstream; however, during the assessment of the sub-basin areas, it was determined that sufficient culvert and channel crossings under the aqueduct (and railroad tracks) exist to prevent flow diversions and impeded flows within the sub-basins. Therefore, the hydrology calculations will disregard the physical impacts of the California Aqueduct.

Figure 3.2.1-2 Flood Map – Los Angeles County Portion



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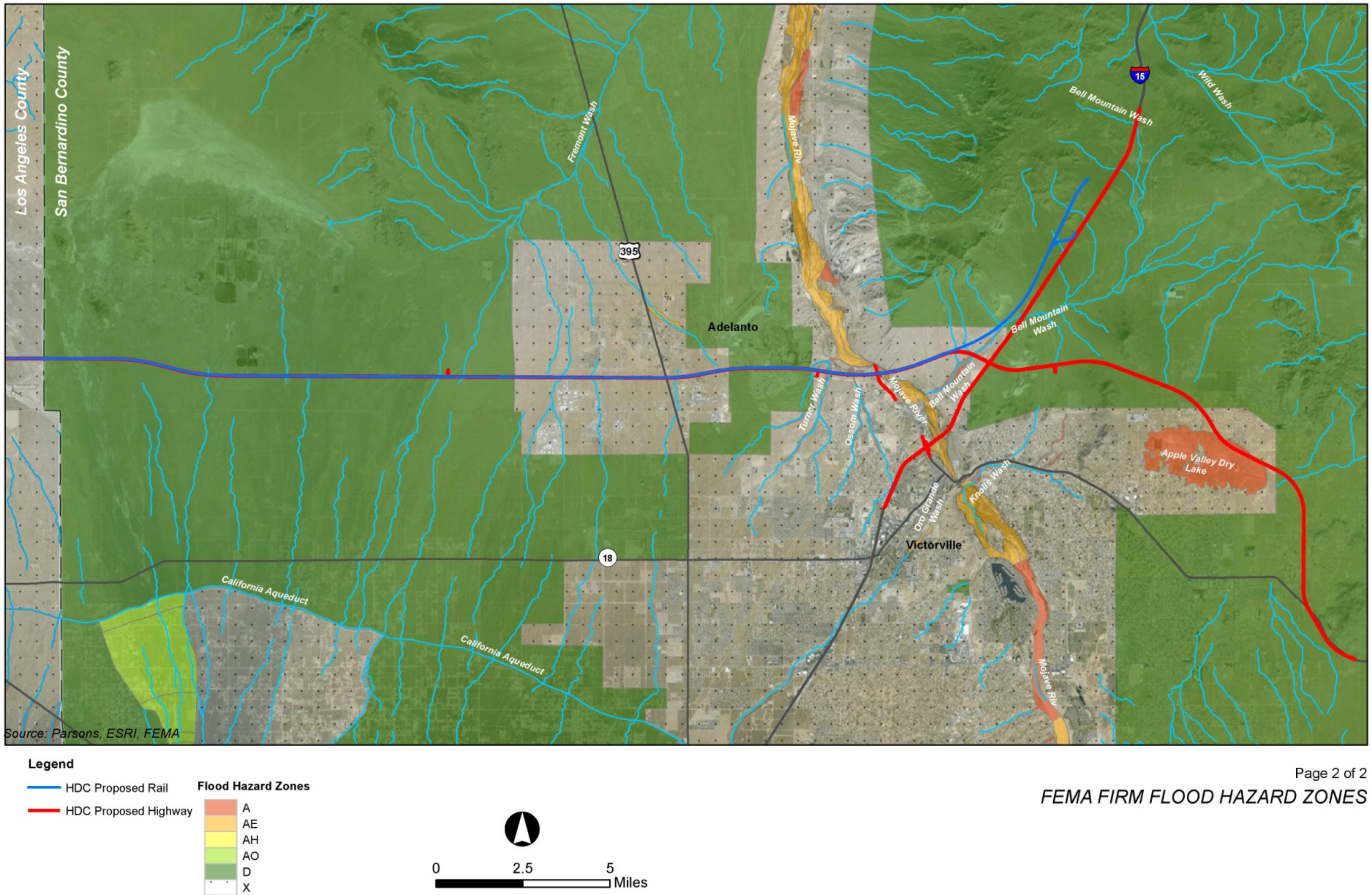
FEMA FIRM FLOOD HAZARD ZONES

Figure 3.2.1-3 Flood Map – San Bernardino County



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FEMA FIRM FLOOD HAZARD ZONES

Runoff in Little Rock Wash is generated from the San Gabriel Mountains and its northern foothills that outlet into Antelope Valley. The wash conveys flow to a closed basin at Rosamond Lake. Northeast of Rosamond Lake is Rogers Lake, which is also a closed basin located east of Rosamond Lake in the northern part of Antelope Valley. A hydraulic feature associated with Little Rock Wash is the Little Rock Dam. The Little Rock Dam, with a tributary drainage area of 49.2 square miles, is located 8 miles upstream of the alignment and 3 miles south of the California Aqueduct. The Little Rock Dam plays a role in reducing peak flows, as well as serving as a storage feature in the watershed.

The proposed alignment would cross Big Rock Wash east of Little Rock Wash. The alignment curves to the northeast past Lovejoy and Alpine buttes, and it eventually forms a common hydrologic system with its sister drainage, flowing to the Rosamond and Rogers Dry Lake Basin. Big Rock Wash is approximately 7.5 miles downstream of the California Aqueduct.

The proposed alignment would cross Turner Wash east of Phantom E, before it drains to the Mojave River. Ossum Wash crosses the alignment east of Turner Wash before it drains to the Mojave River.

The Mojave River is, for the most part, an intermittent river that conveys runoff northerly from the eastern San Bernardino Mountains into the Mojave Desert in San Bernardino County. The Mojave River is the largest drainage system in the Mojave Desert. A small section of the river, referred to as the “Narrows,” is a perennial stream where groundwater outcrops in the narrow valley adjacent to Victorville throughout the entire year. This is the location of the proposed crossing of the HDC.

Environmental Consequences

No Build Alternative

No impacts to hydrology and floodplain would occur under the No Build Alternative.

Freeway Expressway and Freeway/Tollway Alternatives

In general, the roadway would be constructed on fill, and the proposed alignment would be elevated approximately 6 feet above grade and act as a dam to upstream runoff. Local streets would overcross the freeway alignment, as typical. In Palmdale, the alignment would pass the floodplain at the connection with SR-14. Within this area, the roadway profile is significantly higher than 6 feet above grade.

To evaluate the hydraulics of the drainage area within the project site, the U.S. Army Corps of Engineers (USACE) Hydrologic Engineering Center River Analysis System (HEC-RAS) model was used. The HEC-1 hydrologic computer model was employed to develop flow rates used for hydraulic modeling and for sizing of flood control and flow conveyance facilities proposed. The HEC-1 program is designed to simulate the surface runoff response of a watershed to precipitation by representing the watershed as an interconnected system of hydrologic and hydraulic components. The hydrologic methodology is based on the U.S. Natural Resources Conservation Service (NRCS) curve number method.

Drainage subbasins were delineated using U.S. Geological Survey (USGS) topographic mapping superimposed on aerial photogrammetric mapping provided for the HDC Project area. A total of 77 subbasins were delineated, each showing areas that cross the proposed alignment corridor at different locations.

Runoff generally crosses the proposed project corridor in a northerly direction. Facilities would be designed for the 100-year storm event to prevent flooding of the proposed roadway and potential flooding upstream and downstream of the roadway. Two design options enabling flood flows to cross the freeway are to: (1) mimic existing flow conditions by placing cross culverts at existing flow concentration points along the alignment and, where applicable, construct infiltration basins upstream to reduce runoff through the culvert; or (2) place longitudinal channels along the alignment to divert existing flow to crossings. Because flow diversion would exacerbate downstream flooding conditions and cause associated erosion, the first design option (i.e., mimic existing flow conditions) was chosen as the recommended concept for flood and erosion control along most of the project alignment.

The Freeway/Expressway and the Freeway/Tollway alternatives, which include the variations and options, would add approximately 995 acres to the existing 80-acre impervious surface area. The proposed project would replace sections of roadway along SR-18 in Apple Valley at the east end of the proposed project corridor and sections of roadway within Palmdale at the west end of the corridor. As a result of the increased impervious area, a nominal increase in runoff would be exhibited within the various watersheds traversed by the corridor. Because the soils are relatively pervious and groundwater is relatively deep, the installation of infiltration basins or detention basin facilities is practical.

Bridges are proposed over the deeper streams, such as Little Rock Wash, Big Rock Wash, Turner Wash, Ossum Wash, and Mojave River. Cross culverts are proposed at the other waterways traversed by the project alignment, including Grandview Canyon Creek, Graham Canyon Creek, Mescal Creek, Fremont Wash, and Bell Mountain Wash.

Cross culverts will be placed to minimize flow diversions and to mimic existing flow conditions along the project alignment. The culverts would enable runoff to cross the freeway without inundating the paved surface and without flooding upstream and downstream properties. Each culvert would be designed with inlet/outlet headwalls. Energy dissipaters, in the form of vegetated riprap pads, would be incorporated at the downstream ends of the cross culverts to slow flows to nonerosive levels where necessary.

At the Federal Emergency Management Agency (FEMA)-designated floodplain in Apple Valley, the highway would be designed for the 100-year storm event to prevent flooding in coordination with the County of San Bernardino Flood Control District. The area affected within Apple Valley Lake would be less than 1 percent of the total basin area. Given these considerations, water surface elevation impacts on the floodplain would not be substantial, and no Letter of Map Revision (LOMAR) or Conditional Letter of Map Revision (CLOMAR) would be required for improvements placed within the floodplain at this location.

Infiltration basins are proposed at most intersections within the right-of-way (ROW) to treat and partially contain the onsite pavement runoff of the roadway. The infiltration basins treat runoff by retaining the water quality volume (WQV) and enough flow volume to ensure flow rates mimic existing conditions. Along the western portion of the alignment, the City of Palmdale has developed a Drainage Master Plan (DMP) that incorporates a network of storm drains and detention facilities for flood control within Palmdale. After construction of the DMP, the outflow from the infiltration basins would be tied to the proposed drainage network. In this way, installation of the infiltration basins would alleviate water quality and hydromodification impacts related to the roadway.

Freeway/Expressway with HSR Alternative

The Freeway/Expressway with High-Speed Rail (HSR) Alternative, which includes the variations and options, would add approximately 1,365 acres to the existing 80-acre impervious surface area. HSR facilities would be constructed within the HDC ROW. Local streets would undercross the freeway alignment, as typical. The hydrologic modeling analysis conducted for the Freeway/ Expressway and the Freeway/Tollway alternatives would also apply to the Freeway/Expressway with HSR Alternative. Similarly, the drainage facilities (e.g., bridges, cross culverts, infiltration basins) and best management practices (BMPs) proposed would also address potential hydrology and hydraulic impacts associated with construction and operation of any future Freeway/Expressway with HSR alternative. The impacts of the Freeway/Expressway with HSR Alternative, as it relates to drainage facilities, were analyzed. Cross culvert locations, infiltration basin sizes, and roadway crossings were modified to accommodate the Freeway/Expressway with HSR Alternative. Culverts were designed with concrete bottoms to withstand structural and vibratory issues related to the Freeway/Expressway with HSR Alternative.

Due to clearance requirements for the Freeway/Expressway with HSR Alternative, and its variations and options, local roads and United States Highway 395 (US 395) would be required to cross beneath the HDC. Local roads would be graded to allow positive drainage beyond the undercrossing. Positive drainage means a drainage going in a direction downhill and away from the structure to protect from water damage. In a few locations, positive drainage is either not possible or infeasible. At these locations, construction of retention basins is recommended.

Although the rail component of this alternative does not extend east to encroach on the basin at Apple Valley Lake, the highway portion would need to be designed for the 100-year storm event to prevent flooding in coordination with the County of San

Bernardino Flood Control District, similar to that described under the Freeway/ Tollway Alternative above.

Freeway /Tollway with HSR Alternative (Preferred Alternative)

Impacts to hydrology and floodplain as a result of construction and operation of the Freeway/Tollway with HSR Alternative (Preferred Alternative) are the same as those described under the Freeway/Expressway with HSR Alternative above.

Avoidance, Minimization, and/or Mitigation Measures

HF-1: During the final design, runoff control features that mimic existing flow conditions to the maximum extent practicable will be used to avoid exacerbating downstream flooding conditions and associated erosion.

HF-2: Caltrans will include in the construction specifications that all rock slope protection and rip-rap shall be ungrouted and the minimum amount used as necessary to provide scour protection.

HF-3: Bridge structures crossing water resources at the following locations: Little Rock Wash, Big Rock Wash, Turner Wash, Ossum Wash and the Mojave River will be incorporated into the final design.

HF-4: To ensure that the project does not impede attainment of water quality standards in the operational phase, the project will conform to the requirements of the Caltrans' National Pollutant Discharge Elimination System (NPDES) Statewide Storm Water Permit (Order No. 2012-0011-DWQ, NPDES No. CAS000003), adopted by the State Water Resources Control Board on July 1, 2013, and any subsequent permit in effect at the time of design.

The drainage patterns and flow rates across the proposed project corridor would remain unchanged with the incorporation of drainage facility controls into the proposed project. Given this consideration, no significant geomorphologic impacts are anticipated as a result of HDC Project construction or operation. Furthermore, with the proper use of Temporary BMPs during construction, erosion and associated downstream sediment deposition would also be controlled.

The standard conditions provided in Section 3.6, Construction Impacts, would minimize impacts to hydrology and floodplain.

3.2.2 Water Quality and Stormwater Runoff

Regulatory Setting

Federal Requirements: Clean Water Act

In 1972, Congress amended the Federal Water Pollution Control Act, making the addition of pollutants to the waters of the U.S. from any point source[8] unlawful unless the discharge is in compliance with a National Pollutant Discharge Elimination System (NPDES) permit. This act and its amendments are known today as the Clean Water Act (CWA). Congress has amended the act several times. In the 1987 amendments, Congress directed dischargers of stormwater from municipal and industrial/construction point sources to comply with the NPDES permit scheme. The following are important CWA sections:

- Sections 303 and 304 require states to issue water quality standards, criteria, and guidelines.
- Section 401 requires an applicant for a federal license or permit to conduct any activity that may result in a discharge to waters of the U.S. to obtain certification from the state that the discharge will comply with other provisions of the act. This is most frequently required in tandem with a Section 404 permit request (see below).
- Section 402 establishes the NPDES, a permitting system for the discharges (except for dredge or fill material) of any pollutant into waters of the U.S. Regional Water Quality Control Boards (RWQCB) administer this permitting program in California. Section 402(p) requires permits for discharges of stormwater from industrial/construction and municipal separate storm sewer systems (MS4s).
- Section 404 establishes a permit program for the discharge of dredge or fill material into waters of the U.S. This permit program is administered by the U.S. Army Corps of Engineers (USACE).

The goal of the CWA is “to restore and maintain the chemical, physical, and biological integrity of the Nation’s waters.”

USACE issues two types of 404 permits: General and Standard permits. There are two types of General permits: Regional permits and Nationwide permits. Regional permits are issued for a general category of activities when they are similar in nature and cause minimal environmental effect. Nationwide permits are issued to allow a variety of minor project activities with no more than minimal effects.

Ordinarily, projects that do not meet the criteria for a Regional or Nationwide Permit may be permitted under one of USACE’s Standard permits. There are two types of Standard permits: Individual permits and Letters of Permission. For Standard permits, approval by USACE is based on compliance with U.S. Environmental Protection Agency’s (EPA) Section 404 (b)(1) Guidelines (EPA *Code of Federal Regulations*

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[8] A point source is any discrete conveyance, such as a pipe or a man-made ditch.

[CFR] 40 Part 230), and whether the permit approval is in the public interest. The Section 404(b)(1) Guidelines (Guidelines) were developed by EPA in conjunction with USACE and allow the discharge of dredged or fill material into the aquatic system (waters of the U.S.) only if there is no practicable alternative that would have less adverse effects. The Guidelines state that USACE may not issue a permit if there is a least environmentally damaging practicable alternative (LEDPA) to the proposed discharge that would have lesser effects on waters of the U.S. and not have any other significant adverse environmental consequences. According to the Guidelines, documentation is needed that a sequence of avoidance, minimization, and compensation measures has been followed, in that order. The Guidelines also restrict permitting activities that violate water quality or toxic effluent[9] standards, jeopardize the continued existence of listed species, violate marine sanctuary protections, or cause "significant degradation" to waters of the U.S. In addition, every permit from USACE, even if not subject to the Section 404(b)(1) Guidelines, must meet general requirements (see 33 CFR 320.4). A discussion of the LEDPA determination is included in Section 3.3.2, Wetlands and Other Waters.

State Requirements: Porter-Cologne Water Quality Control Act

California's Porter-Cologne Act, enacted in 1969, provides the legal basis for water quality regulation within California. This act requires a "Report of Waste Discharge" for any discharge of waste (liquid, solid, or gaseous) to land or surface waters that may impair beneficial uses for surface waters and/or groundwaters of the state. It predates the CWA and regulates discharges to waters of the state. Waters of the state include more than just waters of the U.S., like groundwater and surface waters not considered waters of the U.S. Additionally, it prohibits discharges of "waste" as defined, and this definition is broader than the CWA definition of "pollutant." Discharges under the Porter-Cologne Act are permitted by Waste Discharge Requirements (WDRs) and may be required even when the discharge is already permitted or exempt under the CWA.

The State Water Resources Control Board (SWRCB) and RWQCBs are responsible for establishing the water quality standards (objectives and beneficial uses) required by the CWA and regulating discharges to ensure compliance with the water quality standards. Details about water quality standards in a project area are included in the applicable RWQCB Basin Plan. In California, Regional Boards designate beneficial uses for all water body segments in their jurisdictions and then set criteria necessary to protect these uses. As a result, the water quality standards developed for particular water segments are based on the designated use and vary depending on that use. In addition, the SWRCB identifies waters failing to meet standards for specific pollutants. These waters are then state-listed in accordance with CWA Section 303(d). If a state determines that waters are impaired for one or more constituents and the standards cannot be met through point source or nonpoint source controls (NPDES permits or WDRs), the CWA requires the establishment of Total Maximum

[9] EPA defines "effluent" as "wastewater, treated or untreated, that flows out of a treatment plant, sewer, or industrial outfall."

Daily Loads (TMDLs). TMDLs specify allowable pollutant loads from all sources (i.e., point, nonpoint, and natural) for a given watershed.

State Water Resources Control Board and Regional Water Quality Control Boards

The SWRCB administers water rights, sets water pollution control policy, and issues water board orders on matters of statewide application, and oversees water quality functions throughout the state by approving Basin Plans, TMDLs, and NPDES permits. RWCQBs are responsible for protecting beneficial uses of water resources within their regional jurisdiction using planning, permitting, and enforcement authorities to meet this responsibility.

National Pollutant Discharge Elimination System Program

Municipal Separate Storm Sewer Systems

Section 402(p) of the CWA requires the issuance of NPDES permits for five categories of stormwater discharges, including MS4s. An MS4 is defined as "any conveyance or system of conveyances (roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, human-made channels, and storm drains) owned or operated by a state, city, town, county, or other public body having jurisdiction over stormwater, that is designed or used for collecting or conveying stormwater." The SWRCB has identified the California Department of Transportation (Caltrans) as an owner/operator of an MS4 under federal regulations. Caltrans' MS4 permit covers all Caltrans rights-of-way (ROWs), properties, facilities, and activities in the state. The SWRCB or the RWQCB issues NPDES permits for 5 years, and permit requirements remain active until a new permit has been adopted.

Caltrans' MS4 Permit (Order No, 2012-0011-DWQ) was adopted on September 19, 2012, and became effective on July 1, 2013. The permit has three basic requirements:

- Caltrans must comply with the requirements of the Construction General Permit (see below);
- Caltrans must implement a year-round program in all parts of the state to effectively control stormwater and non-stormwater discharges; and
- Caltrans' stormwater discharges must meet water quality standards through implementation of permanent and temporary (construction) Best Management Practices (BMPs), to the Maximum Extent Practicable, and other measures as the SWRCB determines to be necessary to meet the water quality standards.

To comply with the permit, Caltrans developed the Statewide Storm Water Management Plan (SWMP) to address stormwater pollution controls related to highway planning, design, construction, and maintenance activities throughout California. The SWMP assigns responsibilities within Caltrans for implementing stormwater management procedures and practices, as well as training, public education and participation, monitoring and research, program evaluation, and reporting activities. The SWMP describes the minimum procedures and practices Caltrans uses to reduce pollutants in stormwater and non-stormwater discharges. It outlines procedures and responsibilities for protecting water quality, including the selection and implementation of BMPs. The proposed project will be programmed to follow the guidelines and procedures outlined in the latest SWMP to address stormwater runoff.

Construction General Permit

NPDES General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Order No. 2009-0009-DWQ, NPDES No. CAS000002 Construction General Permit) was adopted on September 2, 2009, and became effective on July 1, 2010. The Construction General Permit regulates stormwater discharges from construction sites that result in a disturbed soil area (DSA) of 1 acre or greater, and/or smaller sites that are part of a larger common plan of development. By law, all stormwater discharges associated with construction activity where clearing, grading, and excavation result in soil disturbance of at least 1 acre must comply with the provisions of the General Construction Permit. Construction activity that results in soil disturbances of less than 1 acre is subject to this Construction General Permit if there is potential for significant water quality impairment resulting from the activity as determined by the RWQCB. Operators of regulated construction sites are required to develop a Storm Water Pollution Prevention Plan (SWPPP) to implement sediment, erosion, and pollution prevention control measures and to obtain coverage under the Construction General Permit.

The Construction General Permit separates projects into Risk Levels 1, 2, or 3. Risk levels are determined during the planning and design phases, and are based on potential erosion and transport to receiving waters. Requirements apply according to the risk level determined. For example, a Risk Level 3 (highest risk) project would require compulsory stormwater runoff pH and turbidity monitoring, and before construction and after construction aquatic biological assessments during specified seasonal windows. For all projects subject to the Construction General Permit, applicants are required to develop and implement an effective SWPPP. In accordance with Caltrans' Standard Specifications, a Water Pollution Control Plan (WPCP) is necessary for projects with DSA less than 1 acre.

Section 401 Permitting

Under Section 401 of the CWA, any project requiring a federal license or permit that may result in a discharge to a water of the U.S. must obtain a 401 Certification, which certifies that the project will be in compliance with state water quality standards. The most common federal permits triggering 401 Certification are CWA Section 404 permits issued by USACE. The 401 permit certifications are obtained from the appropriate RWQCB, dependent on the project location, and are required before USACE issues a 404 permit.

In some cases, the RWQCB may have specific concerns with discharges associated with a project. As a result, the RWQCB may issue a set of requirements known as WDRs under the State Water Code (Porter-Cologne Act) that define activities, such as the inclusion of specific features, effluent limitations, monitoring, and plan submittals that are to be implemented for protecting or benefiting water quality.

WDRs can be issued to address both permanent and temporary discharges of a project.

Affected Environment

Analysis in this section is based on the *Water Quality Assessment Report* (WQAR) (June 2014); the *Preliminary Hydrology and Hydraulics Report* (January 2016); and the *Final Preliminary Geomorphology Report* (June 2014), prepared for this project.

Surface Water

The project corridor traverses two watersheds (Antelope Valley and Mojave River). The hydrologic regime along the entire corridor exhibits the characteristics of an alluvial fan, with several channels that cross the project alignment. The project area has a High Desert-type climate, characterized by long, dry, hot summers and cold and windy winters. In the Antelope River and Mojave River valleys, the summer months are hot with little or no precipitation, and all areas within this region can be affected by summer monsoonal thunderstorms. Precipitation occurs as rainfall, with snow common in the high mountains (*Preliminary Hydrology and Hydraulics Report*, 2016). Table 3.2.2-1 summarizes the characteristics of hydrologic units within the project area.

Table 3.2.2-1 Characteristics of Hydrologic Units within the Project Area

	Antelope Hydrologic Unit		Mojave Hydrologic Unit	
Hydrologic Area	Lancaster	Rock Creek	El Mirage	Upper Mojave
Hydrologic Subarea (acres)	626.50	626.80	628.10	628.20
Watershed Area (acres)	557,620	265,344	106,382	556,821
Average Annual Rainfall (inches)	7.3	13.3	7.9	12

Source: Water Quality Planning Tool.
Accessed via Web site at: http://stormwater.water-programs.com/wqpt.htm.

The receiving water bodies within the project corridor include Big Rock Creek, Little Rock Creek, Bell Mountain Wash, Fremont Wash, Mescal Wash, Little Rock Wash, Big Rock Wash, Turner Wash, Ossum Wash, Desert Knolls Wash, the Mojave River, and the unnamed creek north of East Rancho Boulevard downgradient from the Southern Palmdale Rail Station. The Little Rock Wash, Big Rock Wash, Fremont Wash, Bell Mountain Wash, and Mojave River have perennial low-flow channels with riparian vegetation located along the water's edge. For most of the HDC alignment that crosses undeveloped land, there are no man-made drainage systems. Existing drainage for most of the area west of Adelanto flows southerly to northerly across the proposed HDC before discharge to dry lakebeds or playas in the region. Rogers Dry Lake on Edwards Air Force Base (EAFB) is the most well known of the playas.

Groundwater

The west portion of the project area is located in the Antelope Valley Groundwater Basin (AVG Basin). The AVG Basin has a surface area of 1,580 square miles and includes portions of Los Angeles, Kern, and San Bernardino counties. Recharge to the AVG Basin is primarily accomplished by perennial runoff from the surrounding mountains and hills. Most recharge occurs at the foot of the mountains and hills by percolation through the head of alluvial fan systems. The Big Rock and Little Rock Creeks, in the southern part of the basin, contribute to about 80 percent of the runoff in the AVG Basin. Other minor recharge is from the return of irrigation water and septic system effluent.

From 1975 through 1998, groundwater levels ranged from an increase of 84 feet to a decrease of 66 feet. The parts of the AVG Basin with declining water levels are along the State Route (SR) 14 corridor from Palmdale through Lancaster to Rosamond and surrounding Rogers Lake on EAFB.

Historically, groundwater flowed north from the San Gabriel Mountains and south and east from the Tehachapi Mountains toward Rosamond Lake, Rogers Lake, and Buckhorn Lake. These dry lakes are places where groundwater can discharge by evaporation. Because of recent groundwater pumping, groundwater levels and flow have been altered in urban areas such as Lancaster and EAFB. Groundwater pumping has caused subsidence of the ground surface, as well as earth fissures to appear in Lancaster and on EAFB. By 1992, 292 square miles of Antelope Valley had subsided by more than 1 foot. This subsidence has permanently reduced aquifer system storage by about 50,000 acre-feet.

The east portion of the project area is located in the Mojave River Groundwater Basin (MRG Basin), which is managed by the Mojave Water Agency (MWA). The MRG Basin encompasses 1,400 square miles and has an estimated total water storage capacity of nearly 5 million acre-feet. Groundwater is recharged into the basin predominantly by infiltration of water from the Mojave River, which accounts for approximately 80 percent of the total basin natural recharge. Other recharge sources include infiltration of storm runoff from the mountains and recharge from human activities such as irrigation return flows, wastewater discharge, and enhanced recharge with imported water. More than 90 percent of the basin groundwater recharge originates in the San Gabriel and San Bernardino mountains. Groundwater is discharged from the basin primarily by well pumping, evaporation through soil, transpiration by plants, seepage into dry lakes where accumulated water evaporates, and seepage into the Mojave River.

Per the Lahontan RWQCB, the Mojave watershed management area includes the Mojave and Broadwell hydrologic units (HUs). In the Mojave River watershed (San Bernardino County), nonpoint source issues relating to overdraft of the groundwater are of concern, including impacts to wetlands and springs. The potential impacts of confined animal facilities (i.e., dairies and chicken farms) and other agricultural activities are of concern. The area is generally in transition from predominantly agricultural to urban land uses. Thus, the nonpoint source concerns are shifting towards urban runoff and construction-related impacts from land development. Other concerns include the use of chemical pesticides to control exotic plants and animals, as well as hydromodification caused by development and flood control projects.

The Antelope Valley watershed management area includes the following hydrologic units: Mesquite, Ivanpah, Owlshead, Leach, Granite, Bicycle, Goldstone, Coyote, Superior, Ballarat, Trona, Coso, Upper Cactus, Indian Wells, Fremont, Antelope, and Cuddeback. In these watersheds, land development (i.e., urban runoff, septic systems) contributes to nonpoint source discharges. At least one confined animal facility is of concern. Historic agricultural use was mainly alfalfa; currently, more common crops are row crops, such as carrots. Other potential nonpoint source discharges result from pesticide applications, irrigation return water, and groundwater percolation. Groundwater overdraft is also an issue. Erosion and habitat loss from deforestation following wildfires is also of concern.

Beneficial Uses

All projects within the Lahontan Region are subject to the requirements of the Lahontan RWQCB. The Lahontan Region spans eastern California from the Oregon border in the north, to the Mojave Desert, San Bernardino Mountains, and eastern Los Angeles County in the south. The region is nearly 600 miles long and has a total area of more than 33,000 square miles. It includes the highest point (Mount Whitney, +14,494 feet) and lowest point (Badwater, Death Valley, –282 feet) in the contiguous U.S.

The Lahontan RWQCB has prepared the Water Quality Control Plan for the Lahontan Region (Basin Plan, 1995, and Amendments to the Basin Plan, 2014) to help preserve and enhance water quality and to protect the beneficial uses of State waters. The Basin Plan designates beneficial uses for surface waters and groundwaters, and it sets qualitative and quantitative objectives that must be attained or maintained to protect the designated beneficial uses and conform to the State's antidegradation policy. The Basin Plan also describes implementation programs to protect the beneficial uses of all waters in the region, as well as surveillance and monitoring activities to evaluate the effectiveness of the Basin Plan.

To protect beneficial uses, the RWQCB has set forth water quality objectives (WQOs) that are described in the Basin Plan. WQOs are intended (1) to protect public health and welfare, and (2) to maintain or enhance water quality in relation to the designated existing and potential beneficial uses of the water. The receiving water bodies within the project corridor with designated beneficial uses are shown in Table 3.2.2-2.

Table 3.2.2-2 Beneficial Uses

Water Body	Beneficial Use																
	MUN	AGR	IND	GWR	FRSH	POW	REC-1	REC-2	COMM	WARM	COLD	WILD	SPWN	RARE	WQE	FLD	MIGR
Antelope HU 626.00																	
Little Rock Creek	X						X	X	X		X	X					
Big Rock Creek	X	X	X				X	X	X		X	X	X				
Little Rock Reservoir	X	X	X	X			X	X	X		X	X					
Minor Surface Waters	X	X		X			X	X	X	X	X	X					
Minor Wetlands	X	X		X	X		X	X		X		X			X	X	
El Mirage HA 628.10																	
Minor Surface Waters	X	X		X	X		X	X		X		X		X			
Minor Wetlands	X	X		X	X		X	X		X		X		X	X	X	
Upper Mojave HA 628.20																	
Mojave River	X	X		X			X	X	X	X	X	X					
Lower Narrows of Mojave River Wetlands	X	X		X			X	X		X	X	X		X	X	X	X
Turner Springs	X	X		X			X	X		X	X	X			X	X	
West Fork Mojave River	X	X		X			X	X	X	X	X	X					
East Fork of West Mojave River	X	X					X	X	X		X	X	X				
Minor Surface Waters	X	X		X		X	X	X		X	X	X					
Minor Wetlands	X	X		X	X		X	X		X	X	X		X	X	X	

MUN = Municipal and Domestic Supply; AGR= Agricultural Supply; IND = Industrial Service Supply; GWR = Groundwater Recharge; FRSH = Freshwater Replenishment; POW = Hydropower Generation; REC-1 = Water Contact Recreation; REC-2 = Non-contact Water Recreation; COMM = Commercial and Sports Fishing; WARM = Warm Freshwater Habitat; COLD = Cold Freshwater Habitat; WILD = Wildlife Habitat; SPWN = Spawning, Reproduction and Development; RARE = Rare, Threatened, or Endangered Species; WQE = Water Quality Enhancement; FLD = Flood Peak Attenuation/Flood Water Storage

Source: *Lahontan RWQCB. Water Quality Control Plan for the Lahontan Region North and South Basins. Effective March 31, 1995, amendments effective August 1995 through December 2005.*

Surface Water Quality

The SWRCB created the Surface Water Ambient Monitoring Program (SWAMP) to provide a measure of the State's ambient water quality and the effectiveness of the State's water quality protection programs. The SWAMP relies primarily on contractors, such as University of California, U.S. Geological Survey (USGS), and others, to collect information on the quality of the State's waters.

For the first 5 years of the SWAMP Program (i.e., 2000–2005), the primary goal of monitoring within the Lahontan Region was to determine whether ambient water quality at the monitored sites was in compliance with the chemical and physical WQOs contained in the Water Quality Control Plan for the Lahontan Region (Basin Plan), the California Toxics Rule, and California's Maximum Contaminant Levels (MCLs) for drinking water. SWAMP monitoring activities were conducted from

July 2000 through August 25, 2005. The Little Rock Reservoir was the only site sampled within the Antelope HU. Two sampling sites within the Mojave HU that were near the HDC Project included the Mojave River at Upper Narrows and the Mojave River below the Forks Reservoir.

For the two HUs, there were 1,226 water quality results that were comparable to Basin Plan criteria. Of these, 44 samples exceeded Basin Plan objectives for pH, dissolved oxygen (DO), total dissolved solids (TDS), fluoride, sulfate (SO_4), and boron. No samples exceeding the California Toxics Rule (CTR) Human Health criteria were observed. Nine (9) samples exceeded the dissolved fluoride limit at the Mojave River below Forks Reservoir site. The remaining water quality results indicated compliance with drinking water primary MCLs. Five (5) samples collected at Little Rock Reservoir, however, exceeded the secondary drinking water criteria MCL for manganese.

List of Impaired Waters

The CWA requires states to identify water bodies that are considered impaired, which means the water body does not meet water quality standards. States must then place these water bodies onto a list, referred to as the "CWA Section 303(d) List of Water Quality Limited Segments." On October 11, 2011, EPA issued its final decision regarding the water bodies and pollutants added to California's 303(d) List. This list, referred to as the California 2010 Integrated Report, replaces the 2006 California CWA 303(d) List. The 2010 Integrated Report includes a combined list of CWA Section 303(d) water bodies that are listed as not meeting water quality standards and Section 305(b) water bodies that identifies water bodies still requiring the development of a TMDL, those that have a completed TMDL approved by EPA, and those that are being addressed by actions other than a TMDL.

Caltrans has identified pollutants that were discharged from Caltrans facilities with a load or concentration that commonly exceeded allowable standards and were still considered treatable by currently available Caltrans-approved Treatment BMPs[10] (Caltrans, 2003). As of 2010, these pollutants, designated as Targeted Design Constituents (TDCs), include sediment, metals (i.e., total and dissolved fractions of zinc, lead, and copper), nitrogen, phosphorus, and general metals.

The Mojave Forks Reservoir outlet to Upper Narrows is listed as impaired for fluoride. The Mojave River (Upper Narrows to Lower Narrows) is listed as impaired for fluoride, SO_4, and TDS. Little Rock Reservoir is listed as impaired for manganese. When comparing these pollutants with the Caltrans TDCs, only manganese would be considered a TDC.

Once a water body is listed as impaired, the State is required to develop a TMDL to address each pollutant causing the impairment. A TMDL defines how much of a

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[10] California Department of Transportation, *Storm Water Monitoring and Data Management: Final Discharge Characterization Study Report*, November 2003, CTSW-RT-03-065.51.42.

pollutant load a water body can tolerate and still meet water quality standards. The TMDL is required to account for contributions from point sources (i.e., permitted discharges), as well as contributions from nonpoint sources, including natural background. TMDLs allocate allowable pollutant loads for each source and identify management measures that, when implemented, will assure that water quality standards are attained. Through the RWQCB's basin planning process, TMDLs and TMDL implementation plans are adopted into a RWQCB's Basin Plan.

All three water bodies (i.e., Little Rock Reservoir, Mojave Forks Reservoir outlet to Upper Narrows, and Mojave River Upper Narrows to Lower Narrows) are listed in the 2010 Integrated Report as requiring the development of a TMDL. It is anticipated that the TMDL for these pollutants (i.e., fluoride, SO_4, TDS, and manganese) will be completed by January 2021 (see Table 3.2.2-3).

Table 3.2.2-3 2010 California 303(d) List of Water Quality Limited Segments in the Lahontan Region

Water Body Name	Pollutant	Expected TMDL Completion Date
Little Rock Reservoir	Manganese	2021
Mojave River (Mojave Forks Reservoir outlet to Upper Narrows)	Fluoride	2021
Mojave River (Upper Narrows to Lower Narrows)	Fluoride	2021
	Sulfates	2021
	Total Dissolved Solids	2021

Source: 2010 California 303(d) List of Water Quality Limited Segments in the Lahontan Region.

Groundwater Quality

Groundwater quality in the Antelope Valley groundwater basin is typically calcium bicarbonate in character near the surrounding mountains and sodium bicarbonate or sodium sulfate character in the central part of the basin. In the eastern part of the basin, the upper aquifer has sodium-calcium bicarbonate-type water and the lower aquifer has sodium bicarbonate-type water. TDS content in the basin averages 300 milligrams per liter (mg/L) and ranges from 200 to 800 mg/L. Data from 213 public supply wells show an average TDS content of 374 mg/L and ranges from 123 to 1,970 mg/L.

According to the Antelope Valley Integrated Regional Water Management Plan, groundwater quality is excellent within the principal aquifer but is not as good towards the northern portion of the dry lake areas. Some portions of the basin contain groundwater with high fluoride, boron, TDS, and nitrate concentrations. Arsenic is another emerging contaminant of concern in the Antelope Valley Region. Research conducted by the Los Angeles County Waterworks District and USGS has shown the problem to reside primarily in the deep aquifer, and it is not anticipated that the existing arsenic problem will lead to future loss of groundwater as a water supply resource for the Antelope Valley.

MWA's groundwater basins contain numerous areas with water quality issues. Key contaminants include arsenic, nitrates, iron, manganese, Chromium VI, and TDS. Measurements in excess of drinking water standards have been found for some of these constituents within the MRG Basin.

Another potential water quality issue facing MWA is the accumulation of salt in the groundwater basins. Because the Mojave Basin area is considered a closed basin, salts added to the locally generated wastewater, salts contained in the imported reclaimed wastewater, and salts in the State Water Project (SWP) supplies are generally not removed from the basin.

To understand the potential long-term water quality changes that may occur in the MRG Basin over time due to long-term effects of wastewater and importation of SWP water into the MWA service area, the Lahontan RWQCB and the MWA worked cooperatively to develop a regional salt balance model. The model was finalized in 2007 and generally showed that the importation of SWP water mitigated the long-term effects of salt loading (i.e., TDS increases) primarily caused by population increases and the associated larger volumes of wastewater entering the basin.

Areas of Special Biological Significance

To protect and restore ecologically sensitive ecosystems along the coast, California created 34 Areas of Special Biological Significance spanning the length of the coast. This designation was intended to bring special protection to fragile coastal biological communities by strictly limiting or prohibiting discharges of point source waste and requiring nonpoint source pollution to be controlled to the "extent practicable" before it reaches an Area of Special Biological Significance to preserve natural water quality conditions. According to the map provided by the SWRCB (SWRCB, 2011b), there are no Areas of Special Biological Significance sites within the project limits.

Water Supply and Availability

The WQAR (June 2014) prepared for the project summarized potential and existing water supplies for the water agencies within the proposed project footprint. As indicated in the WQAR, all of the water agencies within the HDC developed Urban Water Management Plans (UWMPs) in accordance with the Urban Water Management Plan Act (California Water Code § 10610 *et seq.).* The WQAR evaluated all of the UWMPs applicable to the project corridor and summarized existing and potential water supplies within the project area.

Overall, the water agencies within the project corridor rely on either SWP or groundwater resources. In the AVG Basin, recharge is predominantly achieved through perennial runoff, and minor recharge is achieved using irrigation water and septic system effluent. Recharge in the MRG Basin is by infiltration of Mojave River water followed by infiltration of stormwater runoff, irrigation return flows, wastewater discharge, and enhanced recharge with imported water.

Environmental Consequences

No Build Alternative

No impacts to ground or surface water quality would occur under the No Build Alternative.

Freeway/Expressway and Freeway/Tollway Alternatives

Construction of the Freeway/Expressway or the Freeway/Tollway Alternative has the potential to cause temporary impacts. Temporary impacts are associated with construction activities that may contribute pollutants (e.g., chemical constituents and oil and grease) to receiving water bodies; cause changes to the physical, chemical, and biological characteristics of aquatic communities; and cause potential changes in normal ambient pH, temperature, and turbidity levels. Pollutants include sediment and silt associated with soil disturbance and chemical pollutants associated with the construction materials that are used on the project site with the potential to discharge offsite into the environment.

The nature of the impacts from the Freeway/Expressway and the Freeway/Tollway alternatives would derive from the construction of project design features that include infiltration basins, earthen and concrete channels, cross culverts, storm drain pipelines and inlets, riprap energy dissipation devices, and other forms of erosion protection. Soil-disturbance activities include earth-moving activities such as excavation and trenching, soil compaction and moving, cut and fill activities, and grading. Disturbed soils are susceptible to high rates of erosion from wind and rain, resulting in sediment transport via stormwater runoff from the project area. Chemical contaminants, such as oils, fuels, paints, solvents, nutrients, trace metals, and hydrocarbons, can attach to sediment and be transported to downstream drainages and ultimately into collecting waterways, contributing to the chemical degradation of water quality, as well as cause changes to normal ambient levels of pH and temperature.

Some pollutants can create turbidity in water bodies, which blocks light transmission and penetration, reduces oxygen levels, affects the food chain, and creates changes in water temperature.

Construction materials, waste handling, and the use of construction equipment could also result in stormwater contamination and affect water quality and cause chemical, biological, and physical changes to aquatic communities. Spills or leaks from heavy equipment and machinery can result in oil and grease contamination. Operation of vehicles during construction could also result in tracking of dust and debris. Staging areas can also be sources of pollutants because of the use of paints, solvents, cleaning agents, and metals during construction. Pesticide use, including herbicides, fungicides, and rodenticides, associated with site preparation is another potential source of stormwater contamination. Larger pollutants, such as trash, debris, and organic matter, could also be associated with construction activities. As such, the discharge of stormwater may cause or threaten to cause violations of WQOs. These pollutants would occur in both stormwater discharges and non-stormwater discharges and could potentially cause chemical degradation and aquatic toxicity in the receiving waters.

The final construction and completion of the Freeway/ Expressway or the Freeway/ Tollway Alternative would result in an increase in impervious surface areas, causing the velocity and volume of downstream flow to increase. Although changes to aquatic temperatures associated with bridge shading from full-span bridges over riparian habitat within the Mojave River, Ossum Wash, and West Fork Ossum Wash could occur under certain circumstances, the narrow dimension of the project crossings, coupled with the anticipated velocity of the flow, is not anticipated to result in a substantive change to water temperature because the flow would not be subject to shading for sufficient time. Once the new facility is operational, potential pollutant sources would be associated with motor vehicle operations (i.e., brake dust; oil and grease; and nitrites), highway maintenance activities (i.e., sediment and tree/shrub clippings), illegal dumping (i.e., trash), accidental spills (i.e., hazardous and nonhazardous chemicals), and landscaping care (i.e., fertilizers, pesticides, and herbicides). Based on the WQAR (June 2014), the Freeway/Expressway and Freeway/Tollway Alternatives would add an estimated 995 acres to the existing 80-acre impervious surface area.

Under existing conditions, runoff and sediment discharges are in a state of equilibrium. Under the Freeway/Expressway or the Freeway/Tollway Alternative, sediment yield from the road is negligible because it is paved. The project would modify existing slopes and create new slopes. Proposed slopes would generally follow existing grade and would not be steeper than 2:1 (horizontal [H]: vertical [V]) and would be constructed at 4:1 (H:V) or flatter to the maximum extent practicable. Final design and construction criteria include cut and fill slopes, which would be revegetated and recontoured after construction so that they would not provide additional sources of sediment and would match pre-project conditions to the maximum extent practicable. As part of the Freeway/Expressway or Freeway/ Tollway Alternative, final design of all rock slope protection and energy-dissipation riprap placed within stream channels and floodplain areas would be ungrouted whenever feasible, and the minimum amount necessary would be used to provide scour protection. In addition, as part of the project and final design, infiltration basins, earthen and concrete channels, cross culverts, storm drain pipelines and inlets, riprap energy-dissipation devices, and other forms of erosion protection would be constructed so that runoff would be intercepted and conveyed along and across the roadway alignment, minimizing erosion potential.

The addition of impervious surfaces resulting from implementation of the project would not interfere with groundwater recharge because recharge to the AVG Basin is primarily accomplished by perennial runoff from the surrounding mountains and hills. Recharge to the MRG Basin is predominantly accomplished by infiltration of Mojave River water. The other recharge sources include infiltration of stormwater runoff, irrigation return flows, wastewater discharge, and enhanced recharge with imported water. Recharge facilities within this basin are located in the Alto subarea and include the Oro Grande Demonstration Recharge site (approximately 3 miles from the HDC) and the Rock Springs Recharge Site and the proposed Antelope Wash Recharge Site, both of which are located approximately 10 miles from the HDC. The project is not expected to result in the destruction of groundwater wells or the permanent lowering of groundwater levels. There would be no placement of impervious road surfaces in recharge areas. Furthermore, all of the offsite water would be conveyed through the facility and back to the environment. All onsite water would be treated and then released into the environment via the proposed infiltration basins. The project would result in alterations to drainage. These drainage realignments, however, are not anticipated to substantively affect ground surface permeability via paving and changes in topography via grading and excavation. A reduction in recharge is not expected to occur that could affect groundwater levels in the aquifers or existing and potential water supplies.

Of particular concern is development upstream of ecologically significant areas. This includes the Lower Narrows of the Mojave River, which is characterized by perennial flow. The Lower Narrows is a 1-mile section of the Mojave River downstream of the Interstate 15 (I-15) bridge in Victorville. Grading associated with construction upgradient from this area has the potential, if not properly regulated, to temporarily increase erosion and subsequent deposition of soil particles into the sensitive habitat. Runoff produced during and after construction is subject to NPDES regulations, as well as local water quality and runoff standards. Given that the project would disturb more than 1 acre of land, a SWPPP would be required. The SWPPP would require Construction Site BMPs, such as prevention of stormwater from flowing over unprotected slopes, implementation of perimeter controls around appropriate borders of the project area, temporary catch basins, and soil stabilization techniques to prevent additional runoff and/or sediment from washing into downstream receiving water bodies. As part of the project and final design, disturbed areas would also be stabilized as quickly as possible using erosion control techniques such as hydraulic mulches or erosion control blankets. In addition, Caltrans Construction Site BMPs, as referenced in the Caltrans Construction Site BMP Reference Manual, would also be incorporated into the construction plans. Construction staging areas would be located in upland areas outside of stream channels and other surface waters on or around the project site. As part of the project and final design, buffer areas would be identified and exclusion fencing would be used to protect water resources and prevent unauthorized vehicles or equipment from entering or otherwise disturbing any stream channels. In addition, construction equipment would use existing roadways to the extent feasible. Compliance with these conditions would reduce the risk of water degradation from soil erosion-related construction activities. Because violations of WQOs would be minimized, impacts to water quality from construction activities of the proposed project would be less than significant based on the effectiveness of the temporary Construction Site BMPs, along with the required monitoring to verify the effectiveness.

The project would include design features such as the design and installation of Treatment BMPs to the maximum extent practicable. The TDC approach, outlined in the Project Planning and Design Guide (Caltrans, 2010), would be used to determine the prioritization for potential Treatment BMPs. The applicability of all nine Caltrans-approved Treatment BMPs would be analyzed for the entirety of the HDC Project from a water quality perspective in relation to the receiving water bodies within the proposed project limits.

Based on the preliminary engineering, the HDC Project presents opportunities for implementation of Treatment BMPs. All nine Caltrans-approved Treatment BMPs were analyzed to determine their feasibility for implementation. Consequently, infiltration devices are proposed at most intersections within the ROW. Infiltration basins were selected based on their ability to treat the TDCs (i.e., ammonia and general metals) and meet the feasibility and siting criteria identified in the Project Planning and Design Guide (Caltrans, 2010).

These infiltration basins would treat and partially contain the onsite pavement runoff of the roadway. The infiltration basins treat runoff by retaining the water quality volume (WQV) and enough flow volume to ensure flow rates mimic existing conditions. Once the required volume has been retained, runoff will outlet through spillways or pipe risers where the excess runoff will be conveyed to the natural flow path. For each of the build alternatives, the WQV would be routed away from local drainage courses and into the infiltration basin at the onset of a design storm event. It is expected that there would be no observable increase in the surface water quality constituent loadings at each of the local drainage areas. Because infiltration basins are incorporated into the project design features to mitigate the additional stormwater runoff generated from the proposed project, impacts to water quality from operation of the proposed project would be minimized. The implementation of temporary and permanent BMPs, coupled with compliance of applicable regulatory requirements, is anticipated to provide effective runoff management strategies and meet WQOs by treating the chemical, biological, and physical constituents prior to discharge.

Regarding water supply and availability, the project is not expected to result in the destruction of groundwater wells or the permanent lowering of groundwater levels. This is because there would be no placement of impervious road surfaces in recharge areas. Furthermore, all of the offsite water would be conveyed through the facility and back to the environment. All onsite water would be treated and then released into the environment via the proposed infiltration basins, thereby augmenting the groundwater regime. Although the project would result in some alterations to the drainage system, it is not anticipated to substantively affect ground surface permeability via paving and changes in topography via grading and excavation. A reduction in recharge is not expected to occur that could affect groundwater levels in the aquifers or existing and potential water supplies.

The project would also implement Design Pollution Prevention BMPs, which are permanent measures to minimize pollution discharges by retaining source materials and stabilizing soils. Some of the Design Pollution Prevention BMPs proposed for the project include preservation of existing vegetation and slope surface protection systems. By preserving existing vegetation, the need for irrigation water for new landscaping would be reduced. Any disturbed slopes would be revegetated per the Erosion Control Plan, which would be approved by the District Landscape Architect and would include drought-tolerant, desert native vegetation to reduce reliance on potable water for irrigation purposes.

Plant establishment would be accomplished with water trucks delivering water to either temporary irrigation systems or to a natural water delivery/storage system in the area. During plant establishment, irrigation would be managed such that adequate moisture is maintained for the plant species to become established. Once established, no further irrigation would be required.

The temporary impact to water supply during plant establishment would be at the location where water trucks receive their water. The long-term impact to the local water supply would be the volume of water that the plant root systems require from local ground moisture. Because native plants from various vegetation communities along the corridor would be utilized, impacts to water supply and availability would be minimized.

During the construction phase, to reduce the need for potable water during drought conditions, Caltrans would direct the Contractor to use soil binders or a dust palliative to control dust. Dust control binders and dust palliative materials would be directly applied to the surface without mixing with water; therefore, this alternative would minimize the use of potable water during construction. Conservation of potable water could also occur as a result of the Victor Valley Wastewater Reclamation Authority's construction of two subregional water reclamation facilities. Construction of these facilities began in April 2015, and the project is scheduled for completion by mid 2017. Potable water resources would be protected by utilizing reclaimed water for dust suppression and, if necessary, landscape irrigation.

Freeway/Expressway Alternative with High-Speed Rail (HSR) Feeder/Connector Service

Construction of the Freeway/Expressway Alternative with the HSR Feeder/Connector Service, including the Southern Palmdale Rail Station Design Variation, would result in impacts to water quality and stormwater runoff similar to that described under the Freeway/Expressway or Freeway/Tollway Alternative above, with the exception that this alternative would add about 1,365 acres to the existing 80-acre impervious surface area.

Freeway/Tollway Alternative with HSR Feeder/Connector Service (Preferred Alternative)

Construction of the Freeway/Tollway Alternative with the HSR Feeder/Connector Service (Preferred Alternative), including the Southern Palmdale Rail Station Design Variation, would result in impacts to water quality and stormwater runoff similar to that described under the Freeway/Expressway or Freeway/Tollway Alternative above, with the exception that the Preferred Alternative would add about 1,365 acres to the existing 80-acre impervious surface area.

Avoidance, Minimization, and/or Mitigation Measures

Potential long-term water quality impacts associated with operation and maintenance of the transportation facility would be minimized with the implementation of Maintenance, Design Pollution Prevention, and Treatment BMPs. Specifically, the proposed drainage system would include infiltration at most of the intersections to treat highway runoff flow and partially contain flows from pavement runoff before discharging offsite. Numerous channels and ditches would be placed at the edge of the ROW along the project alignment to convey flows to the bridge crossings and cross culverts. Given that all onsite water would be treated and then released into the environment via the proposed infiltration basins, water quality impacts would be minimized with implementation of the project. Regarding the effect on ambient temperature from bridge shading, mitigation would not be required because the bridges would be designed as high, narrow bridges where feasible. A design such as this, coupled with the high-flow conditions of the Mojave River when it surfaces (Lahontan RWQCB, 2014), would not have a measureable effect on the ambient temperature within the Mojave River, Ossum Wash, or West Fork of the Ossum Wash. Because a violation of the WQO for temperature would be minimized, impacts to water quality from operation of the project would not be substantial.

Overall, with incorporation of Temporary Construction Site BMPs (e.g., silt fence, fiber roll, soil binder, stabilized construction entrance/exit) and Permanent BMPs (e.g., infiltration basins), water quality discharges are effectively managed to address chemical, biological, and physical constituents prior to discharge into the environment. Impacts would be minimized with implementation of the project BMPs. WQOs are anticipated to be met as a result of project implementation.

The standard conditions provided in Section 3.6, Construction Impacts, would minimize impacts to water quality from stormwater erosion, construction discharges, and bank or streambed alteration.

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3.2.3 Geology/Soils/Seismic/Topography

Regulatory Setting

For geologic and topographic features, the key federal law is the Historic Sites Act of 1935, which establishes a national registry of natural landmarks and protects "outstanding examples of major geological features." Topographic and geologic features are also protected under the California Environmental Quality Act (CEQA).

This section also discusses geology, soils, and seismic concerns as they relate to public safety and project design. Earthquakes are prime considerations in the design and retrofit of structures. The California Department of Transportation's (Caltrans) Office of Earthquake Engineering is responsible for assessing the seismic hazard for Caltrans projects. Structures are designed using Caltrans's Seismic Design Criteria (SDC). The SDC provides the minimum seismic requirements for highway bridges in California. A bridge's category and classification will determine its seismic performance level and which methods are used for estimating the seismic demands and structural capabilities. For more information, please see Caltrans' Division of Engineering Services, Office of Earthquake Engineering, Seismic Design Criteria.

Affected Environment

Information regarding geology/soils/seismic/topography was obtained from the following reports:

- District Preliminary Geotechnical Report (DPGR) for the Proposed HDC, San Bernardino County Segment, San Bernardino County, California. Department of Transportation Division of Engineering Services, Geotechnical Services, Office of Geotechnical Design South, June 6, 2012.
- DPGR for the Proposed HDC, Los Angeles County Segment, Los Angeles County, California. Department of Transportation Division of Engineering Services, Geotechnical Services, Office of Geotechnical Design South, October 16, 2012.
- Initial Seismic Hazard Assessment Report, The HDC Project (Los Angeles County Section: SR-14 to 240th Street). Department of Transportation Division of Engineering Services, Geotechnical Services, Office of Geotechnical Design South, November 18, 2011.

Geologic Setting/Physiography

The proposed project, located within the High Desert region, is within the geologic region of California known as the Mojave Desert Geomorphic Province. This geologic region consists of unique defining features based on geology, faults, topographic relief, and climate. The Mojave Desert is bounded on the southwest by the San Andreas Fault Zone and Transverse Ranges, which includes the San Gabriel Mountains on the south; on the north and northwest by the Garlock Fault and Tehachapi and Sierra Nevada mountains; and on the east by the Sonoran Desert region. The Mojave Desert is characterized by desert alluvial fans with internal drainages, alluvial valley plains, and lacustrine basins (located north of the alignments).

Topography

The proposed project will occur in the southern California northeastern portion of the Mojave Desert region in the Antelope and Victor valleys. The Antelope Valley portion of the project area ranges in altitude from 2,450 to 3,200 feet, with the surrounding mountains rising up to 4,000 feet, while the Victor Valley portion of the project area ranges in altitude from 2,660 feet at the Mojave River crossing to 3,200 feet near the limestone mines in the hills near Bell Mountain and Catholic Hill east of Interstate 15 (I-15).

The buttes are the most distinctive topographic feature in the Antelope Valley project area. Alpine Butte is the largest, located near Lake Los Angeles, and has an elevation of 1,200 feet. The topography varies from flat with occasional drainages and sand dunes on the Antelope Valley floor to steep foothill mountain areas (3,600 feet) to the south. The San Andreas Fault traverses the project limits parallel and just north of the San Gabriel Mountains and south of Pearblossom Highway.

The San Gabriel Mountains lie to the south of the High Desert Corridor (HDC), and the Sierra Pelona Mountains lie to the southwest. Bedrock hills and an unnamed alluvial valley between I-15 and Bell Mountain and Apple Valley are located at the eastern end of the project area in Victor Valley. A dry lake is located southeast of Apple Valley.

Surface Water and Groundwater

Surface Water

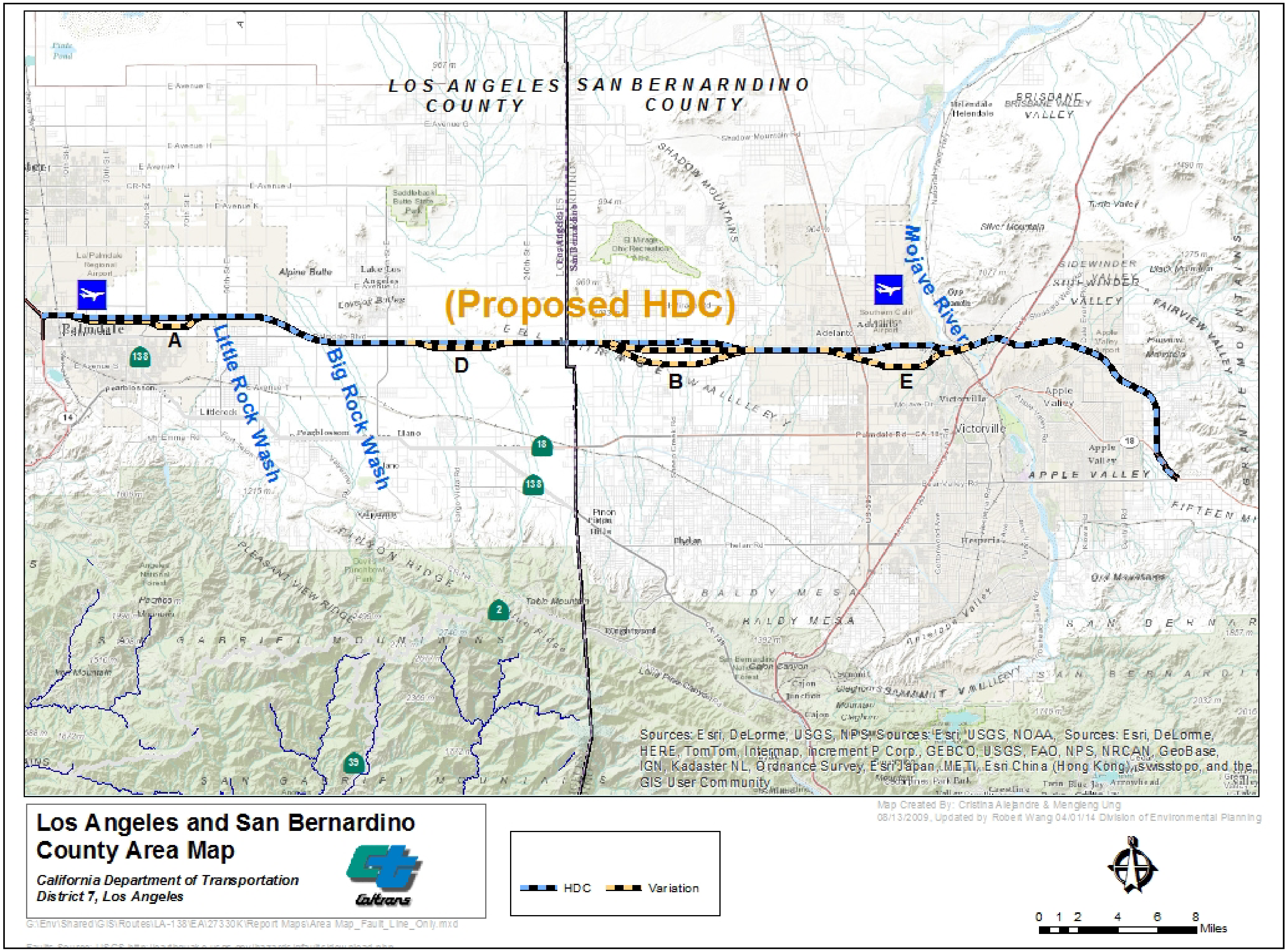
The HDC Project traverses numerous natural water features (refer to Figure 3.2.3-1), including natural washes, creeks, and rivers. Beginning from Los Angeles County at State Route (SR) 14, the water features are Little Rock Wash and Big Rock Wash. Turner, Ossum, and Bell Mountain washes, the Mojave River, and Apple Valley Dry Lake are located in San Bernardino County. Water flows through these features seasonally, mostly during rain, flash flood events, and snow melts from the San Gabriel Mountains, which occur as runoff. The Mojave River area near the Mojave Narrows has the added distinction of having an abnormally high water table; therefore, water flows year round at this location.

Groundwater

In general, shallow groundwater could be anticipated near the washes, creeks, and rivers traversed by the HDC Project. The source of this shallow groundwater could be runoff from the San Gabriel Mountains and seasonal variations in rainfall.

The depth to groundwater along the HDC in the Los Angeles County portion of the project is greater than 140 feet. The depth of groundwater along the Los Angeles County segment mostly would be limited to bridge areas along the washes where perched or isolated groundwater zones could be encountered near farmed areas due to irrigation, groundwater injection, or construction activities.

Figure 3.2.3-1 Surface Water near the High Desert Corridor



Groundwater depth along the HDC in the San Bernardino County segment is described in the DPGR as “deep below” the ground surface. The only exception would be the area of the Mojave River (Mojave Narrows) where the groundwater is shallow; however, groundwater levels are subject to seasonal fluctuations and may vary over time.

Rock and Soils

The HDC in the Antelope Valley area is composed of Quaternary alluvium, which consists of sands, silty sands, and gravelly sands. In Palmdale, consolidated rocks make up the mountains and rocky buttes, while alluvial soils are found on streambeds and the valley floor. Pelona Schist underlies most of the mountainous portions of Palmdale. Situated beneath the alluvial soil lies the same hard rocks found in the mountain areas. Older alluvium deposits consist of sand, gravel silt, and boulders characterized by their ability to store and yield water. Hydrology maps show soil types to be from the Antelope Valley Series and the Little Rock Creek Series. Within this classification, the soils are further classified from Type A to D, A most pervious to D least pervious/ high runoff potential. Project area soils include Types B, C, and D. Type B soils are characteristic of the alluvial deposits along the creeks and the alluvial fan of Little Rock Creek, while Types C and D are found in the upper watershed of Little Rock Creek.

The Victor Valley area of the proposed HDC consists of several soils, sediments, and rock types. Younger alluvial fan deposits, with bedrock outcrops in the local mountains, of quartz monzonite “granitics” and altered limestone deposits are located near the project area. Soils in the area are from the recent wash alluvium, and they consist of interbedded braided layers of sand, silts, and gravel. Thin layers of caliche, or a weak carbonate cementation, are known to occur in the underlying sands and gravels at depth. In the area of the Sheep Creek alluvial fan, the soils consist of fine sands, silts, and clays with traces of fine gravel from the Pelona Schist from the San Gabriel Mountains south of the alignment. At the Mojave River, it contains sandy soils and a few “granitic” cobbles. Silts and clays may also be encountered on the southern segment of the alignment as it crosses the area of Apple Valley Dry Lake Playa. Hydrology maps show soil types to be from the Mojave River Area Series. Within this classification, the soils are further classified from Type A to D, A most pervious to D least pervious/high runoff potential. Project area soils include Types A, B, and D. Type D soils are characteristic of the alluvial deposits along the creeks and the alluvial fan of Sheep Creek, while Types A and B are found near the Mojave River and Apple Valley areas.

Caltrans Corrosion Guidelines Section 5.5 states that Caltrans considers a site’s soils to be corrosive if one or more of the following conditions exist for soil or water samples taken from the site:

- Chloride concentration is greater than or equal to 500 parts per million (ppm)
- Sulfate concentration is greater than or equal to 2,000 ppm
- Percentage of hydrogen (pH) is 5.5 or less

Based on laboratory test results from the DPGR for the Los Angeles County segment of the HDC, the soils tested along the HDC may generally be considered noncorrosive with respect to the Caltrans guidelines, with the exception of one location of the Los Angeles County side of the HDC. The mechanically stabilized earth (MSE) wall adjacent to SR-14, just south of the Rancho Vista Boulevard undercrossing sample result, tested as corrosive.

The corrosion potential along the San Bernardino County segment of the HDC is unknown; however, based on historical soil conditions and soil types as coarse grained (sand), it was concluded that corrosive soils are not anticipated to be a design concern. Indicators of corrosive soil conditions are typically wet, fine-grained soils.

Geologic Hazards

Seismic Hazards

The entire southern California region is seismically active due to the influence of several earthquake fault systems resulting from the interaction of the Pacific and North American tectonic plates. An active fault is defined by the State of California as a "…sufficiently active and well defined fault that has exhibited surface displacement within the last 11,000 years." The active faults in the study area are capable of producing seismic shaking that could be damaging to bridges and other structures. Potential seismic sources are as listed in Table 3.2.3-1.

Table 3.2.3-1 Potential Seismic Sources

Fault	Approximate Closest Distance to Study Area (miles)	Fault Type	Maximum Credible Earthquake Moment Magnitude*
San Andreas Fault (Mojave Section)	Palmdale Segment - 2.14 Lake Los Angeles Segment - 8.62 Adelanto Segment - 19.22 Victorville Segment - 20.62	Right Lateral Strike Slip (RLSS)	7.8
Helendale Fault	5.21	RLSS	7.3
Northridge Blind Thrust	44.51	Reverse (R)	7.3
San Gabriel Fault	29.23	RLSS	7.2
Sierra Madre Fault Zones	27.82	R	6.8-7.2
Simi-Santa Rosa Fault Zones	37.45	Left Lateral Strike Slip (LLSS)	7.0
Santa Susana Fault Zone	41.03	R	6.7
Clear Water Fault	17.04	R	6.8
Cleghorn Fault Zone (Southern Cleghorn Section)	19.78	LLSS	6.5
Mirage Valley	6.75	RLSS	6.9
Lenwood Fault	19.12	RLSS	7.5

*Maximum Credible Earthquake is defined as the largest earthquake that appears to be reasonably capable of occurring under the conditions of presently known "geologic framework."

The nearest active fault to the project area is the San Andreas Fault. The HDC alignment is located approximately 1.5 miles north of the San Andreas Fault at its closest point, as shown in Figures 3.2.3-2 and 3.2.3-3. SR-14 at the Avenue S Bridge is located within the San Andreas Fault (Mojave Section) earthquake fault zone. As the HDC extends eastward towards San Bernardino County, the distance between the project and the San Andreas Fault increases to approximately 20 miles.

The San Andreas Fault is the boundary where the North American Plate and the Pacific Plate meet. The source of seismic activity is related to the tectonic activity of the right lateral movement of the Pacific Plate relative to the North American Plate. Relative movement along these plate boundaries is what causes earthquakes in this area. The San Andreas Fault extends more than 600 miles from the Salton Sea, northwest toward the Pacific Ocean at Point Arena.

The San Andreas Fault system has several fault traces that branch off the primary fault. Local faults that have the potential to influence the project area are faults of the San Andreas Fault system, which includes several major faults considered active by the State. The San Andreas Fault system is a right-lateral strike-slip network of faults, including the San Andreas, Llano, Mirage Valley, Helendale, and Lenwood faults. Any movement from the San Andreas Fault may activate one or all of the subsidiary faults.

Ground Shaking. Ground shaking is the primary cause of structural damage during an earthquake; it is considered to be the most likely damage-producing earthquake phenomenon related to this project. Magnitude, duration, and vibration frequency will vary greatly, depending on the fault and distance from the project area. The High Desert region is subject to moderate to strong ground shaking from local and more distant earthquake events.

The San Andreas Fault (Mojave Section) is the nearest major seismic source to the project area. Based on the moment magnitude of the Maximum Credible Earthquake of 7.8 for this fault, this fault also has the highest average slip rate at 29.0+7.0 millimeters per year.

Liquefaction. Soil liquefaction occurs when saturated loose soils lose their strength due to excess water in the soils. The potential for liquefaction exists when fine silts and sands sit just below the water table. Liquefaction has been documented to affect soils to about 50 feet deep during prolonged periods of ground shaking.

When liquefaction occurs, the strength of the soil decreases and the ability of the soil to support building and bridge foundations is reduced. Liquefaction may result in settlement of the ground surface, additional forces pushing down on foundation piles as a result of soil settlement above the liquefied layers, and reduction of sheer strength of the liquefied soils, resulting in reduced load-carrying capacity. Liquefied soils can also exert pressure on retaining walls, which can cause them to tilt or slide.

Figure 3.2.3-2 The San Andreas Fault near the High Desert Corridor

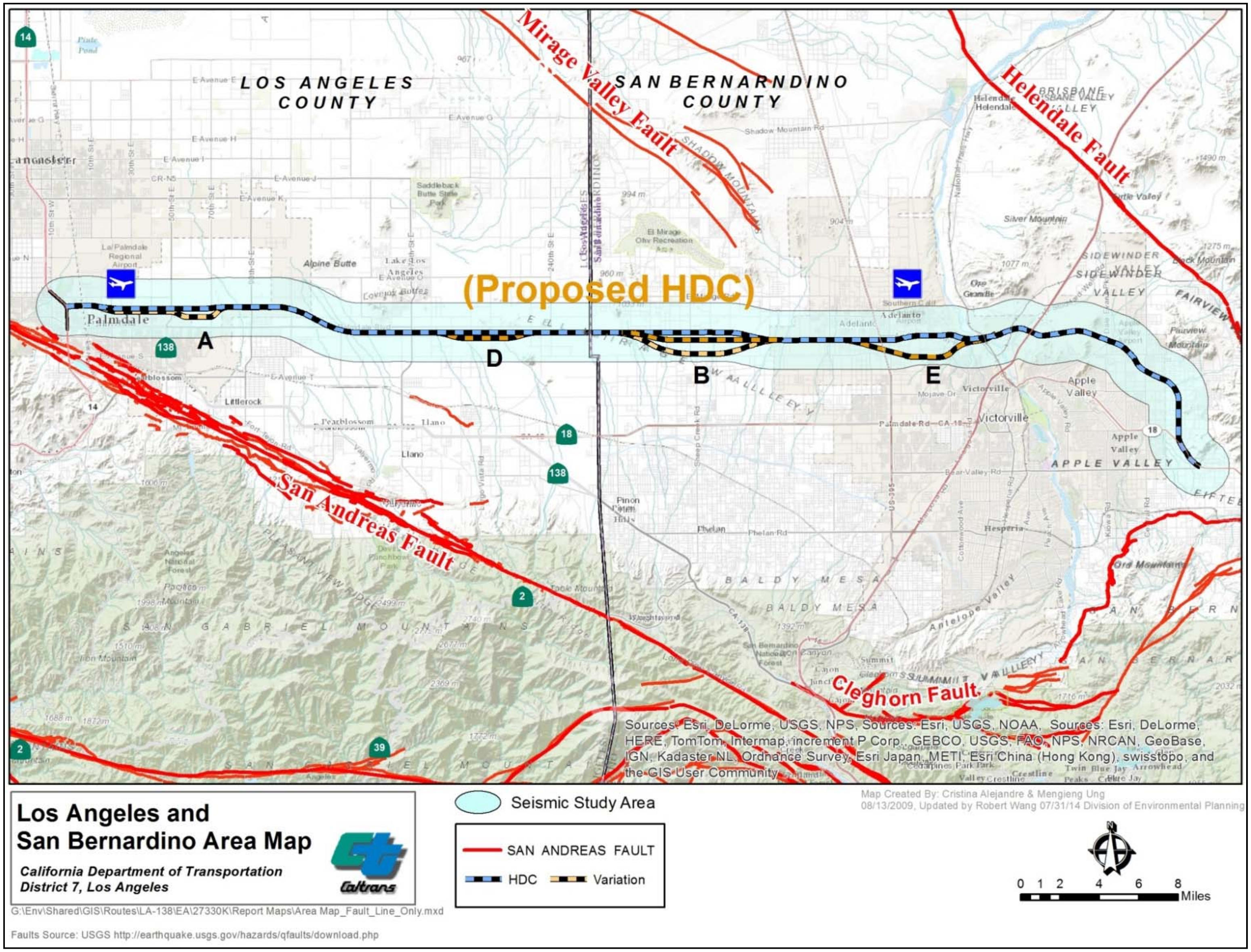
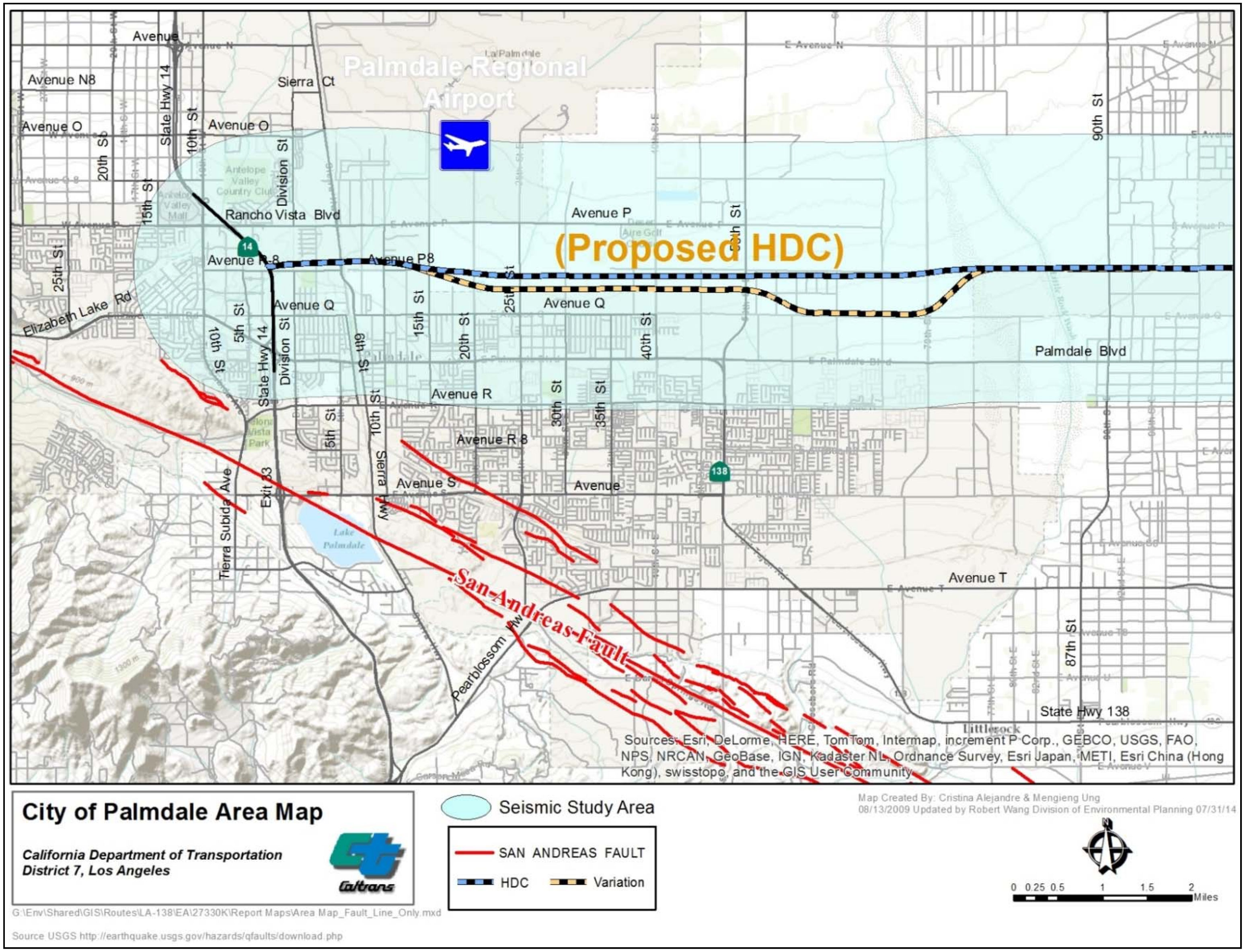


Figure 3.2.3-3 The San Andreas Fault near the High Desert Corridor at Palmdale



The primary factors affecting the possibility of liquefaction in a soil deposit are the intensity and duration of the earthquake shaking, the soil type, the relative density of the soil, the pressures of the materials above the soil, and the depth of the groundwater. Soils most susceptible to liquefaction are clean, loose, uniformly graded, fine-grained sands, nonplastic silts that are saturated, and silty sands.

Based on the analysis results of soil boring/drilling samples taken throughout the HDC alignment, it was concluded that due to the significant depth of groundwater, liquefaction potential is considered low; however, near-surface soils at bridge sites that are crossed by the Mojave River and washes (when flowing) may be susceptible to soil liquefaction hazard during the wet season.

Fault Rupture. An analysis of fault rupture hazard for a particular fault requires that the fault be located exactly and its approximate potential for rupture to be known.

In the Los Angeles County segment of the HDC, the closest well-defined fault trace is the San Andreas Fault, less than 2 miles south of the proposed project at the SR-14/ Avenue S bridge site. This location is considered to be susceptible to fault rupture hazard. Based on preliminary estimates, the median maximum and average horizontal ground surface displacements at this bridge location due to an earthquake of Mmax=7.8 associated with the nearby Mojave Section of the San Andreas Fault may be taken as 30 feet and 16.5 feet, respectively. Other potential bridge locations within the Los Angeles County segment of the HDC are not considered to be susceptible to ground surface rupture or displacement hazard due to fault movements because none of these bridges are mapped in the Earthquake Fault Rupture Hazard Zone except the SR-14/Avenue S Bridge site, which is located about 2 miles south of the HDC.

Because there are no known active or potentially active faults that transect the San Bernardino County segment of the HDC or faults contained in an Earthquake Fault-Rupture Hazard Zone, this segment is not considered to be susceptible to ground surface rupture or displacement hazard due to fault movements.

Tsunami. Tsunamis evolve through three overlapping physical processes: generation by any force (e.g., earthquake) that disturbs the water column, propagation from deeper water near the source to shallow coastal areas, and finally, inundation of dry land. Based on the elevated inland location of the High Desert region, the project area is not considered susceptible to tsunami hazard.

Seismically Induced Landslides/Rock Falls. Landslides are rock, earth, or debris flows on slopes due to gravity and can occur in connection with earthquakes. They can occur on any terrain given the right conditions of soil, moisture, and angle or slope.

There are several natural slopes in the area of the Mojave River, and the hills adjacent to I-15. These slopes are underlain by crystalline bedrock and are not prone to natural slope instability or landsliding.

Settlement and Subsidence. Settlement may result from liquefaction. Based on the depth of groundwater and the medium dense to dense nature of subsurface soils in the area, settlement due to liquefaction is unlikely. In addition, because of the dense nature of the subsurface soils, seismic settlement of dry in-situ soils is expected to be negligible.

In addition, because the subsurface soils are predominantly granular, the soils are not expected to undergo consolidation settlement (i.e., settlement over long periods of time); however, the soils can undergo “immediate” elastic settlement, which usually occurs during earthwork activities and shortly thereafter. Elastic settlement is anticipated to range from less than 0.25 to 2.5 inches because of the medium dense to dense nature of the subsurface soils.

Subsidence is the downward movement of ground caused by many factors, such as soils that shrink or expand (e.g., clay soils), vegetation seeking water, leaking drains that soften or wash away the ground under foundations, or collapsing underground structures (e.g., old mines). Because these factors are generally absent in the project area, the occurrence of subsidence along the project corridor is unlikely.

Volcanic Hazards

The nearest volcanic hazard to the HDC Project is the Coso Volcanic Field located within the boundaries of Naval Air Weapons Station in China Lake. Due to the distance of the HDC Project (more than 100 miles from Bakersfield), it is unlikely that any volcanic activity from the Coso Volcanic Field would affect the HDC Project.

Economical Resources/Mineral Hazards

The project area is a source of gravel, aggregate base, and sand, as indicated by several gravel and sand quarries. These mineral resources do not pose a hazard to the proposed HDC Project. These gravel and sand quarries are not located in or near the proposed HDC site (refer to Figures 3.2.3-4 and 3.2.3-5); therefore, there is no landslide hazard posed to the resources. Detailed analysis of caving or landslide hazard at the project site will be provided during the design phase of the project. A limestone mine is also located in the eastern portion of the HDC past I-15.

Mineral Resources

The State Mining and Reclamation Act of 1975 (SMARA) requires that the State Mining and Geology Board (SMGB) map areas throughout the State of California that contain regionally significant mineral resources. Aggregate mineral resources within the state are classified by the SMGB through application of the Mineral Resource Zone (MRZ) system. The proposed HDC alignment crosses two Mineral Resource Areas (MRA) that have been designated as MRZ-2, areas where adequate information indicates that significant mineral deposits are present, or where it is judged that a high likelihood exists for their presence. These areas are associated with Little Rock Wash and Big Rock Wash.

Figure 3.2.3-4 Aggregate Mines in Los Angeles County near the High Desert Corridor

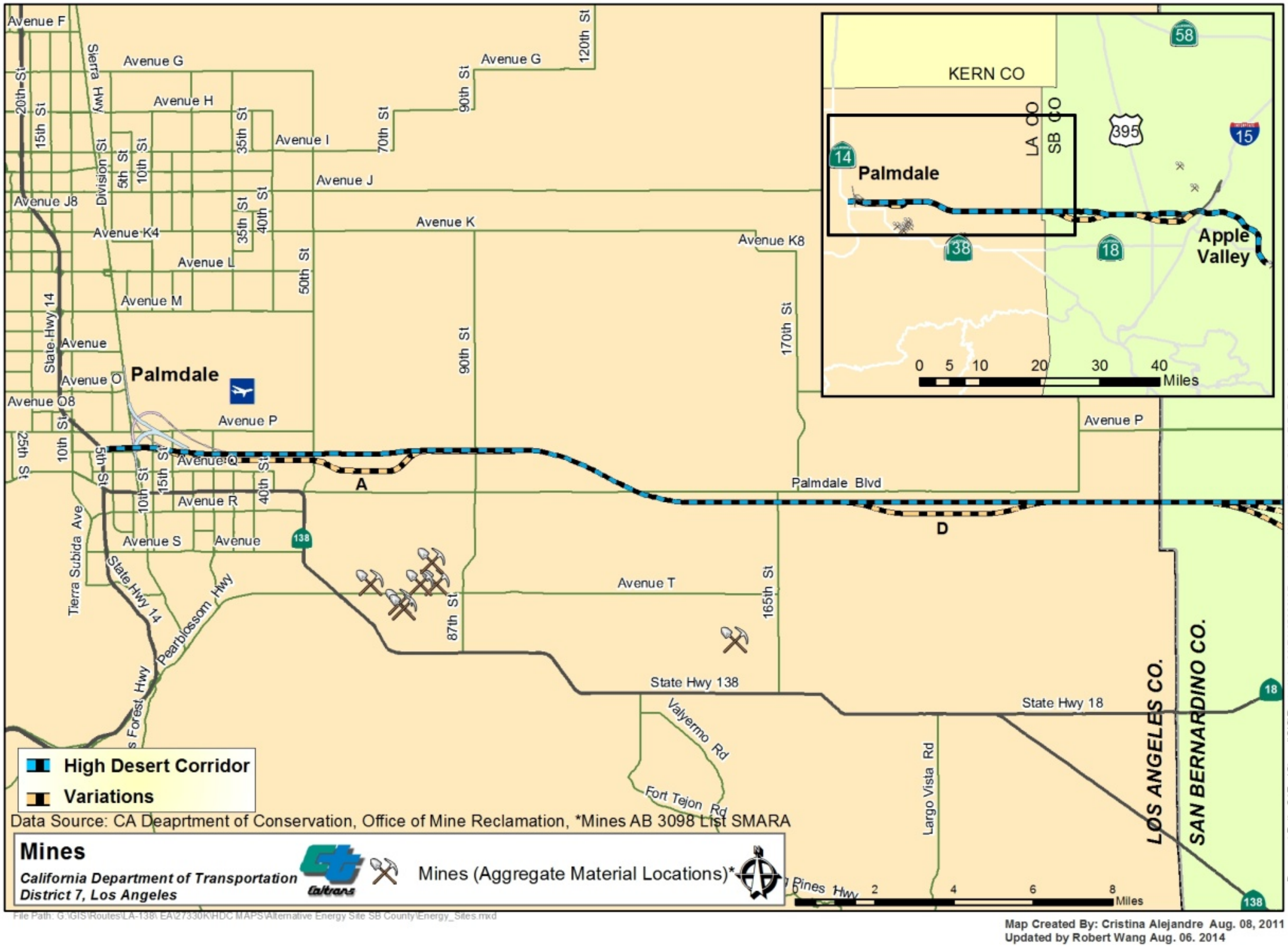
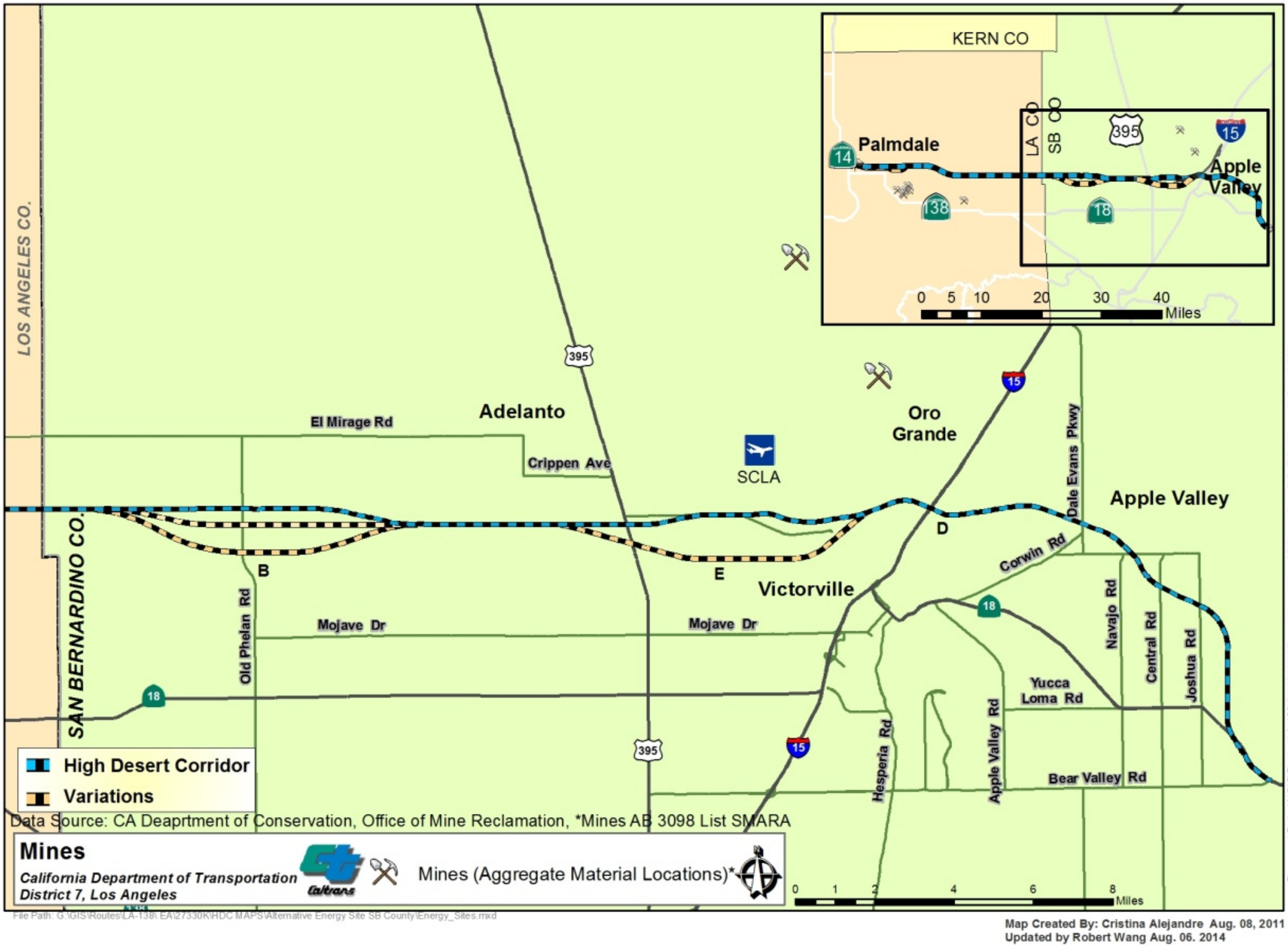


Figure 3.2.3-5 Aggregate Mines in San Bernardino County near the High Desert Corridor



Environmental Consequences

No Build Alternative

Because no ground disturbance would occur under the No Build Alternative, there would be no impacts on geology, soils, seismicity or topography. Existing geologic and seismic hazards would remain.

Common to All Build Alternatives

The proposed project alignment is not located within an Alquist-Priolo Earthquake Fault Zone and is not located over a previous well-defined fault trace, with the exception of the SR-14/Avenue S Bridge site, which is located about 2 miles south of the HDC. The potential for impacts from geologic and seismic hazards to the components under each build alternative is considered low. In addition, the potential of exposure of construction workers and the traveling public (once the HDC is operational) to these hazards is considered low.

Impacts related to erosion occurring during construction and after completion of the project that may affect the traveling public or the project facilities would be reduced through project design, including the use of appropriate grading techniques, such as vegetation, flatter slopes, and jute mesh. Refer to Section 3.2.2, Water Quality and Stormwater Runoff, for additional discussion regarding construction-related water quality impacts and mitigation, including Best Management Practices (BMPs).

Construction of the HDC Project would not affect any designated natural landmarks because there are no officially designated natural landmarks or other major geological features within the project area.

Construction of the HDC Project would traverse two designated MRZ-2 zones; however, the project once in place would not result in the utilization or deplateion of any mineral resources within the designated area. No impacts to mineral resources are anticipated.

As a beneficial impact, the HDC may facilitate the movement of economic mineral resources (i.e., aggregate base, sand, and gravel) from the area by providing lower transportation costs and easier access for trucks and equipment. It may also facilitate the development of more sand and gravel quarries.

Avoidance, Minimization, and/or Mitigation Measures

Standard Conditions

SC-G-1: During final design, prepare a design-level geotechnical report to identify soil-related constraints and hazards such as slope instability, settlement, liquefaction, or related secondary seismic impacts that may be present along the project segments for consideration in the design of the project. The report shall be prepared by professional geotechnical engineers for review and approval by Caltrans.

SC-G-2: Apply erosion prevention measures, such as hydroseeding of slopes or erosion control mesh, at the fill embankments and cut slopes.

SC-G-3: If blasting is required, prepare and implement a blasting plan to minimize potential hazards related to blasting activities. The blasting plan shall meet applicable standards in accordance with the U.S. Department of Interior, Office of Surface Mining. The blasting plan shall include, but not be limited to, hours of blasting activity, notification to adjacent property owners, noise and vibration, and dust control.

Minimization Measure

G-1: Install cast-in-drilled hole (CIDH) piles at the two viaducts over Little Rock Wash. The appropriate type of piling for use at the three connectors at the SR-14/SR-138 interchange, bridge abutment supports, and other supports shall be identified during the final design.

3.2.4 Paleontology

This section identifies and evaluates the potential for impacts caused by the proposed project on significant paleontological resources in the study area.

Regulatory Setting

Paleontology is a natural science focused on the study of ancient animal and plant life as it is preserved in the geologic record as fossils.

Federal Laws and Regulations

A number of federal statutes specifically address paleontological resources, their treatment, and funding for mitigation as a part of federally authorized projects. The proposed project is subject to the federal laws listed below because federal funds administered by the Federal Highway Administration (FHWA) are involved.

16 United States Code (U.S.C.) 431- 433 (the "Antiquities Act") prohibits appropriating, excavating, injuring, or destroying any object of antiquity situated on federal land without the permission of the Secretary of the Department of Government having jurisdiction over the land. Fossils are considered "objects of antiquity" by the Bureau of Land Management (BLM), the National Park Service, the Forest Service, and other federal agencies. Permits to collect fossils on lands administered by federal agencies are authorized under this Act. Therefore, projects involving federal lands will require permits for both paleontological resource evaluation and mitigation efforts.

16 U.S.C. 461- 467 (the National Registry of Natural Landmarks) establishes the National Natural Landmarks (NNL) program. Under this program, property owners agree to protect biological and geological resources such as paleontological features. Federal agencies and their agents must consider the existence and location of designated NNLs, and of areas found to meet the criteria for national significance, in assessing the effects of their activities on the environment under the National Environmental Policy Act (NEPA).

16 U.S.C. 470aaa (the Paleontological Resources Preservation Act) prohibits the excavation, removal, or damage of any paleontological resources located on federal land under the jurisdiction of the Secretaries of the Interior or Agriculture without first obtaining an appropriate permit. The statute establishes criminal and civil penalties for fossil theft and vandalism on federal lands. The BLM is part of the Department of the Interior (DOI), and there are BLM-administered lands within the project limits; therefore, a BLM permit is necessary if paleontological resources are anticipated to be encountered.

23 U.S.C. 1.9(a) requires that the use of federal-aid funds must be in conformity with federal and state law.

23 U.S.C. 305 authorizes the appropriation and use of federal highway funds for paleontological salvage as necessary by the highway department of any state, in compliance with 16 U.S.C. 431-433 above and state law.

42 USC 4321-4347 (NEPA) mandates the protection of important historic, cultural, and natural aspects of our national heritage within its general policy for environmental protection. Consideration of paleontological resources may be required under NEPA when a project is proposed for development on federal land, or land under federal jurisdiction or when federal funds are used.

State Laws and Regulations

Under California law, paleontological resources are protected by the California Environmental Quality Act (CEQA). If paleontological resources are identified during the paleontological assessment as being within the project area, the sponsoring agency must take those resources into consideration when evaluating project effects. The level of consideration may vary with the importance of the resource.

California Public Resources Code (PRC) protects paleontological resources under Section 5097.5, which prohibits the "knowing and willful" excavation, removal, destruction, injury, or defacement of any paleontological feature on public lands (i.e., lands under state, county, city, district, or public authority jurisdiction of a public corporation), except where the public agency with jurisdiction over the lands has granted express permission. Section 30244 of the PRC also requires reasonable mitigation for impacts on paleontological resources, as identified by the State Historic Preservation Officer (SHPO), that occur as a result of development on public lands.

Local Laws and Regulations

The California Department of Transportation (Caltrans) is not required to comply with local laws and ordinances; however, it endeavors to do so to the extent practicable.

Los Angeles County General Plan (Sections 5.9.1 and 5.9.4), in agreement with CEQA, has a policy to protect paleontological resources where feasible.

The County of San Bernardino Development Code (Section 82.20) defines requirements for project paleontological mitigation programs, including criteria for qualified paleontologist(s) who will supervise all paleontological work. A paleontological mitigation program will include, but not be limited to, field survey before grading, monitoring during grading, preparation of recovered specimens, identification and curation of specimens into the San Bernardino County Museum (SBCM), and preparation of a report of findings with an inventory of specimens.

The City of Palmdale 1993 General Plan requires paleontological mitigation measures to avoid adverse effects on paleontological resources when their occurrence is strongly substantiated by background study. Under the Environmental Resources Element of the general plan, Goal ER7.1 protects "historic and culturally significant resources that contribute to the community's sense of history." Objective ER7.1 promotes "the identification and preservation of historic structures, historic sites, archaeological sites, and paleontological resources in the city." Policy ER7.1.3 requires new development to "protect significant historic, paleontological, or archaeological resources or provide for other appropriate mitigation.

Affected Environment

Information contained in this section is summarized from the Combined Paleontological Identification and Evaluation Report (PIR/PER) for the High Desert Corridor (HDC) Freeway, Los Angeles and San Bernardino Counties, California, 07-LA and 08-SBD (PM: SR-14 to SR-18/I-15), EA 116720; Project ID No. 0712000035 (Caltrans, August 2014).

Regional Geology

The project study area (PSA) lies within the Mojave Desert Geomorphic Province, which consists of fault-bounded isolated mountain ranges and large expanses of desert. Most of the project lies north of the San Andreas Fault Zone and east of the Garlock Fault Zone, both of which impact the alignment of the nearby mountain ranges. The Mojave Desert (also locally called the "High Desert") has a closed drainage system, which results in thick alluvial fans and numerous playas. Figure 3.2.4-1 presents the geologic map of the project study area.

Stratigraphy

Most of the PSA is mapped as Quaternary alluvium derived from the San Gabriel and San Bernardino mountains to the south. Additional Quaternary units include dune sands, playa, and river deposits. Quaternary older alluvium and Quaternary older schist gravels, the Pliocene Anaverde Formation, Mesozoic plutonic rocks, and Paleozoic metasedimentary rocks are also in the areas that may be impacted.

Quaternary Deposits

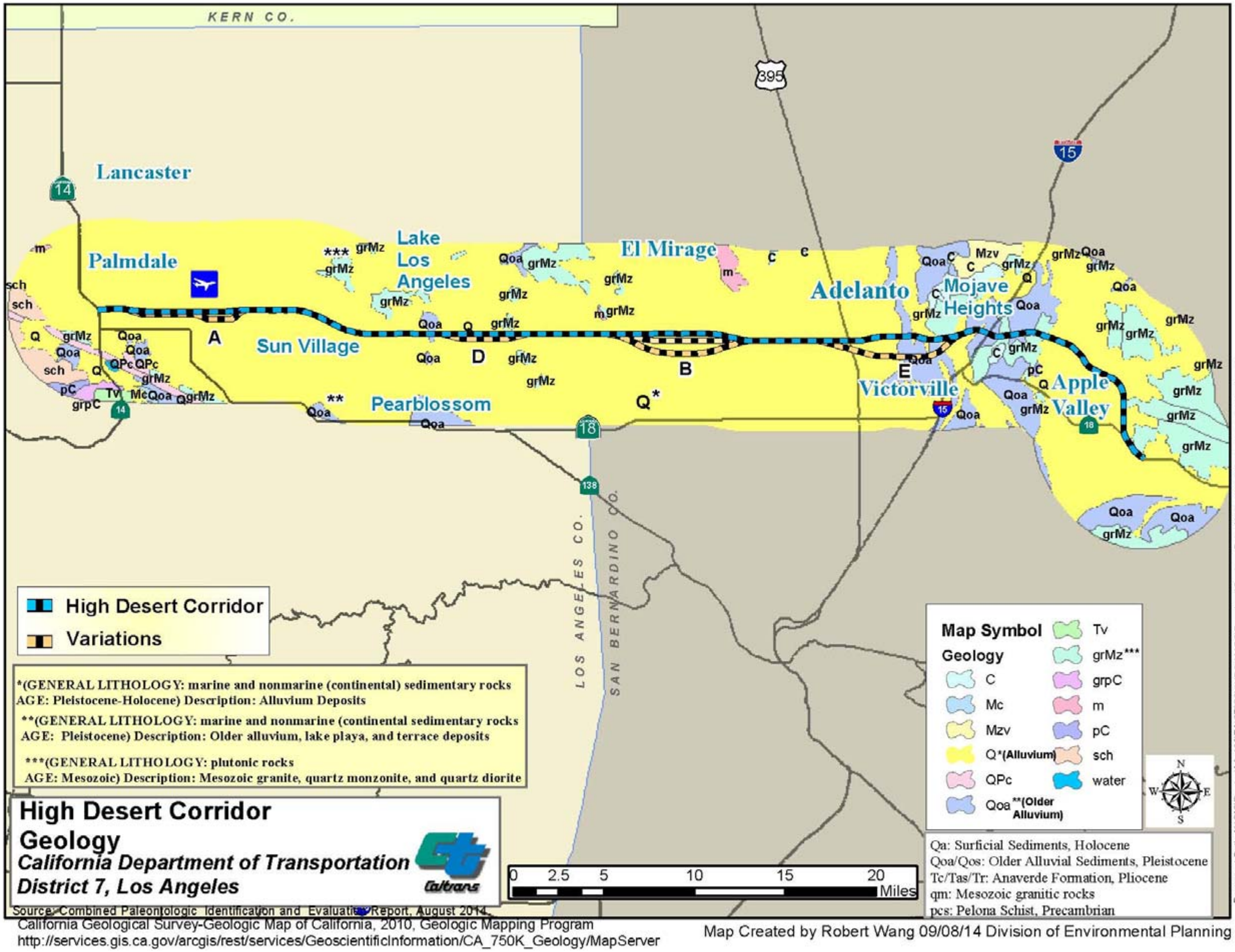
Most of the PSA is mapped as Holocene (less than 11,000 years old) alluvium (Qa). Sediments include unconsolidated sands, silts, and gravels that increase in coarseness in relation to the location of the source. Much of the western and central portions of this project, from Palmdale to Adelanto, and the eastern portion of the project in Apple Valley consist of coarse- to fine-grained alluvial fan deposits off the San Gabriel-San Bernardino mountains and the local hills.

Deposits of Holocene (less than 11,000 years old) dune sand, playa deposits, and river deposits are also present. Quaternary (Holocene) dune sand (Qs) consists of windblown deposits of unconsolidated sand. Quaternary (Holocene) playa deposits (Qc) are unconsolidated clays and silts deposited in a lake. Quaternary (Holocene) Mojave River deposits (Qg) are unconsolidated silts to boulder-sized stream deposits of the current Mojave River.

Quaternary Older Deposits

Outcrops of Pleistocene (11,000 years to 2.6 million years old) older alluvium (Qoa) of the ancient Mojave River, dating to the Irvingtonian North American Land Mammal Age (780 to 350 thousand years) near the Southern California Logistics Airport (SCLA) are present in the Victorville area. These poorly to moderately consolidated, light grey to buff, silt- to boulder-sized stream deposits of the ancient Mojave River border the modern river channel as terraces.

Figure 3.2.4-1 Geologic Map of HDC Study Area



Pleistocene older schist cobble conglomerates (Qos) are derived from the Pelona Schist near the San Andreas Fault Zone. They grey to brown, schist-rich gravels are supported in a matrix of biotite-rich sands.

Pliocene Anaverde Formation

Outcrops of Pliocene (2.6 to 5.3 million years old) Anaverde Formation (Tas, Tac) are present in the southwestern portion of the PSA. The sandstone (Tas) is a grey-white to yellowish buff, fine- to coarse-grained commonly conglomeratic, arkosic sand. Deposited by large streams off of local granitic rock, there are also occasional sections of thin bedded shale. A grey shale unit (Tac) is also present within the PSA. Primarily consisting of thin bedded, clayey to silty shale, the unit also includes interbeds of fine-grained arkosic sands.

Mesozoic Granitics

A Mesozoic (252 to 66 million year old), questionably Jurassic (201 to 145 million year old) quartz monzonite (qm) occurs throughout the PSA in small outcrops. This grey-white, medium-grained, massive to rarely gneissoid rock forms the major batholith of the western Mojave Desert. Along the San Andreas Fault Zone, the quartz monzonite is intensely sheared.

Found in the eastern portion of the PSA as outcrops within the quartz monzonite, a black, medium- to coarse-grained, massive, Mesozoic hornblende diorite and gabbro (hdg) occurs to the north of Apple Valley.

A dark grey, medium-grained, massive Mesozoic quartz diorite (qd) is found east of the Mojave River near Apple Valley.

Light grey to tan, fine- to medium-grained, massive, Mesozoic granite and quartz monzonite (gqm) is found to the northeast of Victorville.

Paleozoic Metasedimentary Rocks

A white to dark blue-grey, fine to coarsely crystalline, massive to bedded, Paleozoic (541 to 252 million year old), questionably Pennsylvanian (323 to 299 million year old) limestone (ml) is found east of the Mojave River near Apple Valley.

Fossil Localities

A paleontological records search for the project was conducted by the SBCM. Prior records searches were also conducted at the University of California, Museum of Paleontology (UCMP) in Berkeley and at the Natural History Museum of Los Angeles County (LACM). Neither the UCMP nor the LACM had any records of fossils occurring within the PSA, but the SBCM had 4. An additional 63 localities occur within 1 mile of the PSA.

In the Palmdale area, there are records of Quaternary reptiles and small mammals from 34 localities. As these taxa occur both in the Holocene and Pleistocene, they are not temporally diagnostic of either time period and may or may not be fossils. An additional locality from the Pliocene Anaverde Formation near the southwestern portion of the PSA has produced the remains of a mastodon.

No localities are known from the central portion of the PSA in the alluvial fan deposits from the San Gabriel and San Bernardino mountains. In the Adelanto-Victorville-Apple Valley area, Quaternary sediments of the ancestral Mojave River have produced another 32 localities, 4 of which occur within the PSA. Along with numerous small mammals and reptiles, the remains of extinct animals, including mammoth *(Mammuthus meridionalis),* giant ground sloth *(Paramylodon harlani),* horse *(Equus sp. cf. E. scotti),* and camels *(Hemiauchenia, Camelops hesternus),* have been recovered.

None of the Mesozoic or Paleozoic units have records of fossils.

Paleontological Sensitivity

Caltrans utilizes a tripartite scale to characterize paleontological sensitivity consisting of no potential, low potential, and high potential (Caltrans, 2012, Appendix C). A multilevel ranking system was developed by professional resource managers as a more practical tool, the Potential Fossil Yield Classification (PFYC) system (BLM, 2009, Appendix C), which has a multilevel scale based on demonstrated yield of fossils. The PFYC system provides additional guidance regarding assessment and management for different fossil yield rankings; therefore, it is used here to complement the Caltrans scale.

Occurrences of fossil resources are closely tied to the geologic units (e.g., formations or members) that contain them. The probability for finding significant fossils in a project area can be broadly predicted from previous records of fossils recovered from the geologic units present in and/or adjacent to the study area.

Using the PFYC system, geologic units are classified based on the relative abundance of vertebrate fossils or scientifically significant invertebrate or plant fossils and their sensitivity to adverse impacts. This ranking is not designed to be applied to specific paleontological localities or small areas within units. Although significant localities may occasionally occur in a geologic unit, a few widely scattered important fossils or localities do not necessarily indicate a higher PFYC value; instead, the relative abundance of localities is intended to be the major determinant for the value assignment. Geological setting and fossil localities were considered in determining paleontological sensitivity according to PFYC criteria.

Mesozoic plutonic rocks were assigned as Caltrans no sensitivity and PFYC 1. The Holocene deposits, Quaternary older schist cobble conglomerate, and the Paleozoic metasedimentary rocks were ranked low on both the Caltrans and PFYC (Level 2) scales. As a limestone, the Paleozoic deposits may include fossils and were ranked Caltrans low and PFYC 3b, indicating moderate potential but undemonstrated yield.

Three geologic units were ranked as Caltrans high and PFYC 3a, indicating moderate potential but unpredictable location of occurrence. These are the Quaternary older alluvium and both units of the Anaverde Formation. No project rock units were ranked higher.

The paleontological sensitivity map is presented in the Combined PIR/PER for the HDC Freeway, Los Angeles and San Bernardino Counties, California, 07-LA and 08-SBD (PM: SR-14 to SR-18/I-15), EA 116720; Project ID No. 0712000035 (Caltrans, 2014), and is being kept on file at Caltrans.

Environmental Consequences

Only qualified, trained paleontologists with specific expertise in the type of fossils being evaluated can determine the scientific significance of paleontological resources. Fossils are considered to be significant if one or more of the following criteria apply:

1. The fossils provide information on the evolutionary relationships and developmental trends among organisms, living or extinct;

2. The fossils provide data useful in determining the age(s) of the rock unit or sedimentary stratum, including data important in determining the depositional history of the region and the timing of geologic events therein;

3. The fossils provide data regarding the development of biological communities or interaction between paleobotanical and paleozoological biotas;

4. The fossils demonstrate unusual or spectacular circumstances in the history of life;

5. The fossils are in short supply and/or in danger of being depleted or destroyed by the elements, vandalism, or commercial exploitation, and are not found in other geographic locations (Scott and Springer, 2003).

As so defined, significant paleontological resources are determined to be fossils or assemblages of fossils that are unique, unusual, rare, uncommon, or diagnostically important. Significant fossils can include remains of large to very small aquatic and terrestrial vertebrates or remains of plants and animals previously not represented in certain portions of the stratigraphy. Assemblages of fossils that might aid stratigraphic correlation, particularly those offering data for the interpretation of tectonic events, geomorphologic evolution, and paleoclimatology, are also critically important (Scott and Springer, 2003; Scott *et al.*, 2004).

No Build Alternative

The No Build Alternative would not create surface or subsurface impacts; therefore, it would not create adverse impacts to potential paleontological resources.

Freeway/Highway and Freeway/Tollway Alternatives

These two alternatives would have the same construction footprint; therefore, impacts on paleontological resources would be the same. Because the footprint covered by various variations to the main corridor is located within the same locality, there would be no notable differences in the level of impacts between the main line and the variations.

The Quaternary older alluvium and Anaverde Formation have been demonstrated to be the only paleontologically sensitive sediments within the PSA that may be affected by project construction activities. These sediments would be encountered at the surface and may also be encountered in excavations at locations where they are overlain by younger non-fossiliferous deposits.

Grading, excavation, and other subsurface excavation in defined areas of the proposed project have the potential to impact significant nonrenewable fossil resources of Pleistocene and Pliocene age. Vertical impacts of construction are at present unknown because the designs have yet to be completed; however, they are expected to be as much as 30 feet deep in bridge construction areas, approximately 30 to 40 feet for bents and other structural supports, and 5 to 10 feet for general grading. Due to the depth, these excavations have the potential to impact fossils in any of the areas mapped as Quaternary deposits. Even shallow excavations in areas mapped as Quaternary older alluvium (Qoa), particularly near the Mojave River and the Anaverde Formation (Tac, Tas), have the potential to encounter significant paleontological resources.

The Combined PIR/PER for the HDC prepared for this project recommended that all excavations in areas mapped as Quaternary older alluvium (Qoa) and Anaverde Formation (Tac, Tas) have the potential to encounter significant paleontological resources and should be monitored full time. Excavations more than 10 feet in depth into Quaternary alluvial deposits (Qa, Qg, Qc, Qs) should be spot checked periodically for the presence of older, paleontologically sensitive sediments. Should sediments conducive to fossil preservation be encountered, monitoring should be implemented in those areas. Areas mapped as Paleozoic rock (ml) and Quaternary older schist cobble conglomerate (Qos) should be spot checked during construction and evaluated further for fossil potential as excavation proceeds.

Freeway/Highway and Freeway/Tollway with HSR Alternatives

These two alternatives would have the same construction footprint; therefore, impacts on paleontological resources would be the same. Because the footprint covered by various variations to the main corridor is located within the same locality, there would be no notable differences in the level of impacts between the main line and the variations.

Impacts to paleontological resources discussed under the Freeway/Highway and Freeway/Tollway alternatives would apply to the alternatives with high-speed rail (HSR), with the exception that the alternatives with HSR would cover a larger footprint due to the required construction of the station connections in Palmdale and Victorville.

Avoidance, Minimization, and/or Mitigation Measures

Avoidance, minimization, and/or mitigation measures to minimize impacts to paleontological resources during project construction are provided in Section 3.6, Construction Impacts, Paleontology.

3.2.5 Hazardous Waste or Materials

Regulatory Setting

Hazardous materials, including hazardous substances and wastes, are regulated by many State and federal laws. Statutes govern the generation, treatment, storage, and disposal of hazardous materials, substances, and waste, and also the investigation and mitigation of waste releases, air and water quality, human health, and land use.

The primary federal laws regulating hazardous wastes/materials are the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA) and the Resource Conservation and Recovery Act of 1976 (RCRA). The purpose of CERCLA, often referred to as “Superfund,” is to identify and clean up abandoned contaminated sites so that public health and welfare are not compromised. The RCRA provides for “cradle to grave” regulation of hazardous waste generated by operating entities. Other federal laws include:

- Community Environmental Response Facilitation Act (CERFA) of 1992
- Clean Water Act
- Clean Air Act
- Safe Drinking Water Act
- Occupational Safety and Health Act (OSHA)
- Atomic Energy Act
- Toxic Substances Control Act (TSCA)
- Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)

In addition to the acts listed above, Executive Order (EO) 12088, Federal Compliance with Pollution Control Standards, mandates that necessary actions be taken to prevent and control environmental pollution when federal activities or federal facilities are involved.

California regulates hazardous materials, waste, and substances under the authority of the CA Health and Safety Code and is also authorized by the federal government to implement RCRA in the state. California law also addresses specific handling, storage, transportation, disposal, treatment, reduction, cleanup, and emergency planning of hazardous waste. The Porter-Cologne Water Quality Control Act also restricts disposal of wastes and requires clean up of wastes that are below hazardous waste concentrations but could impact ground and surface water quality. California regulations that address waste management and prevention and clean up of contamination include Title 22 Division 4.5 Environmental Health Standards for the Management of Hazardous Waste, Title 23 Waters, and Title 27 Environmental Protection.

Worker and public health and safety are key issues when addressing hazardous materials that may affect human health and the environment. Proper management and disposal of hazardous material is vital if it is found, disturbed, or generated during project construction.

Affected Environment

Under federal and State environmental laws, acquisition of contaminated property creates permanent liability for the new property owner. Project proponents must exercise due diligence to prevent acquisition of contaminated property that may create long-term liability or detrimentally affect project cost, scope, or schedule.

A series of Initial Site Assessment (ISA) reports were prepared in accordance with the American Society of Testing and Materials (ASTM) Standard E1527-05, Standard Practice for Environmental Site Assessments: Phase 1 Environmental Site Assessment Process to identify any Recognized Environmental Conditions (RECs), including potential sources of hazardous materials, wastes, and substances in, or adjacent to, the project area. California Department of Transportation (Caltrans) hazardous waste technical specialists have conducted the following:

- Electronic records searches to identify possible land uses or environmental conditions that may be of concern.
- Field inspection of the parcels in and adjacent to the project area to look for and document land use, disturbance, materials, or facilities that may indicate past or current releases or activities that may release or use hazardous materials.
- Historic maps (e.g., Sanborn maps, topographic maps), aerial photographs, as-built plans, and regulatory files, reports, and or permits pertaining to hazardous material handling to identify facilities or sites that may potentially contain hazardous wastes.

Due to the length and scope of this project, the corridor was broken down into sections and segments, and many ISA reports were completed. They are:

- Supplemental ISA Segment 2E & 2F, Proposed SR-138 from Route 14 to 100th Street East, prepared by Office of Environmental Design, District 7, September 22, 2015
- ISA, High Desert Corridor (HDC) Project, prepared by Division of Design, Office of Environmental Design, District 7, February 21, 2014
- ISA Update, Proposed SR-138 from Route 14 to 100th Street East, prepared by Office of Environmental Design, District 7, January 31, 2014
- Supplemental ISA, New LA-138 Highway between 100th Street East and San Bernardino County Line, prepared by Office of Environmental Design, District 7, December 1, 2013
- Supplemental ISA, HDC from Los Angeles County Line to the Town of Apple Valley, prepared by Office of Environmental Design, District 7, August 2013
- ISA, HDC from Los Angeles County Line to the Town of Apple Valley, prepared by Office of Environmental Engineering, District 8, September 2011
- Revised ISA, Proposed SR-138 from Route 14 to 100th Street East, prepared by Office of Environmental Engineering and Corridor Studies, District 7, September 1, 2011

- ISA, New LA-138 Highway between 100th Street East and San Bernardino County Line, prepared by Office of Environmental Engineering and Corridor Studies, District 7, August 31, 2011

Because this project is still in the preliminary design stage, it is anticipated that by the time construction commences, the ISAs would be considered out of date. ISAs will need to be performed prior to acquisition of properties needed for the project to determine changes in environmental conditions in the project area and surroundings. The ISAs did not include detailed surveys and environmental sampling, and they are limited to review of readily available information at the time they were conducted. For properties suspected to be contaminated, site-specific investigations need to be conducted before impacts can be evaluated. Consequently, impacts of contamination at a site to the project cannot be evaluated until site-specific investigations are completed.

It is Caltrans' policy that potentially contaminated properties are fully characterized and remediated, and closure of the remediation effort is achieved prior to acquisition to ensure that all properties acquired are free of contamination before the start of construction. Coordination with the following regulatory agencies would be needed to address site investigations, tank removals, asbestos-containing material (ACM) and lead-based paint (LBP) abatement, management of soil with aerially deposited lead (ADL), and hazardous waste handling, treatment, and disposal:

- California Department of Toxic Substances Control – for site investigations and cleanup; ACM and LBP abatement, management of soil with ADL, and hazardous waste treatment, handling, and disposal
- Lahontan Regional Water Quality Control Board (RWQCB) – tank removals, site investigations involving contaminated groundwater
- Local Air Pollution Control District – ACM abatement

The HDC Project limits presented in the ISA were organized into three sections and are as follows:

- State Route (SR) 14 to 100th Street, Palmdale
- 100th Street to Los Angeles/San Bernardino County Line (Palmdale and Llano)
- Los Angeles/San Bernardino County Line to Town of Apple Valley

Potential hazardous waste sites were explored for these areas and summarized in the Environmental Consequences section below.

Environmental Consequences

No Build Alternative

Under the No Build Alternative, there would be no impacts associated with hazardous materials or wastes.

Freeway/Expressway and Freeway/Tollway Alternatives

Both the Freeway/Expressway and Freeway/Tollway alternatives have the same footprint of the alignment; therefore, the potential impacts related to hazardous materials and wastes would be the same.

Recognized Environmental Concern (REC)

The ISA investigated all parcels subject to acquisition within the project alternative footprint. The following subsections describe the results of the preliminary investigation by section as reported in the ISA.

Section 1: From SR-14 to 100th Street East, Palmdale

The ISA subdivided this portion of the project into four segments (signified as Segments 1, 2a, 2c, and 2d), which also include Variation A. Segment 1 covers parcels subject to acquisition along SR-14. Segment 2a covers parcels subject to acquisition along the new SR-138 alignments. Segments 2c and 2d cover parcels subject to acquisition due to the high-speed rail (HSR) feeder in two alternative alignments. Parcels subject to acquisition under Variation A were identified in the ISA dated September 1, 2011.

Based on Caltrans Office of Environmental Design’s review of background data, historical aerial photographs, site reconnaissance, and review of building permit files, the following conclusions and recommendations are presented regarding the potential hazardous waste conditions within Section 1 of the HDC Project.

A total of 416 parcels in Section 1 are subject to acquisition. Most of the affected properties have been historically vacant; however, records suggest that there are RECs in several commercial/manufacturing/industrial-type properties, as listed in Table 3.2.5-1. The remediation cost of these parcels is roughly estimated in the absence of further study to be in the range of $250,000 to $500,000 per parcel.

In Section 1, minimal lengths of lane striping that would be altered are located along SR-14. Edge striping would be removed at the on- and off-ramps at Rancho Vista Boulevard in Palmdale.

Wooden utility poles likely treated with creosote along Avenue P-8 between 10th Street East and 15th Street East would be removed as part of the project.

Table 3.2.5-1 Affected Parcels with Potential RECs from SR-14 to 100th Street East

Impacted Parcels with Potential RECs			Highway Only		High-Speed Rail**	
APN	Address	Notes	HDC Main Alignment	HDC Variation A	PTC Rail Option 1 Terminus	PTC Rail Option 7 Terminus
3022002915	919 Avenue P-8 East	Palmdale USD transportation facility	X	X		
3004001011	411 Palmdale Boulevard	ARCO gas station	X	X		
3008041007	103 Palmdale Boulevard	Service station	X	X		
3022012919	Vacant	Former manufacturing building	X	X		
3022012271	2104 Avenue P-8		X			
3022012270	2044 Avenue P-8	Palmdale Commerce Center	X	X		
3022004911	39210 10th Street East	Palmdale USD transportation facility	X	X[1]		
3022004910	39226 10th Street East	Metal prefab industrial storage	X	X		
3022004025	39215 15th Street East	Vacant building	X	X		
3022002015	39339 10th Street East	J and P Construction		X[1]		
3022012017	39006 20th Street East	Affordable Auto Body and Repair		X[1]		
3022012029	2229 East Avenue Q	Facility		X[1]		
3022006907	Vacant/Corner of 20th Street East/Avenue P-8	Manufacturing building	X			
3022007900	39300 30th Street	County Water Reclamation Plant	X			
3022006270	Vacant/Corner of Avenue P-8/25th Street East	Former manufacturing building	X			X
3022002902	Vacant/8th Street East/ VIC Avenue P-2	Palmdale Water District building			X	X
3022027911	Vacant/Corner of 10th Street East/Avenue P	Palmdale Water District building			X	
3022004003	39534 10th Street East	Former industrial building			X	

Table 3.2.5-1 Affected Parcels with Potential RECs from SR-14 to 100th Street East

Impacted Parcels with Potential RECs			Highway Only		High-Speed Rail**	
APN	**Address**	**Notes**	**HDC Main Alignment**	**HDC Variation A**	**PTC Rail Option 1 Terminus**	**PTC Rail Option 7 Terminus**
3022004034	39530 12th Street East	Recycling facility			X	
3022004023	39457 15th Street East	Machine shop building tenant improvement			X	
3022004035	39531 15th Street East	Underground storage tank removal			X	
3008027015	38582 6th Street East	Auto repair			X	
3008011034	38712 6th Street East	Auto repair			X	X
3008011033	38744 6th Street East	Existing industrial building			X	X
3008011030	38702 6th Street East	Auto body shop			X	X
3008011029	38646 6th Street East	Cabinet maker			X	
3008011028	38644 6th Street East	Lawn mower repair			X	
Total			12	8	12	5

** Parcel counts for PTC Rail Options 1 and 7 only include parcels that are not within the HDC Main Alignment footprint. To determine the total number of hazardous waste parcels impacted for the Highway and HSR Combinations, add the totals. Total number of hazardous waste parcels for HDC Main Alignment + PTC Rail Option 1 Terminus = 24; similarly, total number of hazardous waste parcels for HDC Main Alignment + PTC Rail Option 7 Terminus = 17; Note 1: applies to Variation A only.

Section 2: From 100th Street East to Los Angeles/San Bernardino County Line, Palmdale and Llano

A total of 408 parcels in Section 2 of the HDC Project alternatives would be subject to acquisition. Section 2 of the HDC Project is characterized as low-density/rural in which most of the area consists of vacant parcels. There are some single-family residences and commercial/industrial properties, built prior to 1980, that would be affected by the HDC Project alternatives. Based on the year of construction, these structures are suspected to contain ACM and/or LBP. Based on the results of historical research, review of environmental database, the previous ISA for this area, and site reconnaissance, RECs have been identified and recommendations are suggested for the properties listed in Table 3.2.5-2. Acquisition of these properties may impact project cost and schedule from any required cleanup and/or remediation.

Table 3.2.5-2 Affected Parcels with Potential RECs from 100th Street East to Los Angeles/San Bernardino County Line

Impacted Parcels with Potential RECs			Highway & High-Speed Rail	
APN	Address	Notes	HDC Main Alignment	HDC Variation D
3075007001	16035 E. Avenue R*	Commercial facility; field visit suggests an active nursery business	X	X
3030021002	18842 E. Palmdale Boulevard*	Single-family residence; field visit reveals an abundance of retired automotive vehicles and parts stored in backyard	X	
3084012003	38227 230th Street East*	Single-family residence; field visit reveals an abundance of retired automotive vehicles and parts stored throughout the property	X	
3075011015	17500 E. Palmdale Boulevard*	Schnaidt Fireworks; manufacturing and wholesale facility; classified as a State Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) site	X	X
3030021001	18846 E. Palmdale Boulevard*	Commercial/industrial building; field visit suggests active automotive recycling yard	X	
3029016009	15366 E. Palmdale Boulevard*	State/Tribal underground storage tank (UST)/aboveground storage tank (AST) site	X	X

Table 3.2.5-2 Affected Parcels with Potential RECs from 100th Street East to Los Angeles/San Bernardino County Line

Impacted Parcels with Potential RECs			Highway & High-Speed Rail	
APN	Address	Notes	HDC Main Alignment	HDC Variation D
3084017024	21216 E. Avenue R*	Single-family residence; many junk cars, abandoned machines, and used equipment were observed scattered throughout the property		X
Total			6	4

Acquisition of these properties may impact project cost and schedule from any required cleanup and/or remediation. The site investigation and remediation cost for 17500 East Palmdale Boulevard is roughly estimated in the absence of further study to be in the range of $250,000 to $500,000. The site investigation and remediation cost for the other six parcels is roughly estimated in the absence of further study to be in the range of $50,000 to $100,000 per parcel.

This section of the HDC would not affect any lane or edge striping on existing area roads.

Wooden utility poles are likely to be located at the planned interchanges at 170th Street East, 210th Street East, and 240th Street East.

Section 3: Los Angeles/San Bernardino County Line to Town of Apple Valley

Impacted parcels within Section 3 of the proposed alignment of the HDC in San Bernardino County were assessed by the Office of Environmental Engineering, District 8, San Bernardino, CA in September 2011 and Office of Environmental Design, District 7, Los Angeles, CA, in April 2014. This section is divided into three segments: Segment 1 covers from County Line to Koala Road in Adelanto, Segment 2 covers from Koala Road in Adelanto to Interstate 15 (I-15), and Segment 3 covers I-15 to the eastern terminus of the HDC at SR-18 and Bear Valley Road. Based on their findings, two locations were identified as RECs in Segment 1 of Section 3. Table 3.2.5-3 lists the affected parcels within Segment 1 of Section 3.

The affected parcels within Segment 2 are listed in Table 3.2.5-4 with their findings. Seven locations were identified as RECs in this segment. The affected parcels within Segment 3 are listed in Table 3.2.5-5.

At I-15, alteration of lane striping would likely be minimal.

Wooden utility poles may be removed at the proposed interchanges at Sheep Creek Road/Old Phelan Road, Koala Road, United States Highway 395 (US 395), and Dale

Evans Parkway. Other wooden utility poles that may be affected are at-grade separations at Bellflower Road, Adelanto Road, National Trails Highway, and Route 66. Roads that would be severed where wooden utility poles may be removed include Muskrat Avenue, Raccoon Avenue, Aster Road, Mesa Linda Road, Dakota Road, Ramona Road, and Navajo Road.

Table 3.2.5-3 Affected Parcels with Potential RECs from Los Angeles/San Bernardino County Line to Koala Road in Adelanto

Impacted Parcels with Potential RECs (San Bernardino County Segment 1 – County Line to Koala Rd)			Highway & High-Speed Rail		
APN	**Address**	**Notes**	**Main Alignment**	**Variation B**	**Variation B-1**
0457-161-10	17900 Sheep Creek Road* (Northwest quadrant of Parkdale Road)	Former dairy farm; possible underground fuel tanks and/or aboveground tanks; additional site assessment will be required depending on which alternative is selected. Test site for hydrocarbons and pesticides.	X		
0457-174-36 0458-212-01 0458-214-46 0458-212-03 0458-212-04	20188 Gray Mountain Road (Mailing address)	Krey Field; entire property needs to be investigated prior to acquisition; possible Phase II study needed.			X
Total			1	0	1

Table 3.2.5-4 Affected Parcels with Potential RECs from Koala Road in Adelanto to I-15

Affected Parcels with Potential RECs (San Bernardino County Segment 2 – Koala Rd to I-15)			Highway & High-Speed Rail	
APN	**Address**	**Notes**	**Main Alignment**	**Variation E**
0459-194-04 0459-194-14	SCLA Air Expressway east of Phantom West on north side. Formerly known as George Air Force Base (GAFB).	Three aboveground jet fuel tanks owned by Kinder-Morgan and associated fuel pipelines, which are located north and south of Air Expressway; A National Priority List (NPL) Superfund site; soils within the former GAFB area will require soil testing for hydrocarbons, metals, and solvents. If groundwater monitoring wells are located within the proposed right-of-way (ROW), coordination with the base and the Lahontan RWQCB will be necessary to have the wells relocated.	X	
0459-211-10	Located north of Air Expressway on SCLA property. West of Phantom East Road.	Former military housing for former GAFB; NPL site; housing units will require asbestos and LBP surveys prior to demolition. Soils in the area will require testing for pesticides, metals, solvents, and hydrocarbons.	X	
0468-261-02	14499 Turner Road	Abandoned building, illicit dumping; prior to property acquisition, additional site assessment will be required. Test site for metals and hydrocarbons.	X	
0472-101-53	17585 Turner Road	Beck Oil Inc. accounting office; historic underground tanks; listed under UST regulatory database; Prior to property acquisition, additional site assessment will be required to determine presence of residual contamination.	X	

Table 3.2.5-4 Affected Parcels with Potential RECs from Koala Road in Adelanto to I-15

Affected Parcels with Potential RECs (San Bernardino County Segment 2 – Koala Rd to I-15)			Highway & High-Speed Rail	
APN	**Address**	**Notes**	**Main Alignment**	**Variation E**
047213113 047213104 047213103 047213106	West of Mohave Equipment Co. at 17430 National Trails Highway	Private recycling/landfill facility with multiple stockpiles of construction and roadway waste. Variation E-Dip cuts deep into it. A detailed hazardous waste investigation is required to check on the waste that will be encountered.		X
071213209	17430 National Trails Highway	Mohave Equipment Company. Major truck repair and rental equipment center. Surface and groundwater at this location may be impacted by fuel, toxic metals, and volatile organic compound (VOC) contaminants. The groundwater may be shallow due to proximity to Mojave River.		X
047206117	East of Mohave Equipment Company at 17430 National Trails Highway	Railroad in a deep cut with its related potential contaminants of concern that becomes more significant due to shallow groundwater for installing the bridge planned for crossing over the railroad.		X
Total			4	3

Table 3.2.5-5 Affected Parcels with Potential RECs from I-15 to the Eastern Terminus of the HDC at SR-18 and Bear Valley Road

Impacted Parcels with Potential RECs (San Bernardino County Segment 3 – I-15 to SR-18/Bear Valley Road)			Highway Only Main Alignment
APN	**Address**	**Notes**	
0472-031-10	Near Falchion/ Quarry Road	Riverside Cement Company; mine/quarry; possible underground tanks, metals; prior to property acquisition, additional site assessment will be required. Test site for metals, solvents, and hydrocarbons.	X
0463-381-63	21288 Papago Road	Triangle truck service; industrial warehouse; prior to property acquisition, additional site assessment will be required. Test site for metals and hydrocarbons.	X
0463-403-04	17130 Navajo Road	Residential lot; auto, construction debris; prior to property acquisition, test site for metals and hydrocarbons.	X
Total			3

Freeway/Expressway and Freeway/Tollway with HSR Alternatives

Recognized Environmental Concern (REC)

The ISA investigated all parcels subject to acquisition within the project alternative footprint. The following subsections describe the results of the preliminary investigation by section as reported in the ISA. The site investigation and remediation cost for these parcels is roughly estimated in the absence of further study to be in the range of $200,000 to $400,000 per parcel.

Section 1: From SR-14 to 100th Street East, Palmdale

The footprint of this section of the Freeway/Expressway and Freeway/Tollway with HSR alternatives is similar to the Freeway/Expressway and Freeway/Tollway alternatives with the exception that theses two alternatives would impact more parcels as a result of the proposed Option 1 and Option 7 rail connection construction. The ISA reported a total of 12 RECs and 5 RECs for Rail Options 1 and 7, respectively, as shown in Table 3.2.5-1.

Section 2: From 100th Street East to Los Angeles/San Bernardino County Line, Palmdale and Llano

The REC list for Section 2 of the Freeway/Expressway and Freeway/Tollway with HSR alternatives is the same as that reported under the Freeway/Expressway and Freeway/Tollway alternatives.

Section 3: Los Angeles/San Bernardino County Line to Town of Apple Valley

The REC list for Section 3 of the Freeway/Expressway and Freeway/Tollway with HSR alternatives is the same as that reported under the Freeway/Expressway and Freeway/Tollway alternatives.

Common to All Alternatives

Asbestos-Containing Materials and Lead-Based Paint

Due to the age of structures located on impacted parcels, it is likely that ACM and LBP will be present. Paint used for lane striping may contain LBP or other hazardous materials. Construction of the HDC Project has the potential to expose construction personnel to ACM and LBP if these materials are not removed prior to construction.

Treated Wood Waste

Wooden utility poles are usually treated with creosote to prevent damage from insects and fungus. Wooden utility poles that would be removed as a result of the project may expose construction personnel to arsenic if these poles are not removed prior to construction.

Aerially Deposited Lead

ADL is not anticipated to be a concern for the Los Angeles County portion of the proposed HDC because the alignment is not along an existing street or highway; however, ADL may be present in areas adjacent to the existing ROW for the project in the San Bernardino County portion. Workers and the general public may be exposed to ADL during construction and operation of the HDC in San Bernardino County.

Oil and Gas Wells

Two oil wells are located within the project limits; however, these two oil wells have been plugged and abandoned. The potential for exposure of construction personnel to hydrocarbons, methane, and hydrogen sulfide is likely during deep excavation or boring for bridge columns.

Groundwater Contamination

Groundwater depth varies within the project limits. The lowest groundwater level is found between 130th Street East and 160th Street East in Palmdale. Groundwater is anticipated to be encountered if bridge columns are installed in the Big Rock Wash area between 140th Street East and 150th Street East. The groundwater gradient beneath the site is estimated to follow the gradient of the existing topography (i.e., south-southeast); therefore, any potential contaminant sources from the north and northwest directions of the site may have potential to impact the site.

Groundwater would be shallow in the proximity of the Mojave River where a bridge would be constructed and where three RECs, with their related contaminants of concern, are suspected.

Pesticides/Herbicides

Potential for pesticides and/or herbicides within farmlands is a concern for the dairy farm located at Sheep Creek Road and Parkdale Road in El Mirage and at the former GAFB housing area where the pesticide Dieldrin was used extensively. Construction personnel could be exposed to unsafe levels of pesticides or herbicides if standard waste site safety practices are not followed.

Unidentified Hazardous Wastes

The former Meadowbrook Dairy Farm at the northwest corner of the Sheep Creek Road/Parkdale Road intersection may have aboveground and underground storage tanks, although a search of GeoTracker did not yield any results for this site. Prior to any full or partial acquisition of this site, a more thorough site investigation of this property is necessary to properly identify RECs at this location.

Variation B Alternative

Unidentified Hazardous Wastes

Variation B of the proposed project is aligned to cross Krey Field, a private airport in Adelanto that was activated in 1987 and closed in April 2014. AirNav.com does not list any services available at this closed airport; however, during the site reconnaissance conducted as part of the ISA process, aboveground tanks were observed at this site. Prior to any full or partial acquisition of this site for this alternative, a more thorough site assessment of this property is necessary to properly identify RECs at this location.

Investigations

Further investigation may be necessary to develop contract special provisions addressing the contamination before and/or during construction, and to satisfy environmental or worker health and safety requirements, or both. Sampling and testing for the following may be necessary:

- Asbestos surveys of structures to be demolished
- LBP surveys of structures to be demolished
- Sampling/testing for creosote of soils around the base of wooden utility poles
- Sampling/testing for ADL of soils along roadways impacted by the project
- Sampling/testing for herbicides/pesticides along agricultural properties impacted by the project
- Sampling/testing of groundwater at the Big Rock Wash for potential contamination

Avoidance, Minimization, and/or Mitigation Measures

The following measures will be implemented:

HAZ-1: Where feasible, adjust the alignment to avoid properties containing ACM and LBP. Prior to acquisition, require the property owner to conduct and remove ACM and/or LBP, if presented. Only a licensed contractor will remove ACM and/or LBP materials prior to demolition based on predemolition surveys of properties to be acquired.

HAZ-2: Where feasible, adjust the alignment to avoid properties containing ADL. Prior to acquisition, require the property owner to conduct the ADL survey and dispose of the ADL-impacted soils, if presented. A Soil Management Plan will be developed and implemented to ensure that soil excavated during construction that is impacted by metals and/or petroleum hydrocarbons is handled, stockpiled, and disposed of in accordance with federal, State, and local regulations. Reuse of ADL-impacted soils within the project footprint will be in accordance with the California Department of Toxic Substances Control requirements for reuse within Caltrans ROW.

HAZ-3: During the Final Design phase, prepare a Construction Contingency Plan (CCP) in accordance with Caltrans' Unknown Hazards Procedures for Construction. The CCP will include provisions for emergency response in the event that unidentified USTs, petroleum hydrocarbons, solid wastes (including hazardous wastes), or other hazardous substances are discovered during construction activities. The CCP will also address UST decommissioning, field screening, contaminant materials testing methods, mitigation and contaminant management requirements, and health and safety requirements for construction workers.

HAZ-4: If dewatering is required, conduct a groundwater evaluation to assess disposal alternatives and to comply with the requirements of the National Pollutant Discharge Elimination System (NPDES), during the preparation of PS&E. Whenever possible, adjust the alignment to avoid areas of contaminated groundwater. To avoid or minimize exposure to contaminated groundwater, containerize, sample, and/or treat groundwater for disposal.

HAZ-5: Coordinate with Los Angeles World Airports (LAWA) and its tenant, the County of Los Angeles Sanitation District No. 20, to avoid or minimize any and all environmental issues on and adjacent to City of Los Angeles' property. Caltrans shall indemnify, defend, and hold harmless LAWA from any environmental impacts caused by, resulting from, or otherwise related to the HDC project.

Measures to minimize impacts related to hazardous waste and materials during construction are provided in Section 3.6, Construction Impacts.

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3.2.6 Air Quality

Regulatory Setting

The federal Clean Air Act (CAA), as amended, is the primary federal law that governs air quality, while the California CAA is its companion state law. These laws, and related regulations by the U.S. Environmental Protection Agency (EPA) and California Air Resources Board (ARB), set standards for the concentration of pollutants in the air. At the federal level, these standards are called National Ambient Air Quality Standards (NAAQS). NAAQS and state ambient air quality standards have been established for six transportation-related criteria pollutants that have been linked to potential health concerns: carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), particulate matter (PM) which is broken down for regulatory purposes into particles of 10 micrometers or smaller (PM_{10}) and particles of 2.5 micrometers and smaller ($PM_{2.5}$), and sulfur dioxide (SO_2). In addition, national and state standards exist for lead (Pb), and state standards exist for visibility-reducing particles, sulfates, hydrogen sulfide (H_2S), and vinyl chloride. The NAAQS and state standards are set at levels that protect public health with a margin of safety and are subject to periodic review and revision. Both state and federal regulatory schemes also cover toxic air contaminants (TACs); some criteria pollutants are also TACs or may include certain TACs in their general definition.

Federal air quality standards and regulations provide the basic scheme for project-level air quality analysis under the National Environmental Policy Act (NEPA). In addition to this environmental analysis, a parallel “Conformity” requirement under the federal CAA also applies.

Conformity

The conformity requirement is based on federal CAA Section 176(c), which prohibits the U.S. Department of Transportation (DOT) and other federal agencies from funding, authorizing, or approving plans, programs, or projects that do not conform to State Implementation Plan (SIP) for attaining the NAAQS. “Transportation Conformity” applies to highway and transit projects and takes place on two levels: the regional—or planning and programming—level and the project level. The proposed project must conform at both levels to be approved.

Conformity requirements apply only in nonattainment and “maintenance” (former nonattainment) areas for the NAAQS, and only for the specific NAAQS that are or were violated. EPA regulations at 40 *Code of Federal Regulations* (CFR) 93 govern the conformity process. Conformity requirements do not apply in unclassifiable/ attainment areas for NAAQS and do not apply at all for state standards regardless of the status of the area.

Regional conformity is concerned with how well the regional transportation system supports plans for attaining the NAAQS for CO, NO_2, O_3, particulate matter (PM_{10} and $PM_{2.5}$), and in some areas (although not in California), SO_2. California has nonattainment or maintenance areas for all of these transportation-related “criteria pollutants” except SO_2, and also has a nonattainment area for Pb; however, Pb is not currently required by the federal CAA to be covered in transportation conformity analysis. Regional conformity is based on emission analysis of Regional Transportation Plans (RTPs) and Federal Transportation Improvement Programs (FTIPs) that include all transportation projects planned for a region over a period of at least 20 years for the RTP and 4 years for the FTIP. RTP and FTIP conformity uses travel demand and emission models to determine whether or not the implementation of those projects would conform to emission budgets or other tests at various analysis years showing that requirements of the CAA and the SIP are met. If the conformity analysis is successful, the Metropolitan Planning Organization (MPO), Federal Highway Administration (FHWA), and Federal Transit Administration (FTA) make determinations that the RTP and FTIP are in conformity with the SIP for achieving the goals of the CAA. Otherwise, the projects in the RTP and/or FTIP must be modified until conformity is attained. If the design concept, scope, and “open-to-traffic” schedule of a proposed transportation project are the same as described in the RTP and FTIP, then the proposed project meets regional conformity requirements for purposes of project-level analysis.

Conformity analysis at the project-level includes verification that the project is included in the regional conformity analysis and a “hot-spot” analysis if an area is “nonattainment” or “maintenance” for CO and/or particulate matter (PM_{10} or $PM_{2.5}$). A region is “nonattainment” if one or more of the monitoring stations in the region measures a violation of the relevant standard and EPA officially designates the area nonattainment. Areas that were previously designated as nonattainment areas but subsequently meet the standard may be officially redesignated to attainment by EPA and are then called “maintenance” areas. “Hot-spot” analysis is essentially the same, for technical purposes, as CO or PM analysis performed for NEPA purposes. Conformity does include some specific procedural and documentation standards for projects that require a hot-spot analysis. In general, projects must not cause the “hot-spot”-related standard to be violated and must not cause any increase in the number and severity of violations in nonattainment areas. If a known CO or PM violation is located in the project vicinity, the project must include measures to reduce or eliminate the existing violation(s) as well.

Affected Environment

Information in this section comes from the Air Quality Report (April 2016) for the project. Detailed analysis methodology, modeling files, and calculation worksheets can be found in the Air Quality Report.

Climate and Meteorology

The project site is located in the Mojave Desert Air Basin (MDAB) within the jurisdictional boundaries of the Antelope Valley Air Quality Management District (AVAQMD) and Mojave Desert Air Quality Management District (MDAQMD). The MDAB is comprised of four air districts; the Kern County Air Pollution Control District (APCD), the AVAQMD, the MDAQMD, and the eastern portion of the South Coast Air Quality Management District (SCAQMD). The AVAQMD covers the western portion of the proposed project in Los Angeles County, while the MDAQMD covers the eastern portion of the proposed project in San Bernardino County. The MDAQMD's boundaries encompass San Bernardino County's High Desert and the Blythe portion of Riverside County.

The climatological station from each jurisdictional area of the AVAQMD and MDAQMD that is closest to the project corridor are the Lancaster/Palmdale Station (#046624) and Victorville Station (#049325) maintained by the Western Regional Climate Center.

Los Angeles County's (AVAQMD/MDAB) Climate Conditions

The climate of the Antelope Valley is characterized by hot summers, mild winters, infrequent rainfall, moderate afternoon breezes, and generally fair weather. The most important weather pattern is associated with the daily onshore sea breeze, which funnels through Soledad Canyon into the upper desert to the north of the heavily developed portions of the Los Angeles Basin. This daily air flow brings polluted air into the area late in the afternoon from late spring to early fall.

Winds blow mainly from south to north and from west to east. These winds are moderately strong during the daytime, averaging from 10 to 13 miles per hour (mph), but they become light and variable at night. Daytime ventilation is very good, but there may be nocturnal stagnation. The primary Antelope Valley air quality concern is that there is a general transport of air from the polluted Los Angeles Basin through the Santa Clarita Valley, and then toward the normally cleaner upper desert, especially during the summer smog season.

In addition to winds that control the rate and direction of pollution dispersal, southern California is notorious for strong temperature inversions that limit the vertical depth through which pollution can be mixed. Inversions are layers in the atmosphere where the temperature increases with height instead of decreasing as is normal. Air starting onshore at the beach is relatively clean, but it becomes progressively more polluted as sources continue to add pollution from below without much dilution from above. Some dilution occurs in the thermal chimneys along the heated slopes of the San Gabriel Mountains, but not enough to prevent the intrusion of significantly polluted air into the Antelope Valley.

Hot summers, cold winters, and widely varying daily temperatures characterize the climate in the Antelope Valley. The annual average maximum temperature recorded from January 1981 to December 2010 at the Palmdale Station is 78.0 degrees Fahrenheit (°F), and the annual average minimum is 48.4°F, but it gets very hot on summer afternoons (close to or over 100°F) and quite cool on winter mornings (around 30°F).

Rainfall in the Antelope Valley area varies considerably in both space and time. Almost all of the annual rainfall comes from the fringes of mid-latitude storms from late November to early April, with summers often completely dry except for occasional widely scattered summer thundershowers. The Antelope Valley is located in a transition area between the semi-arid conditions of the Los Angeles Basin and the completely arid portions of the Mojave Desert. The annual average precipitation from January 1981 to December 2010 is recorded at 7.48 inches at the Palmdale Station. The Antelope Valley may occasionally experience a light winter snowfall.

San Bernardino County's (MDAQMD/MDAB) Climate Conditions

The High Desert is classified as an arid desert climate. In the Mojave Desert, this is modified by the San Bernardino and San Jacinto mountains forming barriers to prevent precipitation. The rain shadow causes the aridity of the High Desert climate, while leaving the summers hot and the winters generally mild.

Prevailing winds in the MDAB are out of the west and southwest. The MDAB is separated from the southern California coastal and central California valley regions by mountains (highest elevation approximately 10,000 feet), whose passes form the main channels for these winds.

There are two types of inversions affecting the High Desert. The first is the regional inversions caused by subsiding air within the high-pressure systems that dominate the summer weather. These subsidence inversions can occur at varying altitudes, with corresponding variable effects on the pollution levels. The lower the inversion level, the greater the concentration of pollutants results between it and the ground. The second type is the radiation inversion that forms when the ground cools rapidly after sunset, cooling the air immediately above it at the same time. Radiation inversions can cause significant concentrations of pollutants because they are generally only a few hundred feet above the ground and are strongest during the early morning commuting time. Especially in the desert, rapid heating of the ground usually disperses radiation inversions within an hour of sunrise.

Average high temperatures in summer are in the mid 90s to 100°F. Average low temperatures are in the mid 60s to 70s. Average high temperatures in winter are in the mid 50s, and average low temperatures are in the mid 30s. The annual average maximum temperature recorded from January 1981 to December 2010 at the Victorville Station is 77.5°F, and the annual average minimum is 43.8°F.

The Mojave Desert receives precipitation from winter cold fronts and moist southerly air masses during the late summer. Annual average precipitation for the same period is recorded at 5.56 inches at the Victorville Station. Summer thunderstorms bring highly variable amounts of localized rain.

Attainment Status

Criteria pollutants are defined as those pollutants for which the federal and state governments have established ambient air quality standards, or criteria, for outdoor concentrations to protect public health and prevent degradation of the environment. The standards for these pollutants are shown in Table 3.2.6-1.

Table 3.2.6-1 State and Federal Criteria Air Pollutant Standards

Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards [1]		National Standards [2]		
		Concentration [3]	Method [4]	Primary [3,5]	Secondary [3,6]	Method [7]
Ozone (O_3)[8]	1 Hour	0.09 ppm (180 $\mu g/m^3$)	Ultraviolet Photometry	—	Same as Primary Standard	Ultraviolet Photometry
	8 Hour	0.070 ppm (137 $\mu g/m^3$)		0.070 ppm (137 $\mu g/m^3$)		
Respirable Particulate Matter (PM10)[9]	24 Hour	50 $\mu g/m^3$	Gravimetric or Beta Attenuation	150 $\mu g/m^3$	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 $\mu g/m^3$		—		
Fine Particulate Matter (PM2.5)[9]	24 Hour	—	—	35 $\mu g/m^3$	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 $\mu g/m^3$	Gravimetric or Beta Attenuation	12.0 $\mu g/m^3$	15 $\mu g/m^3$	
Carbon Monoxide (CO)	1 Hour	20 ppm (23 mg/m^3)	Non-Dispersive Infrared Photometry (NDIR)	35 ppm (40 mg/m^3)	—	Non-Dispersive Infrared Photometry (NDIR)
	8 Hour	9.0 ppm (10 mg/m^3)		9 ppm (10 mg/m^3)	—	
	8 Hour (Lake Tahoe)	6 ppm (7 mg/m^3)		—	—	
Nitrogen Dioxide (NO_2)[10]	1 Hour	0.18 ppm (339 $\mu g/m^3$)	Gas Phase Chemiluminescence	100 ppb (188 $\mu g/m^3$)	—	Gas Phase Chemiluminescence
	Annual Arithmetic Mean	0.030 ppm (57 $\mu g/m^3$)		0.053 ppm (100 $\mu g/m^3$)	Same as Primary Standard	
Sulfur Dioxide (SO_2)[11]	1 Hour	0.25 ppm (655 $\mu g/m^3$)	Ultraviolet Fluorescence	75 ppb (196 $\mu g/m^3$)	—	Ultraviolet Flourescence; Spectrophotometry (Pararosaniline Method)
	3 Hour	—		—	0.5 ppm (1300 $\mu g/m^3$)	
	24 Hour	0.04 ppm (105 $\mu g/m^3$)		0.14 ppm (for certain areas)[10]	—	
	Annual Arithmetic Mean	—		0.030 ppm (for certain areas)[10]	—	
Lead[12,13]	30 Day Average	1.5 $\mu g/m^3$	Atomic Absorption	—	—	High Volume Sampler and Atomic Absorption
	Calendar Quarter	—		1.5 $\mu g/m^3$ (for certain areas)[12]	Same as Primary Standard	
	Rolling 3-Month Average	—		0.15 $\mu g/m^3$		
Visibility Reducing Particles[14]	8 Hour	See footnote 13	Beta Attenuation and Transmittance through Filter Tape	No National Standards		
Sulfates	24 Hour	25 $\mu g/m^3$	Ion Chromatography			
Hydrogen Sulfide	1 Hour	0.03 ppm (42 $\mu g/m^3$)	Ultraviolet Fluorescence			
Vinyl Chloride[12]	24 Hour	0.01 ppm (26 $\mu g/m^3$)	Gas Chromatography			

See footnotes on next page …

For more information please call ARB-PIO at (916) 322-2990

California Air Resources Board (10/1/15)

1. California standards for ozone, carbon monoxide (except 8-hour Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide, and particulate matter (PM10, PM2.5, and visibility reducing particles), are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

2. National standards (other than ozone, particulate matter, and those based on annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over three years, is equal to or less than the standard. For PM10, the 24 hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 $\mu g/m^3$ is equal to or less than one. For PM2.5, the 24 hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact the U.S. EPA for further clarification and current national policies.

3. Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

4. Any equivalent measurement method which can be shown to the satisfaction of the ARB to give equivalent results at or near the level of the air quality standard may be used.

5. National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.

6. National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

7. Reference method as described by the U.S. EPA. An "equivalent method" of measurement may be used but must have a "consistent relationship to the reference method" and must be approved by the U.S. EPA.

8. On October 1, 2015, the national 8-hour ozone primary and secondary standards were lowered from 0.075 to 0.070 ppm.

9. On December 14, 2012, the national annual PM2.5 primary standard was lowered from 15 $\mu g/m^3$ to 12.0 $\mu g/m^3$. The existing national 24-hour PM2.5 standards (primary and secondary) were retained at 35 $\mu g/m^3$, as was the annual secondary standard of 15 $\mu g/m^3$. The existing 24-hour PM10 standards (primary and secondary) of 150 $\mu g/m^3$ also were retained. The form of the annual primary and secondary standards is the annual mean, averaged over 3 years.

10. To attain the 1-hour national standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 ppb. Note that the national 1-hour standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the national 1-hour standard to the California standards the units can be converted from ppb to ppm. In this case, the national standard of 100 ppb is identical to 0.100 ppm.

11. On June 2, 2010, a new 1-hour SO_2 standard was established and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour national standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO_2 national standards (24-hour and annual) remain in effect until one year after an area is designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.

    Note that the 1-hour national standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the 1-hour national standard to the California standard the units can be converted to ppm. In this case, the national standard of 75 ppb is identical to 0.075 ppm.

12. The ARB has identified lead and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

13. The national standard for lead was revised on October 15, 2008 to a rolling 3-month average. The 1978 lead standard (1.5 $\mu g/m^3$ as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.

14. In 1989, the ARB converted both the general statewide 10-mile visibility standard and the Lake Tahoe 30-mile visibility standard to instrumental equivalents, which are "extinction of 0.23 per kilometer" and "extinction of 0.07 per kilometer" for the statewide and Lake Tahoe Air Basin standards, respectively.

For more information please call ARB-PIO at (916) 322-2990 **California Air Resources Board (10/1/15)**

As shown in Table 3.2.6-2, the MDAB within the AVAQMD (in the Los Angeles County portion) has been designated as nonattainment of the federal and state O_3 (8-hour) standards, as well as for the state PM_{10} standard. This area is unclassified or in attainment of the federal and state standards for CO; the federal standard for PM_{10}; and the federal and state standards for $PM_{2.5}$.

Table 3.2.6-2 Designations of Criteria Pollutants in the MDAB within the AVAQMD (Los Angeles County Portion)

Pollutants	Federal	State
O_3 (8-hour)	Nonattainment-Severe 15	Nonattainment
CO	Attainment	Attainment
PM_{10}	Unclassified/Attainment	Nonattainment
$PM_{2.5}$	Unclassified/Attainment	Unclassified/Attainment
NO_2	Unclassified/Attainment	Unclassified/Attainment

Notes:
1. The federal 1-hour ozone (O_3) standard was rescinded effective June 15, 2005, with implementation of the 8-hour standard.
2. Effective October 1, 2015, the national 8-hour O_3 primary and secondary standards were lowered from 0.075 to 0.070 parts per million (ppm).

Sources: http://pd.dot.ca.gov/env/air/html/areadesig/canafed_index.htm, http://www3.epa.gov/airquality/greenbk/ancl.html

As shown in Table 3.2.6-3, the MDAB within the MDAQMD (in the San Bernardino County portion) has been designated as nonattainment of the federal and state standards for O_3 (8-hour) and PM_{10}. This area is also in nonattainment of the state standard for $PM_{2.5}$. This area, however, is unclassified or in attainment of the federal and state standards for CO and federal standard for $PM_{2.5}$.

Table 3.2.6-3 Designations of Criteria Pollutants in the MDAB within the MDAQMD (San Bernardino County Portion)

Pollutants	Federal	State
O3 (8-hour)	Nonattainment-Severe 15	Nonattainment
CO	Attainment	Attainment
PM10	Nonattainment, Moderate	Nonattainment
PM2.5	Unclassified/Attainment	Nonattainment
NO2	Unclassified/Attainment	Unclassified/Attainment

Notes:
1. The federal 1-hour ozone (O_3) standard was rescinded effective June 15, 2005, with implementation of the 8-hour standard.
2. Effective October 1, 2015, the national 8-hour O_3 primary and secondary standards were lowered from 0.075 to 0.070 ppm.

Sources: http://pd.dot.ca.gov/env/air/html/areadesig/canafed_index.htm, http://www.epa.gov/region9/air/maps/pdfs/AIR1100018_7.pdf, http://www3.epa.gov/airquality/greenbk/ancl.html

The MDAB has an approved 2004 Ozone SIP (Attainment Plan) and an adopted 2008 8-hour Ozone SIP (Attainment Plan). The 2008 Ozone SIP was submitted in February

2008, but this plan has not been approved by EPA due to the region exceeding the federal 8-hour O_3 standards 14 days in that year.

Transportation conformity for O_3 is demonstrated by the project being listed in the currently conforming RTP and FTIP. The HDC Project is in the 2012 RTP Amendment 1 (Project Identification Numbers: 1C0404, LA962212, LA0G665, and SB20020144). The Southern California Association of Governments (SCAG) adopted the plan on April 4, 2012. FHWA and FTA made a conformity finding for the plan on June 4, 2012. The project is also included in SCAG's financially constrained 2013 FTIP No. 13-15, page 10 for Los Angeles County and page 8 for San Bernardino County. The SCAG 2013 FTIP was determined to conform by FHWA and FTA on December 18, 2013. The design concept and scope of the proposed project is consistent with the project description in the 2012 RTP, 2013 FTIP, and the "open to traffic" assumptions of the SCAG's regional emissions analysis.

Currently, the MDAB has two PM_{10} SIPs pending adequacy finding with no prior approval. The two PM_{10} SIPs are the 1995 PM_{10} SIP for MDAB (excluding Searles Valley) and the 1996 PM_{10} SIP for Searles Valley, which are still pending adequacy findings due to the different motor vehicle emissions not being combined into clearly defined budgets consistent with the federal conformity regulations. The MDAB is designated as a nonattainment area for the state PM_{10} and $PM_{2.5}$ standards.

Local Ambient Air Quality

The ARB and the AVAQMD and MDAQMD maintain a network of air quality monitoring stations located throughout the Basin. The nearest most representative air monitoring stations to the project site are the Lancaster/Palmdale Station (#046624) and Victorville Station (#049325) maintained by the Western Regional Climate Center. The Lancaster/Palmdale Station is approximately 1.3 miles east of State Route (SR) 14 and approximately 5 miles north of the proposed HDC alignment. The Victorville Station is located approximately 0.2 mile west of Interstate 15 (I-15) and 0.25 mile north of SR-18. All criteria pollutants except SO_2 are monitored at this station (i.e., O_3, CO, NO_2, PM_{10}, and $PM_{2.5}$). Figure 3.2.6-1 presents the location of these monitoring stations. Tables 3.2.6-4 and 3.2.6-5 present ambient air quality data that were recorded at these stations from 2007 through 2012. Tables 3.2.6-4 and 3.2.6-5 show the following trends in local ambient criteria pollutant concentrations:

- **Ozone –** The maximum 1-hour O_3 concentration recorded during the 2007 to 2012 period was 0.122 parts per million (ppm). During this period, the California standard of 0.09 ppm was exceeded between 11 and 22 times annually, with the highest number of exceedances recorded in 2009. The 8-hour O_3 national standard was never exceeded. The 8-hour O_3 standard state standard was exceeded every year, and the highest number of exceedances occurred in 2010.
- **Fine Particulate Matter ($PM_{2.5}$) –** During the recorded period of 2007 to 2012, the maximum 24-hour concentrations recorded was 50 micrograms per cubic meter ($\mu g/m^3$). During the 2007 to 2012 period, the national standard of 35 $\mu g/m^3$ was exceeded only once, in 2011.

Figure 3.2.6-1 Mojave Desert Air Basin Monitoring Stations

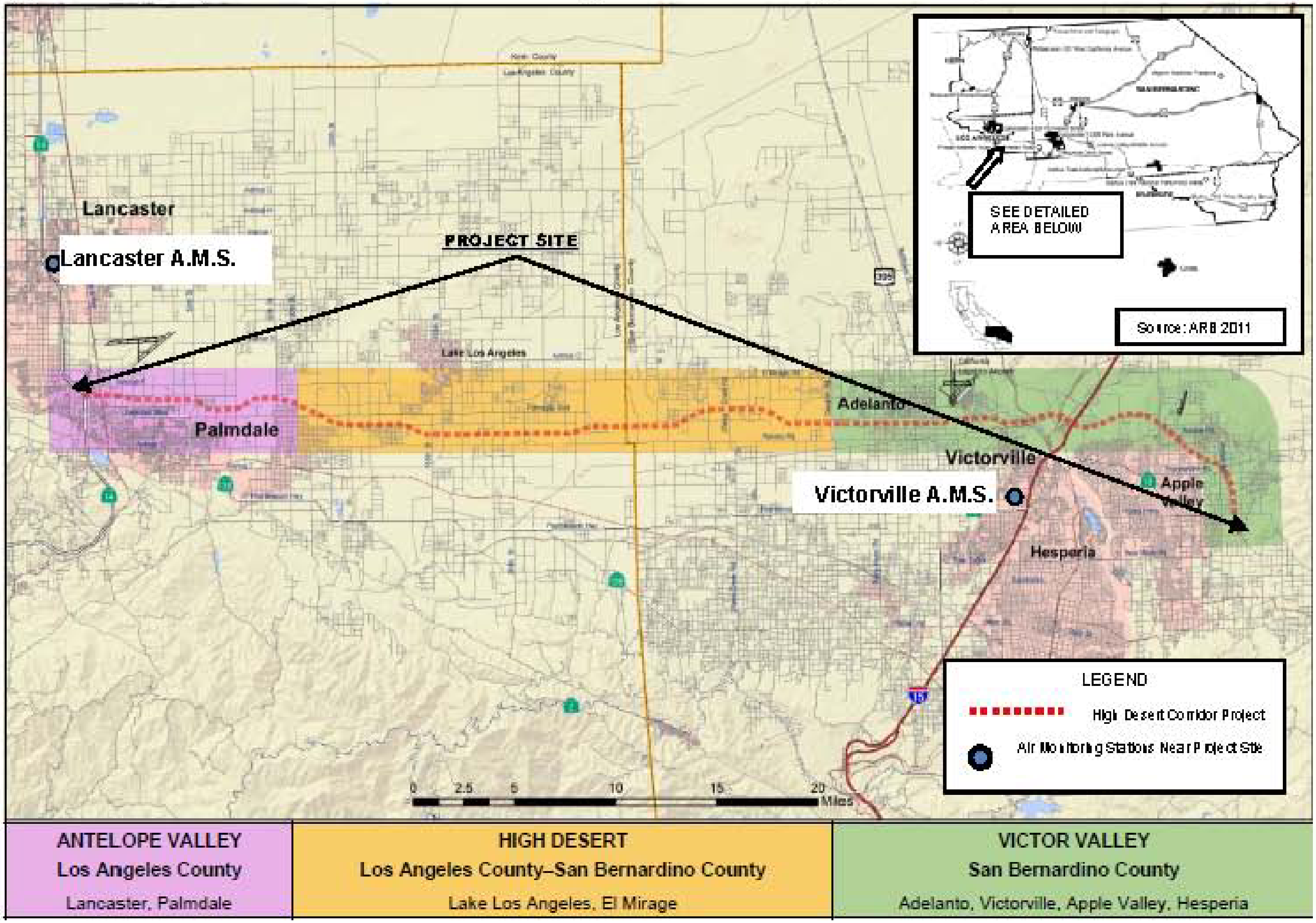


Table 3.2.6-4 Ambient Monitoring Data at Lancaster/Palmdale Station

Pollutant Standards	2011	2012	2013	2014	2015
1-Hour Ozone Concentration (ppm)					
Maximum 1-hour	0.115	0.112	0.108	0.101	0.132
1-hour California designation value	0.11	0.11	0.11	0.11	0.12
1-hour expected peak-day	0.113	0.108	0.112	0.107	0.116
Number of days standard exceeded[1]					
CAAQS 1-hour (> 0.09 ppm)	19	13	9	3	26
8-Hour Ozone Concentration (ppm)					
National maximum 8-hour	0.100	0.095	0.093	0.087	0.103
National second-highest 8-hour	0.098	0.089	0.092	0.086	0.102
State maximum 8-hour	0.100	0.096	0.094	0.088	0.103
State second-highest	0.098	0.089	0.094	0.087	0.103
8-hour national designation value	0.091	0.089	0.090	0.086	0.090
8-hour California designation value	0.102	0.098	0.100	0.096	0.102
8-hour expected peak-day	0.102	0.099	0.100	0.096	0.102
Number of days standard exceeded[1]					
NAAQS 8-hour (> 0.075 ppm)[7]	53	39	34	17	53
CAAQS 8-hour (> 0.070 ppm)	76	72	53	36	82
Carbon Monoxide (CO) Concentration (ppm)					
National[2] maximum 8-hour	1.3	1.4	1.2	10.6	*
National[2] second-highest 8-hour	1.2	1.3	1.1	10.5	*
California[3] maximum 8-hour	1.33	1.00	*	*	*
California[3] second-highest 8-hour	1.20	0.99	*	*	*
Maximum 1-hour	2.3	1.9	1.9	15.2	*
Second-highest 1-hour	1.6	1.8	1.8	14.8	*
Number of days standard exceeded[1]					
NAAQS 8-hour (> 9.0 ppm)	0	0	0	5	*
CAAQS 8-hour (> 9.0 ppm)	0	0	*	*	*
NAAQS 1-hour (> 35 ppm)	0	0	0	0	*
CAAQS 1-hour (> 20 ppm)	0	0	*	*	*
Particulate Matter (PM_{10})[4] Concentration (μg/m^3)					
National[2] maximum 24-hour	51	47.0	47	131	112.8
National[2] second-highest 24-hour	43	38.0	43	80	68.3
State[3] maximum 24-hour	49.0	43.0	173.4	*	*
State[3] second-highest 24-hour	40.0	35.0	68.7	*	*
National Annual Average	19.6	19.8	21.8	24.3	19.3
State annual average	*	18.5	*	*	*
Number of days standard exceeded[1]					
NAAQS 24-hour (> 150 μg/m^3)[6]	0	0	0	0	0
CAAQS 24-hour (> 50 μg/m^3)[6]	0	0	*	*	*

Table 3.2.6-4 Ambient Monitoring Data at Lancaster/Palmdale Station

Pollutant Standards	2011	2012	2013	2014	2015
Particulate Matter ($PM_{2.5}$) Concentration (µg/m^3)					
National[2] maximum 24-hour	50	14	11.9	42	10.4
National[2] second-highest 24-hour	13	10	10.5	27.9	9.8
State[3] maximum 24-hour	50.0	14.0	11.9	42.0	10.4
State[3] second-highest 24-hour	13.0	10.0	10.5	27.9	9.8
National annual designation value	*	*	*	*	*
National annual average	*	*	5.8	7.2	*
State annual designation value	8	*	*	*	*
State annual average[5]	*	*	*	*	*
Numbers of days standard exceeded[1]					
NAAQS 24-hour (> 35 µg/m^3)	1	0	0	1	0

Notes: CAAQS = California Ambient Air Quality Standards, NAAQS = National Ambient Air Quality Standards.
* = insufficient data available to determine the value.
1 An exceedance is not necessarily a violation.
2 National statistics are based on standard conditions data. In addition, national statistics are based on samplers, using federal reference or equivalent methods.
3 State statistics are based on local conditions data, except in the South Coast Air Basin; statistics there are based on standard conditions data. In addition, state statistics are based on California-approved samplers.
4 Measurements are usually collected every 6 days.
5 The state criteria for ensuring that the data are complete for calculating valid annual averages are more stringent than the national criteria.
6 Mathematical estimate of how many days concentrations would have been measured as higher than the level of the standard had each day been monitored.
7. The National standard changed in October 2015 from >0.075 ppm to >0.070 ppm.

Source: Air Quality Report, 2016.; California Air Resources Board ADAM database (http://www.arb.ca.gov/adam/); *and U.S. Environmental Protection Agency database Ihttp://www3.epa.gov/airdata/.*

Table 3.2.6-5 Ambient Monitoring Data at Victorville Station

Pollutant Standards	2011	2012	2013	2014	2015
1-Hour Ozone Concentration (ppm)					
Maximum 1-hour	0.098	0.111	0.120	0.122	0.132
1-hour California designation value	0.11	0.10	0.11	0.11	0.11
1-hour expected peak-day	0.105	0.103	0.105	0.105	0.109
Number of days standard exceeded[1]					
CAAQS 1-hour (> 0.09 ppm)	2	6	9	3	1
8-Hour Ozone Concentration (ppm)					
National maximum 8-hour	0.085	0.094	0.097	0.096	0.105
National second-highest 8-hour	0.082	0.090	0.093	0.094	0.100
State maximum 8-hour	0.085	0.095	0.097	0.097	0.106
State second-highest	0.083	0.090	0.093	0.094	0.100
8-hour national designation value	0.083	0.083	0.085	0.086	0.089
8-hour California designation value	0.093	0.093	0.095	0.097	0.100
8-hour expected peak-day	0.094	0.093	0.096	0.097	0.100
Number of days standard exceeded[1]					
NAAQS 8-hour (> 0.075 ppm)[7]	5	28	31	18	21
CAAQS 8-hour (> 0.070 ppm)	13	58	60	40	39

Table 3.2.6-5 Ambient Monitoring Data at Victorville Station

Pollutant Standards	2011	2012	2013	2014	2015
Carbon Monoxide (CO) Concentration (ppm)					
National[2] maximum 8-hour	1.5	1.8	0.9	9.2	*
National[2] second-highest 8-hour	1.5	1.5	0.9	7.8	*
California[3] maximum 8-hour	1.51	1.83	0.80	*	*
California[3] second-highest 8-hour	1.50	1.52	0.67	*	*
Maximum 1-hour	1.9	2.1	1.2	11.5	*
Second-highest 1-hour	1.8	1.9	1.1	11.1	*
Number of days standard exceeded[1]					
NAAQS 8-hour (> 9.0 ppm)	0	0	0	0	*
CAAQS 8-hour (> 9.0 ppm)	0	0	*	*	*
NAAQS 1-hour (> 35 ppm)	0	0	0	0	*
CAAQS 1-hour (> 20 ppm)	0	0	*	*	*
Particulate Matter (PM_{10})[4] Concentration ($\mu g/m^3$)					
National[2] maximum 24-hour	36.0	45.0	77.9	104	100.8
National[2] second-highest 24-hour	35.0	41.0	58.0	98	82.7
State[3] maximum 24-hour	34.0	40.0	70.6	*	*
State[3] second-highest 24-hour	33.0	40.0	52.8	*	*
National Annual Average	22.1	23.3	22.5	30.2	24.9
State annual average	20.2	*	*	*	*
Number of days standard exceeded[1]					
NAAQS 24-hour (> 150 $\mu g/m^3$)[6]	0	0	0	0	0
CAAQS 24-hour (> 50 $\mu g/m^3$)[6]	0	*	*	*	*
Particulate Matter ($PM_{2.5}$) Concentration ($\mu g/m^3$)					
National[2] maximum 24-hour	15.0	12.0	13.1	24	50.2
National[2] second-highest 24-hour	11.0	12.0	11.8	24	31.9
State[3] maximum 24-hour	16.0	12.0	13.8	24.1	50.2
State[3] second-highest 24-hour	12.0	12.0	12.7	24.1	32.3
National annual designation value	*	*	*	*	*
National annual average	*	*	*	*	6.6
State annual designation value	9	8	*	*	6
State annual average[5]	*	*	*	*	6.4
Numbers of days standard exceeded[1]					
NAAQS 24-hour (> 35 $\mu g/m^3$)	0	0	0	0	1

Notes: CAAQS = California Ambient Air Quality Standards, NAAQS = National Ambient Air Quality Standards.
* = insufficient data available to determine the value.
1 An exceedance is not necessarily a violation.
2 National statistics are based on standard conditions data. In addition, national statistics are based on samplers, using federal reference or equivalent methods.
3 State statistics are based on local conditions data, except in the South Coast Air Basin; statistics there are based on standard conditions data. In addition, state statistics are based on California-approved samplers.
4 Measurements are usually collected every 6 days.
5 The state criteria for ensuring that the data are complete for calculating valid annual averages are more stringent than the national criteria.
6 Mathematical estimate of how many days concentrations would have been measured as higher than the level of the standard had each day been monitored.
7. The National standard changed in October 2015 from >0.075 ppm to >0.070 ppm.

Source: Air Quality Report, 2016.; California Air Resources Board ADAM database (http://www.arb.ca.gov/adam/); *and U.S. Environmental Protection Agency database Ihttp://www3.epa.gov/airdata/.*

Mobile Sources Air Toxics

Controlling air toxic emissions became a national priority with passage of the federal CAA Amendments, whereby Congress mandated that EPA regulate 188 identified air toxics, also known as hazardous air pollutants. Mobile source air toxics (MSATs) are a subset of the 188 air toxics. The agency identified 7 compounds that have significant contributions from mobile sources (FHWA, 2006) that are among the national and regional-scale cancer risk drivers from their 1999 National Air Toxics Assessment (see the following Web site for more information: http://www.epa.gov/ttn/atw/nata1999/). The priority MSATs are acrolein, benzene, 1,3-butadiene, diesel particulate matter (DPM) plus diesel exhaust organic gases, formaldehyde, naphthalene, and polycyclic organic matter. While FHWA currently considers these to be the priority MSATs, the list is subject to change and may be adjusted in consideration of future EPA rules. Of these 7 pollutants, DPM, 1,3-butadiene, and benzene account for about 89 percent of the total toxic air pollutants responsible for potential excess cancer risk. DPM accounts for 71.2 percent of the total toxic air pollutants producing potential excess cancer risk. FHWA released interim guidance on February 3, 2006, to determine when and how to address MSAT impacts in the NEPA process for transportation projects. The guidance document was updated on December 6, 2012 (FHWA, 2012)[11]. FHWA has identified three levels of analysis:

- No analysis for exempt projects or projects with no potential for meaningful MSAT effects.
- Qualitative analysis for projects with low potential MSAT effects.
- Quantitative analysis to differentiate alternatives for projects with higher potential MSAT effects.

The HDC Project best fits into the last category. For projects warranting MSAT analysis, the seven priority MSATs should be analyzed.

Based on FHWA guidance, the HDC Project is a project with higher potential MSAT effects. This category includes projects that have the potential for meaningful differences among project alternatives. Only a limited number of projects meets this two-pronged test. To fall into this category, projects must:

- Create or significantly alter a major intermodal freight facility that has the potential to concentrate high levels of DPM in a single location; or
- Create new or add significant capacity to urban highways such as interstates, urban arterials, or urban collector-distributor routes with traffic volumes where the annual average daily traffic (AADT) is projected to be in the range of 140,000 to 150,000 or greater by the design year; and
- Be located near populated areas or in rural areas near concentrations of vulnerable populations (i.e., schools, nursing homes, hospitals).

[11] http://www.fhwa.dot.gov/environment/air_quality/air_toxics/policy_and_guidance/aqintguidmem.cfm (accessed August 11, 2014).

The HDC Project meets the second and third criteria above.

Several studies have concluded that mobile sources (i.e., on-road and non-road combined) are responsible for most of the excess cancer risk associated with exposure to urban air toxics. While much work has been done to assess the overall health risk of air toxics, many questions remain unanswered. Currently, the tools and techniques for assessing project-specific health impacts from MSATs are limited.

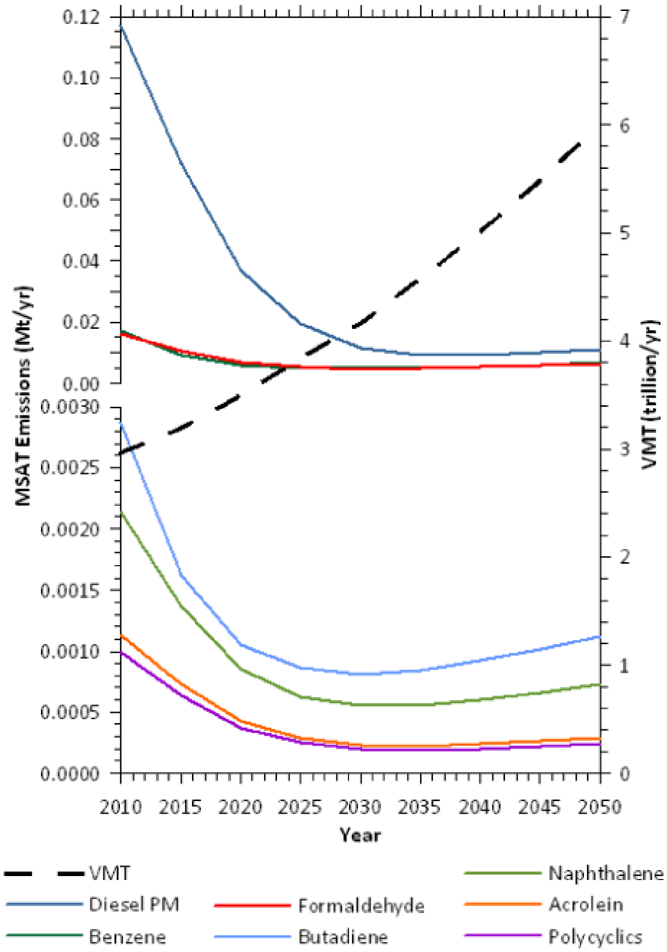
Furthermore, neither EPA nor ARB has established regulatory concentration targets for the seven relevant MSATs for use in the project development process. For the same reason, states are not required to achieve an identified level of air toxics in the ambient air or to identify air toxics reduction measures in the SIP. Developing strategies for reducing MSATs is a cooperative effort between federal and local authorized agencies.

The federal CAA provides EPA with the authority to establish and regulate emission standards for engines and vehicles. The State of California also has certain rights to adopt its own emission regulations, which are often more stringent than the federal rules. To reduce mobile source emissions, mandatory and incentive-based programs have been developed in conjunction with new engine emission regulations; additional emission testing requirements (i.e., supplemental emission test, not-to-exceed limits); and limiting fuel sulfur content. These programs are implemented by all levels of government: federal, state, and local. Currently, FHWA's interim guidance update is used to analyze potential impacts of MSATs to be included in environmental documents.

The 2007 EPA rule requires controls that will dramatically decrease MSAT emissions through cleaner fuels and cleaner engines. According to an FHWA analysis, using EPA's MOBILE 6.2 emission factors model, even if vehicle activity (vehicle miles traveled [VMT]) increases by 102 percent as assumed, a combined reduction of 83 percent in the total annual emission rate for the priority MSATs is projected from 2010 to 2050, as shown in Figure 3.2.6-2.

Based on FHWA's tiered approach in its interim guidance document, the project would be considered to have potential effects from MSAT emissions. The following analysis provides an assessment of the project's local effects from MSAT emissions. The analysis used projected traffic data, including peak and off-peak roadway traffic volumes and VMT, fleet mix, traffic diversion data, average speed, and associated changes in air toxics emissions from project alternatives.

Figure 3.2.6-2 Projected National Mobile Source Air Toxic Emissions Trends 2010 – 2050 for Vehicles Operating on Roadways using EPA's MOVES2010b Model



Note: Trends for specific locations may be different, depending on locally derived information representing VMT, vehicle speeds, vehicle mix, fuels, emission control programs, meteorology, and other factors.
Source: EPA MOVES2010b model runs conducted during May-June 2012 by FHWA.

Information for Project-Specific Mobile Source Air Toxics Impact Analysis

Available technical tools do not enable reliable predictions of the project-specific health impacts of the emission changes associated with the alternatives in this environmental document. Due to these limitations, the following discussion is included in accordance with the Council on Environmental Quality (CEQ) regulations (40 CFR 1502.22[b]) on incomplete or unavailable information.

Incomplete or Unavailable Information

When an agency is evaluating reasonably foreseeable significant adverse effects on the human environment in an Environmental Impact Statement (EIS) and there is incomplete or unavailable information, the agency shall always make clear that such information is lacking.

a. If the incomplete information relevant to reasonably foreseeable significant adverse impacts is essential to a reasoned choice among alternatives and the overall costs of obtaining it are not exorbitant, the agency shall include the information in the EIS.

b. If the information relevant to reasonably foreseeable significant adverse impacts cannot be obtained because the overall costs of obtaining it are exorbitant or the means to obtain it are not known, the agency shall include within the EIS:

   1. A statement that such information is incomplete or unavailable;
   2. A statement of the relevance of the incomplete or unavailable information to evaluating reasonably foreseeable significant adverse impacts on the human environment;
   3. A summary of existing credible scientific evidence which is relevant to evaluating the reasonably foreseeable significant adverse impacts on the human environment; and
   4. The agency's evaluation of such impacts based upon theoretical approaches or research methods generally accepted in the scientific community. For the purposes of this section, "reasonably foreseeable" includes impacts that have catastrophic consequences, even if their probability of occurrence is low, provided that the analysis of the impacts is supported by credible scientific evidence, is not based on pure conjecture, and is within the rule of reason.

c. The amended regulation will be applicable to all EISs for which a Notice to Intent (40 CFR 1508.22) is published in the *Federal Register* on or after May 27, 1986. For EISs in progress, agencies may choose to comply with the requirements of either the original or amended regulation.

Incomplete or Unavailable Information for Project-Specific MSAT Health Impacts Analysis

In FHWA's view, information is incomplete or unavailable to credibly predict the project-specific health impacts due to changes in MSAT emissions associated with a proposed set of highway alternatives. The outcome of such an assessment, adverse or not, would be influenced more by the uncertainty introduced into the process through assumption and speculation rather than any genuine insight into the actual health impacts directly attributable to MSAT exposure associated with a proposed action.

EPA is responsible for protecting the public health and welfare from any known or anticipated effect of an air pollutant. They are the lead authority for administering the CAA and its amendments and have specific statutory obligations with respect to hazardous air pollutants and MSAT. EPA is in the continual process of assessing human health effects, exposures, and risks posed by air pollutants. They maintain the Integrated Risk Information System (IRIS), which is "a compilation of electronic reports on specific substances found in the environment and their potential to cause human health effects" (EPA, http://www.epa.gov/iris/). Each report contains assessments of noncancerous and cancerous effects for individual compounds and quantitative estimates of risk levels from lifetime oral and inhalation exposures with uncertainty spanning perhaps an order of magnitude.

Other organizations are also active in the research and analyses of the human health effects of MSAT, including the Health Effects Institute (HEI). Two HEI studies are summarized in Appendix D of FHWA's Interim Guidance Update on Mobile Source Air Toxic Analysis in NEPA documents. Among the adverse health effects linked to MSAT compounds at high exposures are cancer in humans in occupational settings; cancer in animals; and irritation to the respiratory tract, including the exacerbation of asthma. Less obvious is the adverse human health effects of MSAT compounds at current environmental concentrations (HEI, http://pubs.healtheffects.org/view.php?id=282) or in the future as vehicle emissions substantially decrease (HEI, http://pubs.healtheffects.org/view.php?id=306).

The methodologies for forecasting health impacts include emissions modeling; dispersion modeling; exposure modeling; and then final determination of health impacts – each step in the process building on the model predictions obtained in the previous step. All are encumbered by technical shortcomings or uncertain science that prevents a more complete differentiation of the MSAT health impacts among a set of project alternatives. These difficulties are magnified for lifetime (i.e., 70-year) assessments, particularly because unsupportable assumptions would have to be made regarding changes in travel patterns and vehicle technology (which affects emissions rates) over that time frame, because such information is unavailable.

It is particularly difficult to reliably forecast 70-year lifetime MSAT concentrations and exposure near roadways; to determine the portion of time that people are actually exposed at a specific location; and to establish the extent attributable to a proposed action, especially given that some of the information needed is unavailable.

There are considerable uncertainties associated with the existing estimates of toxicity of the various MSAT, because of factors such as low-dose extrapolation and translation of occupational exposure data to the general population, a concern expressed by HEI (http://pubs.healtheffects.org/view.php?id=282). As a result, there is no national consensus on air dose-response values assumed to protect the public health and welfare for MSAT compounds, and in particular for DPM. EPA (http://www.epa.gov/risk/basicinformation.htm#g) and HEI (http://pubs.healtheffects.org/getfile.php?u=395) have not established a basis for quantitative risk assessment of DPM in ambient settings.

There is also the lack of a national consensus on an acceptable level of risk. The current context is the process used by EPA as provided by the CAA to determine whether more stringent controls are required to provide an ample margin of safety to protect public health or to prevent an adverse environmental effect for industrial sources subject to the maximum achievable control technology standards, such as benzene emissions from refineries. The decision framework is a two-step process. The first step requires EPA to determine an "acceptable" level of risk due to emissions from a source, which is generally no greater than approximately 100 in a million. Additional factors are considered in the second step, the goal of which is to maximize the number of people with risks less than 1 in a million due to emissions from a source. The results of this statutory two-step process do not guarantee that cancer risks from exposure to air toxics are less than 1 in a million; in some cases, the residual risk determination could result in maximum individual cancer risks that are as high as approximately 100 in a million. In a June 2008 decision, the U.S. Court of Appeals for the District of Columbia Circuit upheld EPA's approach to addressing risk in its two-step decision framework. Information is incomplete or unavailable to establish that even the largest of highway projects would result in levels of risk greater than deemed acceptable.

Because of the limitations in the methodologies for forecasting health impacts described, any predicted difference in health impacts between alternatives is likely to be much smaller than the uncertainties associated with predicting the impacts. Consequently, the results of such assessments would not be useful to decision makers, who would need to weigh this information against project benefits, such as reducing traffic congestion, accident rates, and fatalities plus improved access for emergency response, that are better suited for quantitative analysis.

Due to the limitations cited, a discussion (reflecting any local and project-specific circumstances), should be included regarding incomplete or unavailable information in accordance with CEQ regulations [40 CFR 1502.22(b)].

Naturally Occurring Asbestos

Asbestos is a term used for several types of naturally occurring fibrous minerals that are a human health hazard when airborne. The most common type of asbestos is chrysotile, but other types, such as tremolite and actinolite, are also found in California. Asbestos is classified as a known human carcinogen by state, federal, and international agencies and was identified as a TAC by ARB in 1986. All types of asbestos are hazardous and may cause lung disease and cancer.

Asbestos can be released from serpentinite and ultramafic rocks when the rock is broken or crushed. At the point of release, the asbestos fibers may become airborne, causing air quality and human health hazards. These rocks have been commonly used for unpaved gravel roads, landscaping, fill projects and other improvement projects in some localities. Asbestos may be released to the atmosphere due to vehicular traffic on unpaved roads, during grading for development projects, and at quarry operations. All of these activities may have the effect of releasing potentially harmful asbestos into the air. Natural weathering and erosion processes can act on asbestos bearing rock and make it easier for asbestos fibers to become airborne if such rock is disturbed. Serpentinite may contain chrysotile asbestos, especially near fault zones. Ultramafic rock, a rock closely related to serpentinite, may also contain asbestos minerals. Asbestos can also be associated with other rock types in California, though much less frequently than serpentinite and/or ultramafic rock. Serpentinite and/or ultramafic rock are known to be present in 44 of California's 58 counties. These rocks are particularly abundant in the counties of the Sierra Nevada foothills, the Klamath Mountains, and Coast Ranges. The California Department of Conservation, Division of Mines and Geology have developed a map of the state showing the general location of ultramafic rock in the state. Los Angeles County is one of the counties identified as containing serpentinite and ultramafic rock. However, only the Catalina Island portion of Los Angeles County has been found to contain such rock; therefore, it is not anticipated to be found in the project area.

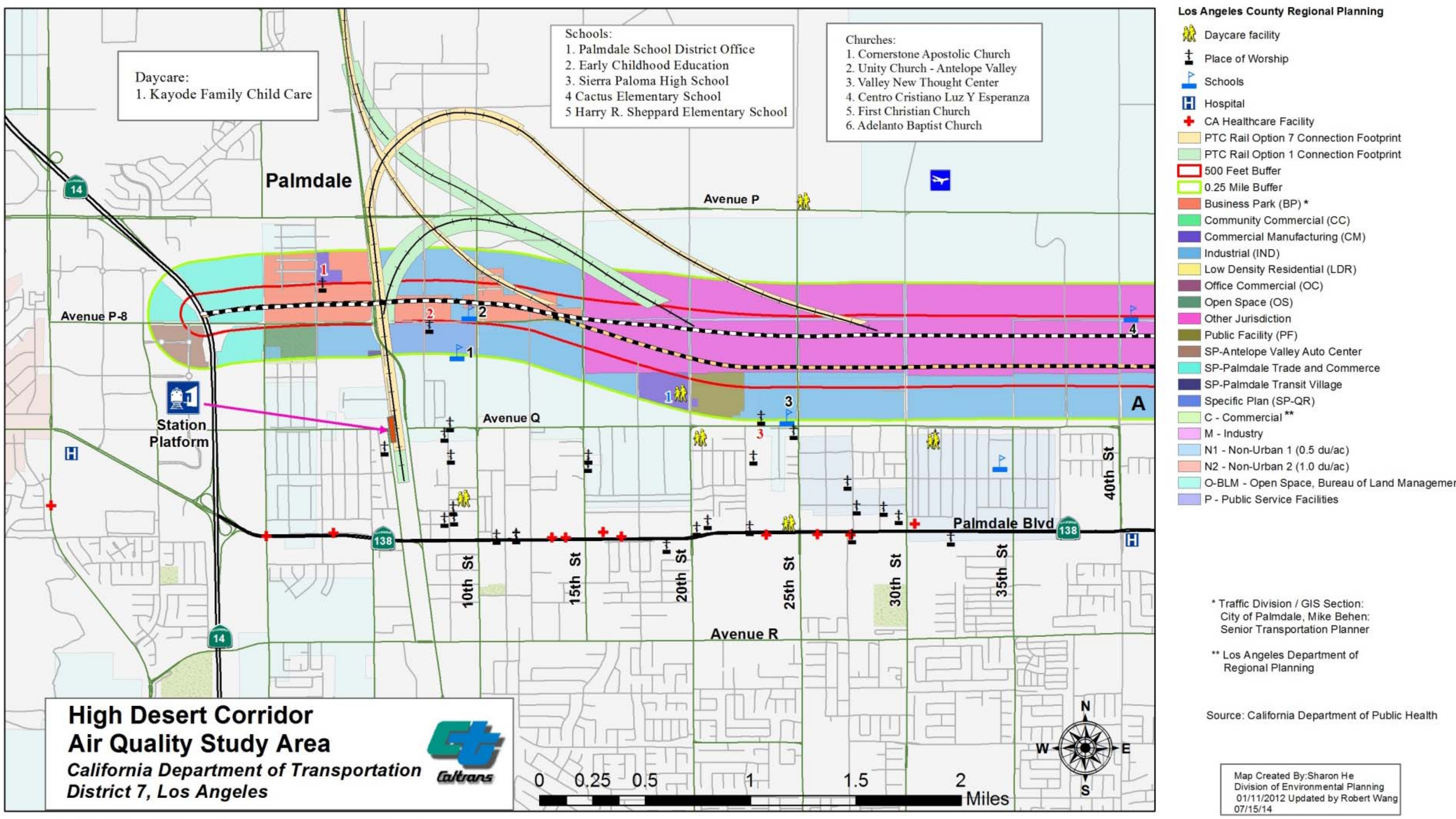
Other Asbestos-Containing Materials

The use of asbestos in many building products was banned by EPA by the late 1970s. Those already in use when the ban was implemented may still be present in bridge joints or in structural materials. ACMs represent a concern when they are subject to damage that results in the release of fibers. Asbestos may be found in roadway materials such as rails, bearing pads, support piers, expansion joint material in bridges, asphalt, and concrete within the study area.

Sensitive Receptors

Figures 3.2.6-3 through 3.2.6-14 show the sensitive receptors in the proposed project area.

Figure 3.2.6-3 Sensitive Receptors, Part 1 (within 500 feet and 0.25 mile of Project Corridor)



File Path: G:\Shared\GIS\Routes\LA-138\EA\27330K\HDC MAPS\Air Quality

Figure 3.2.6-4 Sensitive Receptors, Part 2 (within 500 feet and 0.25 mile of Project Corridor)

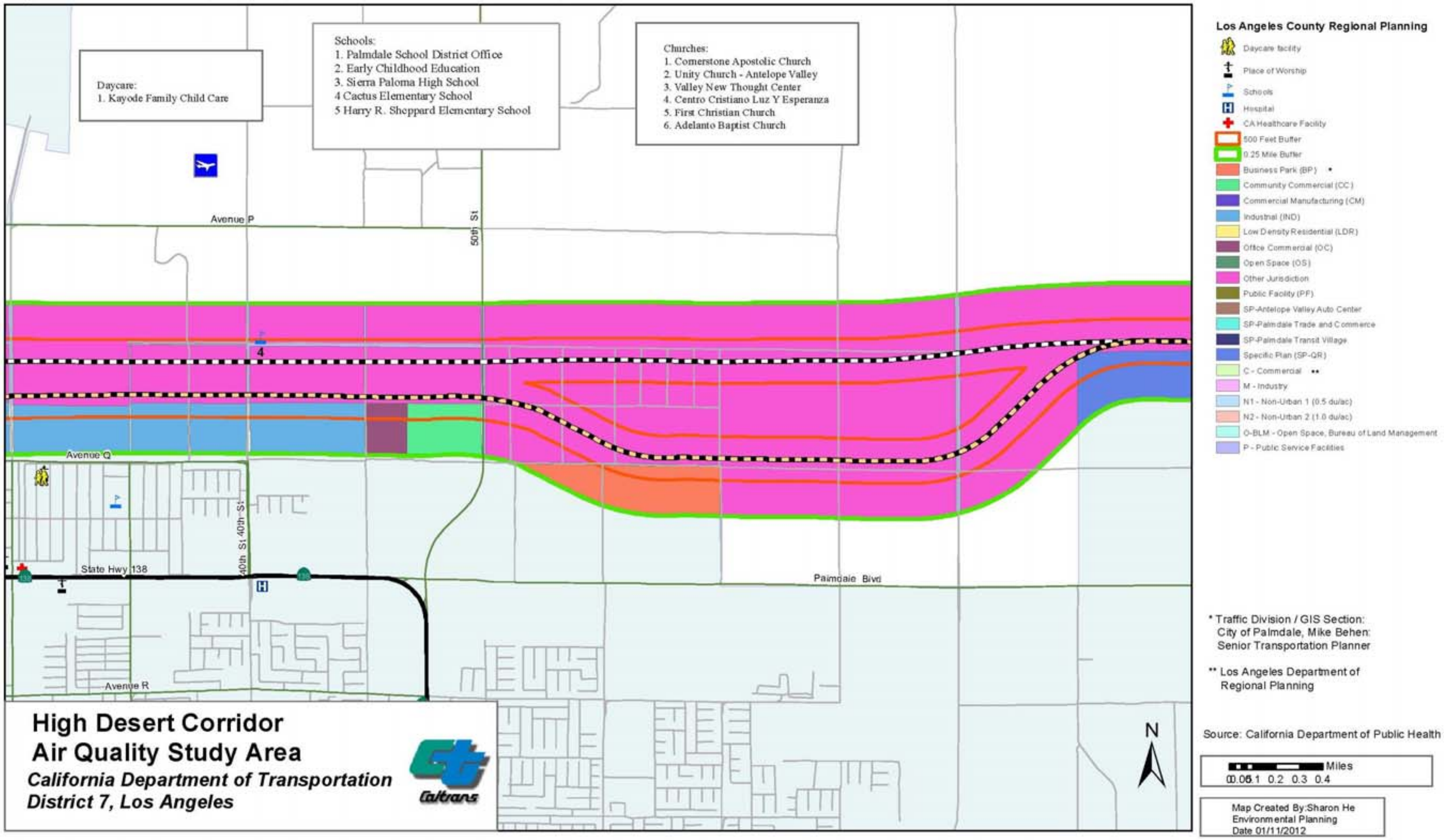


Figure 3.2.6-5 Sensitive Receptors, Part 3 (within 500 feet and 0.25 mile of Project Corridor)

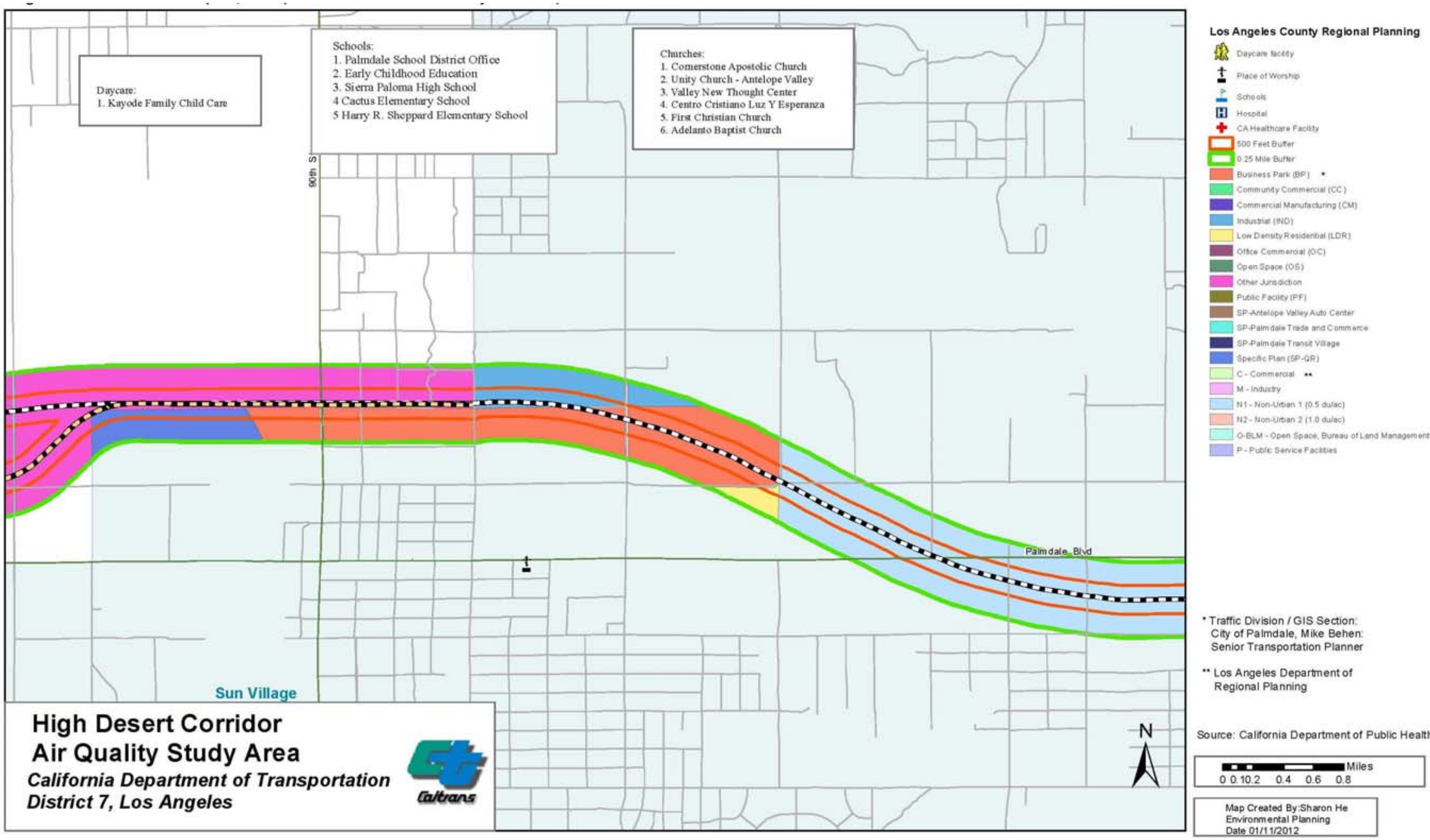


Figure 3.2.6-6 Sensitive Receptors, Part 4 (within 500 feet and 0.25 mile of Project Corridor)

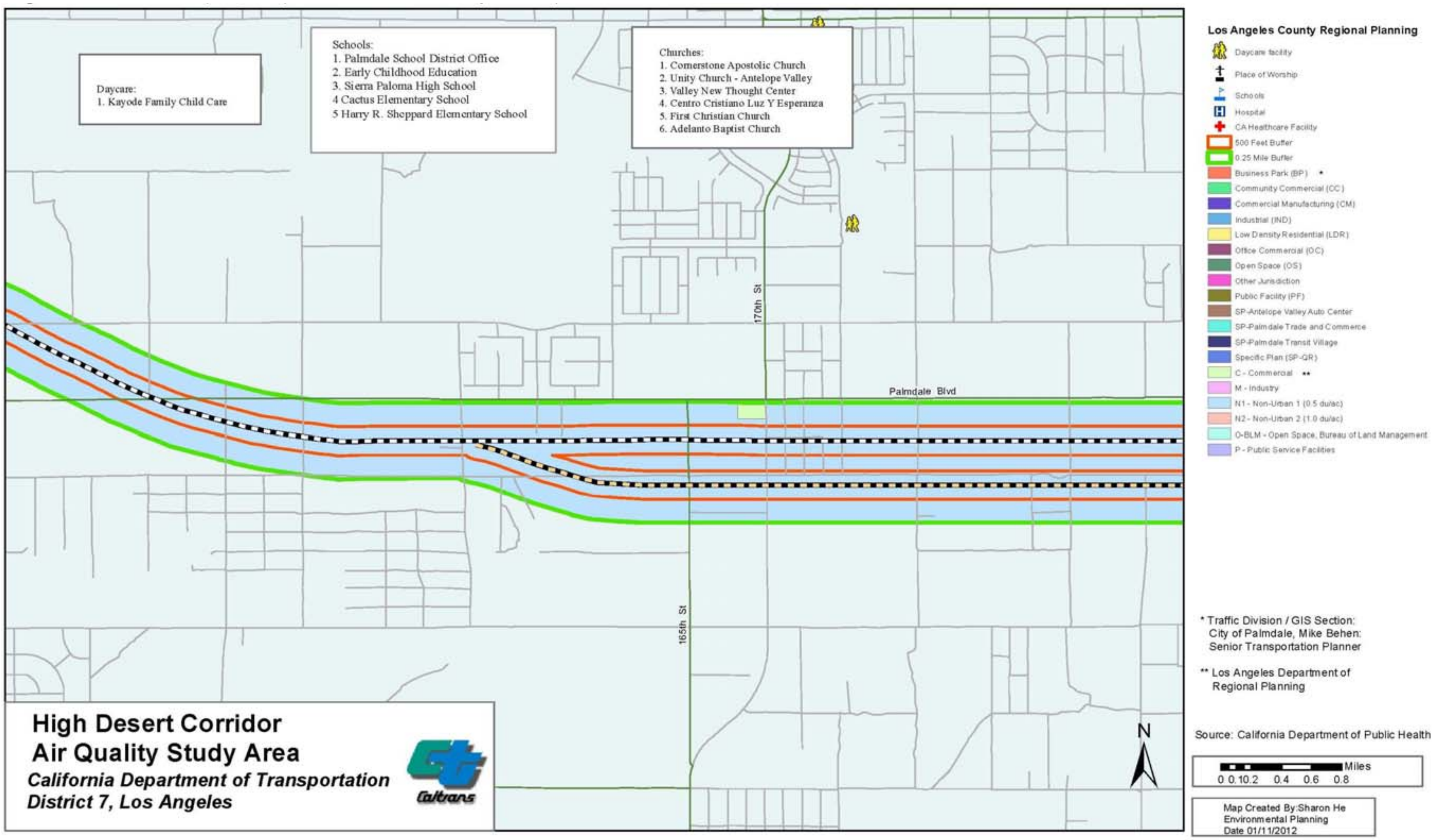


Figure 3.2.6-7 Sensitive Receptors, Part 5 (within 500 feet and 0.25 mile of Project Corridor)

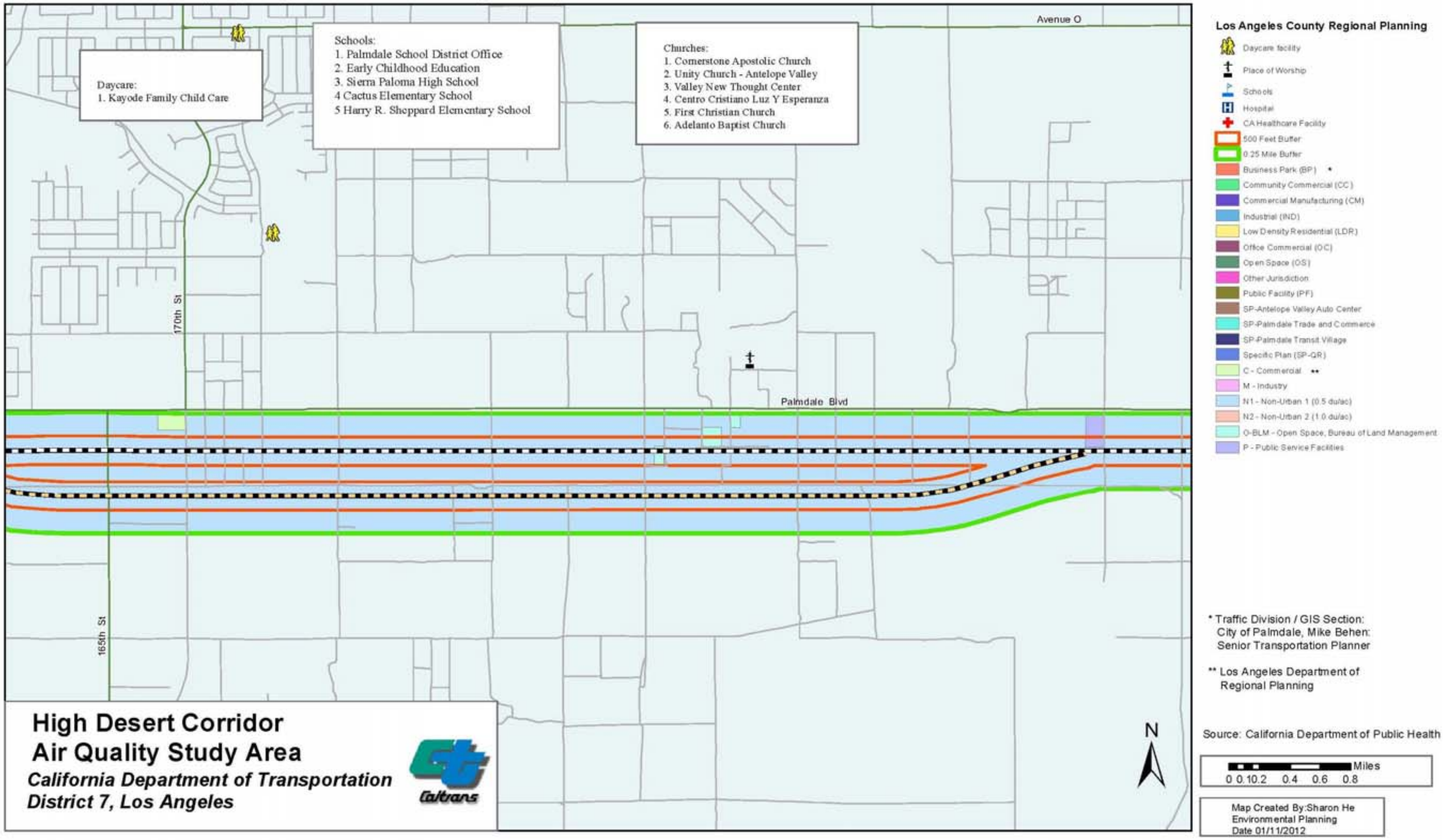


Figure 3.2.6-8 Sensitive Receptors, Part 6 (within 500 feet and 0.25 mile of Project Corridor)

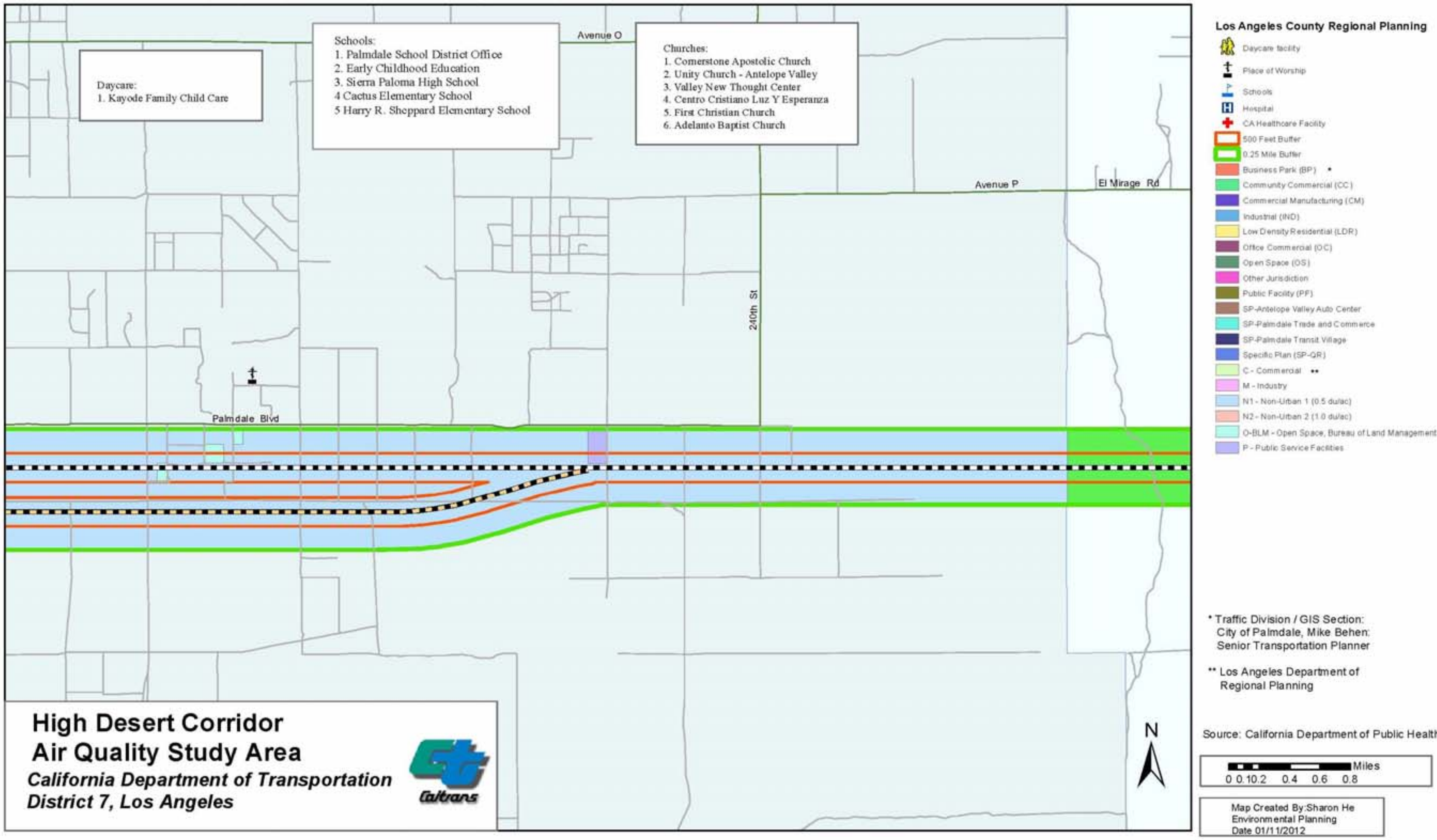


Figure 3.2.6-9 Sensitive Receptors, Part 7 (within 500 feet and 0.25 mile of Project Corridor)

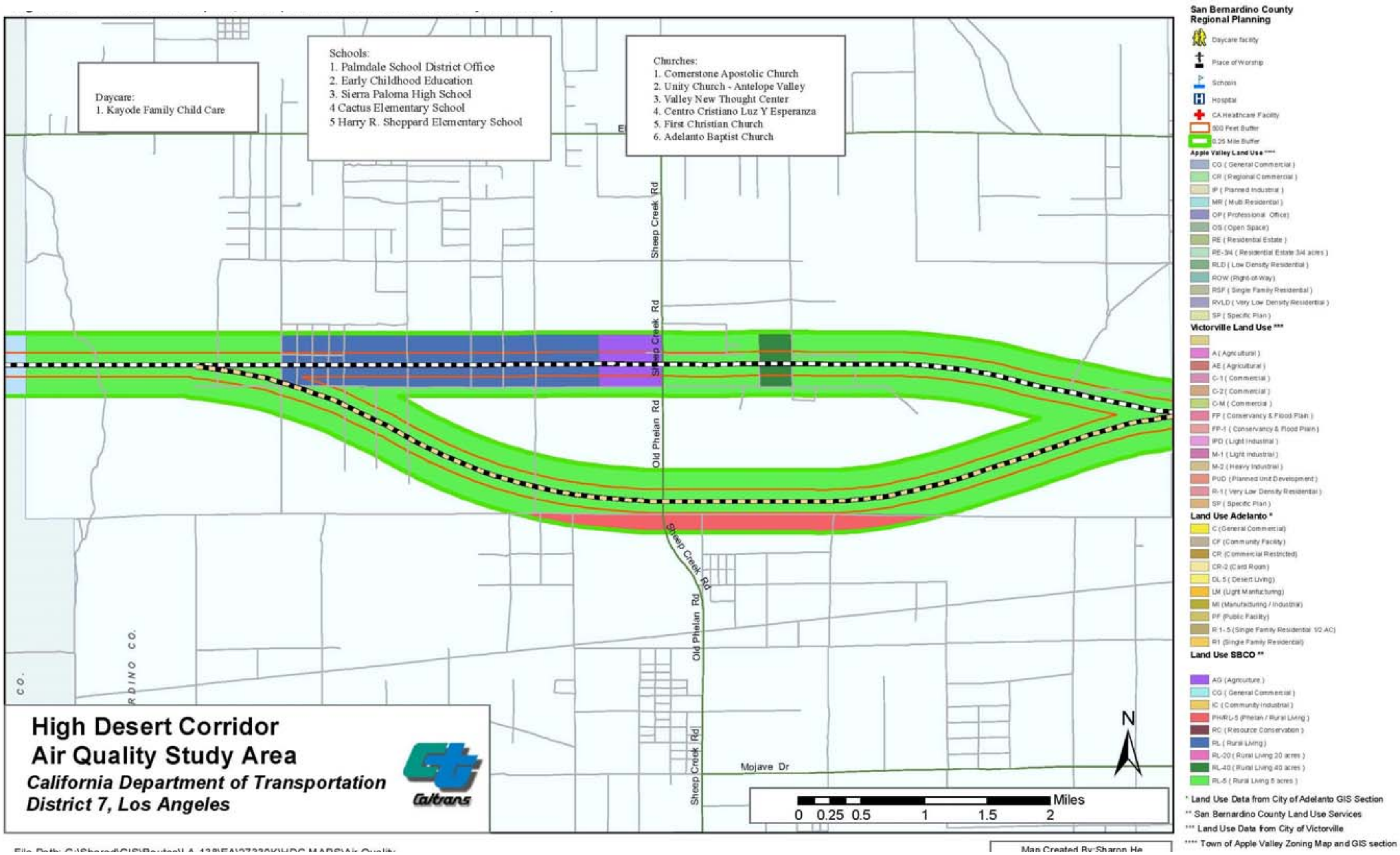


Figure 3.2.6-10 Sensitive Receptors, Part 8 (within 500 feet and 0.25 mile of Project Corridor)

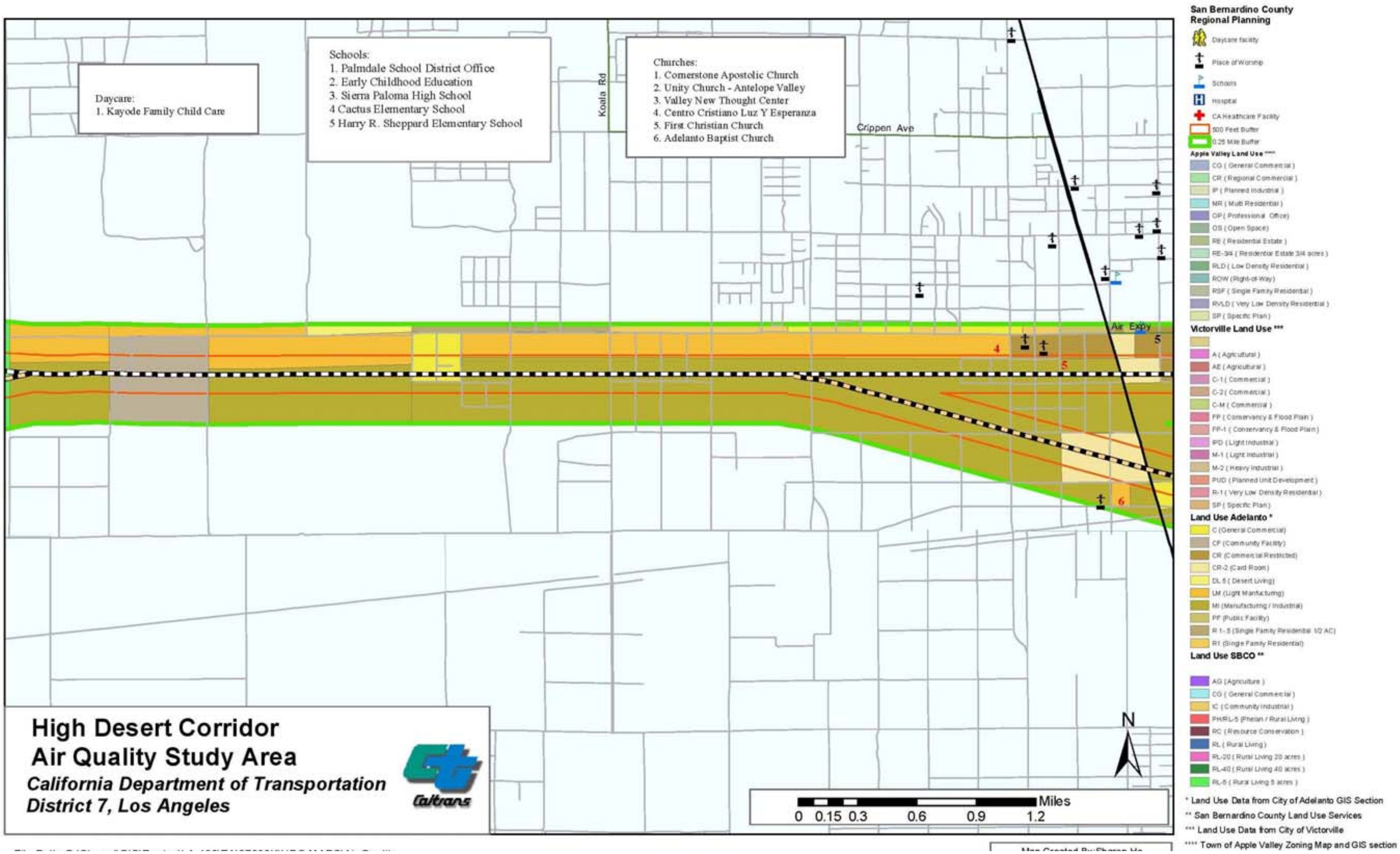


Figure 3.2.6-11 Sensitive Receptors, Part 9 (within 500 feet and 0.25 mile of Project Corridor)

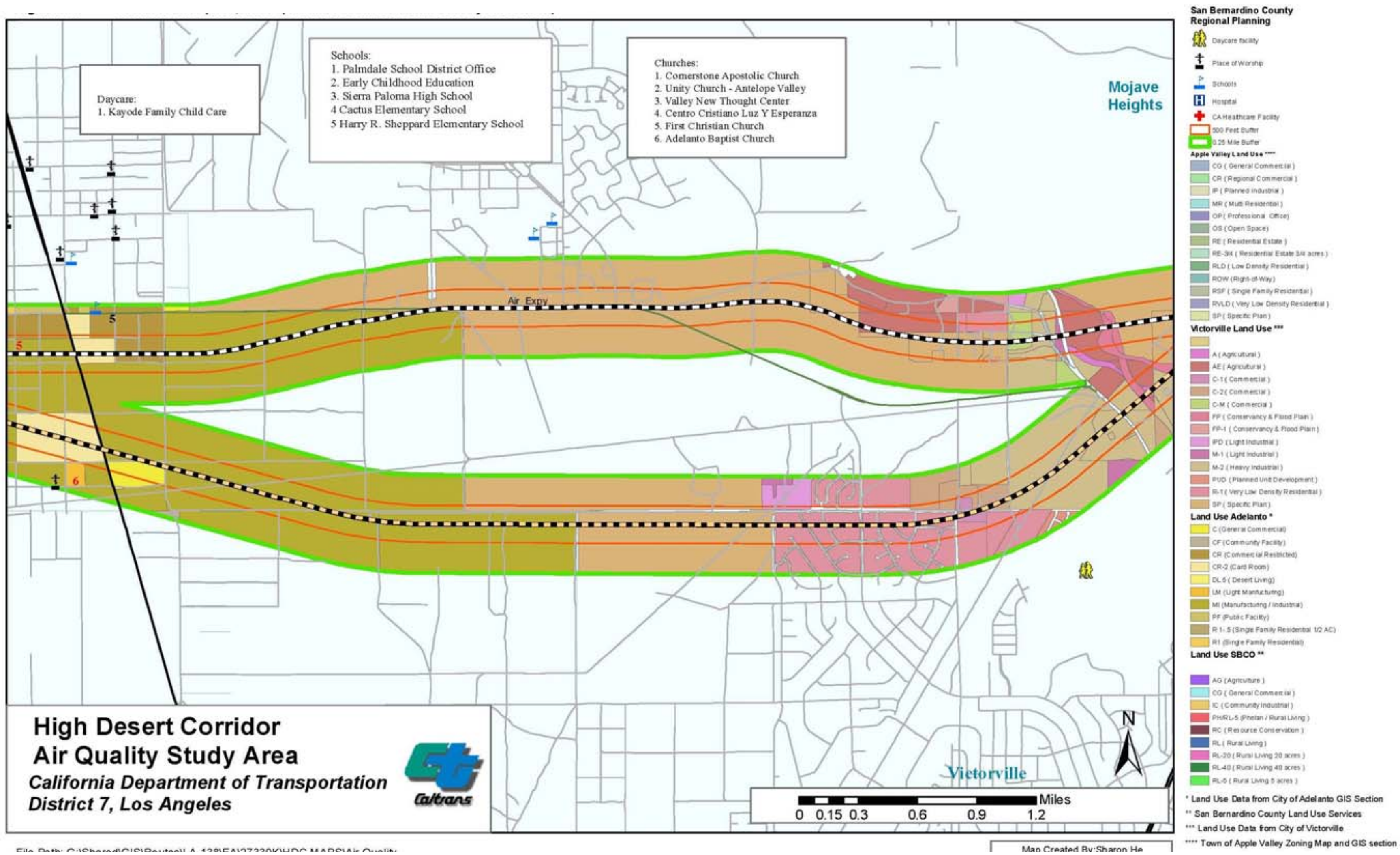


Figure 3.2.6-12 Sensitive Receptors, Part 10 (within 500 feet and 0.25 mile of Project Corridor)

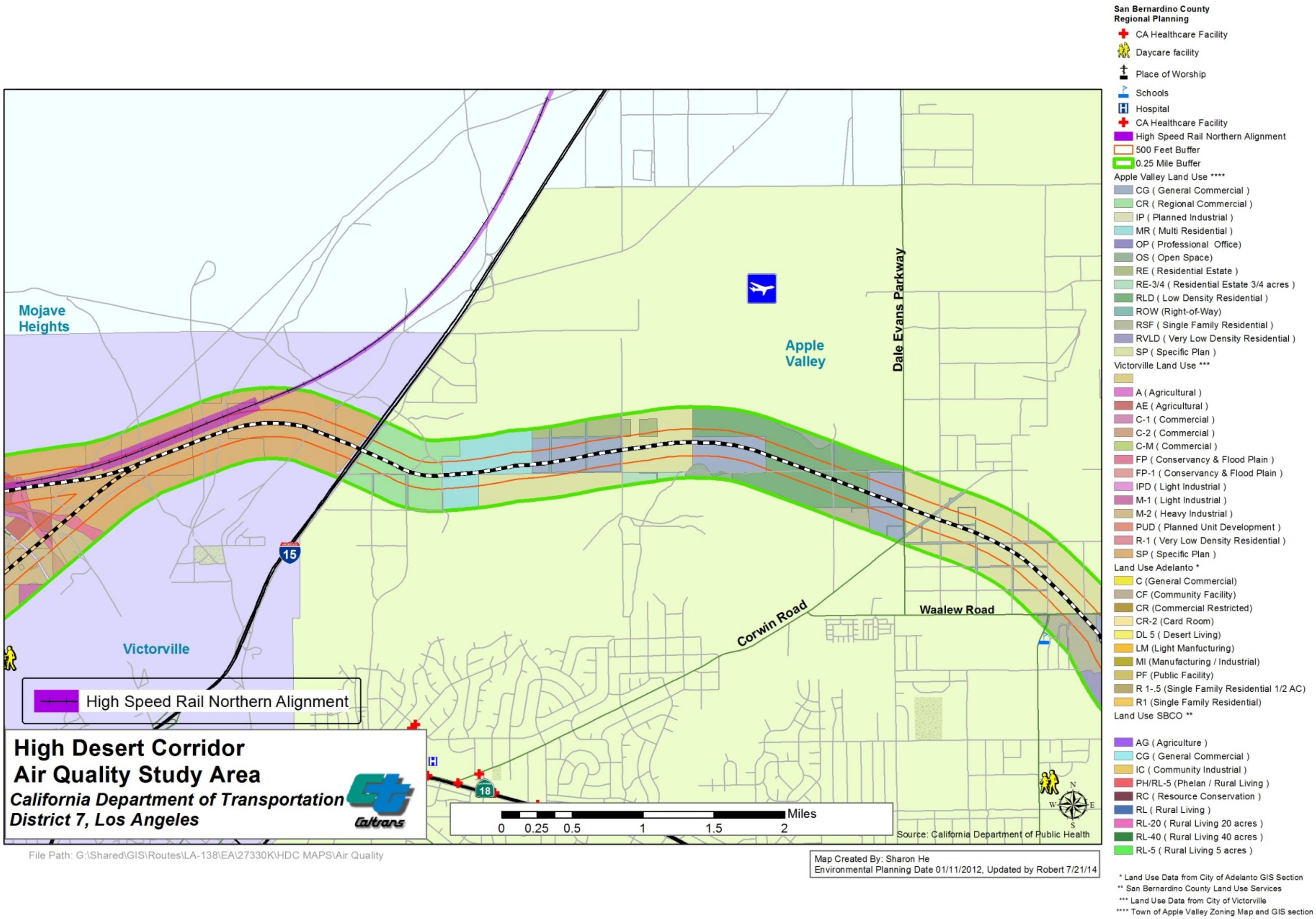


Figure 3.2.6-13 Sensitive Receptors, Part 11 (within 500 feet and 0.25 mile of Project Corridor)

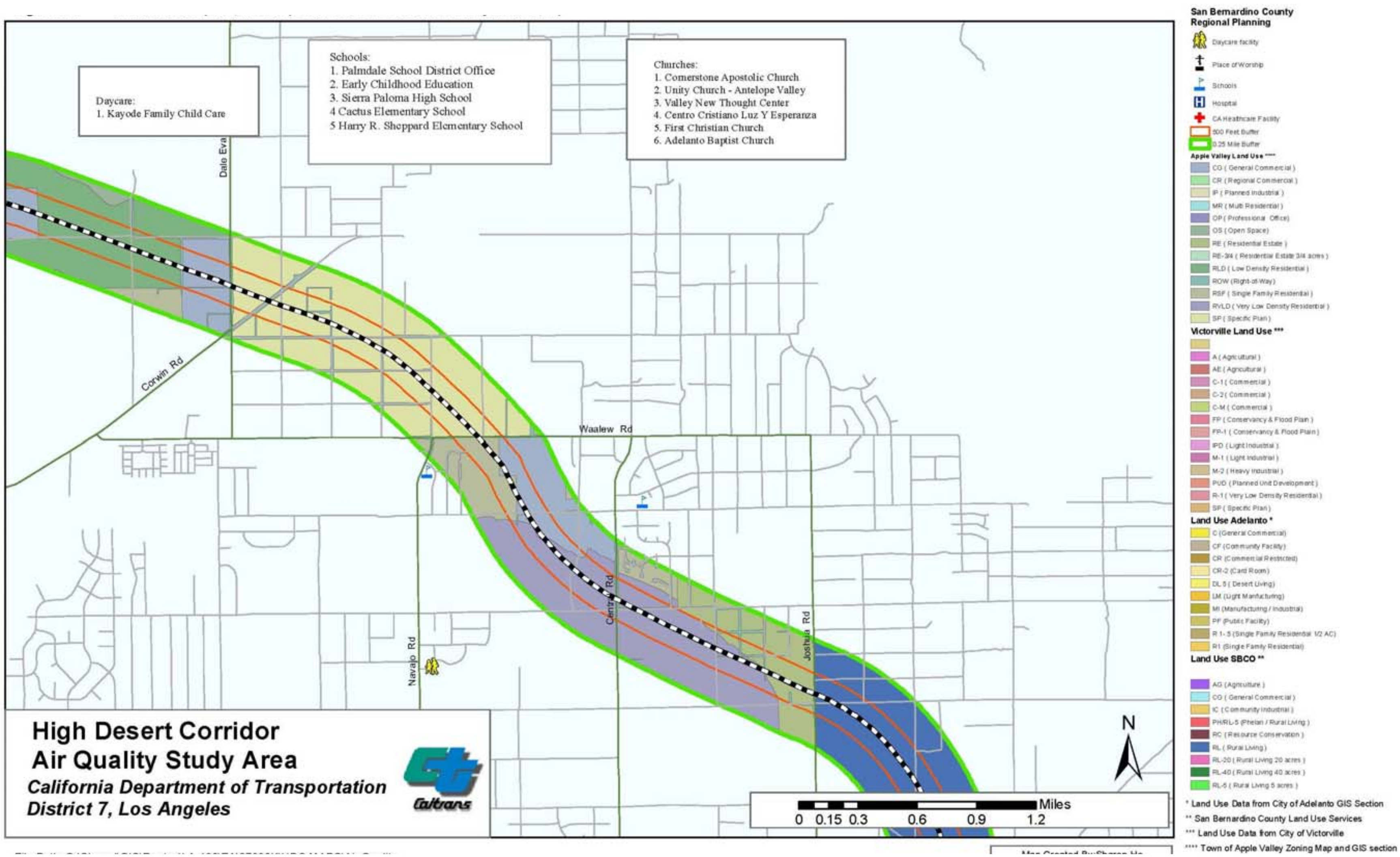
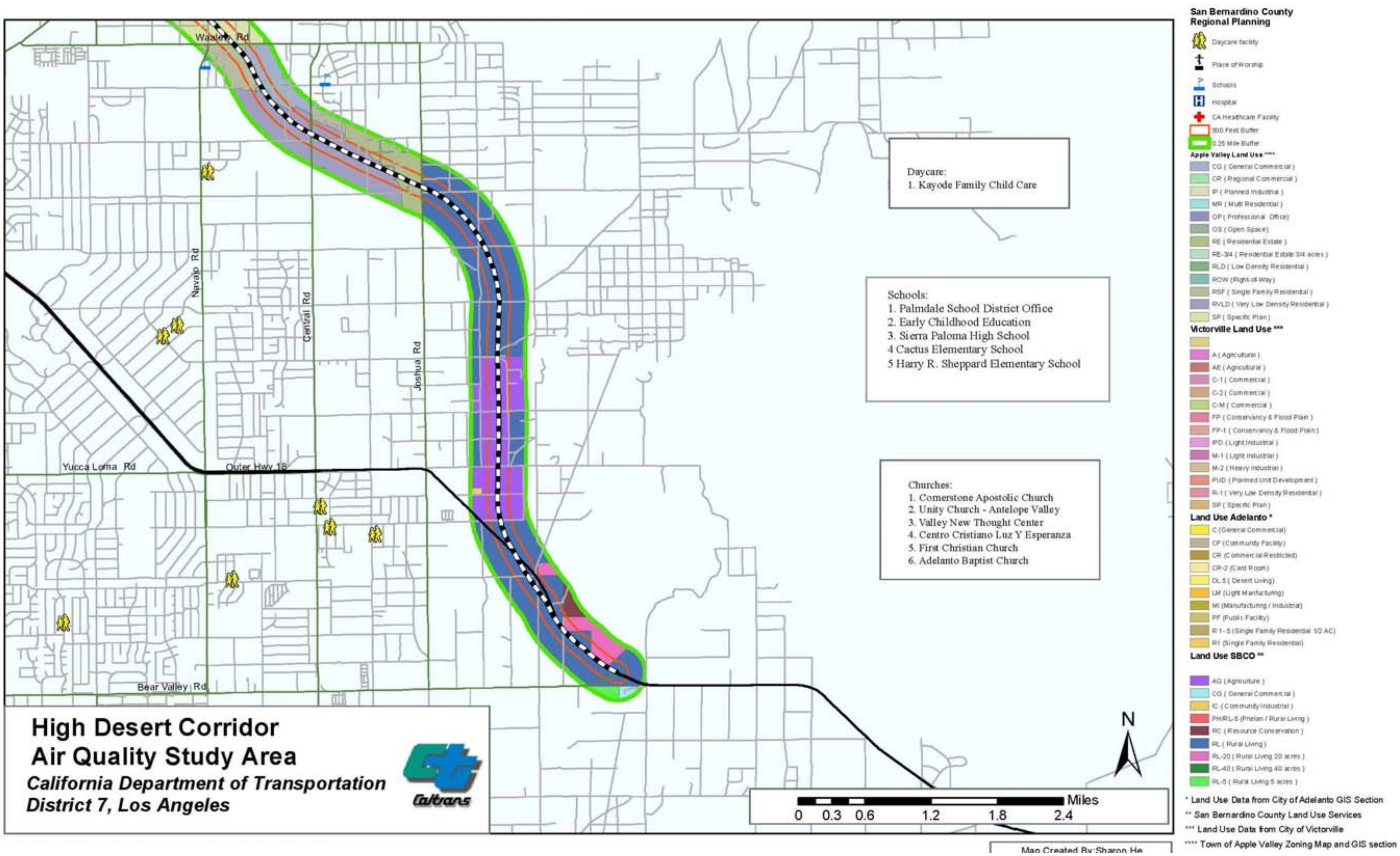


Figure 3.2.6-14 Sensitive Receptors, Part 12 (within 500 feet and 0.25 mile of Project Corridor)



Environmental Consequences

This section discusses long-term impacts on air quality in terms of regional air quality conformity and project-level conformity. Temporary impacts associated with construction of the project are addressed in Section 3.6, Construction Impacts.

No Build Alternative

The No Build Alternative would not make any project improvements; therefore, no analysis of improvements would be required. However, this alternative would potentially be inconsistent with regional plans and programs such as the 2012 RTP/Sustainable Communities Strategy (SCS) and 2013 FTIP because the project would not be constructed as approved in the RTP for the area.

Common to All Build Alternatives

Regional Air Quality Conformity

In determining whether a project conforms to an approved air quality plan, agencies must use current emission estimates based on the most recent population, employment, travel, and congestion estimates determined by SCAG. As the MPO for the region, SCAG is required to develop and maintain long-range plans and programs, such as 20-year RTP and 4-year (or longer) Regional Transportation Improvement Program (RTIP) that set out transportation policies and programs for the region. A conforming RTIP model projects that the regulated pollutants will be reduced to acceptable levels within time frames that meet the NAAQS.

The proposed project is listed in the 2012 financially constrained RTP Amendment No. 1, which was found to conform by SCAG on April 4, 2012, and FHWA and FTA made a regional conformity determination finding on June 4, 2012. The project is also included in SCAG's financially constrained 2013 FTIP No. 13-15, page 10 for Los Angeles County and page 8 for San Bernardino County. The SCAG 2013 FTIP was determined to conform by FHWA and FTA on December 18, 2013. The design concept and scope of the proposed project is consistent with the project description in the 2012 RTP, 2013 FTIP, and the "open to traffic" assumptions of SCAG's regional emissions analysis.

Project-Level Conformity

The MDAB within the project area is federally designated as a nonattainment area for the following standards: 8-hour O_3 for both AVAQMD and MDAQMD areas, and 24-hour PM_{10} for MDAQMD area only. The basin is designated as an attainment area for federal and state CO standards. A project-level transportation conformity determination is required for the project for those criteria pollutants that are currently in nonattainment of the federal standards. Project-level transportation conformity is thus demonstrated with a PM_{10} hot-spot analysis.

To meet conformity requirements, a project-level hot-spot analysis is required under EPA's Transportation Conformity Rule for projects of local air quality concern. Section 40 CFR 93.123(b)(1) of the Transportation Conformity Rule defines types of projects that are considered projects of local air quality concern, including the following:

- New or expanded highway projects that have a significant number of or significant increase in diesel vehicles.
- Projects affecting intersections that are at level of service (LOS) D, E, or F with a significant number of diesel vehicles, or those that will change to LOS D, E, or F because of increased traffic volumes from a significant number of diesel vehicles related to the project.

The HDC Project falls within the category of new or expanded highway projects with a significant number of diesel vehicles; therefore, the project would be considered as a project of local air quality concern. Based on the current and forecast traffic data, the new HDC is projected to experience a significant increase in diesel vehicles and to carry a significant number of diesel vehicles. The project is therefore considered to be of air quality concern as described in 40 CFR 93.123 (b)(l)(i) and requires a detailed conformity hot-spot analysis.

Discussion of Results from Carbon Monoxide Hot-Spot Analysis Common to all Build Alternatives

Localized CO impacts from the project build alternatives were evaluated following the 1997 Caltrans guidance document titled Transportation Project-Level Carbon Monoxide Protocol. A quantitative hot-spot analysis was done at two intersections that would have the highest traffic volume and the worst peak-hour LOS according to the Air Quality Report (April 2016). The intersections were selected based on their travel activity data.

Localized concentrations of CO were estimated for the year 2040 using the CALINE4 dispersion model (developed by Caltrans), in conjunction with emission factors from the ARB emission factor model EMFAC2011.

Background CO concentrations were taken from the Lancaster/Palmdale Station (#046624) and Victorville Station (#049325) maintained by the Western Regional Climate Center. The Lancaster/Palmdale Station is located approximately 1.3 miles east of SR-14 and approximately 5 miles north of the proposed HDC alignment. The Victorville Station is located approximately 0.2 mile west of I-15 and 0.25 mile north SR-18. Because the air basin is in attainment for CO standards, using the average ambient concentrations during the past 3 years at these monitoring stations is appropriate for background concentrations for future years, as well as the existing condition.

Results of localized CO analysis are shown in Table 3.2.6-6. According to the results in Table 3.2.6-6, the proposed project build alternatives would result in concentrations less than the federal and State standards and would not create violations of the standards at the project intersections in which the worst-case CO impacts are anticipated within the project area in Los Angeles and San Bernardino counties.

Table 3.2.6-6 8-Hour CO Concentrations for Build Condition

Intersection	Distance from Edge of Travel Way (Meters)		8-Hour CO Concentration (Modeled + Background in ppm)	8-Hour Exceeds Standards? State	8-Hour Exceeds Standards? Federal
10th Street West and West Avenue P in Los Angeles County	Receptor 1	3	1.4	No	No
	Receptor 2	3	1.6	No	No
	Receptor 3	3	1.6	No	No
	Receptor 4	3	1.4	No	No
SR-18 and Armargosa Road in San Bernardino County	Receptor 1	3	4.6	No	No
	Receptor 2	3	4.7	No	No
	Receptor 3	3	4.6	No	No
	Receptor 4	3	4.8	No	No
Ambient 8-hour standards: State = 9.0 ppm; Federal = 9 ppm					

Source: Air Quality Report 2016.

As Table 3.2.6-6 shows, the project build alternatives would not have a considerable impact on 8-hour local CO concentrations at the intersections with the highest traffic volumes. No substantial adverse effect is expected to occur at any other locations in the study area. The project would not contribute to a violation of standards, and project-level CO conformity would be satisfied.

Particulate Matter Conformity Hot-Spot Analysis and General Discussion of Results from Modeling

EPA's Transportation Conformity Rule (40 CFR Parts 51.390 and Part 93, March 2012) addresses local air quality impacts in PM (PM_{10} and $PM_{2.5}$) federal nonattainment and maintenance areas. The rule provides criteria and procedures to ensure that any such project will not cause or contribute to new violations, increase the frequency or severity of any existing violations, or delay the timely attainment of the relevant NAAQS as described in 40 CFR Part 93.101. In March 2006, EPA issued a guidance document with a methodology for qualitative PM analysis. The qualitative analysis is required effective March 10, 2006. The qualitative analysis requires analysis based on EPA's Transportation Conformity Guidance for Qualitative Hot-Spot Analyses in Particulate Matter ($PM_{2.5}$ and PM_{10}) Nonattainment and Maintenance Areas.

Methodology

Hot-spot analyses were conducted in accordance with *EPA's Transportation Conformity Guidance for Quantitative Hot-Spot Analyses in $PM_{2.5}$ and PM_{10} Nonattainment and Maintenance Areas* (EPA Guidance, November 2013).

This quantitative PM hot-spot analysis was prepared based on the build alternative that comprises of the most complete set of proposed project features, including the toll program and rail system, to demonstrate conformity; and furthermore, emissions of $PM_{2.5}$ and PM_{10} were estimated for all alternatives based on the forecast travel activity data and emission factors generated from the latest EPA-approved emissions model, EMFAC2011. The demonstration of conformity requirements would be updated after the preferred alternative is selected. While emissions analysis for all alternatives is discussed separately, the results of the conformity hot-spot analysis, as well as quantitative analysis, are provided below.

While the American Meteorological Society/EPA Regulatory Model (AERMOD) is the EPA's recommended model, Section 3.2 of Appendix W to 40 CFR Part 51 provides applicable guidance with which an EPA's Regional Office may determine the acceptability of alternative models such as some commercial Graphical User Interface (GUI) versions of AERMOD. The quantitative analysis for the proposed project was prepared using the AERMOD View Message Passing Interface by Lakes Environmental (Lakes AERMOD View MPI). Prior to the use of the Lakes AERMOD View MPI, Caltrans coordinated with EPA Region 9 Office and Model Clearinghouse and satisfactorily demonstrated that the Lakes AERMOD View MPI produced concentration estimates equivalent to those obtained using EPA's standard AERMOD for all types of sources typically used in dispersion modeling and those used in the hot-spot analysis.

According to the conformity rules and regulations, nonattainment and maintenance areas are required to attain and maintain applicable NAAQS. San Bernardino County is in nonattainment of the 24-hour PM_{10} NAAQS, while both Los Angeles and San Bernardino counties are in attainment of 24-hour $PM_{2.5}$ and annual $PM_{2.5}$ NAAQS. The Antelope Valley portion of Los Angeles County in which the proposed project area is located is in attainment of the 24-hour PM_{10} NAAQS. A hot-spot analysis to demonstrate conformity to the 24-hour PM_{10} NAAQS was thus prepared under a separate cover for the portion of the proposed project in San Bernardino County and was submitted to the interagency consultation for their review and concurrence. The interagency consultation within the SCAG area is conducted as the Transportation Conformity Working Group (TCWG). As noted in Section 5.3, the TCWG is comprised of agencies including SCAG, Caltrans, EPA, FHWA, air districts, ARB, and regional transportation agencies that are involved with maintaining conformity and improving air quality in southern California.

The TCWG reviewed and provided comments in April 2014. The hot-spot analysis was revised to address the comments and submitted to the TCWG in May 2014; and it was concurred with by the TCWG in June 2014. The hot-spot analysis for the preferred alternative was updated and finalized in mid 2015 and was submitted to the TCWG for review. The TCWG provided its concurrence with the hot-spot analysis in its September 2015 monthly meeting (FHWA provided its concurrence in October 2015). Appendix F of the Air Quality Report provides a Quantitative PM_{10} Hot-Spot Analysis as submitted to and concurred with by the TCWG in September 2015. As indicated in Appendix F of the Air Quality Report, the conformity requirement has been demonstrated, and the project is deemed acceptable for circulation to the public.

In addition to the demonstration of conformity requirement for the 24-hour PM_{10} NAAQS, design concentrations (or Design Value) of 24-hour $PM_{2.5}$ and annual $PM_{2.5}$ were calculated at hot-spot locations in San Bernardino and Los Angeles counties, as shown in Tables 3.2.6-7 and 3.2.6-8.

Table 3.2.6-7 Design Values at Hot-Spot Locations in Los Angeles and San Bernardino Counties in 2020

Project Area	24-Hour PM_{10} (µg/m^3)	24-Hour $PM_{2.5}$ (µg/m^3)	Annual $PM_{2.5}$ (µg/m^3)
Los Angeles County	70	32	9.2
San Bernardino County	80	27	12.8

Source: Air Quality Report 2016.

Table 3.2.6-8 Design Values at Hot-Spot Locations in Los Angeles and San Bernardino Counties in 2040

Project Area	24-Hour PM_{10} (µg/m^3)	24-Hour $PM_{2.5}$ (µg/m^3)	Annual $PM_{2.5}$ (µg/m^3)
Los Angeles County	70	33	9.8
San Bernardino County	90	29	13.6

Source: Air Quality Report 2016.

The AERMOD estimates ground-level concentrations at a series of receptors placed in the model. For this hot-spot analysis, a line of receptors was placed at the right-of-way (ROW) line, and layers of receptors were placed subsequently at every 10 meters up to 50 meters from the ROW line; and at 50 meters up to 250 meters from the ROW line. All receptors were placed around a hot-spot location in Los Angeles and San Bernardino counties, each identified from model runs of the entire corridor with FASTALL option. The location and spacing of receptor placement for the hot-spot analysis was determined according to the EPA Guidance.

The EPA Guidance notes that design values are a fundamental component of PM analyses because they are the values compared to applicable NAAQS. In general, a design value is a statistic that describes a future air quality concentration in the project area and is calculated by combining modeled concentrations and monitored background concentrations. Background concentrations at Lancaster/Palmdale and Victorville are summarized in Table 3.2.6-9 and were used in calculating design values (presented earlier in Tables 3.2.6-7 and 3.2.6-8) for portions of the project in Los Angeles and San Bernardino counties, respectively.

Table 3.2.6-9 Background Concentrations at Lancaster/Palmdale and Victorville

Monitoring Station	24-Hour PM_{10} (µg/m^3)	24-Hour $PM_{2.5}$ (µg/m^3)*	Annual $PM_{2.5}$ (µg/m^3)*
Lancaster/Palmdale	51	27	6.9
Victorville	45	14	7.0**
NAAQS	150	35	12.0
CAAQS	50	No Separate CAAQS	12

* 24-Hour and Annual $PM_{2.5}$ background concentrations at Lancaster/Palmdale were calculated based on 3-year measurements between 2009 and 2011 due to unavailability of 3rd quarter measurements in 2012.

** Victorville has two monitors at the site, and the highest background concentration is noted.

Source: HDC Air Quality Report 2016.

The design values in Tables 3.2.6-7 and 3.2.6-8 are based on the multiple model runs and indicate that the proposed project would not likely create new or worsen existing violations of the 24-hour PM_{10} NAAQS or 24-hour $PM_{2.5}$ NAAQS. While the results indicate that the highest design values for annual $PM_{2.5}$ are higher than the NAAQS and CAAQS in the San Bernardino County portion of the proposed project, these design values occur at receptors located in unpopulated areas along the ROW line (1 meter away from the fence line) and would not be considered appropriate "area-wide" locations representative of neighborhood, urban, and regional scales, as well as micro- or middle-scale monitors defined in 40 CFR 58.1. All other appropriate receptors modeled within the vicinity of the identified hot-spot resulted in levels below the NAAQS and CAAQS for the annual $PM_{2.5}$.

The proposed project build alternatives, however, would likely cause violations of the state 24-hour PM_{10} standard in both counties. Federal and state requirements are anticipated to help further reduce PM_{10} emissions in the future by essentially lowering per-vehicle emissions for each of the diesel vehicles.

As concurred with by the TCWG (see Appendix K), the project has demonstrated the project-level conformity requirements for the criteria pollutant that is in nonattainment (24-hour PM_{10}) as defined in 40 CFR Sections 93.116 and 93.123.

Conformity Determination

As mentioned earlier, the proposed project build alternatives are contained in the approved RTP and included in the regional emissions analysis that was used to meet regional conformity. Based on the above analysis results, this project would not delay timely attainment of the PM (PM_{10} or $PM_{2.5}$) NAAQS for the MDAB area. Activities of this project should, therefore, be considered consistent with the purpose of the SIP, and it should be determined that the project build alternatives conform to the requirements of the federal CAA.

Naturally Occurring Asbestos

As indicated in the Affected Environment section, Los Angeles County is one of the counties identified as containing serpentinite and ultramafic rock, but only the Catalina Island portion of Los Angeles County has been found to contain such rock; hence, it is not anticipated to be found in the project area. Therefore, no potential impacts from naturally occurring asbestos during project construction would occur.

Other Asbestos-Containing Materials

Impacts from ACMs are addressed in Section 3.2.5, Hazardous Waste or Materials.

Construction Impacts

Please refer to Section 3.6 for discussion of construction impacts related to air quality.

Mobile Source Air Toxics

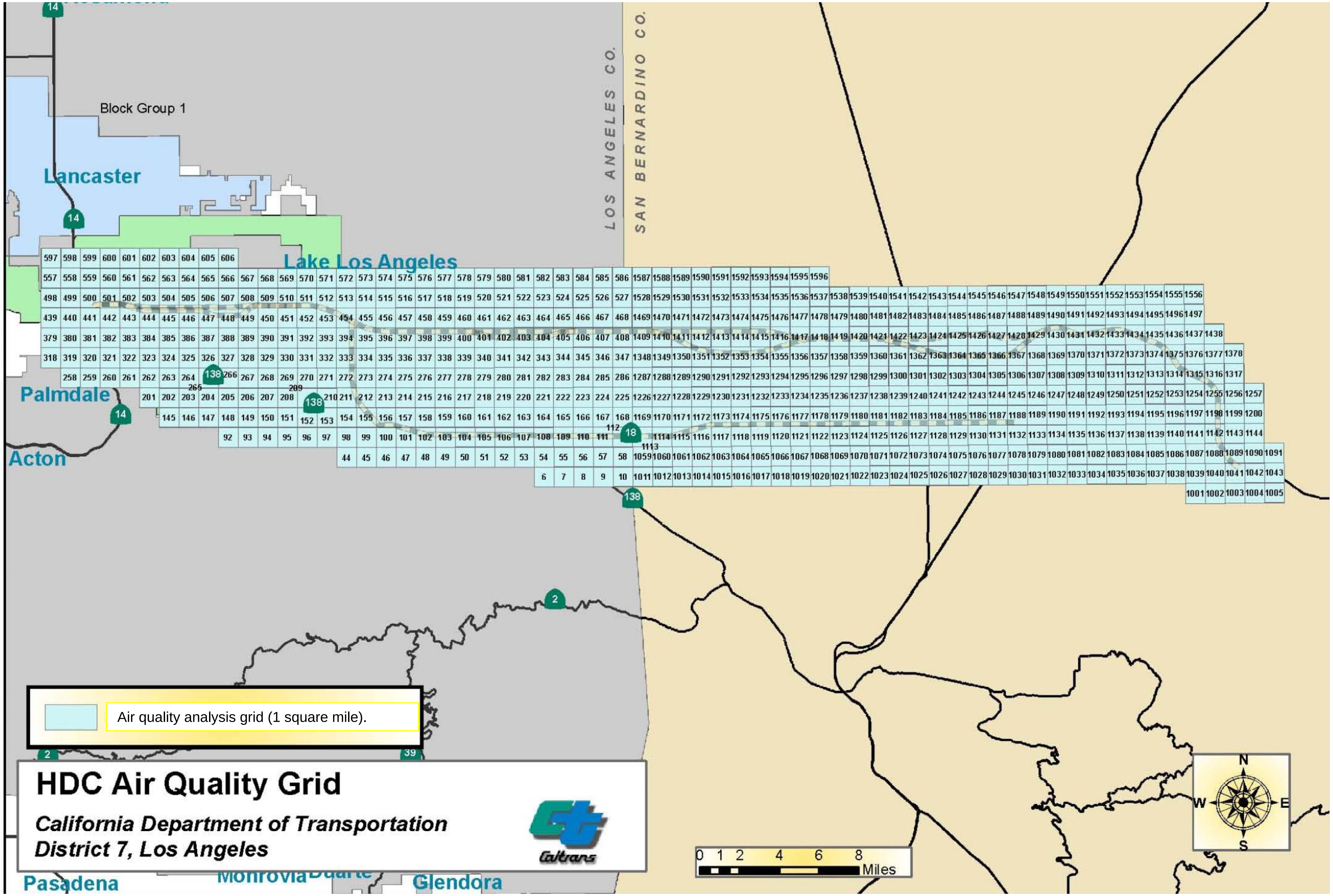
Although an emissions analysis cannot identify and measure health impacts from MSATs, it can provide a basis for identifying and comparing the potential differences in MSAT emissions from various alternatives and between various project milestone years.

Regional and Corridor MSAT Emissions Analysis

MSAT emissions analysis for the proposed project was performed using CT-EMFAC (v5.0). While the MDAB was selected as the geographic area, emission factors were drawn from the inventory according to the counties in which each respective analysis area is located to evaluate its representative conditions. For the purpose of this emissions analysis, an area covering approximately 606 square miles along and surrounding the proposed HDC was evaluated, roughly bounded to the west by SR-14, to the east by SR-18, to the south by SR-138, and to the north by I-15. To provide evaluation of localized MSAT emissions, the area was divided into individual mile-by-mile squares, totaling up to 606 squares. Traffic data were analyzed in and forecasted for each of the squares; and emissions were estimated for each square based on the individual set of forecast traffic data. Figure 3.2.6-15 illustrates the extent of the area considered in this MSAT emissions analysis, and it provides a key map for locations that correspond to the grid numbers in the MSAT summary tables in Appendix G of the Air Quality Report.

In addition to the regional emissions of MSAT covering 606 mile-by-mile squares, daily emissions of DPM and benzene were also estimated for each segment along the proposed corridor. These corridor emissions have been estimated based on the corridor-level VMTs forecasted with four periods of a day: AM period is identified as the time period when the roadway is congested from 6:00 to 9:00 a.m. in the morning; PM period is the congested time period in the afternoon from 3:00 to 7:00 p.m.; Mid-Day is identified between the AM and PM peak periods from 9:00 a.m. to 3:00 p.m.; and Night period is defined from 7:00 p.m. to 6:00 a.m.

Figure 3.2.6-15 Analysis Area for MSAT and Key Map



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Discussion of Results

The MSAT emissions were estimated for the current year conditions, as well as for the No Build Alternative and all build alternatives in the future years of 2020 (opening year) and 2040 (build-out year). Results of the No Build Alternative were compared to those of the build alternatives in the future years of 2020 and 2040 (Table 3.2.6-10). Results of the MSAT emissions for the future years were also compared to those for the existing year. Summaries of the comparison are provided in Table 3.2.6-10 with differences compared between each respective build alternative and the No Build Alternative or between build alternatives in the future years and the existing conditions.

Table 3.2.6-10 Comparison of MSAT Emissions for Project Alternatives – Opening Year 2020 and Horizon Year 2040

	Summary of VMT Used for GHG Calculation (Mile)*	Mobile Source Air Toxics Emissions (lbs/day)							
		Benzene	Acrolein	Formalde-hyde	Butadiene	Naphtha-lene	POM	DPM	DEOG
Base Year, 2010	7,722,930	107.8	5.4	134.2	24.1	5.3	1.9	288.8	392.0
Opening Year, 2020									
No Build Alternative	10,071,438	42.2	2.0	65.5	8.9	3.4	0.9	99.0	267.1
Change from Base Year		*-65.6*	*-3.4*	*-68.7*	*-15.2*	*-1.9*	*-1.0*	*-189.8*	*-124.9*
Fwy/Exp or Fwy/Exp with HSR	12,369,704	51.5	2.4	76.9	11.0	3.9	1.1	137.5	301.4
Change from Base Year		*-56.3*	*-2.9*	*-57.3*	*-13.1*	*-1.4*	*-0.8*	*-151.3*	*-90.6*
Change from No Build Alternative		*9.3*	*0.5*	*11.5*	*2.1*	*0.5*	*0.2*	*38.5*	*34.2*
Fwy/Toll or Fwy/Toll with HSR	11,736,991	49.1	2.4	70.7	10.5	3.8	1.0	120.0	267.2
Change from Base Year		*-58.8*	*-3.0*	*-63.5*	*-13.6*	*-1.6*	*-0.9*	*-168.7*	*-124.8*
Change from No Build Alternative		*6.9*	*0.4*	*5.2*	*1.6*	*0.3*	*0.1*	*21.0*	*0.0*
Horizon Year, 2040									
No Build Alternative	13,666,032	38.0	1.8	60.9	8.0	5.1	1.1	96.8	253.8
Change from Base Year		*-69.8*	*-3.6*	*-73.3*	*-16.1*	*-0.2*	*-0.8*	*-191.9*	*-138.2*
Fwy/Exp or Fwy/Exp with HSR	17,012,874	46.9	2.2	71.0	10.0	5.7	1.3	130.0	279.1
Change from Base Year		*-60.9*	*-3.2*	*-63.2*	*-14.1*	*0.4*	*-0.6*	*-158.8*	*-112.9*
Change from No Build Alternative		*9.0*	*0.5*	*10.1*	*2.0*	*0.6*	*0.2*	*33.1*	*25.3*
Fwy/Toll or Fwy/Toll with HSR	16,234,481	45.0	2.2	66.5	9.6	5.6	1.3	118.9	255.3
Change from Base Year		*-62.8*	*-3.2*	*-67.7*	*-14.5*	*0.2*	*-0.7*	*-169.9*	*-136.7*
Change from No Build Alternative		*7.0*	*0.4*	*5.6*	*1.6*	*0.5*	*0.2*	*22.0*	*1.6*

Note:
* VMT presented here is a summary of VMT within the 606 mile-by-mile square grid. Speed at each grid varies depending on type of roadway and traffic volume. Note also that these VMT data were provided by the traffic analysis team for use as input to the greenhouse gas (GHG) calculations.

Source: HDC Air Quality Report, 2016.

The summary of regional emissions indicates that reduction in regional MSAT emissions is anticipated with all of the build alternatives when compared to the existing conditions; however, when compared to the No Build Alternative in each respective year, all of the build alternatives are anticipated to result in an increase in all MSAT emissions. As depicted in Appendices G and H, however, future MSAT emissions in 2020 and 2040 result in a decrease in many areas outside the immediate vicinity along the proposed HDC, while most of the increased emissions are anticipated along the proposed HDC.

The emissions of benzene and DPM were also estimated for each segment only along the proposed HDC based on the corridor-level VMT data and are summarized in Table 3.2.6-11. It should be noted that the corridor-level emissions are provided only for the build alternatives.

Table 3.2.6-11 Summary of Corridor-Level MSAT Emissions

	Summary of VMT Used for GHG Calculation (Mile)*	Mobile Source Air Toxics Emissions (lbs/day)	
		Benzene	DPM
Opening Year, 2020**			
Fwy/Exp or Fwy/Exp with HSR	4,305,895	16.4	56.0
Fwy/Toll or Fwy/Toll with HSR	6,892,708	12.5	36.6
Horizon Year, 2040			
Fwy/Exp or Fwy/Exp with HSR	5,991,701	15.8	53.8
Fwy/Toll or Fwy/Toll with HSR	8,303,004	12.5	42.5

Note:

* VMT presented here is a summary of VMT at four different time periods of the day. Speed at each time period varies depending on traffic volume. Note also that these VMT data were provided by the traffic analysis team for use as input to the GHG calculations.

** Data for Base Year and No Build are not available because there was no corridor in 2010 (Base Year) and there would be no corridor to project the no-build condition.

Source: HDC Air Quality Report, 2016.

The ARB's "Air Quality and Land Use Handbook" identifies the following land uses as particularly sensitive to MSATs: residential areas, schools, hospitals and other health care facilities, day care and other child care facilities, and parks and playgrounds. However, as discussed above, the magnitude and the duration of potential increases and exposure compared to the No Build Alternative cannot be accurately quantified due to the inherent deficiencies of current models. On a regional basis, EPA's and California's vehicle and fuel regulations, coupled with fleet turnover, will over time cause regionwide MSAT levels to be lower than today.

Discussion of Results from Regional and Corridor-Level PM Emissions Analysis

In a similar manner as the regional MSAT emissions, regional PM emissions were estimated for the current year conditions, as well as for the No Build Alternative and all of the build alternatives in the future years of 2020 (opening year) and 2040 (build-out year). Results of the No Build Alternative were compared to those of the build alternatives in the future years of 2020 and 2040. Results of the PM emissions for the future years were also compared to those for the existing year. Summaries of the comparison in regional PM emissions are provided in Table 3.2.6-12.

Table 3.2.6-12 Comparison of PM Emissions for Project Alternatives – Opening Year 2020 and Horizon Year 2040

	Particulate Matter (lbs/day)	
	PM_{10}	$PM_{2.5}$
Base Year, 2010	1,186.7	649.4
Opening Year, 2020		
No Build Alternative	1,249.4	565.5
Change from Base Year	*62.7*	*-83.9*
Fwy/Exp or Fwy/Exp with HSR	1,552.0	707.9
Change from Base Year	*365.3*	*58.5*
Change from No Build Alternative	*302.6*	*142.4*
Fwy/Toll or Fwy/Toll with HSR	1,455.1	659.9
Change from Base Year	*268.4*	*10.6*
Change from No Build Alternative	*205.7*	*94.5*
Horizon Year, 2040		
No Build Alternative	1,642.8	730.5
Change from Base Year	*456.1*	*81.1*
Fwy/Exp or Fwy/Exp with HSR	2,049.6	912.5
Change from Base Year	*862.9*	*263.2*
Change from No Build Alternative	*406.8*	*182.0*
Fwy/Toll or Fwy/Toll with HSR	1,946.1	864.9
Change from Base Year	*759.4*	*215.6*
Change from No Build Alternative	*303.3*	*134.5*

Source: HDC Air Quality Study, 2016.

The summary indicates that the regional PM emissions are anticipated to increase with all of the alternatives when compared to the existing conditions, except for the $PM_{2.5}$ emissions for the No Build Alternative in 2020. When compared to the No Build Alternative in each respective year, all of the build alternatives are anticipated to result in an increase in all PM emissions. When evaluated based on the grid areas, in greater detail, future PM emissions in 2020 and 2040 result in a decrease in many areas outside the immediate vicinity along the proposed HDC, while most of the increased emissions are anticipated along the proposed HDC.

The emissions of PM_{10} and $PM_{2.5}$ were also estimated for each segment along the proposed corridor based on the corridor-level VMT data. Table 3.2.6-13 summarizes total corridor-level emissions for the build alternatives. It should be noted that these corridor emissions include fugitive dust emissions as they were included as part of the demonstration for project-level conformity. Furthermore, alternatives with the proposed HSR feeder service should consider approximately 1.74 pounds per mile of PM_{10} emissions per day to account for wind-driven fugitive dust from operation of the rail service. Likewise, approximately 0.26 pound per mile per day should be added for $PM_{2.5}$ emissions.

Table 3.2.6-13 Summary of Corridor-Level PM Emissions

	Particulate Matter Emissions (lbs/day)	
	PM_{10}	$PM_{2.5}$
Opening Year, 2020		
Fwy/Exp or Fwy/Exp with HSR	1,703.9	534.7
Fwy/Toll or Fwy/Toll with HSR	1,158.8	365.9
Horizon Year, 2040		
Fwy/Exp or Fwy/Exp with HSR	2,197.6	688.5
Fwy/Toll or Fwy/Toll with HSR	1,654.3	520.1
Note: The summary includes fugitive dust emissions from vehicular traffic along the proposed corridor only.		

Source: HDC Air Quality Study, 2016.

Discussion of Regional and Corridor-Level Organic Gases and CO Emissions Results

In a similar manner with estimates of PM, CO_2, and MSATs, regional emissions were estimated for reactive organic gases (ROG), total organic gases (TOG), nitrogen oxides (NO_X), and CO and are summarized in Table 3.2.6-14.

Table 3.2.6-14 Summary of Emissions of Regional Pollutants

	Emissions of Other Pollutants (lbs/day)			
	ROG	TOG	CO	NO_X
Base Year, 2010	3,285.6	3,990.1	74,536.1	16,737.3
Opening Year, 2020				
No Build Alternative	1,418.3	1,837.9	37,671.5	8,145.5
Change from Base Year	*-1,867.3*	*-2,152.1*	*-36,864.6*	*-8,591.8*
Fwy/Exp or Fwy/Exp with HSR	1,726.4	2,211.6	44,493.3	10,641.8
Change from Base Year	*-1,559.1*	*-1,778.4*	*-30,042.8*	*-6,095.5*
Change from No Build Alternative	*308.2*	*373.7*	*6,821.8*	*2,496.3*
Fwy/Toll or Fwy/Toll with HSR	1,639.1	2,105.3	42,671.4	9,603.3
Change from Base Year	*-1,646.5*	*-1,884.7*	*-31,864.7*	*-7,133.9*
Change from No Build Alternative	*220.8*	*267.4*	*4,999.9*	*1,457.8*
Horizon Year, 2040				
No Build Alternative	1,215.8	1,639.8	34,512.0	5,941.2
Change from Base Year	*-2,069.8*	*-2,350.2*	*-40,024.1*	*-10,796.1*
Fwy/Exp or Fwy/Exp with HSR	1,508.2	1,996.1	40,858.9	7,381.3
Change from Base Year	*-1,777.4*	*-1,993.9*	*-33,677.2*	*-9,356.0*
Change from No Build Alternative	*292.4*	*356.3*	*6,346.9*	*1,440.1*
Fwy/Toll or Fwy/Toll with HSR	1,442.8	1,913.9	39,250.2	6,894.7
Change from Base Year	*-1,842.8*	*-2,076.2*	*-35,285.9*	*-9,842.6*
Change from No Build Alternative	*227.0*	*274.1*	*4,738.2*	*953.5*

Source: HDC Air Quality Study, 2016.

Furthermore, emissions of CO were also estimated for each segment along the proposed corridor based on the corridor-level VMT data. Table 3.2.6-15 provides a summary of total corridor-level emissions for the proposed HDC build alternatives.

Table 3.2.6-15 Summary of Corridor-Level CO Emissions

	CO (lbs/day)
Opening Year, 2020	
Fwy/Exp or Fwy/Exp with HSR	12,693.6
Fwy/Toll or Fwy/Toll with HSR	9,470.4
Horizon Year, 2040	
Fwy/Exp or Fwy/Exp with HSR	12,199.1
Fwy/Toll or Fwy/Toll with HSR	9,262.7

Source: HDC Air Quality Study, 2016.

The summary indicates that the regional emissions are anticipated to decrease with all of the alternatives and for all future years when compared to the existing conditions. When compared to the No Build Alternative in each respective year, all of the build alternatives are anticipated to result in an increase in all regional emissions.

Toxic Air Contaminants

In 1998, EPA's Office of Environmental Health Hazard Assessment (OEHHA) completed a comprehensive health assessment of diesel exhaust. This assessment formed the basis for a decision by the ARB to formally identify particles in diesel exhaust as a TAC that may pose a threat to human health.

TACs consist of a variety of compounds, including metals, minerals, soot, and hydrocarbon-based chemicals. There are hundreds of different types of air toxics, with varying degrees of toxicity. Sources of TACs include industrial processes, such as petroleum refining and chrome-plating operations; commercial operations, such as gasoline stations and dry cleaners; and motor vehicle exhaust. TACs are a concern in the basin because of the large number of mobile sources and industrial facilities throughout the basin. Toxicity of TACs is studied by the OEHHA.

California regulates TACs through its Air Toxics Program, which is mandated in Chapter 3.5 of the Health and Safety Code – *Toxic Air Contaminants*, and Part 6 – *Air Toxics Hot Spots Information and Assessment* (H&SC Sections 39660 *et seq*. and 44300 *et seq*., respectively).

The regulatory approach used in controlling TAC levels relies on a quantitative risk assessment process rather than ambient air conditions to determine allowable emission levels from the source. In addition, for carcinogenic air pollutants, there is no safe concentration in the atmosphere. Local concentrations can pose a health risk and are termed "toxic hot spots."

The ARB has adopted a Diesel Risk Reduction Plan (DRRP) with control measures that would reduce the overall DPM emissions by about 85 percent from 2000 to 2020. In addition, total toxic risk from diesel exhaust may only be exposed for a much shorter duration. Furthermore, DPM is only one of many environmental toxics, and those of other toxics and other pollutants in various environmental media may overshadow its cancer risks. Thus, while diesel exhaust may pose potential cancer risks to receptors spending time on or near high-risk DPM facilities, most receptors' short-term exposure would only cause minimal harm, and these risks would also greatly diminish in the future operating years of the project due to planned emission control regulations.

Climate Change

Climate change is analyzed in Chapter 4. Neither EPA nor FHWA has issued explicit guidance or methods to conduct project-level greenhouse gas (GHG) analysis. As stated on FHWA's climate change Website (http://www.fhwa.dot.gov/hep/climate/index.htm), climate change considerations should be integrated throughout the transportation decision-making process – from planning through project development and delivery. Addressing climate change mitigation and adaptation up front in the planning process will aid decision making and improve efficiency at the program level, and it will inform the analysis and stewardship needs of project-level decision making. Climate change considerations can easily be integrated into many planning factors, such as supporting economic vitality and global efficiency, increasing safety and mobility, enhancing the environment, promoting energy conservation, and improving the quality of life. The climate change impact analysis presented in Section 4.5.1, "Climate Change under the California Environmental Quality Act," is also applicable to NEPA and is suitable for informing federal decisions. The four strategies set forth by FHWA to lessen climate change impacts correlate with efforts that the State has undertaken and is undertaking to deal with transportation and climate change; the strategies include improved transportation system efficiency, cleaner fuels, cleaner vehicles, and reduction in the growth of vehicle hours traveled.

Avoidance, Minimization, and/or Mitigation Measures

Standard conditions to minimize short-term air quality impacts, including MSAT, are noted in Section 3.6, Construction Impacts.

3.2.7 Noise

This section describes the methodology used in assessing the existing noise conditions along the proposed High Desert Corridor (HDC) Project alignment, provides general information on fundamentals of airborne noise and groundborne vibration issues related to the proposed project, discusses the criteria and models used for evaluating potential noise and vibration impact, and presents the impact analysis, along with abatement recommendations, where appropriate. Construction noise impacts are presented in Section 3.6.

The Nature of Noise

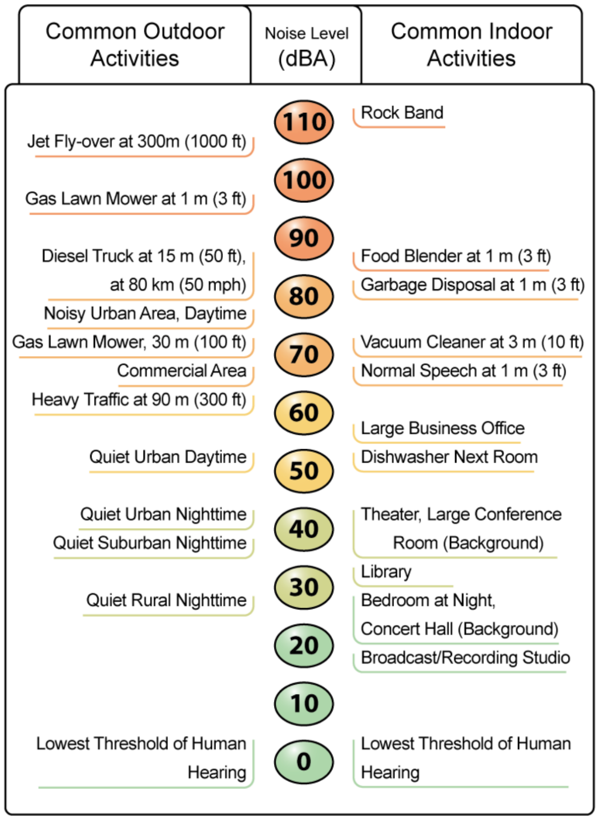
Noise is usually defined as sound that is undesirable because it interferes with speech communication and hearing, or is otherwise annoying.

The decibel (dB) is the accepted standard unit for measuring the amplitude of sound because it accounts for the large variations in sound pressure amplitude. When describing sound and its effect on a human population, A-weighted (dBA) sound pressure levels are typically used to account for the response of the human ear. The term “A-weighted” refers to a filtering of the noise signal in a manner corresponding to the way the human ear perceives sound. The A-weighted noise level has been found to correlate well with people’s judgments of the noisiness of different sounds and has been used for many years as a measure of community noise. Figure 3.2.7-1 illustrates typical A-weighted sound pressure levels for various noise sources to enable readers to compare the actual and predicted project noise levels discussed in this section with common activities.

Community noise levels usually change continuously during the day. The equivalent continuous A-weighted sound pressure level (L_{eq}) is normally used to describe community noise. The L_{eq} is the equivalent steady-state A-weighted sound pressure level that would contain the same acoustical energy as the time-varying A-weighted sound pressure level during the same time interval. The maximum sound pressure level (L_{max}) is the greatest instantaneous sound pressure level observed during a single noise measurement interval.

Another descriptor, the day-night average sound pressure level (L_{dn}), was developed to evaluate the total daily community noise environment. The L_{dn} is a 24-hour average sound pressure level with a 10-dB time-of-day weighting added to sound pressure levels in the nine nighttime hours from 10:00 p.m. to 7:00 a.m. This nighttime 10-dB adjustment is an effort to account for people’s increased sensitivity to nighttime noise events. The Federal Transit Administration (FTA) uses L_{dn} and L_{eq} to evaluate potential train noise impacts at the surrounding communities.

Figure 3.2.7-1 Noise Levels of Common Activities



The Nature of Vibration

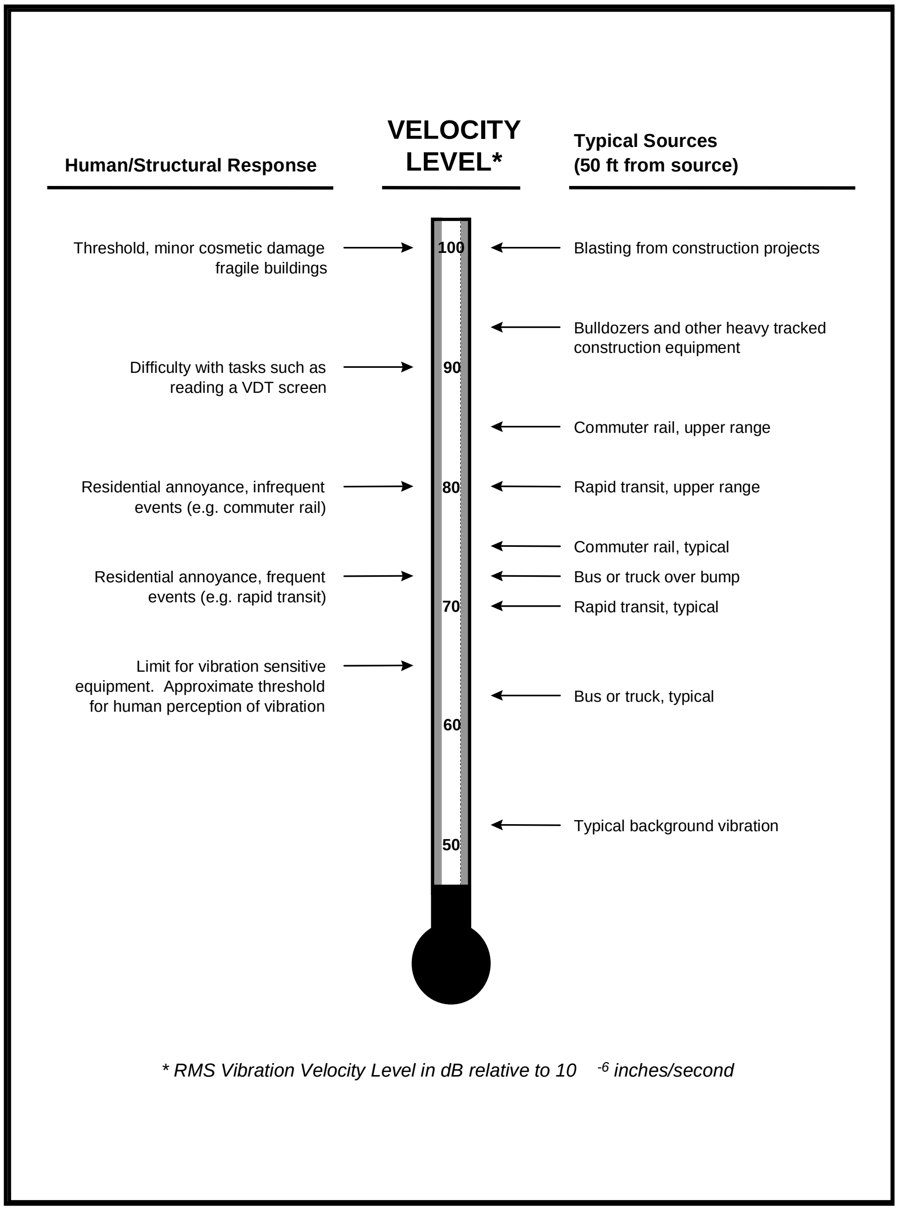
Vibration is an oscillatory motion, which can be described in terms of displacement, velocity, or acceleration. Displacement, in the case of a vibrating floor, is simply the distance that a point on the floor moves away from its static position. The velocity represents the instantaneous speed of the floor movement, and acceleration is the rate of change of the speed. The response of humans, buildings, and equipment to vibration is normally described using velocity or acceleration. In this section, velocity would be used in describing ground-borne vibration.

Vibration amplitudes are usually expressed as either peak particle velocity (PPV) or the root mean square (RMS) velocity. The PPV is defined as the maximum instantaneous peak of the vibration signal in inches per second (in/sec). The RMS of a signal is the average of the squared amplitude of the signal in vibration decibels (VdB), or one micro-inch per second. The Federal Railroad Administration (FRA) uses the abbreviation VdB for vibration decibels to reduce the potential for confusion with sound decibel. Although PPV is appropriate for evaluating the potential of building damage, it is not suitable for evaluating human response. Because it takes some time for the human body to respond to vibration signals, RMS amplitude is more appropriate to evaluate human response to vibration than PPV. For sources such as trucks or motor vehicles, peak vibration levels are typically 6 to 14 dB higher than RMS levels.

Decibel notation acts to compress the range of numbers required in measuring vibration. Similar to the noise descriptors, L_{eq} and L_{max} can be used to describe the average vibration and the maximum vibration level observed during a single vibration measurement interval.

Figure 3.2.7-2 shows common vibration sources and the human and structural responses to groundborne vibration. As shown in the figure, the threshold of perception for human response is approximately 65 VdB; however, human response to vibration is not usually substantial unless the vibration exceeds 70 VdB. Vibration tolerance limits for sensitive instruments, such as magnetic resonance imaging (MRI) or electron microscopes, could be much lower than the human vibration perception threshold.

Figure 3.2.7-2 Typical Levels of Groundborne Vibration



Regulatory Setting

The National Environmental Policy Act (NEPA) of 1969 and the California Environmental Quality Act (CEQA) provide the broad basis for analyzing and abating highway traffic noise effects. The intent of these laws is to promote the general welfare and to foster a healthy environment. The requirements for noise analysis and consideration of noise abatement, however, differ between NEPA and CEQA.

Noise and vibration impacts for this project are based on the criteria as defined in the 23 *Code of Federal Regulations* (CFR) 772 and the FRA High-Speed Ground Transportation Noise and Vibration Impact Assessment (September 2012) guidance manual. The criteria contained in this document are applicable for both NEPA and CEQA documentation.

California Environmental Quality Act

CEQA requires a strictly baseline versus build analysis to assess whether a proposed project will have a noise impact. If a proposed project is determined to have a significant noise impact under CEQA, then CEQA dictates that abatement measures must be incorporated into the project unless those measures are not feasible. The rest of this section will focus on the NEPA 23 CFR 772 noise analysis; please see Chapter 4 of this document for further information on noise analysis under CEQA.

National Environmental Policy Act and 23 CFR 772

For highway transportation projects with Federal Highway Administration (FHWA) (and California Department of Transportation [Caltrans], as assigned) involvement, the federal-Aid Highway Act of 1970 and the associated implementing regulations (23 CFR 772) govern the analysis and abatement of traffic noise impacts. The regulations require that potential noise impacts in areas of frequent human use be identified during the planning and design of a highway project. The regulations include noise abatement criteria (NAC) that are used to determine when a noise impact would occur. The NAC differ depending on the type of land use under analysis. For example, the NAC for residences (67 dBA) is lower than the NAC for commercial areas (72 dBA). Table 3.2.7-1 lists the NAC for use in the NEPA 23 CFR 772 analysis.

According to the Caltrans Traffic Noise Analysis Protocol for New Highway Construction and Reconstruction Projects (May 2011), a noise impact occurs when the predicted future noise level with the project substantially exceeds the existing noise level (defined as a 12-dBA or more increase) or when the future noise level with the project approaches or exceeds the NAC. Approaching the NAC is defined as coming within 1 dBA of the NAC.

Table 3.2.7-1 Noise Abatement Criteria

Activity Category	NAC, Hourly A-Weighted Noise Level, $L_{eq}(h)$	Description of Activity Category
A	57 (Exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B[1]	67 (Exterior)	Residential.
C[1]	67 (Exterior)	Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings.
D	52 (Interior)	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios.
E	72 (Exterior)	Hotels, motels, offices, restaurants/bars, and other developed lands, properties, or activities not included in A through D or F.
F	No NAC—reporting only	Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (e.g., water resources, water treatment, electrical), and warehousing.
G	No NAC—reporting only	Undeveloped lands that are not permitted.

[1] Includes undeveloped lands permitted for this activity category.

If it is determined that the project will have noise impacts, then potential abatement measures must be considered. Noise abatement measures that are determined to be reasonable and feasible at the time of final design are incorporated into the project plans and specifications. This document discusses noise abatement measures that would likely be incorporated in the project.

The Caltrans Traffic Noise Analysis Protocol sets forth the criteria for determining when an abatement measure is reasonable and feasible. Feasibility of noise abatement is basically an engineering concern. Noise abatement must be predicted to reduce noise by at least 5 dB at an impacted receptor to be considered feasible from an acoustical perspective. Other considerations include topography, access requirements, other noise sources, and safety considerations. The overall reasonableness is determined by these factors: acoustical design goal, the cost of abatement, and viewpoints of benefited receptors (including property owners and residents of the benefited receptors). 23 CFR 722 requires that an acoustical design goal be applied to all noise abatement. Caltrans' acoustical design goal is a barrier that must be predicted to provide at least 7 dB of noise reduction at one or more benefited receptors.

FRA Noise Impact Criteria

The criteria in the FRA High-Speed Ground Transportation Noise and Vibration Impact Assessment are for assessing future noise impacts from train operations. They are founded on well-documented research on community reaction to noise and are based on change in noise exposure using a sliding scale. The amount that transit projects are allowed to change the overall noise environment is reduced with increasing levels of existing noise. The FRA noise impact criteria applicable to three categories of land use are summarized in Table 3.2.7-2.

Table 3.2.7-2 Land Use Categories and Metrics for Transit Noise Impact Criteria

Land Use Category	Noise Metric, dBA	Description of Land Use Category
1	Outdoor $L_{eq}(h)$*	Tracts of land where quiet is an essential element in their intended purpose. This category includes lands set aside for serenity and quiet, and such land uses as outdoor amphitheaters and concert pavilions, as well as national historic landmarks with significant outdoor use. Also included are recording studios and concert halls.
2	Outdoor L_{dn}	Residences and buildings where people normally sleep. This category includes homes, hospitals, and hotels where a nighttime sensitivity to noise is assumed to be of utmost importance.
3	Outdoor $L_{eq}(h)$*	Institutional land uses with primarily daytime and evening use. This category includes schools, libraries, theaters, and churches, where it is important to avoid interference with such activities as speech, meditation, and concentration on reading material. Places for meditation or study associated with cemeteries, monuments, and museums can also be considered to be in this category. Certain historical sites, parks, campgrounds, and recreational facilities are also included.

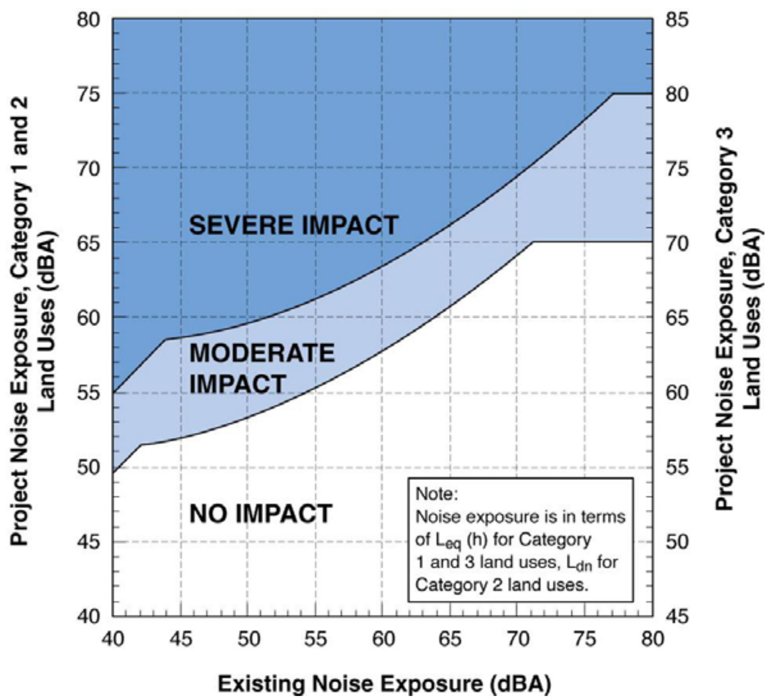
* L_{eq} for the noisiest hour of transit-related activity during hours of noise sensitivity.

L_{dn} is used to characterize noise exposure for residential areas and hotels (Category 2). The maximum 1-hour L_{eq} during the period that the facility is in use is used for other noise-sensitive land uses such as school buildings and parks (Categories 1 and 3). There are two levels of impact included in the FRA criteria, as shown in Figure 3.2.7-3. The interpretations of these two levels of impact are summarized as follows:

- **Severe Impact:** Project noise above the upper curve is considered to cause severe impact because a significant percentage of people would be highly annoyed by the new noise. Severe noise impact is considered "significant" as this term is used in NEPA and implementing regulations. Noise abatement would normally be specified for severe impact areas unless there is no practical method of mitigating the noise.

- **Moderate Impact:** The change in cumulative noise level in this range is noticeable to most people but may not be sufficient to cause strong, adverse reaction from the community. Therefore, other project-specific factors must be considered to determine the magnitude of the impact and the need for abatement. These other factors can include the existing noise level, the predicted increase over existing noise levels, and the types and number of noise-sensitive land uses affected.

Figure 3.2.7-3 Noise Impact Criteria for Transit Projects

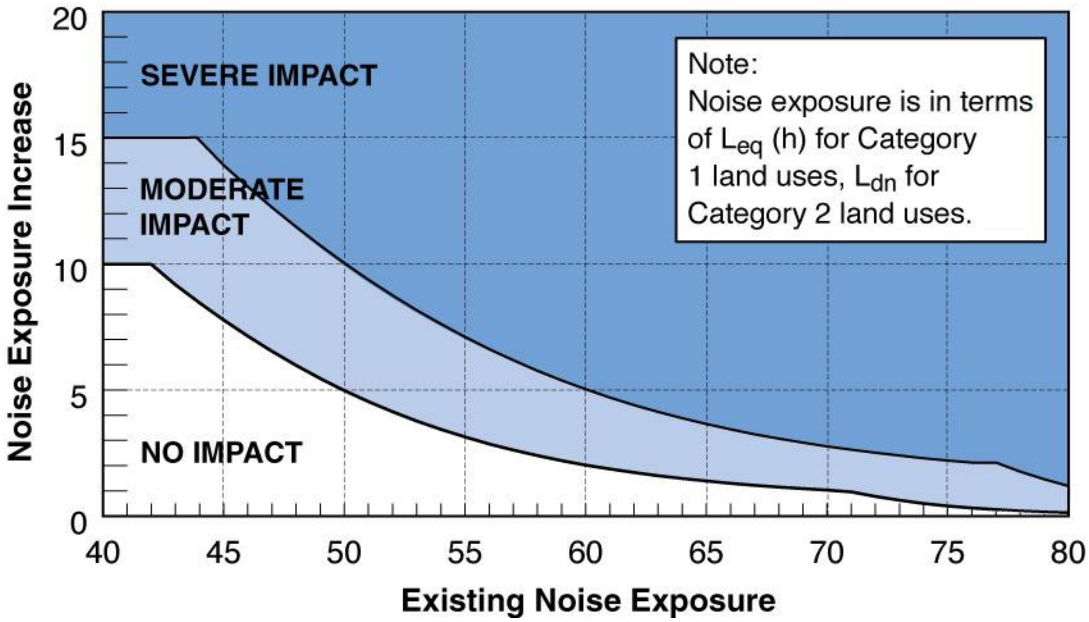


The horizontal axis in Figure 3.2.7-3 is the existing L_{dn} without any project noise, and the vertical axis (right side) is the L_{dn} at residential land uses caused by the project.

Although the curves in Figure 3.2.7-3 are defined in terms of project noise exposure and the existing noise exposure, it is important to emphasize that the increase in the cumulative noise (i.e., when the project noise is added to existing noise) is the basis for the criteria. Figure 3.2.7-3 shows the noise impact criteria for Categories 1 and 2 land uses in terms of the allowable increase in the cumulative noise exposure.

Figure 3.2.7-4 shows that the criterion for impact allows a noise exposure increase of 10 dBA if the existing noise exposure is 42 dBA or less, but only a 1-dBA increase when the existing noise exposure is 70 dBA. As the existing level of ambient noise increases, the allowable level of project noise increases, but the total allowable increase in community noise exposure is reduced. This reduction accounts for an unexpected result: project noise exposure levels that are less than the existing noise exposure can still cause impact.

Figure 3.2.7-4 Increase in Cumulative Noise Levels Allowed by Criteria



The described FRA criteria are normally used for assessing high-speed rail (HSR) projects where the train operation noise would be the dominant noise source. The HDC Project is a multimodal facility where there are both highway and HSR sharing the same corridor. As such, the freeway noise would be the more dominant noise source. Due to this special circumstance, it has been concurred with FRA that peak-hour noise level instead of day-night noise level would be used to assess the rail noise impact for this specific project for all land uses (FRA, 2014). This would allow the rail noise levels to be combined with the peak-hour levels of the highway noise levels. Consequently, this would allow the overall noise impacts and abatement to be assessed and analyzed using the FHWA NAC, which has been agreed upon between FRA and Caltrans as the approach to use for the project.

FRA Vibration Impact Criteria

The criteria set forth in the FRA High-Speed Ground Transportation Noise and Vibration Impact Assessment were used to evaluate vibration impacts from train operations.

Table 3.2.7-3 presents the criteria for various land use categories, as well as the frequency of events. The criteria are related to ground-borne vibration causing human annoyance or interfering with the use of vibration-sensitive equipment. The criteria for acceptable groundborne vibration are expressed in terms of RMS velocity levels in VdB and are based on the maximum levels for a single event (L_{max}).

Table 3.2.7-3 Groundborne Vibration Impact Criteria

Land Use Category	Groundborne Vibration Impact Levels (dB ref. 1 micro-inch/sec)		
	Frequent[1] Events	Occasional[2] Events	Infrequent[3] Events
Category 1: Buildings where low ambient vibration is essential for interior operations.	65 VdB4	65 VdB4	65 VdB[4]
Category 2: Residences and buildings where people normally sleep.	72 VdB	75 VdB	80 VdB
Category 3: Institutional land uses with primarily daytime use.	75 VdB	78 VdB	83 VdB

Notes:
[1] "Frequent Events" is defined as more than 70 vibration events of the same source per day.
[2] "Occasional Events" is defined as between 30 and 70 vibration events of the same source per day.
[3] "Infrequent Events" is defined as fewer than 30 vibration events of the same source per day.
[4] This criterion limit is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes. Ensuring lower vibration levels in a building often requires special design of the heating, ventilation, and air conditioning (HVAC) systems and stiffened floors.

Source: FTA, 2006.

The sensitive receptors within the project boundary (i.e., residences, parks, or churches) fall under Land Use Categories 2 and 3; thus, the maximum allowable vibration levels of 75 and 78 VdB, respectively, will be used as project criteria because the estimated number of HSR operations will be between 30 and 70 per day. Hence, the operation can be categorized as "Occasional Events." No Category 1 land use was identified along the proposed commuter rail alignment.

Affected Environment

Caltrans District 7 published a detailed *Traffic Noise Study Report* on June 9, 2014, titled The High Desert Corridor Project from SR-14 in Los Angeles County to SR-18 in San Bernardino County, California, EA 26000, EFIS 0712000035. A separate technical report analyzing the noise and vibration effects of the HSR component, as well as that of the overall project, was published in June 2014.

Field investigations were conducted to identify land uses that could be subject to operation and construction noise impacts from the proposed project. Land uses in the project area were categorized by land use types, Activity Categories as defined in Table 3.2.7-1, and the extent of frequent human use. For this particular project, single-family residences and multi-family residences were identified as Activity Category B, while schools, parks, recreation areas, playgrounds, golf courses, places of worship, medical facilities, and cemeteries were identified as Activity Category C land uses in the project area. Hotels/motels and restaurants were identified under Activity Category E.

Short-term measurement locations were selected to represent each major developed area within the project area. Long-term measurements were conducted to capture diurnal traffic noise level patterns in the project area. Short-term measurement locations were selected to serve as representative modeling locations. Several other nonmeasurement locations were selected as modeling locations. The field survey for all noise measurements included visiting the project sites to identify land uses within the project limits and to select the noise measurement sites.

The noise measurement sites were selected taking into consideration the following general site requirements:

- Sites were acoustically representative of areas and conditions of interest. They were located at areas of human use.
- Sites were clear of major obstructions between source and receiver. Microphone positions were more than 10 feet away from reflecting surfaces.
- Sites were free of noise contamination by sources other than those of interest. Sites were not located near barking dogs, lawn mowers, pool pumps, air conditioners, etc.
- Sites were not exposed to prevailing meteorological conditions that are beyond the constraints discussed in the Technical Noise Supplement (TeNS).

Field investigations were conducted to determine existing noise levels and gather information to develop and calibrate the traffic noise model that was used for predicting future noise levels. Ambient noise levels were measured along the HDC main alignment area to assess new freeway traffic noise impacts for the HDC Project. Existing noise levels were recorded at 66 locations and modeled at 32 locations. Five long-term (24-hour) noise-level readings were conducted to determine the noisiest hour within the project limits. These locations are acoustically representative of the noise environment and land uses within the limits of the project. The existing ambient noise levels measured were between 42 and 70 dBA. These existing noise levels, in addition to 5 other long-term noise measurements conducted along the project corridor, were also used in assessing the rail noise impacts. Existing noise levels at various receptor locations are presented in Tables 3.2.7-4 through 3.2.7-8. Receptor locations are shown in Appendix N.

Table 3.2.7-4 Predicted Train and Overall Noise Levels – HDC Freeway/Expressway Alternative with HSR – Main Alignment Segment 1 (between SR-14 and 100th Street)

						TRAFFIC NOISE		TRAIN NOISE			TRAFFIC + TRAIN NOISE	
Receiver	Direction	Location	Land Use	FHWA Noise Abatement Criteria (dBA)	Existing Noise Level. dBA	Future Worst-Hour Traffic Noise Level, Leq, dBA	FHWA/ Caltrans Impact Type (Appoach/ Exceed, Substantial)	Future Peak Hour Train Noise Level, Leq, dBA	FRA Noise Impact Criteria (Moderate/ Severe), dBA	FRA Train Noise impact Type (None, Moderate, Severe)	Future Peak Hour Overall Project Noise Level, Leq, dBA	Increase of Future Noise Level Due to Train Operations
B0	WB	1018 E. Ave. P5, Palmdale	R	B (67)	49	68	A/E	47	58 / 64	None	68	0
BM0	WB	1045 E. Ave. P5, Palmdale	R	B (67)	49	68	A/E	49	58 / 64	None	68	0
B1	EB	38902 25th St., Palmdale	R	B (67)	58	60	None	40	62 / 67	None	60	0
B5	EB	39149 8th St., Palmdale	CH	B (67)	48	66	A/E	43	58 / 64	None	66	0
B6	WB	39315 Carolside Ave., Palmdale	R	B (67)	53	68	A/E	37	59 / 65	None	68	0

Land Use:
R = Residential
CH = Church

Table 3.2.7-5 Predicted Train and Overall Noise Levels – HDC Freeway/Expressway Alternative with HSR – Main Alignment Segment 2 (between 100th Street and Los Angeles/San Bernardino County Line)

						TRAFFIC NOISE		TRAIN NOISE			TRAFFIC + TRAIN NOISE	
Receiver	Direction	Location	Land Use	FHWA Noise Abatement Criteria (dBA)	Existing Noise Level. dBA	Future Worst-Hour Traffic Noise Level, Leq, dBA	FHWA/ Caltrans Impact Type (Appoach/ Exceed, Substantial)	Future Peak Hour Train Noise Level, Leq, dBA	FRA Noise Impact Criteria (Moderate/ Severe), dBA	FRA Train Noise impact Type (None, Moderate, Severe)	Future Peak Hour Overall Project Noise Level, Leq, dBA	Increase of Future Noise Level Due to Train Operations
1	EB	13400 E Ave R, Palmdale	R	B (67)	44	55	A/E	41	57 / 64	None	55	0
2	WB	14660 E Palmdale Blvd., Palmdale	R	B (67)	45	63	S	46	57 / 64	None	63	0
3	EB	14745 E Ave Q14, Palmdale	R	B (67)	46	68	A/E	49	57 / 64	None	68	0
4	WB	15366 Palmdale Blvd., Palmdale	R	B (67)	46	62	S	45	57 / 64	None	62	0
M4	WB	15616 E Palmdale Blvd, Palmdale	R	B (67)	46	67	A/E	49	57 / 64	None	67	0
9	WB	20150 Palmdale Blvd., Lancaster	R	B (67)	55	59	None	46	60 / 66	None	59	0
M9	WB	38250 200th St. E, Lancaster	R	B (67)	55	63	None	46	60 / 66	None	63	0
10	EB	20539 Ave R, Palmdale	R	B (67)	57	57	None	42	61 / 67	None	57	0
M10	EB	20847 Ave R, Palmdale	R	B (67)	57	58	None	44	61 / 67	None	58	0
M11	WB	22210 E Palmdale Blvd., +C54Lake Los Angeles	R	B (67)	55	62	None	45	60 / 66	None	62	0

Land Use:
R = Residential

Table 3.2.7-6 Predicted Train and Overall Noise Levels – HDC Freeway/Expressway Alternative with HSR – Main Alignment Segment 2 (between 100th Street and Los Angeles/San Bernardino County Line), Variation D

						TRAFFIC NOISE		TRAIN NOISE			TRAFFIC + TRAIN NOISE	
Receiver	Direction	Location	Land Use	FHWA Noise Abatement Criteria (dBA)	Existing Noise Level. dBA	Future Worst-Hour Traffic Noise Level, Leq, dBA	FHWA/ Caltrans Impact Type (Appoach/ Exceed, Substantial)	Future Peak Hour Train Noise Level, Leq, dBA	FRA Noise Impact Criteria (Moderate/ Severe), dBA	FRA Train Noise impact Type (None, Moderate, Severe)	Future Peak Hour Overall Project Noise Level, Leq, dBA	Increase of Future Noise Level Due to Train Operations
10	WB	20539 Ave R, Palmdale	R	B (67)	57	65	None	47	61 / 67	None	65	0
M10	WB	20847 Ave R, Palmdale	R	B (67)	57	60	None	44	61 / 67	None	60	0

Land Use:
R = Residential

Table 3.2.7-7 Predicted Train and Overall Noise Levels – HDC Freeway/Expressway Alternative with HSR – Main Alignment Segment 3

						TRAFFIC NOISE		TRAIN NOISE			TRAFFIC + TRAIN NOISE	
Receiver	Direction	Location	Land Use	FHWA Noise Abatement Criteria (dBA)	Existing Noise Level. dBA	Future Worst-Hour Traffic Noise Level, Leq, dBA	FHWA/ Caltrans Impact Type (Appoach/ Exceed, Substantial)	Future Peak Hour Train Noise Level, Leq, dBA	FRA Noise Impact Criteria (Moderate/ Severe), dBA	FRA Train Noise impact Type (None, Moderate, Severe)	Future Peak Hour Overall Project Noise Level, Leq, dBA	Increase of Future Noise Level Due to Train Operations
15		17713 Stevens St., Adelanto	R	B (67)	56	56	None	42	61 / 67	None	56	0
16		11301 Air Expressway, Adlanto	R	B (67)	52	63	None	47	59 / 65	None	63	0
M1-17		Richardson Park, Adelanto	R	B (67)	57	58	None	40	61 / 69	None	58	0
M2-17	WB	Adelanto School District Office	C	E (72)	56	56	None	41	61 / 67	None	56	0
18	EB	12200 Hibiscus Rd., Adelanto	R	B (67)	59	60	None	44	62 / 68	None	60	0
19		15059 Turner Rd. , Victorville	R	B (67)	49	58	None	47	58 / 65	None	59	1
20		18003 Westwind Rd., Victorville	G	B (67)	64	64	None	44	65 / 70	None	64	0
20a	WB	Rockview Park, Victorville	P	B (67)	42	52	None	49	57 / 62	None	53	1
21		17442 D St., Victorville	R	B (67)	63	63	None	49	65 / 70	None	63	0
22e		17284 Dante St., Victorville	R	B (67)	48	59	None	43	58 / 64	None	59	0
M22e	EB	Near 17284 Dante St Victorville	R	B (67)	57	59	None	44	61 / 67	None	59	0

Land Use:
R = Residential
C = Commercial
P = Park
G = Golf Course

Table 3.2.7-8 Predicted Train and Overall Noise Levels – HDC Freeway/Expressway Alternative with HSR – Main Alignment Segment 3, Variation E

						TRAFFIC NOISE		TRAIN NOISE			TRAFFIC + TRAIN NOISE	
Receiver	Direction	Location	Land Use	FHWA Noise Abatement Criteria (dBA)	Existing Noise Level. dBA	Future Worst-Hour Traffic Noise Level, Leq, dBA	FHWA/ Caltrans Impact Type (Appoach/ Exceed, Substantial)	Future Peak Hour Train Noise Level, Leq, dBA	FRA Noise Impact Criteria (Moderate/ Severe), dBA	FRA Train Noise impact Type (None, Moderate, Severe)	Future Peak Hour Overall Project Noise Level, Leq, dBA	Increase of Future Noise Level Due to Train Operations
C	EB	16924 Jurassic Pl., Victorville	R	B (67)	48	54	None	47	58 / 64	None	54	0
M1C	EB	16982 Manning St., Victorville	R	B (67)	48	57	None	52	58 / 64	None	58	1
M2C	EB	16988 Jurassic PL, Victorville	R	B (67)	48	59	None	42	58 / 64	None	59	0
M3C	EB	17092 Jurassic PL, Victorville	R	B (67)	48	60	None	40	58 / 64	None	60	0
M4C	EB	17139 Jurassic PL., Victorville	R	B (67)	48	61	None	39	58 / 64	None	61	0
M5C	EB	17047 Jurassic PL, Victorville	R	B (67)	48	56	None	42	58 / 64	None	56	0
M6C	EB	17103 Jurassic PL, Victorville	R	B (67)	48	57	None	40	58 / 64	None	57	0

Land Use:
R = Residential

Environmental Consequences

This section describes the potential impacts related to operation of the proposed project. Under 23 CFR 772.7, this project has been deemed to be a Type I project.[12]

Freeway/Expressway and Freeway/Tollway Alternatives

Noise impacts from these two alternatives and their variations would arise from traffic noise. As detailed in the *Noise Study Report and High-Speed Rail Impact Assessment*, there would be substantial noise increases in most of the areas due to the mainline alignment because it is a newly constructed freeway. Conversely, some areas are expected to experience a drop in noise levels postconstruction due to retaining walls from the new connectors shielding traffic noise coming from the main alignment. Overall, according to FHWA's Traffic noise Prediction Model (FHWA-RD-77-108) and Caltrans' Traffic Noise Model (TNM 2.5), future noise levels are predicted to be in the range of 52 to 77 dBA-L_{eq}(h).

The traffic noise analysis indicates that residential areas, a school, a park, and a church within the project limits would be impacted after project completion under the Freeway/Expressway and Freeway/Tollway alternatives including their variations (i.e., the noise level would approach or exceed FHWA NAC) as summarized in Tables 3.2.7-4 through 3.2.7-8.

Freeway/Expressway and Freeway/Tollway with HSR Alternatives

Noise impacts under the alternatives with HSR feeder would arise from traffic noise and noise associated with HSR operation. Future project noise levels, as well as the combined cumulative noise levels, which include the projected traffic noise levels, were calculated.

Procedures outlined in the FRA High-Speed Ground Transportation Noise and Vibration Impact Assessment were used to predict HSR pass-by noise levels at representative noise-sensitive locations along the project alignment. Per discussion earlier, due to the special circumstance of this project where the freeway noise would be the dominant noise source, it has been decided and agreed upon with FRA that rail noise impact would be assessed using Category 3 (L_{eq}) criteria for all noise-sensitive land uses.

Train pass-by noise levels at the sensitive locations were calculated using the operation schedule, speed, and distance to track alignment that were available at the time of the study. Some of the parameters used in the analysis are as follows:

- A 10-car electric multiple unit (EMU) train would be operating.
- Operating speed of 125 miles per hour (mph) assumed throughout the length of the corridor for worst-case analysis.
- The operating times for the proposed service would be between 6:00 a.m. and midnight. The operating plan for HSR service specifies mid-day headways of

[12] Type I project is a project that involves construction of a highway on new location or the physical alteration of an existing highway, which significantly changes either the horizontal or vertical alignment or increases the number of through-traffic lanes.

20 minutes, morning and evening headways of 30 minutes, and early morning and late night headways of 1 hour.

- Tracks would be on embankment.

Results of the train noise analysis indicate that there would be no impact expected as a result of the HSR operation, and the train noise contribution to the overall project noise levels would be insignificant throughout the entire project corridor. Tables 3.2.7-4 through 3.2.7-8 present the results of the train noise impact analysis, as well as the combined project noise effects along the segment where both HSR and freeway/expressway co-exist. As shown in the tables, the increase in future noise levels as a result of the train noise operations are mostly zeros. It is also shown that all potential project impacts are due to the traffic noise generated by the freeway component of the project. The primary reason that the HSR operation noise is not anticipated to have a significant effect on the overall noise level is due to the continuous dominant noise effect of freeway vehicular traffic, compared to the relatively infrequent HSR operations. When the energy of the relatively low train noise (in terms of L_{eq}) is compared to that of the much higher vehicular traffic noise because of the normally continuous and higher volume traffic flow, the effect of the train noise would be negligible. For this reason, there would be no meaningful difference in noise levels for a train operating between 125 mph and 150 mph.

Vibration Associated with HSR Operation

Following guidelines and procedures in the FRA High-Speed Ground Transportation Noise and Vibration Assessment manual, the ground vibration related to the HSR pass bys were estimated and assessed at locations of various distances from track centerline. The distance from track centerline to the vibration impact line for each of the FRA land-use categories is summarized in Table 3.2.7-9.

Table 3.2.7-9 Groundborne Vibration Impact Levels

FRA Land-Use Category	Groundborne Vibration Impact Levels (dB ref. 1 micro-inch/sec)	Distance to Impact Level Line (ft)
Category 1: Buildings where low ambient vibration is essential for interior operations.	65 VdB	300
Category 2: Residences and buildings where people normally sleep.	75 VdB	100
Category 3: Institutional land uses with primarily daytime use.	78 VdB	75

As shown in Table 3.2.7-9, the FRA limits for groundborne vibration related to train pass by for this project would be 65, 75, and 78 VdB for Categories 1, 2, and 3 land uses, respectively. Assuming that the HSR would be operating at maximum operating speed of 125 mph throughout the entire length of the project corridor for worst-case analysis, unless there are Category 1 land uses located within 300 feet of the nearest track centerline, Category 2 land uses (i.e., homes) located within 100 feet of the track centerline, or Category 3 land uses (i.e., institutional land uses with primarily daytime use) located within 75 feet of the nearest track centerline, there would be no anticipated vibration impact due to HSR operation.

Category 1 land uses are for buildings where low ambient vibration is essential for interior operations. The Air Force Plant 42 (AFP-42) facilities located near the project corridor in Palmdale would be considered Category 1 to account for the vibration-sensitive operations inside the buildings. The nearest AFP-42 building is estimated to be approximately 700 feet from the nearest track centerline; therefore, no impact at AFP-42 is anticipated. The estimated vibration level at AFP-42 would be approximately 53 VdB. No vibration impact is expected to occur along the entire length of the project corridor as a result of the HSR operation.

Avoidance, Minimization, and/or Noise Abatement Measures

Project Construction

Measures to minimize noise impacts during project construction are provided in Section 3.6, Construction Impacts, of this environmental document.

Project Operation

Because traffic noise impacts have been identified, noise abatement has been considered for the impacted receptors. As stated in 23 CFR 772 and in Caltrans Protocol, noise abatement is considered where noise impacts are predicted, where frequent human use occurs, and where a lowered noise level would be of benefit. In addition, because no train operation noise impacts are anticipated and the train noise contribution to the overall project noise is minimal, the abatement considered for traffic noise would also be valid and effective for the overall project noise.

Noise abatement is considered for locations where traffic noise levels would approach or exceed the NAC or there is a noise level increase of 12 dB. A barrier must meet both the feasible and reasonable criteria to be built. Feasibility of noise abatement is an engineering concern. A minimum 5-dB reduction in the future noise level must be achieved for an abatement measure to be considered feasible. The preliminary reasonableness determination is made first by achieving the noise reduction design goal. The design goal is that a barrier must be predicted to provide at least 7 dB of noise reduction at one or more benefited receptors for the barrier to be considered reasonable. Second, for a barrier to be considered reasonable, construction cost must be within the established allowance per benefited receptor. Finally, the viewpoints of benefitted receptors (including property owners and residents of the benefitted receptors) must be taken into account for a barrier to be considered reasonable.

Based on the studies completed to date, Caltrans intends to incorporate noise abatement in the form of soundwalls at the location described in the following paragraphs. If during final design, conditions have substantially changed, noise abatement may not be necessary. The final decision of the noise abatement will be made upon completion of the project design and the public involvement processes.

A summary of the considered soundwalls is presented in Tables 3.2.7-10 through 3.2.7-14.

Table 3.2.7-10 Summary of Considered Soundwalls on SR-14 – Freeway/Expressway Alternative (Palmdale)

Proposed Soundwall	Design Yr. (2035) Noise level dBA $L_{eq}(h)$	Noise Increase (dBA)	Direction	Location	Acoustically Feasible Height Range (feet)	Approximate Length (feet)	Noise Attenuation Range (dBA)	Number of Benefitted Receivers	Reasonable Allowance
SW-100	67	0	NB	Between Avenue S and Palmdale Boulevard	10 to 16	3,150	5 to 9	1 to 14	$71,000 to $974,000
SW-101	67	0				1,993			
SW-102	77	11	SB	Between Avenue S and Palmdale Boulevard	10 to 16	2,940	7 to 11	36 to 62	$2.556,000 to $4,402,000
SW-103	77	11				970			
SW-104	70	0	SB	Between new SR-138 / HDC and 10th Street W	12 to 16	1,780	5 to 7	11	$781,000
SW-105	71	0	SB	Between Avenue O-8 W and Avenue O	10 to 16	400	6 to 8	2	$142,000

Table 3.2.7-11 Summary of Considered Soundwalls on HDC – Freeway/Expressway Alternative – Main Alignment Segment 1 (between SR-14 and 100th Street)

Proposed Soundwall	Design Yr. (2035) Noise level dBA L_{eq}(h)	Noise Increase (dBA)	Direction	Location	Acoustically Feasible Height Range (feet)	Approximate Length (feet)	Noise Attenuation Range (dBA)	Number of Benefitted Receivers	Reasonable Allowance
SW-106	69	15	WB	Between Division Street and 3rd Street E	10 to 16	1594	8 to 11	14	$994,000
SW-107	66	18	EB	Between Sierra Highway and 15th Street E	10 to 16	3400	6 to 7	1	$71,000
SW-109	68	19	WB	Between 10th Street E and 15th Street E	8 to 16	2500	5 to 7	11 to 22	$781,000 to $1,562,000

Table 3.2.7-12 Summary of Considered Soundwalls on HDC – Freeway/Expressway Alternative – Main Alignment Segment 1 (between SR-14 and 100th Street) – Variation A

Proposed Soundwall	Design Yr. (2035) Noise level dBA L_{eq}(h)	Noise Increase (dBA)	Direction	Location	Acoustically Feasible Height Range (feet)	Approximate Length (feet)	Noise Attenuation Range (dBA)	Number of Benefitted Receivers	Reasonable Allowance
SW-106	68	15	WB	Between Division Street and 3rd Street E	10 to 16	1594	8 to 11	14	$994,000
SW-107	67	19	EB	Between Sierra Highway and 15th Street E	8 to 16	3000	5 to 9	1	$71,000
SW-109	71	22	WB	Between 10th Street E and 15th Street E	8 to 16	2800	6 to 8	11 to 22	$781,000 to $1,562,000

Table 3.2.7-13 Summary of Considered Soundwalls on HDC – Freeway/Expressway Alternative – Main Alignment Segment 2 (between 100th Street and Los Angeles/San Bernardino County Line)

Proposed Soundwall	Design Yr. (2035) Noise level dBA L_{eq}(h)	Noise Increase (dBA)	Direction	Location	Acoustically Feasible Height Range (feet)	Approximate Length (feet)	Noise Attenuation Range (dBA)	Number of Benefitted Receivers	Reasonable Allowance
SW-111	63	18	WB	Between 140th Street E and 170th Street E	8 to 16	4290	5 to 8	2	$142,000
SW-112	68	22	EB	Between 140th Street E and 170th Street E	12 to 16	2000	6 to 7	1	$71,000
SW-113	67	21	WB	Between 140th Street E and 170th Street E	8 to 16	4500	5 to 9	2	$142,000

Table 3.2.7-14 Summary of Considered Soundwalls on HDC – Freeway/Expressway Alternative – Main Alignment Segment 3 - Expressway

Proposed Soundwall	Design Yr. (2035) Noise level dBA L_{eq}(h)	Noise Increase (dBA)	Direction	Location	Acoustically Feasible Height Range (feet)	Approximate Length (feet)	Noise Attenuation Range (dBA)	Number of Benefitted Receivers	Reasonable Allowance
SW-114	63	17	EB	Between Joshua Road and Standing Rock Road	12 to 16	2000	7 to 9	1	$71,000

Northbound SR-14

Soundwalls SW-100 and SW-101 would be located at the edge-of-shoulder and would benefit single-family homes and the Palmdale Learning Plaza School between Avenue S and Palmdale Boulevard, along northbound State Route (SR) 14. The proposed Soundwall SW-100 would replace an existing 12-foot-high soundwall, which would be removed due to the proposed freeway widening. Soundwall SW-100, in combination with Soundwall SW-101, would attenuate the predicted noise impacts at the school playground. A combination of the two proposed soundwalls would provide up to 9 dB of noise reduction. The proposed soundwalls were analyzed based on the assumption that they are constructed on retaining walls of the connector and ramp along the northbound side. If the assumption has changed and the proposed connectors and ramps are to be built on piles, all soundwalls in the area would need to be reanalyzed and remodeled.

Soundwall SW-104 would be located at the edge-of-shoulder, along northbound SR-14, between the new HDC freeway and 10th Street West. This soundwall would attenuate the noise impact at the residential area represented by Sites A0 and A3. The height of the soundwall required to meet the design goals for feasibility and reasonableness is 16 feet. The traffic noise analysis for the area is based on the assumption that all soundwalls are built on retaining walls of connectors and ramps. If the assumption has changed and the proposed connectors and ramps are to be built on piles, all soundwalls in the area would need to be reanalyzed and remodeled.

Southbound SR-14

Soundwalls SW-102 and SW-103 would be located at the edge-of-shoulder and would benefit the residential area consisting of single-family homes between Palmdale Boulevard and Avenue S along southbound SR-14. Soundwall SW-102 would replace the entire existing 12-foot-high soundwall in the area south of Palmdale Boulevard. The existing 12-foot-high soundwall would be removed due to the proposed widening along southbound SR-14 and realignment of the southbound on-ramp from eastbound Palmdale Boulevard. The two proposed soundwalls would provide up to 11 dB of noise reduction.

Soundwall SW-105 would be located at the southbound edge-of-shoulder between Avenue O and Avenue O-8 W. This soundwall would benefit two residential properties.

Westbound HDC Main Alignment 1

Soundwall SW-106 would benefit the residential area consisting of single-family homes located between Division Street and 3rd Street East. Soundwall SW-106 (range of 10 to 16 feet) would provide noise reduction from 8 to 11 dBA to the residents.

Soundwall SW-109 would benefit the residential area consisting of single-family homes located between 10th Street East and 15th Street East. Soundwall SW-109 (range of 8 to 16 feet) would provide noise reduction from 5 to 7 dBA to the residents.

Eastbound HDC Main Alignment 1

Soundwall SW-107 would benefit Unity Church located west of 8th Street East along the newly proposed eastbound HDC. Soundwall SW-107 (range of 10 to 16 feet) would provide noise reduction from 6 to 7 dBA.

Westbound HDC Main Alignment 1, Variation A

Soundwall SW-106 would have the same benefits as mentioned previously for the Westbound HDC Main Alignment 1.

Soundwall SW-109 would benefit the residential area consisting of single-family homes located between 10th Street East and 15th Street East. Soundwall SW-109 (range of 8 to 16 feet) would provide noise reduction from 6 to 8 dBA.

Eastbound HDC Main Alignment 1 Variation A

Soundwall SW-107 would benefit Unity Church located west of 8th Street East along the newly proposed eastbound HDC. Soundwall SW-107 (range of 8 to 16 feet) would provide noise reduction of 5 to 9 dBA.

Westbound HDC Main Alignment 2

Soundwall SW-111 would benefit the residential area consisting of two single-family homes located between just east of 140th Street East and 150th Street East. Soundwall SW-111 (range of 8 to 16 feet) would provide noise reduction of 5 to 8 dBA.

Soundwall SW-113 would benefit the residential area consisting of two single-family homes located between east of 150th Street East and 160th Street East. Soundwall SW-113 (range of 8 to 16 feet) would provide noise reduction of 5 to 9 dBA.

Eastbound HDC Main Alignment 2

Soundwall SW-112 would benefit a single-family residential home located between 140th Street East and 150th Street East. Soundwall SW-112 (range of 12 to 16 feet) would provide a 6- to 7-dBA noise reduction.

Eastbound HDC Main Alignment 3 Expressway

Soundwall SW-114 would benefit a single-family residential home located between Joshua Road and Standing Rock Road. Soundwall SW-114 (range of 12 to 16 feet) would provide a 7- to 9-dBA noise reduction.

A Noise Abatement Decision Report (NADR), dated June 18, 2015, was prepared by Caltrans to determine whether the considered noise abatement measures would meet requirements to be recommended. Two determining factors are the feasibility and reasonableness of the soundwalls. Tables 3.2.7-15 through 3.2.7-19 summarize NADR findings on construction cost and calculated reasonable allowance to determine economic feasibility for each noise barrier.

Based on the studies completed to date and the NADR, Caltrans intends to incorporate noise abatement in the form of soundwalls that were found to be both feasible and reasonable. The recommended soundwalls would reduce the traffic noise levels by at least 5 dB at the impacted receivers, would meet the design goal by providing a 7-dB reduction for at least one receiver, and would cost less than the reasonableness cost allowance. If, during final design, conditions have substantially changed, noise abatement may not be necessary. The final decision of the noise abatement will be made upon completion of the project design and the public involvement processes.

The recommended soundwalls, determined by the NADR to meet these criteria, are presented in Table 3.2.7-20. The soundwall locations are also graphically shown in figures in Appendix N.

Prior to the formal selection of the Preferred Alternative and approval of the project, all property owners of the benefitted receptors located adjacent to each of the proposed soundwalls will be given an opportunity to vote if they want the soundwall to be constructed to abate the traffic noise in their area or not. For soundwalls located within State right-of-way (ROW), if more than 50 percent of the votes from responding benefitted receptors oppose the abatement, the abatement will not be considered reasonable and will not be built. If the soundwall is to be located on private property (or properties), 100 percent of the property owners must vote in favor of the soundwall for it to be constructed; however, at this time, none of the recommended soundwalls are on private property.

NOI-1: Based on the studies completed to date and the NADR, Caltrans intends to incorporate noise abatement in the form of soundwalls that were found to be both feasible and reasonable.

Table 3.2.7-15 Summary of Preliminary Noise Abatement Decision for Soundwalls on SR-14

Barrier	Height (ft)	Acoustically Feasible (5dBA min.)	Number of Benefited Residences	Total Reasonable Allowance	Estimated Construction Cost	Cost less than Allowance	Noise Reduction (dBA)
SW-100, SW-101	8	Y	1	$71,000	$1,420,000	N	5
	10	Y	8	$568,000	$1,655,000	N	6
	12	Y	10	$710,000	$1,891,000	N	7
	14	Y	14	$994,000	$2,126,000	N	7
	16	Y	14	$994,000	$2,344,000	N	8
SW-102, SW-103	8	N	0	$0	$1,080,000	N	5
	10	Y	36	$2,556,000	$1,259,000	Y	8
	12	Y	62	$4,402,000	$1,437,000	Y	10
	14	Y	62	$4,402,000	$1,616,000	Y	11
	16	Y	62	$4,402,000	$1,782,000	Y	12
SW-104	8	N	0	$0	$491,000	N	4
	10	N	0	$0	$573,000	N	5
	12	Y	11	$781,000	$654,000	Y	5
	14	Y	11	$781,000	$736,000	Y	6
	16	Y	11	$781,000	$751,000	Y	7
SW-105	8	N	0	$0	$110,000	N	4
	10	Y	2	$142,000	$129,000	Y	6
	12	Y	2	$142,000	$137,000	Y	7
	14	Y	2	$142,000	$165,000	N	7
	16	Y	2	$142,000	$182,000	N	8

Table 3.2.7-16 Summary of Preliminary Noise Abatement Decision for Soundwalls on HDC: Main Alignment, Segment 1

Barrier	Height (ft)	Acoustically Feasible (5dBA min.)	Number of Benefited Residences	Total Reasonable Allowance	Estimated Construction Cost	Cost less than Allowance	Noise Reduction (dBA)
SW-106	8	N	0	$0	$351,000	N	3
	10	Y	14	$994,000	$424,000	Y	8
	12	Y	14	$994,000	$497,000	Y	9
	14	Y	14	$994,000	$570,000	Y	10
	16	Y	14	$994,000	$637,000	Y	11
SW-107	8	Y	0	$0	$939,000	N	3
	10	Y	1	$71,000	$1,094,000	N	4
	12	Y	1	$71,000	$1,250,000	N	4
	14	Y	1	$71,000	$1,406,000	N	4
	16	Y	1	$71,000	$1,550,000	N	5
SW-109	8	Y	11	$781,000	$690,000	Y	4
	10	Y	11	$781,000	$745,000	Y	6
	12	Y	22	$1,562,000	$1,076,000	Y	7
	14	Y	22	$1,562,000	$1,034,000	Y	8
	16	Y	22	$1,562,000	$1,139,000	Y	9

Table 3.2.7-17 Summary of Preliminary Noise Abatement Decision for Soundwalls on HDC: Main Alignment, Segment 1 (Variation A)

Barrier	Height (ft)	Acoustically Feasible (5dBA min.)	Number of Benefited Residences	Total Reasonable Allowance	Estimated Construction Cost	Cost less than Allowance	Noise Reduction (dBA)
SW-106	8	N	0	$0	$351,000	N	3
	10	Y	14	$994,000	$424,000	Y	8
	12	Y	14	$994,000	$497,000	Y	9
	14	Y	14	$994,000	$570,000	Y	10
	16	Y	14	$994,000	$637,000	Y	11
SW-107	8	Y	1	$71,000	$828,000	N	2
	10	Y	1	$71,000	$966,000	N	2
	12	Y	1	$71,000	$1,103,000	N	4
	14	Y	1	$71,000	$1,240,000	N	5
	16	Y	1	$71,000	$1,367,000	N	5
SW-109	8	Y	11	$781,000	$773,000	Y	4
	10	Y	11	$781,000	$841,000	N	6
	12	Y	22	$1,562,000	$1,205,000	Y	7
	14	Y	22	$1,562,000	$1,158,000	Y	8
	16	Y	22	$1,562,000	$1,276,000	Y	8

Table 3.2.7-18 Summary of Preliminary Noise Abatement Decision for Soundwalls on HDC: Main Alignment, Segment 2

Barrier	Height (ft)	Acoustically Feasible (5dBA min.)	Number of Benefited Residences	Total Reasonable Allowance	Estimated Construction Cost	Cost less than Allowance	Noise Reduction (dBA)
SW-111	8	Y	2	$142,000	$1,185,000	N	2
	10	Y	2	$142,000	$1,381,000	N	2
	12	Y	2	$142,000	$1,577,000	N	4
	14	Y	2	$142,000	$1,773,000	N	5
	16	Y	2	$142,000	$1,955,000	N	5
SW-112	8	N	0	$0	$552,000	N	5
	10	N	0	$0	$644,000	N	5
	12	Y	1	$71,000	$735,000	N	7
	14	Y	1	$71,000	$827,000	N	7
	16	Y	1	$71,000	$912,000	N	8
SW-113	8	N	1	$71,000	$1,243,000	N	3
	10	Y	2	$142,000	$1,448,000	N	4
	12	Y	2	$142,000	$1,654,000	N	6
	14	Y	2	$142,000	$1,860,000	N	7
	16	Y	2	$142,000	$2,051,000	N	7

Table 3.2.7-19 Summary of Preliminary Noise Abatement Decision for Soundwalls on HDC: Main Alignment, Segment 3

Barrier	Height (ft)	Acoustically Feasible (5dBA min.)	Number of Benefited Residences	Total Reasonable Allowance	Estimated Construction Cost	Cost less than Allowance	Noise Reduction (dBA)
SW-114	8	N	0	$0	$552,000	N	4
	10	N	0	$0	$644,000	N	4
	12	Y	1	$71,000	$735,000	N	7
	14	Y	1	$71,000	$827,000	N	8
	16	Y	1	$71,000	$912,000	N	9

Table 3.2.7-20 Summary of Preliminary NADR Recommended Soundwalls

Barrier	Soundwall Height (ft)	Noise Reduction (dBA)	
SW-100	16	8	
SW-101	16	8	
SW-102	16	12	
SW-103	16	12	
SW-104	16	7	
SW-105	12	7	
SW-106 /SW-106 (Var A)	16 /16	11	11
SW-109 / SW109 (Var A)	16 /16	9	8

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3.2.8 Energy

Regulatory Setting

The National Environmental Policy Act (42 United States Code [U.S.C.] Part 4332) (NEPA) requires identification of all potentially significant impacts to the environment, including energy impacts. For the California Environmental Quality Act (CEQA), Appendix F, Energy Conservation, in the CEQA Guidelines, states that Environmental Impact Reports (EIRs) must include a discussion of the potential energy impacts of proposed projects, with particular emphasis on avoiding or reducing inefficient, wasteful, and unnecessary consumption of energy.

Affected Environment

Information presented in this section of the environmental document is obtained from the *High Desert Corridor (HDC) Energy Technical Report* (TAHA, 2014).

Energy is currently consumed in the study area for construction of public and private projects; operation of motor vehicles; and to power a variety of existing land use functions. According to the California Energy Commission (CEC), California is the tenth largest worldwide energy consumer, and the state is ranked second in consumption in the United States. Of the overall energy consumed, the transportation sector represents the largest portion, as energy use in California continues to be dominated by growth in passenger vehicles. As such, consumption associated with vehicular movement is almost entirely fossil fuel (i.e., gasoline and diesel) based. It is important to note that the population of California is estimated to exceed 44 million by 2020, which could result in substantial increases in the State's transportation fuel demand.

As discussed in the *HDC Energy Technical Report,* California contains abundant sources of renewable and nonrenewable energy sources. Nonrenewable resources include large crude oil and natural gas deposits that are located in the Central Valley and along the coast. Additionally, California's renewable energy sources include hydroelectric; geothermal and wind power resources found along the coastal mountain ranges and the eastern border with Nevada; and solar energy potential concentrated in the southeast deserts. Existing energy resources pertinent to this project and market conditions are described below.

Petroleum

California is one of the top producers of crude oil in the country, accounting for approximately 8 percent of the country's total production in 2012. Foreign suppliers currently provide more than 40 percent of the crude oil refined in California. California refineries are capable of processing a wide variety of crude oil types and are designed to yield a high percentage of light products such as motor gasoline. Fuel is distributed across metropolitan southern California by many methods, including pipelines, railroads, and trucks.

Vehicles traversing the study area are primarily powered by gasoline and diesel fuel, with natural gas- and electric-powered vehicles representing a very small percentage of overall vehicular operations. California's gasoline and diesel markets are characterized by increasing demands. As of 2013, California imports more than 60 percent of its crude oil. The State's dependence on this increasingly expensive energy resource continues to grow.

Energy consumption in California continues to be dominated by growth in passenger vehicles. According to the *Indicators of Climate Change in California,* published by the California Environmental Protection Agency, Office of Environmental Health Hazard Assessment (OEHHA) (April 2009), California is the second largest consumer of transportation fuels in the world (behind the United States as a whole). More than 16 billion gallons of gasoline and 4 billion gallons of diesel fuel are consumed each year (California Environmental Protection Agency, 2009).

Electricity

Due to high electricity demand, California imports more electricity than any other state. States in the Pacific Northwest deliver power to California markets primarily from hydroelectric sources, while states in the Desert Southwest deliver power primarily from coal- and natural gas-fired sources. The major sources of electricity in California are from natural gas-powered plants, hydroelectric, and nuclear. Natural gas-fired power plants generate more than 50 percent of the state's electricity. California is one of the largest hydroelectric power producers in the country, producing approximately 12 percent of the state's electricity. California has one remaining nuclear power plant (Diablo Canyon in Central California), accounting for approximately 9 percent of the state's electricity. Only a few small coal-fired power plants operate in California.

Renewable Energy

California is second in the country in electricity generation from nonhydroelectric renewable energy sources. California is the top producer of electricity from geothermal energy in the country, generating 6.4 percent of its electricity in 2012. Approximately 5 percent of the electricity generated in the state is produced by wind energy, which is ranked third in the country. Solar power represents about 1 percent of electricity generated in California (CEC, 2013). The California Energy Action Plan includes incentives that encourage the installation of individual solar power systems on rooftops to further increase renewable energy usage.

In 2006, California amended its renewable portfolio standard to require investor-owned utilities, electric service providers, small and multijurisdictional utilities, and community choice aggregators to provide at least 33 percent of retail sales from renewable sources by the end of 2020. California has also adopted other policies to promote energy efficiency and renewable energy, including energy standards for public buildings, power source disclosure requirements for utilities, and net metering.

Environmental Consequences

This section addresses potential energy impacts during long-term operation of the HDC Project. Short-term energy impacts associated with construction of the project are addressed in Section 3.6, Construction Impacts. The analysis of operational impacts is at the regional level; therefore, by its nature, it is an analysis of cumulative impacts.

Transportation energy consumption reflects the types and number of vehicles in use, the extent of their use (vehicle miles traveled [VMT]), and their fuel economy (miles per gallon). Energy consumed in the operation of transportation systems is typically referred to as direct energy, which includes the fuel required for passenger vehicles (i.e., automobiles, vans, and light trucks), heavy trucks (i.e., three or more axles), and transit buses. Energy used to operate facilities, such as gas stations and station amenities, maintenance shops, and yards, is also part of direct energy, but it is a small percentage compared to the overall fuel consumption by automobiles.

Energy consumed in construction and maintenance is referred to as indirect energy. Indirect energy consumption includes three main components: (1) energy required to build the project; (2) energy required to manufacture vehicles that use the roads; and (3) energy required for maintenance/periodic rehabilitation of the infrastructure.

Implementation of the HDC Project would affect the use of energy resources in Los Angeles and San Bernardino counties. This analysis compares the energy consumption associated with the project in build-out year 2040 with the energy consumption for the No Build Alternative in 2040, as shown in Table 3.2.8-1. This comparison generally allows for an analysis of the relative impact of the project on energy consumption based on like assumptions about technology, fuels, and vehicles.

Table 3.2.8-1 Annual Projected Operational Energy Consumption by Alternative

Alternative[1]	VMT (millions)	BTU[2] (trillions)	Barrels (millions)	% Change from No Build Alternative
2020				
No Build	158,824	871.8	150.3	--
Freeway/Expressway	159,369	874.8	150.8	0.34
Freeway/Tollway	159,429	875.1	150.9	0.38
Freeway/Expressway with HSR Feeder Service	158,967	872.6	150.4	0.09
Freeway/Tollway with HSR Feeder Service	159,010	872.8	150.5	0.12
2040				
No Build	181,941	998.7	172.19	--
Freeway/Expressway	182,734	1,003.0	172.94	0.44
Freeway/Tollway	182,782	1,003.3	172.98	0.46
Freeway/Expressway with HSR Feeder Service	182,156	999.9	172.4	0.12
Freeway/Tollway with HSR Feeder Service	182,247	1000.3	172.5	0.17

[1] The alignment variations for the alternatives would also have no significant impact on energy usage.
[2] British Thermal Units

Source: High Desert Corridor Energy Study, 2014.

No Build Alternative

As shown in Table 3.2.8-1, the No Build Alternative would result in fewer VMT in comparison with each build alternative; however, these VMT numbers are considered worst-case because the calculations did not take into consideration the fact that the build alternatives would decrease travel times of delay by creating a shorter, more direct route with faster travel speeds (see Section 1.2.2, Need, *Travel Time*). Without the capacity improvements proposed in the build alternatives, congested traffic conditions and limitations on mobility would be more prevalent throughout the study area. These conditions would contribute to inefficient energy consumption because vehicles would use extra fuel while idling in stop-and-go traffic or moving at slow speeds through congested roadways.

Build Alternatives

As stated above, local energy demand for transportation projects typically is dominated by vehicle fuel consumption. Energy use calculations for roadway operations of each alternative are based on study area annual VMT (Table 3.2.8-1) for the 2020 opening year and the build-out year 2040. To calculate the propulsion energy generated for powering transit vehicles, the VMT for high-speed rail (HSR) was back-calculated using an energy consumption factor for rail transit from an estimated energy usage that was calculated through a Load Flow Simulation and Modeling run.

Table 3.2.8-1 shows that the VMT would increase for each of the build alternatives compared to the No Build Alternative. These increases could be interpreted to indicate that the project would create trips, when in fact, it would primarily redistribute trips. However, this increase in VMT represents a worst-case scenario because the project would decrease travel times of delay by creating a shorter direct route with faster travel speeds; therefore, the model reflects an increase in VMT due to the following reasons:

- The increased capacity for vehicles with implementation of the proposed project. Vehicles from outside the area would be attracted to the shorter route provided by the proposed project, resulting in less regional VMT.
- The mode shift from automobiles to transit with the provision of HSR service.
- The trip lengths for individual vehicles within the study area is held constant when, in actuality, the more direct route provided by the proposed alternatives would result in shorter trip lengths and an associated reduction in VMT.

However, for project consistency, the VMT was analyzed as output by the model.

Freeway/Expressway and Freeway/Tollway Alternatives

As shown in Table 3.2.8-1, compared to the No Build Alternative, the Freeway/ Expressway Alternatives would result in a 0.34 and 0.44 percent increase in energy consumption in 2020 and 2040, respectively, while the Freeway/Tollway Alternative would increase the energy consumption slightly higher than the Freeway/Expressway Alternatives (0.38 and 0.46 percent in 2020 and 2040, respectively). This increase represents a nominal change and would not substantially deplete supplies. Vehicle speeds would be increased, travel times would be reduced, and the increased energy would be used efficiently. Therefore, a less-than-significant energy impact related to operation of the Freeway/Expressway Alternative would occur.

Freeway/Expressway and Freeway/Tollway with HSR Alternatives (Preferred Alternative)

The Freeway/Expressway with HSR Feeder Service Alternative would result in a 0.09 percent increase in energy consumption in 2020 and a 0.12 percent increase in energy consumption in 2040 compared to the No Build Alternative, while the Freeway/Tollway with HSR Feeder Service Alternative would increase the energy consumption over the No Build Alternative by 0.12 percent in 2020 and 0.17 percent in 2040. This increase represents a nominal change and would not substantially deplete supplies.

The traffic analysis prepared for the proposed project indicates that approximately 81 percent of the projected HSR ridership would be diverted from automobiles. When subtracting HSR annual energy requirements, this would result in an energy reduction of approximately 641 and 833 billion British Thermal Units (BTUs) in 2020 and 2040, respectively. Over a 26-year span of the project, an approximate 15.9 trillion BTU reduction would occur as a result of automobile diversion to HSR feeder service; therefore, a less-than-significant energy impact related to operation of the Freeway/Expressway with HSR Feeder Service Alternative would occur.

Avoidance, Minimization, and/or Mitigation Measures

While the energy consumption of various build alternatives would not be substantially increased over the No Build Alternative as discussed above, the Los Angeles County Metropolitan Transportation Authority (Metro) and California Department of Transportation (Caltrans) have planned to incorporate the green and sustainable technologies as part of the project components. Based on the *Green Energy Feasibility Study* prepared for this project (June 2014), the following technologies are being recommended for further detailed study: photovoltaic solar highways; non-fossil fuel refueling stations; and opportunity for utility utilization of highway right-of-way (ROW). Inclusion of the green energy component into the proposed project would further improve energy efficiency. Once the specific site for the solar array is identified, additional environmental review would likely be required to analyze the site-specific effects.

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3.2.9 Electromagnetic Radiation

Information presented in this section of the environmental document is obtained from the *High Desert Corridor (HDC) Electromagnetic Radiation (EMR) Technical Memo* (May 2015). The Technical Memo also provides a description of the electrical systems associated with the high-speed rail (HSR) component of the proposed project and a background discussion on the science of EMR that may be useful to the reader in understanding the information presented in this section.

3.2.9.1 Regulatory Setting

Health and Safety

Federal

The U.S. Department of Commerce, Federal Communications Commission (FCC), has rules and regulations (47 *Code of Federal Regulations* [CFR] Part 15) on licensed and unlicensed radio frequency (RF) transmissions. Most telecommunications devices sold in the United States, whether they radiate intentionally or unintentionally, must comply with Part 15. FCC maximum permissible exposure (MPE) levels are compared to American National Standards Institute (ANSI)/Institute of Electrical and Electronics Engineers (IEEE) safety standards in Table 3.1.9-1.

Table 3.2.9-1 Maximum Permissible Exposure Levels for the General Public

Frequency (MHz)	General Public Maximum Permissible Exposure (mW/cm^2)	
	FCC Standards	ANSI/IEEE Standards
450	0.3	0.225
900	0.6	0.45
5,000	1.0	1.0

Notes: ANSI – American National Standards Institute, IEEE – Institute of Electrical and Electronics Engineers, FCC – Federal Communications Commission, mW/cm^2 – milliWatts per square centimeter, MHz – megahertz.

Source: Occupational Safety and Health Administration 1990

U.S. Department of Commerce, FCC, Office of Engineering and Technology Bulletin 65, *Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields* (OET 65) provides assistance in evaluating whether proposed or existing transmitting facilities, operations, or devices comply with limits for human exposure to RF fields adopted by the FCC.

State

The California Department of Education has established minimum distances for siting school facilities from the edge of power line easements (California Code of Regulations, Title 5, Section 14010) at: 100 feet for 50- to 133- kilovolt (kV) lines; 150 feet for 220- to 230-kV lines; and 350 feet for 500- to 550-kV lines.

The California Energy Commission (CEC) recommends designing electric power transmission lines so that electric fields at the edge of the utility's right-of-way (ROW) do not exceed 1.6 kV per meter (kV/m); the CEC made no recommendation on the strength of magnetic fields.

Other Organizations

Several organizations have developed guidelines for EMR exposure, including the International Commission on Non-Ionizing Radiation Protection, the IEEE, ANSI, and the American Conference of Governmental Industrial Hygienists (ACGIH). EMR standards suggested by these organizations address low-frequency (e.g., 60-hertz [Hz]) EMR exposure to the general public. A 1982 ANSI-recommended standard is 1 milliWatt per square centimeter (mW/cm^2).

The IEEE Standard, C95.6, *IEEE Standard for Safety Levels with Respect to Human Exposure to Electromagnetic Fields, 0-3 kHz,* is commonly used in the United States and was formally adopted by ANSI. This standard specifies MPE levels for the general public to extremely low frequency (ELF) (e.g., 0-3 kilohertz [kHz]) electromagnetic fields (EMFs). IEEE standards for the general public are frequency dependent and are based on RF levels averaged over 30 minutes. The MPEs are intended to protect all members of the public, including pregnant women, infants, and the infirm. The IEEE standards for 60-Hz fields for the general public are shown in Table 3.1.9-2.

Table 3.2.9-2 IEEE Standards for the General Public

Body Part	Frequency (Hz)	Field Strength
Magnetic Field Level		
Head and Torso	60	9.04 x 10^3 mG
Arms or Legs	60	632,000 mG
Electric Field Level		
Whole Body	60	5 kV/m
Notes: kV/m – kilovolt per meter, Hz – Hertz, mG – milliGauss.		

Source: Peninsula Corridor Joint Powers Board, 2014.

Electromagnetic Interference

The U.S. Department of Transportation, Federal Railroad Administration (FRA) has regulations (49 CFR Parts 236.8, 238.225, and 236 Appendix C) that provide rules, standards, and instructions about operating characteristics of electromagnetic, electronic, and electrical apparatus, and standards for passenger equipment. The FCC regulations discussed above, although health-based, serve to limit electromagnetic interference (EMI) from telecommunications devices. No other federal, state, or local governmental agency specifically regulates EMF for purposes of avoiding EMI.

3.2.9.2 Affected Environment

The HDC encompasses urban areas (Palmdale and Victorville) at each end and traverses an undeveloped area between the two cities. The EMF environment is thus expected to vary substantially, with a relatively noisy EMF environment in the urban areas and a relatively quiet EMF environment in undeveloped areas. This section describes the HDC study area in terms of existing and proposed sources of EMF and in terms of current and anticipated future EMF field densities.

General Setting

Land Use

Lands along the project alignment are mostly undeveloped. Some of the undeveloped land is used for rangeland or agriculture. Other common land uses along the proposed HDC route are residential and office development. Air Force Plant 42 (AFP-42)/Los Angeles/Palmdale Regional Airport abuts the project alignment near its western terminus in Palmdale. Land uses in the general vicinity of the proposed HDC include several other airports (e.g., Southern California Logistics Airport [SCLA]) and airfields; several schools; and at least three medical centers.

Sensitive receptors of EMR for health effect concerns include homes, offices, and other occupied structures near the project alignment, especially high-density land uses or land uses where individuals are present for long periods. Sensitive receptors for potential EMI along the proposed HDC include businesses engaged in nanotechnology or biotechnology research or other high-technology industries with sensitive electrical equipment, hospitals and other health facilities that use magnetic resonance imaging (MRI) or computerized axial tomology (CAT) technology, airports and other aircraft facilities, and businesses with radio or microwave communications.

Existing Sources of EMR

Substantial sources of EMR near the HDC alignment include several amplitude modulated (AM) and frequency modulated (FM) radio stations. Two cell phone towers are located near the alignment, one to the southwest of Palmdale and one to the east. A third cell phone tower is located at Quartzite Mountain to the north of Victorville. Several electric power transmission lines rated at 100 to 500 kV and owned by Los Angeles Department of Water and Power (LADWP) or Southern California Edison (SCE) cross the eastern portion of the HDC alignment, including one 500-kV direct current (DC) power line with a capacity of 2,400 megawatts (MW). In addition, several low-power electric power distribution lines cross the project alignment at various points. All of these facilities generate EMR of different frequencies and intensities.

Existing EMR Levels

The earth’s natural magnetic field ranges from about 300 to 600 milliGauss (mG), DC. EMR from human-made sources is common and is generally increasing in urban areas as new technologies are introduced and proliferate. People living in urban areas are exposed daily to a complex EMF of varying frequencies and strengths from a variety of electrical sources, including external sources, appliances, televisions, computers, and wiring in their homes. The average home in North America has a background alternating current (AC) magnetic field level indoors of about 1 mG (World Health Organization, 2007).

EMF in the HDC study area has not been measured; however, electron magnetic levels along the CalTrain corridor on the San Francisco peninsula have been measured and are assumed to be reasonably representative of urban and rural EMFs in California. Along that alignment, DC magnetic fields ranged from about 357 to 640 mG, and AC magnetic fields ranged from about 1.8 to 18.4 mG. EMFs in the kHz to megahertz (MHz) range also were detected along the alignment, but they were not quantified.

Ambient EMF levels also were measured for the California HSR project. Measurements of the AC magnetic field at nine locations along the proposed alignment resulted in a range of levels from 0.46 to 10.94 mG; the high measurement was detected where a transmission line crossed the alignment. Combining the two sets of field measurements for other proposed HSR alignments in California yields a range of values for AC magnetic fields of about 0.5 to 18 mG. This range of EMF levels is assumed to be similar to the range of EMF levels along the HDC alignment.

3.2.9.3 Environmental Consequences

This section addresses potential EMR impacts from HSR during long-term operation of the HDC Project. The effects of EMR from the potential HSR component of the project on high-technology facilities or equipment along the project alignment were examined. Construction of the HDC would not use any unusual powered construction equipment; therefore, it would not generate EMR beyond that typically associated with the use of common construction equipment. Construction of the HDC would not affect EMR-sensitive land uses along the project alignment.

Determination of Significance

An impact would occur if project-generated EMI disrupted sensitive electrical, electronic, or magnetic equipment in nearby facilities. Based on the standards, observations, and recommendations discussed in Section 3.1.9.1, a useful screening level for such disruptions would be a change in the AC magnetic field at the receptor site of 2 mG or more, assuming that electric fields generated by project operations would not be a substantial factor. Further evaluation would then be necessary to determine the exact level of effect on the facility. An impact on a single device or facility, however, would not constitute a “public” impact unless the disruption of that facility, in turn, resulted in a substantial public effect. A disruption that affects a substantial portion of the community over a substantial period, or that reoccurs frequently, would qualify as a significant impact under the California Environmental Quality Act (CEQA) or the National Environmental Policy Act (NEPA).

Alternatives Analysis

No Build Alternative

The HSR would not be constructed under the No Build Alternative. No new EMF would be created within the High Desert region, although continuing development of the area could include new sources of EMF.

Build Alternatives

Freeway/Expressway and Freeway/Tollway Alternatives

Alternatives without HSR would not pose a concern about EMR; therefore, these alternatives are not further addressed in this section.

Freeway/Expressway with HSR Alternative

The HSR portion of the HDC Project could incrementally increase the strength of electric and magnetic fields near the alignment. The HSR would create new sources of EMI and could expose humans to slightly higher EMF levels. EMR generated by the low-voltage electric power distribution lines, traction power substations (TPSS), switching equipment, overhead catenary system (OCS), communications and control systems, train motors (i.e., electric multiple units [EMUs]), and train movements would consist of power-frequency electric and magnetic fields, harmonic magnetic fields from vehicles, RF fields, and minor perturbations of the earth's background magnetic field. Among these sources, TPSS would generate the most substantial EMR, along with the AC magnetic fields from the propulsion currents flowing in the traction power system – the OCS and rails. EMF fields from electric HSR service on the HDC ROW would be highest during periods of peak train operations.

Power Supply System

Power-frequency electric and magnetic fields would be produced by the traction power system, TPSS, and utility feeder lines. Commercial power in the United States operates at a frequency of 60 Hz, so the dominant EMF would be 25 kV at 60 Hz, AC. A 60-Hz electric field would be produced by the 25-kV operating voltage of the traction system, and a 60-Hz magnetic field would be produced by the flow of currents providing power to the HSR vehicles. Along the tracks, magnetic fields would be produced by the flow of propulsion currents to the trains in the OCS and rails. The OCS and power distribution system would generate ELF EMR at 60 Hz and at harmonics (multiples) of 60 Hz. Magnetic fields from low-voltage lines would drop to background levels within a few hundred feet (e.g., a 115-kV power line generates an electric field of about 0.07 volts per meter [V/m] and a magnetic field of about 1.7 mG at 100 feet [Hafemeister, 1996]). Therefore, depending on the placement of these facilities, EMF levels at the edge of the ROW are expected to be at or below background levels and below the screening level of 2 mG.

The main source of transient EMI disturbances from the HSR would be switching currents produced by switching loads, relays, power controllers, and switch mode power supplies associated with the OCS and the traction power facilities. High-current electronic switches and controls can produce transient signals that can be transmitted along the power supply network to other electronic systems. Magnetic fields also can be generated by switching stations and TPSS. The specific frequencies and power levels of these EMR emissions would depend on the design of the system but, based on studies of similar light-rail and HSR systems, EMI beyond the edge of the project alignment would not be substantial and would not adversely affect sensitive facilities.

The OCS would also generate EMF from the frequent loss of continuity and arcing between the power supply line and the pantograph.[13] Studies have shown that EMF emissions from the detaching of the power supply line and from re-establishing contact with it differ. Generally, however, these OCS discontinuities produce a large, strongly damped oscillation at 0.5 to 1.0 MHz and a smaller, less damped oscillation at about 20 MHz (Gianetti, *et al.*, 2001). Other researchers have determined that the OCS discontinuities produce broadband EMI in the 20 to 40 MHz range; however, most of the EMF generated by the OCS comes from the main circuit conducting power to the trains rather than from the OCS arcs.

Electromagnetic Fields from Vehicles

Power electronics would produce currents with frequencies in the kHz range. Potential sources include power conversion units, switching power supplies, motor drives, and auxiliary power systems. These sources are highly localized in the trains and would move along the track with the trains. When departing from a station, HSR trains would operate at lower speeds, but they would have high acceleration rates, thus drawing much more current and producing stronger magnetic fields. Conversely, when approaching a station, HSR trains would be decelerating and would draw much less current.

The specific frequencies and power levels of these EMR emissions would depend on the design of the system, as noted above for wayside facilities, but based on studies of similar light-rail and HSR systems, EMF beyond the edge of the project alignment would be at or below background levels. A study of an operating light-rail system found that the maximum EMI from the propulsion system was only 2 mG at 30 feet from the train (University of Michigan, 2009). The propulsion systems are point sources of EMF, and the field strength would decrease with the square of the distance from the source (e.g., field strength at the edge of the HDC would be only about 0.2 to 0.4 percent of the field strength in the vicinity of the source). Thus, EMR from individual trains is not expected to adversely affect sensitive equipment or interfere with communications systems.

Radio-Frequency Fields

The HSR system would use a variety of RF communications, data transmission, and monitoring systems, both on the vehicles and along the corridor. These communications systems would operate in the same frequency ranges as existing

[13] Pantograph – A device usually consisting of two parallel, hinged, double-diamond frames for transferring current from an overhead wire to a vehicle, as a trolley car or electric locomotive.

communications systems in the study area, but they would be assigned specific frequencies that would not conflict with other communication systems in the area. HSR radio systems would transmit radio signals from antennas located at stations, along the track alignment, and on train cars; radio communications would be facilitated by 100-foot-high radio towers approximately every 2 miles along the alignment. These radio systems would likely operate at frequencies below 925 MHz because frequencies higher than 925 MHz will not function on trains traveling at high speeds. Radio systems procured for HDC use are expected to be commercial off-the-shelf systems. These wireless systems would meet the FCC's regulatory requirements for intentional emitters (47 CFR Part 51 and FCC DET Bulletin #65), which include emissions requirements intended to ensure electromagnetic compatibility with other radio users.

Train Movement

The movement of large metallic objects within the earth's natural magnetic field causes fluctuations in that field; therefore, high-speed trains would cause short-term fluctuations in the background magnetic field as they move along the HDC alignment. These shifts in the earth's DC magnetic field measure about 1 mG at a distance of 80 feet from a train (University of Michigan, 2009), and they would not adversely affect sensitive nearby land uses.

Estimated Overall EMR Strength from High-Speed Rail Operations

As shown in Table 3.1.9-3, estimated field strengths beyond the HDC ROW for HSR operations are generally well below recommended thresholds, with the exception of electric fields at TPSS; however, the electric field at the TPSS, would be mostly contained within the structure.

Table 3.2.9-3 Estimated EMR Strength for High-Speed Rail Operations within the High Desert Corridor

Location	Electric Field (kV/m)	Magnetic Field (mG)	
		Average/Off-Peak	Maximum
Within 16 feet of alignment centerline	-	-	720
Within 30 feet of alignment centerline		-	117
Within 58 feet of alignment centerline	0.48	4-11	35-41
Traction Power Substation	0-22.2	15	110

Notes: Values are for a frequency range of zero to 3,000 Hz. Calculations were made from the centerline of the track. The current distributions assumed for the analysis represent "worst-case" conditions and are therefore conservative.

Source: Peninsula Corridor Joint Powers Board, 2014.

Magnetic fields generated by the project beyond the HSR ROW would be minor in comparison to background levels and threshold levels. The intensity of these magnetic fields generated by the project would decrease rapidly with distance and would be substantially lower at nearby sensitive receptors where sensitive equipment may be located. EMF levels at nearby schools, hospitals, businesses, and residences would be below the screening threshold for magnetic fields. EMR from the project would not create EMI with existing communication systems or sensitive equipment.

EMR effects on AFP-42 are of particular concern. Under either of the two HSR options considered for connecting the HSR to the Palmdale Transportation Center, the HSR alignment would approach AFP-42. Under Rail Option #1, the nearest approach of the HSR alignment to AFP-42 would be about 900 feet; at this distance, the EMF would be about 30 percent of its strength at the edge of the 500-foot-wide corridor. Under Rail Option #7, the nearest approach of the HSR alignment to AFP-42 would be about 700 feet. At this distance, the EMF would be about 50 percent of its strength at the edge of the 500-foot-wide corridor.

Freeway/Tollway with HSR Alternative (Preferred Alternative)

The impacts on the environment from EMF generated by the HSR component of this alternative would be the same as described for the freeway/expressway alternative with HSR. No significant impacts on sensitive facilities or land uses would result from EMF generated by the HSR component of the HDC Project.

Avoidance, Minimization, and Mitigation Measures

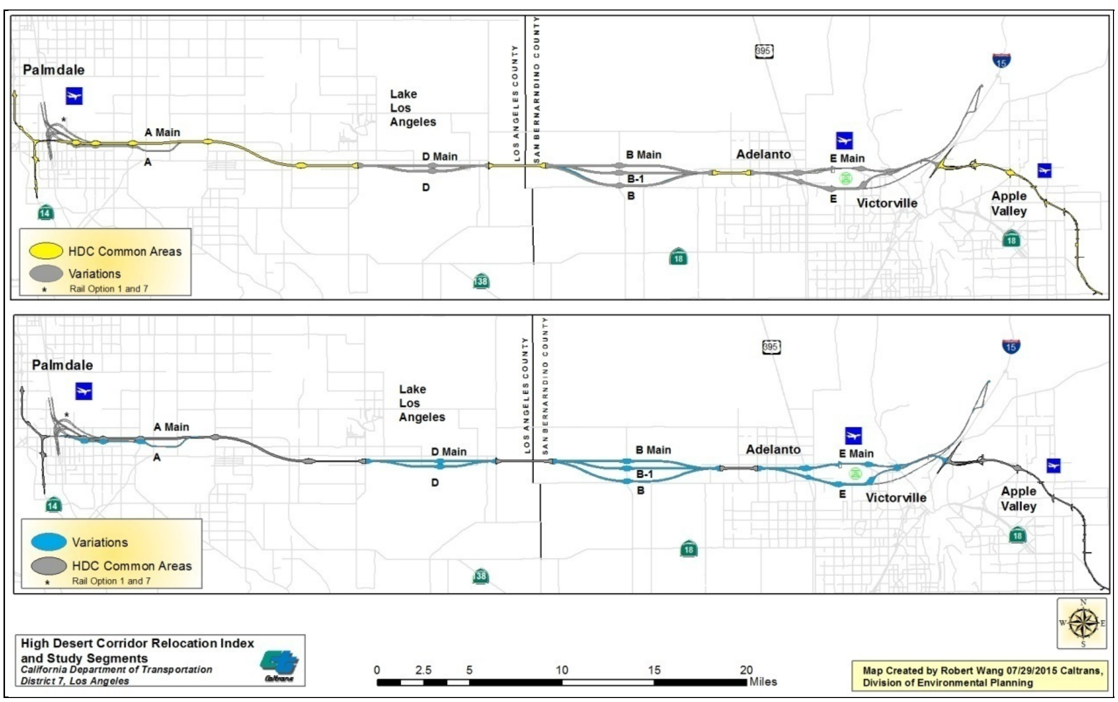
The potential for EMI effects shall be minimized by ensuring that all electronic equipment is operated with a good electrical ground and that proper shielding is provided for electronic system cords, cables, and peripherals. The design of the system will consider and incorporate, where practicable, the latest standards relevant to minimizing the effects of EMI on other systems.

EMR-1 During final design, detailed analyses shall be undertaken to determine the specific levels of voltages that could be induced onto parallel longitudinal conductors and, if significant voltages are identified, mitigation measures shall be developed in accordance with the relevant industry-accepted IEEE or military standards. The final design shall use proven technologies for OCS components, and the technical specifications shall be written to assure that damage to the conductors and hardware during construction will be minimized.

3.3 Biological Environment

This section describes impacts to various biological resources as a result of the High Desert Corridor (HDC) Project implementation, including natural communities, wetlands and other waters, plant species, animal species, threatened and endangered species, and invasive species. Figure 3.3-1 presents the notation of the alignment and variation sections along the HDC within the biological study area (BSA) used in describing the impacts on various biological resources throughout this section. The BSA was defined during development of the project purpose and need, and has been developed through a collaborative process between the transportation agencies (Caltrans, the Federal Highway Administration, Metro, Los Angeles and San Bernardino Counties). The BSA includes the areas anticipated to be directly and indirectly affected by the proposed project, including all alignments and variations, plus any areas that were required to be surveyed for biological resources according to agency protocol. It is generally 500 feet in width over most of the 63-mile length with few exceptions at interchanges, intersections with on-/off-ramps, where the rail line and highway separate, and in few areas where the roadway narrows. Additional information on the development of the BSA can be found in Section 2.1 of the Natural Environment Study (June 2016).

Figure 3.3-1 Alignment Key Map for Biological Study Area



3.3.1 Natural Communities

This section of the document discusses natural communities of concern. The focus of this section is on biological communities, not individual plant or animal species. This section includes information on wildlife corridors and habitat fragmentation. Wildlife corridors are areas of habitat used by wildlife for seasonal or daily migration. Habitat fragmentation involves the potential for dividing sensitive habitat and thereby lessening its biological value.

Habitat areas that have been designated as critical habitat under the Federal Endangered Species Act (FESA) are discussed in Section 3.3.5, Threatened and Endangered Species. Wetlands and other waters are discussed in Section 3.3.2.

Affected Environment

Information regarding natural communities was obtained from the *Natural Environment Study* (June 2016). The biological study area (BSA) (Figure 3.3.1-1) encompasses approximately 8,459 acres, including 36 different plant communities/land cover types. It is generally 500 feet in width over most of the 63-mile-long alignment, with a few exceptions at interchanges, intersections with on-/off-ramps, where the rail line and highway separate, and in a few areas where the roadway narrows.

Plant communities were classified consistent with "A Manual of California Vegetation" (Sawyer *et al.*, 2009) and "List of Vegetation Alliances and Associations" (CDFG, 2010). At times, specific areas did not conveniently fall within a described series, alliance, or association within these references; therefore, plant communities were assigned based on descriptions provided in these references.

The BSA includes 30 plant communities, 7 of which are designated as both disturbed and undisturbed, and 6 land cover types. Plant communities present within the BSA include allscale scrub (disturbed and undisturbed), big sagebrush (undisturbed), black willow thickets (disturbed and undisturbed), California buckwheat scrub (undisturbed), California buckwheat scrub/American bulrush marsh (undisturbed), cheesebush scrub (undisturbed), creosote-bush scrub (allscale scrub, white bursage scrub [disturbed and undisturbed]), fourwing saltbush scrub (disturbed and undisturbed), Fremont cottonwood forest (undisturbed), Joshua tree woodland (disturbed and undisturbed), Mojave yucca scrub (undisturbed), Nevada joint fir scrub (undisturbed), non-native grasslands, red brome grasslands, red willow thickets (undisturbed)**,** rubber rabbitbrush scrub (disturbed and undisturbed), sandbar willow thickets (undisturbed), scalebroom scrub (undisturbed), southern cattail marsh (undisturbed) and white bursage scrub (disturbed and undisturbed). Land cover types present within the BSA include agriculture, disturbed, developed, rock outcrop, unvegetated wash, and windrow. Each habitat type is described in Section 3.1.2 of the Natural Environment Study. The total acres of each plant community and land cover type in the BSA are summarized in Table 3.3.1-1. The only sensitive plant communities within the BSA are Joshua tree woodland, riparian woodland, and scalebroom scrub, all considered special-status by the California Department of Fish and Wildlife (CDFW). The plant communities that make up riparian woodland include black willow thickets, Fremont cottonwood forest, red willow thickets, and sandbar willow thickets. These special-status plant communities are described in more detail in the environmental consequences section.

Figure 3.3.1-1 Biological Study Area

Table 3.3.1-1 Natural Communities and Habitat Types in the BSA

Natural Community / Habitat Type	Existing (acres)	Natural Community / Habitat Type	Existing (acres)
Agriculture	208.14	Allscale scrub alliance	262.98
Big sagebrush alliance	21.15	Black willow thickets	1.20
California buckwheat scrub alliance	5.76	California bulrush-American bulrush marsh	1.53
Cheesebush scrub alliance	2.14	Creosote bush scrub alliance	3,778.01
Creosote bush scrub/allscale scrub alliance	0.39	Creosote bush/white bursage scrub series	0.44
Developed	1,058.18	Disturbed	585.75
Disturbed allscale scrub alliance	90.46	Disturbed black willow thickets	5.52
Disturbed creosote bush scrub alliance	405.53	Disturbed fourwing saltbush scrub alliance	137.49
Disturbed Joshua tree woodland alliance	92.54	Disturbed rubber rabbitbrush scrub alliance	572.43
Disturbed salt grass flats alliance	8.76	Disturbed white bursage scrub alliance	89.57
Fourwing saltbush scrub alliance	317.87	Fremont cottonwood forest alliance	21.38
Joshua tree woodland alliance	511.53	Mojave yucca scrub alliance	22.62
Nevada joint fir scrub	5.23	Non-native grassland	15.83
Red brome grasslands	6.32	Red willow thickets	1.77
Rock outcrop	24.70	Rubber rabbitbrush scrub alliance	125.35
Sandbar willow thickets alliance	3.80	Scalebroom scrub alliance	24.99
Southern cattail marsh	0.55	Unvegetated wash	10.31
White bursage scrub alliance	37.81	Windrow	0.59
Total		**8,458.62**	

Source: Natural Environment Study, 2016.

The predominant plant communities observed were creosote bush scrub, Joshua tree woodland, fourwing saltbush scrub, allscale scrub, and rubber rabbitbrush scrub. Riparian scrub and riparian woodland (comprised of black willow thickets, Fremont cottonwood forest, red willow thickets, and sandbar willow thickets) also occur, primarily in the Mojave River area. Impacts to the four plant communities that are grouped as riparian woodland are included individually in Tables 3.3.1-2 through 3.3.1-4 below and in a separate section for riparian woodland.

Wildlife Movement Corridors

The landscape in most of the eastern portion of the BSA is generally flat and characterized by open habitats that would not constrict or limit wildlife movement. The diffuse permeability that characterizes this portion of the BSA largely precludes it from providing specific linkages; however, there are a few small drainages and patches of vegetation that provide cover that may provide important wildlife crossing areas. In locations where the proposed project crosses these drainages, culverts may provide important crossing areas for wildlife that move within or along these washes.

Table 3.3.1-2 Impacts to Vegetation Communities for Variations of Highway Only Alternatives (in acres)

	Main Alignment/ Common Areas		Variation A Main		Variation A		Variation D Main		Variation D		Variation B Main		Variation B		Variation B1		Variation E Main		Variation E	
	Perm. Impact	**Temp. Impact**	**Perm. Impact**	**Temp. Impact**	**Perm. Impact**	**Temp. Impact**	**Perm. Impact**	**Temp. Impact**	**Perm. Impact**	**Temp. Impact**	**Perm. Impact**	**Temp. Impact**	**Perm. Impact**	**Temp. Impact**	**Perm. Impact**	**Temp. Impact**	**Perm. Impact**	**Temp. Impact**	**Perm. Impact**	**Temp. Impact**
Agriculture	112.09	51.65	3.80	0.50	-	-	-	-	-	-	6.89	2.90	-	-	-	-	-	-	-	-
Allscale scrub alliance	133.04	60.09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	18.65	5.50	4.80	8.96
Big sagebrush alliance	-	6.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Black willow thickets	-	0.79	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
California buckwheat scrub alliance	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
California bulrush-American bulrush marsh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.15	0.19
Cheesebush scrub alliance	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Creosote bush scrub alliance	429.52	357.70	-	-	-	-	155.00	116.43	199.24	142.74	241.76	160.27	292.20	229.95	204.15	155.51	187.61	60.30	116.65	128.86
Creosote bush scrub/allscale scrub alliance	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.09	0.18	0.02	0.04
Creosote bush scrub/white bursage scrub series	-	-	-	-	-	-	0.02	0.03	0.10	0.29	-	-	-	-	-	-	-	-	-	-
Developed	127.50	64.66	51.44	10.98	38.15	9.11	14.93	6.45	10.11	2.32	23.32	9.40	8.68	3.03	31.53	10.84	66.25	12.54	51.73	68.81
Disturbed	150.81	74.76	13.26	9.21	28.13	21.92	3.76	1.71	7.02	2.33	29.79	21.37	9.68	6.49	11.71	8.22	34.80	9.26	13.96	9.71
Disturbed allscale scrub alliance	42.56	15.38	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.48	0.19	4.75	11.38
Disturbed black willow thickets	-	-	1.14	0.20	3.34	0.66	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Disturbed creosote bush scrub alliance	26.39	18.95	-	-	-	-	35.84	9.22	4.80	1.26	25.79	26.88	6.11	4.38	74.72	50.93	11.42	5.22	25.35	45.35
Disturbed fourwing saltbush scrub alliance	47.80	39.13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Disturbed Joshua tree woodland alliance	-	-	27.24	11.53	28.16	12.24	-	-	-	-	-	-	-	-	-	-	4.45	3.14	-	0.01
Disturbed rubber rabbitbrush scrub alliance	12.96	25.88	126.39	60.85	109.04	46.39	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Disturbed salt grass flats alliance	6.87	1.85	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Disturbed white bursage scrub alliance	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	26.14	9.57	-	-
Fourwing saltbush scrub alliance	82.49	56.09	23.54	3.87	28.34	5.13	15.36	11.44	2.44	2.12	-	-	-	-	-	-	3.10	5.49	0.38	0.20
Fremont cottonwood forest alliance	5.15	4.48	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.15	0.71	0.24	0.48
Joshua tree woodland alliance	153.77	54.70	78.45	23.36	87.30	24.83	-	-	-	-	-	0.07	-	0.04	-	0.05	-	-	-	-
Mojave yucca scrub alliance	7.98	0.41	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.23	0.06	-	-
Nevada joint fir scrub	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Non-native grassland	9.22	5.55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.08	-	-	-
Red brome grasslands	3.51	1.90	-	-	-	-	0.32	0.15	0.33	0.14	-	-	-	-	-	-	-	-	-	-
Red willow thickets	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rock outcrop	0.37	4.70	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.27	0.93	1.27	1.79
Rubber rabbitbrush scrub alliance	7.95	14.72	0.58	0.16	0.16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sandbar willow thickets alliance	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.79	0.70
Scale broom scrub alliance	2.20	12.86	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Southern cattail marsh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.22	0.29
Unvegetated wash	-	1.47	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.19	0.56	1.18
White bursage scrub alliance	2.22	0.97	-	-	-	-	-	-	-	-	9.58	7.98	12.19	9.78	10.14	7.75	5.92	0.17	1.88	2.41
Windrow	-	-	0.59	-	0.90	-	-	-			-	-	-	-	-	-	-	-	-	-
Total	**1,364.40**	**875.29**	**326.43**	**120.66**	**323.52**	**120.28**	**225.23**	**145.43**	**224.04**	**151.20**	**337.13**	**228.87**	**328.86**	**253.67**	**332.25**	**233.3**	**369.64**	**113.45**	**222.75**	**280.36**

Note: Impact acreages of the green energy facility are unknown and not included in the vegetation community impacts calculations.

Table 3.3.1-3 Impacts to Vegetation Communities for Variations of Highway and Rail Alternative (in acres)

	Main Alignment/ Common Areas		Variation D Main		Variation D		Variation B Main		Variation B		Variation B1		Variation E Main		Variation E	
	Perm. Impact	**Temp. Impact**	**Perm. Impact**	**Temp. Impact**	**Perm. Impact**	**Temp. Impact**	**Perm. Impact**	**Temp. Impact**	**Perm. Impact**	**Temp. Impact**	**Perm. Impact**	**Temp. Impact**	**Perm. Impact**	**Temp. Impact**	**Perm. Impact**	**Temp. Impact**
Agriculture	145.95	28.85	4.65	1.10	7.01	0.16	9.01	3.51	-	-	-	-	-	-	-	-
Allscale scrub alliance	144.54	59.53	-	-	-	-	-	-	-	-	-	-	14.88	7.61	9.40	10.70
Big sagebrush alliance	-	6.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Black willow thickets	-	0.79	-	-	-	-	-	-	-	-	-	-	-	-	-	-
California buckwheat scrub alliance	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
California bulrush-American bulrush marsh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.23	0.11
Cheesebush scrub alliance	2.14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Creosote bush scrub alliance	465.90	233.09	235.82	50.70	327.97	29.40	388.63	93.74	480.95	120.40	374.37	65.61	244.84	183.28	287.92	138.11
Creosote bush scrub/allscale scrub alliance	-	-	-	-	-	-	-	-	-	-	-	-	0.09	0.18	0.03	0.03
Creosote bush scrub/white bursage scrub series	-	-	-	0.05	-	-	-	-	-	-	-	-	-	-	-	-
Developed	204.91	59.67	16.98	2.49	11.26	1.63	29.45	10.38	10.92	0.99	40.45	2.23	79.39	13.94	91.99	65.87
Disturbed	209.96	45.13	16.07	1.99	26.09	0.84	39.85	13.52	10.80	2.23	18.48	1.16	46.40	15.59	26.42	9.04
Disturbed allscale scrub alliance	42.56	15.38	-	-	-	-	-	-	-	-	-	-	3.99	0.37	10.18	14.13
Disturbed black willow thickets	2.11	0.07	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Disturbed creosote bush scrub alliance	33.48	5.85	34.11	12.99	4.08	1.07	43.26	9.74	2.23	0.12	121.51	15.54	12.63	3.77	38.15	48.53
Disturbed fourwing saltbush scrub alliance	89.73	4.71	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Disturbed Joshua tree woodland alliance	39.57	6.19	-	-	-	-	-	-	-	-	-	-	6.35	1.24	-	-
Disturbed rubber rabbitbrush scrub alliance	215.19	62.94	-	-	-	-	-	-	-	-	-	-	-	-	2.63	-
Disturbed salt grass flats alliance	6.87	1.85	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Disturbed white bursage scrub alliance	-	-	-	-	-	-	-	-	-	-	-	-	44.58	13.50	-	-
Fourwing saltbush scrub alliance	159.92	52.89	22.58	4.91	5.25	0.38	-	-	-	-	-	-	3.35	6.15	0.38	0.15
Fremont cottonwood forest alliance	0.08	9.55	-	-	-	-	-	-	-	-	-	-	3.60	0.74	2.49	0.29
Joshua tree woodland alliance	317.18	44.91	-	-	-	-	6.07	2.71	6.17	3.41	7.30	1.44	13.54	5.83	9.82	5.08
Mojave yucca scrub alliance	15.06	3.25	-	-	-	-	-	-	-	-	-	-	0.93	0.34	-	-
Nevada joint fir scrub	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Non-native grassland	12.02	2.75	-	-	-	-	-	-	-	-	-	-	0.04	-	-	-
Red brome grasslands	-	-	5.18	0.7	6.22	-	-	-	-	-	-	-	-	-	-	-
Red willow thickets	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.01	-
Rock outcrop	0.40	4.46	-	-	-	-	-	-	-	-	-	-	5.30	1.22	1.27	1.27
Rubber rabbitbrush scrub alliance	14.99	8.79	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sandbar willow thickets alliance	-	-	-	-	-	-	-	-	-	-	-	-	-	0.04	0.98	0.40
Scale broom scrub alliance	3.78	20.47	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Southern cattail marsh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.22	0.15
Unvegetated wash	-	1.39	-	-	-	-	-	-	-	-	-	-	-	0.21	5.32	1.65
White bursage scrub alliance	-	-	-	-	-	-	17.12	2.97	20.21	2.53	18.54	2.54	5.92	1.94	2.82	1.45
Windrow	0.59	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Total	**2,126.93**	**679.11**	**335.39**	**74.93**	**387.88**	**33.48**	**533.39**	**136.57**	**531.28**	**129.68**	**580.65**	**88.52**	**485.83**	**255.95**	**491.26**	**296.96**

Table 3.3.1-4 Impacts to Vegetation Communities for Variations of Highway and Rail Options Alternative (in acres)

Vegetation Communities	Option 1A		Option 1B		Option 1C		Option 7A		Option 7B		Option 7C	
	Perm. Impact	Temp. Impact	Perm. Impact	Temp. Impact	Perm. Impact	Temp. Impact	Perm. Impact	Temp. Impact	Perm. Impact	Temp. Impact	Perm. Impact	Temp. Impact
Agriculture	-	-	-	-	-	-	-	-	-	-	-	-
Allscale scrub alliance	-	-	-	-	-	-	-	-	-	-	-	-
Big sagebrush alliance	-	0.31	-	0.20	-	0.17	0.94	0.71	1.03	0.71	0.40	0.61
Black willow thickets	-	-	-	-	-	-	-	-	-	-	-	-
California buckwheat scrub alliance	-	-	-	-	-	-	-	-	-	-	-	-
California bulrush-American bulrush marsh	-	-	-	-	-	-	-	-	-	-	-	-
Cheesebush scrub alliance	-	-	-	-	-	-	-	-	-	-	-	-
Creosote bush scrub alliance	-	-	-	-	-	-	-	-	-	-	-	-
Creosote bush scrub/allscale scrub alliance	-	-	-	-	-	-	-	-	-	-	-	-
Creosote bush scrub/white bursage scrub series	-	-	-	-	-	-	-	-	-	-	-	-
Developed	21.88	19.06	21.77	23.29	16.03	18.15	23.06	30.73	29.68	36.94	21.42	18.13
Disturbed	0.93	2.93	-	3.29	0.26	0.96	2.59	4.97	2.44	5.02	2.34	1.79
Disturbed allscale scrub alliance	-	-	-	-	-	-	-	-	-	-	-	-
Disturbed black willow thickets	-	-	-	-	-	-	-	-	-	-	-	-
Disturbed creosote bush scrub alliance	-	-	-	-	-	-	-	-	-	-	-	-
Disturbed fourwing saltbush scrub alliance	-	-	-	-	-	-	-	-	-	-	-	-
Disturbed Joshua tree woodland alliance	-	-	-	-	5.22	2.95	-	-	-	-	8.14	3.13
Disturbed rubber rabbitbrush scrub alliance	0.40	17.68	0.03	17.25	-	14.72	9.39	13.78	8.70	12.58	7.92	7.89
Disturbed salt grass flats alliance	-	-	-	-	-	-	-	-	-	-	-	-
Disturbed white bursage scrub alliance	-	-	-	-	-	-	-	-	-	-	-	-
Fourwing saltbush scrub alliance	-	-	-	-	-	-	-	-	-	-	-	-
Fremont cottonwood forest alliance	-	-	-	-	-	-	-	-	-	-	-	-
Joshua tree woodland alliance	-	-	-	-	-	-	-	-	-	-	-	-
Mojave yucca scrub alliance	-	-	-	-	-	-	-	-	-	-	-	-
Nevada joint fir scrub	-	-	-	-	-	5.24	-	-	-	-	0.63	18.16
Non-native grassland	-	-	-	-	-	-	-	-	-	-	-	-
Red brome grasslands	-	-	-	-	-	-	-	-	-	-	-	-
Red willow thickets	-	-	-	-	-	-	-	-	-	-	-	-
Rock outcrop	-	-	-	-	-	-	-	-	-	-	-	-
Rubber rabbitbrush scrub alliance	0.00	9.38	-	8.81		14.10	9.65	29.19	11.95	27.90	12.60	36.65
Sandbar willow thickets alliance	-	-	-	-	-	-	-	-	-	-	-	-
Scale broom scrub alliance	-	-	-	-	-	-	-	-	-	-	-	-
Southern cattail marsh	-	-	-	-	-	-	-	-	-	-	-	-
Unvegetated wash	-	-	-	-	-	-	-	-	-	-	-	-
White bursage scrub alliance	-	-	-	-	-	-	-	-	-	-	-	-
Windrow	-	-	-	-	-	-	-	-	-	-	-	-
Total	**23.21**	**49.36**	**21.8**	**52.84**	**21.51**	**56.29**	**45.63**	**79.38**	**53.80**	**83.15**	**53.45**	**86.36**

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South Coast Missing Linkages

An interagency report produced by South Coast Wildlands (2008)[14] identified a network of high-priority, not yet established landscape linkages within the South Coast Ecoregion, an area that extends along the coastal zone from southern Kern and Ventura Counties down into Baja California, for their potential to preserve the region's biodiversity and mitigate the effects of habitat loss and fragmentation. The linkages were identified based on their potential to connect large tracts of relatively intact wild areas and allow natural movement of wildlife throughout the region.

Three of the proposed linkages identified in the report cross the BSA: DE13, SC205, and DE16 (Figure 3.3.1-1) (Penrod *et al.*, 2000)[15]. Linkages DE13 and SC205 are adjacent to one another and cross the western portion of the BSA and are listed as medium priority. Linkage DE13 potentially represents a choke-point for movement for Mojave fringe-toed lizard *(Uma scoparia).* Linkage SC205 has potential to provide a landscape linkage for mountain lion *(Puma concolor),* desert tortoise, Mohave ground squirrel, and LeConte's thrasher *(Toxostoma lecontei).* Linkage DE16 crosses the eastern portion of the BSA and is listed as a high priority. DE16 potentially provides a landscape linkage for arroyo toad *(Anaxyrus californicus),* least Bell's vireo, and willow flycatcher *(Empidonax traillii).*

Five medium-priority linkages are present north, south, and southwest of the BSA: DE14 (three linkages within this designation), DE15, and SC113. None of these cross the BSA. DE14 represents three potential choke-points for desert tortoise, while DE15 provides a potential landscape linkage for arroyo toad, large mammals, southwestern willow flycatcher, least Bell's vireo, peregrine falcon *(Falco peregrinus),* and bald eagle *(Haliaeetus leucocephalus).* SC113 represents a potential choke-point for large mammals, three-spine stickleback *(Gasterosteus aculeatus),* southwestern willow flycatcher, and western spadefoot toad *(Spea hammondii).*

California Essential Habitat Connectivity

The California Essential Habitat Connectivity Project (CEHC) was a collaboration between Caltrans and CDFW to identify the important wildlands that should be conserved for the purpose of habitat connectivity and wildlife movement state-wide (Spencer *et al.*, 2010)[16]. The CEHC addresses these areas on a coarse scale and was intended to be used as a supplemental document paired with more refined regional and local habitat connectivity plans to create a complete picture of undeveloped lands

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[14] South Coast Wildlands. 2008. South Coast Missing Linkages: A Wildland Network for the South Coast Ecoregion. Produced in cooperation with partners in the South Coast Missing Linkages Initiative. Available online at http://www.scwildlands.org.

[15] Penrod, K., P. Beier, E. Garding, and C. Cabanero. 2012. A Linkage Network for the California Deserts. Produced for the Bureau of Land Management and The Wildlands Conservancy. Produced by Science and Collaboration for Connected Wildlands, Fair Oaks, CA (www.scwildlands.org) and Northern Arizona University, Flagstaff, Arizona (http://oak.ucc.nau.edu/pb1/).

[16] Spencer, W.D., P. Beier, K. Penrod, K. Winters, C. Paulman, H. Rustigian-Romsos, J. Strittholt, M. Parisi, and A. Pettler. 2010. California Essential Habitat Connectivity Project: A Strategy for Conserving a Connected California. Prepared for California Department of Transportation, California Department of Fish and Game, and Federal Highways Administration.

that are important for movement activities, gene flow, and other resources necessary for supporting wildlife populations. It is important to note that the CEHC does not address the individual needs or occurrences of localized wildlife movement. Rather, it identifies lands that are most likely important to wildlife movement within the state.

In this document, a total of 850 Natural Landscape Blocks (NLBs) throughout the state of California were identified. These lands were designated as such due to their well-conserved and generally intact nature. A total of 192 Essential Connectivity Areas that provide substantial connections in and among the NLBs were also identified. The CEHC encourages the prioritization of land conservation and associated management activities within these areas to preserve, maintain, and enhance connectivity throughout the state’s natural areas.

The CEHC has not identified any Essential Connectivity Areas within the BSA. The mountainous areas to the south of the BSA, the San Gabriel and San Bernardino Mountain Ranges, were identified as an Essential Connectivity Area with varying levels of energy expenditure for wildlife movement (i.e., some areas present a higher risk of mortality or may require more energy to travel through than other areas). Natural Landscape Blocks have been identified in multiple locations surrounding the project, but none have been identified within or abutting the BSA (Figure 3.3.1-2).

Wildlife Movement Studies

Four wildlife movement studies were conducted along the BSA to help understand the use of the project site by traveling wildlife and to identify existing wildlife movement corridors. Methods of detecting wildlife movement included nighttime spotlighting, tracking stations, and motion sensor camera stations. Wildlife was found to use the natural drainages as movement corridors throughout the project site. Various species of wildlife often use and follow movement corridors to find food, cover, and reproductive resources that oftentimes are part of larger landscape-level habitat linkage. The purpose of these linkages is to provide seasonal travel routes or connect important resources, which would prevent the isolation of populations. Isolation of populations can have a negative effect on genetics of the individual population and possibly the species as a whole, and it places the isolated population at risk of eventual elimination. Wildlife movement corridors are discussed further in Section 3.1.2.3, Wildlife Movement, of the Natural Environment Study and in the Natural Environment Study Appendix H, Wildlife Corridor Evaluations.

The proposed project site is located within a large contiguous open space area of the Mojave Desert with the east and west ends of the site within developed areas. As such, there are no regional corridors linking two or more noncontiguous areas of natural habitat within the project site; rather, the site is located within a larger contiguous open space.

The Mojave River and its associated habitats, Big Rock Wash, Little Rock Wash, and several other larger drainages provide for wildlife movement and connectivity between large open spaces to the north and to the south of the proposed project site. The Antelope Valley Significant Ecological Area (SEA) extends from the Angeles National Forest to the playa lakes within Edwards AFB, serving as a major habitat linkage and movement corridor for all wildlife species within its vicinity. Numerous smaller drainages along the proposed High Desert Corridor (HDC) also provide for local movement of wildlife within the open space immediately surrounding the proposed project site. In addition, large expanses of creosote bush scrub within the region allow relatively unrestricted movement of various species of wildlife, such as gray fox, kit fox, coyote, American badger, and bobcat.

Several wildlife movement linkages were identified in wildlife movement studies and then presented in the Draft Environmental Impact Report (EIR)/Environmental Impact Statement (EIS). The Town of Apple Valley's Draft Multispecies Habitat Conservation Plan (MSHCP)/Natural Communities Conservation Plan (NCCP) was reviewed, specifically for identification of known wildlife linkages. Several were noted, three important ones in particular: (1) Granite Mountain Corridor, (2) Northern Lucerne Wildlife Linkage, and (3) the Mojave River. The MSHCP/NCCP states that these three "are important features of the landscape, and their preservation will benefit the region by maintaining connectivity for plant and wildlife species and helping to mitigate impacts from climate change."

County of Los Angeles Significant Ecological Areas

The County of Los Angeles Department of Regional Planning has identified 21 SEAs within the county in its current General Plan, which was adopted in October 2015. The proposed project BSA would overlap with a portion of the Antelope Valley SEA, which includes the former Big Rock Wash SEA and Little Rock Wash SEA, as well as additional areas. The Antelope Valley SEA is located in the central portion of the Antelope Valley, primarily east of the cities of Palmdale and Lancaster, within a predominantly unincorporated area of the County. The SEA is focused on the principal watercourses of the area, Little Rock Wash and Big Rock Wash and their tributaries, which are the focus for desert wildlife and central to connectivity and biodiversity in this region. The SEA also contains three dry lakes and their adjacent plains on Edwards AFB, which are principal resting areas in the region on the Pacific Flyway when they are flooded during the rainy season. As stated above, the SEA provides a major habitat linkage and movement corridor from the San Gabriel Mountains to the desert.

Environmental Consequences

No Build Alternative

Because no ground disturbance would occur under the No Build Alternative, there would be no impacts on natural communities or wildlife movement corridors.

Build Alternatives

The build alternatives would result in temporary and permanent impacts to all natural communities due to roadway development and the development of existing and to be acquired right-of-way (ROW). Tables 3.3.1-2 through 3.3.1.4 quantify the amount of permanent and temporary impacts to vegetation communities and habitat types present within the variations for the highway only, and highway and rail alternatives. For the purpose of avoiding redundancy, when discussing project impacts, it should be noted that the Freeway/Expressway Alternative, Freeway/Tollway Alternative, Freeway/ Expressway Alternative with the High-Speed Rail (HSR) Feeder Service, and the Freeway/Tollway Alternative with the HSR Feeder Service (see Figure 3.3-1 Alignment Key Map for Biological Study Area) are discussed collectively because the impacts amount to the same in main alignment/common areas; however, it is the variations and options that differ in impacts to plant communities, and they are each broken down and discussed.

Plant communities that could be affected by the proposed project generally represent a very small percentage of similar plant communities that occur in the project vicinity especially within the overall western Mojave Desert, with the exception of communities described below.

Table 3.3.4-3 in Section 3.3.4 lists the acreage of each vegetation community/land cover type within the BSA and the percentage of the same or similar community that occurs in the western Mojave Desert. Vegetation data for the overall western Mojave Desert has been taken from the Desert Renewable Energy Conservation Plan (DRECP) West Mojave and Eastern Slopes Ecoregion Subarea (DRECP EIR/EIS August 2015). As shown in Table 3.3.4-3 in Section 3.3.4, the plant communities in the BSA constitute a small percentage (less than 1 percent) of the same plant communities available in the West Mojave and Eastern Slopes Ecoregion Subarea, with the exception of the 10 communities listed below.

As shown in Table 3.3.4-3, only 10 of 30 plant communities within the BSA constitute at least 1 percent of that community's availability within the western Mojave Desert. All other plant communities (20) within the BSA make up less than 1 percent of the same plant community in the western Mojave Desert. As such, the loss of these plant communities is not considered the loss of a substantial portion of the availability of these 20 plant communities. The 10 communities within the BSA that constitute at least 1 percent of that community's availability within the western Mojave Desert include:

- Big sagebrush alliance (4.23 percent),
- Black willow thickets (2.00 percent),
- California bulrush-American bulrush marsh (1.53 percent),
- Creosote bush scrub alliance (3.05 percent),
- Disturbed black willow thickets (9.20 percent; occurs only within A Main and Variation A),
- Disturbed saltgrass flats alliance (2.19 percent),
- Fourwing saltbush scrub alliance (1.27 percent),
- Mojave yucca scrub alliance (2.26 percent),
- Red willow thickets (2.95 percent; occurs only within the Mojave River in Variation E), and
- Sandbar willow thickets (1.90 percent; occurs within the Mojave River and would be completely avoided unless Variation E is selected under both build alternatives).

It should be noted that these percentages represent the total amount of each community found within the entire BSA and not all would be affected completely by any one alternative. As such, the impact to a particular community from each alternative would represent the loss of a lower percentage of that community's availability in the western Mojave Desert.

Depending on the alternative and variations that are selected, these 10 communities would be affected by the proposed project potentially resulting in an impact to at least 1 percent of that community's availability within the western Mojave Desert. Affecting 1 percent or greater of a community within the overall western Mojave Desert would result in a substantial impact. The amount of temporary and permanent impacts to these 10 communities would vary depending on the alternative and variation that is selected. For example, Table 3.3.4-4 in Section 3.3.4 shows the plant communities that would be impacted by the Preferred Alternative. Under the Preferred Alternative permanent impacts would occur to 4 plant communities that make up 1 percent or more of the communities' availability within the western Mojave Desert. These 4 plant communities include creosote bush scrub alliance (1.14 percent) , disturbed black willow thickets (3.48 percent), disturbed saltgrass flats alliance (1.72 percent), and Mojave yucca scrub alliance (1.60 percent) (Table 3.3.4-4). The Preferred Alternative would affect less than 1 percent of the availability of the remaining 26 plant communities in the western Mojave Desert. Other alternative and variations would have similar effects as the Preferred Alternative, and are estimated to have temporary or permanent impacts to at least 1 percent of a plant community's availability in the western Mojave Desert. The exception would be red willow thickets, which would only be affected if Variation E is selected under the Highway and Rail Alternative.

Depending on the alternative and variations that are selected, potentially substantial impacts (impacts to greater than 1 percent of a community's availability in the western Mojave Desert) would occur to the following nine plant communities: big sagebrush alliance; black willow thickets; California bulrush-American bulrush marsh; creosote bush scrub alliance; disturbed black willow thickets; disturbed saltgrass flats alliance; fourwing saltbush scrub alliance; Mojave yucca scrub alliance; and red willow thickets. Please note that sandbar willow thickets would not be affected because this plant community would be avoided by all alternatives and variations through the use of multiple bridges to cross the Mojave River. Because of the amount of impact to these nine communities similar habitat should be acquired and protected in perpetuity. Revegetation of temporarily impacted areas after construction would further reduce impacts to plant communities. With the implementation of avoidance and minimization measures BNC-1 through BNC -5, BAN-5, BAN-7, BWL-4, BTE-2, BTE-3, and BTE-11, impacts from the loss of plant communities would be minimized and impacts would be less than substantial.

Table 3.3.1-5 Impacts to Vegetation Communities for the Preferred Alternative

Vegetation Communities	Permanent Impacts	Temporary Impacts
Agriculture	152.96	28.99
Allscale scrub Alliance	159.47	67.16
Big sagebrush Alliance	0.00	6.77
Black willow thickets	0.00	0.79
California bulrush-American bulrush marsh	0.00	0.00
Cheesebush scrub Alliance	2.14	0.00
Creosote bush scrub Alliance	1,413.15	511.41
Creosote bush scrub/Allscale scrub Alliance	0.09	0.18
Developed	352.09	95.62
Disturbed	301.31	63.82
Disturbed Allscale scrub Alliance	46.53	15.74
Disturbed Black willow thickets	2.09	0.07
Disturbed Creosote bush scrub Alliance	171.71	26.26
Disturbed Fourwing saltbush scrub Alliance	89.77	4.70
Disturbed Joshua tree woodland Alliance	51.13	10.35
Disturbed Rubber rabbitbrush scrub Alliance	215.18	77.71
Disturbed Salt grass flats Alliance	6.88	1.85
Disturbed White bursage scrub Alliance	44.57	13.50
Fourwing saltbush scrub Alliance	168.49	59.46
Fremont cottonwood forest Alliance	3.69	10.30
Joshua tree woodland Alliance	338.14	52.19
Mojave yucca scrub Alliance	16.02	3.60
Nevada Joint Fir Scrub	0.00	5.23
Non-native grassland	12.06	2.75
Red brome grasslands	6.23	0.00
Rock outcrop	5.70	5.66
Rubber rabbitbrush scrub Alliance	14.99	22.89
Sandbar willow thickets Alliance	0.00	0.04
Scale broom scrub Alliance	3.78	20.46
Unvegetated wash	0.00	1.60
White bursage scrub Alliance	24.48	4.52
Windrow	0.59	0.00
Total	**3,603.23**	**1,113.62**

Notes: The Preferred Alternative includes: Main Alignment/Common Areas; Variation A Main; Variation B1; Variation D; Variation E Main; and Option 1C.

Green Energy Facility

This proposed multimodal transportation project also proposes to construct photovoltaic (PV) solar panels in various areas along the route. These panels would be installed within Caltrans ROW in areas where possible that due to various constraints, would total no more than 20 linear miles along the proposed route at a

100-foot width and no more than 242 total acres. Because exact locations have not yet been determined, impact analysis is challenging for some biological topics.

Total impacts to natural plant communities could be up to 242 acres. As stated above, exact locations are not yet known; therefore, impact amounts to individual plant communities cannot be calculated. Mitigation Measure BNC-5 requires that riparian woodland and jurisdictional drainages be avoided and that panels be installed in areas that are considered disturbed (greater than 50 percent non-native plants) or already developed in some manner. At the time of this writing, it is understood that these sensitive areas would be avoided and are one of the limiting factors restricting installation to no more than 20 linear miles. Please note that due to the unknown design of the green energy facility, the vegetation impact calculations do not reflect impacts from the green energy facility.

Joshua Tree Woodland

A total of 512 acres of Joshua tree woodland and 93 acres of disturbed Joshua tree woodland occurs within the project limits. It is estimated that there are 4000 to 4,400 individual Joshua trees within the limits of impact. This estimate was calculated by counting individual Joshua trees at three representative locations to determine the estimated average density. An additional 10 percent was calculated and included as the upper end of the range to account for individual trees that occur incidentally within other plant communities. Additional information on the Joshua tree density calculation methodology is presented in Section 4.1.2.2 of the Natural Environment Study. Although individual Joshua trees are not considered to be special status, Joshua tree woodland is considered a special-status vegetation community by CDFW. With the implementation of avoidance and minimization measures BNC-1 through BNC-4 and BAN-5, impacts to Joshua tree woodland would be less than substantial.

Freeway/Expressway and Freeway/Tollway Alternatives

Main Alignment/Common Areas

Approximately 208 acres of this plant community exist within the main alignment/ common areas. Approximately 153.77 acres of Joshua tree woodland would be permanently impacted, while 54.7 acres of Joshua tree woodland would be temporarily impacted under the main alignment/common areas. No disturbed Joshua tree woodland would be affected under the main alignment/common area. Through implementation of the above avoidance and minimization measures, and replanting efforts, impacts to this plant community would be reduced.

Variation A

Approximately 104 acres of this plant community occur within the main alignment corridor corresponding to Variation A (a so-called Variation A Main alignment), and approximately 153 acres occur within Variation A alignment. Approximately 78.45 acres of Joshua tree woodland and 27.24 acres of disturbed Joshua tree woodland would be permanently impacted, while 23.36 acres of Joshua tree woodland and 11.53 of disturbed Joshua tree woodland would be temporarily impacted under the Variation A Main alignment. Under Variation A, approximately 87.3 acres of Joshua tree woodland and 28.16 acres of disturbed Joshua tree woodland would be permanently impacted, while 24.83 acres of Joshua tree woodland and 12.24 acres of disturbed Joshua tree woodland would be temporarily impacted. The Variation A Main alignment would result in lesser impacts to this plant community compared to the Variation A alignment. Through implementation of the above avoidance and minimization measures, and replanting efforts, impacts to this plant community would be reduced.

Variation B

Approximately 0.07 acre of this plant community occurs within the main alignment corridor corresponding to Variation B (a so-called Variation B Main alignment), 0.05 acre occur within the Variation B1 alignment, and 0.04 acre occur in the Variation B alignment. All of the Joshua tree woodland within these variations would be temporarily impacted. The Variation B or Variation B1 alignment would result in lesser impacts to this plant community compared to the Variation B Main alignment.

Variation D

This plant community was not observed in this variation.

Variation E

Approximately 7.59 acres of this plant community occur within the main alignment corridor corresponding to Variation E (a so-called Variation E Main alignment), and approximately 0.01 acre occur within Variation E. The Variation E Main alignment would permanently impact 4.45 acres of disturbed Joshua tree woodland and temporarily impact 3.14 acres of disturbed Joshua tree habitat. The Variation E alignment would not permanently impact any Joshua tree habitat, but it would temporarily impact 0.01 acre of disturbed Joshua tree habitat. The Variation E alignment would result in lesser impacts to this plant community in comparison to the Variation E Main alignment.

Freeway/Expressway and Freeway/Tollway with HSR Alternatives

Main Alignment/Common Areas

Approximately 407.85 acres of this plant community occur within the main alignment/common areas. Approximately 317.18 acres of Joshua tree woodland and 39.57 acres of disturbed Joshua tree woodland would be permanently impacted, while 44.91 acres of Joshua tree woodland and 6.19 acres of disturbed Joshua tree woodland would be temporarily impacted under the main alignment/common areas. Through implementation of the above avoidance and minimization measures, and replanting efforts, impacts to this plant community would be reduced.

Variation B

Approximately 8.78 acres of this plant community occur within the main alignment corridor corresponding to Variation B (a so-called Variation B Main alignment), approximately 9.58 acres occur within the Variation B alignment, and approximately 8.74 acres occur within the Variation B1 alignment. Approximately 6.07 acres of Joshua tree woodland would be permanently impacted, while 2.71 acres of Joshua tree woodland would be temporarily impacted under the Variation B Main alignment.

Under Variation B, approximately 6.17 acres of Joshua tree woodland would be permanently impacted, while 3.41 acres of Joshua tree woodland would be temporarily impacted. Under Variation B1, approximately 7.30 acres of Joshua tree woodland would be permanently impacted, while 1.44 acres of Joshua tree woodland would be temporarily impacted. Variation B Main alignment or Variation B1 alignment would result in lesser impacts to this plant community in comparison to the Variation B alignment.

Variation D

This plant community was not observed in this variation.

Variation E

Approximately 26.96 acres of this plant community occur within the main alignment corridor corresponding to Variation E (a so-called Variation E Main alignment), and approximately 14.9 acres occur within the Variation E alignment. Approximately 13.54 acres of Joshua tree woodland and 6.35 acres of disturbed Joshua tree woodland would be permanently impacted, while 5.83 acres of Joshua tree woodland and 1.24 acres of disturbed Joshua tree woodland would be temporarily impacted under the Variation E Main alignment. Variation E would permanently impact approximately 9.82 acres of Joshua tree woodland and temporarily impact approximately 5.08 acres. The Variation E Main alignment would result in more impacts to this plant community in comparison to the Variation E alignment.

Rail Options 1A, 1B, 1C and Rail Options 7A, 7B, 7C

Approximately 8.17 acres of disturbed Joshua tree woodland were observed within Option 1C, and 11.27 acres of disturbed Joshua tree woodland were observed within Option 7C. Option 1C would result in 5.22 acres of permanently impacted disturbed Joshua tree woodland and 2.95 acres of temporarily impacted disturbed Joshua tree woodland. Under Option 7C, approximately 8.14 acres of disturbed Joshua tree woodland would be impacted, while 3.13 acres would be temporarily impacted. Option 1C would result in less impact to this plant community in comparison to Option 7C. Through implementation of the above avoidance and minimization measures, and replanting efforts, impacts to this plant community would be reduced.

This plant community was not observed in the remaining options (1A, 1B, 7A, 7B); therefore, these options would have no impacts to this plant community.

Riparian Woodland

Approximately 33.68 acres of riparian woodlands (black willow thickets [disturbed and undisturbed] [6.72 acres], Fremont cottonwood forest [21.38 acres], red willow thickets [1.7 acres], and sandbar willow thickets [3.8 acres]) are located within the BSA, with most of them occurring near the Mojave River. With the implementation of avoidance and minimization measures BNC-1, BNC-2, and BAN-5, impacts to riparian woodland would be less than substantial.

Freeway/Expressway and Freeway/Tollway Alternatives

Main Alignment/Common Areas

Approximately 0.79 acre of black willow thickets exist within the main alignment/ common areas, all of which would be temporarily impacted. Approximately 9.63 acres of Freemont cottonwood forest exist within the main alignment/common areas; 5.15 acres would be permanently impacted, while 4.48 acres would be temporarily impacted. No red willow thickets or sandbar willow thickets would be impacted. Through implementation of the above avoidance and minimization measures, and replanting efforts, impacts to this plant community would be reduced.

Variation A

Approximately 1.34 acres of disturbed black willow thickets occurs within the Variation A Main alignment; 1.14 acres would be permanently impacted and 0.2 acre would be temporarily impacted. Approximately 4.00 acres of disturbed black willow thickets occurs within Variation A; 3.34 acres would be permanently impacted and 0.66 acre would be temporarily impacted. The Variation A Main alignment would result in lesser impacts in comparison to Variation A.

Variation B

This plant community was not observed in this variation.

Variation D

This plant community was not observed in this variation.

Variation E

Approximately 2.86 acres of Fremont cottonwood forest was observed within the Variation E Main alignment, and approximately 0.72 acre occurs within Variation E. The Variation E Main alignment would result in 2.15 acres of permanent impact and 0.71 acre of temporary impact of Fremont cottonwood forest. Variation E would result in 0.24 acre of permanent impact and 0.48 acre of temporary impact of Fremont cottonwood forest. Variation E would result in less impacts to this plant community in comparison to the Variation E Main alignment.

Approximately 1.49 acres of sandbar willow thickets was observed within Variation E, while none were observed within the Variation E Main alignment. Variation E would result in permanent impacts to 0.79 acre of sandbar willow thickets and temporary impacts to 0.70 acre of sandbar willow thickets. The Variation E Main alignment would result in less impact to this plant community in comparison to Variation E.

Freeway/Expressway and Freeway/Tollway with HSR Alternatives

Main Alignment/Common Areas

Approximately 2.97 acres of black willow thickets occur within the main alignment/ common areas. Approximately 2.11 acres of disturbed black willow thickets would be permanently impacted, while 0.79 acre of black willow thickets and 0.07 acre of disturbed black willow thickets would be temporarily impacted.

Approximately 9.63 acres of Freemont cottonwood forest exist within the main alignment/common areas; 0.08 acre would be permanently impacted, while 9.55 acres would be temporarily impacted. Through implementation of the above avoidance and minimization measures, and replanting efforts, impacts to this plant community would be reduced.

Variation B

This plant community was not observed in this variation.

Variation D

This plant community was not observed in this variation.

Variation E

Approximately 4.34 acres of Freemont cottonwood forest was observed within the Variation E Main alignment, and approximately 2.78 acres occurs within the Variation E alignment. The Variation E Main alignment would result in 3.60 acres of permanent impact and 0.74 acre of temporary impact of Fremont cottonwood forest. Variation E would result in 2.49 acres of permanent impact and 0.29 acre of temporary impact to Fremont cottonwood forest. Variation E would result in less impacts to this plant community in comparison to the Variation E Main alignment.

Approximately 1.01 acres of sandbar willow thickets were observed within Variation E, while 0.04 acre was observed within the Variation E Main alignment. The Variation E Main alignment would temporarily impact 0.04 acre of sandbar willow thickets, while Variation E would permanently impact 0.98 acre and temporarily impact 0.40 acre of sandbar willow thickets. The Variation E Main alignment would result in less impact to this plant community in comparison to Variation E.

Through implementation of the above avoidance and minimization measures, and replanting efforts, impacts to these plant communities would be reduced.

Rail Options 1A, 1B, 1C and Rail Options 7A, 7B, 7C

This plant community was not observed in these segments; therefore, no impacts to this plant community would occur with the implementation of the proposed project for any of these segments.

Scale Broom Scrub

Approximately 24.99 acres scale broom scrub is located within the BSA. Impacts to scale broom scrub are detailed below by each alternative and variation. With the implementation of avoidance and minimization measures BNC-1, BNC-2, and BAN-5, impacts to scale broom scrub would be less than substantial.

Freeway/Expressway and Freeway/Tollway Alternatives

Main Alignment/Common Areas

Approximately 15.05 acres of scale broom scrub exists within the Main Alignment/Common Areas. Approximately 2.20 acres would be permanently impacted and 12.85 acres would be temporarily impacted. Through implementation of the above avoidance and minimization measures, and replanting efforts, impacts to this plant community would be reduced.

Variation A

This plant community was not observed in this variation.

Variation B

This plant community was not observed in this variation.

Variation D

This plant community was not observed in this variation.

Variation E

This plant community was not observed in this variation.

Freeway/Expressway and Freeway/Tollway with HSR Alternatives

Main Alignment/Common Areas

Approximately 24.24 acres of scale broom scrub exists within the Main Alignment/Common Areas. Approximately 3.78 acres would be permanently impacted and 20.46 acres would be temporarily impacted. Through implementation of the above avoidance and minimization measures, and replanting efforts, impacts to this plant community would be reduced.

Variation B

This plant community was not observed in this variation.

Variation D

This plant community was not observed in this variation.

Variation E

This plant community was not observed in this variation.

Rail Options 1A, 1B, 1C and Rail Options 7A, 7B, 7C

This plant community was not observed in this variation.

Wildlife Movement Corridors

Permanent impacts on wildlife movement corridors may occur under all of the build alternatives for species such as gray fox, kit fox, coyote, American badger, and bobcat. Construction of a multilane highway over such a long span has the potential to create a barrier to wildlife movement locally. Each build alternative, including the proposed variations, would have the same effect on wildlife movement because each crosses the same natural drainages at right angles. Two exceptions are the Variation E alignment, which would cross the Mojave River in two locations instead of at one location, and the alternative with HSR, which would impact an area of I-15 that would otherwise not be impacted; however, all crossings of the Mojave River are expected to be bridged at a relatively high elevation, which would minimize impacts. More information on wildlife movement corridors can be found in Appendix H Wildlife Corridor Evaluations of the *Natural Environment Study* (AMEC, 2011).

Various types of dirt, gravel, and paved roads exist throughout the development envelope of the proposed project. With the exception of the areas where the new proposed Freeway/Expressway (Freeway/Tollway) alignment intersects with the existing State Route (SR) 14, United States Highway 395 (US 395), I-15, and SR-18, no roads currently exist along the proposed corridor.

Road-strike data were collected in various areas of the project site during the wildlife crossing study. Based on these data, it was determined that wildlife was taken as a result of vehicle strikes. Because few animals were noted, a statistical analysis could not be conducted to determine the amount of collisions one could expect under the existing conditions of the project site. When attempting to understand the difference between existing conditions when compared to post-implementation of the proposed project, it must be assumed relatively few strikes occur under current conditions. Because of the speed limits expected on the proposed Freeway/Expressway and Freeway/Tollway alternatives, and considering the expected volume of traffic within a rural area, it is expected that there would be a relatively high vehicle/wildlife collision rate; therefore, there is potential for a substantial increase in vehicle/wildlife collisions to occur with the implementation of any of the proposed build alternatives. It appears there is no appreciable difference among any of the build alternatives, variations, or options. Implementation of the proposed mitigation measures could reduce the impact from the potential increase in vehicle/wildlife collisions to a level less than substantial.

Any vehicle/wildlife strikes resulting from operation of the HSR would be an increase from the existing conditions because such a rail does not currently exist. Because the rail line is located within the median of the proposed freeway/expressway for much of the route, the alternative including HSR and all of the related variations and options would not substantially increase the number of vehicle/wildlife collisions.

The proposed project provides for wildlife crossing at the three locations noted in the Town of Apple Valley's Draft MSHCP/NCCP and many others nearby. With the construction of the proposed free-span bridge over the Mojave River at an elevation of 80 feet or greater, it is expected that there would be no impact to wildlife movement through the Mojave Narrows reach of the river where the transit line crosses. At many locations in and near the Northern Lucerne Wildlife Linkage Corridor, numerous soft-bottomed box culverts and elevated viaducts are included in the design. With the implementation of mitigation measures BNC-6 through BNC-10, impacts to wildlife movement would be less than substantial. The preparation and implementation of an HMMP (BAN-5) and compensatory mitigation for impacts to habitat for various sensitive plant and wildlife species (BNC-4, BAN-7, BTE-2, BTE-3, and BTE-11) would further minimize impacts.

Upon further review of the vehicle traffic that is anticipated to occur on SR-18 at the eastern terminus of the proposed project, there is potential for impact to wildlife crossing farther east of the terminus. Although SR-18 is currently a two-lane highway with only few 18-inch corrugated metal culverts crossing the highway, with the anticipated quadrupling of the traffic at this point, wildlife crossing could be affected. As such, project design includes soft-bottom box culverts at the location identified as Granite Mountain Corridor designed to facilitate wildlife crossing. With the implementation of these culverts, no impact is expected to occur to wildlife movement along Granite Mountain Corridor.

As discussed in Chapter 2, the HDC build alternatives would include dual-purpose culverts. At some locations, the culverts would function as a crossing for water only, while at other locations they would function as a crossing for water and a passage for wildlife. These wildlife crossing culverts are intended to link habitat that would otherwise be separated by the HDC. Those locations selected for the dual-purpose culvert would be modified (i.e., higher and wider culverts) to accommodate wildlife and encourage wildlife to use these culverts. The locations to function as dual-purpose culverts were determined by a Wildlife Movement Study (Preliminary Wildlife Corridor Evaluation, September 23, 2011). Refer to Figures 2-32, 2-33, and 2-34 for locations of wildlife crossings, and Table 2-1 for a list of culverts to be constructed for wildlife crossing purposes within the project corridor.

Los Angeles County Significant Ecological Areas (SEA)

This proposed project would impact SEA 48 Big Rock Wash, SEA 49 Little Rock Wash and one additional proposed area in the Antelope Valley near the San Bernardino County Line according to the SEA boundaries originally established (Figure 3.3.1-2).

Since then, the Los Angeles County General Plan was updated (General Plan 2035) and includes SEA boundary and name changes. SEA 48 Big Rock Wash and SEA 49 Little Rock Wash are now part of the newly named SEA titled Antelope Valley SEA and is described in the General Plan 2035. An excerpt taken the General Plan 2035 regarding the description and criteria used to include it follows.

Antelope Valley SEA

Boundary and Resources Description

The Antelope Valley SEA is located in the central portion of the Antelope Valley, primarily east of the cities of Palmdale and Lancaster, within a predominantly unincorporated area of the County. The SEA is focused on the principal watercourses of the area: Little Rock Wash and Big Rock Wash and tributaries, such as Mescal Creek. Audubon California recognizes the area of Edwards Air Force Base as a Globally Important Bird Area (IBA), which is visited by tens of thousands of migrant birds during the spring and fall migratory seasons, and supports the breeding of rare and endangered birds during the spring and summer months.

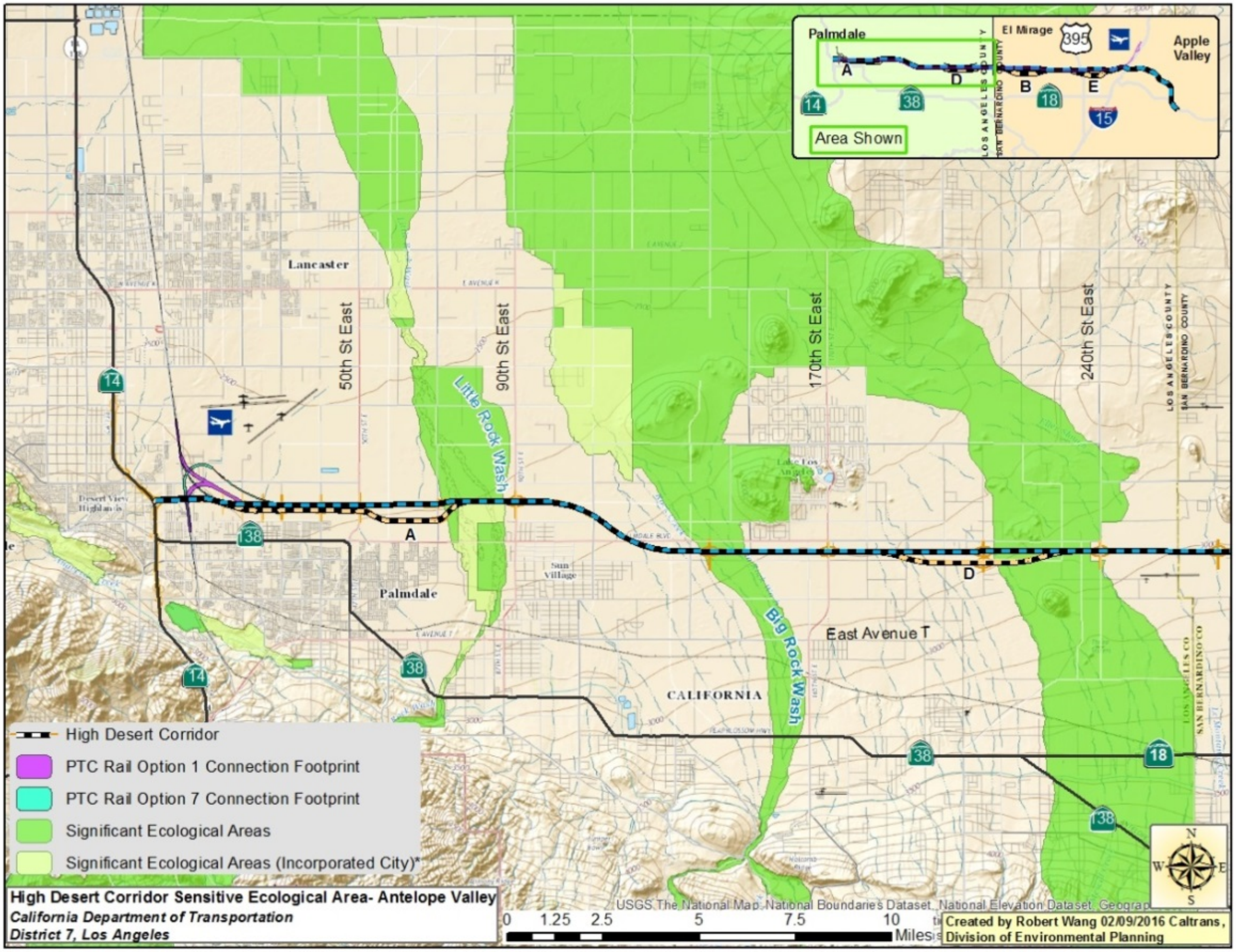

Figure 3.3.1-2 Significant Ecological Areas

The SEA is located, at least partially, in each of the following United States Geological Survey (USGS) 7.5' California Quadrangles: Rosamond, Rosamond Lake, Redman, Rogers Lake South, Jackrabbit Hill, Lancaster East, Alpine Butte, Hi Vista, Adobe Mountain, Palmdale, Littlerock, Lovejoy Buttes, El Mirage, Pacifico Mountain, Juniper Hills, Valyermo, and Mescal Creek.

Watercourses and water features, such as dry lakes and springs, are the focus for desert wildlife and central to connectivity and biodiversity in this region. The SEA was delineated to emphasize the importance of the Little Rock Wash and Big Rock Wash watersheds to the surface and subsurface hydrology of the Antelope Valley and to the dry lakes. The western portion of the SEA extends along the margin of the Little Rock Wash and floodplain zone, while the eastern margin follows a tributary of Big Rock Wash, which is Mescal Creek Wash and its tributaries. The origins of the watercourses in the Angeles National Forest are an important aspect of their diversity and connectivity, and the importance of the diverse forest vegetation of this SEA is discussed below. The SEA includes several major buttes and numerous minor ones, which have highly diverse biota along with diverse desert habitats, which range from sand dunes formed from the wind-blown dust that the buttes collect, to rocky crags, which are home to various raptors. The SEA includes the County’s portion of the watershed basin for dry lakes, which are the destination for the watercourses. There are three dry lakes and their adjacent plains (protected as part of Edwards Air Force Base) included in the SEA: Rosamond Dry Lake with the adjacent Piute Ponds, Buckhorn Lake, and Rogers Lake. These lakes and ponds are often flooded during the rainy winter-spring seasons, and are the principal resting areas in the region on the Pacific Flyway. The northeastern portion of the SEA encompasses some agricultural cropland (portions of which are fallow) and dispersed rural residential uses; however, the underlying hydrology of the washes remains intact throughout the entire SEA.

Three main watercourse segments originate in the San Gabriel Mountains and flow through the Antelope Valley to dry lakes near the northern County boundary: 1) Little Rock Wash; 2) Big Rock Wash; and 3) Desert-Montane. Desert-Montane centers on Mescal Creek and includes adjacent drainages. The flows of all three drainages are subsurface for much of the year and may be on the surface during rain and snowmelt.

The Little Rock Wash segment (the westernmost segment), goes north from Little Rock-Palmdale Dam as its southern barrier. Upstream from the reservoir is critical habitat for the endangered arroyo toad (Anaxyrus californicus FE, SSC). The toad could occur from time to time in the downstream area of the SEA. Heading north to Mount Emma Road, the boundaries follow the flood zone of the Little Rock Wash and also incorporate some of the vegetated slopes that drain to the wash. North from Mount Emma Road, the boundaries generally follow Federal Emergency Management Agency (FEMA) boundaries. On the west side, south of Edwards Air Force Base and north of Avenue F, the SEA boundary follows the Economic Opportunity Area boundary.

All of Edwards Air Force Base that is in the County is included in the SEA because the restricted entry and use protect the dry lakes and their neighboring areas. Many desert plants and wildlife species once found broadly across the Antelope Valley are now found only or primarily within Edwards Air Force Base. The ponds and dry lakes have distributed habitat of marshy alkali grassland, alkali flats, and cattail and bulrush marsh augmented by wastewater treatment facilities that have additional ponds. Some of the nesting rare and uncommon birds include white-faced ibis (*Plegadis chihi*), tricolored blackbird (*Agelaius tricolor*), redhead (*Aythya americana*), gadwall (*Anas strepera*), yellow-headed blackbird (*Xanthocephalus xanthocephalus*), least bittern (*Ixobrychus exilis*), and federally-threatened western snowy plover (*Charadrius alexandrinus nivosus*).

The Big Rock Wash area has western and eastern segments in the SEA. The western arm of the Big Rock Wash segment begins near the northern boundary of the Angeles National Forest, heads north out of the Forest along Pallett Creek. The SEA includes parts of Cruthers and Holmes creeks near their junctions with Pallett Creek. SEA boundaries follow the braided stream channel toward the confluence with Big Rock Wash. From the aqueduct at Big Rock Wash to Edwards Air Force Base, the western boundary line follows recently active braids of Big Rock Wash, encompassing Alpine Butte, and joining to the Little Rock Wash segment within Edwards Air Force Base. On the eastern arm of the Big Rock Wash segment, the SEA boundaries head north from the Angeles National Forest headwaters of Dorr Canyon (a Big Rock Wash tributary) and the headwater area of Big Rock Wash near State Route-2. The boundaries travel through the Angeles National Forest and follow the wash area of the streams toward their confluence with Pallett Creek. The Angeles National Forest floodplain of the widened area of South Fork of Big Rock Wash is included in the SEA.

South Fork of Big Rock Wash is part of the federally-designated critical habitat of the mountain yellow-legged frog (*Rana muscosa*, FE, SE). This frog is known in the County from only a few high- mountain streams in the San Gabriel Mountains. A fungal pathogen is principally responsible for its decline; however, climate change, air pollution and non-native predators are also likely contributing factors.

Another broad area of the San Andreas Fault Zone near the Valyermo Ranch follows the FEMA boundaries and includes a nesting area for gray vireos near Bobs Gap. Between the Angeles National Forest and the aqueduct, the SEA boundaries follow FEMA boundaries. The eastern boundary generally follows the FEMA boundary and recently active braids along the main course of Big Rock Wash to the vicinity of Avenue Q East, at which point it projects east to encompass Lovejoy Buttes. At Avenue O, the eastern boundary rejoins the main active portion of Big Rock Wash, continuing northeastward to skirt development in Lake Los Angeles. In the vicinity of Avenue M, the boundary projects eastward from about 156th Street East to 180th Street East) to encompass Rocky, Piute, and Saddleback Buttes, and connect with the Desert-Montane transect segment.

The Desert-Montane Transect segment begins in the Angeles National Forest along the ridge of Table Mountain at the San Bernardino-Los Angeles County line. Table Mountain is known for its diverse flora, which includes desert and mountain elements, and some unusual limestone-obligate species. The SEA southern boundary along the ridgeline meets the western boundary as it skirts the camp developments along the southern base of Table Mountain. The boundary turns north along the western ridge of the Mescal Creek drainage, crossing the California Aqueduct with the State Route- 138. From the aqueduct to Avenue R, the western boundary buffers the westernmost portion of the drainage by 200 feet, protecting the braided area of the watercourse. This part of the SEA includes Black Butte and the Three Sisters Buttes, and many smaller unnamed buttes, as well as Mescal and Theodore Payne County wildlife sanctuaries. The east side of the transect is the San Bernardino-Los Angeles County line. At about Avenue U East, the eastern boundary veers off the San Bernardino-Los Angeles County line to the north-northwest, buffering the Puzzle Creek watercourse by about 200 feet, protecting the braiding of the easternmost drainages. Near Avenue R, the boundary trends north, and goes north-northwest near Avenue P to include Moody Butte, lesser unnamed rises, and Blue Rock Butte.

The Desert-Montane segment largely avoids drainages that flow into and out of the Lake Los Angeles community, but the transect includes diffuse watercourses on the south side of Saddleback Butte, Saddleback Butte and the surrounding Saddleback Butte State Park, the Antelope Valley Indian Museum State Park at the base of Piute Butte, and Piute Butte. At about Avenue H and 170th Street East, the boundary turns to the northeast following natural vegetation to the County boundary near Avenue C. Here the boundary turns north along the line to where San Bernardino, Kern and Los Angeles counties meet. This northeastern part of the SEA has WEMO conservation areas for the threatened desert tortoise and state-threatened Mojave ground squirrel. The northeastern area has some BLM land and the County Phacelia Wildlife Sanctuary, which is also County Wildflower Preserve A. The SEA includes large parts of County Wildflower Preserve F.

On Edwards Air Force Base, north to south between Avenues B and E East, and west to east between 140th Street East and the San Bernardino-Los Angeles County line, there is federally- designated critical habitat for the state and federally-threatened desert tortoise (*Gopherus agassizii*). At 190th Street, the critical habitat widens to extend north beyond the County and the SEA into Kern County. At 200th Street, the critical habitat widens to the south to extend to Avenue H and then goes east across the San Bernardino-Los Angeles County line. The desert tortoise critical habitat area on Edwards Air Force Base is included in the SEA, and much of the SEA area north of Avenue H in the eastern drainages of the SEA is designated critical habitat for the tortoise.

The SEA traverses the Antelope Valley from the foothills of the San Gabriel Mountains, to the low elevations of the dry lake basins, and its expanse and considerable topographical relief is reflected in its relatively high floral and faunal diversity. The SEA includes playa lake, alkali marsh, alluvial fan scrub, a mosaic of xeric desert scrubs, Joshua tree woodland, desert riparian woodlands, juniper scrub, pinyon pine, chaparral and mixed conifer, oak, and riparian communities of higher elevations. Transitional zones (ecotones) between these communities often contain unusual species compositions, such as pinyon pine, juniper and Joshua trees together, or Joshua trees adjacent to cottonwood forest.

Edwards Air Force Base has the only good stands of mesquite (*Prosopis glandulosa*) remaining in the County. It has areas of Mojave spineflower (*Chorizanthe spinosa*), creosote bush scrub, alkali sink, and the transition vegetation between the two. Rosamond Lake has the best example of the shadscale scrub and alkali sink biotic communities in the County. Shadscale scrub needs heavy soil with underlying hardpan between 3000-6000 feet elevation, which is unusual in the County, and more common in the north Mojave Desert and Owens Valley. In addition, the playa has the southernmost extension of the Great Basin kangaroo rat (*Dipodomys microps*), which is an isolated geographic population of scientific interest.

The southernmost portions of the three “legs” of the SEA lie within the Angeles National Forest, and include the upper tributary watersheds and streams for Little Rock Wash, Big Rock Wash, and Mescal Creek. These areas support multi-species oak and conifer woodlands that are common to the middle-elevation zones on the north face of the San Gabriel Mountains. The creeks are higher energy systems at those elevations, as they collect water from the surrounding terrain, and are typically lined with woodlands of alder, willow, sycamore and cottonwood, with varying densities and with various compositions of species.

As the creeks drop north of the pressure ridges of the San Andreas Fault Zone, they lose gradient and widen, and most of the flow becomes sub-surface, except during high energy storms or in the spring (depending upon rainfall totals in the watersheds). The vegetation becomes sparser and less evenly distributed along the channel margins. Crossing the lowlands of the Antelope Valley, the channels support a variety of desert scrub vegetation within the alluvial plains. Where the alluvial plains are wide and shallow, cottonwood-willow woodland and sycamore woodland vegetation communities often occur within the overall floodplain on stable terraces; around oxbow flow zones in the Antelope Valley; or where the groundwater table is replaced or augmented by agricultural runoff. The surrounding upland habitats are primarily desert scrubs, including creosote and chenopod scrubs, sand sheets (chiefly around the buttes), and Joshua tree woodland. Intact Joshua tree woodland, with native understories present, supports a relatively high diversity of annual wildflowers, reptiles and mammals. The Joshua trees also provide nest sites for many resident and migratory bird species.

Lovejoy, Alpine, Piute, Black and Saddleback buttes, along with other, smaller unnamed buttes, form most of the topographical relief within the SEA. These areas offer different ecological conditions that are associated with rock shelter, perching sites, nesting sites, denning areas, wind protection and sand sheet accumulation areas. Local and migratory bat species roost and reproduce in the caves and crevices of the butte formations. The higher buttes provide local nesting sites for owls and other birds of prey.

Alpine Butte is the least disturbed butte in the County, with excellent stands of Joshua tree woodland and creosote bush scrub, and impressive wildflower displays when rainfall creates appropriate conditions. Lovejoy Butte has Joshua tree woodland and creosote bush scrub, with a central wind-blown sand community for a good mixture of rock and sand habitats. In addition, the close proximity of Lovejoy Butte to Big Rock Wash increases the diversity of habitats in the area. Nevertheless, it also suffers from impact from the Lake Los Angeles community, which borders the butte on three sides. The clustering of buttes in the SEA may be important to the abundant, diverse wildlife that inhabits the various vegetation communities around and in the buttes. Saddleback Butte and Piute Butte together are protected as a state park, but Saddleback Butte is also subject to development for campsites and hiking trails. Piute Butte has a prehistoric site that may protect it from much future recreational development. All of the buttes harbor diverse wildlife and flora. Most of them are critical habitat for the state and federally-threatened desert tortoise. Some buttes within the desert tortoise's critical habitat are not included in the SEA.

The active and fallow open agricultural lands support a diversity of wildlife species, which essentially regard the fields and ditches as irrigated desert. Birds of prey frequently hunt over the open agricultural areas, including fallow fields; wide-ranging predators also find excellent hunting conditions in and around agricultural areas. A spectrum of local and migratory bat species feed over the irrigated fields in the spring and summer, when insect numbers are the highest, and at least one sensitive bat species, the pallid bat, forages in open scrub or ruderal desert habitats.

The northern portion of the SEA contains several unique habitat types, including mesquite bosque (threatened locally by lowering water tables and harvest for firewood), clay pan pools, vernal pools, alkali grasslands, alkali and freshwater marshes, and permanent ponds. Hundreds of bird species have been recorded from the pond and marsh habitats around the dry lakes and ponds, and numerous species nest on the playa margins or in the associated riparian habitats. The open creosote scrub and other xeric habitats on the slopes surrounding the lake playas serve as important wintering areas for many raptor species, as well as large numbers of songbirds.

Wildlife Movement

The SEA extends from the Angeles National Forest to the playa lakes within Edwards Air Force Base, encompassing most of the two largest drainages exiting the northern slope of the San Gabriel Mountain range. The geographical features of the SEA serve as a major habitat linkage and movement corridor for all wildlife species within its vicinity and in an intergenerational sense, many of the plant species. Ecologically generalist species (mountain lion, bobcat, coyote, gray fox, etc.) have the ability to move across such vast areas and through changing habitat types. For such species, the SEA may serve as an important system for long-term and genetic exchange among populations. For smaller or less-mobile species or taxa, which are narrowly restricted in their habitat needs, the SEA can serve as a broad linkage zone, in which individual movement can take place during seasonal population dispersal or over generations. This provides essential genetic exchange within and between metapopulations. The two drainages, combined with the upland terrestrial Desert-Montane transect portion of the SEA, ensure linkage and direct movement areas for all of the wildlife species present within the County portion of the Antelope Valley.

Regional Biological Value

The SEA meets several SEA designation criteria and supports many regional biological values. Each criterion and how it is met described in Table 3.3.1-6.

Table 3.3.1-6 Criteria Analysis of the Antelope Valley SEA

Criterion		Status	Justification
A)	The habitat of core populations of endangered or threatened plant or animal species.	Met	Critical habitat for the only known Antelope Valley population of the federally-endangered arroyo toad is adjacent to Little Rock Reservoir, upstream in Little Rock Creek, and some may still be found downstream of the dam in the SEA. The SEA encompasses much of the County ranges of the federally-threatened California desert tortoise, including much of the County critical habitat for the tortoise. The state-threatened Mohave ground squirrel occurs throughout much of the SEA. The SEA includes some of the critical habitat of mountain yellow-legged frog in the South Fork of Big Rock Creek. It includes habitat designated in the Western Mojave Plan (WEMO) for the alkali mariposa lily, which is a rare lily of the desert floor.
B)	On a regional basis, biotic communities, vegetative associations, and habitat of plant or animal species that are either unique or are restricted in distribution.	Met	The mesquite bosque, sand sheet, rocky butte, desert riparian woodland, and alluvial fan sage scrub habitats are unique and regionally restricted biotic communities encompassed by the SEA. Desert species not, or rarely, found elsewhere in the County, such as verdin, black-throated sparrow, Mojave rattlesnake, desert banded gecko, Leech's prionid borer, and mesquite borer, occur within these habitats. Additionally, the ponds and other riparian and wetland systems in the northern portion of the SEA support numerous water birds and raptors not found elsewhere in the County.
C)	Within the County, biotic communities, vegetative associations, and habitat of plant or animal species that are either unique or are restricted in distribution.	Met	The desert alluvial fan sage scrub, Joshua tree woodland, desert riparian woodland, mesquite bosque, alkali meadow/marsh, desert freshwater marsh, playa lake and seasonal pool habitats are located within, are unique to, or best represented within, the SEA.
D)	Habitat that at some point in the life cycle of a species or group of species, serves as concentrated breeding, feeding, resting, migrating grounds and is limited in availability either regionally or in the County.	Met	The freshwater habitats within and around Rosamond, Buckhorn and Rogers dry lake basins have large concentrations of migratory and resident waterfowl and birds of prey, providing them with essential seasonal and permanent resources. The rocky desert buttes are unique roosting, sheltering, perching and nesting sites for birds of prey and bats. This SEA is centered on migratory routes for both plants and animals along principal desert washes and buttes that connect the mountains to freshwater playas.

Table 3.3.1-6 Criteria Analysis of the Antelope Valley SEA

Criterion		Status	Justification
E)	Biotic resources that are of scientific interest because they are either an extreme in physical/ geographical limitations, or represent unusual variation in a population or community.	Met	The mesquite bosque that is located within the SEA is clearly at an extreme of its geographical range, along with its associated biota, such as the mesquite borer. Edge populations usually represent an unusual genetic variation in a population or community, and therefore meet the criterion of scientific interest as well as the criterion of a population at the extreme physical/geographical limit of its range.
F)	Areas that would provide for the preservation of relatively undisturbed examples of the original natural biotic communities in the County.	Met	The SEA encompasses some of the most biotically intact acreages of Joshua tree woodland, desert riparian woodland, and desert alluvial fan sage scrub remaining in the County. Mesquite was formerly widely distributed in the Antelope Valley, but due to harvesting and drawdown of groundwater, is now limited to a few protected areas, such as the Edwards Air Force Base.

In conclusion, the area described is a SEA because it contains A) the habitat of core populations of endangered and threatened plant and animal species; B-C) biotic communities, vegetative associations, and habitat of plant and animal species that are either unique or are restricted in distribution in the County and regionally; D) concentrated breeding, feeding, resting, or migrating grounds, which are limited in availability in the County; E) populations of scientific interest at the edge of their range including the desert tortoise, the mesquite bosque, and the Mojave ground squirrel; and F) areas that provide for the preservation of relatively undisturbed examples of original natural biotic communities in the County.

Information required by SEA Technical Advisory Committee (TAC) in the form of their Biota Report and Impact Analysis Report is included in the *Natural Environment Study* (2016). Because the County of Los Angeles Planning Commission does not have jurisdiction for approval of this proposed project, Caltrans submitted the DEIR/EIS to the County of Los Angeles for comment.

Indirect Impacts

Indirect impacts on biological resources would occur to those natural habitats in surrounding areas immediately adjacent to the proposed project limits, after completion of the proposed project. Any one of these topics or combination of two or more can be referred to as an “edge effect.” It is expected that implementation of the proposed project would result in indirect impacts to biological resources in the following ways: increased light and glare; increased noise; vibration; increase in populations of non-native plants; increase in vehicle/wildlife collisions and kills; and growth inducement (increase in human presence and development) (see Section 4.9 of the *Natural Environment Study*). Indirect impacts applicable to natural communities include increase in populations of non-native plants, growth inducement, and shading.

Indirect impacts associated with the proposed project are not quantifiable but are reasonably foreseeable. As such, the discussion that follows provides a common-sense identification of the types of secondary impacts and their relative magnitude.

Non-native Plants

Areas within the project development envelope consist of native and non-native plants. Although non-native plants already occur within the project footprint and within the vicinity, it can be reasonably concluded that creation of a larger roadway could exacerbate this condition.

Growth Inducement

It is reasonable to assume that construction of a new highway in a rural area such as many areas of the proposed project site would provide opportunities for development that would not otherwise exist. Construction of the Freeway/Expressway or Freeway/Tollway would provide a faster travel time to/from the vicinity of the project site, providing for development. It is challenging to predict the amount of development, or growth, of areas surrounding the project site; therefore, it is difficult to quantify the impacts to the natural resources. It should be assumed that any growth that converts natural habitat to a developed condition would negatively impact biological resources. The level of impact would be dependent on the specifics of the individual project and would only be understood after the evaluation of those individual projects. Analysis of known approved projects to biological resources is discussed in the Cumulative Impacts section.

Shading

No shadowing effects (indirect impact), from bridge and abutment structures, to riparian vegetation is anticipated (*Natural Environment Study*). The proposed roadway would span the Mojave River on a bridge. The bridge is designed to be at least 80 feet above the ground and would have three separate bridge decks, one each for eastbound and westbound vehicular traffic and one for rail travel. The height and design of the three narrow bridge decks would allow ample sunlight to the areas below the bridge. Appendix L of the Biological Assessment contains photographs of existing bridges over the Mojave River located upstream and downstream of the Preferred Alternative. The bridges include National Trails Highway, the Burlington Northern Santa Fe (BNSF) Railroad (bridges both east and west of I-15), and the I-15 bridge. Although the bridges are not the same height, construction technique, or orientation as the Preferred Alternative bridge, they do show that riparian vegetation continues to grow underneath and directly adjacent to the bridges despite any shading on the vegetation from the bridge structures.

Avoidance, Minimization, and/or Mitigation Measures

The project would be designed to minimize impacts on natural communities. Compensatory mitigation has been discussed with CDFW. If impacts to natural communities cannot be avoided, the following measures will be implemented:

BNC-1: The road shoulder and graded slopes will be revegetated with like plant communities prior to construction conditions to minimize the loss of each community.

BNC-2: The elevation of the highway will be kept to a minimum necessary for drainage to reduce the overall footprint due to required shoulder sloping.

BNC-3: Joshua tree woodland will be preserved in place as feasible. A biological monitor will be onsite to establish an environmentally sensitive area (ESA) around the areas where this plant community occurs. If impacts cannot be avoided, these areas should be included in the calculations for acquisition of land to preserve in perpetuity. To further reduce project impacts to this community, individual trees can be translocated to an area that will not be impacted. To aid in revegetation of the finish graded slopes, individual trees can be temporarily located in an onsite nursery and replanted within revegetation areas.

BNC-4: Compensatory Mitigation: Any area of Joshua tree woodland to be permanently impacted will be compensated by purchasing land at a 2:1 ratio within the region and preserved in perpetuity.

BNC-5: Riparian woodland will be preserved in place as feasible. Impacts will be avoided with the design of a span bridge over the Mojave River with no impacts to jurisdictional areas. A biological monitor will be onsite to establish an ESA around the jurisdictional areas within the Mojave River.

The project would also be designed to minimize impacts on wildlife movement corridors. When feasible, all Mojave River crossings will be bridged at a relatively high elevation to minimize impacts; however, this must be balanced with BNC-2 to determine an elevation suitable for wildlife crossings while minimizing the project footprint. Specific design features will include the following:

BNC-6: Use large at-grade culverts under the new highway where natural drainages occur, where feasible. Wildlife is more likely to use such crossings when “daylight” or openings to the other side are visible. Where culvert lengths need to be longer due to design, median daylights will be used. Fencing will be used as needed to guide wildlife into the culverts and along the ROW to prevent wildlife from trying to cross the highway.

BNC-7: Construct bridges and culverts that cross drainage features to be high and wide enough to allow large wildlife to travel under the structure. The design will also include culverts as crossing structures that are specifically designed for wildlife travel.

BNC-8: Design the culverts to be a “soft bottom.” Because it is not feasible to bridge all 200+ natural drainages, it is understood that the smaller drainages will have a hard-bottom box culvert that is placed a minimum 1 foot below surrounding grade to allow soil to be placed on top of the hard bottom, thus creating a soft bottom. It is also understood that without this soft-bottom design, each culvert would essentially require a bridging design that would be cost prohibitive. As feasible, culverts will also be designed to be tall and wide to better attract wildlife use.

BNC-9: Install fencing along the route that prevents wildlife from crossing in areas other than intended wildlife crossing locations. Fencing shall be installed to channel wildlife to the intended crossing locations.

BNC-10: Maintain fencing throughout the existence of the Freeway/Expressway or Freeway/Tollway alignment.

In addition, with implementation of Mitigation Measure BAN-5, found in Section 3.3.4, Animal Species, and BWL-1 through BWL-4, found in Section 3.3.2, Wetlands, impacts on riparian woodland and jurisdictional drainages from green energy facilities would be less than substantial.

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3.3.2 Wetlands and Other Waters

This section of the document discusses the federal and state agency regulated wetlands, other waters, and associated riparian environments.

Regulatory Setting

Wetlands and other waters are protected under a number of laws and regulations. At the federal level, the Federal Water Pollution Control Act, more commonly referred to as the Clean Water Act (CWA) (33 United States Code [U.S.C.] 1344), is the main law regulating wetlands and surface waters. One purpose of the CWA is to regulate the discharge of dredged or fill material into waters of the U.S., including wetlands. Waters of the U.S. include navigable waters, interstate waters, territorial seas, and other waters that may be used in interstate or foreign commerce. To classify wetlands for the purposes of the CWA, a three-parameter approach is used that includes the presence of hydrophytic (water-loving) vegetation, wetland hydrology, and hydric soils (soils formed during saturation/inundation). All three parameters must be present, under normal circumstances, for an area to be designated as a jurisdictional wetland under the CWA.

Section 404 of the CWA establishes a regulatory program that provides that discharge of dredged or fill material cannot be permitted if a practicable alternative exists that is less damaging to the aquatic environment or if the nation's waters would be significantly degraded. The Section 404 permit program is run by the U.S. Army Corps of Engineers (USACE) with oversight by the U.S. Environmental Protection Agency (EPA).

USACE issues two types of 404 permits: General and Standard permits. There are two types of General Permits: Regional permits and Nationwide permits. Regional permits are issued for a general category of activities when they are similar in nature and cause minimal environmental effects. Nationwide permits are issued to authorize a variety of minor project activities with no more than minimal effects.

There are two types of Standard permits: Individual permits and Letters of Permission. Ordinarily, projects that do not meet the criteria for a Nationwide Permit may be permitted under one of the USACE' Standard permits. For Standard permits, USACE's decision to approve is based on compliance with EPA's Section 404(b)(1) guidelines (EPA 40 *Code of Federal Regulations* [CFR] Part 230), and whether permit approval is in the public interest. The Section 404(b)(1) guidelines were developed by EPA in conjunction with USACE and allow the discharge of dredged or fill material into the aquatic system (waters of the U.S.) only if there is no practicable alternative that would have less adverse effect. The guidelines state that USACE may not issue a permit if there is a least environmentally damaging practicable alternative (LEDPA) to the proposed discharge that would have fewer effects on waters of the U.S. and not have any other significant adverse environmental consequences.

The Executive Order (EO) for the Protection of Wetlands (11990) also regulates the activities of federal agencies with regard to wetlands. Essentially, EO 11990 states that a federal agency, such as the Federal Highway Administration (FHWA) and/or California Department of Transportation (Caltrans), as assigned, cannot undertake or provide assistance for new construction located in wetlands unless the head of the agency finds: (1) that there is no practicable alternative to the construction and (2) the proposed project includes all practicable measures to minimize harm.

The Department, FHWA, USACE, EPA, and U.S. Fish and Wildlife Service (USFWS) entered into a memorandum of understanding (MOU) to integrate the National Environmental Policy Act (NEPA) and the CWA for Environmental Impact Statement (EIS) projects that have 5 or more acres of permanent impact to waters of the United States (U.S.). Caltrans did not initiate the integration process under this MOU for this project because permanent impacts to waters of the U.S. identified through the analysis for this project did not reach the 5-acre threshold until after the Draft EIR/EIS was circulated and adjustments to the project alternatives and variations were made in response to public comments. Caltrans decided not to initiate the integration process at that point as the preferred alternative does not meet the 5-acre threshold.

At the state level, wetlands and waters are regulated primarily by the California Department of Fish and Wildlife (CDFW) and the Lahonton Regional Water Quality Control Board (RWQCB). Sections 1600-1607 of the California Fish and Game Code require any agency that proposes a project that will substantially divert or obstruct the natural flow of or substantially change the bed or bank of a river, stream, or lake to notify CDFW before beginning construction. If CDFW determines that the project may substantially and adversely affect fish or wildlife resources, a Lake or Streambed Alteration Agreement will be required. CDFW jurisdictional limits are usually defined by the tops of the stream or lake banks, or the outer edge of riparian vegetation, whichever is wider. Wetlands under jurisdiction of USACE may or may not be included in the area covered by a Streambed Alteration Agreement obtained from CDFW.

The RWQCBs were established under the Porter-Cologne Water Quality Control Act to oversee water quality. Discharges under the Porter-Cologne Act are permitted by Waste Discharge Requirements (WDRs) and may be required even when the discharge is already permitted or exempt under the CWA. In compliance with Section 401 of the CWA, the RWQCBs also issue water quality certifications for activities which may result in a discharge to waters of the U.S. This is most frequently required in tandem with a Section 404 permit request. See Section 3.2.2, Water Quality, for more details.

Affected Environment

Information in this section comes from the *Natural Environment Study* (April 2016) and the *Federal Jurisdictional Delineation* and *State Jurisdictional Delineation reports (August 2015 and November 2015)* contained in Appendix I of the *Natural Environment Study*.

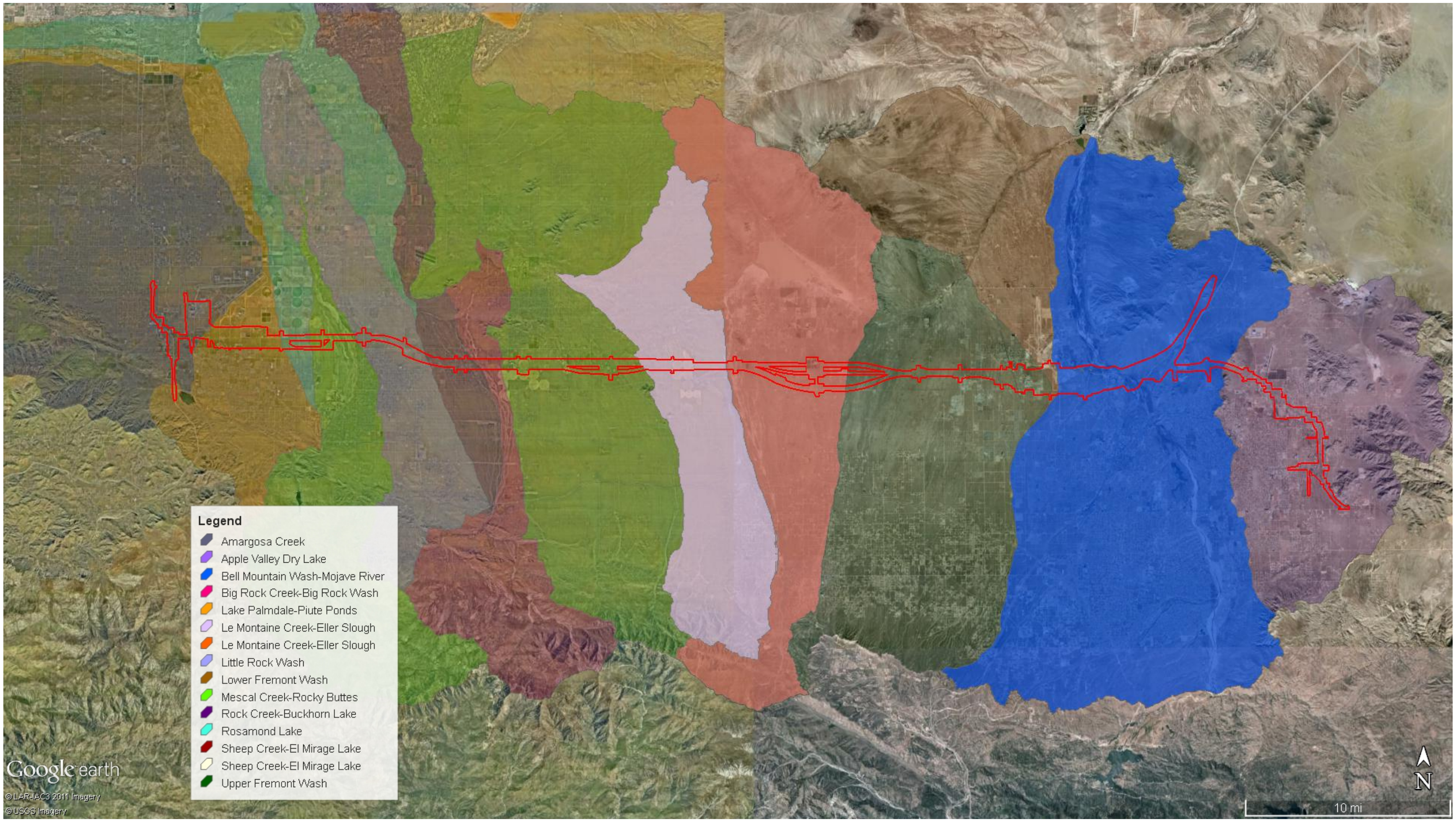
A combined total of approximately 157.44 acres of hydrological features were mapped within the Biological Study Area (BSA) inclusive of all variations to the proposed alternatives (see Appendix I of the *Natural Environment Study* for Summary Jurisdictional Delineation Map). Of the 157.44 acres of hydrological features, approximately 65.76 acres are “isolated”, non-federally jurisdictional waters and approximately 58.20 acres are federally jurisdictional waters. The remaining portions (33.48 acres) of the features mapped in the BSA included areas upslope of the channel and riparian habitat associated with a stream channel, and likely within limits of CDFW jurisdiction.

The BSA was defined during development of the project purpose and need, and has been developed through a collaborative process between the transportation agencies (Caltrans, the Federal Highway Administration, Metro, Los Angeles and San Bernardino Counties). The BSA includes the areas anticipated to be directly and indirectly affected by the proposed project, including all alignments and variations, plus any areas that were required to be surveyed for biological resources according to agency protocol. It is generally 500 feet in width over most of the 63-mile length with few exceptions at interchanges, intersections with on/off ramps, where the rail line and highway separate, and in few areas where the roadway narrows. Additional information on the development of the BSA can be found in Section 2.1 of the NES.

Hydrological features that were potentially jurisdictional were delineated using 33 Code of Federal Regulations (CFR) Part 328 and applicable regulatory guidance letters published by USACE. Generally speaking, waters of the U.S. that may be regulated under Section 404 of the Clean Water Act include traditionally navigable waters, other waters of the U.S. such as washes and ephemeral tributaries, and wetlands. Wetlands are a subset of waters of the U.S. The RWQCBs currently accepts USACE methodology for determining jurisdictional boundaries of waters of the State, so the same methodology that is used to determine limits of USACE jurisdiction is applied to hydrologic features in the BSA to determine the RWQCB jurisdictional limits even if they do not have a direct connection to navigable waters and other USACE regulated features or meet other federal nexus requirements. The CDFW jurisdictional limits typically include the limits of waters of the U.S. and waters of the State plus the outer edges of associated riverine or riparian features such as streambanks or riparian vegetation. More detail on the methodologies and jurisdictional limits used are described in the jurisdictional delineation reports contained in Appendix I of the *Natural Environment Study*.

The BSA includes two major watersheds; Antelope-Fremont Valleys Watershed and the Mojave River Watershed (see Figure 3.3.2-1). All of the drainages within the BSA in the Antelope-Fremont Valleys HUC-8 watershed are considered isolated and flow toward Rosamond Dry Lake, Buckhorn Dry Lake, and Rogers Dry Lake on Edwards Air Force Base. As such, the wetland and non wetland waters in this watershed are not under the jurisdiction of the USACE. Non-wetland features include natural, un-vegetated channels bisecting undeveloped areas and un-vegetated roadside ditches. The mapped features flow ephemerally, during and shortly after rain events. Smaller dry washes had several indicators of OHWM including bed and bank, sediment deposition, and absence of vegetation. Some highly braided areas had very faint indicators of OHWM. Other slightly larger dry washes had more defined indicators of OHWM, including wracking, shelving, and more defined bed-and-bank. The characteristics observed within the mapped features with OHWM suggest that they channel surface water, hence they are likely jurisdictional as Waters of the State and regulated by RWQCB and by CDFW as streambeds. Additional details on the features mapped in this watershed are included in the *State Jurisdictional Delineation* (2015) report in Appendix I of the *Natural Environment Study.*

Figure 3.3.2-1 Antelope-Fremont Valleys and Mojave River Watershed (with HUC-10 Watersheds Identified)

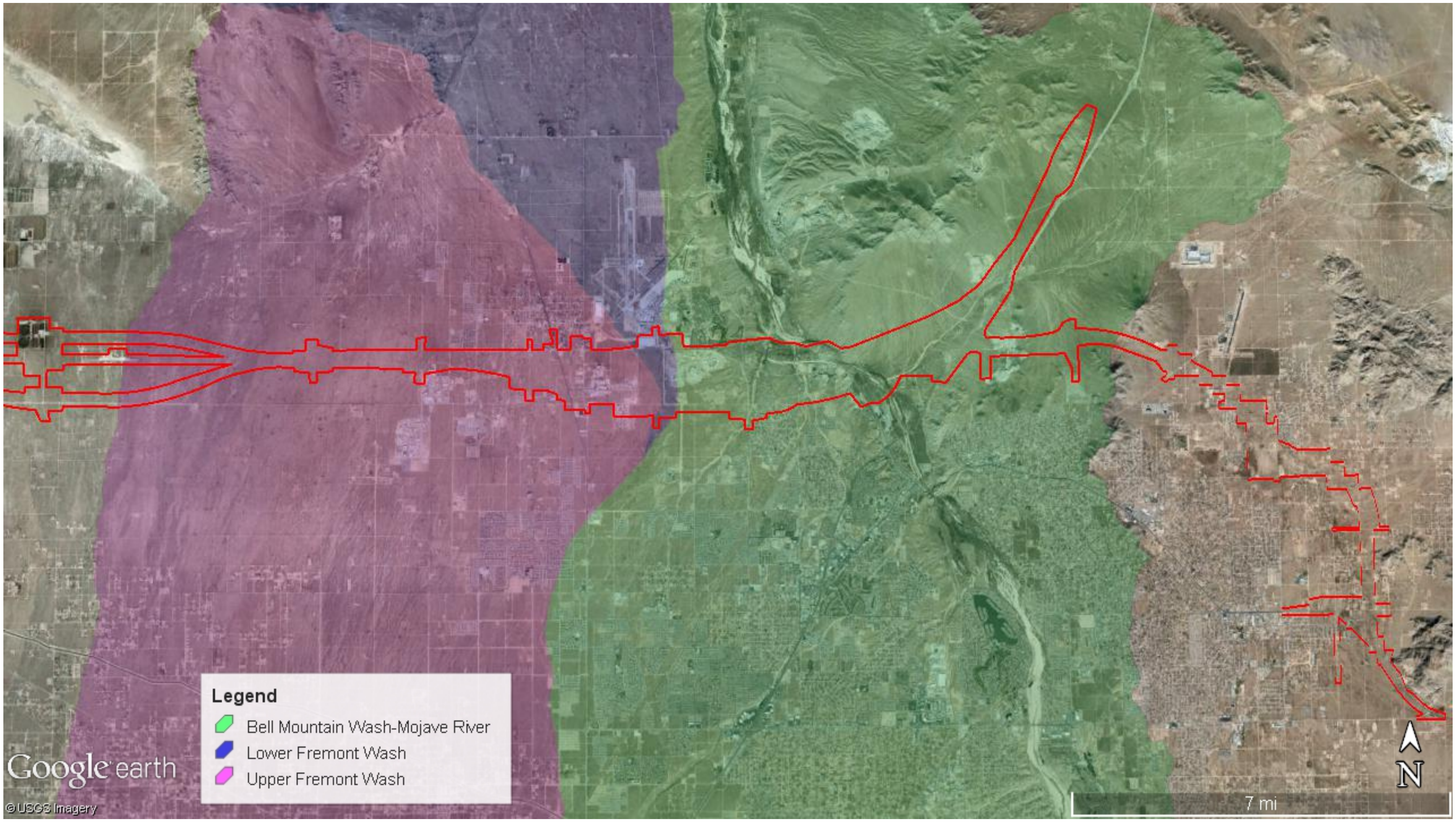


The USACE maintains jurisdiction over wetland and non-wetland Waters within the majority of the Mojave River Watershed (see Figure 3.3.2-2). The Mojave River is the dominant feature within this area and is considered a TNW and has connectivity that is observable and predictable thus making a significant nexus with its tributaries within the watershed even though they are non-relatively permanent waters (RPWs). The Mojave River is an intermittent stream that is considered the largest USACE-determined waters of the U.S. within the project due to its downstream muted hydrological connection to Silver Lakes (two manmade navigable lakes in the City of Helendale). Due to this hydrological connection and that portions of the Mojave River within the BSA are perennial due to local geology through the area known as "the narrows" (ECORP, 2013), the Mojave River qualifies as a navigable water of the U.S. under 33 CFR § 329 and meets the definition of a traditional navigable water (TNW). Several ephemeral tributaries to the Mojave River that meet the definition of non-relatively permanent waters (non-RPWs) include Fremont Wash, an unnamed tributary to Fremont Wash, Turner Wash, Ossum Wash, and Bell Mountain Wash. These waters of the U.S. drainages are within the Upper Fremont Wash and Mojave River-Bell Mountain Wash HUC subwatersheds (see Figure 3.3.2-1).

In contrast to the Antelope-Fremont Valley Watershed, the USACE would consider all non-RPWs with an OHWM and physical surface channel connectivity to the Mojave River to have a significant nexus with a TNW, and would therefore be determined to be under USACE jurisdiction. There are two closed basin sub-watersheds within the Mojave River Watershed, Apple Pond-Apple Valley Dry Lake (HUC 180902080304) and El Mirage Lake (HUC 180902080404). These hydrologic units are considered 100 percent "non-contributing", meaning that all surface flow is internal and no overland flow leaves the unit through the outlet point. Drainage features observed in these sub-watersheds were considered non-jurisdictional. Additional details on the features mapped in this watershed are included in the *Federal Jurisdictional Delineation* (2015) and *State Jurisdictional Delineation* (2015) report in Appendix I of the *Natural Environment Study*.

Approximately 87.37 acres within the BSA of the Freeway/Expressway and Freeway/Tollway alternatives and approximately 83.17 acres within the BSA of the alternatives with HSR that flow through the following hydrologic unit code (HUC) subwatersheds either evaporate or percolate into the groundwater table: Apple Valley Dry Lake; Sheep Creek-El Mirage Lake; Le Montaine Creek-Eller Slough; Mescal Creek-Rocky Buttes; Big Rock Creek-Big Rock Wash; Rock Creek-Buckhorn Lake; Town of Pearblossom; Little Rock Wash; Rosamond Lake; Lake Palmdale-Piute Ponds; and Amargosa Creek. The Rosamond dry lake, Buckhorn dry lake, Rogers dry lake, El Mirage dry lake, and Apple Valley dry lake serve as the downstream hydrological terminus to these isolated intermontane basins (USACE, 2010; 2011a; 2011b; 2013; 2016). These dry lake systems are isolated waters without a surface connection and are considered nonjurisdictional waters of the U.S. but these features and their associated tributaries are likely regulated by the RWQCB as waters of the State and CDFW as resources regulated by 1600-1607 of the California Fish and Game Code (*Natural Environment Study*, 2016).To determine the estimated acreages of jurisdictional features associated with an alternative/variation/option, calculations

Figure 3.3.2-2 Upper Fremont Wash, Lower Fremont Wash, and Mojave River-Bell Mountain Wash HUC Subwatersheds



are separate for each design feature to differentiate between the main alignment common areas, the main alignment corresponding to the variations, the variations, and the rail options (see Figure 3.3-1, Alignment Key Map for Biological Study Area). These acreages should be considered preliminary until designs are finalized and until jurisdictional features and limits are verified by USACE, RWQCB, and CDFW.

Freeway/Expressway Alternative

Potentially jurisdictional waters identified under this alternative were analyzed by category of jurisdiction (USACE, RWQCB, and CDFW) as they occur in the Main Alignment common areas, by Main A, B, D, E, and by Variations A, B, B1, D, and E.

Approximately 121.18 acres of regulated hydrological features were mapped within the BSA inclusive of all variations to the Freeway/Expressway Alternative.

Freeway/Tollway Alternative

Potentially jurisdictional waters identified under this alternative would be the same as the jurisdictional waters identified under the Freeway/Expressway Alternative (with Main Alignment common areas, Main A, B, D, E, and Variations A, B, B1, D, and E). This alternative follows the same footprint as the Freeway/Expressway Alternative, but it would have sections that operate as a tollway.

Freeway/Expressway with HSR Alternative

Potentially jurisdictional waters identified under this alternative were analyzed by category of jurisdiction (USACE, RWQCB, and CDFW) as they occur in the Main Alignment common areas, Rail Options 1A, 1B, 1C, Rail Options 7A, 7B, 7C, and by Main B, D, E, and Variations B, B1, D, and E with High-Speed Rail (HSR) Feeder Service.

Approximately 157.44 acres of regulated hydrological features were mapped within the BSA inclusive of all variations to the Freeway/Expressway with HSR Alternative.

Freeway/Tollway Alternative with HSR Alternative

Potentially jurisdictional waters identified under this alternative would be the same as the jurisdictional waters identified under the Freeway/Expressway Alternative with the HSR Feeder Service (with Main Alignment common areas, Rail Options 1A, 1B, 1C, Rail Options 7A, 7B, 7C, Main B, D, E, and Variations B, B1, D, and E with HSR Feeder Services). This alternative follows the same footprint as the Freeway/Expressway Alternative, but it would have sections that operate as a tollway.

Approximately 121.18 acres of regulated hydrological features were mapped within the BSA inclusive of all variations to the Freeway/Expressway and Freeway/Tollway alternative.

Environmental Consequences

No Build Alternative

No impacts would occur under the No Build Alternative.

Build Alternatives

The following section describes impacts to USACE, RWQCB, and CDFW jurisdictional resources. Acreages are provided by alternative and by variation. Acreages provided for variations are additional to the main alignment impact acreage. These acreage conclusions represent a calculated estimation of the jurisdictional areas within the project impact area and are subject to modification following the USACE, RWQCB, and CDFW verification processes.

USACE Jurisdiction Impacts

Pursuant to the CWA, all dredge and fill activities within waters of the U.S. are regulated under Section 404 by USACE. Within the project footprint, USACE jurisdictional features are located within the Lower Fremont Wash and Bell Mountain-Mojave River 10-digit HUC subwatersheds of all alternatives, variations, and options.

The following subsections summarize the impacts to USACE jurisdictional waters by alternative. The data in table format can be found in the *Natural Environment Study*. These acreage conclusions represent a calculated estimation of the jurisdictional areas within the project impact area and are subject to modification following the USACE verification process. The USACE has reviewed the Federal Jurisdictional Delineation report and has issued concurrence in the form of Preliminary and Approved Jurisdictional Determinations (USACE, 2016).

Freeway/Expressway and Freeway/Tollway Alternatives

Including all variations to the Freeway/Expressway and Freeway/Tollway alternatives, there are approximately 33.81 acres within the BSA that are considered to be under USACE jurisdiction.

Main Alignment/Common Areas

Permanent direct impacts to waters of the U.S. in the main alignment common areas are approximately 1.58 acres of non-wetland waters. These permanent impacts include:

- Piers, piling, or footing locations below the OHWM of several contributing unnamed washes to Bell Mountain Wash.
- Box culverts within Fremont Wash and its contributing washes. These washes do not have wetlands or riparian vegetation and are not considered shade-sensitive; permanent indirect impacts are not expected.

Based on the data presented in the *Natural Environment Study*, temporary impacts to waters of the U.S. in the main alignment common areas are approximately 10.15 acres of non-wetland waters . These temporary impacts include equipment maneuvering and unpaved access roads surrounding the Fremont Wash and contributing washes, as well as Bell Mountain Wash and several of its contributing washes.

Variations A and D

Potential USACE jurisdictional features were not identified within the project footprint of Variations A and D of the Freeway/Expressway (Freeway/Tollway) Alternative.

Variation B

Permanent direct impacts to waters of the U.S. in the Main B, Variation B, and Variation B1 alignments are approximately 0.09, 0.04, and 0.16 acre of non-wetland waters, respectively. These permanent impacts include box culverts within Fremont Wash and its contributing washes. These washes do not have wetlands or riparian vegetation and are not considered shade-sensitive; permanent indirect impacts are not expected.

Temporary impacts to waters of the U.S. in the Main B, Variation B, and Variation B1 alignments are approximately 0.08, 0.04, and 0.14 acre of non-wetland waters, respectively. These temporary impacts include equipment maneuvering and unpaved access roads surrounding the Fremont Wash and contributing washes.

Variation E Main with Mojave River Bridges

Permanent direct impacts to waters of the U.S. in the Variation E Main alignment with the Mojave River Bridges are approximately 2.48 acres of non-wetland waters. These permanent impacts include piers, piling, or footing locations below the OHWM of several contributing unnamed washes to Turner Wash, Ossum Wash, and the Mojave River. No permanent impacts to wetland waters would occur.

Temporary impacts to waters of the U.S. in the Variation E Main alignment with the Mojave River Bridges are approximately 1.32 acres. These temporary impacts include equipment maneuvering and unpaved access roads surrounding Turner Wash, Ossum Wash, and several contributing unnamed washes to Turner Wash, Ossum Wash, and the Mojave River. Of the 1.32 acres, approximately 0.001 acre would be wetland waters.

These acreage calculations resulted from additional design refinement based on public comments that included design modifications of the project alignment in the areas of Victorville.

Variation E with Mojave River Bridges

Permanent direct impacts to waters of the U.S. in the Variation E alignment with the Mojave River Bridges are approximately 5.52 acres. These permanent impacts include piers, piling, or footing locations below the OHWM of several contributing unnamed washes to Turner Wash, Ossum Wash, and the Mojave River. Of the

5.52 acres, approximately 0.87 acre would be wetland waters and 4.65 acres would be non-wetland waters.

Temporary impacts to waters of the U.S. in the Variation E alignment with the Mojave River Bridges are approximately 9.82 acres. These temporary impacts include equipment maneuvering and unpaved access roads surrounding Turner Wash, Ossum Wash, and several contributing unnamed washes to Fremont Wash, Turner Wash, Ossum Wash, and the Mojave River. Of the 9.82 acres, approximately 1.32 acres would be wetland waters and 8.50 acres would be non-wetland waters.

These acreage calculations resulted from further design modifications that were based on public comments that included adding additional on-/off-ramps or moving detention basins in the areas of Victorville. These design modifications within Variation E have an extensive impact to biological resources and jurisdictional features, and this option has been eliminated as a viable variation alternative.

Freeway/Expressway and Freeway/Tollway with HSR Alternatives

Approximately 50.91 acres within the BSA inclusive of all variations to the Freeway/Expressway and Freeway/Tollway with HSR alternatives are considered under USACE jurisdiction.

Main Alignment/Common Areas

Permanent direct impacts to waters of the U.S. in the main alignment common areas are approximately 1.35 acres. These permanent impacts include box culverts within Fremont Wash and its contributing washes. These washes do not have wetlands or riparian vegetation and are not considered shade-sensitive; permanent indirect impacts are not expected.

Temporary impacts to waters of the U.S. in the main alignment common areas are approximately 7.88 acres of non-wetland waters. These temporary impacts include equipment maneuvering and unpaved access roads surrounding Fremont Wash and its contributing washes.

Rail Options 1A, 1B, 1C, Rail Options 7A, 7B, 7C, and Variation D

Potential USACE jurisdictional features were not identified within the Rail Options 1 (A, B, C) and 7 (A, B, C), or Variation D of the Freeway/Expressway (Freeway/ Tollway) Alternative with the HSR Feeder Service.

Variation B

Permanent direct impacts to waters of the U.S. in the B Main, Variation B, and Variation B1 alignments are approximately 0.14, 0.11, and 0.25 acre of non-wetland waters, respectively. These permanent impacts include box culverts within Fremont Wash and its contributing washes. These washes do not have wetlands or riparian vegetation and are not considered shade-sensitive; permanent indirect impacts are not expected.

Temporary impacts to waters of the U.S. in the B Main, Variation B, and Variation B1 are approximately 0.04, 0.04, and 0.05 acre of non-wetland waters, respectively. These temporary impacts include equipment maneuvering and unpaved access roads surrounding the Fremont Wash and contributing washes.

Variation E Main with HSR Feeder Service with Mojave River Bridges

Permanent direct impacts to waters of the U.S. in the Variation E Main alignment with HSR and with Mojave River Bridges are approximately 3.24 acres of non-wetland waters. These permanent impacts include:

- Piers, piling, or footing locations below the OHWM of several contributing unnamed washes to Turner Wash, Ossum Wash, and the Mojave River.
- Piers, piling, or footing locations within waters of the U.S. nonwetland riparian vegetation of the Mojave River.

Temporary impacts to waters of the U.S. in Variation E Main alignment with HSR and with Mojave River Bridges are approximately 7.26 acres of non-wetland waters. These temporary impacts include equipment maneuvering and unpaved access roads surrounding Turner Wash, Ossum Wash, and several contributing unnamed washes to Turner Wash, Ossum Wash, and the Mojave River. No impacts to wetland waters would occur.

Variation E with HSR Feeder Service with Mojave River Bridges

Permanent direct impacts to waters of the U.S. in Variation E alignment with HSR and with Mojave River Bridges are approximately 18.68 acres. These permanent impacts include:

- Piers, piling, or footing locations below the OHWM of the Mojave River and several contributing unnamed washes to Turner Wash, Ossum Wash, and the Mojave River.
- Piers, piling, or footing locations within waters of the U.S. nonwetland riparian vegetation of the Mojave River.

Of the 18.68 acres, approximately 2.99 acres would be wetland waters and 15.69 acres would be non-wetland waters.

Temporary impacts to waters of the U.S. in Variation E alignment with HSR and with Mojave River Bridges are approximately 9.67 acres. These temporary impacts include equipment maneuvering and unpaved access roads within the Mojave River and surrounding Turner Wash, Ossum Wash, and several contributing unnamed washes to Turner Wash, Ossum Wash, and the Mojave River. Of the 9.67 acres, approximately 0.73 acre would be wetland waters and 8.94 would be non-wetland waters.

Summary

With the implementation of avoidance and minimization measures, incorporation of design modifications requested during public comments, and several options that were eliminated, permanent impacts to no more than 7.26 acres of waters of the U.S. and temporary impacts to no more than 20.11 acres of waters of the U.S. are anticipated within the proposed Freeway/Expressway (Freeway/Tollway) Alternative along the longest/widest variations (this includes the Main Alignment + Variations B1 and E) (see Table 3.3.2-1).

With the implementation of avoidance and minimization measures, incorporation of design modifications requested during public comments, and several options that were eliminated, permanent impacts to no more than 20.28 acres of waters of the U.S. and temporary impacts to no more than 17.60 acres of waters of the U.S. are anticipated within the Freeway/Expressway (Freeway/Tollway) with HSR Feeder Service (see Table 3.3.2-1) (this includes the Main Alignment + Variations B1 and E) (see Table 3.3.2-1).

With the implementation of avoidance and minimization measures, incorporation of design modifications during public comments, and several options that were eliminated, permanent impacts to no more than 4.84 acres of waters of the U.S. and temporary impacts to no more than 15.19 acres of waters of the U.S. are anticipated for the Preferred Alternative (Freeway/Tollway with HSR Feeder Service) (this includes the Main Alignment + Variations B1 and E) (see Table 3.3.2-1).

These acreage conclusions represent a calculated estimation of the jurisdictional areas within the project impact area and are subject to modification following the USACE verification process.

RWQCB Jurisdiction

Pursuant to the CWA, all dredge and fill activities regulated under Section 404 are required to obtain a 401 Water Quality Certification from the RWQCB. Typically, waters of the U.S., as regulated under Section 401 of the CWA, reflect those waters that fall under USACE jurisdiction. In cases where hydrological features have OHWM indicators but do not have a direct connection to navigable waters and other USACE regulated features or meet other federal nexus requirements, the RWQCB may take jurisdiction under the Porter-Cologne Water Quality Control Act as waters of the State. The RWQCB is ultimately responsible for determining waters of the State pursuant to the Porter-Cologne Act.

Within the project footprint for all of the alternatives, variations, and options, impacts to features regulated by RWQCB include USACE jurisdictional features under CWA Section 401 and isolated features in closed watershed areas that are subject to regulation under the Porter-Cologne Water Quality Control Act. RWQCB jurisdictional features are referred to collectively as “waters of the State”. The Mojave River, Fremont Wash, Turner Wash, Ossum Wash, Bell Mountain Wash, and contributing unnamed washes in Mojave River Watershed are considered waters of the State as are named washes and contributing un-named tributaries in the Antelope-Fremont Valleys Watershed that drain to Rosamond Dry Lake, Buckhorn Dry Lake, and Rogers Dry Lake on Edwards Air Force Base such as Mescal Creek, Big Rock Wash, and Little Rock Wash. The acreage conclusions represent a calculated estimation of the jurisdictional areas within the project impact area, and are subject to modification following the RWQCB determinations.

Table 3.3.2-1 Temporary and Permanent Impacts to USACE Jurisdictional Features for the High Desert Corridor Project

Project Component	Non-wetland Waters of the U.S.		Wetland Waters of the U.S.		Total Waters of the U.S.	
	Temporary Impacts (acres)	Permanent Impacts (acres)	Temporary Impacts (acres)	Permanent Impacts (acres)	Temporary Impacts (acres)	Permanent Impacts (acres)
	Equipment and Access Roads	*Fill*	*Equipment and Access Roads*	*Fill*	*Equipment and Access Roads*	*Fill*
Freeway/Expressway (Freeway/Tollway) Alternative						
Total Main Alignment/ Common Areas	10.15	1.58	0.00	0.00	10.15	1.58
Total Variation A Main	0.00	0.00	0.00	0.00	0.00	0.00
Total Variation A	0.00	0.00	0.00	0.00	0.00	0.00
Total Variation B Main	0.08	0.09	0.00	0.00	0.08	0.09
Total Variation B	0.04	0.04	0.00	0.00	0.04	0.04
Total Variation B1	0.14	0.16	0.00	0.00	0.14	0.16
Total Variation D Main	0.00	0.00	0.00	0.00	0.00	0.00
Total Variation D	0.00	0.00	0.00	0.00	0.00	0.00
Total Variation E Main with Mojave River Bridges	1.32	2.48	0.001	0.000	1.32	2.48
Total Variation E with Mojave River Bridges	8.50	4.65	1.32	0.87	9.82	5.52
Freeway/Expressway (Freeway/Tollway) Alternative with HSR Feeder Service						
Total Main Alignment/Common Areas	7.88	1.35	0.00	0.00	7.88	1.35
Total Variation A Main	0.00	0.00	0.00	0.00	0.00	0.00
Total Variation A	0.00	0.00	0.00	0.00	0.00	0.00
Total Variation B Main	0.04	0.14	0.00	0.00	0.04	0.14
Total Variation B	0.04	0.11	0.00	0.00	0.04	0.11
Total Variation B1	0.05	0.25	0.00	0.00	0.05	0.25
Total Variation D Main	0.00	0.00	0.00	0.00	0.00	0.00
Total Variation D	0.00	0.00	0.00	0.00	0.00	0.00

Table 3.3.2-1 Temporary and Permanent Impacts to USACE Jurisdictional Features for the High Desert Corridor Project

Project Component	Non-wetland Waters of the U.S.		Wetland Waters of the U.S.		Total Waters of the U.S.	
	Temporary Impacts (acres)	Permanent Impacts (acres)	Temporary Impacts (acres)	Permanent Impacts (acres)	Temporary Impacts (acres)	Permanent Impacts (acres)
	Equipment and Access Roads	***Fill***	***Equipment and Access Roads***	***Fill***	***Equipment and Access Roads***	***Fill***
Total Variation E Main with HSR Feeder Service with Mojave River Bridges	7.26	3.24	0.00	0.00	7.26	3.24
Total Variation E with HSR Feeder Service with Mojave River Bridges	8.94	15.69	0.73	2.99	9.67	18.68
Total Option 1A	0.00	0.00	0.00	0.00	0.00	0.00
Total Option 1B	0.00	0.00	0.00	0.00	0.00	0.00
Total Option 1C	0.00	0.00	0.00	0.00	0.00	0.00
Total Option 7A	0.00	0.00	0.00	0.00	0.00	0.00
Total Option 7B	0.00	0.00	0.00	0.00	0.00	0.00
Total Option 7C	0.00	0.00	0.00	0.00	0.00	0.00

Common to All Alternatives/Variations/Options

With the implementation of avoidance and minimization measures, incorporation of design modifications requested during public comments, and several options that were eliminated, permanent impacts to no more than 27.61 acres of RWQCB waters of the State and temporary impacts to no more than 45.96 acres of waters of the State are anticipated within the proposed Freeway/ Expressway and Freeway/Tollway alternatives along the longest/widest variations (see highlighted rows in Table 3.3.2-2).

With the implementation of avoidance and minimization measures, incorporation of design modifications requested during public comments, and several options that were eliminated, permanent impacts to no more than 19.52 acres of waters of the State and temporary impacts to no more than 46.75 acres of waters of the State are anticipated within the Freeway/Expressway (Freeway/Tollway) with HSR Feeder Service (Preferred Alternative) (see highlighted rows in Table 3.3.2-2).

Rail Option 1C and Rail Option 7A have the least impacts to RWQCB jurisdictional features compared to Rail Option 1A, Option 1B, Option 7B, and Option 7C of the Freeway/Expressway (Freeway/Tollway) with HSR Feeder Service.

Coordination with the RWQCB will be required to confirm waters of the State and obtain Section 401 Water Quality Certification.

Table 3.3.2-2 Temporary and Permanent Impacts to RWQCB Jurisdictional Features for the High Desert Corridor Project

Project Component	Non-wetland Waters of the State		Wetland Waters of the State		Total Waters of the State	
	Temporary Impacts (acres)	Permanent Impacts (acres)	Temporary Impacts (acres)	Permanent Impacts (acres)	Temporary Impacts (acres)	Permanent Impacts (acres)
	Equipment and Access Roads	*Fill*	*Equipment and Access Roads*	*Fill*	*Equipment and Access Roads*	*Fill*
Freeway/Expressway (Freeway/Tollway) Alternative						
Total Main Alignment/Common Areas	28.52	10.31	0.00	0.00	28.52	10.31
Total Variation A Main	0.68	4.41	0.00	0.15	0.68	4.56
Total Variation A	6.24	9.13	0.03	0.88	6.53	10.01
Total Variation B Main	0.56	0.60	0.00	0.00	0.56	0.60
Total Variation B	0.40	0.60	0.00	0.00	0.40	0.60
Total Variation B1	0.58	0.62	0.00	0.00	0.58	0.62
Total Variation D Main	0.37	1.11	0.00	0.00	0.37	1.11
Total Variation D	0.61	0.59	0.00	0.00	0.61	0.59
Total Variation E Main with Mojave River Bridges	1.32	2.48	0.01	0.00	1.33	2.48
Total Variation E with Mojave River Bridges	8.63	4.69	1.32	0.87	9.96	5.56
Freeway/Expressway (Freeway/Tollway) Alternative with the HSR Feeder Service						
Total Main Alignment/Common Areas	37.47	7.66	0.00	0.00	37.47	7.66
Total Variation A Main	1.16	5.15	0.01	0.15	1.17	5.30
Total Variation B Main	0.55	1.42	0.00	0.00	0.55	1.42
Total Variation B	0.40	1.31	0.00	0.00	0.40	1.31
Total Variation B1	0.39	1.64	0.00	0.00	0.39	1.64
Total Variation D Main	0.25	1.42	0.00	0.00	0.25	1.42
Total Variation D	0.11	1.27	0.00	0.00	0.11	1.27

Table 3.3.2-2 Temporary and Permanent Impacts to RWQCB Jurisdictional Features for the High Desert Corridor Project

Project Component	Non-wetland Waters of the State		Wetland Waters of the State		Total Waters of the State	
	Temporary Impacts (acres)	Permanent Impacts (acres)	Temporary Impacts (acres)	Permanent Impacts (acres)	Temporary Impacts (acres)	Permanent Impacts (acres)
	Equipment and Access Roads	***Fill***	***Equipment and Access Roads***	***Fill***	***Equipment and Access Roads***	***Fill***
Total Variation E Main with HSR Feeder Service with Mojave River Bridges	7.26	3.24	0.00	0.13	7.26	3.37
Total Variation E with HSR Feeder Service with Mojave River Bridges	9.05	14.46	0.73	4.29	9.77	18.75
Total Option 1A	0.34	0.83	0.00	0.00	0.34	0.83
Total Option 1B	0.34	0.95	0.00	0.00	0.34	0.95
Total Option 1C	0.36	0.28	0.00	0.00	0.36	0.28
Total Option 7A	0.33	0.76	0.03	0.00	0.36	0.76
Total Option 7B	0.37	1.16	0.03	0.00	0.40	1.16
Total Option 7C	0.17	0.90	0.05	0.03	0.23	0.93

Freeway/Expressway (Freeway/Tollway) Alternative

Main Alignment/Common Areas

Ephemeral washes located in the main alignment common areas are located within the following 10-digit HUC subwatersheds: Bell Mountain-Mojave River, Amargosa Creek, Lake Palmdale-Piute Ponds, Little Rock Wash, Town of Pearblossom, Rock Creek-Buckhorn Lake, Big Rock Creek-Big Rock Wash, Le Montaine Creek-Eller Slough, Mescal Creek-Rocky Buttes, Lower Fremont Wash, Upper Fremont Wash, and Apple Valley Dry Lake.

Permanent direct impacts to RWQCB jurisdictional features in the Main Alignment common areas are approximately 10.31 acres. These permanent direct impacts include:

- Box culverts in Grandview Canyon Creek, Graham Canyon Creek, Mescal Creek, Sheep Creek, Fremont Wash, contributing washes, and numerous isolated unnamed washes.
- Piers, pilings, footings, and desert scrub vegetation clearing within the streambeds of Little Rock Wash. Piers, piling, or footing locations within jurisdictional areas of Big Rock Wash.

Temporary impacts to RWQCB jurisdictional features in the Main Alignment common areas are approximately 28.52 acres. These temporary impacts include equipment maneuvering and unpaved access roads within the Little Rock Wash, Big Rock Wash, Grandview Canyon Creek, Graham Canyon Creek, Mescal Creek, Sheep Creek, Fremont Wash, contributing washes, and numerous isolated unnamed washes.

Variation A

The following ephemeral washes within the A Main and Variation A alignments are located within the 10-digit HUC subwatersheds:

- Lake Palmdale-Piute Ponds
- Amargosa Creek
- Little Rock Wash

Permanent direct impacts to RWQCB jurisdictional features in the Variation A Main alignment are approximately 4.56 acres. These permanent direct impacts include:

- Box culverts and desert scrub vegetation clearing within several isolated unnamed washes.
- Piers, pilings, footings, and desert scrub vegetation clearing within the streambeds of Little Rock Wash.

Temporary impacts to RWQCB jurisdictional features in the Variation A Main alignment are approximately 0.68 acre. These temporary impacts include equipment maneuvering and unpaved access roads within Little Rock Wash and several isolated unnamed washes.

Variation B

The following ephemeral washes within the B Main, Variation B, and Variation B1 alignments are located within the 10-digit HUC subwatersheds:

- Sheep Creek-El Mirage Lake
- Le Montaine Creek-Eller Slough
- Lower Fremont Wash

Permanent direct impacts to RWQCB jurisdictional features in the B Main, Variation B, and Variation B1 alignments are approximately 0.60, 0.60, and 0.62 acre, respectively. These permanent direct impacts include box culverts and desert scrub vegetation clearing within Sheep Creek, Fremont Wash, contributing washes, and several isolated unnamed washes.

Temporary impacts to RWQCB jurisdictional features in the B Main, Variation B, and Variation B1 alignments are approximately 0.56, 0.40, and 0.58 acre, respectively, within Sheep Creek, Fremont Wash, an unnamed tributary to Fremont Wash, and several isolated unnamed washes.

Variation D

The following ephemeral washes located within the D Main and Variation D alignments are located within the 10-digit HUC subwatersheds:

- Le Montaine Creek-Eller Slough
- Mescal Creek-Rocky Buttes

Permanent direct impacts to RWQCB jurisdictional features in the Variation D Main alignment are approximately 1.11 acre and Variation D alignment are approximately 0.52 acre.

Temporary impacts to RWQCB jurisdiction features in the Variation D Main alignment are approximately 0.37 acre and the Variation D alignment are approximately 0.61 acre. These temporary impacts include equipment maneuvering and unpaved access roads within Mescal Creek and several isolated unnamed washes.

Variation E with the Mojave River Bridges

The following ephemeral washes located within the Main E with Mojave River Bridges are located within the 10-digit HUC subwatersheds:

- Bell Mountain-Mojave River
- Upper Fremont Wash
- Lower Fremont Wash

Permanent direct impacts to RWQCB jurisdictional features in the Variation E Main alignment with Mojave River Bridges are approximately 2.48 acres. Permanent direct impacts to RWQCB jurisdictional features in the Variation E with Mojave River Bridges are approximately 5.56 acres. These permanent impacts include:

- Piers, pilings, footings, and desert scrub vegetation clearing limited to the top of the banks of Turner Wash, Ossum Wash, and several contributing unnamed washes to Turner Wash, Ossum Wash, and the Mojave River.
- Piers, piling, or footing locations within RWQCB jurisdictional areas of the Mojave River.

No permanent indirect impacts to RWQCB jurisdictional features from shading are anticipated (NES 2016).

Temporary impacts to RWQCB jurisdictional features in the Variation E Main alignment with Mojave River Bridges are approximately 1.33 acres. Temporary impacts to RWQCB jurisdictional features in the Variation E with Mojave River Bridge are approximately 9.96 acres. These temporary impacts include equipment maneuvering and unpaved access roads within the Mojave River and surrounding Turner Wash, Ossum Wash, and several contributing unnamed washes to Fremont Wash, Turner Wash, Ossum Wash, and the Mojave River.

These acreage calculations resulted from further design modifications that were based on public comments that included adding additional on-/off-ramps or moving detention basins in the areas of Victorville. These design modifications within Variation E have an extensive impact to biological resources and jurisdictional features, and this option has been eliminated as a viable variation alternative.

Freeway/Expressway and Freeway/Tollway with HSR Alternatives

Main Alignment/Common Areas

Permanent direct impacts to RWQCB jurisdictional features in the Main Alignment common areas are approximately 7.66 acres. These permanent direct impacts include:

- Piers, pilings, footings, and desert scrub vegetation clearing limited to the top of the banks of several isolated unnamed washes.
- Piers, piling, or footing locations within RWQCB -defined waters of the State of Big Rock Wash.

Temporary impacts to RWQCB jurisdictional features in the Main Alignment common areas are approximately 37.47 acres. These temporary impacts include equipment maneuvering and unpaved access roads within several isolated unnamed washes.

Rail Options 1A, 1B, 1C

The 10-digit HUC subwatershed within the Rail Options 1A, 1B, and 1C footprint include ephemeral Amargosa Creek. Permanent impacts of 0.83 acre and temporary impacts of 0.34 acre are anticipated to RWQCB jurisdictional features in Rail Option 1A. Permanent impacts of 0.95 acre and temporary impacts of 0.34 acre are anticipated to RWQCB jurisdictional features in Rail Option 1B. There are 0.28 acre permanent impacts within Rail Option 1C, and there are temporary impacts of

0.36 acre anticipated to RWQCB jurisdictional features in Rail Option 1C. These permanent direct impacts include:

- Piers, pilings, footings, and desert scrub vegetation clearing limited to the top of the banks of several isolated unnamed washes.
- Piers, piling, or footing locations within RWQCB -defined waters of the State wetlands of Big Rock Wash.

Temporary impacts include equipment maneuvering and unpaved access roads within several isolated unnamed washes.

Rail Option 7A, 7B, 7C

The 10-digit HUC subwatershed within the Rail Options 7A, 7B, and 7C footprint include ephemeral Amargosa Creek and Lake Palmdale-Piute Ponds. Permanent impacts of 0.76 acre and temporary impacts of 0.36 acre are anticipated to RWQCB jurisdictional features in Rail Option 7A. Permanent impacts of 1.16 acres and temporary impacts of 0.40 acre are anticipated to RWQCB jurisdictional features in Rail Option 7B. Permanent impacts of 0.93 acre and temporary impacts of 0.23 acre are anticipated to RWQCB jurisdictional features in Rail Option 7C. These permanent direct impacts include:

- Piers, pilings, footings, and desert scrub vegetation clearing limited to the top of the banks of several isolated unnamed washes.

Temporary impacts include equipment maneuvering and unpaved access roads within several isolated unnamed washes.

Variation B

The following ephemeral washes within the Variation B Main alignment are located within the 10-digit HUC subwatersheds:

- Sheep Creek-El Mirage Lake
- Le Montaine Creek-Eller Slough
- Lower Fremont Wash

Permanent direct impacts to RWQCB jurisdictional features in the Variation Main B alignment are approximately 1.42 acres. Permanent direct impacts to RWQCB jurisdictional features in Variation B are approximately 1.31 acres. Permanent direct impacts to RWQCB jurisdictional features in Variation B1 are approximately 1.64 acres. These permanent direct impacts include box culverts and desert scrub vegetation clearing within Sheep Creek, Fremont Wash, an unnamed tributary to Fremont Wash, and several isolated unnamed washes.

Temporary impacts to RWQCB jurisdictional features in the Main B, Variation B, and Variation B1 alignments are approximately 0.55, 0.40, and 0.39 acre, respectively. These temporary impacts include equipment maneuvering and unpaved access roads within Sheep Creek, Fremont Wash, contributing unnamed washes, and several isolated unnamed washes.

Variation D

The following ephemeral washes within the Variation D Main alignment are located within the 10-digit HUC subwatershed:

- Le Montaine Creek-Eller Slough
- Mescal Creek-Rocky Buttes

Permanent direct impacts to RWQCB jurisdictional features in the D Main and Variation D alignments are approximately 1.42 and 1.27 acres, respectively. These permanent direct impacts include box culverts and desert scrub vegetation clearing within Mescal Creek and several isolated unnamed washes.

Temporary impacts to RWQCB jurisdictional features in the D Main and Variation D alignments are approximately 0.25 and 0.11 acre, respectively. These temporary impacts include equipment maneuvering and unpaved access roads within Mescal Creek and several isolated unnamed washes.

Variation E Main Alignment with HSR and with the Mojave River Bridges

The following ephemeral washes within the Variation E alignment with the Mojave River Bridges are located within the 10-digit HUC subwatershed:

- Bell Mountain-Mojave River
- Upper Fremont Wash
- Lower Fremont Wash

Permanent impacts to RWQCB jurisdictional features in the Variation E Main alignment with HSR and with Mojave River Bridges are approximately 3.37 acres. These permanent impacts include:

- Piers, piling, or footing locations below the banks of several contributing unnamed washes to Turner Wash, Ossum Wash, and the Mojave River.
- Indirect impacts will be due to bridge shading from the Mojave River clear-span bridges over riparian vegetation (see Table 3.3.2-3). Staging and equipment access will occur above banks.

Temporary impacts to RWQCB jurisdictional features in the Variation E Main HSR and with Mojave River Bridges are approximately 7.26 acres. These temporary impacts include equipment maneuvering and unpaved access roads surrounding Turner Wash, Ossum Wash, and several contributing unnamed washes to Fremont Wash, Turner Wash, Ossum Wash, and the Mojave River.

These acreage calculations resulted from additional design refinement based on public comments that included design modifications of the project alignment in the areas of Victorville.

Summary

With the implementation of avoidance and minimization measures, incorporation of design modifications requested during public comments, and several options that were eliminated, permanent impacts to no more than 27.61 acres of RWQCB waters of the State and temporary impacts to no more than 46.20 acres of waters of the State are anticipated within the proposed Freeway/ Expressway and Freeway/Tollway alternatives along the longest/widest variations (the greatest permanent impacts would occur along the Main Alignment + Variations A, D Main, B1, and E; the greatest temporary impacts would occur along the Main Alignment + Variations A, D, B1, and E) (see Table 3.3.2-2).

With the implementation of avoidance and minimization measures, incorporation of design modifications requested during public comments, and several options that were eliminated, permanent impacts to no more than 35.93 acres of waters of the State and temporary impacts to no more than 49.61 acres of waters of the State are anticipated within the Freeway/Expressway and Freeway/Tollway with HSR Feeder Service (the greatest permanent impacts would occur along the Main Alignment + Variations A Main, D Main, B1, E and Rail Option 7B; the greatest temporary impacts would occur along the Main Alignment + Variations A Main, D Main, B Main, E, and Rail Option 7B) (see Table 3.3.2-2).

With the implementation of avoidance and minimization measures, incorporation of design modifications requested during public comments, and several options that were eliminated, permanent impacts to no more than 19.52 acres of waters of the State and temporary impacts to no more than 46.76 acres of waters of the State are anticipated for the Preferred Alternative (Freeway/Tollway with HSR Feeder Service) (this includes the Main Alignment + Variations A Main, D, B1, E Main, and Rail Option 1C) (see Table 3.3.2-2).

Variation E with HSR with Mojave River Bridges

The following ephemeral washes within the Variation E with the Mojave River Bridges are located within the 10-digit HUC subwatersheds:

- Bell Mountain-Mojave River
- Upper Fremont Wash
- Lower Fremont Wash

Permanent direct impacts to RWQCB jurisdictional features in Variation E with HSR Feeder Service with Mojave River Bridges are approximately 18.75 acres. These permanent impacts include:

- Piers, piling, or footing locations below the banks of the Mojave River and several contributing unnamed washes to Turner Wash, Ossum Wash, and the Mojave River.
- Piers, piling, or footing locations within CDFW jurisdictional areas of the Mojave River.

- Indirect impacts will be due to bridge shading from the Mojave River full-span bridges over riparian vegetation. Staging and equipment access will occur above banks.

Temporary impacts to Variation E with HSR Feeder Service with Mojave River Bridges are approximately 9.77 acres. These temporary impacts include equipment maneuvering and unpaved access roads within the Mojave River, and surrounding Turner Wash, Ossum Wash, and several contributing unnamed washes to Turner Wash, Ossum Wash, and the Mojave River.

CDFW Jurisdiction

Pursuant to Fish and Game Code Section 1600-1603, impacts to features regulated by CDFW include USACE and RWQCB jurisdictional features with an OHWM as "streambeds" plus any riparian habitat associated with the regulated streambeds.

The following subsections summarize the impacts to CDFW jurisdictional waters by alternatives. The data in table format can be found in the *Natural Environment Study* and in Table 3.3.2-3 below.

Freeway/Expressway (Freeway/Tollway) Alternative

Main Alignment/Common Areas

Ephemeral washes located in the main alignment common areas are located within the following 10-digit HUC subwatersheds: Bell Mountain-Mojave River, Amargosa Creek, Lake Palmdale-Piute Ponds, Little Rock Wash, Town of Pearblossom, Rock Creek-Buckhorn Lake, Big Rock Creek-Big Rock Wash, Le Montaine Creek-Eller Slough, Mescal Creek-Rocky Buttes, Lower Fremont Wash, Upper Fremont Wash, and Apple Valley Dry Lake.

Permanent direct impacts to CDFW jurisdictional features in the Main Alignment common areas are approximately 18.79 acres. These permanent direct impacts include:

- Box culverts and desert scrub vegetation clearing limited to the top of the banks of Grandview Canyon Creek, Graham Canyon Creek, Mescal Creek, Sheep Creek, Fremont Wash, contributing washes, and numerous isolated unnamed washes.
- Piers, pilings, footings, and desert scrub vegetation clearing within the streambeds of Little Rock Wash. Piers, piling, or footing locations within CDFW jurisdictional areas of Big Rock Wash.

Temporary impacts to CDFW jurisdictional features in the Main Alignment common areas are approximately 31.48 acres. These temporary impacts include equipment maneuvering and unpaved access roads within the Little Rock Wash, Big Rock Wash, Grandview Canyon Creek, Graham Canyon Creek, Mescal Creek, Sheep Creek, Fremont Wash, contributing washes, and numerous isolated unnamed washes.

Table 3.3.2-3 Temporary and Permanent Impacts to CDFW Jurisdictional Features for the High Desert Corridor Project

Project Component	CDFW Streambeds		CDFW Riparian		Total	
	Temporary Impacts (acres)	Permanent Impacts (acres)	Temporary Impacts (acres)	Permanent Impacts (acres)	Temporary Impacts (acres)	Permanent Impacts (acres)
	Equipment and Access Roads	***Fill***	***Equipment and Access Roads***	***Fill***	***Equipment and Access Roads***	***Fill***
Freeway/Expressway (Freeway/Tollway) Alternative						
Total Main Alignment/Common Areas	31.30	18.79	0.18	0.00	31.48	18.79
Total Variation A Main	0.69	5.32	0.07	0.34	0.76	5.66
Total Variation A	6.35	10.74	0.01	0.02	6.36	10.76
Total Variation B Main	0.56	0.60	0.04	0.06	0.60	0.67
Total Variation B	0.40	0.60	0.05	0.06	0.45	0.66
Total Variation B1	0.71	0.85	0.04	0.06	0.75	0.91
Total Variation D Main	0.86	2.77	0.00	0.00	0.86	2.77
Total Variation D	1.04	0.89	0.00	0.00	1.04	0.89
Total Variation E Main with Mojave River Bridges	1.32	2.51	4.96	1.59	6.28	4.10
Total Variation E with Mojave River Bridges	10.34	5.55	0.81	1.01	11.15	6.56
Freeway/Expressway (Freeway/Tollway) Alternative with the HSR Feeder Service						
Total Main Alignment/Common Areas	31.67	25.06	0.18	0.00	31.86	25.06
Total Variation A Main	1.17	6.07	0.02	0.60	1.19	6.67
Total Option 1A	0.61	1.42	0.00	0.00	0.61	1.42
Total Option 1B	0.58	1.70	0.00	0.00	0.58	1.70
Total Option 1C	0.10	0.00	0.00	0.00	0.10	0.00
Total Option 7A	0.50	1.21	0.00	0.00	0.50	1.21
Total Option 7B	0.54	1.97	0.00	0.00	0.54	1.97
Total Option 7C	0.17	0.28	0.00	0.00	0.17	0.28

Table 3.3.2-3 Temporary and Permanent Impacts to CDFW Jurisdictional Features for the High Desert Corridor Project

Project Component	CDFW Streambeds		CDFW Riparian		Total	
	Temporary Impacts (acres)	Permanent Impacts (acres)	Temporary Impacts (acres)	Permanent Impacts (acres)	Temporary Impacts (acres)	Permanent Impacts (acres)
	Equipment and Access Roads	***Fill***	***Equipment and Access Roads***	***Fill***	***Equipment and Access Roads***	***Fill***
Total Variation B Main	0.56	1.42	0.01	0.09	0.57	1.51
Total Variation B	0.41	1.31	0.01	0.09	0.42	1.39
Total Variation B1	0.46	2.02	0.01	0.09	0.47	2.11
Total Variation D Main	0.38	3.50	0.00	0.00	0.38	3.50
Total Variation D	0.15	1.94	0.00	0.00	0.15	1.94
Total Variation E Main with HSR Connection with Mojave River Bridges	7.42	3.38	4.92	2.32	12.34	5.69
Total Variation E with HSR Connection with Mojave River Bridges	10.89	18.02	0.52	2.48	11.41	20.49

Variation A

The following ephemeral washes within the A Main and Variation A alignments are located within the 10-digit HUC subwatersheds:

- Lake Palmdale-Piute Ponds
- Amargosa Creek
- Little Rock Wash

Permanent direct impacts to CDFW jurisdictional features in the Variation A Main alignment are approximately 5.66 acres. These permanent direct impacts include:

- Box culverts and desert scrub vegetation clearing within several isolated unnamed washes.
- Piers, pilings, footings, and desert scrub vegetation clearing within the streambeds of Little Rock Wash.

Temporary impacts to CDFW jurisdictional features in the Variation A Main alignment are approximately 0.76 acre. These temporary impacts include equipment maneuvering and unpaved access roads within Little Rock Wash and several isolated unnamed washes.

Variation B

The following ephemeral washes within the B Main, Variation B, and Variation B1 alignments are located within the 10-digit HUC subwatersheds:

- Sheep Creek-El Mirage Lake
- Le Montaine Creek-Eller Slough
- Lower Fremont Wash

Permanent direct impacts to CDFW jurisdictional features in the B Main, Variation B, and Variation B1 alignments are approximately 0.67, 0.66, and 0.91 acre, respectively. These permanent direct impacts include box culverts and desert scrub vegetation clearing within Sheep Creek, Fremont Wash, contributing washes, and several isolated unnamed washes.

Temporary impacts to CDFW jurisdictional features in the B Main, Variation B, and Variation B1 alignments are approximately 0.60, 0.45, 0.75 acre, respectively, within Sheep Creek, Fremont Wash, an unnamed tributary to Fremont Wash, and several isolated unnamed washes.

Variation D

The following ephemeral washes located within the D Main and Variation D alignments are located within the 10-digit HUC subwatersheds:

- Le Montaine Creek-Eller Slough
- Mescal Creek-Rocky Buttes

Permanent direct impacts to CDFW jurisdictional features in the Variation D Main alignment are approximately 2.77 acre and Variation D alignment are approximately 0.89 acre.

Temporary impacts to CDFW jurisdiction features in the Variation D Main alignment are approximately 0.86 acre and the Variation D alignment are approximately 1.04 acres. These temporary impacts include equipment maneuvering and unpaved access roads within Mescal Creek and several isolated unnamed washes.

Variation E with the Mojave River Bridges

The following ephemeral washes located within the Main E with Mojave River Bridges are located within the 10-digit HUC subwatersheds:

- Bell Mountain-Mojave River
- Upper Fremont Wash
- Lower Fremont Wash

Permanent direct impacts to CDFW jurisdictional features in the Variation E Main alignment with Mojave River Bridges are approximately 4.10 acres. Permanent direct impacts to CDFW jurisdictional features in the Variation E with Mojave River Bridges are approximately 6.56 acres. These permanent impacts include:

- Piers, pilings, footings, and desert scrub vegetation clearing limited to the top of the banks of Turner Wash, Ossum Wash, and several contributing unnamed washes to Turner Wash, Ossum Wash, and the Mojave River.
- Piers, piling, or footing locations within CDFW jurisdictional areas of the Mojave River.

No permanent indirect impacts to CDFW jurisdictional features from shading are anticipated (NES 2016).

Temporary impacts to CDFW jurisdictional features in the Variation E Main alignment with Mojave River Bridges are approximately 6.28 acres. Temporary impacts to CDFW jurisdictional features in the Variation E with Mojave River Bridges are approximately 11.15 acres. These temporary impacts include equipment maneuvering and unpaved access roads within the Mojave River and surrounding Turner Wash, Ossum Wash, and several contributing unnamed washes to Fremont Wash, Turner Wash, Ossum Wash, and the Mojave River.

These acreage calculations resulted from further design modifications that were based on public comments that included adding additional on-/off-ramps or moving detention basins in the areas of Victorville. These design modifications within Variation E have an extensive impact to biological resources and jurisdictional features, and this option has been eliminated as a viable variation alternative.

Freeway/Expressway and Freeway/Tollway with HSR Alternatives

Main Alignment/Common Areas

Permanent direct impacts to CDFW jurisdictional features in the Main Alignment common areas are approximately 25.06 acres. These permanent direct impacts include:

- Piers, pilings, footings, and desert scrub vegetation clearing limited to the top of the banks of several isolated unnamed washes.
- Piers, piling, or footing locations within CDFW-defined streambed and associated riparian habitat of Big Rock Wash.

Temporary impacts to CDFW jurisdictional features in the Main Alignment common areas are approximately 31.86 acres. These temporary impacts include equipment maneuvering and unpaved access roads within several isolated unnamed washes.

Rail Options 1A, 1B, 1C

The 10-digit HUC subwatershed within the Rail Options 1A, 1B, and 1C footprint include ephemeral Amargosa Creek. Permanent impacts of 1.42 acres and temporary impacts of 0.61 acre are anticipated to CDFW jurisdictional features in Rail Option 1A. Permanent impacts of 1.70 acres and temporary impacts of 0.58 acre are anticipated to CDFW jurisdictional features in Rail Option 1B. There are no permanent impacts within Rail Option 1C, and there are temporary impacts of 0.10 acre anticipated to CDFW jurisdictional features in Rail Option 1C. These permanent direct impacts include:

- Piers, pilings, footings, and desert scrub vegetation clearing limited to the top of the banks of several isolated unnamed washes.
- Piers, piling, or footing locations within CDFW-defined streambeds and associated riparian habitat of Big Rock Wash.

Temporary impacts include equipment maneuvering and unpaved access roads within several isolated unnamed washes.

Rail Option 7A, 7B, 7C

The 10-digit HUC subwatershed within the Rail Options 7A, 7B, and 7C footprint include ephemeral Amargosa Creek and Lake Palmdale-Piute Ponds. Permanent impacts of 1.21 acres and temporary impacts of 0.50 acre are anticipated to CDFW jurisdictional features in Rail Option 7A. Permanent impacts of 1.97 acres and temporary impacts of 0.54 acre are anticipated to CDFW jurisdictional features in Rail Option 7B. Permanent impacts of 0.280acre and temporary impacts of 0.17 acre are anticipated to CDFW jurisdictional features in Rail Option 7C. These permanent direct impacts include:

- Piers, pilings, footings, and desert scrub vegetation clearing limited to the top of the banks of several isolated unnamed washes.

Temporary impacts include equipment maneuvering and unpaved access roads within several isolated unnamed washes.

Variation B

The following ephemeral washes within the Variation B Main alignment are located within the 10-digit HUC subwatersheds:

- Sheep Creek-El Mirage Lake
- Le Montaine Creek-Eller Slough
- Lower Fremont Wash

Permanent direct impacts to CDFW jurisdictional features in the Variation Main B alignment are approximately 1.51 acres. Permanent direct impacts to CDFW jurisdictional features in Variation B are approximately 1.39 acres. Permanent direct impacts to CDFW jurisdictional features in Variation B1 are approximately 2.11 acres. These permanent direct impacts include box culverts and desert scrub vegetation clearing within Sheep Creek, Fremont Wash, an unnamed tributary to Fremont Wash, and several isolated unnamed washes.

Temporary impacts to CDFW jurisdictional features in the Main B, Variation B, and Variation B1 alignments are approximately 0.57, 0.42, and 0.47 acre, respectively. These temporary impacts include equipment maneuvering and unpaved access roads within Sheep Creek, Fremont Wash, contributing unnamed washes, and several isolated unnamed washes.

Variation D

The following ephemeral washes within the Variation D Main alignment are located within the 10-digit HUC subwatershed:

- Le Montaine Creek-Eller Slough
- Mescal Creek-Rocky Buttes

Permanent direct impacts to CDFW jurisdictional features in the D Main and Variation D alignments are approximately 3.50 and 1.94 acres, respectively. These permanent direct impacts include box culverts and desert scrub vegetation clearing within Mescal Creek and several isolated unnamed washes.

Temporary impacts to CDFW jurisdictional features in the D Main and Variation D alignments are approximately 0.38 and 0.15 acre, respectively. These temporary impacts include equipment maneuvering and unpaved access roads within Mescal Creek and several isolated unnamed washes.

Variation E Main Alignment with HSR and with the Mojave River Bridges

The following ephemeral washes within the Variation E alignment with the Mojave River Bridges are located within the 10-digit HUC subwatershed:

- Bell Mountain-Mojave River

- Upper Fremont Wash
- Lower Fremont Wash

Permanent impacts to CDFW jurisdictional features in the Variation E Main alignment with HSR and with Mojave River Bridges are approximately 5.69 acres. These permanent impacts include:

- Piers, piling, or footing locations below the banks of several contributing unnamed washes to Turner Wash, Ossum Wash, and the Mojave River.
- Indirect impacts will be due to bridge shading from the Mojave River clear-span bridges over riparian vegetation (see Table 3.3.2-3). Staging and equipment access will occur above banks.

Temporary impacts to CDFW jurisdictional features in the Variation E Main HSR and with Mojave River Bridges are approximately 12.34 acres. These temporary impacts include equipment maneuvering and unpaved access roads surrounding Turner Wash, Ossum Wash, and several contributing unnamed washes to Fremont Wash, Turner Wash, Ossum Wash, and the Mojave River.

These acreage calculations resulted from additional design refinement based on public comments that included design modifications of the project alignment in the areas of Victorville.

Variation E with HSR with Mojave River Bridges

The following ephemeral washes within the Variation E with the Mojave River Bridges are located within the 10-digit HUC subwatersheds:

- Bell Mountain-Mojave River
- Upper Fremont Wash
- Lower Fremont Wash

Permanent direct impacts to CDFW jurisdictional features in Variation E with HSR Feeder Service with Mojave River Bridges are approximately 20.49 acres. These permanent impacts include:

- Piers, piling, or footing locations below the banks of the Mojave River and several contributing unnamed washes to Turner Wash, Ossum Wash, and the Mojave River.
- Piers, piling, or footing locations within CDFW jurisdictional areas of the Mojave River.
- Indirect impacts will be due to bridge shading from the Mojave River full-span bridges over riparian vegetation. Staging and equipment access will occur above banks.

Temporary impacts to Variation E with HSR Feeder Service: with Mojave River Bridges are approximately 11.41 acres. These temporary impacts include equipment maneuvering and unpaved access roads within the Mojave River, and surrounding

Turner Wash, Ossum Wash, and several contributing unnamed washes to Turner Wash, Ossum Wash, and the Mojave River.

Summary

With the implementation of avoidance and minimization measures, incorporation of design modifications requested during public comments, and several options that were eliminated, permanent impacts to no more than 39.79 acres of CDFW jurisdictional features and temporary impacts to no more than 50.78 acres of CDFW jurisdictional features are anticipated within the proposed Freeway/Expressway (Freeway/Tollway) Alternative along the longest/widest variations (the greatest permanent impacts would occur along the Main Alignment + Variations A, D Main, B1, and E; the greatest temporary impacts would occur along the Main Alignment + Variations A, D, B1, and E) (see Table 3.3.2-3).

With the implementation of avoidance and minimization measures, incorporation of design modifications requested during public comments, and several options that were eliminated, permanent impacts to no more than 59.80 acres of CDFW jurisdictional features and temporary impacts to no more than 46.95 acres of CDFW jurisdictional features are anticipated within the Freeway/ Expressway (Freeway/Tollway) with HSR Feeder Service (the greatest permanent impacts would occur along the Main Alignment + Variations A Main, D Main, B1, E, and Rail Option 7B; the greatest temporary impacts would occur along the Main Alignment + Variations A Main, D Main, B Main, E, and Rail Option 1A) (see Table 3.3.2-3).

With the implementation of avoidance and minimization measures, incorporation of design modifications requested during public comments, and several options that were eliminated, permanent impacts to no more than 41.47 acres of CDFW jurisdictional features and temporary impacts to no more than 46.11 acres of CDFW jurisdictional features are anticipated for the Preferred Alternative (Freeway/Tollway with HSR Feeder Service) (this includes the Main Alignment + Variations A Main, D, B1, E Main, and Rail Option 1C) (see Table 3.3.2-3).

Rail Option 1C and Rail Option 7C have the least impacts to CDFW jurisdictional features compared to Rail Option 1A, Option 1B, Option 7A, and Option 7B of the Freeway/Expressway (Freeway/Tollway) with HSR Feeder Service.

Coordination with CDFW will be required to confirm jurisdictional features and obtain a 1602 Streambed Alteration Agreement.

Summary of Impacts

Preliminary findings and conclusions regarding the locations and extent of waters subject to the jurisdiction of USACE, CDFW, and RWQCB are discussed in several jurisdictional delineation reports that accommodate design changes and main alignment variations. This information was further analyzed by Caltrans biologists and is presented, but it should not be considered final until concurrence is obtained by USACE, CDFW, and RWQCB. Methods, results, and impacts of the jurisdictional delineation are provided in Sections 2.2.8, 3.1.3.2, and 4.1.4 of the *Natural*

Environment Study (2016) report and in the jurisdictional delineation reports (Appendix I) of the *Natural Environment Study*.

The project has two alternatives that avoid adverse impacts to federal wetlands. Specifically, the Freeway/Expressway (Freeway/Tollway) Alternative – Main Alignment and the Freeway/Expressway (Freeway/Tollway) with HSR Feeder Service – Main Alignment are the only wetlands practicable alternatives.

The Freeway/Expressway (Freeway/ Tollway) Alternative and Freeway/Expressway (Freeway/Tollway) with HSR Feeder Service – Variation E Alternative was identified as the most environmentally damaging to federal wetlands. Per EO 11990 for the Protection of Wetlands, if this alternative is selected a Wetlands Only Practicable Finding will need to be prepared to show impacts to wetlands are not avoidable.

USACE Jurisdiction

With the implementation of avoidance and minimization measures, incorporation of design modifications requested during public comments, and several options that were eliminated, permanent impacts to no more than 7.26 acres of waters of the U.S. and temporary impacts to no more than 20.11 acres of waters of the U.S. are anticipated within the proposed Freeway/Expressway (Freeway/Tollway) Alternative along the longest/widest variations.

With the implementation of avoidance and minimization measures, incorporation of design modifications requested during public comments, and several options that were eliminated, permanent impacts to no more than 4.84 acres of waters of the U.S. and temporary impacts to no more than 15.19 acres of waters of the U.S. are anticipated within the Freeway/Expressway (Freeway/Tollway) with HSR Feeder Service (Preferred Alternative).

These acreage conclusions represent a calculated estimation of the jurisdictional areas within the project impact area and are subject to modification following the USACE verification process.

RWQCB Jurisdiction

Within the project footprint for all of the alternatives, variations, and options, impacts to features regulated by RWQCB include USACE jurisdictional features under CWA Section 401 and isolated features in closed watershed areas that are subject to regulation under the Porter-Cologne Water Quality Control Act. RWQCB jurisdictional features are referred to herein collectively as “waters of the State”. The Mojave River, Fremont Wash, Turner Wash, Ossum Wash, Bell Mountain Wash, and contributing unnamed washes in Mojave River Watershed are considered waters of the State as are named washes and contributing un-named tributaries in the Antelope-Fremont Valleys Watershed that drain to Rosamond Dry Lake, Buckhorn Dry Lake, and Rogers Dry Lake on Edwards Air Force Base such as Mescal Creek, Big Rock Wash, Little Rock Wash,.

With the implementation of avoidance and minimization measures, incorporation of design modifications requested during public comments, and several options that were eliminated, permanent impacts to no more than 27.61 acres of RWQCB waters of the State and temporary impacts to no more than 45.96 acres of waters of the State are anticipated within the proposed Freeway/ Expressway and Freeway/Tollway alternatives along the longest/widest variations.

With the implementation of avoidance and minimization measures, incorporation of design modifications requested during public comments, and several options that were eliminated, permanent impacts to no more than 19.52 acres of waters of the State and temporary impacts to no more than 46.75 acres of waters of the State are anticipated within the Freeway/Expressway (Freeway/Tollway) with HSR Feeder Service (Preferred Alternative).

Rail Option 1C and Rail Option 7A have the least impacts to RWQCB jurisdictional features compared to Rail Option 1A, Option 1B, Option 7B, and Option 7C of the Freeway/Expressway (Freeway/Tollway) with HSR Feeder Service.

Coordination with the RWQCB will be required to confirm waters of the State and obtain Section 401 Water Quality Certification.

CDFW Jurisdiction

Within the project footprint for all of the alternatives, variations, and options, impacts to features regulated by CDFW include USACE and RWQCB jurisdictional features as “streambeds” plus any riparian habitat associated with the regulated streambeds.

With the implementation of avoidance and minimization measures, incorporation of design modifications requested during public comments, and several options that were eliminated, permanent impacts to no more than 39.79 acres of CDFW jurisdictional features and temporary impacts to no more than 50.60 acres of CDFW jurisdictional features are anticipated within the proposed Freeway/Expressway (Freeway/Tollway) Alternative along the longest/widest variations (see highlighted rows in Table 3.3.2-3).

With the implementation of avoidance and minimization measures, incorporation of design modifications requested during public comments, and several options that were eliminated, permanent impacts to no more than 41.47 acres of CDFW jurisdictional features and temporary impacts to no more than 46.12 acres of CDFW jurisdictional features are anticipated within the Freeway/ Expressway (Freeway/Tollway) with HSR Feeder Service (Preferred Alternative) (see highlighted rows in Table 3.3.2-3).

Rail Option 1C and Rail Option 7C have the least impacts to CDFW jurisdictional features compared to Rail Option 1A, Option 1B, Option 7A, and Option 7B of the Freeway/Expressway (Freeway/Tollway) with HSR Feeder Service.

Coordination with CDFW will be required to confirm jurisdictional features and obtain a 1602 Streambed Alteration Agreement.

The project would require the following permits:

- USACE Section 404 Permit
- RWQCB Section 401 Water Quality Certification and/or WDRs under Porter-Cologne Water Quality Act
- CDFW Section 1602 Streambed Alteration Agreement

Least Environmentally Damaging Practicable Alternative (LEDPA) Identification

Regulatory Requirements

CWA Section 404(b)(1) guidelines specify that a permit can be issued for a discharge of dredged or fill material to waters of the U.S. only if the discharge is determined to be the least environmentally damaging practicable alternative (LEDPA) (40 CFR §230.10 [a]). When a proposed project requires an individual permit for filling waters of the U.S., an analysis of alternatives must be completed. The LEDPA analysis is required for non-water dependent projects (which include essentially all surface transportation projects) that require filling of wetlands or other special aquatic sites. Special aquatic sites are areas possessing special ecological characteristics of productivity, habitat, wildlife protection, or other important and easily disrupted ecological values. These areas are generally recognized as significantly influencing or positively contributing to the general overall environmental health or vitality of the entire ecosystem of a region.

No discharge of dredged or fill material shall be permitted if it: (a) causes or contributes to violations of any applicable State water quality standard; (b) jeopardizes the continued existence of species listed as endangered or threatened under the federal Endangered Species Act of 1973 (FESA), as amended, or results in the likelihood of the destruction or adverse modification of a habitat which is determined to be a critical habitat under the FESA; or (c) violates any requirement imposed to protect any marine sanctuary. The LEDPA generally is the practicable alternative that either avoids waters of the U.S. or impacts the smallest area of waters.

The evaluation of alternatives must consider a reasonable range of options that could fulfill the project purpose and need with focus on projects that avoid or minimize fill. An alternative is practicable "if it is available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes" (40 CFR §230.10 [a] [2]). For projects that include fill of wetlands or other special aquatic sites, it is presumed that practicable alternatives that do not involve special aquatic sites are available, unless clearly demonstrated otherwise. An alternative with fewer impacts to aquatic resources than the Preferred Alternative may be eliminated by demonstrating that it has other overriding severe environmental impacts, is not practicable, or does not meet the project purpose and need.

Identification of the LEDPA

Because a Section 404 permit can only be issued for the LEDPA, Section 404 compliance usually requires a more detailed and specific analysis of the aquatic impacts of each alternative. This analysis is referred to as a Section 404(b)(1) Alternatives Analysis. The Section 404(b)(1) specific analyses will be finalized in separate documentation as part of the project permitting process, in compliance with the law.

A range of alternatives were considered and are described in Chapter 2 of this Final EIR/EIS. The planning and design focus has included minimizing impacts to wetlands and other waters of the U.S. Recent focus has been on continued avoidance and minimization of impacts that would occur with project implementation and this focus will continue through final design. The guidelines require that mitigation of impacts to waters of the U.S. be considered in the sequence of first avoidance of impacts, then minimization of impacts, and finally compensation for impacts. All unavoidable impacts to wetlands and other waters of the U.S. associated with all the build alternatives would be minimized to the extent practicable or mitigated.

Because each of the build alternatives would result in some aquatic resource loss, the practicable alternative with the least damage to aquatic resources must be selected as the LEDPA, unless that alternative has other significant adverse environmental consequences. There is no practicable way to avoid all potential impacts to wetlands and other waters of the U.S.

The Preferred Alternative is the Freeway/Tollway Alternative with HSR, including Variations D, B1, and E Main. A green energy corridor and bike path are also included in the Preferred Alternative. The Preferred Alternative has been identified as the least environmentally damaging of the analyzed alternatives, especially when considering the design refinements described in this Final EIR/EIS. The Preferred Alternative also would have the fewest net permanent direct impacts on resources overall, including the fewest acres of waters of the U.S. permanently impacted (4.84 acres versus 7.26 acres for the Freeway/Expressway Alternative). Activities within the current footprint of the Preferred Alternative could result in temporary impacts to 0.001 acre of wetland waters of the U.S., a special aquatic site. The Preferred Alternative is the current LEDPA because, of the practicable alternatives, this one minimizes environmental impacts to the maximum extent practicable while meeting the overall project purpose and need.

Avoidance, Minimization, and/or Mitigation Measures

Complete avoidance of permanent impacts to waters of the U.S., RWQCB waters of the State, and CDFW jurisdictional features was determined not possible in achieving the project purpose. The project has been designed to minimize temporary and permanent impacts to waters of the U.S., waters of the State, and CDFW jurisdictional areas to the maximum extent practicable. Due to the topography associated with the eastern portion of the project within the Mojave River valley, the proposed main alignment will be constructed with an above-grade separation supported by piers. This preliminary design will ease the fluctuations of the transportation corridor over the terrain and avoid or minimize impacts to the following jurisdictional features:

- Mojave River and several contributing unnamed washes
- Bell Mountain Wash and several contributing unnamed washes
- Ossum Wash
- Turner Wash and a contributing unnamed wash

Acreages of jurisdictional features avoided by this design are summarized below:

Freeway/Expressway and Freeway/Tollway Alternatives

USACE Jurisdiction

- 0.67 acre of non-wetland waters of the U.S.
- 0.61 acre of wetland waters of the U.S.

CDFW Jurisdiction

- 0.87 acre of CDFW streambed
- 6.47 acre of CDFW associated riparian/riverine habitat

RWQCB

- 0.67 acre of non-wetland waters of the state
- 0.62 acre of wetland waters of the state

Freeway/Expressway and Freeway/Tollway with HSR Alternatives

USACE Jurisdiction

- 1.00 acre of non-wetland waters of the U.S.
- 0.67 acre of wetland waters of the U.S.

CDFW Jurisdiction

- 7.45 acres of CDFW riparian 1.14 acres of CDFW streambed
- 7.45 acres of CDFW associated riparian/riverine habitat

RWQCB

- 1.00 acre of non-wetland waters of the state
- 0.80 acre of wetland waters of the state

Project alternatives and pier locations will continue to be refined to include measures to protect sensitive areas and to maintain the hydrological integrity of the jurisdictional washes.

The following avoidance, minimization, and mitigation measures will be implemented:

BWL-1: Project alternatives and pier locations will continue to be refined to include measures to protect sensitive areas and to maintain the hydrological integrity of the jurisdictional washes.

BWL-2: Any work within the ephemeral washes will be conducted when there is no flow in the channel.

BWL-3: Temporary construction staging areas and access roads will be strategically placed to avoid and/or minimize impacts to jurisdictional features to the extent feasible and are expected to be restored to pre-project conditions.

BWL-4: Compensatory mitigation for impacts to jurisdictional features of USACE, RWQCB, and CDFW will be determined during the permitting process with the agencies with considerations to onsite restoration, offsite mitigation, and in-lieu fees. In general, the ratios are based on the amount and quality of the permanently and directly impacted jurisdictional features of the agencies. Impacts to waters of the U.S. and waters of the State will be mitigated sufficiently to meet the federal and state no net loss standards.

Wetlands Only Practicable Finding

The EO for the Protection of Wetlands (EO 11990) regulates the activities of federal agencies such that the FHWA cannot undertake or provide assistance for new construction located in wetlands unless the head of the agency finds that: (1) there is no practicable alternative to the construction, and (2) the proposed project includes all practicable measures to minimize harm. Of the alternatives, variations, and project components considered, only the Variation E with Mojave River Bridges component would result in permanent impacts to wetland waters of the U.S. This Variation is not included in the Preferred Alternative.

3.3.3 Plant Species

Regulatory Setting

The U.S. Fish and Wildlife Service (USFWS) and California Department of Fish and Wildlife (CDFW) have regulatory responsibility for the protection of special-status plant species. “Special-status” species are selected for protection because they are rare and/or subject to population and habitat declines. Special status is a general term for species that are provided varying levels of regulatory protection. The highest level of protection is given to threatened and endangered species; these are species that are formally listed or proposed for listing as endangered or threatened under the Federal Endangered Species Act (FESA) and/or the California Endangered Species Act (CESA). Please see Section 3.3.5, Threatened and Endangered Species, for detailed information about these species.

This section of the document discusses all other special-status plant species, including CDFW species of special concern, USFWS candidate species, and California Native Plant Society (CNPS) rare and endangered plants.

The regulatory requirements for FESA can be found at 16 United States Code (U.S.C.), Section 1531, *et seq.* See also 50 *Code of Federal Regulations* (CFR) Part 402. The regulatory requirements for CESA can be found at California Fish and Game Code, Section 2050, *et seq.* Department projects are also subject to the Native Plant Protection Act, found at Fish and Game Code, Section 1900-1913, and the California Environmental Quality Act (CEQA), CA Public Resources Code, Sections 2100-21177.

Affected Environment

Information regarding plant species was obtained from the *Natural Environment Study* (June 2016). To identify special-status plant species that may occur in the project biological study area (BSA), a records search of the California Natural Diversity Database (CNDDB) and the CNPS Rare Plant Inventory was performed. A total of 21 special-status plant species have the potential to be present within the BSA, as described in Table 3.3.3-1.

Table 3.3.3-1 Special-Status Plant Species with Potential to Occur in the Biological Study Area

Species	Status	Habitat	Potential to Occur in the Biological Study Area
Alkali Mariposa Lily *Calochortus striatus*	CNPS 1B.2	Mojavean desert scrub, chenopod scrub, chaparral, and wetland-riparian.	Present. Observed during focused surveys.

Table 3.3.3-1 Special-Status Plant Species with Potential to Occur in the Biological Study Area

Species	Status	Habitat	Potential to Occur in the Biological Study Area
White Pygmy Poppy *Canbya candida*	CNPS 4.2	Mojavean desert scrub, creosote bush scrub, Joshua tree woodland and pinyon/juniper woodland.	Present. Observed during focused surveys.
Desert cymopterus *Cymopterus deserticola*	CNPS 1B.2	Joshua tree woodland and Mojavean desert scrub.	Moderate potential of occurring. Suitable habitat occurs within the BSA, but the species was not observed during focused surveys. Known range includes southeastern Kern County and west-central San Bernardino County.
Booth's evening-primrose *Eremothera boothii* ssp. *boothii*	CNPS 2B.3	Joshua tree woodland and pinyon/juniper woodland.	Present. Observed during focused surveys.
Sagebrush loeflingia *Loeflingia squarrosa* var. *artemisiarum*	CNPS 2B.2	Desert dunes, Great Basin scrub, and Sonoran desert scrub.	Low potential of occurring. Suitable habitat does not occur within the BSA. In California, known from Los Angeles, Ventura, Lassen, and San Bernardino counties.
Mojave monkeyflower *Mimulus mohavensis*	CNPS 1B.2	Gravelly banks of desert washes, Joshua tree woodland, and Mojavean desert scrub.	Moderate potential of occurring. Suitable habitat occurs within the BSA, but the species was not observed during focused surveys. Known range includes northeastern Los Angeles County and west-central/central San Bernardino County.
Crowned muilla *Muilla coronata*	CNPS 4.2	Chenopod scrub, Joshua tree woodland, Mojavean desert scrub, and pinyon/juniper woodland.	Present. Observed during focused surveys.
Robbins' nemacladus *Nemacladus secundiflorus* var. *robbinsii*	CNPS 1B.2	Chaparral, valley and foothill grasslands.	Low potential of occurring. Suitable habitat does not occur within the BSA.

Table 3.3.3-1 Special-Status Plant Species with Potential to Occur in the Biological Study Area

Species	Status	Habitat	Potential to Occur in the Biological Study Area
Short-joint beavertail *Opuntia basilaris var. brachyclada*	CNPS 1B.2	Chaparral, Joshua tree woodland, Mojavean desert scrub, and pinyon/juniper woodland.	Low potential of occurring. Suitable habitat occurs within the BSA, but the species was not observed during focused surveys. Historically distributed on the desert slopes of the San Gabriel and San Bernardino mountains, and also the Providence Mountains.
Beaver Dam breadroot *Pediomelum castoreum*	CNPS 1B.2	Mojavean desert scrub and Joshua tree woodland.	Moderate potential of occurring. Suitable habitat occurs within the BSA, but the species was not observed during focused surveys. Known range includes central Inyo County and west-central/central/northern San Bernardino County.
Parish's popcornflower *Plagiobothrys parishii*	CNPS 1B.1	Great Basin scrub and Joshua tree woodland.	Low potential of occurring. Suitable habitat does occur within the BSA, however, within San Bernardino County, historically isolated to one location in Lucerne Valley.
Mojave fish-hook cactus *Sclerocactus polyancistrus*	CNPS 4.2	Mojavean desert scrub, Joshua tree woodland, and Great Basin scrub.	Present. Observed during focused surveys.
Southern mountains skullcap *Scutellaria bolanderi* ssp. *austromontana*	CNPS 1B.2	Chaparral,cismontane woodland, lower montane coniferous forest.	Low potential of occurring. Suitable habitat does not occur within the BSA. Extant (and recent) populations mostly known for Riverside and San Diego counties.

Table 3.3.3-1 Special-Status Plant Species with Potential to Occur in the Biological Study Area

Species	Status	Habitat	Potential to Occur in the Biological Study Area
San Bernardino aster *Symphyotrichum defoliatum*	CNPS 1B.2	Shores of streams/springs, coastal scrub, lower montane coniferous forest, meadows and seeps, marshes and swamps, and valley/foothill grassland.	Moderate potential of occurring. Suitable habitat occurs within the BSA, but the species was not observed during focused surveys. Known range includes San Luis Obispo, Santa Barbara, Kern, Los Angeles, Orange, San Diego, Riverside and San Bernardino counties; the majority of Mojave Desert occurrences recorded are from southwestern San Bernardino County.

Federal Endangered Species Act (FESA):
FE = Federally listed as endangered.
FT = Federally listed as threatened.
FC = Federal listed as a species of concern

California Endangered Species Act (CESA):
CE = State listed as endangered in California.
CT = State listed as threatened in California.

California Native Plant Society (CNPS) Rare Plant Rank:
Rank 1B = Rare, threatened, or endangered in California and elsewhere.
Rank 2B = rare, threatened, or endangered in California, but more common elsewhere.
Rank 4 = limited distribution (Watch List).

CNPS Threat Rank:
0.1 = Seriously threatened in California (over 80% of occurrences threatened/high degree and immediacy of threat)
0.2 = Fairly threatened in California (20-80% occurrences threatened / moderate degree and immediacy of threat)
0.3 = Not very threatened in California (<20% of occurrences threatened or no current threats known)

Source: Natural Environment Study, June 2016; CNPS Rare and Endangered Plant Inventory, 2016; California Natural Diversity Database, 2016.

Survey Methods

Prior to field surveys, a review of available databases and reports was conducted to identify special-status species that occur within the region of the proposed project or directly within the BSA. Based on literature and database review, a list of potentially occurring special-status plant species was prepared. Special-status plants are those that are considered rare, threatened, or endangered within the state or region by local, state, or federal resource conservation agencies and the CNPS. To the extent possible, reference populations were checked prior to conducting surveys in order to verify the stage of development so that the optimal time for conducting surveys could be determined. With the BSA extending over 50 miles, several reference population locations had to be visited due to variability between subpopulations that are geographically separated such that they are exposed to differing weather conditions.

Focused special-status plant surveys were conducted between 2008 and 2015 by AMEC, ECORP, and ICF. During spring 2008, a biological survey was conducted by ECORP in survey areas within west Los Angeles County and white pygmy poppy and crown muilla were observed. During spring 2011, AMEC conducted a rare plant survey in survey areas within San Bernardino County and alkali mariposa lily and Mojave fish-hook cactus were observed. During spring 2011, ICF conducted a rare plant survey in survey areas within east Lost Angeles County and special-status plants were not observed. During a spring 2012 listed riparian bird survey within the Mojave River channel (San Bernardino County), ECORP observed Booth's evening primrose. During a spring 2014 listed riparian bird survey within the Mojave River channel (San Bernardino County), ECORP observed Booth's evening primrose. During spring 2015, two rounds of rare plant surveys were conducted by ECORP in survey areas within west Los Angeles County and Booth's evening primrose and Mojave fish-hook cactus were observed.

It should be noted that 2012, 2013, and 2014 experienced extremely low rainfall. Certain rare plants are only detectable during short periods in the growing season. Due to lack of rainfall, the possibility for detection for certain species is drastically reduced. As a result, focused plants surveys will continue to be conducted prior to construction to maximize detection.

Survey Results

Five special-status plant species were observed within the BSA during the focused surveys: alkali mariposa lily, Booth's evening primrose, crowned muilla, Mojave fish-hook cactus, and white pygmy poppy. Twelve (12) individuals of alkali mariposa lily were identified in 5 locations west of the Mojave River at the boundaries of the BSA. Five individuals of white pygmy poppy were observed in 5 locations near Variation A within the BSA. Booth's evening primrose was observed at 1 location along the Mojave River within the Variation E alignment. Five individuals of crowned muilla were identified in 5 locations near Variation A within the BSA. Mojave fish-hook cactus was observed east of the Mojave River, where the main alignment and Variation E converge.

Focused surveys thus far were conducted during an extended period of drought conditions and although survey results did not identify all of the species listed in Table 3.3.3-1, it does not preclude these species from occurring within the BSA. Other special-status plant species listed in Table 3.3.3-1 that were not observed within the BSA during previous surveys will continue to be a part of target species lists during future rare plant surveys.

Environmental Consequences

No Build Alternative

Because no ground disturbance would occur under the No Build Alternative, there would be no impacts to special-status plant species.

Build Alternatives

The build alternatives would result in temporary and permanent impacts to individual alkali mariposa lily, white pygmy poppy, Booth's evening primrose, crowned muilla, and Mojave fish-hook cactus and their habitat due to roadway development and the acquisition of new right-of–way (ROW), discussed below.

For the purpose of avoiding redundancy, when discussing project impacts to plant species, it should be noted that the Freeway/Expressway Alternative, Freeway/ Tollway Alternative, Freeway/Expressway Alternative with the High-Speed Rail (HSR) Feeder Service, and the Freeway/Tollway Alternative with the HSR Feeder Service are discussed collectively because the impacts amount to the same in main alignment/common areas; however, it is the variations and options that differ in impacts to plant species, and they are each broken down and discussed further (see Figure 3.3-1, Alignment Key Map for Biological Study Area).

Because there is moderate potential for desert cymopterus, Mojave monkeyflower, Beaver Dam breadroot, and San Bernardino aster occurring within the BSA, direct impacts could occur to these species. These species were not observed during surveys that occurred between 2008 and 2015. In order to continue with verification that these species are assumed not present within the BSA, focused special-status plant species surveys will continue to occur prior to construction and during years with average or above-average rainfall. These species will generally occur in Mojavean desert scrub and Joshua tree woodland, with San Bernardino aster occurring in various habitats near freshwater aquatic resources.

Other species from Table 3.3.3-1 that have a low potential to occur include San Fernando Valley spineflower, slender-horned spineflower, Parish's daisy, Cushenbury buckwheat, sagebrush loeflingia, spreading navarretia, Robbins' nemacladus, short-joint beavertail, California orcutt grass, Cushenbury oxytheca, Parish's popcornflower, and southern mountains skullcap. Based on the fact that there was not suitable habitat observed during surveys and these species were not observed during surveys, they are assumed not present within the BSA and impacts will not occur to these species. In order to continue with verification that these species are assumed not present within the BSA, focused special-status plant species surveys will continue to occur prior to construction and during years with average or above-average rainfall.

Indirect impacts to all special-status plant species would be the same. Construction of the project could introduce invasive species into plant communities. Areas within the project development consist of native and non-native plants. Although non-native plants already occur within the project footprint and within the vicinity, it can be reasonably concluded that creation of a larger roadway could exacerbate this condition. In addition, fugitive dust emissions from construction activities could also harm the growth of special-status plant species. Avoidance and minimization measures for these indirect impacts are included in Sections 3.2.6 and 3.3.6.

Alkali Mariposa Lily

Main Alignment/Common Areas, Rail Options1A, 1B, 1C, 7A, 7B, and 7C, Variation A, Variation B, and Variation D

This plant species was not observed in these options/variations. No impacts would occur.

Variation E Main

Twelve (12) alkali mariposa lily individuals were observed within the main alignment corridor corresponding to the Variation E alignment (a so-called Variation E Main). The existing habitat where these individuals were observed is within saltbush scrub (i.e., chenopod scrub; fourwing saltbush scrub series/allscale scrub series) that is in a disturbed state. The habitat that includes this species and individual plants along the Variation E Main alignment would be impacted by construction of the project. Direct impacts would affect all known alkali mariposa lilies in the BSA, which occur in close proximity to each other in western San Bernardino County, and northwest of Victorville, California.

Through implementation of the avoidance and minimization measures, specifically BPL-1, 2 and 3 below, impacts to this species would be reduced. If these steps are included in the pre- and post-construction process, construction impacts to alkali mariposa lily are anticipated to be mitigated and not have a substantial effect on local and regional populations or the distribution of the species statewide. In addition, the preparation and implementation of a HMMP (BAN-5) and compensatory mitigation for impacts to habitat for various sensitive plant and wildlife species (BNC-4, BAN-7, BTE-2, BTE-3, and BTE-11) will also reduce impacts to alkali mariposa lily.

Variation E

Alkali mariposa lily individuals were not observed within the Variation E alignment; therefore, the Variation E alignment would result in lesser impacts to this species compared to the corresponding Variation E Main alignment corridor. Indirect impacts to alkali mariposa lily could include increased dust coating the plants when growing above ground (bulbs), which could affect pollination potential. In addition, the project could also indirectly affect alkali marisposa lily plants due to increased non-native plant species migrating onto the project site following disturbance which could deposit seed that eventually germinates near plants outside of the project area.

Impacts to alakali mariposa lily suitable habitat from the Preferred Alternative are summarized in Table 3.3.3-2.

Table 3.3.3-2 Preferred Alternative Impacts to Alkali Maripora Lily Suitable Habitat

Alkali Mariposa Lily Suitable Habitat	Permanent Impacts*	Temporary Impacts*
Allscale scrub Alliance	159.47	67.16
Creosote bush scrub Alliance	1,413.15	511.41
Creosote bush scrub/Allscale scrub Alliance	0.09	0.18
Disturbed Allscale scrub Alliance	46.53	15.74
Disturbed Creosote bush scrub Alliance	171.71	26.26
Disturbed Fourwing saltbush scrub Alliance	89.77	4.70
Disturbed Joshua tree woodland Alliance	51.13	10.35
Disturbed White bursage scrub Alliance	44.57	13.50
Fourwing saltbush scrub Alliance	168.49	59.46
Joshua tree woodland Alliance	338.14	52.19
White bursage scrub Alliance	24.48	4.52
Total	**2,507.52**	**765.47**
***** in acres		

White Pygmy Poppy

Main Alignment/Common Areas, Rail Options 1A, 1B, 1C, 7A, 7B, and 7C, Variation B, Variation D, Variation E

This plant species was not observed in these options/variations. No impacts would occur.

Variation A Main

Approximately 122 white pygmy poppy individuals were observed within the corresponding main alignment of Variation A (a so-called Variation A Main). The existing habitat where these individuals were observed is within Joshua tree woodland (i.e., Joshua tree woodland alliance) that is in a disturbed state. The habitat that includes this species and individual plants along the Variation A Main alignment would be impacted by construction of the project. Direct impacts would affect less than half of the known white pygmy poppies in the BSA (total of 288 known), which occur in close proximity to each other in northwestern Los Angeles County, and east of Palmdale, California.

Through implementation of the avoidance and minimization measures, specifically BPL-1, 2 and 3 below, impacts to this species would be reduced. If these steps are included in the pre- and post-construction process, construction impacts to white pygmy poppy are anticipated to be mitigated and not have a substantial effect on local and regional populations or the distribution of the species statewide. In addition, the preparation and implementation of a HMMP (BAN-5) and compensatory mitigation for impacts to habitat for various sensitive plant and wildlife species (BNC-4, BAN-7, BTE-2, BTE-3, and BTE-11) will also reduce impacts to white pygmy poppy.

Variation A

White pygmy poppy individuals were not observed within the Variation A alignment; therefore, the Variation A alignment would result in lesser impacts to this species compared to the corresponding Variation A Main alignment corridor. Indirect impacts to white pygmy poppy could include increased dust coating the plants, which could affect pollination potential. In addition, the project could also indirectly affect white pygmy poppy plants due to increased non-native plant species migrating onto the project site following disturbance which could deposit seed that eventually germinates near plants outside of the project area.

Impacts to white pygmy poppy suitable habitat from the Preferred Alternative are summarized in Table 3.3.3-3.

Table 3.3.3-3 Preferred Alternative Impacts to White Pygmy Poppy Suitable Habitat

White Pygmy Poppy Suitable Habitat	Permanent Impacts*	Temporary Impacts*
Creosote bush scrub Alliance	1,413.15	511.41
Creosote bush scrub/Allscale scrub Alliance	0.09	0.18
Disturbed Creosote bush scrub Alliance	171.71	26.26
Disturbed Joshua tree woodland Alliance	51.13	10.35
Disturbed White bursage scrub Alliance	44.57	13.50
Joshua tree woodland Alliance	338.14	52.19
White bursage scrub Alliance	24.48	4.52
Total	**2,043.26**	**618.41**
***** in acres		

Booth’s Evening Primrose

Main Alignment/Common Areas, Rail Options 1A, 1B, 1C, 7A, 7B, and 7C, Variation A, Variation B, and Variation D

This plant species was not observed in these options/variations. No impacts would occur.

Variation E

Approximately 915 Booth’s evening primrose individuals were observed within Variation E alignment. One Booth’s evening primrose located within the Mojave River channel has overlap with Variation E, however, since the project will include a bridge that spans the Mojave River, impacts to this individual is not anticipated. The existing habitat where these individuals were observed is within Mojavean desert scrub (i.e., creosote bush scrub alliance) that is in a disturbed state (due to OHV activity). The habitat that includes this species and individual plants along the Variation E alignment would be impacted by construction of the project. Direct impacts would affect most of the known Booth's evening primrose in the BSA (an estimated 916 exist), which occur in close proximity to each other in western San Bernardino County, and northwest of Victorville, California.

Through implementation of the avoidance and minimization measures, specifically BPL-1, 2 and 3 below, impacts to this species would be reduced. If these steps are included in the pre- and post-construction process, construction impacts to Booth's evening primrose are anticipated to be mitigated and not have a substantial effect on local and regional populations or the distribution of the species statewide. In addition, the preparation and implementation of a HMMP (BAN-5) and compensatory mitigation for impacts to habitat for various sensitive plant and wildlife species (BNC-4, BAN-7, BTE-2, BTE-3, and BTE-11) will also reduce impacts to Booth's evening primrose.

Variation E Main

Booth's evening primrose individuals were not observed within the corresponding main alignment of Variation E (a so-called Variation E Main); therefore, the Variation E Main alignment corridor would result in lesser impacts to this species compared to the Variation E alignment corridor. Indirect impacts to Booth's evening primrose could include increased dust coating the plants, which could affect pollination potential. In addition, the project could also indirectly affect Booth's evening primrose due to increased non-native plant species migrating onto the project site following disturbance which could deposit seed that eventually germinates near plants outside of the project area.

Impacts to Booth's evening primrose suitable habitat from the Preferred Alternative are summarized in Table 3.3.3-4.

Table 3.3.3-4 Preferred Alternative Impacts to Booth's Evening Primrose Suitable Habitat

Booth's Evening Primrose Suitable Habitat	Permanent Impacts*	Temporary Impacts*
Disturbed Joshua tree woodland Alliance	51.13	10.35
Joshua tree woodland Alliance	338.14	52.19
Total	**389.26**	**62.55**
***** in acres		

Crowned Muilla

Main Alignment/Common Areas, Rail Options 1A, 1B, 1C, 7A, 7B, and 7C, Variation B, Variation D, and Variation E

This plant species was not observed in these options/variations. No impacts would occur.

Variation A Main

A total of five crowned muilla individuals were observed within the corresponding main alignment of Variation A (a so-called Variation A Main). The existing habitat where these individuals were observed is within Joshua tree woodland and chenopod scrub (i.e., Joshua tree woodland alliance and fourwing saltbush scrub alliance) that is mostly in a disturbed state. The habitat that includes this species and individual plants along the Variation A Main alignment would be impacted by construction of the project. Direct impacts would affect more than half of the known crowned muilla in the BSA (total of seven known), which occur in close proximity to each other in northwestern Los Angeles County, and east of Palmdale, California.

Through implementation of the avoidance and minimization measures, specifically BPL-1, 2 and 3 below, impacts to this species would be reduced. If these steps are included in the pre- and post-construction process, construction impacts to crowned muilla are anticipated to be mitigated and not have a substantial effect on local and regional populations or the distribution of the species statewide. In addition, the preparation and implementation of a HMMP (BAN-5) and compensatory mitigation for impacts to habitat for various sensitive plant and wildlife species (BNC-4, BAN-7, BTE-2, BTE-3, and BTE-11) will also reduce impacts to crowned muilla.

Variation A

Crowned muilla individuals were not observed within the Variation A alignment; therefore, the Variation A alignment would result in lesser impacts to this species compared to the corresponding Variation A Main alignment corridor. Indirect impacts to crowned muilla could include increased dust coating the plants, which could affect pollination potential. In addition, the project could also indirectly affect crowned muilla plants due to increased non-native plant species migrating onto the project site following disturbance which could deposit seed that eventually germinates near plants outside of the project area.

Impacts to crowned muilla suitable habitat from the Preferred Alternative are summarized in Table 3.3.3-5.

Table 3.3.3-5 Preferred Alternative Impacts to Crowned Muilla Suitable Habitat

Crowned Muilla Suitable Habitat	Permanent Impacts*	Temporary Impacts*
Allscale scrub Alliance	159.47	67.16
Creosote bush scrub Alliance	1,413.15	511.41
Creosote bush scrub/Allscale scrub Alliance	0.09	0.18
Disturbed Allscale scrub Alliance	46.53	15.74
Disturbed Creosote bush scrub Alliance	171.71	26.26
Disturbed Fourwing saltbush scrub Alliance	89.77	4.70
Disturbed Joshua tree woodland Alliance	51.13	10.35
Disturbed White bursage scrub Alliance	44.57	13.50
Fourwing saltbush scrub Alliance	168.49	59.46
Joshua tree woodland Alliance	338.14	52.19
White bursage scrub Alliance	24.48	4.52
Total	**2,507.52**	**765.47**
***** in acres		

Mojave Fish-Hook Cactus

Main Alignment/Common Areas, *Rail Options 1A, 1B, 1C, 7A, 7B, and 7C, Variation A, Variation B, and Variation D*

This plant species was not observed in these options/variations. No impacts would occur.

Variation A Main

A total of five Mojave fish-hook cactus individuals were observed within the corresponding main alignment of Variation E (a so-called Variation E Main). The existing habitat where these individuals were observed is within good quality Mojavean desert scrub (i.e., creosote bush scrub alliance) and some areas with rocky outcrops. The habitat that includes this species and individual plants along the Variation E Main alignment would be impacted by construction of the project. Direct impacts would affect more than half of the known crowned muilla in the BSA (total of nine known), which occur in close proximity to each other (within 3.5 miles) in western San Bernardino County, and north/northeast of Victorville, California.

Through implementation of the avoidance and minimization measures, specifically BPL-1, 2 and 3 below, impacts to this species would be reduced. If these steps are included in the pre- and post-construction process, construction impacts to Mojave fish-hook cactus are anticipated to be mitigated and not have a substantial effect on local and regional populations or the distribution of the species statewide. In addition, the preparation and implementation of a HMMP (BAN-5) and compensatory mitigation for impacts to habitat for various sensitive plant and wildlife species

(BNC-4, BAN-7, BTE-2, BTE-3, and BTE-11) will also reduce impacts to Mojave fish-hook cactus.

Variation A

Mojave fish-hook cactus individuals were not observed within the Variation E alignment; therefore, the Variation E alignment would result in lesser impacts to this species compared to the corresponding Variation E Main alignment corridor. Indirect impacts to Mojave fish-hook cactus could include increased dust coating the plants, which could affect pollination potential. In addition, the project could also indirectly affect crowned Mojave fish-hook cactus due to increased non-native plant species migrating onto the project site following disturbance which could deposit seed that eventually germinates near plants outside of the project area.

Impacts to Mojave fish-hook suitable habitat from the Preferred Alternative are summarized in Table 3.3.3-6.

Table 3.3.3-6 Preferred Alternative Impacts to Mojave Fish-Hook Suitable Habitat

Mojave Fish-Hook Suitable Habitat	Permanent Impacts*	Temporary Impacts*
Big sagebrush Alliance	0.00	6.77
Creosote bush scrub Alliance	1,413.15	511.41
Creosote bush scrub/Allscale scrub Alliance	0.09	0.18
Disturbed Creosote bush scrub Alliance	171.71	26.26
Disturbed Joshua tree woodland Alliance	51.13	10.35
Disturbed White bursage scrub Alliance	44.57	13.50
Joshua tree woodland Alliance	338.14	52.19
White bursage scrub Alliance	24.48	4.52
Total	**2,043.26**	**625.19**
***** in acres		

Avoidance, Minimization, and/or Mitigation Measures

The project would be designed to minimize impacts on special-status plant species. Portions of the Alkali mariposa lily, white pygmy poppy, Booth's evening primrose, crowned muilla, and Mojave fish-hook cactus populations were identified at the boundaries of the BSA; therefore, there is potential for these areas to be preserved in place. The Mojave River occurrence of Booth's evening primrose was also identified in an area that may be avoided by spanning the Mojave River with a bridge. To avoid and mitigate impacts for all plant species, the following measures will be implemented:

BPL-1: Prior to the start of any ground disturbing activities within any previously undisturbed rare plant suitable habitat, conduct focused plant surveys at a time prior to construction when detection is most optimal, such as normal rainfall years. If the results of surveys indicate presence of any of the species identified in Table 3.3.3-1 (*Special-Status Plant Species with Potential to Occur in the Biological Study Area*), then BPL-2 and BPL-3 will be implemented.

BPL-2: Provide a biological monitor onsite to establish an environmentally sensitive area (ESA) around the areas where each special-status species occurs. The biological monitor shall have the authority to establish ESAs in potential suitable habitat areas where rare plant preconstruction surveys were conducted; however, due to low rainfall these areas may still represent potential habitat even if special-status plants were not observed. In addition, any special-status plant occurrences identified within the ROW that can be avoided during construction and preserved in place, shall be established as an ESA as a construction avoidance area by the biological monitor.

BPL-3: Coordinate with CDFW regarding the collection and propagation of bulbs and plants, as well as seed bulking. Only a CDFW-approved nursery may be used for these activities. If it is determined that mitigation locations for replanting bulbs, applying seed, replanting salvaged plants, or planting propagated plants is more appropriate at an off-site location, then this location shall be coordinated with all applicable resource agencies. In some cases, it may be more practical to provide funding for an In-Lieu Fee Program, or to purchase mitigation credits from a mitigation bank. These options shall be explored if other mitigation options are not feasible.

3.3.4 Animal Species

Regulatory Setting

Many state and federal laws regulate impacts to wildlife. The U.S. Fish and Wildlife Service (USFWS), the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NOAA Fisheries), and the California Department of Fish and Wildlife (CDFW) are responsible for implementing these laws. This section discusses potential impacts and permit requirements associated with animals not listed or proposed for listing under the federal or state Endangered Species Act. Species listed or proposed for listing as threatened or endangered are discussed in Section 3.3.5. All other special-status animal species are discussed here, including CDFW fully protected species and species of special concern, and USFWS or NOAA Fisheries candidate species.

Federal laws and regulations relevant to wildlife include the following:

- National Environmental Policy Act (NEPA)
- Migratory Bird Treaty Act (MBTA)
- Fish and Wildlife Coordination Act
- Federal Endangered Species Act (FESA)
- Bald and Golden Eagle Protection Act

State laws and regulations relevant to wildlife include the following:

- California Environmental Quality Act (CEQA)
- California Endangered Species Act (CESA)
- Title 14, California Code of Regulations, Section 460
- Title 14, California Code of Regulations, Section 670.7
- Section 4150 and 4152 of the California Fish and Game Code
- Sections 3511, 4700, 5050, and 5515 of the California Fish and Game Code
- Section 3503 of the California Fish and Game Code
- Section 3503.5 of the California Fish and Game Code
- Section 3513 of the California Fish and Game Code

Affected Environment

Information in this section comes from the *Natural Environment Study* (June 2016).

A list of 61 wildlife species was observed, or detected by their sign, in the Biological Study Area (BSA) and are included in Appendix J – Wildlife Compendium of the *Natural Environment Study*. This is a comprehensive list of all wildlife observed on all site visits, general studies, and focused surveys. Species observed include 42 bird species, 12 mammal species, and 7 reptile species.

A total of 41 special-status animal species were identified as occurring within the vicinity of the proposed project site. Of those, 28 species were observed or have a potential to occur within the project limits due to habitat suitability, as noted in

Table 2: Special-Status Species with Potential for Occurrence of the *Natural Environment Study*. Listed special-status species are discussed in Section 3.3.5.

Twenty-two (22) nonlisted special-status wildlife species have the potential to occur within the BSA and were evaluated in the *Natural Environment Study*, as listed in Table 3.3.4-1.

Table 3.3.4-1 Special-Status Wildlife Species with Potential to Occur in the Biological Study Area

Species	Status	Habitat	Potential to Occur in the Biological Study Area
Accipiter cooperii Cooper's hawk	CDFW: WL MBTA	Woodland and semi-open habitats, riparian groves, and mountain canyons.	Present. Observed during site visits. Suitable foraging habitat present. None observed during site visits. Moderate potential for occurrence.
Agelaius tricolor Tricolored blackbird	CDFW: SSC, BLM: S MBTA	Lowland species, breeding in freshwater marshes with tall emergent vegetation, in upland habitats (especially thickets of non-native Himalayan blackberry), and in silage fields. Forages in agricultural areas where livestock is present and grass is short.	Observed during site visits. Suitable habitat present. Present.
Buteo regalis Ferruginous Hawk	CDFW: WL	Typically breeds in arid and open landscapes dominated by grass or shrubs no more than 6,500 feet elevation.	Not observed during focused raptor surveys. Not expected to occur.
Circus cyaneus Northern harrier	CDW: SSC MBTA	Coastal salt and fresh water marsh. Nest and forages in grassland from saltgrass in desert sink to mountain cienagas. Also nests on ground in shrubby vegetation.	Observed during site visits. Suitable foraging habitat present.
Athene cunicularia Burrowing owl	CDFW: SSC, BLM: S MBTA	Usually occupies ground squirrel burrows in open, dry grasslands, agricultural and range lands, railroad rights-of-way (ROWs), margins of highways, golf courses, and airports. Resident over most of southern California (sparsely distributed over desert areas).	Observed during site surveys. Suitable nesting and foraging habitat present.

Table 3.3.4-1 Special-Status Wildlife Species with Potential to Occur in the Biological Study Area

Species	Status	Habitat	Potential to Occur in the Biological Study Area
Asio flammeus Short-eared owl	CDFW: SSC MBTA	Found in fresh and salt swampland, lowland meadows, irrigated alfalfa fields. Nests on dry ground concealed by vegetation.	Observed during site surveys. Suitable foraging habitat present.
Asio otus Long-eared owl	CDFW: SSC MBTA	Forest and shrublands near open areas.	Observed during site surveys. Suitable habitat present.
Charadrius montanus Mountain plover	CDFW: SSC* BLM: S MBTA *only wintering sites are considered SSC	Nests in heavily grazed, shortgrass prairie, xeric scrub and fallow fields. A dietary generalist in winter when it inhabits semi-desert, dry, bare agricultural land and breeding-type habitats.	None observed during site visits. Suitable habitat present. High potential for occurrence.
Falco mexicanus Prairie falcon	CDFW: WL MBTA	Nests in cliffs or rocky outcrops; forages in open arid valleys and agricultural fields. Throughout the desert and arid interior portions of coastal countries. Uncommon resident in southern California.	None observed during site visits. Suitable foraging habitat present. Potential for occurrence.
Icteria virens Yellow-breasted chat	CDFW: SSC MBTA	Found in dense second-growth, riparian thickets and brush. Also found in abandoned farmland and other rural areas where overgrown vegetation proliferates.	None observed during site visits. Suitable habitat present in Mojave River. Moderate potential for occurrence.
Lanius ludovicianus Loggerhead shrike	CDFW: SSC MBTA	Semi-open areas, nesting in trees and shrubs.	Observed during site visits. Suitable habitat present.
Piranga rubra Summer tanager	CDFW: SSC MBTA	Occur along streams among willows, cottonwoods, mesquite, or saltcedar.	Observed in Mojave River during site visits. Suitable habitat in Mojave River.

Table 3.3.4-1 Special-Status Wildlife Species with Potential to Occur in the Biological Study Area

Species	Status	Habitat	Potential to Occur in the Biological Study Area
Toxostoma lecontei Le Conte's thrasher	CDFW: SSC* MBTA *Designation refers only to the San Joaquin population	Inhabits sparsely vegetated desert flats, dunes, alluvial fans, or gently rolling hills having a high proportion of saltbush *(Atriplex* spp.) or cholla *(cylindrical Opuntia* spps.), often occurring along small washes or sand dunes. Prefers dense thorny shrubs (most often saltbush or cholla) for nesting. Uncommon and local resident in low desert scrub throughout most of the Mojave Desert. Breeding range into eastern Mojave.	Observed during focused surveys. Suitable habitat present.
Setophaga petechia Yellow Warbler	CA: SSC MBTA	Riparian plant associations, prefer willows, cottonwood, aspen, sycamore and alder trees for nesting and foraging.	Present. Observed in Mojave River during site visits. Suitable habitat in Mojave River.
Eumops perotis californicus Western mastiff bat	CDFW: SSC, BLM: S	Primarily cliff-dwelling mammal that occurs in dry desert washes, floodplains, chaparral, oak woodlands, open ponderosa pine forests, grasslands, and montane meadows.	None observed during site visits. Suitable habitat present. Foraging habitat present. Moderate potential for occurrence.
Microtus californicus mohavensis Mojave River vole	CDFW: SSC	Weedy herbaceous growth in wet areas along the Mojave River, and possibly in some nearby irrigated pastures.	None observed during site visits. Suitable habitat present. Moderate potential for occurrence.
Myotis yumanensis Yuma myotis	BLM: S, WBWG: LM	Occasionally roosting in mines or caves, but often found in buildings or bridges. Bachelors sometimes roost in abandoned cliff swallow nests.	Detected during acoustic surveys. Suitable foraging habitat present. Moderate potential for occurrence.

Table 3.3.4-1 Special-Status Wildlife Species with Potential to Occur in the Biological Study Area

Species	Status	Habitat	Potential to Occur in the Biological Study Area
Neotoma lepida intermedia San Diego Desert Woodrat	CDFW: SSC	Found in southern California inhabiting Joshua tree, pinyon-juniper, mixed and chamise-redshank chaparral, sagebrush, and most desert habitats. Nest middens are built against a rock crevice, at the base of creosote or cactus or in the lower branches of trees.	Not expected to occur within BSA. Desert woodrats were observed during Mohave ground squirrel trapping surveys; however, due to the range of this species, it is not expected to occur within the BSA.
Taxidea taxus American badger	CDFW: SSC	Prefers open areas and may frequent brushlands with little groundcover. Inhabits regions ranging from below sea level to elevations upwards of 3,600 meters.	Present. Observed during site visits. Suitable habitat present.
V. m. arsipus Desert kit fox	CDFW: FP	Occurs in annual grasslands or grassy open stages of vegetation dominated by scattered brush, shrubs, and scrub.	Not observed during site visits. Suitable habitat present. Known to occur within BSA. Potential dens observed within BSA.
Anniella pulchra Silvery legless lizard	CDFW: SSC, USFS: S	Occurs in moist warm loose soil with plant cover. Occurs in sparsely vegetated areas of beach dunes, chaparral, pine-oak woodlands, desert scrub, sandy washes, and stream terraces with sycamores, cottonwoods, or oaks. Found from 0 to 5,900 feet elevation.	Not observed during site visits. Suitable habitat present. Known to occur in vicinity of project. High potential for occurrence.
Phrynosoma blainvillii Coast horned lizard	CDFW: SSC, BLM: S, USFS: S	Occurs in annual grassland, coastal sage scrub, chaparral, and woodland communities. Prefers open country, especially sandy areas, washes, and floodplains.	Present. Observed during focused surveys. Suitable habitat present.

Designations:

US – United States
CA – California
FE – Federally Endangered
FT – Federally Threatened
SE – State Endangered
ST – State Threatened
CT – Candidate Threatened

CDFW: SSC – Species of Special Concern
CDFW: FP – Fully Protected
CDFW: WL – Watch List
BLM : S – Sensitive
USFS: S – Sensitive
MBTA – Migratory Bird Treaty Act

Source: Natural Environment Study, 2016.

Reptiles

Silvery legless lizard *(Anniella pulchra pulchra)* is known to occur in numerous locations within the vicinity of the project site. Suitable habitat for the coast horned lizard *(Phrynosoma blainvilliiz)* is present, and several individuals were observed within the limits of the project on site visits.

Birds

Suitable habitat for Cooper's hawk *(Accipiter cooperii),* northern harrier *(Circus cyaneus),* tricolored blackbird *(Agelaius tricolor),* short-eared owl *(Asio flammeus),* and long-eared owl *(Asio otus)* exists within the project area, and individuals of these species were seen during site visits.

Loggerhead shrike *(Lanius ludovicianus),* summer tanager *(Piranga rubra),* Le Conte's thrasher *(Toxostoma lecontei),* and yellow warbler *(Setophaga petechia)* were observed during site visits; suitable habitat for these species is present, and these species could occur on the project site in the future during the construction phase. Mountain plover *(Charadrius montanus),* prairie falcon *(Falco mexicanus),* ferruginous hawk *(Buteo regalis),* and yellow-breasted chat *(Icteria virens)* were not observed during site visits; however, suitable habitat for these species is present, and these species could occur on the project site in the future during the construction phase.

Burrowing owl *(Athene cunicularia)* habitat assessment and focused surveys were conducted throughout the BSA in 2008, 2011, 2012, and 2015. Several breeding pairs, individuals, sign of scat, and sign of active burrows were observed throughout various areas of the project site. For areas of suitable habitat and a few observation locations, refer to the burrowing owl consolidated report in Appendix E of the *Natural Environment Study*. Sign or individuals were detected in eastern Palmdale, near the Los Angeles/San Bernardino county boundary and near the high-speed rail (HSR) line north and east of the Mojave River. In the last 3 years, a total of 3 live burrowing owls and an additional 14 potential burrows were identified.

Results of the 2015 comprehensive focused survey resulted in three confirmed breeding pairs: two were successful in fledging seven young each and the third pair's attempt appeared to have failed. Refer to the map set provided in the Consolidated Burrowing Owl Report for locations (NES, 2016). AMEC's field study of San Bernardino County in 2011 resulted in two individual owls, each within separate burrows and presumed to represent a breeding pair, and their 2012 survey resulted in three breeding pairs within the same area. ECORP's study of Los Angeles County in 2008 resulted in three individuals noted within burrows, each thereby representing a breeding pair for a total of three pairs in Los Angeles County. Breeding success for AMEC and ECORP observations was not determined. Additional burrows with sign were noted, but none were confirmed to be active.

Mammals

Suitable habitat for Yuma myotis *(Myotis yumanensis)* exist in areas near the Mojave River and this species was detected during focused acoustic surveys (Caltrans, 2015). Western mastiff bat *(Eumops perotis californicus)* was not detected during the focused acoustic surveys; however, suitable habitat for this species is present within the project area near the Mojave River (Caltrans, 2015). No observations of Mojave river vole *(Microtus californicus mohavensis)* were recorded during site visits; however, suitable habitat for this species is present within the project area. Desert woodrats were observed during Mohave ground squirrel trapping surveys. However, they are not expected to be the San Diego desert woodrat *(Neotoma lepida intermedia)* due to the range of this species being outside of the BSA. An American badger *(Taxidea taxus)* was observed during site visits.

The desert kit fox is a fur-bearing mammal protected under Title 14, California Code of Regulations (CCR), Chapter 5, Section 406, which prohibits take of the species at any time. Currently, CDFW does not have a mechanism for take of the species; therefore, desert kit fox are treated like a fully protected species.

Environmental Consequences

For the purpose of avoiding redundancy, when discussing project impacts, it should be known that the Freeway/Expressway Alternative, Freeway/Tollway Alternative, Freeway/Expressway Alternative with the HSR Feeder Service, and the Freeway/ Tollway Alternative with the HSR Feeder Service are discussed collectively because the impacts amount to the same in the main alignment/common areas. However, it is the variations and options that differ in impacts to animal species; thus, they are each broken down and discussed further (see Figure 3.3-1, Alignment Key Map for Biological Study Area).

No Build Alternative

Because no ground disturbance would occur under the No Build Alternative, there would be no impacts to special-status wildlife species.

Build Alternatives

Impacts to special-status wildlife individualsare discussed below in species-specific discussions. Impacts to special-status wildlife habitat are discussed after the species-specific discussions in sections *Special-Status Wildlife Habitat* and *Raptor Foraging Habitat*.

Reptiles

Silvery legless lizard *(Anniella pulchra pulchra):* Silvery legless lizard is known to occur in numerous locations within the vicinity of the project site. Observations are within the same habitat type found within the project limits within 0.5 mile of the site. Because of the secretive nature of this species, its range is not completely understood, and it should be assumed this species occurs with equal potential throughout the entire BSA. Avoidance and minimization measures BAN-1 and BAN-5 should be implemented. Impacts to individuals of this species will be mitigated per consultation with the appropriate agencies.

Coast horned lizard *(Phrynosoma blainvillii):* Suitable habitat for this species is present, and several individuals were observed within the limits of the project on site visits. It is expected that the number of individuals found would be equal to those of the surrounding area. It should be assumed that this species occurs with equal potential throughout the BSA. Avoidance and minimization measures BAN-1 and BAN-5 should be implemented. Impacts to individuals of this species will be mitigated per consultation with the appropriate agencies.

Freeway/Expressway and Freeway/Tollway Alternatives

Main Alignment/Common Areas

Within the BSA of the main alignment common areas, impacts to silvery legless lizard and coast horned lizard have the potential to occur. Silvery legless lizard and coast horned lizard habitat occurs throughout the proposed project corridor. Impacts to this species are expected to occur due to clearing and grubbing activities associated with the proposed project. With incorporation of minimization measures, the impacts to individuals of this species are expected to be low.

Variation A

Potential impacts to the silvery legless lizard and coast horned lizard may occur with implementation of the main alignment corridor corresponding to Variation A (a so-called Variation A Main alignment). The preferred habitat type is known to occur within the limits of this alignment; however, with avoidance and minimization measures, impacts to these species are expected to be low. The Variation A Main alignment would result in fewer acres of permanent and temporary impacts to habitat compared to the Variation A alignment.

The Variation A alignment contains potential habitat for the silvery legless lizard and coast horned lizard and, if implemented, would potentially cause impacts to these species. With avoidance and minimization measures, such as having a biological monitor present for clearing and grubbing activities and translocation of individuals onsite, impacts to these species is expected to be low. However, the Variation A alignment requires considerably more acres of temporary and permanent impacts to habitat compared to the Variation A Main alignment; therefore, the potential impacts to these species and habitat is slightly higher if the Variation A alignment is chosen as the preferred alternative.

Variation B

The main alignment corridor corresponding to Variation B (a so-called Variation B Main alignment) includes areas that are potential habitat to the silvery legless lizard and coast horned lizard, and with implementation of this alignment, impacts may occur; however, with the avoidance and minimization measures mentioned above, impacts are expected to be low. The Variation B Main alignment has the potential to have impact on habitat to a lesser extent than the Variation B alignment and Variation

B1 alignment, because this option traverses less open space than these variations and, at one location, bisects farmland rather than suitable habitat.

The Variation B alignment contains potential habitat for the silvery legless lizard and coast horned lizard and, if implemented, could potentially cause impacts to these species. With avoidance and minimization measures, such as having a biological monitor present for clearing and grubbing activities, and translocation of individuals onsite, impacts to these species is expected to be low; however, the Variation B alignment requires considerably more acres of temporary and permanent impacts to habitat compared to the Variation B Main alignment and Variation B1 alignment due to its alignment encompassing a greater distance.

Potential impacts to the silvery legless lizard and coast horned lizard may occur with implementation of the Variation B1 alignment. The preferred habitat type is known to occur within the limits of this variation; however, with avoidance and minimization measures, impacts to these species would be minor. This variation would require slightly more acres of permanent and temporary impacts to habitat than the Variation B Main alignment because it runs through open space, whereas the Variation B Main alignment bisects farmland at one location. If the Variation B1 alignment was selected as the preferred alternative, it would require fewer acres of permanent and temporary impacts to habitat compared to the Variation B alignment.

Variation D

Potential impacts to the silvery legless lizard and coast horned lizard may occur with implementation of the main alignment corridor corresponding to Variation D (a so-called Variation D Main alignment). The preferred habitat type is known to occur within the limits of this alignment; however, with avoidance and minimization measures, impacts to this species would be minor. If the Variation D Main alignment was selected as the preferred alternative, it would require fewer acres of permanent and temporary impacts to habitat compared to the Variation D alignment due to traversing a shorter distance.

The Variation D alignment contains potential habitat for the silvery legless lizard and coast horned lizard and, if implemented, would potentially cause impacts to these species. With avoidance and minimization measures, such as having a biological monitor present for clearing and grubbing activities, and translocation of individuals onsite, impacts to these species is expected to be low; however, the Variation D alignment requires considerably more acres of temporary and permanent impacts to habitat compared to the Variation D Main alignment due to its alignment encompassing a greater distance. Much of this alignment includes open space, which is one of the preferred habitats of the silvery legless lizard and coast horned lizard.

Variation E

Potential habitat for the silvery legless lizard and coast horned lizard occurs within the potential impact area of the main alignment corridor corresponding to Variation E (a so-called Variation E Main alignment) and, if implemented, this alignment could have an impact to these species. With avoidance and minimization measures, impacts to this species are to be considered low. The Variation E Main alignment requires fewer acres for implementation compared to Variation E Highway Only and Variation E with HSR Connection; therefore, it would have less of an impact to habitat if implemented.

The Variation E Highway Only alignment includes areas that are potential habitat to the silvery legless lizard and coast horned lizard, and with implementation of this variation, impacts to these species may occur; however, with avoidance and minimization measures, impacts are expected to be low. Variation E Highway Only has the potential to have impact on habitat to a greater extent than the Variation E Main alignment, because this option traverses more open space in comparison; however, Variation E Highway Only has less of an impact than Variation E with HSR Connection.

Freeway/Expressway and Freeway/Tollway with HSR Alternatives

Impacts with the Freeway/Expressway and Freeway/Tollway with HSR alternatives are generally the same with the exception of the variations described below. The Freeway/Expressway and Freeway/Tollway with HSR alternatives have a wider footprint within the studied corridor compared to the Freeway/Expressway and Freeway/Tollway alternatives because of the rail feeder in the middle; therefore, impacts to scrubland habitat for these species would be higher in comparison. The HSR alternative increases the potential impact to this species proportional to the increase in scrubland community impacts. In addition to this, the HSR spur in Victorville that departs from the highway alignment would be an additional impact for this alternative, affecting approximately 85 acres of scrubland habitat; therefore, it would result in increased impacts to habitat for these species.

Rail Options 1A, 1B, 1C, 7A, 7B, and 7C

All rail options include areas that are potential habitat to the silvery legless lizard and coast horned lizard, and with implementation of either of these options, impacts to the silvery legless lizard and coast horned lizard may occur; however, with avoidance and minimization measures, impacts are expected to be low. Rail Option 1 (A, B, C) has the potential to have impact on habitat to a greater extent than Rail Option 7, because this option traverses more open space than Rail Option 7 (A, B, C); however, this option runs through the outskirts of urbanized areas within Palmdale, which is considered to be marginal quality habitat. Rail Option 1 (A, B, C) also requires more acreage of permanent and temporary impacts to preferred habitat compared to Rail Option 7 (A, B, C).

Birds

Cooper's hawk *(Accipiter cooperii):* Suitable habitat for this species is present, and one individual was observed within the limits of the project on site visits. Vegetation and land cover types that are considered potentially suitable nesting and foraging habitat for this species are listed in Table 3.3.4-2. Avoidance and minimization measures BAN-2, BAN-4, and BAN-5 will be implemented.

Ferruginous hawk (*Buteo regalis*)*:* Suitable foraging habitat for this species is present. This species was not observed during focused raptor surveys. Vegetation and land cover types that are considered potentially suitable foraging habitat for this species are listed in Table 3.3.4-2. This species is not known to nest in the Mojave Desert. Avoidance and minimization measures BAN-2, BAN-4, and BAN-5 will be implemented.

Northern harrier *(Circus cyaneus):* Suitable habitat for this species is present, and one individual was observed within the limits of the project on site visits. Vegetation and land cover types that are considered potentially suitable nesting and foraging habitat for this species are listed in Table 3.3.4-2. Avoidance and minimization measures BAN-2, BAN-4, and BAN-5 will be implemented.

Tricolored blackbird *(Agelaius tricolor):* Potential foraging habitat for tricolored blackbird in the vicinity of the BSA was identified through consultation with tricolored blackbird specialists Dr. Robert J. Meese and Dr. Jonathan S. Feenstra of UC Davis Tricolored Blackbird Portal (2015). Point surveys were conducted by Caltrans biologists Christopher Stevenson and Mary Ngo in various locations adjacent to agricultural fields and within riparian areas along the project limits with a focus on flood control basins on May 1, 2015. One single male tricolored blackbird was observed on May 1, 2015, foraging in a detention basin with several red-winged blackbirds at Sierra Highway and Avenue O in Palmdale. Suitable foraging habitat exists throughout the BSA within the agricultural fields along Avenue P between SR-14 and 40th Street East. Dr. Feenstra advised that Lake Palmdale often has a breeding colony, though not this year (2015), and it is probably the single most likely source of nesting and foraging tricolored blackbirds adjacent to the project area. Tricolored blackbird was not observing foraging or nesting at Turner Springs and the Mojave River on May 1, 2015. Nesting habitat occurs outside the project limits. Vegetation and land cover types that are considered potentially suitable nesting and foraging habitat for this species are listed in Table 3.3.4-2. Avoidance and minimization measures BAN-2, BAN-4, and BAN-5 will be implemented.

Table 3.3.4-2 Special-Status Bird Species Potential Suitable Nesting and Foraging Habitat

Species	Status	Vegetation Communities/Land Cover Types that are Potentially Suitable Nesting Habitat	Vegetation Communities/Land Cover Types that are Potentially Suitable Foraging Habitat
Accipiter cooperii Cooper's hawk	CDFW: WL MBTA	Developed (only where tall, mature trees are present), Fremont cottonwood forest Alliance, Windrow	The following habitats only when in vicinity of tall, mature trees: Agriculture, Allscale scrub Alliance, Big sagebrush Alliance, Black willow thickets, California buckwheat scrub Alliance, California bulrush-American bulrush marsh, Cheesebush scrub Alliance, Creosote bush scrub Alliance, Creosote bush scrub/Allscale scrub Alliance, Creosote bush/White bursage scrub series, Developed, Disturbed Allscale scrub Alliance, Disturbed black willow thickets, Disturbed Creosote bush scrub Alliance, Disturbed fourwing saltbush scrub Alliance, Disturbed Joshua tree woodland Alliance, Disturbed rubber rabbitbrush scrub Alliance, Disturbed salt grass flats Alliance, Disturbed white bursage scrub Alliance, Fourwing saltbush scrub Alliance, Fremont cottonwood forest Alliance, Joshua tree woodland Alliance, Mojave yucca scrub Alliance, Nevada joint fir scrub, Non-native grassland, Red brome grasslands, Red willow thickets, Rubber rabbitbrush scrub Alliance, Sandbar willow thickets Alliance, Scale broom scrub Alliance, Southern cattail marsh, White bursage scrub Alliance, Windrow
Agelaius tricolor Tricolored blackbird	CDFW: SSC, BLM: S MBTA	Not expected to nest within BSA due to lack of suitable habitat for colonial breeding.	Agriculture, Black willow thickets, California bulrush-American bulrush marsh, Disturbed black willow thickets, Disturbed salt grass flats Alliance, Red willow thickets, Southern cattail marsh, Unvegetated wash
Circus cyaneus Northern harrier	CDW: SSC MBTA	Agriculture, Disturbed salt grass flats Alliance, Non-native grassland, Red brome grasslands, Southern cattail marsh	Agriculture, Disturbed salt grass flats Alliance, Non-native grassland, Red brome grasslands, Southern cattail marsh, Unvegetated wash

Table 3.3.4-2 Special-Status Bird Species Potential Suitable Nesting and Foraging Habitat

Species	Status	Vegetation Communities/Land Cover Types that are Potentially Suitable Nesting Habitat	Vegetation Communities/Land Cover Types that are Potentially Suitable Foraging Habitat
Athene cunicularia Burrowing owl	CDFW: SSC, BLM: S MBTA	Allscale scrub Alliance, Big sagebrush Alliance, Cheesebush scrub Alliance, Creosote bush scrub Alliance, Creosote bush scrub/Allscale scrub Alliance, Creosote bush/White bursage scrub series, Disturbed, Disturbed Allscale scrub Alliance, Disturbed Creosote bush scrub Alliance, Disturbed fourwing saltbush scrub Alliance, Disturbed Joshua tree woodland Alliance, Disturbed rubber rabbitbrush scrub Alliance, Disturbed white bursage scrub Alliance, Fourwing saltbush scrub Alliance, Joshua tree woodland Alliance, Mojave yucca scrub Alliance, Nevada joint fir scrub, Non-native grassland, Red brome grasslands, Rock outcrop, Rubber rabbitbrush scrub Alliance, White bursage scrub Alliance	Allscale scrub Alliance, Big sagebrush Alliance, Cheesebush scrub Alliance, Creosote bush scrub Alliance, Creosote bush scrub/Allscale scrub Alliance, Creosote bush/White bursage scrub series, Disturbed, Disturbed Allscale scrub Alliance, Disturbed Creosote bush scrub Alliance, Disturbed fourwing saltbush scrub Alliance, Disturbed Joshua tree woodland Alliance, Disturbed rubber rabbitbrush scrub Alliance, Disturbed white bursage scrub Alliance, Fourwing saltbush scrub Alliance, Joshua tree woodland Alliance, Mojave yucca scrub Alliance, Nevada joint fir scrub, Non-native grassland, Red brome grasslands, Rock outcrop, Rubber rabbitbrush scrub Alliance, White bursage scrub Alliance, Unvegetated wash
Asio flammeus Short-eared owl	CDFW: SSC MBTA	Winter resident; nesting is not expected within the BSA.	Agriculture, Allscale scrub Alliance, Big sagebrush Alliance, California bulrush-American bulrush marsh, Cheesebush scrub Alliance, Creosote bush scrub Alliance, Creosote bush scrub/Allscale scrub Alliance, Creosote bush/White bursage scrub series, Disturbed Allscale scrub Alliance, Disturbed Creosote bush scrub Alliance, Disturbed fourwing saltbush scrub Alliance, Disturbed Joshua tree woodland Alliance, Disturbed rubber rabbitbrush scrub Alliance, Disturbed salt grass flats Alliance, Disturbed white bursage scrub Alliance, Fourwing saltbush scrub Alliance, Joshua tree woodland Alliance, Mojave yucca scrub Alliance, Nevada joint fir scrub, Non-native grassland, Red brome grasslands, Rubber rabbitbrush scrub Alliance, southern cattail marsh, White bursage scrub Alliance, Unvegetated wash

Table 3.3.4-2 Special-Status Bird Species Potential Suitable Nesting and Foraging Habitat

Species	Status	Vegetation Communities/Land Cover Types that are Potentially Suitable Nesting Habitat	Vegetation Communities/Land Cover Types that are Potentially Suitable Foraging Habitat
Asio otus Long-eared owl	CDFW: SSC MBTA	Winter resident; nesting is not expected within the BSA.	Allscale scrub Alliance, Big sagebrush Alliance, Cheesebush scrub Alliance, Creosote bush scrub Alliance, Creosote bush scrub/Allscale scrub Alliance, Creosote bush/White bursage scrub series, Disturbed Allscale scrub Alliance, Disturbed Creosote bush scrub Alliance, Disturbed fourwing saltbush scrub Alliance, Disturbed Joshua tree woodland Alliance, Disturbed rubber rabbitbrush scrub Alliance, Disturbed white bursage scrub Alliance, Fourwing saltbush scrub Alliance, Fremont cottonwood forest alliance, Joshua tree woodland Alliance, Mojave yucca scrub Alliance, Nevada joint fir scrub, Non-native grassland, Red brome, grasslands, Rock outcrop, Rubber rabbitbrush scrub Alliance, White bursage scrub Alliance, Unvegetated wash, Windrow
Charadrius montanus Mountain plover	CDFW: SSC, BLM: S MBTA	Winter resident; nesting is not expected within the BSA.	Agriculture, Allscale scrub Alliance, Allscale scrub Alliance, Big sagebrush Alliance, California buckwheat scrub Alliance, Cheesebush scrub Alliance, Creosote bush scrub Alliance, Creosote bush scrub/Allscale scrub Alliance, Creosote bush/White bursage scrub series, Disturbed Allscale scrub Alliance, Disturbed Creosote bush scrub Alliance, Disturbed fourwing saltbush scrub Alliance, Disturbed Joshua tree woodland Alliance, Disturbed rubber rabbitbrush scrub Alliance, Disturbed salt grass flats Alliance, Disturbed white bursage scrub Alliance, Fourwing saltbush scrub Alliance, Joshua tree woodland Alliance, Mojave yucca scrub Alliance, Nevada joint fir scrub, Non-native grassland, Red brome grasslands, Rubber rabbitbrush scrub Alliance, Scale broom scrub Alliance, White bursage scrub Alliance

Table 3.3.4-2 Special-Status Bird Species Potential Suitable Nesting and Foraging Habitat

Species	Status	Vegetation Communities/Land Cover Types that are Potentially Suitable Nesting Habitat	Vegetation Communities/Land Cover Types that are Potentially Suitable Foraging Habitat
Falco mexicanus Prairie falcon	CDFW: WL MBTA	Rock outcrop	Agriculture, Allscale scrub Alliance, Allscale scrub Alliance, Big sagebrush Alliance, California buckwheat scrub Alliance, Cheesebush scrub Alliance, Creosote bush scrub Alliance, Creosote bush scrub/Allscale scrub Alliance, Creosote bush/White bursage scrub series, Disturbed Allscale scrub Alliance, Disturbed Creosote bush scrub Alliance, Disturbed fourwing saltbush scrub Alliance, Disturbed Joshua tree woodland Alliance, Disturbed rubber rabbitbrush scrub Alliance, Disturbed salt grass flats Alliance, Disturbed white bursage scrub Alliance, Fourwing saltbush scrub Alliance, Joshua tree woodland Alliance, Mojave yucca scrub Alliance, Nevada joint fir scrub, Non-native grassland, Red brome grasslands, Rock outcrop, Rubber rabbitbrush scrub Alliance, Scale broom scrub Alliance, White bursage scrub Alliance, Unvegetated wash, Windrow
Icteria virens Yellow-breasted chat	CDFW: SSC MBTA	Black willow thickets, Fremont cottonwood forest alliance, Red willow thickets, and Sandbar willow thickets Alliance	Black willow thickets, Fremont cottonwood forest Alliance, Red willow thickets, and sandbar willow thickets Alliance

Table 3.3.4-2 Special-Status Bird Species Potential Suitable Nesting and Foraging Habitat

Species	Status	Vegetation Communities/Land Cover Types that are Potentially Suitable Nesting Habitat	Vegetation Communities/Land Cover Types that are Potentially Suitable Foraging Habitat
Lanius ludovicianus Loggerhead shrike	CDFW: SSC MBTA	Allscale scrub Alliance, Big sagebrush Alliance, Cheesebush scrub Alliance, Creosote bush scrub Alliance, Creosote bush scrub/Allscale scrub Alliance, Creosote bush/White bursage scrub series, Disturbed Allscale scrub Alliance, Disturbed Creosote bush scrub Alliance, Disturbed fourwing saltbush scrub Alliance, Disturbed Joshua tree woodland Alliance, Disturbed rubber rabbitbrush scrub Alliance, Disturbed white bursage scrub Alliance, Fourwing saltbush scrub Alliance, Joshua tree woodland Alliance, Mojave yucca scrub Alliance, Nevada joint fir scrub, Rubber rabbitbrush scrub Alliance, White bursage scrub Alliance	Allscale scrub Alliance, Big sagebrush Alliance, Cheesebush scrub Alliance, Creosote bush scrub Alliance, Creosote bush scrub/Allscale scrub Alliance, Creosote bush/White bursage scrub series, Disturbed Allscale scrub Alliance, Disturbed Creosote bush scrub Alliance, Disturbed fourwing saltbush scrub Alliance, Disturbed Joshua tree woodland Alliance, Disturbed rubber rabbitbrush scrub Alliance, Disturbed white bursage scrub Alliance, Fourwing saltbush scrub Alliance, Joshua tree woodland Alliance, Mojave yucca scrub Alliance, Nevada joint fir scrub, Non-native grassland, Red brome grasslands, Rubber rabbitbrush scrub Alliance, White bursage scrub Alliance, Unvegetated wash
Piranga rubra Summer tanager	CDFW: SSC MBTA	Black willow thickets, Fremont cottonwood forest alliance, Red willow thickets, and Sandbar willow thickets Alliance	Black willow thickets, Fremont cottonwood forest alliance, Red willow thickets, and Sandbar willow thickets Alliance
Toxostoma lecontei Le Conte's thrasher	CDFW: SSC MBTA	SSC designation refers to the San Joaquin population only; subspecies present within BSA is not SSC.	SSC designation refers to the San Joaquin population only; subspecies present within BSA is not SSC.
Setophaga petechia Yellow Warbler	CA: SSC MBTA	Black willow thickets, Fremont cottonwood forest Alliance, Red willow thickets, and Sandbar willow thickets Alliance	Black willow thickets, Fremont cottonwood forest Alliance, Red willow thickets, and Sandbar willow thickets Alliance

Designations:
US – United States, CA – California, FE – Federally Endangered, FT – Federally Threatened, SE – State Endangered, ST – State Threatened, CT – Candidate Threatened, CDFW: SSC – Species of Special Concern, CDFW: FP – Fully Protected, CDFW: WL – Watch List, BLM : S – Sensitive, USFS: S – Sensitive, MBTA – Migratory Bird Treaty Act

Short-eared owl *(Asio flammeus):* Suitable habitat for this species is present, and one individual was observed within the limits of the project on site visits. This species is a winter resident; therefore, nesting is not expected within the BSA. Vegetation and land cover types that are considered potentially suitable foraging habitat for this species are listed in Table 3.3.4-2. Avoidance and minimization measures BAN-2, BAN-4, and BAN-5 will be implemented.

Long-eared owl *(Asio otus):* Suitable habitat for this species is present, and one individual was observed within the limits of the project on site visits. Vegetation and land cover types that are considered potentially suitable nesting and foraging habitat for this species are listed in Table 3.3.4-2. Avoidance and minimization measures BAN-2, BAN-4, and BAN-5 will be implemented.

Mountain plover *(Charadrius montanus):* No individuals of this species were noted within the BSA during site visits; however, suitable habitat for this species is present, and this species could occur on the project site in the future during the construction phase. Vegetation and land cover types that are considered potentially suitable nesting and foraging habitat for this species are listed in Table 3.3.4-2. Avoidance and minimization measures BAN-2, BAN-4, and BAN-5 will be implemented.

Prairie falcon *(Falco mexicanus):* Suitable habitat for this species is present, and one individual was observed within the limits of the project during site visits. Vegetation and land cover types that are considered potentially suitable nesting and foraging habitat for this species are listed in Table 3.3.4-2. Avoidance and minimization measures BAN-2, BAN-4, and BAN-5 will be implemented.

Yellow-breasted chat *(Icteria virens):* No individuals of this species were noted within the BSA during site visits; however, suitable habitat for this species is present, and this species could occur on the project site in the future during the construction phase. Vegetation and land cover types that are considered potentially suitable nesting and foraging habitat for this species are listed in Table 3.3.4-2. Avoidance and minimization measures BAN-2, BAN-4, and BAN-5 will be implemented.

Loggerhead shrike *(Lanius ludovicianus):* Suitable habitat for this species is present, and individuals were observed within the limits of the project on site visits. Vegetation and land cover types that are considered potentially suitable nesting and foraging habitat for this species are listed in Table 3.3.4-2. Avoidance and minimization measures BAN-2, BAN-4, and BAN-5 will be implemented.

Le Conte's thrasher *(Toxostoma lecontei):* SSC designation refers to the San Joaquin population only; subspecies present within BSA is not SSC. No individuals of this species were noted within the BSA during site visits; however, suitable habitat for this species is present, and this species could occur on the project site in the future during the construction phase. Vegetation and land cover types that are considered potentially suitable nesting and foraging habitat for this species are listed in Table 3.3.4-2. Avoidance and minimization measures BAN-2, BAN-4, and BAN-5 will be implemented.

Although individual adult birds are expected to flee in the presence of construction equipment, the potential exists for impacts to active nests and fledglings that are reliant upon them. Active nests are protected by the MBTA and various sections of the California Fish and Game Code. With implementation of the above avoidance and minimization measures to protect active bird nests, this potential is eliminated or reduced to a level that is less than substantial.

Potentially suitable nesting and foraging habitat for each special-status bird species is listed in Table 3.3.4-2. A discussion regarding impacts to habitat for special-status wildlife species is discussed later in this section (Special-Status Wildlife Habitat).

Freeway/Expressway and Freeway/Tollway Alternatives

Main Alignment/Common Areas

Within the BSA of the main alignment common areas, impacts to the above-listed species have the potential to occur. Foraging and nesting habitat occurs throughout the proposed project corridor. Impacts to these species are expected to occur due to clearing and grubbing activities associated with implementation of the proposed project. With incorporation of minimization measures, the impacts to individuals of these species are expected to be low.

Variation A

Potential impacts to the above-listed species may occur with implementation of the main alignment corridor corresponding to Variation A (a so-called Variation A Main alignment). Foraging and nesting habitat is known to occur within the limits of this alignment; however, with avoidance and minimization measures, impacts to these species are expected to be low. The Variation A Main alignment would require fewer acres of permanent and temporary impacts to foraging and nesting habitat compared to Variation A.

The Variation A alignment contains potential habitat for the above-listed species and, if implemented, would potentially cause impacts to these species. With avoidance and minimization measures, such as having a biological monitor present for clearing and grubbing activities and avoiding construction during nesting season, impacts to these species are expected to be low. However, the Variation A alignment requires considerably more acres of temporary and permanent impacts to foraging and nesting habitat compared to the Variation A Main alignment; therefore, potential impacts to these species and foraging and nesting habitat are slightly higher.

Variation B

The main alignment corridor corresponding to Variation B (a so-called Variation B Main alignment) includes areas that are potential habitat to the above-listed species, and with implementation of this alignment, impacts to these species may occur; however, with avoidance and minimization measures, impacts are expected to be low. The Variation B Main Alignment has the potential to have impact on habitat to a lesser extent than Variation B and Variation B1, because this option traverses less open space than these variations and, at one location, bisects farmland rather than suitable habitat.

The Variation B alignment contains potential foraging and nesting habitat for the above-listed species and, if implemented, could potentially cause impacts to these species. With avoidance and minimization measures, such as having a biological monitor present for clearing and grubbing activities, impacts to these species are expected to be low; however, the Variation B alignment requires considerably more acres of temporary and permanent impacts to foraging and nesting habitat compared to the Variation B Main alignment and Variation B1, due to its alignment encompassing a greater distance.

Potential impacts to the above-listed species may occur with implementation of the Variation B1 alignment. Foraging and nesting habitat is known to occur within the limits of this variation; however, with avoidance and minimization measures, impacts to these species would be minor. This variation would require slightly more acres of permanent and temporary impacts to foraging and nesting habitat than the Variation B Main alignment because it runs through open space, whereas the Variation B Main alignment bisects farmland at one location.

Variation D

Potential impacts to the above-listed species may occur with implementation of the main alignment corridor corresponding to Variation D (a so-called Variation D Main alignment). Foraging and nesting habitat is known to occur within the limits of this alignment; however, with avoidance and minimization measures, impacts to these species would be minor. The Variation D Main alignment would require fewer acres of permanent and temporary impacts to foraging and nesting compared to Variation D due to traversing a shorter distance.

The Variation D alignment contains potential habitat for the above-listed species and, if implemented, would potentially cause impacts to these species. With avoidance and minimization measures, such as avoiding construction during nesting season, impacts to these species are expected to be low; however, the Variation D alignment requires considerably more acres of temporary and permanent impacts to foraging and nesting habitat compared to the Variation D Main alignment due to its alignment encompassing a greater distance. Much of this alignment includes undisturbed space, which is a higher quality habitat for these species.

Variation E

Potential habitat for the above-listed species occurs within the potential impact area of the main alignment corridor corresponding to Variation E (a so-called Variation E Main alignment) and, if implemented, this alignment could have an impact to these species. With avoidance and minimization measures, impacts to these species are to be considered low. The Variation E Main alignment requires fewer acres for implementation compared to Variation E Highway Only and Variation E with HSR Connection; therefore, it would have less of an impact to foraging and nesting habitat if implemented.

The Variation E Highway Only alignment includes areas that are potential foraging and nesting habitat to the above-listed species, and with implementation of this variation, impacts may occur; however, with avoidance and minimization measures, impacts to are expected to be low. The Variation E Highway Only alignment has the potential to have impact on foraging and nesting habitat to a greater extent than the Variation E Main alignment, because this option traverses more open space in comparison; however, Variation E Highway Only has less of an impact than Variation E with HSR Connection.

Freeway/Expressway and Freeway/Tollway with HSR Alternatives

Impacts with the Freeway/Expressway and Freeway/Tollway with HSR alternatives are generally the same with the exception of the variations described below. The Freeway/Expressway and Freeway/Tollway with HSR alternatives have a wider footprint within the studied corridor compared to the Freeway/Expressway and Freeway/Tollway alternatives because of the rail feeder in the middle; therefore, impacts to habitat for these species would be higher in comparison. The alternatives with HSR increase the potential impact to this species proportional to the increase in scrubland community impacts. In addition to this, the HSR spur in Victorville that departs from the highway alignment would be an additional impact for this alternative, affecting approximately 85 acres of scrubland habitat, thus resulting in increased impacts to habitat for these species.

Rail Options 1A, 1B, 1C, 7A, 7B, and 7C

All rail options include areas that are potential habitat to the above-listed species, and with implementation of any of these options, impacts may occur; however, with avoidance and minimization measures, impacts are expected to be low. Rail Option 1 (A, B, C) has the potential to have impact on foraging and nesting habitat to a greater extent than Rail Option 7 (A, B, C), because this option traverses more open space than Rail Option 7 (A, B, C); however, this option runs through the outskirts of urbanized areas within Palmdale, which is considered to be marginal quality habitat. Rail Option 1 (A, B, C) also requires more acreage of permanent and temporary impacts to preferred foraging and nesting habitat compared to Rail Option 7 (A, B, C).

Summer Tanager *(Piranga rubra):* Suitable habitat for this species is present in the BSA. This species was observed within the BSA during biological surveys and could be present during the construction phase. Vegetation and land cover types that are considered potentially suitable nesting and foraging habitat for this species are listed in Table 3.3.4-2. Avoidance and minimization measures BAN-2, BAN-4, and BAN-5 will be implemented.

Yellow Warbler *(Setophaga petechia):* Suitable habitat for this species is present in the BSA. This species was observed within the BSA during biological surveys and could be present during the construction phase. Vegetation and land cover types that are considered potentially suitable nesting and foraging habitat for this species are listed in Table 3.3.4-2. Avoidance and minimization measures BAN-2, BAN-4, and BAN-5 will be implemented.

Implementation of the proposed project has the potential to impact these species during the construction phase of this project. Because these species have the ability to fly away, direct impacts to individual adults are not expected during the construction phase of this project. Potential exists for impacts to nesting birds should they be present. With implementation of avoidance and minimization measures BAN-2, BAN-4, and BAN-5, impacts to this species will be minimized.

These species are a riparian obligate species along riparian habitats. Because only a few alternatives contain this type of habitat, others are eliminated from discussion. Variation E Main, Variation E Highway Only, and Variation E with HSR are discussed below.

Freeway/Expressway and Freeway/Tollway Alternatives

Variation E

Potential habitat for these species occurs within the potential impact area of the main alignment corridor corresponding to Variation E (a so-called Variation E Main alignment) and, if implemented, this alignment could have an impact to individuals. With avoidance and minimization measures, impacts to these species are to be considered low. The Variation E Main alignment requires fewer acres for implementation within the Mojave River compared to the Variation E Highway Only alignment and Variation E with HSR Connection alignment; therefore, it would have less of an impact to foraging and nesting habitat if implemented.

The Variation E Highway Only alignment includes areas that are potential foraging and nesting habitat to these species, and with implementation of this variation, impacts may occur; however, with avoidance and minimization measures, impacts are expected to be low. The Variation E Highway Only alignment has the potential to have impact on foraging and nesting habitat to a greater extent than the Variation E Main alignment, because this option has more impacts to the Mojave River; however, the Variation E Highway Only alignment has less of an impact than the Variation E with HSR Connection alignment.

Freeway/Expressway and Freeway/Tollway with HSR Alternatives

The Freeway/Expressway and Freeway/Tollway with HSR alternatives have a wider footprint within the studied corridor compared to the Freeway/Expressway and Freeway/Tollway alternatives because of the rail feeder in the middle; therefore, impacts to habitat for these species would be higher in comparison. The alternatives with HSR increase the potential impact to these species proportional to the increase in scrubland community impacts

Variation E with HSR Connection

The Variation E with HSR Connection alignment contains potential habitat for these species and, if implemented, would potentially cause impacts. With avoidance and minimization measures, such as having a biological monitor present for clearing, impacts to these species are expected to be low; however, the Variation E with HSR Connection alignment requires considerably more acres of temporary and permanent impacts to foraging and nesting habitat compared to the Variation E Main alignment and Variation E Highway Only alignment due to the alignment encompassing a larger area with more impacts to the Mojave River.

Burrowing owl *(Athene cunicularia):* Three breeding pairs of burrowing owl were observed within the BSA in the most recent study (Caltrans, 2015). Because of their location, all three burrows, individuals, and surrounding habitat would be impacted should any of the project alternatives be implemented; therefore, the analysis for impacts to individuals, breeding pairs, and habitat would apply to any of the proposed alternatives equally.

In determining the potential impacts to any individual or breeding pair, one must consider the amount, type, and quality of habitat surrounding the active burrow. The map presented in the Consolidated Burrowing Owl Report depicts the location of each of the three active burrows, project limits, and the surrounding area. Habitat type, or plant community type, surrounding the active burrows can be viewed in the map set presented in the Consolidated Plant Community Report. As noted in these reports, Burrows 1 and 2 are surrounded by disturbed creosote bush scrub and Burrow 3 is located within disturbed agricultural areas. As the name of the plant communities suggests, these areas are disturbed natural communities. Because burrowing owl are known to inhabit disturbed areas such as grassland, agricultural fields, and grazing lands, the disturbed nature of these areas should not be misconstrued as lesser quality for burrowing owl.

Determining the amount of occupied burrowing owl habitat that would be impacted by implementation of the proposed project is more difficult to determine. Several studies conducted in the San Francisco Bay area and the Imperial Valley have determined that the amount of area needed to support a breeding pair can vary from one habitat type to another. According to these studies, approximately 80 percent of all observations occur within a radius of 600 meters of the burrow. It is estimated that each of the three pairs could use approximately 240 acres of suitable habitat; therefore, approximately 720 acres of suitable occupied burrowing owl habitat could be impacted by the project alternatives. When viewing available suitable habitat surrounding Burrows 1 through 3, similar amounts of suitable habitat available for each of these pairs were noted.

This species has the potential for occurring during the construction phase. Avoidance and minimization measures BAN-2, BAN-4, and BAN-5 will be implemented. Compensatory mitigation measure BAN-7 will be implemented.

Burrowing owl is listed as a California Species of Special Concern (CA SSC). It could be said that no other species that is only listed as CA SSC receives so much attention and consideration when evaluating impacts and determining appropriate mitigation. Because this species is not afforded protection under FESA or CESA at this time, impact analysis and mitigation measures are addressed in this CEQA document only; however, the MBTA and California Fish and Game Code prohibit take of active nests. Because of the terrestrial nature of this animal, surveys for the presence of this species should occur prior to construction to avoid incidental take even during the nonbreeding season. If an individual is found to occupy a burrow during the nonbreeding season, subsequent avoidance and minimization measures will be coordinated with CDFW, including an option of passive relocation.

Freeway/Expressway and Freeway/Tollway Alternatives

Main Alignment/Common Areas

Within the BSA of the main alignment common areas, impacts to burrowing owl have the potential to occur. Burrowing owl habitat occurs throughout the proposed project corridor, within dry grasslands, agricultural and range lands, railroad rights-of-way (ROWs), margins of highways, golf courses, and airports. Impacts to this species are expected to occur due to clearing and grubbing activities associated with implementation of the proposed project. With incorporation of minimization measures, impacts to individuals of this species are expected to be low.

Variation A

Potential impacts to the burrowing owl may occur with implementation of the main alignment corridor corresponding to Variation A (a so-called Variation A Main alignment). The burrowing owl's preferred habitat type is known to occur within the limits of this alignment; however, with avoidance and minimization measures, impacts to this species are expected to be low. The Variation A Main alignment would require fewer acres of permanent and temporary impacts to dry grasslands, agricultural and range lands, railroad ROWs, margins of highways, golf courses, and airports compared to the Variation A alignment, because it traverses less distance along existing roadways.

The Variation A alignment contains potential habitat for the burrowing owl and, if implemented, would potentially cause impacts to this species. With avoidance and minimization measures, such as having a biological monitor present for clearing and grubbing activities and translocation of individuals onsite, impacts to this species are expected to be low; however, the Variation A alignment requires considerably more acres of temporary and permanent impacts to dry grasslands, agricultural and range lands, railroad ROWs, margins of highways, golf courses, and airports compared to the Variation A Main alignment. Therefore, potential impacts to this species and its habitat are slightly higher with implementation of this variation.

Variation B

The main alignment corridor corresponding to Variation B (a so-called Variation B Main alignment) includes areas that are potential habitat to the burrowing owl, and with implementation of this alignment, impacts to the burrowing owl may occur; however, with avoidance and minimization measures, impacts to burrowing owl are expected to be low. The Variation B Main alignment has the potential to have impact on burrowing owl habitat to a lesser extent than Variation B and Variation B1, because this option traverses less open space than these variations and, at one location, bisects farmland rather than suitable habitat.

Variation B contains potential habitat for the burrowing owl and, if implemented, could potentially cause impacts to this species. With avoidance and minimization measures, such as having a biological monitor present for clearing and grubbing activities, and translocation of individuals onsite, impacts to this species are expected to be low; however, Variation B requires considerably more acres of temporary and permanent impacts to dry grasslands, agricultural and range lands, railroad ROWs, margins of highways, golf courses, and airports compared to the Variation B Main alignment and Variation B1 alignment due to its alignment encompassing a greater distance.

Potential impacts to the burrowing owl may occur with implementation of the Variation B1 alignment. The burrowing owl's preferred habitat type is known to occur within the limits of this variation; however, with avoidance and minimization measures, impacts to this species would be minor. This variation would require slightly more acres of permanent and temporary impacts to burrowing owl habitat than the Variation B Main alignment because it runs through open space, whereas the Variation B Main alignment bisects farmland at one location. The Variation B1 alignment would require fewer acres of permanent and temporary impacts to brushlands with little groundcover compared to the Variation B alignment.

Variation D

Potential impacts to the burrowing owl may occur with implementation of the main alignment corridor corresponding to Variation D (a so-called Variation D Main alignment). The burrowing owl's preferred habitat type is known to occur within the limits of this alignment; however, with avoidance and minimization measures, impacts to this species would be minor. The Variation D Main alignment would require fewer acres of permanent and temporary impacts to dry grasslands, agricultural and range lands, railroad ROWs, margins of highways, golf courses, and airports, compared to Variation D due to the shorter distance along an existing roadway.

Variation D contains potential habitat for the burrowing owl and, if implemented, would potentially cause impacts to this species. With avoidance and minimization measures, such as having a biological monitor present for clearing and grubbing activities, and translocation of individuals onsite, impacts to this species are expected to be low; however, Variation D requires considerably more acres of temporary and permanent impacts to dry grasslands, agricultural and range lands, railroad ROWs, margins of highways, golf courses, and airports compared to the Variation D Main alignment due to its alignment encompassing a greater distance. Much of this alignment includes open space, which is one of the preferred habitats of the burrowing owl.

Variation E

Potential habitat for the burrowing owl occurs within this segment. With the avoidance and minimization measures mentioned in the previous section, impacts to this species are to be considered low. The Variation E Main alignment requires fewer acres for implementation in comparison to Variation E*;* therefore, it would have less of an impact to burrowing owl habitat if implemented.

Freeway/Expressway and Freeway/Tollway with HSR Alternatives

Impacts with the Freeway/Expressway and Freeway/Tollway with HSR alternatives are generally the same with the exception of the variations described below. The Freeway/Expressway and Freeway/Tollway with HSR alternatives have a wider footprint within the studied corridor compared to the Freeway/Expressway and Freeway/Tollway alternatives because of the rail feeder in the middle; therefore, impacts to habitat for this species would be higher in comparison. The alternatives with HSR increase the potential impact to this species proportional to the increase in scrubland community impacts. In addition to this, the HSR spur in Victorville that departs from the highway alignment would be an additional impact for this alternative, affecting approximately 85 acres of scrubland habitat, thus resulting in increased impacts to habitat for this species.

Rail Options 1A, 1B, 1C, 7A, 7B, and 7C

All rail options include areas that are potential habitat to the burrowing owl, and with implementation of any of these options, impacts to the burrowing owl may occur; however, with avoidance and minimization measures, impacts to burrowing owl are expected to be low. Rail Option 1 (A, B, C) has the potential to have impact on burrowing owl habitat to a greater extent than Rail Option 7 (A, B, C), because this option traverses more open space than Rail Option 7 (A, B, C); however, this option runs through the outskirts of urbanized areas within Palmdale, which is considered to be low quality habitat. Rail Option 1 (A, B, C) also requires more acreage of permanent and temporary impacts to the burrowing owl’s preferred habitat of dry grasslands, agricultural and range lands, railroad ROWs, margins of highways, golf courses, and airports compared to Rail Option 7 (A, B, C).

Mammals

Western mastiff bat *(Eumops perotis californicus):* No individuals of this species were detected within the BSA during site visits; however, suitable habitat for this species is present, and this species could occur on the project site in the future during the construction phase. Avoidance and minimization measures BAN-3 and BAN-5 will be implemented.

Yuma myotis *(Myotis yumanensis):* This species was detected within the BSA during focused acoustic surveys (Caltrans, 2015). Avoidance and minimization measures BAN-3 and BAN-5 will be implemented.

Implementation of the proposed project has the potential to impact temporary roosting areas these species of bats during the construction phase of this project which are protected under Fish and Game Code (FGC) 4150 during the construction phase of this project. Because these species have the ability to fly away and safely vacate temporary roosting locations, direct impacts to individual adults are not expected during the construction phase of this project. With implementation of the above-stated avoidance and minimization measures, impacts to these species will be minimized thereby complying with FGC 4150.

Freeway/Expressway and Freeway/Tollway Alternatives

Main Alignment/Common Areas

Within the BSA of the main alignment common areas, impacts have the potential to occur. Habitat occurs throughout the proposed project corridor. Impacts to these species are expected to occur due to clearing and grubbing activities associated with implementation of the proposed project. With incorporation of the minimization measures listed above, the impacts to individuals of these species are expected to be low.

Variation A

Potential impacts may occur with implementation of the main alignment corridor corresponding to Variation A (a so-called Variation A Main alignment). Preferred habitat type is known to occur within the limits of this alignment; however, with avoidance and minimization measures mentioned above, impacts to these species are expected to be low. The Variation A Main alignment would require fewer acres of permanent and temporary impacts to habitat compared to the Variation A alignment, because it traverses less distance along existing roadways.

The Variation A alignment contains potential habitat for these species and, if implemented, would potentially cause impacts to these species. With the avoidance and minimization measures mentioned above, such as having a biological monitor present for clearing and grubbing activities and translocation of individuals onsite, impacts are expected to be low; however, the Variation A alignment requires considerably more acres of temporary and permanent impacts to habitat compared to the Variation A Main alignment. Therefore, potential impacts to these species and its habitat are slightly higher with implementation of this variation.

Variation B

The main alignment corridor corresponding to Variation B (a so-called Variation B Main alignment) includes areas that are potential habitat, and with implementation of this alignment, impacts may occur; however, with the avoidance and minimization measures mentioned above, impacts are expected to be low. The Variation B Main alignment has the potential to have impact on habitat to a lesser extent than the Variation B alignment and Variation B1 alignment, because this option traverses less open space than these variations and, at one location, bisects farmland rather than suitable habitat.

The Variation B alignment contains potential habitat for these species and, if implemented, could potentially cause impacts to these species. With avoidance and minimization measures, impacts are expected to be low; however, Variation B requires considerably more acres of temporary and permanent impacts to habitat compared to the Variation B Main alignment and Variation B1 alignment due to its alignment encompassing a greater distance.

Potential impacts may occur with implementation of the Variation B1 alignment. The preferred habitat type is known to occur within the limits of this variation; however, with avoidance and minimization measures mentioned above, impacts to these species would be minor. This variation would require slightly more acres of permanent and temporary impacts to habitat than the Variation B Main alignment because it runs through open space, whereas the Variation B Main alignment bisects farmland at one location. The Variation B1 alignment would require fewer acres of permanent and temporary impacts to habitat, compared to the Variation B alignment.

Variation D

Potential impacts may occur with implementation of the main alignment corridor corresponding to Variation D (a so-called Variation D Main alignment). The preferred habitat type is known to occur within the limits of this alignment; however, with avoidance and minimization measures mentioned above, impacts to these species would be minor. The Variation D Main alignment would require fewer acres of permanent and temporary impacts to habitat compared to the Variation D alignment due to the shorter distance along an existing roadway.

The Variation D alignment contains potential habitat for these species and, if implemented, would potentially cause impacts. With the avoidance and minimization measures mentioned above, such as having a biological monitor present for clearing and grubbing activities, and translocation of individuals onsite, impacts to these species are expected to be low; however, Variation D requires considerably more acres of temporary and permanent impacts to habitat compared to the Variation D Main alignment due to its alignment encompassing a greater distance. Much of this alignment includes open space, which is preferred habitat.

Variation E

Potential habitat occurs within the potential impact area of the main alignment corridor corresponding to Variation E (a so-called Variation E Main alignment) and, if implemented, this alignment could have an impact to individuals of these species. With avoidance and minimization measures, impacts to these species are to be considered low. The Variation E Main alignment requires fewer acres for implementation compared to the Variation E Highway Only alignment and Variation E with HSR Connection alignment; therefore, it would have less of an impact to habitat if implemented.

The Variation E Highway Only alignment includes areas that are potential habitat, and with implementation of this variation, impacts may occur; however, with the avoidance and minimization measures mentioned above, impacts are expected to be low. The Variation E Highway Only alignment has the potential to have impact on habitat to a greater extent than the Variation E Main alignment, because this option traverses more open space; however, the Variation E Highway Only alignment has less of an impact than the Variation E with HSR Connection alignment.

Freeway/Expressway and Freeway/Tollway with HSR Alternatives

Impacts with the Freeway/Expressway and Freeway/Tollway with HSR alternatives are generally the same with the exception of the variations described below. The

Freeway/Expressway and Freeway/Tollway with HSR alternatives have a wider footprint within the studied corridor compared to the Freeway/Expressway and Freeway/Tollway alternatives because of the rail feeder in the middle; therefore, impacts to habitat for these species would be higher in comparison. The alternatives with HSR increase the potential impact to this species proportional to the increase in scrubland community impacts. In addition to this, the HSR spur in Victorville that departs from the highway alignment would be an additional impact for this alternative, affecting approximately 85 acres of scrubland habitat, thus resulting in increased impacts to habitat for these species

Rail Options 1A, 1B, 1C, 7A, 7B, 7C

All rail options include areas that are potential habitat, and with implementation of any of these options, impacts may occur; however, with the avoidance and minimization measures mentioned above, impacts are expected to be low. Rail Option 1 (A, B, C) has the potential to have impact on these species to a greater extent than Rail Option 7 (A, B, C), because this option traverses more open space than Rail Option 7 (A, B, C); however, this option runs through the outskirts of urbanized areas within Palmdale, which is considered to be marginal quality habitat. Rail Option 1 (A, B, C) also requires more acreage of permanent and temporary impacts to the habitat compared to Rail Option 7 (A, B, C).

Variation E with HSR Connection

The Variation E with HSR Connection alignment contains potential habitat and, if implemented, would potentially cause impacts to these species. With the avoidance and minimization measures mentioned above, such as having a biological monitor present for clearing and grubbing activities and translocation of individuals onsite, impacts to these species are expected to be low; however, Variation E with HSR Connection requires considerably more acres of temporary and permanent impacts to habitat compared to the Variation E Main alignment and Variation E Highway Only alignment due to the alignment encompassing a larger area with more open space.

Mojave river vole *(Microtus californicus mohavensis):* No sign or observation of individuals was recorded during surveys or site visits; however, suitable habitat for this species occurs within the BSA. Avoidance and minimization measures BAN-1 and BAN-5 will be implemented.

Because the habitat on the project site appears similar to that of the surrounding area, it is expected that impacts to this species would be no greater in the number of individuals expected to be taken in any one area within the project limits.

Impacts to this species can be minimized, to some extent, by requiring a biological monitor to be present onsite during initial clearing and grubbing activity to capture and relocate any individuals.

Habitat for this species can be re-established within temporary impact zones between the highway and edge of ROW. This area should be replanted with native plants similar to the natural surrounding area and the soil compacted only to a point necessary for construction purposes. This would allow any natural occurring individuals within the immediate vicinity to repopulate the temporary impact zone.

This species is a riparian obligate species primarily within weedy herbaceous-dominated riparian habitats near the Mojave River. Because only a few alternatives contain this type of habitat, others are eliminated from discussion. Variations E Main, Variation E Highway Only, and Variation E with HSR Connection are discussed below.

Freeway/Expressway and Freeway/Tollway Alternatives

Variation E

Potential habitat for the Mojave river vole occurs within the potential impact area of the main alignment corridor corresponding to Variation E (a so-called Variation E Main alignment) and, if implemented, this alignment could have an impact to Mojave river vole individuals. With avoidance and minimization measures mentioned in the previous section, impacts to this species are to be considered low. The Variation E Main alignment requires fewer acres for implementation compared to the Variation E Highway Only alignment and Variation E with HSR Connection alignment; therefore, it would have less of an impact to Mojave river vole foraging and nesting habitat within the Mojave River if implemented.

The Variation E Highway Only alignment includes areas that are potential foraging and nesting habitat to the Mojave river vole, and with implementation of this variation, impacts to the Mojave river vole may occur; however, with the avoidance and minimization measures mentioned above, impacts to Mojave river vole are expected to be low. The Variation E Highway Only alignment has the potential to have impact on Mojave river vole foraging and nesting habitat within the Mojave River, to a greater extent than the Variation E Main alignment, because this option traverses more open space in comparison; however, the Variation E Highway Only alignment has less of an impact than the Variation E with HSR Connection alignment.

Freeway/Expressway and Freeway/Tollway with HSR Alternatives

The Freeway/Expressway Freeway/Tollway with HSR alternatives have a wider footprint within the studied corridor compared to the Freeway/Expressway and Freeway/Tollway alternatives because of the rail feeder in the middle; therefore, impacts to habitat for this species would be higher in comparison. The HSR alternatives increase the potential impact to this species proportional to the increase in scrubland community impacts.

Variation E with HSR Connection

The Variation E with HSR Connection alignment contains potential habitat for the Mojave river vole and, if implemented, would potentially cause impacts to this species. With the avoidance and minimization measures mentioned above, such as having a biological monitor present for clearing, impacts to this species are expected to be low; however, Variation E with HSR Connection requires considerably more acres of temporary and permanent impacts to Mojave river vole foraging and nesting habitat compared to the Variation E Main alignment and Variation E Highway Only alignment due to the alignment encompassing a larger area within the Mojave River.

American Badger *(Taxidea taxus):* Suitable habitat for this species is present, and individuals have been observed within the BSA. Avoidance, minimization, and mitigation measures BAN-1, BAN-5, BAN-6, BAN-7, and BAN-8 will be implemented.

Desert Kit Fox *(V. m. arsipus)*: Suitable habitat for this species is present, and suitable dens were observed within the BSA. Avoidance, minimization, and mitigation measures BAN-5, BAN-8, and BAN-9 will be implemented.

As noted above, these two species occur within the proposed project limits. Because the habitat on the project site appears similar to those of the surrounding area, it is expected that impacts to these species would be no greater in the number of individuals expected to be taken in any one area within the project limits.

Habitat for these species can be re-established within temporary impact zones between the highway and edge of ROW. This area should be replanted with native plants similar to the natural surrounding area and the soil compacted only to a point necessary for construction purposes. This would allow any natural occurring individuals within the immediate vicinity to repopulate the temporary impact zone.

Freeway/Expressway and Freeway/Tollway Alternatives

Main Alignment/Common Areas

Within the BSA of the main alignment common areas, impacts to American badger and desert kit fox have the potential to occur. American badger and desert kit fox habitat occurs throughout the proposed project corridor within brushlands with little groundcover. Impacts to this species are expected to occur due to clearing and grubbing activities associated with implementation of the proposed project. With incorporation of the minimization measures listed above, the impacts to individuals of this species are expected to be low.

Variation A

Potential impacts to the American badger and desert kit fox may occur with implementation of the main alignment corridor corresponding to Variation A (a so-called Variation A Main alignment). American badger and desert kit fox preferred habitat type is known to occur within the limits of this variation; however, with the avoidance and minimization measures mentioned above, impacts to this species are expected to be low. The Variation A Main alignment would require fewer acres of permanent and temporary impacts to Joshua tree woodland, pinyon-juniper woodland, mixed and chamise-redshank chaparral, and sagebrush compared to Variation A, because it traverses less distance along existing roadways.

The Variation A alignment contains potential habitat for American badger and desert kit fox and, if implemented, would potentially cause impacts to these species. With the avoidance and minimization measures mentioned above, such as having a biological monitor present for clearing and grubbing activities and translocation of individuals onsite, impacts to this species are expected to be low; however, the Variation A alignment requires considerably more acres of temporary and permanent impacts to brushlands with little groundcover compared to the Variation A Main alignment; therefore, the potential impacts to this species and its habitat are slightly higher with implementation of this variation.

Variation B

The main alignment corridor corresponding to Variation B (a so-called Variation B Main alignment) includes areas that are potential habitat to the American badger and desert kit fox, and with implementation of this alignment, impacts to the American badger may occur; however, with the avoidance and minimization measures mentioned above, impacts to American badger and desert kit fox are expected to be low. The Variation B Main alignment has the potential to have impact on American badger and desert kit fox habitat to a lesser extent than the Variation B alignment and Variation B1 alignment, because this option traverses less open space than these variations and, at one location, bisects farmland rather than suitable habitat.

The Variation B alignment contains potential habitat for the American badger and desert kit fox and, if implemented, could potentially cause impacts to these species. With the avoidance and minimization measures mentioned above, such as having a biological monitor present for clearing and grubbing activities, and translocation of individuals onsite, impacts to these species are expected to be low; however, Variation B requires considerably more acres of temporary and permanent impacts to brushlands with little groundcover compared to the Variation B Main alignment and Variation B1 alignment due to its alignment encompassing a greater distance.

Potential impacts to the American badger and desert kit fox may occur with implementation of Variation B1. The American badger and desert kit fox's preferred habitat type is known to occur within the limits of this variation; however, with avoidance and minimization measures mentioned above, impacts to these species would be minor. This variation would require slightly more acres of permanent and temporary impacts to American badger and desert kit fox habitat than the Variation B Main alignment because it runs through open space, whereas the Variation B Main alignment bisects farmland at one location. The Variation B1 alignment would require fewer acres of permanent and temporary impacts to brushlands with little groundcover compared to the Variation B alignment.

Variation D

Potential impacts to the American badger and desert kit fox may occur with implementation of the main alignment corridor corresponding to Variation D (a so-called Variation D Main alignment). The American badger and desert kit fox's preferred habitat type is known to occur within the limits of this alignment; however, with avoidance and minimization measures mentioned above, impacts to these species would be minor. The Variation D Main alignment would require fewer acres of permanent and temporary impacts to brushlands with little groundcover compared to the Variation D alignment due to the shorter distance along an existing roadway.

The Variation D alignment contains potential habitat for the American badger and desert kit fox and, if implemented, would potentially cause impacts to these species. With the avoidance and minimization measures mentioned above, such as having a biological monitor present for clearing and grubbing activities, and translocation of individuals onsite, impacts to these species are expected to be low; however, Variation D requires considerably more acres of temporary and permanent impacts to brushlands with little groundcover compared to the Variation D Main alignment due to its alignment encompassing a greater distance. Much of this alignment includes open space, which is one of the preferred habitats of the American badger and desert kit fox.

Variation E

Potential habitat for the American badger and desert kit fox occurs within the potential impact area of the main alignment corridor corresponding to Variation E (a so-called Variation E Main alignment) and, if implemented, this alignment could have an impact to American badger and desert kit fox individuals. With avoidance and minimization measures mentioned in the previous section, impacts to these species are to be considered low. The Variation E Main alignment requires fewer acres for implementation compared to the Variation E Highway Only alignment and Variation E with HSR Connection alignment; therefore, it would have less of an impact to American badger and desert kit fox habitat if implemented.

The Variation E Highway Only alignment includes areas that are potential habitat to the American badger and desert kit fox, and with implementation of this variation, impacts to the American badger and desert kit fox may occur; however, with the avoidance and minimization measures mentioned above, impacts to American badger and desert kit fox are expected to be low. The Variation E Highway Only alignment has the potential to have impact on American badger and desert kit fox habitat to a greater extent than the Variation E Main alignment because this option traverses more open space; however, the Variation E Highway Only alignment has less of an impact than the Variation E with HSR Connection alignment.

Freeway/Expressway and Freeway/Tollway with HSR Alternatives

Impacts with the Freeway/Expressway and Freeway/Tollway with HSR alternatives are generally the same with the exception of the variations described below. The Freeway/Expressway and Freeway/Tollway with HSR alternatives have a wider footprint within the studied corridor compared to the Freeway/Expressway and Freeway/Tollway alternatives because of the rail feeder in the middle; therefore, impacts to habitat for these species would be higher in comparison. The HSR alternatives increase the potential impact to these species proportional to the increase in scrubland community impacts. In addition to this, the HSR spur in Victorville that departs from the highway alignment would be an additional impact for this alternative, affecting approximately 85 acres of scrubland habitat, thus resulting in increased impacts to habitat for these species.

Rail Options 1A, 1B, 1C, 7A, 7B, 7C

All rail options include areas that are potential habitat to the American badger and desert kit fox, and with implementation of any of these options, impacts to the American badger and desert kit fox may occur; however, with the avoidance and minimization measures mentioned above, impacts to American badger and desert kit fox are expected to be low. Rail Option 1 (A, B, C) has the potential to have impact on American badger and desert kit fox habitat to a greater extent than Rail Option 7 (A, B, C) because this option traverses more open space than Rail Option 7 (A, B, C); however, this option runs through the outskirts of urbanized areas within Palmdale, which is considered to be marginal quality habitat. Rail Option 1 (A, B, C) also requires more acreage of permanent and temporary impacts to the American badger and desert kit fox's preferred habitat of brushlands with little groundcover compared to Rail Option 7 (A, B, C).

Variation E with HSR Connection

The Variation E with HSR Connection alignment contains potential habitat for American badger and desert kit fox and, if implemented, would potentially cause impacts to these species. With the avoidance and minimization measures mentioned above, such as having a biological monitor present for clearing and grubbing activities and translocation of individuals onsite, impacts to these species are expected to be low; however, Variation E with HSR Connection requires considerably more acres of temporary and permanent impacts to brushlands with little groundcover compared to the Variation E Main alignment and Variation E Highway Only alignment due to the alignment encompassing a larger area with more open space.

Mollusks

Shoulderband Snail *(Helminthoglypta mohaveana):* In response to a comment on the Draft Environmental Impact Report (EIR)/Environmental Impact Statement (EIS) made by CDFW, potential of suitable habitat and potential impacts to the shoulderband snail is addressed below.

The shoulderband snail is not recognized by the federal or state government as special status. This species is recognized by an international entity supported by private interest organizations with a rank of G1 and S1. Because ranking criteria for these listings are not fully understood, the shoulderband snail is not recognized as special status.

This species typically occurs under rocks among the leaves of riparian stands of trees within 6 feet of the Mojave River. Marginal habitat suited for this species occurs within the Mojave River upstream and downstream of the proposed project location where it would cross the river. No suitable habitat occurs within the proposed project footprint. Because conditions within the river can change from year to year based on the amount of rainfall, there is potential for this species to occur within the reach of the Mojave River in the future at the time of construction.

As stated above, the only potentially suitable habitat for this species would occur within nearby reaches of the Mojave River. Design and construction methods for the bridge crossing the river will avoid direct impacts to the river and its habitat; therefore, no direct impacts would occur to this species with implementation of this proposed project. In addition, with implementation of mitigation measures and Best Management Practices (BMPs) intended to protect the Mojave River, indirect impacts to the river and this species are not expected. Because every alternative/option/ variation crossing the river will have the same design and construction method, no impact to the river would occur with any of these variations.

Special-Status Wildlife Habitat

Implementation of the proposed project would result in the loss of various vegetation communities that are habitat for special-status wildlife. Table 3.3.4-3 lists the acreage of each vegetation community/land cover type within the BSA and the percentage of that community when compared to the acreages of each community in the western Mojave Desert. The data for the overall western Mojave Desert natural communities and land cover types has been taken from the Desert Renewable Energy Conservation Plan (DRECP) West Mojave and Eastern Slopes Ecoregion Subarea (DRECP EIR/EIS August 2015). As shown in Table 3.3.4-3, the vegetation communities in the BSA only constitute a small percentage of the same vegetation communities available in the West Mojave and Eastern Slopes Ecoregion Subarea. The BSA contains approximately 4.23 percent of big sagebrush Alliance, approximately 3.05 percent of creosote bush scrub Alliance, and approximately 9.20 percent of disturbed black willow Alliance found within the West Mojave and Eastern Slopes Ecoregion Subarea. It should be noted that this percentage represents all of the entire community found within the BSA and not all of a particular community would be impacted by any alternative.

Table 3.3.4-3 Vegetation Community and Land Cover Type Acreage

Vegetation Community/Land Cover Types in the BSA	Total Acres in BSA*	Percentage of Vegetation Community/Land Cover Type within the West Mojave and Eastern Slopes Ecoregion Subarea	Vegetation Community/Land Cover Types in the West Mojave and Eastern Slopes Ecoregion Subarea*	Alliance	Acres within the West Mojave and Eastern Slopes Ecoregion Subarea
Agriculture	208.14	0.35%	Agriculture	N / A	60,000
Allscale scrub Alliance	262.98	0.14%	Lower bajada and fan Mojavean–Sonoran desert scrub	*Atriplex polycarpa*	193,000
Big sagebrush Alliance	21.15	4.23%	Mojavean semi-desert wash scrub	*Artemisia tridentata* ssp. *parishii*	500
Black willow thickets	1.2	2.00%	Southwestern North American riparian/wash scrub	*Salix lasiolepis*	60
California buckwheat scrub Alliance	5.76	0.01%	Central and south coastal Californian coastal sage scrub	*Eriogonum fasciculatum*	39,000
California bulrush-American bulrush marsh	1.53	1.53%	Arid West freshwater emergent marsh	*Typha (angustifolia, domingensis, latifolia)*	100
Cheesebush scrub Alliance	2.14	0.03%	Mojavean semi-desert wash scrub	*Ambrosia salsola*	7,000
Creosote bush scrub Alliance	3,778.01	3.05%	Lower bajada and fan Mojavean–Sonoran desert scrub	*Larrea tridentata*	124,000
Creosote bush scrub/Allscale scrub Alliance	0.39	0.00031%	Lower bajada and fan Mojavean–Sonoran desert scrub	*Larrea tridentata*	124,000
Creosote bush/white bursage scrub series	0.44	0.000033%	Lower bajada and fan Mojavean–Sonoran desert scrub	*Larrea tridentata–Ambrosia dumosa*	1,315,000
Developed	1,058.18	0.34%	Developed and disturbed areas	N / A	310,000
Disturbed	585.75	0.19%	Developed and disturbed areas	N / A	310,000
Disturbed Allscale scrub Alliance	90.46	0.05%	Lower bajada and fan Mojavean–Sonoran desert scrub	*Atriplex polycarpa*	193,000
Disturbed Black willow thickets	5.52	9.20%	Southwestern North American riparian/wash scrub	*Salix lasiolepis*	60
Disturbed Creosote bush scrub Alliance	405.53	0.33%	Lower bajada and fan Mojavean–Sonoran desert scrub	*Larrea tridentata*	124,000

Table 3.3.4-3 Vegetation Community and Land Cover Type Acreage

Vegetation Community/Land Cover Types in the BSA	Total Acres in BSA*	Percentage of Vegetation Community/Land Cover Type within the West Mojave and Eastern Slopes Ecoregion Subarea	Vegetation Community/Land Cover Types in the West Mojave and Eastern Slopes Ecoregion Subarea*	Alliance	Acres within the West Mojave and Eastern Slopes Ecoregion Subarea
Disturbed Fourwing saltbush scrub Alliance	137.49	0.55%	Shadscale–saltbush cool semi-desert scrub	*Atriplex canescens*	25,000
Disturbed Joshua tree woodland Alliance	92.54	0.09%	Mojave and Great Basin upper bajada and toeslope	*Yucca brevifolia*	107,000
Disturbed Rubber rabbitbrush scrub Alliance	572.43	0.92%	Intermontane seral shrubland	*Ericameria nauseosa*	62,000
Disturbed Salt grass flats Alliance	8.76	2.19%	Southwestern North American salt basin and high marsh	*Distichlis spicata*	400
Disturbed White bursage scrub Alliance	89.57	0.10%	Lower bajada and fan Mojavean–Sonoran desert scrub	*Ambrosia dumosa*	86,000
Fourwing saltbush scrub Alliance	317.87	1.27%	Shadscale–saltbush cool semi-desert scrub	*Atriplex canescens*	25,000
Fremont cottonwood forest Alliance	21.38	0.71%	Southwestern North American riparian evergreen and deciduous woodland	*Populus fremontii*	3,000
Joshua tree woodland Alliance	511.53	0.48%	Mojave and Great Basin upper bajada and toeslope	*Yucca brevifolia*	107,000
Mojave yucca scrub Alliance	22.62	2.26%	Mojave and Great Basin upper bajada and toeslope	*Yucca schidigera*	1,000
Nevada Joint Fir Scrub	5.23	0.07%	Intermontane deep or well-drained soil scrub	*Ephedra nevadensis*	8,000
Non-native grassland	15.83	0.02%	California annual and perennial grassland	*Mediterranean California naturalized annual and perennial grassland*	69,000

Table 3.3.4-3 Vegetation Community and Land Cover Type Acreage

Vegetation Community/Land Cover Types in the BSA	Total Acres in BSA*	Percentage of Vegetation Community/Land Cover Type within the West Mojave and Eastern Slopes Ecoregion Subarea	Vegetation Community/Land Cover Types in the West Mojave and Eastern Slopes Ecoregion Subarea*	Alliance	Acres within the West Mojave and Eastern Slopes Ecoregion Subarea
Red brome grasslands	6.32	0.01%	California annual and perennial grassland	*Mediterranean California naturalized annual and perennial grassland*	69,000
Red willow thickets	1.77	2.95%	Southwestern North American riparian/wash scrub	*Salix lasiolepis*	60
Rock outcrop	24.7	0.09%	North American warm desert bedrock cliff and outcrop	*N / A*	29,000
Rubber rabbitbrush scrub Alliance	125.35	0.20%	Intermontane seral shrubland	*Ericameria nauseosa*	62,000
Sandbar willow thickets Alliance	3.8	1.90%	Southwestern North American riparian/wash scrub	*Salix exigua*	200
Scale broom scrub Alliance	24.99	0.50%	Mojavean semi-desert wash scrub	*Lepidospartum squamatum*	5,000
Southern cattail marsh	0.55	0.55%	Arid West freshwater emergent marsh	*Typha (angustifolia, domingensis, latifolia)*	100
Unvegetated wash	10.31	0.15%	Madrean warm semi-desert wash woodland/scrub	*N / A*	7,000
White bursage scrub Alliance	37.81	0.04%	Lower bajada and fan Mojavean–Sonoran desert scrub	*Ambrosia dumosa*	86,000
Windrow	0.59	0.00019%	Developed and disturbed areas	*N / A*	310,000
Grand Total	**8,458.62**				

*Please note that not all acreages of each community would be impacted by an alternative.
Source: Desert Renewable Energy Conservation Plan (DRECP) and Environmental Impact Report/Environmental Impact Statement (August 2014)

Table 3.3.4-4 shows the vegetation communities that would be impacted by the Preferred Alternative. Under the Preferred Alternative permanent impacts to vegetation communities greater than 1 percent of the communities' occurrence within the West Mojave and Eastern Slopes Ecoregion Subarea would occur to creosote bush scrub Alliance (1.14 percent) , disturbed black willow thickets (3.48 percent), disturbed saltgrass flats Alliance (1.72 percent), and Mojave yucca scrub Alliance (1.60 percent) (Table 3.3.4-4).

Even though the BSA contains a relatively high percentage of big sagebrush alliance, creosote bush scrub alliance, and disturbed black willow thickets alliance their loss would not result in a substantial impact to special-status wildlife habitat. Special-status wildlife species with the potential to occur within the BSA, with the exception of riparian birds, are not habitat specialists limited to only big sagebrush Alliance, creosote bush scrub Alliance, or black willow thickets and will use available suitable habitat in all vegetation communities in the vicinity of the BSA. As such, impacts to special-status wildlife habitat from the loss of vegetation communities would be less than substantial. Furthermore, implementation of mitigation measure BAN-5 and compensatory mitigation measure BNC-4, BAN-7, BTE-2, BTE-3, and BTE-11 would further minimize impacts from the loss of vegetation communities.

Raptor Hunting Habitat

Various species of raptors are known to occur within the vicinity of the proposed project site, and several were observed during site visits. Of particular note an active golden eagle nest was observed just outside the project limits on the upper most, steep section of Bell Mountain. Golden eagle is a federal and state fully protected species and is discussed in detail in Section 3.3.5, Threatened and Endangered Species. Although the implementation of the proposed project is not expected to directly take an individual raptor, as adults are mobile and expected to fly away and active nests are protected, implementation of the proposed project would convert substantial raptor hunting habitat to unsuitable hunting habitat. Because such habitat is synonymous with natural desert scrub, enhancement/restoration, and preservation of such natural plant community, as stated in BAN-5, BNC-4, BAN-7, BTE-2, BTE-3, and BTE-11 would minimized impacts from the conversion of raptor hunting habitat to unsuitable habitat.As such, impacts would be less than substantial.

Table 3.3.4-4 Vegetation Impacts from the Preferred Alternative

Vegetation Community/ Land Cover Types in the Preferred Alternative	Permanent Impacts (acres)	Percentage of Permanent Impacts to Vegetation Community/Land Cover Type within the Mojave and Eastern Slopes Ecoregion Subarea*	Temporary Impacts (acres)	Percentage of Temporary Impacts to Vegetation Community/Land Cover Type within the Mojave and Eastern Slopes Ecoregion Subarea*	Vegetation Community/Land Cover Types in the West Mojave and Eastern Slopes Ecoregion Subarea*	Alliance*	Acres within the West Mojave and Eastern Slopes Ecoregion Subarea*
Agriculture	152.96	0.25%	28.99	0.05%	Agriculture	N / A	60,000
Allscale scrub Alliance	159.47	0.08%	67.16	0.03%	Lower bajada and fan Mojavean–Sonoran desert scrub	*Atriplex polycarpa*	193,000
Big sagebrush Alliance	0.00	0.00%	6.77	1.35%	Mojavean semi-desert wash scrub	*Artemisia tridentata* ssp. *parishii*	500
Black willow thickets	0.00	0.00%	0.79	1.32%	Southwestern North American riparian/wash scrub	*Salix lasiolepis*	60
California buckwheat scrub Alliance	0.00	0.00%	0.00	0.00%	Central and south coastal Californian coastal sage scrub	*Eriogonum fasciculatum*	39,000
California bulrush-American bulrush marsh	0.00	0.00%	0.00	0.00%	Arid West freshwater emergent marsh	*Typha (angustifolia, domingensis, latifolia)*	100
Cheesebush scrub Alliance	2.14	0.03%	0.00	0.00%	Mojavean semi-desert wash scrub	*Ambrosia salsola*	7,000
Creosote bush scrub Alliance	1,413.15	1.14%	511.41	0.41%	Lower bajada and fan Mojavean–Sonoran desert scrub	*Larrea tridentata*	124,000

Table 3.3.4-4 Vegetation Impacts from the Preferred Alternative

Vegetation Community/ Land Cover Types in the Preferred Alternative	Permanent Impacts (acres)	Percentage of Permanent Impacts to Vegetation Community/Land Cover Type within the Mojave and Eastern Slopes Ecoregion Subarea*	Temporary Impacts (acres)	Percentage of Temporary Impacts to Vegetation Community/Land Cover Type within the Mojave and Eastern Slopes Ecoregion Subarea*	Vegetation Community/Land Cover Types in the West Mojave and Eastern Slopes Ecoregion Subarea*	Alliance*	Acres within the West Mojave and Eastern Slopes Ecoregion Subarea*
Creosote bush scrub/Allscale scrub Alliance	0.09	0.00%	0.18	0.00%	Lower bajada and fan Mojavean–Sonoran desert scrub	*Larrea tridentata*	124,000
Creosote bush/white bursage scrub series	0.00	0.00%	0.00	0.00%	Lower bajada and fan Mojavean–Sonoran desert scrub	*Larrea tridentata–Ambrosia dumosa*	1,315,000
Developed	352.09	0.11%	95.62	0.03%	Developed and disturbed areas	N / A	310,000
Disturbed	301.31	0.10%	63.82	0.02%	Developed and disturbed areas	N / A	310,000
Disturbed Allscale scrub Alliance	46.53	0.02%	15.74	0.01%	Lower bajada and fan Mojavean–Sonoran desert scrub	*Atriplex polycarpa*	193,000
Disturbed Black willow thickets	2.09	3.48%	0.07	0.12%	Southwestern North American riparian/wash scrub	*Salix lasiolepis*	60
Disturbed Creosote bush scrub Alliance	171.71	0.14%	26.26	0.02%	Lower bajada and fan Mojavean–Sonoran desert scrub	*Larrea tridentata*	124,000

Table 3.3.4-4 Vegetation Impacts from the Preferred Alternative

Vegetation Community/ Land Cover Types in the Preferred Alternative	Permanent Impacts (acres)	Percentage of Permanent Impacts to Vegetation Community/Land Cover Type within the Mojave and Eastern Slopes Ecoregion Subarea*	Temporary Impacts (acres)	Percentage of Temporary Impacts to Vegetation Community/Land Cover Type within the Mojave and Eastern Slopes Ecoregion Subarea*	Vegetation Community/Land Cover Types in the West Mojave and Eastern Slopes Ecoregion Subarea*	Alliance*	Acres within the West Mojave and Eastern Slopes Ecoregion Subarea*
Disturbed Fourwing saltbush scrub Alliance	89.77	0.36%	4.70	0.02%	Shadscale–saltbush cool semi-desert scrub	*Atriplex canescens*	25,000
Disturbed Joshua tree woodland Alliance	51.13	0.05%	10.35	0.01%	Mojave and Great Basin upper bajada and toeslope	*Yucca brevifolia*	107,000
Disturbed Rubber rabbitbrush scrub Alliance	215.18	0.35%	77.71	0.13%	Intermontane seral shrubland	*Ericameria nauseosa*	62,000
Disturbed Salt grass flats Alliance	6.88	1.72%	1.85	0.46%	Southwestern North American salt basin and high marsh	*Distichlis spicata*	400
Disturbed White bursage scrub Alliance	44.57	0.05%	13.50	0.02%	Lower bajada and fan Mojavean–Sonoran desert scrub	*Ambrosia dumosa*	86,000
Fourwing saltbush scrub Alliance	168.49	0.67%	59.46	0.24%	Shadscale–saltbush cool semi-desert scrub	*Atriplex canescens*	25,000

Table 3.3.4-4 Vegetation Impacts from the Preferred Alternative

Vegetation Community/ Land Cover Types in the Preferred Alternative	Permanent Impacts (acres)	Percentage of Permanent Impacts to Vegetation Community/Land Cover Type within the Mojave and Eastern Slopes Ecoregion Subarea*	Temporary Impacts (acres)	Percentage of Temporary Impacts to Vegetation Community/Land Cover Type within the Mojave and Eastern Slopes Ecoregion Subarea*	Vegetation Community/Land Cover Types in the West Mojave and Eastern Slopes Ecoregion Subarea*	Alliance*	Acres within the West Mojave and Eastern Slopes Ecoregion Subarea*
Fremont cottonwood forest Alliance	3.69	0.12%	10.30	0.34%	Southwestern North American riparian evergreen and deciduous woodland	*Populus fremontii*	3,000
Joshua tree woodland Alliance	338.14	0.32%	52.19	0.05%	Mojave and Great Basin upper bajada and toeslope	*Yucca brevifolia*	107,000
Mojave yucca scrub Alliance	16.02	1.60%	3.60	0.36%	Mojave and Great Basin upper bajada and toeslope	*Yucca schidigera*	1,000
Nevada Joint Fir Scrub	0.00	0.00%	5.23	0.07%	Intermontane deep or well-drained soil scrub	*Ephedra nevadensis*	8,000
Non-native grassland	12.06	0.02%	2.75	0.00%	California annual and perennial grassland	*Mediterranean California naturalized annual and perennial grassland*	69,000

Table 3.3.4-4 Vegetation Impacts from the Preferred Alternative

Vegetation Community/ Land Cover Types in the Preferred Alternative	Permanent Impacts (acres)	Percentage of Permanent Impacts to Vegetation Community/Land Cover Type within the Mojave and Eastern Slopes Ecoregion Subarea*	Temporary Impacts (acres)	Percentage of Temporary Impacts to Vegetation Community/Land Cover Type within the Mojave and Eastern Slopes Ecoregion Subarea*	Vegetation Community/Land Cover Types in the West Mojave and Eastern Slopes Ecoregion Subarea*	Alliance*	Acres within the West Mojave and Eastern Slopes Ecoregion Subarea*
Red brome grasslands	6.23	0.01%	0.00	0.00%	California annual and perennial grassland	*Mediterranean California naturalized annual and perennial grassland*	69,000
Red willow thickets	0.00	0.00%	0.00	0.00%	Southwestern North American riparian/wash scrub	*Salix lasiolepis*	60
Rock outcrop	5.70	0.02%	5.66	0.02%	North American warm desert bedrock cliff and outcrop	*N / A*	29,000
Rubber rabbitbrush scrub Alliance	14.99	0.02%	22.89	0.04%	Intermontane seral shrubland	*Ericameria nauseosa*	62,000
Sandbar willow thickets Alliance	0.00	0.00%	0.04	0.02%	Southwestern North American riparian/wash scrub	*Salix exigua*	200
Scale broom scrub Alliance	3.78	0.08%	20.46	0.41%	Mojavean semi-desert wash scrub	*Lepidospartum squamatum*	5,000
Southern cattail marsh	0.00	0.00%	0.00	0.00%	Arid West freshwater emergent marsh	*Typha (angustifolia, domingensis, latifolia)*	100

Table 3.3.4-4 Vegetation Impacts from the Preferred Alternative

Vegetation Community/ Land Cover Types in the Preferred Alternative	Permanent Impacts (acres)	Percentage of Permanent Impacts to Vegetation Community/Land Cover Type within the Mojave and Eastern Slopes Ecoregion Subarea*	Temporary Impacts (acres)	Percentage of Temporary Impacts to Vegetation Community/Land Cover Type within the Mojave and Eastern Slopes Ecoregion Subarea*	Vegetation Community/Land Cover Types in the West Mojave and Eastern Slopes Ecoregion Subarea*	Alliance*	Acres within the West Mojave and Eastern Slopes Ecoregion Subarea*
Unvegetated wash	0.00	0.00%	1.60	0.02%	Madrean warm semi-desert wash woodland/scrub	*N / A*	7,000
White bursage scrub Alliance	24.48	0.03%	4.52	0.01%	Lower bajada and fan Mojavean–Sonoran desert scrub	*Ambrosia dumosa*	86,000
Windrow	0.59	0.00%	0.00	0.00%	Developed and disturbed areas	*N / A*	310,000
Grand Total	**3,603.23**		**113.62**				

* Desert Renewable Energy Conservation Plan (DRECP) and Environmental Impact Report/Environmental Impact Statement (August 2014)

Avoidance, Minimization, and/or Mitigation Measures

Impacts to wildlife species can be avoided or minimized by implementation of the measures listed below.

BAN-1: Impacts to silvery legless lizard, coast horned lizard, American badger, and Mojave River vole can be minimized by requiring a biological monitor to be present onsite during initial clearing and grubbing activity to capture and relocate any individuals. If areas of high-density occurrences are found, salvage efforts can be made by more carefully removing shrubs with clam-shell loaders and searching for individuals at the base of the shrub or within the root system, as this is a more likely place for them to occur. Habitat for these species can be re-established within temporary impact zones between the highway and edge of ROW. This area will be replanted with native plants similar to the natural surrounding area and the soil compacted only to a point necessary for construction purposes. This will allow any natural occurring individuals within the immediate vicinity to repopulate the temporary impact zone.

BAN-2: A qualified biologist will recommend approved limits of disturbance, including construction staging areas and access routes, to minimize impacts to adjacent habitat. To ensure the avoidance of impacts to migratory birds, the following measures will be implemented pursuant to the MBTA. Clearing and grubbing of vegetation will be conducted outside of bird-nesting season. If clearing and grubbing of vegetation needs to be conducted during bird-nesting season (February 15 to September 1), a qualified biologist will conduct a preconstruction survey prior to clearing and grubbing of vegetation and monitor construction during clearing, grading, and/or trenching activities for any occurrence of birds nesting. If birds are observed nesting, construction will stop until it is determined that the fledglings have left their nests. If this is not possible, coordination with a qualified biologist should take place to minimize the risk of violating the MBTA, and the following minimization measure put in place: an ESA fencing buffer of 150 feet for songbirds and 500 feet for raptors, which must be maintained during all phases of construction.

BAN-3: A qualified biologist will recommend approved limits of disturbance, including construction staging areas and access routes, to minimize impacts to adjacent habitat. To ensure the avoidance of impacts to bats, preconstruction surveys will be conducted of rock faces adjacent to the roadway, trees, or structures designated for removal due to the initiation of construction-related activities to assess any potential presence of the species. Clearing and grubbing of vegetation will be conducted outside of the bat maternity season. If clearing and grubbing of vegetation needs to be conducted during bat maternity season (February 15 to November 30), a qualified biologist will monitor construction during clearing, grading, and/or trenching activities for any occurrence of the species breeding. If an active bat maternity roost is detected, bat exclusionary devices shall be installed during the non-breeding season (December 1 through February 14) to passively exclude bats from the tree or structure. Removal of trees and demolition of structures shall occur once the biologist deems the structure void of bats.

For planning purposes, a preconstruction survey should be conducted approximately 30 days prior to clearing and grubbing. A second preconstruction survey shall be conducted no more than 3 days prior to clearing and grubbing. If any species are found during preconstruction surveys, they will be excluded using CDFW, U.S. Forest Service (USFS), and USFWS approved methods. Alternate bat habitat will be provided for any excluded bats.

BAN-4: A biological monitor will be present a minimum of 1 week prior to clearing and grubbing activities to walk the proposed areas to be cleared and grubbed and relocate animals that have the ability to flee. A qualified biologist will survey for, trap/capture species present, and relocate to a designated area approved by USFWS or CDFW.

BAN -5: Appropriate native habitat will be replanted in temporarily impacted areas. Additionally, a Habitat Mitigation Monitoring Plan (HMMP) will be developed. Restoration of disturbed habitat within the project limits will be conducted.

BAN-6: The boundaries of ROW shall be fenced off with materials approved by a Caltrans District Biologist for the following reasons: (1) serve as a guide for wildlife to utilize the appropriate crossings, meanwhile reducing impacts to wildlife/vehicle collisions, and (2) reduce vandalism to restoration sites. ROW fencing shall be designed and installed in a manner as to not conflict with permanent desert tortoise exclusion fencing or Biological Opinion permit requirements.

BAN-7: Compensatory Mitigation: Acceptable mitigation for impacts to a burrowing owl breeding pair would be to preserve suitable habitat and manage it for the benefit of burrowing owl in perpetuity. CDFW guidelines suggest that such land should be of similar type and of equal or greater quality to ensure a no net loss. As such, approximately 720 acres of suitable burrowing owl habitat should be preserved.

BAN-8: Preconstruction surveys for desert kit fox will be conducted inside the project disturbance area and 300-foot buffer. The survey will be conducted according to the USFWS Standard Recommendations for Protection of the Endangered San Joaquin Kit Fox Prior to or During Ground Disturbance (USFWS, 2011). During the survey, the biologists will mark and classify all potential desert kit fox dens found in the project disturbance area and buffer. Desert kit fox dens found during the survey will be classified as inactive, potentially active, and definitely active. Following the preconstruction survey, the biologists will establish disturbance limit buffers around all potentially active and definitely active dens that can be avoided by construction. The disturbance limit buffer distances will follow the USFWS Standard Recommendations for Protection of the Endangered San Joaquin Kit Fox Prior to or During Ground Disturbance (USFWS, 2011). Potentially active dens will receive a 50-foot buffer, definitely active dens will receive a 100-foot buffer, and natal/pupping dens will be given a 300-foot buffer.

BAN-9: Potentially active and definitely active desert kit fox dens located in the project disturbance area that cannot be avoided with a disturbance limit buffer will need to be monitored, excavated, and collapsed in order to avoid direct impacts to desert kit fox as a result of construction. Den excavation and collapse should avoid the breeding season to the maximum extent possible and should only occur August 1 to December 31.

All inactive dens that do not show any sign of activity in the recent past, or are damaged, dilapidated, or unusable for use will be immediately excavated by hand and backfilled to prevent reuse by desert kit fox. All desert kit fox dens in the disturbance area identified as potentially active or definitely active will be monitored for 3 consecutive nights using a tracking medium (e.g., diatomaceous earth or fire clay) and remote infrared cameras at the entrance. If, after 3 nights, no desert kit tracks are found at the den entrance, and no photos of the target species using the den are observed, the den can be carefully excavated, collapsed, and backfilled by hand. The den should be fully excavated, filled with dirt, and compacted to ensure that desert kit fox cannot reenter or use the den during the construction period. If, at any point during excavation, a desert kit fox is discovered inside the den, the excavation activity shall cease immediately, and monitoring of the den as described above should be resumed. Destruction of the den may be completed when, in the judgment of the biologist, the animal has escaped from the partially disturbed den without any further disturbance.

If desert kit fox tracks or photos are observed during 3 nights, the den will be monitored for a minimum of 3 additional days using infrared wildlife cameras and/or tracking medium to determine its status. If the den complex is determined to be a natal den still occupied by pups, a 300-foot disturbance limit buffer will be established, and monitoring by infrared cameras or weekly visits by the biologist will continue until it has been determined that the young have dispersed. If the den is determined to be non-natal, passive hazing techniques will be used to discourage desert kit fox from using the den. Passive hazing techniques will include the use of coyote urine, a primary desert kit fox predator, around the den entrances and the use of wooden lathe in the center of the den entrance to discourage use of the den. During the hazing period, the den will be continually monitored with tracking medium and remote infrared cameras to determine activity. During this period, if no desert kit fox activity is observed at the den for 3 consecutive nights, then the den may be carefully excavated by hand, collapsed, and backfilled to prevent further use.

If desert kit fox continue to persist in the dens and passive hazing techniques are unsuccessful, CDFW will be contacted to discuss other options, such as passive relocation and the use of one-way doors. The passive relocation will consist of installing one-way doors at the entrance of the dens that remain active. The one-way doors will be installed during the afternoon while desert kit fox are inactive and deep inside of their dens. If any desert kit fox leave the den or den complex in response to one-way door installation, door installation will cease until after the desert kit fox has voluntarily left the vicinity of the den complex. After the one-way doors are installed, the den will be monitored with tracking medium and remote infrared cameras for 3 days to determine whether the animals have left the den. On the third day following the one-way door installation, the biologist will use a fiber-optic scope camera to inspect the den and ensure that desert kit fox no longer occupy the den. Upon confirmation that the den complex is not occupied, the den will be carefully excavated, collapsed, and backfilled using hand tools.

With implementation of the mitigation measures stated below, the indirect impacts to wildlife would be less than substantial.

BAN-10: Use lighting in areas only where necessary for safety and signage. Eliminate all lighting in other areas.

BAN-11: All lighting should be downcast to minimize lighting of natural areas, particularly rivers, washes, and drainages.

BAN-12: Limit operation of vibration-causing equipment, such as pile drivers, dozers, and large excavators, to daylight hours when working in areas adjacent to open space.

BAN-13: Biological monitor shall be present to observe activities of wildlife during construction adjacent to open spaces. If activities are noted to affect wildlife, biological monitor shall stop construction activities as necessary.

3.3.5 Threatened and Endangered Species

Regulatory Setting

The main federal law protecting threatened and endangered species is the Federal Endangered Species Act (FESA): 16 United States Code (U.S.C.), Section 1531, *et seq.* See also 50 *Code of Federal Regulations* (CFR) Part 402. This act and subsequent amendments provide for the conservation of endangered and threatened species and the ecosystems upon which they depend. Under Section 7 of this act, federal agencies, such as the Federal Highway Administration (FHWA), are required to consult with the U.S. Fish and Wildlife Service (USFWS) and the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NOAA Fisheries) to ensure that they are not undertaking, funding, permitting, or authorizing actions likely to jeopardize the continued existence of listed species or destroy or adversely modify designated critical habitat. Critical habitat is defined as geographic locations critical to the existence of a threatened or endangered species. The outcome of consultation under Section 7 may include a Biological Opinion (BO) with an Incidental Take statement and a Letter of Concurrence. Section 3 of the FESA defines take as "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or any attempt at such conduct."

California has enacted a similar law at the state level, the California Endangered Species Act (CESA), California Fish and Game Code (FGC), Section 2050, *et seq*. The CESA emphasizes early consultation to avoid potential impacts to rare, endangered, and threatened species and to develop appropriate planning to offset project-caused losses of listed species populations and their essential habitats. The California Department of Fish and Wildlife (CDFW) is the agency responsible for implementing the CESA. Section 2081 of the FGC prohibits take of any species determined to be an endangered or threatened species. "Take" is defined in Section 86 of the FGC as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." Take of a federally or state-listed endangered or threatened species due to accidental vehicle collision is addressed in FGC Section 2000.5. If a motor vehicle is being operated on a road or highway and a bird, mammal, reptile, or amphibian is accidentally struck and killed, then FGC Secion 2000.5 releases the driver of the motor vehicle from being held legally responsible for take of the animal that was struck. The CESA allows for take incidental to otherwise lawful development projects; for these actions, an incidental take permit is issued by the CDFW. For species listed under both the FESA and the CESA requiring a BO under Section 7 of the FESA, the CDFW may also authorize impacts to CESA species by issuing a Consistency Determination under Section 2080.1 of the FGC.

Affected Environment

Information regarding threatened and endangered species was obtained from the *Natural Environment Study* (June 2016), Biological Assessment (August 2015), and Biological Opinion (April 2016). USFWS, CDFW, and NOAA Fisheries are the primary agencies responsible for coordination and review involving special-status species.

The findings summarized in this section were based on the results and discussions from formal Section 7 consultation with USFWS and extensive research and field surveys for special-status species in the Biological Study Area (BSA) and its vicinity. Prior to the surveys, record searches of the USFWS species lists, and the California Natural Diversity Database (CNDDB) were conducted. The USFWS species list and CNDDB covering the project study area are provided in Appendix L. Table 3.3.5-1 summarizes the results of the record searches of species evaluated during the environmental review process.

Table 3.3.5-1 Listed, Proposed Species, and Critical Habitat Evaluated for Potential to Occur in Project Area.

Scientific Name Common Name	Status	Habitat Requirements	Potential for Occurrence
PLANTS			
Chorizanthe parryi var. *fernandina* San Fernando Valley Spineflower	FC SE CNPS 1B.1	Coastal sage scrub at 1080 to 3340 feet elevation	Low potential of occurring. Suitable habitat does not occur within the BSA.
Dodecahema leptoceras Slender-Horned spineflower	FE SE CNPS 1B.1	Chaparral, coastal sage scrub at 1180 to 2690 feet elevation	Low potential of occurring. Suitable habitat does not occur within the BSA.
Erigeron parishii Parish's daisy	FT CNPS 1B.1	Mojavean desert scrub and pinyon-juniper woodland at 3970 to 7410 feet elevation	Low potential of occurring. Suitable habitat does occur within the BSA, however, historically distributed south of Lucerne Valley and Johnson valley, at the northern edge of the San Bernardino National Forest.
Navarretia fossalis Spreading navarretia	FT CNPS 1B.1	Chenopod scrub, freshwater-marsh, playas, and vernal-pools with clay soils that experience inundation at 290 to 3510 feet elevation	Low potential of occurring. While chenopod (Atriplex) scrub is present in the BSA, it does not contain clay soils therefore does not get inundated like the species prefers. Suitable habitat does not occur within BSA. Known populations only exist in California from western Los Angeles, Riverside, and San Diego counties.
Orcuttia californica California Orcutt grass	FE SE CNPS 1B.1	Valley grassland, freshwater wetlands, wetland-riparian at 190 to 2160 feet elevation	Low potential of occurring. Suitable habitat does not occur within the BSA.

Table 3.3.5-1 Listed, Proposed Species, and Critical Habitat Evaluated for Potential to Occur in Project Area.

Scientific Name Common Name	Status	Habitat Requirements	Potential for Occurrence
Acanthoscyphus parishii var. *goodmaniana* Cushenbury oxytheca	FE CNPS 1B.1	Pinyon-juniper woodland at 4460 to 8130 feet elevation (in carbonate soils, or talus substrate)	Low potential of occurring. Suitable habitat does occur within the BSA, however, historically distributed south of Lucerne Valley and Johnson valley, at the northern edge of the San Bernardino National Forest. Not observed during focused surveys and therefore no effect on species.
INVERTEBRATES			
Branchinecta lynchi Vernal Pool fairy shrimp	US: FT	Restricted to vernal pools, and on occasion artificial pools created by roadside ditches.	Suitable habitat not present. Not expected to occur and therefore no effect on species.
Streptocephalus woottoni Riverside fairy shrimp	US: FE	Restricted to deep vernal pools and ponds with chemistry and temperature conditions specific to nonmarine and nonriverine waters. Vernal pool habitat lies within annual grasslands, which may be interspersed with chaparral or coastal sage scrub vegetation.	Suitable habitat not present. Not expected to occur and therefore no effect on species.
FISHES			
Gila bicolor ssp. *Mohavensis* Mohave Tui chub	US: FE CA: SE	Historically occurred within the Mojave River, associated with deep pools and sloughs of the river. This species does not currently occupy the Mojave river, but a few perennial stretches of the river remain that could support the species. Current populations are located in man-made or man-supported habitats.	Not expected to occur and therefore no effect on species.
AMPHIBIANS			
Anaxyrus californicus Arroyo toad	US: FE CDFW: SSC	Washes and arroyos with open water; sand or gravel beds; for breeding, pools with sparse overstory vegetation. Coastal and a few desert streams from Santa Barbara County to Baja California.	Not expected to occur and therefore no effect on species. CNDDB records indicate extirpated from Mojave River region.
Rana draytoniil California red-legged frog	US: FT	Occurs in or near quiet permanent water of streams, marshes, ponds, and lakes. Individuals may range far from water along riparian corridors and in damp thickets and forests.	Not expected to occur and therefore no effect on species. CNDDB records indicate extirpated from Mojave River region. Suitable habitat not present during site visits. Project limits not within species range.

Table 3.3.5-1 Listed, Proposed Species, and Critical Habitat Evaluated for Potential to Occur in Project Area.

Scientific Name Common Name	Status	Habitat Requirements	Potential for Occurrence
Rana muscosa Mountain yellow-legged frog	US: FE	Habitat includes sunny riverbanks, meadow streams, isolated pools, and lake borders in the Sierra Nevada, rocky stream courses in southern California. Prefers sloping banks with rocks or vegetation to the water's edge. USFWS concluded this species requires water source found between 1210 -7540 feet elevation that are permanent	Not expected to occur and therefore no effect on species. Suitable habitat not present during site visits. Project limits not within species range.
REPTILES			
Gopherus agassizii Desert tortoise	US: FT CA: ST	Historically found throughout the Mojave and Sonoran Deserts into Arizona, Nevada, and Utah. Occurs throughout the Mojave Desert in scattered populations. Found in creosote bush scrub, saltbush scrub, thornscrub (in Mexico), and Joshua tree woodland. Found in the open desert as well as in oases, riverbanks, washes, dunes, and occasionally rocky slopes.	Present. Observed during focused surveys.
BIRDS			
Aquila chrysaetos Golden eagle	Golden Eagle Protection Act CDFW: FP BLM: S	Wide range of flat or mountainous, largely open habitats, often above the tree line from seal level to 13100 feet elevation.	Present. Observed during site visits. Suitable foraging habitat present. Observed near BSA.
Buteo swainsoni Swainson's hawk	CA: ST	Open and semi-open country within deserts, grasslands and prairies	Present. One observed during site visits. Suitable foraging habitat present.
Coccyzus americanus occidentalis Western yellow-billed cuckoo	US: T CA: SE BLM: S (Nesting sites are protected.)	Riparian obligate species primarily with willow-cottonwood riparian forests, but other species occur in alder and box elder dominated riparian habitats	Suitable habitat present. None observed during focused surveys. Moderate potential for occurrence.
Empidonax traillii extimus Southwestern willow flycatcher	US: FE CA: SE Critical Habitat within project limits	Breeds and nests in riparian forest with dense understory. Rare and local in southern California.	Present. Nest and breeding pair observed in Mojave River during focused surveys. Suitable habitat in Mojave River.

Table 3.3.5-1 Listed, Proposed Species, and Critical Habitat Evaluated for Potential to Occur in Project Area.

Scientific Name Common Name	Status	Habitat Requirements	Potential for Occurrence
Gymnogyps californianus California condor	US: FE	Range includes rocky, open-country scrubland, coniferous forest and oak savanna. Cliffs, rocky outcrops or large trees are used as nest sites.	None observed during site visits. Project site is outside CDFW designated California condor range. Not expected to occur and therefore no effect on species.
Vireo bellii pusillus Least Bell's vireo	US: FE CA: SE	Riparian forests and willow thickets. Breeds and nests only in southwestern California; winters in Baja California.	Present. Observed during focused surveys. Suitable habitat present.
MAMMALS			
Corynorhinus townsendii Townsend's big-eared bat	CA: CT CDFW: SSC BLM: S USFS: S	Coniferous forests and woodlands, semi-desert and montane shrublands	Moderate potential for occurrence. None detected during site visits. Suitable foraging and roosting habitat is present.
Dipodomys merriami parvus San Bernardino kangaroo rat	US: FE	Inhabits sandy loam substrates, characteristic of alluvial fans and flood plains. Surrounding vegetation is dominated by chaparral and coastal sage scrub.	Suitable habitat not present. Project limit is outside known range. Not expected to occur and therefore no effect on species.
Xerospermophilus mohavensis Mohave ground squirrel	CA: ST	Occupies creosote bush scrub, saltbush scrub, and Joshua tree woodland type plant communities. This species is found in open areas of sandy and gravelly soils devoid of rocky areas in the eastern and northern parts of the Mojave Desert region.	Low potential for occurrence. Not detected during focused surveys. Potential suitable habitat present.

Designations:
US: United States
CA: California
FE – Federally Endangered
FT – Federally Threatened
FC – Federally-listed Species of Concern
SE – State Endangered
ST – State Threatened
CT – Candidate Threatened

CDFW: SSC – Species of Special Concern
CDFW: FP – Fully Protected
CDFW: WL – Watch List
BLM: S – Sensitive
USFS: S – Sensitive
WBWG: M – Medium Priority

California Native Plant Society (CNPS) Rare Plant Rank:
Rank 1B = Rare, threatened, or endangered in California and elsewhere.
Rank 2B = rare, threatened, or endangered in California, but more common elsewhere.
Rank 4 = limited distribution (Watch List).

CNPS Threat Rank:
0.1 = Seriously threatened in California (over 80% of occurrences threatened/high degree and immediacy of threat)
0.2 = Fairly threatened in California (20-80% occurrences threatened / moderate degree and immediacy of threat)
0.3 = Not very threatened in California (<20% of occurrences threatened or no current threats known)

USFWS species records were reviewed at the outset of the biological studies for the project and have been continually updated. A copy of the most recent records included in Appendix L. This list includes sevenspecies: arroyo toad, California condor, least Bell's vireo, southwestern willow flycatcher, Mojave tui chub, Cushenbury oxytheca, and desert tortoise and one designated critical habitat for southwestern willow flycatcher.

A total of 64 listed (threatened or endangered), proposed species, special-status plant and animal species, and one critical habitat were identified as having potential to occur within the vicinity of the BSA. Of those, 23 are threatened or endangered species and will be discussed in this section. Of those, 12 species are not expected to occur either because there is no suitable habitat or the Project Area is outside of the known range of the species. This includes the arroyo toad, California condor, and Mojave tui chub, which were on the current USFWS official species list for which a No Effect determination was made. The remaining 11 species (Parish's daisy, Cushenbury buckwheat, Cushenbury oxytheca, desert tortoise, southwestern willow flycatcher, least Bell's vireo, Western yellow-billow cuckoo, Swainson's hawk, golden eagle, Townsend's big-eared bat, and Mohave ground squirrel) will be discussed further in this section. The specific habitat types within the BSA for each species are described in Table 3.3.5-2.

Table 3.3.5-2 Suitable Habitat Types within Biological Study Area

Species	Habitat Type
Parish's daisy	Allscale scrub Alliance, Big sagebrush Alliance, Cheesebush scrub Alliance, Creosote bush scrub Alliance, Fourwing saltbush scrub Alliance, Joshua tree woodland Alliance, Mojave yucca scrub Alliance, Nevada Joint Fir Scrub, Rock outcrop, Rubber rabbitbrush scrub Alliance, Scale broom scrub Alliance, Unvegetated wash (not in Mojave River), White bursage scrub Alliance, including intergrades of these communities and the native communities that have been disturbed but are in the process of recovering
Cushenbury buckwheat	Allscale scrub Alliance, Big sagebrush Alliance, Cheesebush scrub Alliance, Creosote bush scrub Alliance, Fourwing saltbush scrub Alliance, Joshua tree woodland Alliance, Mojave yucca scrub Alliance, Nevada Joint Fir Scrub, Rock outcrop, Rubber rabbitbrush scrub Alliance, Scale broom scrub Alliance, Unvegetated wash (not in Mojave River), White bursage scrub Alliance, including intergrades of these communities and the native communities that have been disturbed but are in the process of recovering
Cushenbury oxytheca	Calcium carbonate soils or talus substrate.
desert tortoise	Allscale scrub Alliance, Big sagebrush Alliance, Cheesebush scrub Alliance, Creosote bush scrub Alliance, Fourwing saltbush scrub Alliance, Joshua tree woodland Alliance, Mojave yucca scrub Alliance, Nevada Joint Fir Scrub, Rock outcrop, Rubber rabbitbrush scrub Alliance, Scale broom scrub Alliance, Unvegetated wash (not in Mojave River), White bursage scrub Alliance, including intergrades of these communities and the native communities that have been disturbed but are in the process of recovering
southwestern willow flycatcher	Black willow thickets, red willow thickets, Sandbar willow thickets Alliance, Fremont Cottonwood Forest Alliance, unvegetated wash
least Bell's vireo	Black willow thickets, red willow thickets, Sandbar willow thickets Alliance, Fremont Cottonwood Forest Alliance, unvegetated wash

Table 3.3.5-2 Suitable Habitat Types within Biological Study Area

Species	Habitat Type
Western yellow-billow cuckoo	Black willow thickets, red willow thickets, Sandbar willow thickets Alliance, Fremont Cottonwood Forest Alliance, unvegetated wash
Swainson's hawk	Agriculture, Allscale scrub Alliance, Big sagebrush Alliance, Cheesebush scrub Alliance, Creosote bush scrub Alliance, Disturbed, Disturbed Salt grass flats Alliance, Fourwing saltbush scrub Alliance, Joshua tree woodland Alliance, Mojave yucca scrub Alliance, Nevada Joint Fir Scrub, Non-native grassland, Red brome grasslands, Rock outcrop, Rubber rabbitbrush scrub Alliance, Scale broom scrub Alliance, Unvegetated wash, White bursage scrub Alliance, Windrow, including intergrades of these communities and the native communities that have been disturbed but are in the process of recovering
Golden eagle	Allscale scrub Alliance, Cheesebush scrub Alliance, Creosote bush scrub Alliance, Fourwing saltbush scrub Alliance, Joshua tree woodland Alliance, Disturbed salt grass flats Alliance, Mojave yucca scrub Alliance, Nevada Joint Fir Scrub, Rubber rabbitbrush scrub Alliance, Scale broom scrub Alliance, Unvegetated wash, White bursage scrub Alliance, including intergrades of these communities and the native communities that have been disturbed but are in the process of recovering.
Mohave ground squirrel	Allscale scrub Alliance, Big sagebrush Alliance, Cheesebush scrub Alliance, Creosote bush scrub Alliance, Fourwing saltbush scrub Alliance, Joshua tree woodland Alliance, Mojave yucca scrub Alliance, Nevada Joint Fir Scrub, Rock outcrop, Rubber rabbitbrush scrub Alliance, Scale broom scrub Alliance, Unvegetated wash (not in Mojave River), White bursage scrub Alliance, including intergrades of these communities and the native communities that have been disturbed but are in the process of recovering
Townsend's big-eared bat	Roosting habitat includes caves, mines, tunnels, and buildings in Allscale scrub Alliance, Big sagebrush Alliance, Black willow thickets, California bulrush-American bulrush marsh, Cheesebush scrub Alliance, Creosote bush scrub Alliance, Disturbed Salt grass flats Alliance, Fourwing saltbush scrub Alliance, Fremont cottonwood forest Alliance, Joshua tree woodland Alliance, Mojave yucca scrub Alliance, Nevada Joint Fir Scrub, Red willow thickets, Rock outcrop, Rubber rabbitbrush scrub Alliance, Sandbar willow thickets Alliance, Scale broom scrub Alliance, Southern cattail marsh, Unvegetated wash, White bursage scrub Alliance

Source: Natural Environment Study, 2016.

Formal Section 7 consultation with USFWS was initiated after release of the Draft Environmental Impact Report (EIR)/Environmental Impact Statement (EIS) on August 14, 2015, with submittal of the Biological Assessment (BA) (August 2015). The California Department of Transportation (Caltrans) has received concurrence from USFWS that the proposed High Desert Corridor (HDC) Project "may affect, likely to adversely affect" the desert tortoise and is "not likely to adversely affect" southwestern willow flycatcher, southwestern willow flycatcher critical habitat, or least Bell's vireo through the issuance of a Biological Opinion (BO) on the HDC Project (April 2016). The formal consultation on the desert tortoise also concluded that the HDC Project is not likely to jeopardize the continued existence of the species.

CDFW authorizes take of endangered, threatened, or candidate species through the provisions of Section 2081 and 2080.1 of the FGC. Consultation with CDFW is ongoing because the proposed project may have adverse effects to eight species with those designations. A Consistency Determination under Section 2080.1 of the FGC for desert tortoise, southwestern willow flycatcher, least Bell's vireo, and western yellow-billed cuckoo, which are listed threatened or endangered under both the FESA and CESA, would be required prior to project construction for any project-related effects to these species. An incidental take permit from CDFW under Section 2081 of the FGC for Swainson's hawk, golden eagle, Mohave ground squirrel, and Townsend's big-eared bat would be required prior to project construction for any project-related effects to these species. CDFW authorizes take of endangered, threatened, or candidate species through the provisions of Section 2081 and 2080.1 of the FGC. On October 19, 2010, Caltrans (Paul Caron and Jeff Johnson) met with CDFW (Jamie Jackson, Eric Weiss, and Scot Harris) to present the project alignment and discuss survey needs. Caltrans and CDFW (formerly California Department of Fish and Game) also met in June 2011 and February 2012 to discuss changes to the alignment and potential impacts to special-status species. In March 2013, Caltrans personnel (Paul Caron and Jeff Johnson) met with CDFW (Jamie Jackson) and USFWS (Ray Bransfield) in the USFWS Ventura Office to specifically discuss survey needs, impact analysis, and potential mitigation measures for the desert tortoise and southwestern willow flycatcher. An additional meeting occurred with CDFW (Becky Jones) in April 2013 to further discuss desert tortoise survey needs, impact analysis, design criteria, and mitigation measures. Numerous telephone conversations occurred between Caltrans (Jeff Johnson) and CDFW (Jamie Jackson) between 2011 and 2013 to discuss project alignment shifts and survey results and to request input on culvert design with regard to wildlife crossing.

Copies of the agency correspondence are provided in Appendix L.

Tables 3.3.5-3 through 3.3.5-5 comprise the amount of suitable habitat available for each of the species listed in Table 3.3.5-2, above. Following Table 3.3.5-5 is a brief description of baseline conditions for each species, its presence or absence during surveys, and their location within project area, if observed during surveys.

Table 3.3.5-3 Suitable Habitat for Threatened and Endangered Species within the Footprint of the Freeway/Expressway and Freeway/Tollway Alternatives (acres)[1]

Species	Main Alignment/ Common Areas	Variation A Main	Variation A	Variation D Main	Variation D	Variation B Main	Variation B	Variation B1	Variation E Main	Variation E	Total
Parish's Daisy	1,565.11	168.76	186.18	343.4	352.97	472.4	554.86	503.3	35s7.5	356.06	**4,860.54**
Cushenbury Buckwheat	1,565.11	168.76	186.18	343.4	352.97	472.4	554.86	503.3	357.5	356.06	**4,860.54**
Cushenbury Oxytheca	94.00	0	0	0	0	0	0	0	0	0	**94.00**
Desert Tortoise	1,565.11	168.76	186.18	343.4	352.97	472.4	554.86	503.3	357.5	356.06	**4,860.54**
Least Bell's Vireo	0	0	0	0	0	0	0	0	0.73	2.27	**3.00**
Southwestern Willow Flycatcher	0	0	0	0	0	0	0	0	0.73	2.27	**3.00**
Swainson's Hawk	2,037.26	383.4	392.72	349.34	362.79	533.4	571.02	523.23	401.75	379.76	**5,934.67**
Golden Eagle	1,883.97	380.29	396.71	349.34	362.79	523.6	571.02	523.23	405.27	381.99	**5,778.21**
Western Yellow-billed Cuckoo	0	0	0	0	0	0	0	0	0.73	2.27	**3.00**
Mohave Ground Squirrel	1,568.5	168.76	186.18	343.4	352.97	472.4	554.86	503.3	354.29	353	**4,857.66**
Townsend's Big-eared Bat	1,409.08	131.32	149.8	298.32	346.9	419.7	544.36	377.64	295.61	272.26	**4,244.99**
Total	**11,688.14**	**1,570.05**	**1,683.95**	**2,370.60**	**2,484.36**	**3,366.30**	**3,905.84**	**3,437.30**	**2,531.61**	**2,462.00**	**35,500.15**

[1]Note: This table represents the amount of potentially suitable habitat for each species within the proposed project limits. Focused surveys for each species in this table were conducted in areas of potentially suitable habitat. This table does not represent impacts to habitat or individuals, only baseline conditions within each Variation.

Table 3.3.5-4 Suitable Habitat for Threatened and Endangered Species within the Footprint of the Freeway/Expressway and Freeway/Tollway Alternatives with HSR Feeder Service[1] (acres)

Species	Main Alignment/ Common Areas	Variation A Main	Variation A	Variation D Main	Variation D	Variation B Main	Variation B	Variation B1	Variation E Main	Variation E	Total
Parish's Daisy	1,528.39	244.3	0	361.21	368.16	564.28	636.17	606.95	582.27	586.62	**5,478.35**
Cushenbury Buckwheat	1,528.39	244.3	0	361.21	368.16	564.28	636.17	606.95	582.27	586.62	**5,478.35**
Cushenbury Oxytheca	94.00	0	0	0	0	0	0	0	0	0	**94.00**
Desert Tortoise	1,528.39	244.3	0	361.21	368.16	564.28	636.17	606.95	582.27	586.62	**5,478.35**
Least Bell's Vireo	0	0	0	0	0	0	0	0	0.8	4.77	**5.57**
Southwestern Willow Flycatcher	0	0	0	0	0	0	0	0	0.8	4.77	**5.57**
Swainson's Hawk	2,010.60	518.56	0	390.93	408.49	630.2	649.22	626.58	644.59	624.71	**6,503.88**
Golden Eagle	1,851.53	515.43	0	385.17	401.31	617.66	649.22	626.58	649.68	629.89	**6,326.47**
Western Yellow-billed Cuckoo	0.00	0	0	0	0	0	0	0	0.8	4.77	**5.57**
Mohave Ground Squirrel	1,541.18	244.3	0	361.21	368.16	564.28	636.17	606.95	575.76	584.08	**5,482.09**
Townsend's Big-eared Bat	1,380.07	200.72	0	314.12	362.99	511.26	633.8	469.88	501.13	481.51	**4,855.48**
Total	**11,462.55**	**2,211.91**	**0.00**	**2,535.06**	**2,645.43**	**4,016.24**	**4,476.92**	**4,150.84**	**4,120.37**	**4,094.36**	**39,713.68**

[1]Note: This table represents the amount of potentially suitable habitat for each species within the proposed project limits. Focused surveys for each species in this table were conducted in areas of potentially suitable habitat. This table does not represent impacts to habitat or individuals, only baseline conditions within each Variation.

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Table 3.3.5-5 Suitable Habitat for Threatened and Endangered Species within the Footprint of the Freeway/Expressway and Freeway/Tollway Alternatives with HSR Feeder Service (Rail Options) (acres)[1]

Species	Option 1A	Option 1B	Option 1C	Option 7A	Option 7B	Option 7C	Total
Parish's Daisy	9.7	9.03	27.66	40.5	41.62	80.27	**208.78**
Cushenbury Buckwheat	9.7	9.03	27.66	40.5	41.62	80.27	**208.78**
Cushenbury Oxytheca	0	0	0	0	0	0	**0**
Desert Tortoise	9.7	9.03	27.66	40.5	41.62	80.27	**208.78**
Least Bell's Vireo	0	0	0	0	0	0	**0**
Southwestern Willow Flycatcher	0	0	0	0	0	0	**0**
Swainson's Hawk	31.65	29.6	43.61	71.2	70.35	100.21	**346.62**
Golden Eagle	31.65	29.6	43.61	71.2	70.35	100.21	**346.62**
Western Yellow-billed Cuckoo	0	0	0	0	0	0	**0**
Mohave Ground Squirrel	9.39	8.82	27.48	38.85	39.88	79.26	**203.68**
Townsend's Big-eared Bat	9.7	9.03	19.51	40.5	41.62	69.03	**189.39**
Total	**111.49**	**104.14**	**217.19**	**343.25**	**347.06**	**589.52**	**1,712.65**

[1]Note: This table represents the amount of potentially suitable habitat for each species within the proposed project limits. Focused surveys for each species in this table were conducted in areas of potentially suitable habitat. This table does not represent impacts to habitat or individuals, only baseline conditions within each Variation.

Listed Plants

Parish's Daisy

Parish's Daisy is federally-listed threatened species. Its habitat includes Mojavean desert scrub and pinyon-juniper woodland plant communities. This perennial herb usually grows in soils that are carbonate, but can also grow in granitic soils. This plant is known to be distributed south of Lucerne Valley and Johnson valley, at the northern edge of the San Bernardino National Forest, near the southern-central boundary of the Mojave Desert. For the potentially suitable habitat types in the proposed project areas, see Table 3.3.5-2 and for the overall amount of potentially suitable habitat in each proposed project area, see Table 3.3.5-5. Focused rare plant surveys were conducted in 2015 during the known blooming period for this species.

Parish's daisy was not detected during focused surveys, but suitable habitat is present within the BSA. Suitable habitat observed within the BSA includes Mojavean desert scrub (i.e., creosote bush scrub alliance) that is present near the limestone mine at Falchion Road and Apple Valley Road, north of Victorville, California. No critical habitat for Parish's daisy is present within the BSA.

Cushenbury buckwheat

Cushenbury buckwheat is federally-listed endangered species. Its habitat includes Mojavean desert scrub, Joshua tree woodland, and pinyon-juniper woodland plant communities. This perennial herb typically grows in soils that are carbonate. This plant is known to be distributed south of Lucerne Valley and Johnson valley, at the northern edge of the San Bernardino National Forest, near the southern-central boundary of the Mojave Desert. For the potentially suitable habitat types in the proposed project areas, see Table 3.3.5-2 and for the overall amount of potentially suitable habitat in each proposed project area, see Table 3.3.5-5. Focused rare plant surveys were conducted in 2015 during the known blooming period for this species. Cushenbury buckwheat was not detected during focused surveys, but suitable habitat is present within the BSA. Suitable habitat observed within the BSA includes Mojavean desert scrub (i.e., creosote bush scrub alliance) that is present near the limestone mine at Falchion Road and Apple Valley Road, north of Victorville, California. No critical habitat for cushenbury buckwheat is present within the BSA.

Cushenbury oxytheca

Cushenbury oxytheca is federally-listed an endangered species. Its habitat includes the pinyon-juniper woodland plant community. This annual herb typically grows in sandy or carbonate soils. This plant is known to be distributed south of Lucerne Valley and Johnson valley, at the northern edge of the San Bernardino National Forest, near the southern-central boundary of the Mojave Desert. For the potentially suitable habitat types in the proposed project areas, see Table 3.3.5-2 and for the overall amount of potentially suitable habitat in each proposed project area, see Table 3.3.5-5. The amount of suitable habitat was based more on the type of soils present rather than the vegetation community, as pinyon-juniper woodland does not occur within the BSA. Focused rare plant surveys were conducted in 2015 during the known blooming period for this species. Cushenbury oxytheca was not detected during focused surveys, but suitable habitat is present within the BSA. Suitable habitat that is present within the BSA exists near the limestone mine at Falchion Road and Apple Valley Road, north of Victorville, California; however, the habitat is marginal and does not strongly fit the habitat affinity for this species. No critical habitat for cushenbury oxytheca is present within the BSA.

Listed Birds

For 4 years spanning 2012-2015, biologists conducted focused federally listed bird surveys for least Bell's vireo and southwestern willow flycatcher along the Mojave River. In 2015, focused surveys were conducted for western yellow-billed cuckoo.

Southwestern Willow Flycatcher

Southwestern willow flycatcher is a federally listed endangered species and state-listed endangered species. It breeds and nests in riparian forest with dense understory. These areas were found to be present in both Alternatives corresponding to Variation E Main and Variation E only. For the potentially suitable habitat types in the proposed project areas, see Table 3.3.5-2 and for the overall amount of potentially suitable habitat in each proposed project area, see Tables 3.3.5-3 through 3.3.5-5. Southwestern willow flycatcher was observed during focused surveys within 200 feet of Variation E. Individuals and nesting behavior of southwestern willow flycatcher have only been observed in the area where the Variation E Freeway/Expressway (Freeway/Tollway) with High Speed Rail (HSR) Alternative rail line intersects the Mojave River. In addition, Critical Habitat for the southwestern willow flycatcher is present within the Mojave River at all proposed crossing locations. Refer to the map set provided in the Consolidated Listed Riparian Bird Studies Report for locations (NES, 2016).

Critical Habitat for this species was designated by the USFWS in October 2005 (USFWS 2005) and revised in January 2013 (USFWS 2013). The Variation E Main and Variation E alignments cross the Basin and Mojave Management Unit of designated Critical Habitat for southwestern willow flycatcher. This Unit comprises a 22.2-mile section of the Mojave River and three other sections of waterways in San Bernardino County. Not all of these locations are known to be occupied by southwestern willow flycatcher or to contain the physical and biological features necessary for this species, but they were designated as Critical Habitat for the purposes of species recovery. These areas were identified for southwestern willow flycatcher conservation because they have the potential to provide protection against habitat loss, areas for population growth with the potential for colonization, habitat for metapopulation stability, and protection of genetic connectivity.

Primary Constituent Elements (PCEs) described for SWFL Critical Habitat are based on the biological and ecological needs of the species. They are considered to be essential for the conservation of a species and are described in detail within a species Critical Habitat designation. The USFWS identified two PCEs for SWFL Critical Habitat (USFWS 2013b). These include riparian habitat and insect prey populations; the following descriptions are from the final rule (USFWS 2013b).

Riparian habitat located in “dynamic successional riverine environments” is imperative to the survival of SWFL because the flycatcher uses riparian habitat during all life stages, including foraging, migration, nesting, shelter, and dispersal. Several factors contribute to this PCE for flycatcher Critical Habitat. Trees and shrubs are an important factor and usually include several willow species, tamarisk, and cottonwoods and must be dense and ranging in height from 6 to 98 feet. Researchers have found that SWFLs do not appear to have a preference between native and non-native tree and shrub species; however, the density of these stands is a limiting factor. Shorter stands of dense riparian habitat are used at higher elevations, while taller stands are occupied in lower elevations. Dense areas of vegetation interspersed with smaller openings of sparser vegetation and/or open water or marsh are used by

SWFLs from ground level to approximately 13 feet above the ground. A dense tree or shrub canopy is imperative for breeding sites (areas with 50 to 100 percent coverage).

Floodplain-specific invertebrate prey comprises the majority of the SWFL's diet. Therefore, an insect population associated with the aforementioned riparian vegetation features is considered a PCE of SWFL Critical Habitat. An insect generalist, the flycatcher consumes several different types of species, ranging from beetles *(Coleoptera),* to butterflies and moths *(Lepidoptera)*, wasps and bees *(Heteroptera)*, and dragonflies *(Anisoptera).* Prey availability can be influenced by quality of vegetation present in the habitat, presence of and proximity to water, and microclimate features such as humidity and temperature.

Within Variation E Main Freeway/Expressway and Freeway/Tollway Alternatives with HSR Feeder Service there are approximately 12.7 acres of critical habitat, of which 4 acres are potentially suitable. Within Variation E Main Freeway/Expressway and Freeway/Tollway there is approximately 9.4 acres of critical habitat, of which 2.41 acres are potentially suitable. Within Variation E Freeway/Expressway and Freeway/Tollway Alternatives with HSR Feeder Service there is approximately 8.2 acres of critical habitat, of which 5.07 acres is potentially suitable. Within Variation E Main Freeway/Expressway and Freeway/Tollway there is approximately 4.22 acres of critical habitat, of which 2.23 acres are potentially suitable.

In general, riparian habitat within 1,000 feet upstream and downstream of both Alternatives for Variation E Main and the Highway only portion of Variation E is of poor quality, in terms of supporting the large, dense stands of mixed -height riparian vegetation that comprises appropriate nesting requirements and Primary Constituent Elements for southwestern willow flycatcher critical habitat.

Conversely, the area where the SWFL were observed during the focused survey (where Variation E Freeway/Expressway (Freeway/Tollway) with HSR Alternative rail line intersects the Mojave River) is occupied critical habitat and does contain the PCEs essential for this species.

Least Bell's Vireo

Least Bell's vireo is a federally listed endangered species and state-listed endangered species. Its habitat includes riparian forests and willow thickets. These areas were found to be present in both Alternatives corresponding to Variation E Main and Variation E only. For the potentially suitable habitat types in the proposed project areas, see Table 3.3.5-2 and for the overall amount of potentially suitable habitat in each proposed project area, see Tables 3.3.5-3 through 3.3.5-5. Individuals displaying nesting behavior were observed within the BSA in specific areas along the Mojave River, specifically within the proposed footprint of Variation E and upstream and downstream of Variation E. Individuals and nesting behavior has only been observed in the area where the Variation E of the Freeway/Expressway (Freeway/Tollway) with HSR Alternative rail line intersects the Mojave River. Surveys conducted where Variation E Main intersects with the Mojave River has yielded no observations of individuals or nesting behavior of this species. Individuals and nesting behavior has only been observed in the area where the Variation E of the Freeway/Expressway (Freeway/Tollway) with HSR Alternative rail line intersects the Mojave River. No critical habitat for this species is present within the BSA. Refer to the map set provided in the Consolidated Listed Riparian Bird Studies Report for locations (NES, 2016).

Western Yellow-Billed Cuckoo

Western yellow-billed cuckoo is a federally listed threatened species and state-listed endangered species. Its habitat includes riparian areas, primarily with willow-cottonwood riparian forests. For the potentially suitable habitat types in the proposed project areas, see Table 3.3.5-2 and for the overall amount of potentially suitable habitat in each proposed project area, see Tables 3.3.5-3 through 3.3.5-5. No individuals were observed within the BSA during focused surveys however, suitable habitat is present in the Mojave River area of the BSA. The closest recorded observation of this species was documented 2.5 miles upstream in the Mojave River near the State Route (SR) 18 bridge. No critical habitat for this species is present within the BSA and critical habitat has not been designated for this species.

Golden Eagle

Golden eagle is a federal and state fully protected species. Their habitat includes a wide range of flat or mountainous, largely open habitats, often above the tree line from sea level to 4,000 meters in elevation. Their nesting sites are mostly along high cliffs to the north and east of the eastern end of the Project. For the potentially suitable habitat types in the proposed project areas, see Table 3.3.5-2 and for the overall amount of potentially suitable habitat in each proposed project area, see Tables 3.3.5-3 through 3.3.5-5. No individual golden eagles were noted within the BSA during the 2015 focused survey; however, one individual was observed foraging in the vicinity of the proposed HDC Project near the Victorville dump facility. In addition, a records search and interviews with professional raptor experts were conducted. There were 22 documented golden eagle nests within five miles of the project, however most were documented before 2011 and CDFW considers an active nest as one that has been used at least once in the last five years. There are several nest sites that have been noted north and east of the project envelope during studies unrelated to the proposed project after 2011. Suitable foraging habitat for this species was noted in various locations at the eastern end of the project site, and nesting sites are known to occur east of Interstate 15. No critical habitat for this species is present within the BSA and critical habitat has not been designated for this species. Refer to the map set provided in the Consolidated Nesting Raptor Studies Report for locations (NES 2016).

Swainson’s Hawk

Swainson’s hawk is a state-listed threatened species. Habitat for this species includes open and semi-open country within deserts, grasslands, and prairies. For the potentially suitable habitat types in the proposed project areas, see Table 3.3.5-2 and for the overall amount of potentially suitable habitat in each proposed project area, see Tables 3.3.5-3 through 3.3.5-5. One individual was observed during the 2015 riparian bird surveys, soaring over the Mojave River. Suitable foraging habitat is present in various locations at the western end of the project site. A records search and interviews with professional raptor experts were conducted, and several nest sites have been documented north and west of the project site during 2015 studies unrelated to the HDC Project. Two nests were found to occur within one mile of the Project alignment: one near Palmdale just south of the alignment near SR-138, and the other was just east of Highway 395. No critical habitat for this species is present within the BSA and critical habitat has not been designated for this species. Refer to the map set provided in the Consolidated Nesting Raptor Studies Report for locations (NES, 2016).

Listed Mammals

Mohave Ground Squirrel

Mohave ground squirrel is a state-listed threatened species. Its habitat includes creosote bush scrub, saltbush scrub, and Joshua tree woodland type plant communities. This species is found in open areas of sandy and gravelly soils devoid of rocky areas in the eastern and northern parts of the Mojave Desert region. For the potentially suitable habitat types in the proposed project areas, see Table 3.3.5-2 and for the overall amount of potentially suitable habitat in each proposed project area, see Tables 3.3.5-3 through 3.3.5-5. Focused surveys for Mohave ground squirrel were conducted between 2011 and 2014. This species was not detected during focused surveys, but suitable habitat is present within the BSA. No critical habitat for this species is present within the BSA and critical habitat has not been designated for this species. Therefore, this species is not considered present within the proposed project areas. Refer to the map set provided in the Consolidated Mohave Ground Squirrel Studies Report for locations (NES, 2016).

Townsend's Big-Eared Bat

Townsend's big-eared bat is a state candidate threatened species. Its habitat typically includes coniferous forests and woodlands, semi-desert, and montane shrublands. This species inhabits old buildings, mines, and caves. For the potentially suitable habitat types in the proposed project areas, see Table 3.3.5-2 and for the overall amount of potentially suitable habitat in each proposed project area, see Tables 3.3.5-3 through 3.3.5-5. Focused bat roost surveys were conducted in two areas near the Mojave River and no individuals of this species was detected and there were no incidental observations noted during other wildlife surveys. Mines and caves were not indentified during any wildlife survey conducted throughout the BSA. Roost features, such as bridges, rock outcroppings, and tree cavities, that could support bat roosting and foraging habitat were identified primarily in the Mojave River area. There are old buildings along the BSA, however, those buildings were either still occupied or permission to access the property was not obtained. It is assumed that the buildings within the footprint of the chosen Alternative will become abandoned prior to construction. No critical habitat for this species is present within the BSA and critical habitat has not been designated for this species. Therefore, there is a moderate potential for this species to occur in the BSA. Refer to the map set provided in the Bat Survey Report for study design and survey locations (NES, 2016).

Listed Reptile

Desert Tortoise

Desert tortoise is a federally and state-listed threatened species. Its habitat occurs throughout the Mojave Desert in scattered populations. Suitable habitat within the BSA includes creosote bush scrub and desert saltbush scrub. For the potentially suitable habitat types in the proposed project areas, see Table 3.3.5-2 and for the overall amount of potentially suitable habitat in each proposed project area, see Tables 3.3.5-3 through 3.3.5-5.

Focused surveys for desert tortoise were conducted in 2011, 2012, and 2013. Desert tortoise was observed during focused surveys in 2012 and 2013. Burrows, scat, and carcass material of the desert tortoise were identified within the eastern portion of the BSA, to the east of 240th Street East. Focused surveys on the western portion (between 240th Street East and SR-14) were negative for desert tortoise sign or individuals. A total of 2 live tortoises, 41 burrows, 16 carcasses, and 72 pieces of scat were observed in the eastern portion of the BSA. Focused surveys on the western portion (between 240th Street East and SR-14) were negative for desert tortoise sign or individuals. The USFWS and CDFW do not consider any part of the project site to the west of 240th Street East to be suitable habitat for desert tortoise. The BO specifically identifies this dividing feature of the HDC Project in its minimization and mitigation measures. No critical habitat for desert tortoise is present within the BSA. Refer to the map set provided in the Consolidated Desert Tortoise Studies Report for locations (NES, 2016).

Environmental Consequences

No Build Alternative

Because no ground disturbance or construction would occur under the No Build Alternative, there would be no impacts to threatened and endangered species.

Build Alternatives

The build alternatives would result in temporary and permanent impacts to some threatened and endangered species’ habitats due to roadway development and the development of existing and to be acquired right-of-way (ROW). Tables 3.3.5-6 through 3.3.5-9 quantify the amount of temporary and permanent impacts to habitats occupied by threatened and endangered species within the variations for the highway only, and highway and rail alternatives. For the purpose of avoiding redundancy, when discussing project impacts, it should be noted that the Freeway/Expressway Alternative, Freeway/Tollway Alternative, Freeway/Expressway Alternative with the HSR Feeder Service, and the Freeway/Tollway Alternative with the HSR Feeder Service are discussed collectively because the impacts amount to the same in main alignment/common areas; however, it is the variations and options that differ in impacts to threatened and endangered species, and thus, they are each broken down and discussed (see Figure 3.3-1, Alignment Key Map for Biological Study Area).

Listed Plants

Parish's Daisy

No impacts to this species are expected due to multiple rare plant surveys that have been conducted since 2008, and a focused rare plant survey in 2015. Through implementation of the avoidance and minimization measures, specifically BPL-1, 2 and 3 below, impacts to this species would be reduced. If these steps are included in the pre- and post-construction process, construction impacts to Parish's daisy are anticipated to be mitigated and not have a substantial effect on local and regional populations or the distribution of the species statewide. In addition, implementation of BAN-5 (Habitat Mitigation and Monitoring Plan including restoration activities) will also reduce impacts to Parish's daisy.

Cushenbury Buckwheat

No impacts to this species are expected due to multiple rare plant surveys that have been conducted since 2008, and a focused rare plant survey in 2015. Through implementation of the avoidance and minimization measures, specifically BPL-1, 2 and 3 below, impacts to this species would be reduced. If these steps are included in the pre- and post-construction process, construction impacts to Cushenbury buckwheat are anticipated to be mitigated and not have a substantial effect on local and regional populations or the distribution of the species statewide. In addition, implementation of BAN-5 (Habitat Mitigation and Monitoring Plan including restoration activities) will also reduce impacts to Cushenbury buckwheat.

Cushenbury Oxytheca

No impacts to this species are expected due to multiple rare plant surveys that have been conducted since 2008, and a focused rare plant survey in 2015. This species was not formally consulted on; however, based on the species not being detected during focused surveys, the primary plant community the species is associated with not being present nor adjacent to the BSA, and the preferred soil types for this species being marginal in the BSA, a no effect determination has been made. However, because some of the surveys for this species were conducted during a drought year, there is a low potential for this species to occur. Through implementation of the avoidance and minimization measures, specifically BPL-1, 2 and 3, impacts to this species would be reduced. If these steps are included in the pre- and post-construction process, construction impacts to Cushenbury oxytheca are anticipated to be mitigated and not have a substantial effect on local and regional populations or the distribution of the species statewide. In addition, implementation of BAN-5 (Habitat Mitigation and Monitoring Plan including restoration activities) will also reduce impacts to Cushenbury oxytheca.

Table 3.3.5-6 Impacts to Occupied/Foraging Habitats of Threatened and Endangered Species for the Freeway/Expressway and Freeway/Tollway Alternatives (acres)

Habitats of Species	Main Alignment/ Common Areas		Variation A Main		Variation A		Variation D Main		Variation D		Variation B Main		Variation B		Variation B1		Variation E Main			Variation E		Totals	
	Perm. Impact	Temp. Impact	Perm. Impact	Temp. Impact	Perm. Impact	Temp. Impact	Perm. Impact	Temp. Impact	Perm. Impact	Temp. Impact	Perm. Impact	Temp. Impact	Perm. Impact	Temp. Impact	Perm. Impact	Temp. Impact	No Impact	Perm. Impact	Temp. Impact	Perm. Impact	Temp. Impact	Perm. Impact	Temp. Impact
Parish's Daisy																							
Occupied Habitat	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
Cushenbury Buckwheat																							
Occupied Habitat	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
Cushenbury oxytheca																							
Occupied Habitat	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
Desert Tortoise																							
Occupied Habitat	668.42	430.74	0	0	0	0	0	0	0	0	277.13	195.27	310.56	244.3	289.06	214.24	0.14	266.38	90.98	155.74	200.32	**2,118.29**	**1,224.65**
Least Bell's Vireo																							
Occupied Habitat	738.28	360.88	0	0	0	0	0	0	0	0	296.94	175.46	341.92	212.94	319.09	184.22	0.14	281.48	75.88	140.58	215.27	**0**	**0**
Southwestern Willow Flycatcher																							
Occupied Habitat	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
Swainson's Hawk																							
Foraging Habitat	463.67	318.06	206.73	96.78	209.09	98.97	0	0	0	0	0	0	0	0	0	0	0	299.05	99.35	168.45	208.25	**1,346.99**	**821.41**
Golden Eagle																							
Foraging Habitat	448.81	319.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	135.66	33.89	76.07	83.28	**660.54**	**436.83**
Western Yellow-billed Cuckoo																							
Occupied Habitat	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
Mohave Ground Squirrel																							
Occupied Habitat	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
Townsend's Big-eared Bat																							
Occupied Habitat	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
Totals	**1650.76**	**998.6**	**206.73**	**96.78**	**209.09**	**98.97**	**0**	**0**	**0**	**0**	**296.94**	**175.46**	**341.92**	**212.94**	**319.09**	**184.22**	**0.14**	**716.19**	**209.12**	**385.1**	**506.8**	**4125.82**	**2482.89**

[2]Desert tortoise occupied habitat permanent impacts is based on the location of the permanent Right-of-Way fence around the Project, not necessarily on the vegetation communities. The corridor that will be within the fenced ROW will permanently restrict tortoises from entering. Despite an area being only temporarily impacted, if that area occurs within the fence ROW, it was considered a permanent impact.

Table 3.3.5-7 Impacts to Occupied/Foraging Habitats of Threatened and Endangered Species for the Freeway/Expressway and Freeway/Tollway Alternatives with HSR Feeder Service (acres)

Habitats of Species	Main Alignment/ Common Areas		Variation A Main		Variation A		Variation D Main		Variation D		Variation B Main		Variation B		Variation B1		Variation E Main			Variation E		Totals	
	Perm. Impact	Temp. Impact	Perm. Impact	Temp. Impact	Perm. Impact	Temp. Impact	Perm. Impact	Temp. Impact	Perm. Impact	Temp. Impact	Perm. Impact	Temp. Impact	Perm. Impact	Temp. Impact	Perm. Impact	Temp. Impact	No Impact	Perm. Impact	Temp. Impact	Perm. Impact	Temp. Impact	Perm. Impact	Temp. Impact
Parish's Daisy																							
Occupied Habitat	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
Cushenbury Buckwheat																							
Occupied Habitat	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
Cushenbury oxytheca																							
Occupied Habitat	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
Desert Tortoise																							
Occupied Habitat	754.71	289.53	0	0	0	0	0	0	0	0	469.37	94.91	530.89	105.27	542.93	64.02	0.13	389.25	192.89	290.78	297.80	**2977.93**	**1044.43**
Least Bell's Vireo																							
Occupied Habitat	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.86	0	**1.86**	**0**
Southwestern Willow Flycatcher																							
Occupied Habitat	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.86	0	**1.86**	**0**
Swainson's Hawk																							
Foraging Habitat	503.14	283.76	325.22	60.57	0	0	0	0	0	0	0	0	0	0	0	0	0	397.73	240.08	393.21	228.96	**1619.3**	**813.37**
Golden Eagle																							
Foraging Habitat	459.74	306.14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	173.18	155.81	236.45	114.93	**869.37**	**576.88**
Western Yellow-billed Cuckoo																							
Occupied Habitat	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
Mohave Ground Squirrel																							
Occupied Habitat	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
Townsend's Big-eared Bat																							
Occupied Habitat	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
Totals	**1717.59**	**879.43**	**325.22**	**60.57**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**469.37**	**94.91**	**530.89**	**105.27**	**542.93**	**64.02**	**0.13**	**960.16**	**588.78**	**924.16**	**641.69**	**5470.32**	**2434.68**

[2]Desert tortoise occupied habitat permanent impacts is based on the location of the permanent Right-of-Way fence around the Project, not necessarily on the vegetation communities. The corridor that will be within the fenced ROW will permanently restrict tortoises from entering. Despite an area being only temporarily impacted, if that area occurs within the fence ROW, it was considered a permanent impact.

Table 3.3.5-8 Impacts to Occupied/Foraging Habitats of Threatened and Endangered Species for the Freeway/Expressway and Freeway/Tollway Alternatives with HSR Feeder Service (Rail Options) (acres)

Habitats of Species	Option 1A		Option 1B		Option 1C		Option 7A		Option 7B		Option 7C		Totals	
	Perm. Impact	Temp. Impact	Perm. Impact	Temp. Impact	Perm. Impact	Temp. Impact	Perm. Impact	Temp. Impact	Perm. Impact	Temp. Impact	Perm. Impact	Temp. Impact	Perm. Impact	Temp. Impact
Parish's Daisy														
Occupied Habitat	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
Cushenbury Buckwheat														
Occupied Habitat	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
Cushenbury oxytheca														
Occupied Habitat	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
Desert Tortoise														
Occupied Habitat	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
Least Bell's Vireo														
Occupied Habitat	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
Southwestern Willow Flycatcher														
Occupied Habitat	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
Swainson's Hawk														
Foraging Habitat	1.34	30.31	0.03	29.57	5.48	38.13	22.56	48.64	24.13	46.22	32.01	68.2	**85.55**	**261.07**
Golden Eagle														
Foraging Habitat	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
Western Yellow-billed Cuckoo														
Occupied Habitat	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
Mohave Ground Squirrel														
Occupied Habitat	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
Townsend's Big-eared Bat														
Occupied Habitat	0	0	0	0	0	0	0	0	0	0	0	0		
Totals	**1.34**	**30.31**	**0.03**	**29.57**	**5.48**	**38.13**	**22.56**	**48.64**	**24.13**	**46.22**	**32.01**	**68.2**	**85.55**	**261.07**

Table 3.3.5-9 Impacts to Occupied/Foraging Habitats of Threatened and Endangered Species for the Preferred Alternative (acres)[1]

Habitats of Species	Main Alignment/ Common Areas		Variation A Main		Variation D		Variation B1		Variation E Main			Option 1C		Totals	
	Perm. Impact	Temp. Impact	Perm. Impact	Temp. Impact	Perm. Impact	Temp. Impact	Perm. Impact	Temp. Impact	No Impact	Perm. Impact	Temp. Impact	Perm. Impact	Temp. Impact	Perm. Impact	Temp. Impact
Parish's Daisy															
Occupied Habitat	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
Cushenbury Buckwheat															
Occupied Habitat	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
Cushenbury oxytheca															
Occupied Habitat	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
Desert Tortoise															
Occupied Habitat	754.71	289.53	0	0	0	0	542.93	64.02	0.13	389.25	192.89	0	0	**1686.886**	**546.4431**
Least Bell's Vireo															
Occupied Habitat	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
Southwestern Willow Flycatcher															
Occupied Habitat	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
Swainson's Hawk															
Foraging Habitat	503.14	283.76	325.22	60.57	0	0	0	0	0	397.73	240.08	5.48	38.13	**1231.57**	**622.54**
Golden Eagle															
Foraging Habitat	459.74	306.14	0	0	0	0	0	0	0	173.18	155.81	0	0	**632.92**	**461.95**
Western Yellow-billed Cuckoo															
Occupied Habitat	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
Mohave Ground Squirrel															
Occupied Habitat	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
Townsend's Big-eared Bat															
Occupied Habitat	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
Totals	**1717.59**	**879.43**	**325.22**	**60.57**	**0.00**	**0.00**	**542.93**	**64.02**	**0.13**	**960.16**	**588.78**	**5.48**	**38.13**	**3551.38**	**1630.93**

[1]This table represents the amount of impacts to threatened and endangered species in the Preferred Alternative, which is made up of the Main Alignment/Common Areas, Variation A Main, Variation D, Variation B1, Variation E Main, and Rail Option 1C of the Freeway/Expressway and Freeway/Tollway Alternatives with HSR Feeder Service.

[2]Desert tortoise occupied habitat permanent impacts is based on the location of the permanent Right-of-Way fence around the Project, not necessarily on the vegetation communities. The corridor that will be within the fenced ROW will permanently restrict tortoises from entering. Despite an area being only temporarily impacted, if that area occurs within the fence ROW, it was considered a permanent impact.

Listed Birds

Southwestern Willow Flycatcher

This species is a riparian obligate species requiring riparian forest with a dense understory. Since only Variation E Main and Variation E contain such habitats, other alignments are eliminated from discussion. Variation E Main and Variation E of the Freeway/Expressway (Freeway/Tollway) Alternative and the Freeway/Expressway (Freeway/Tollway) with HSR Alternatives are discussed below.

Direct and indirect impacts to southwestern willow flycatcher have the potential to occur. Impacts to this species are expected to occur during the construction phase of the selected Variation/Alternative. With the incorporation of minimization measures BTE 4 - BTE- 10 from the Biological Assessment and incorporated by reference in the Biological Opinion, which were developed in consultation with CDFW to ensure consistency, the impacts to individuals of this species is expected to be low except in the Variation E Highway and Rail Alternative. Below is a discussion of direct and indirect impacts that could occur as a result of the implementation of the proposed project. The discussion is applicable to Variation E and Variation E Main in each Alternative that provides suitable habitat.

Table 3.3.5-10 shows the amount of critical habitat within the Variation E Main and Variation E, broken down by vegetation community. The “None” column refers to the bridges associated with Variation E Main where the proposed facilities would cross over the vegetation communities without permanent or temporary impacts.

Table 3.3.5-10 Southwestern Willow Flycatcher Critical Habitat Impacts by Vegetation Community(in acres) [1]

Row Labels	Variation E Main				Variation E		
	None	Perm	Temp	Total	Perm	Temp	Total
Freeway/Expressway and Freeway/Tollway Alternatives with HSR Feeder Service							
Allscale scrub Alliance		2.34		**2.34**	0.01		**0.01**
California bulrush-American bulrush marsh	0.18			**0.18**	0.25	0.11	**0.36**
Developed			0.07	**0.07**	0.27	0.07	**0.34**
Disturbed		0.03	0.56	**0.59**	1.10	0.06	**1.16**
Disturbed Allscale scrub Alliance		0.05	0.04	**0.09**			**0**
Disturbed Creosote bush scrub Alliance				**0**	0.19	0.02	**0.21**
Fourwing saltbush scrub Alliance		2.14	1.96	**4.1**	0.04	0.03	**0.07**
Fremont cottonwood forest Alliance	0.27	3.17	0.07	**3.51**	2.38	0.30	**2.68**
Mojave yucca scrub Alliance		0.00	0.32	**0.32**			**0**
Non-native grassland	0.13			**0.13**			**0**
Red willow thickets				**0**	1.01		**1.01**
Rock outcrop		0.18	0.57	**0.75**	0.00	0.10	**0.1**

Table 3.3.5-10 Southwestern Willow Flycatcher Critical Habitat Impacts by Vegetation Community(in acres) [1]

Row Labels	Variation E Main				Variation E		
	None	Perm	Temp	Total	Perm	Temp	Total
Sandbar willow thickets Alliance	0.45		0.04	**0.49**	0.98	0.40	**1.38**
Southern cattail marsh				**0**	0.22	0.16	**0.38**
Unvegetated wash	0.13			**0.13**	0.43	0.07	**0.5**
Total	**1.16**	**7.91**	**3.63**	**12.7**	**6.88**	**1.32**	**8.2**
Freeway/Expressway and Freeway/Tollway Alternatives							
Allscale scrub Alliance		1.90	0.04	**1.94**			**0**
California bulrush-American bulrush marsh	0.20			**0.2**	0.16	0.18	**0.34**
Developed			0.07	**0.07**	0.04	0.12	**0.16**
Disturbed			0.53	**0.53**	0.11	0.12	**0.23**
Disturbed Allscale scrub Alliance		0.00	0.02	**0.02**			**0**
Disturbed Creosote bush scrub Alliance			0.09	**0.09**	0.19	0.04	**0.23**
Fourwing saltbush scrub Alliance		1.85	1.29	**3.14**	0.04	0.03	**0.07**
Fremont cottonwood forest Alliance	0.31	1.63	0.13	**2.07**	0.23	0.50	**0.73**
Mojave yucca scrub Alliance			0.01	**0.01**			**0**
Non-native grassland	0.00			**0**			**0**
Rock outcrop		0.09	0.76	**0.85**	0.00	0.23	**0.23**
Sandbar willow thickets Alliance	0.34			**0.34**	0.79	0.71	**1.5**
Southern cattail marsh				**0**	0.22	0.29	**0.51**
Unvegetated wash	0.14			**0.14**	0.14	0.08	**0.22**
Total	**0.99**	**5.47**	**2.94**	**9.4**	**1.92**	**2.3**	**4.22**

[1]This table presents all vegetation communities and land cover types occurring within the southwestern willow flycatcher critical habitat.

Freeway/Expressway and Freeway/Tollway Alternatives

Variation E Main

Based on the 4 years of focused surveys for this species, observations indicate the reach of the Mojave River that intersects with the Variation E Main does not support this species; therefore, this Variation is not occupied habitat (Table 3.3.5-5). Southwestern willow flycatchers (including migrants) were not detected within 1,000 feet of Variation E Main. Variation E Main is entirely within designated critical habitat for this species. Habitat quality and suitability for this species in Variation E Main are discussed further below. Spanning the Mojave River with a bridge following the Variation E Main would have low impacts to potentially suitable habitat.

Impacts to southwestern willow flycatcher critical habitat are expected to be low and would not jeopardize the continued existence of this species in this area along the Mojave River. Tables 3.3.5-11 and 3.3.5-12 summarize the impacts to Southwestern willow flycatcher critical habitat within the Variation E Main using only the suitable habitat types for the species. Variation E Main crosses through southwestern willow flycatcher critical habitat within the Mojave River and its greater floodplain. Specifically, it crosses at two locations: one across the Mojave River at the proposed bridge location and a floodplain area west of Gas Line Road to approximately 0.3 mile west of Matthews Lane. Currently, 0.65 acre would not be affected (bridge over Mojave River), 1.63 acres would be permanently impacted, and 0.13 acre would be temporarily affected, for a total of 2.41 acres of low quality riparian habitat within the Variation E Main Freeway/Expressway and Freeway/Tollway Alternatives. The riparian vegetation where the project would cross critical habitat is of poor quality in terms of supporting the large, dense stands of mixed -height riparian vegetation that comprises southwestern willow flycatcher critical habitat; therefore, impacts to designated critical habitat for the southwestern willow flycatcher are not anticipated. This habitat does not contain the physical and biological features necessary to support this species.

Table 3.3.5-11 Southwestern Willow Flycatcher Critical Habitat Impacts (in acres)[1]

Alternative	Variation E Main			Variation E	
	None	Permanent	Temporary	Permanent	Temporary
Freeway/Expressway and Freeway/Tollway Alternatives	0.65*	1.63*	0.13*	1.02*	1.21*
Freeway/Expressway and Freeway/Tollway Alternatives with HSR Feeder Service	0.72*	3.17*	0.11*	4.37	0.70

[1]This table is a summary of the suitable habitat types for southwestern willow flycatcher available in critical habitat within each Variation.
*Note: The vegetation communities that make up this acreage amount in this variation do not provide the PCEs for SWFL Critical Habitat.

Table 3.3.5-12 Southwestern Willow Flycatcher Critical Habitat Impacts in Preferred Alternative (in acres)[1]

Variation E Main		
None	Permanent*	Temporary*
0.72	3.17	0.11

*Note: The vegetation communities in this variation do not provide the PCEs for SWFL Critical Habitat.
[1] This table represents the amount of impacts to southwestern willow flycatcher critical habitat in the Preferred Alternative, which is made up of the Main Alignment/Common Areas, Variation A Main, Variation D, Variation B1, Variation E Main, and Rail Option 1C of the Freeway/Expressway and Freeway/Tollway Alternatives with HSR Feeder Service. Variation E Main is the only component of the Preferred Alternative that contains southwestern willow flycatcher critical habitat. It is noted that the Biological Assessment (October 2015) reported that 3.24 acres of permanent impacts and 0.07 acre of temporary impacts would occur to Southwestern willow flycatcher critical habitat as a result of the Preferred Alternative. However, in November 2015 slight modifications occurred to the Variation E Main footprint, thereby reducing the amount of permanent impacts and slightly increasing the amount of temporary impacts. Therefore, the impacts to critical habitat presented in the BA and the BO do not exactly match those reported here.

Permanent and temporary habitat loss for southwestern willow flycatcher and southwestern willow flycatcher critical habitat would occur as a result of construction activities; however, it would not occur in all riparian habitat within the project. In general, riparian habitat within 1,000 feet upstream and downstream (identified as the action area in BA) is very poor and does not contain the appropriate nesting requirements (e.g., dense vegetative cover and structural diversity) for southwestern willow flycatcher. Under Variation E Main, permanent and temporary habitat loss would occur in the stretch of riparian vegetation west of Gas Line Road, approximately one mile west of the Mojave River. Temporary impacts would occur to 0.13 acre of Fremont cottonwood forest alliance and permanent impacts would occur to 1.63 acres of Fremont cottonwood forest. The Fremont cottonwood forest alliance at this location does not provide suitable habitat for this species because it is small in size, has a sparsely vegetated understory, and the cottonwood trees are unhealthy; therefore, it is anticipated that this habitat removal would not have a direct effect to this species.

Shading effects from the newly constructed bridge over the Mojave River are not expected to affect riparian vegetation below the bridge. Existing riparian vegetation in this area is sparse, so effects from shade to the vegetation beneath the bridge would be minimal. Furthermore, the bridge is designed to be at least 80 feet above the ground and will have three separate bridge decks, one each for eastbound and westbound vehicular traffic and one for rail travel. The height and design of the three narrow bridge decks will allow ample sunlight to the areas below the bridge. There are other bridges over the Mojave River in the area and include: National Trails Highway, the BNSF Railroad (bridges both east and west of I-15), and the I-15 bridge. Although the bridges are not the same height, construction technique, or orientation of the proposed bridge, they do show that riparian vegetation continues to grow underneath and directly adjacent to the bridges despite any shading to the vegetation from the bridge structures.

Direct impacts in the form of vehicle-wildlife collisions for willow flycatcher individuals are not likely to occur because the height of the bridge spanning the Mojave River would be at least 80 feet above the river, which is high enough that birds are more likely to fly under, rather than over, the bridge if traveling north-south along the Mojave River.

Indirect impacts associated with noise, vibration, increased human activity and visual disturbance, light disturbance, and water quality could also occur as a result of the project. These indirect impacts are not expected to affect southwestern willow flycatcher based on the lack of suitable nesting habitat and the distance from the alignment to the closest observed nest.

During construction activities, noise levels are not expected to exceed 105 dB at 50 feet from the noise source (Jin Lee, Caltrans, personal communication, July 28, 2015). Based on this measurement, projected noise levels at 1,000 feet from the source are expected to be 80 dB. This level is a one-time measurement, it is not the averaged noise level over the period of an hour, which is the standard measurement used when determining noise impacts to breeding birds. Noise impacts to bird species are typically measured at 60 dB averaged over an hour (dBA) at a certain distance from the noise source. With the equipment planned for project use, it is expected that noise levels will not be sustained at 105 dB for longer than a few seconds during construction activities. This activity may be repeated every few seconds or so, but the period of lower noise levels averages with the high noise levels to be substantially lower than 80 dBA at 1,000 feet from the source. Furthermore, Variation E Main is located in an area with steep walls and curves, further diminishing construction activity noise and preventing it from reaching the upstream areas where southwestern willow flycatchers were detected. Noise levels are not expected to exceed 60 dBA at 1,000 feet from the boundaries of Variation E Main.

Existing ambient noise levels at Rockview Nature Park, located adjacent to Variation E Main to the north, were measured at 42 dBA (Caltrans 2014). Noise projections found that this location would be projected to increase to 53 dBA during the worst traffic conditions (e.g., rush hour traffic) after the roadway is constructed.

Increased noise levels during and after construction are not expected to affect nesting activities for southwestern willow flycatcher because suitable nesting habitat is not present within the action area for either of these species. Higher quality and more suitable southwestern willow flycatcher habitat is located upstream that this species is more likely to nest in (and was found in during focused surveys). Furthermore, the closest listed bird nest that has been documented to Variation E Main during focused surveys was a least Bell’s vireo nest documented approximately 2,600 feet away. Successful southwestern willow flycatcher nesting has not been documented during focused surveys within the action area.

Based on the lack of suitable nesting habitat, the distance from Variation E Main that the closest nest was documented (least Bell’s vireo), and the lack of southwestern willow flycatcher observations within the action area (nesting and individual), noise impacts are not expected to occur to nesting southwestern willow flycatchers.

Increased human activity and visual disturbances associated with the project are not expected to create impacts to southwestern willow flycatchers because homeless encampments, OHV use, and other evidence of human activity (e.g., trash and graffiti) are currently prevalent in the area where southwestern willow flycatchers were found. Construction of the bridge and new roadway may attract additional human activity to the area, but this increase is not anticipated to be substantially more than what is already present in the area.

Ground-based vibration resulting from the use of heavy equipment and large vehicles used during the construction phase of the project is not expected to be an impact to southwestern willow flycatchers because this species was not found to breed within the action area because of low quality habitat. Ground-based vibration is not expected to create impacts to migratory individuals because the area is currently subjected to a high level of ground vibrations from the nearby BNSF railroad and busy roads throughout the area. The higher quality habitat located upstream (south) of the action area is more likely to attract migrating individuals than the small and sparsely vegetated riparian vegetation within the action area.

The lighting on the new bridge over the Mojave River, the viaduct west of Gas Line Road, and along constructed roadways would consist of directional lighting that focuses the light towards the roadway and the HSR. Southwestern willow flycatchers have not been documented within 2,600 feet of Variation E Main. At this distance, the nighttime lighting effects from the roadway would be substantially reduced by the presence of vegetation and the distance away from the light source.

The closest listed bird nest that has been documented to Variation E Main during focused surveys was a least Bell's vireo nest documented approximately 2,600 feet away. Successful southwestern willow flycatcher nesting has not been documented during focused surveys in the action area.

No impacts to southwestern willow flycatchers are expected to occur as a result of nighttime light disturbance.

A Storm Water Pollution Prevention Plan (SWPPP) would be prepared for the project prior to construction in order to obtain National Pollutant Discharge Elimination System permit coverage for storm water discharges. SWPPP BMPs would be implemented to ensure that construction does not adversely affect water quality from the use, for example, of petroleum products (e.g., fuels, oil, and lubricants) and erosion of land cleared during construction.

Operation of the highway could have potential long-term water quality impacts associated with the generation of urban contaminants from vehicles (e.g., oil, debris, litter); however, implementation of site design/Low Impact Development measures would effectively capture, filter, store, evaporate, detain, and/or infiltrate runoff close to its source. Additionally, source control BMPs would be used to avoid or minimize the introduction of pollutants into natural drainages by reducing on-site pollutant generation and off-site pollutant transport. The source control BMPs would help to improve long-term water quality by avoiding or minimizing pollutant generation and exposure to storm flows at the source.

The USFWS has issued a Biological Opinion (April 2016) for southwestern willow flycatcher and southwestern willow flycatcher critical habitat based on Variation E Main Freeway/Expressway and Freeway/Tollway Alternatives with HSR Feeder Service. The determination is that the project is not likely to adversely affect this species or its critical habitat. The project is not likely to adversely affect these biological resources because of low-quality existing habitat within the action area, project design, and the many project measures implemented to protect these resources.

Variation E

Based on the 4 years of focused surveys for this species, observations indicate the reach of the Mojave River that intersects with the Variation E does not support this species; therefore, this Variation is not occupied habitat (Table 3.3.5-5). Migrant willow flycatchers were detected in Variation E, however these individuals did not remain in the area for nesting and breeding, therefore not the endangered species.

Because of the proximity to Variation E Main, impacts to habitat quality and suitability are similar.

Impacts to southwestern willow flycatcher critical habitat are expected to be low and would not jeopardize the continued existence of this species in this area along the Mojave River. Tables 3.3.5-11 and 3.3.5-12 summarize the impacts to southwestern willow flycatcher critical habitat within Variation E. With this Variation, approximately 0.5 acre of Fremont Cottonwood forest Alliance and 0.71 acre of sandbar willow thickets would be temporarily impacted, while permanent impacts to approximately 0.23 acre of Fremont Cottonwood forest Alliance and 0.79 acre of sandbar willow thickets would occur. Currently, 1.02 acres would be permanently impacted and 1.21 acre would be temporarily affected, making a total of 2.23 acres of low quality riparian habitat within the Variation E *Freeway/Expressway and Freeway/Tollway Alternatives*. The riparian vegetation where the project would cross critical habitat is of poor quality in terms of supporting the large, dense stands of mixed -height riparian vegetation that comprises southwestern willow flycatcher critical habitat; therefore, impacts to designated critical habitat for the southwestern willow flycatcher would be low. This habitat does not contain the physical and biological features (PCEs) necessary to support this species.

Direct and indirect impacts to this species for this Variation are similar to what is stated above.

<u>Freeway/Expressway and Freeway/Tollway with HSR Alternatives</u>

Variation E Main

Because of the proximity to Variation E Main Highway only Alternative, impacts to habitat quality and suitability are similar. Based on the 4 years of focused surveys for this species, observations indicate the reach of the Mojave River that intersects with the Variation E Main does not support this species; therefore, this Variation is not occupied habitat (Table 3.3.5-5). Spanning the Mojave River with a bridge following the Variation E Main would have low impacts to potentially suitable habitat.

Impacts to southwestern willow flycatcher critical habitat are expected to be low and would not jeopardize the continued existence of this species in this area along the Mojave River. Tables 3.3.5-11 and 3.3.5-12 summarize the impacts to Southwestern willow flycatcher critical habitat within the Variation E Main. Variation E Main crosses through southwestern willow flycatcher critical habitat within the Mojave River and its greater floodplain. Specifically, it crosses at two locations: one across the Mojave River at the proposed bridge location and a floodplain area west of Gas Line Road to approximately 0.3 mile west of Matthews Lane. The riparian vegetation where the project would cross critical habitat is of poor quality in terms of supporting the large, dense stands of mixed -height riparian vegetation that comprises southwestern willow flycatcher critical habitat; therefore, impacts to designated critical habitat for the southwestern willow flycatcher would be low.

The BA (August 2015), which only accounted for impacts to the Preferred Alternative (Variation E Main, Highway and High Speed Rail), state that a total of

4.19 acres of low quality riparian habitat occur within critical habitat, of which 0.88 acre would not be affected; 3.24 acres would be permanently impacted; and 0.07 acre would be temporarily affected. However, this alignment underwent minor engineering revisions in November 2015, and the impacts have been slightly reduced (Tables 3.3.5-11 and 3.3.5-12). Currently, 0.72 acre would not be affected (bridge over Mojave River); 3.17 acres would be permanently impacted; and 0.11 acre would be temporarily affected, making a total of 4.00 acres of low quality riparian habitat within the Variation E Main Freeway/Expressway and Freeway/Tollway Alternatives with HSR Feeder Service. This habitat does not contain the physical and biological features necessary to support this species.

Direct and indirect impacts to this species for this Variation are similar to what is stated above. With this Variation, approximately 0.07 acre of Fremont Cottonwood forest Alliance and 0.04 acre of sandbar willow thickets would be temporarily impacted, while permanent impacts to approximately 3.17 acres of Fremont Cottonwood forest Alliance would occur.

Variation E

Based on the 4 years of focused surveys for this species, observations indicate the reach of the Mojave River that intersects with the Variation E does support this species; therefore, this Variation is considered to contain occupied habitat (Table 3.3.5-5). Nesting (southwestern) willow flycatchers were observed within 200 feet of this Variation, therefore direct and indirect impacts have the potential to occur. With this Variation, the highway and High Speed Rail are split by about 2,500 feet. The Highway portion is adjacent to the Variation E Main and Variation E associated with the Highway only Alternative, which is considered unoccupied and low-quality habitat for this species. Because of this, the occupied portion of this Variation was determined by the records of the species within 1,000 feet of the project boundaries. Although there are a total of 4.77 acres of potentially suitable habitat that could be permanently or temporarily impacted as a result of this Variation, based on the results of surveys, it was determined that 1.86 acres of occupied habitat (which is all designated critical habitat) would be permanently impacted as a result of implementation of this Variation (Table 3.3.5-6).

Direct impacts to this species would include direct removal of occupied critical southwestern willow flycatcher habitat and potential train collisions with individuals.

The High Speed Rail portion of this Variation is planned to be constructed through occupied habitat. Currently, this habitat is used by southwestern willow flycatchers for breeding, nesting, and raising young. In addition, this habitat may be used by migrant willow flycatchers as a temporary stopover point before nesting in another location.

Indirect impacts associated with noise, vibration, increased human activity and visual disturbance, light disturbance, and water quality could also occur as a result of the project. Each of these impacts is described below.

Although a nesting individual was documented within 200 feet of the project boundary, because there is suitable nesting habitat closer to the project boundary, it is possible for a pair to nest closer than 200 feet. Potential short-term and long-term noise impacts could result if construction or operation noise levels exceed a level of 60 dBA at the nest from the project boundary during the breeding season.

Ground-based vibration resulting from the use of heavy equipment and large vehicles used during the construction phase and from trains during the operation phase of the project is anticipated to occur. If vibration causes the birds to leave their nest or the nest to fail, this would be considered an impact.

The lighting on the new bridge over the Mojave River and along constructed roadways will consist of directional lighting that focuses the light towards the roadway and the HSR. In addition, night-time construction is not anticipated. Because the flycatchers are not expected to nest directly adjacent to the new railway bridge, impacts are anticipated to be minimal.

Least Bell's Vireo

This species is a riparian obligate species along streams among willow-, aspen-, and sycamore-dominated riparian habitats. Since only Variation E Main and Variation E contain such habitats, other alignments are eliminated from discussion. Variation E Main and Variation E of the Freeway/Expressway (Freeway/Tollway) Alternative and the Freeway/Expressway (Freeway/Tollway) with HSR Alternatives are discussed. With the implementation of BTE 4 - BTE 10 impacts to this species would be reduced.

<u>Freeway/Expressway and Freeway/Tollway Alternatives</u>

Variation E Main

Based on the 4 years of focused surveys for this species, observations indicate the reach of the Mojave River that intersects with the Variation E Main does not support this species; therefore, this Variation is not occupied habitat (Table 3.3.5-5). Least Bell's vireo were not detected within 1,000 feet of Variation E Main. Spanning the Mojave River with a bridge following the Variation E Main would have low impacts to potentially suitable habitat.

The riparian vegetation where the project would cross the Mojave River is of poor quality in terms of supporting the willow-dominated area that comprises least Bell's vireo habitat; therefore, impacts to this species are not anticipated.

Permanent and temporary habitat loss for least Bell's vireo would occur as a result of construction activities; however, it would not occur in all riparian habitat within the project. In general, riparian habitat within 1,000 feet upstream and downstream (identified as action area in BA) is very poor and does not contain the appropriate nesting requirements (e.g., dense vegetative cover and structural diversity) for least Bell's vireo. Under Variation E Main, permanent and temporary habitat loss would occur in the stretch of riparian vegetation west of Gas Line Road, approximately one mile west of the Mojave River. Temporary impacts would occur to 0.13 acre of Fremont cottonwood forest alliance and permanent impacts would occur to 1.63 acres of Fremont cottonwood forest. The Fremont cottonwood forest alliance at this location does not provide suitable habitat for this species because it is small in size, has a sparsely vegetated understory, and the cottonwood trees are unhealthy; therefore, it is anticipated that this habitat removal would not have a direct effect to this species.

Because this species shares similar habitat types to southwestern willow flycatcher, direct and indirect impacts to this species for this Variation are similar to what is stated above in the southwestern willow flycatcher section. These direct and indirect impacts are not expected to affect least Bell's vireo based on the lack of suitable nesting habitat and the distance from the alignment to the closest observed nest.

The USFWS has issued a Biological Opinion (April 2016) for least Bell's vireo on Variation E Main *Freeway/Expressway and Freeway/Tollway Alternatives with HSR Feeder Service.* The determination is that the project may affect, but is not likely to adversely affect. The project is not likely to adversely affect these biological resources because of low- quality existing habitat within the action area, project design, and the many project measures implemented to protect these resources.

Variation E

Based on the 4 years of focused surveys for this species, observations indicate the reach of the Mojave River that intersects with the Variation E does not support this species; therefore, this Variation is not occupied habitat (Table 3.3.5-5). Because of the proximity to Variation E Main, impacts to habitat quality and suitability are similar.

Direct and indirect impacts to this species for this Variation are similar to what is stated above.

<u>Freeway/Expressway and Freeway/Tollway with HSR Alternatives</u>

Variation E Main

Because of the proximity to Variation E Main Highway only Alternative, impacts to habitat quality and suitability are similar. Based on the 4 years of focused surveys for least Bell's vireo, observations indicate the reach of the Mojave River that intersects with the Variation E Main does not support this species; therefore, this Variation is not occupied habitat (Table 3.3.5-5). Spanning the Mojave River with a bridge following the Variation E Main would have low impacts to potentially suitable habitat.

The riparian vegetation where the project would cross the Mojave River is of poor quality in terms of supporting a willow-dominated riparian area that comprises suitable habitat; therefore, impacts to suitable habitat would be low.

The BA (August 2015), which only accounted for impacts to the Preferred Alternative (Variation E Main, Highway and High Speed Rail), state that a total of

4.19 acres of low quality riparian habitat occur within critical habitat, of which 0.88 acre would not be affected; 3.24 acres would be permanently impacted; and 0.07 acre would be temporarily affected. However, this alignment underwent minor engineering revisions in November 2015, and the impacts have been slightly reduced (Tables 3.3.5-11 and 3.3.5-12). Currently, 0.72 acre would not be affected (bridge over Mojave River); 3.17 acres would be permanently impacted; and 0.11 acre would be temporarily affected, making a total of 4.00 acres of low quality riparian habitat within the Variation E Main Freeway/Expressway and Freeway/Tollway Alternatives with HSR Feeder Service. This habitat does not contain the physical and biological features necessary to support this species.

Direct and indirect impacts to this species for this Variation are similar to what is stated above. With this Variation, approximately 0.07 acre of Fremont Cottonwood forest Alliance and 0.04 acre of sandbar willow thickets would be temporarily impacted, while permanent impacts to approximately 3.17 acres of Fremont Cottonwood forest Alliance would occur.

Variation E

Based on the 4 years of focused surveys for this species, observations indicate the reach of the Mojave River that intersects with the Variation E does support this species, therefore this Variation is considered occupied habitat (Table 3.3.5-5). Several individuals and nesting territories of least Bell’s vireo were observed within 1,000 feet of this Variation, therefore direct and indirect impacts have the potential to occur. With this Variation, the highway and High Speed Rail are split by about 2,500 feet. The Highway portion is adjacent to the Variation E Main and Variation E associated with the Highway only Alternative, which is considered unoccupied and low-quality habitat for this species. Because of this, the occupied portion of this Variation was determined by the records of the species within 1,000 feet of the project boundaries. Although there are a total of 4.77 acres of potentially suitable habitat that could be permanently or temporarily impacted as a result of this Variation, based on the results of surveys it was determined that 1.86 acres of occupied habitat would be permanently impacted as a result of implementation of this Variation (Table 3.3.5-6).

Spanning this reach of the river with a bridge would impact the quality of habitat reducing it by the shadowing effect, which would likely negatively affect the quality of habitat to a point where nesting of these species may not occur. This determination is different than the other Alternative analysis further downstream because the vegetation is sparse and is not considered suitable habitat for the species. The vegetation associated with this Variation is dense riparian vegetation that would be affected as a result of a bridge. Additionally, this area would suffer from a negative effect from increased litter and vagrancy, as this is typical of bridge structures over rivers. Therefore, there is potential for the rail line associated with Variation E to have substantial impact to nesting habitat of this species. There would be 1.86 acres of permanent impacts to occupied least Bell’s vireo habitat with Variation E implementation.

Direct impacts to this species would include direct removal of suitable habitat and potential train car collisions with individuals.

Indirect impacts from noise, vibration, increased human activity and visual disturbance, and light disturbance could also occur as a result of the project.

Western Yellow-billed Cuckoo

This species is a riparian obligate species primarily within willow-cottonwood riparian forests. Since only a few variations contain this type of habitat, others are eliminated from discussion. Variation E Main and Variation E for both the Freeway Expressway (Freeway/Tollway) Alternative and Freeway Expressway (Freeway/Tollway) with HSR Alternative are discussed below. No impacts to this species are expected, due to the focused surveys that have not detected individuals.

Caltrans submitted a Biological Assessment to the USFWS (October 2015) based on Variation E Main Freeway/Expressway and Freeway/Tollway Alternatives with HSR Feeder Service (Preferred Alternative). Caltrans determined that the project would have no effect to Western yellow-billed cuckoo because of negative focused surveys and lack of adequate suitable habitat. Therefore, Avoidance and Mitigation Measures are not necessary. The habitat patches are not large enough for cuckoo presence, as they are known to occupy very large, wide areas of riparian habitat, up to 2,000 ft in width and have not been documented nesting in isolated patches 1 to 2 acres in size or in narrow corridors 30 to 60 feet in width (Halterman *et al.*, 2015).

Golden Eagle

Suitable foraging habitat was observed within the limits of the HDC Project; therefore, implementation of the proposed project has the potential to impact this species during the construction phase and during continued use of the facility after construction. One potential impact may occur when individuals attempt to hunt in suitable habitat where a nest is known to occur on Bell Mountain. Because adults of this species have the ability to fly away, direct impacts to individual adults are not expected during the construction phase of this project. Individuals hunting near the completed facility would have to avoid vehicles traveling at high speeds. Because vehicle/bird strikes are known to occur, there is potential for individual mortality. With the implementation of BTE-1, BTE-2, and BAN-6 [this measure requires installation of fencing that would reduce the potential for roadkill that would attract eagles to the freeway], the potential for impacts would be reduced to the point where golden eagle mortality is not expected.In addition, the accidental taking of an eagle by collision with a motor vehicle while the vehicle is being operated on a highway is not a violation of the FGC (Section 2000.5).

Implementation of the HDC Project would permanently convert suitable foraging habitat at the eastern end of the site to a paved highway/transit facility. The amount of suitable foraging habitat can be challenging to determine without a multi-year radio tracking study. Based on conversations with resource personnel and estimated home range and foraging ranges, this species is expected to forage up to 5 miles from its nesting site during breeding season. When known nest sites within a 5-mile radius of the proposed project are mapped relative to the project boundary, there are two nesting/foraging territories overlapping with the project limits. The amount of foraging habitat impacts presented in Tables 3.3.5-5, -6, and -7 were calculated using the suitable foraging habitat types presented in Table 3.3.5-2 within a 5 mile radius of the nest and within the temporary and permanent impact boundaries of each Variation/Alternative. These areas can be viewed on the map set in the Consolidated Raptor Survey Report of the *Natural Environment Study*. Conversion of these areas would result in the permanent loss of golden eagle foraging habitat. The amount of permanent habitat loss depends on which alternative and variation are selected. The maximum amount of permanent impacts to foraging golden eagle habitat is 696.19 acres and the maximum amount of temporary impacts is 461.95 acres. Because nest sites and suitable foraging habitat occur only at the eastern end of the project site, only differences among Freeway Expressway, Freeway Expressway with HSR, and Variation E in the Victorville and Apple Valley area are further discussed below.

<u>Freeway/Expressway and Freeway/Tollway Alternatives</u>

Because this alternative features only a highway, it is narrower in comparison to the Freeway/Expressway (Freeway/Tollway) with HSR Alternative, and therefore impacts to habitat for this species will occur to a lesser extent of up to approximately 150 acres because of the reduced area of impact.

Impacts to golden eagle foraging habitat located within five miles of known nest sites are described below.

Main Alignment/Common Areas

Approximately 768.47 acres of foraging habitat exists within five miles of a known golden eagle nest within this alignment area. Approximately 448.81 acres would be permanently impacted. Approximately 319.66 acres would be temporarily impacted. Through implementation of avoidance and minimization measures, impacts would be reduced.

Variation E Main

Approximately 169.55 acres of foraging habitat exists within five miles of a known golden eagle nest within this Variation. Approximately 135.66 acres would be permanently impacted and approximately 33.89 acres would be temporarily impacted. Through implementation of avoidance and minimization measures, impacts would be reduced.

Variation E

Approximately 159.35 acres of foraging habitat exists within five miles of a known golden eagle nest within this segment. Approximately 76.07 acres would be permanently impacted and approximately 83.28 acres would be temporarily impacted. Through implementation of avoidance and minimization measures, impacts would be reduced.

Freeway/Expressway and Freeway/Tollway with HSR Alternatives

The Freeway/Expressway (Freeway/Tollway) with HSR Alternative has a wider footprint and greater area within the vicinity of the Bell Mountain nest site when compared to the Freeway/Expressway (Freeway/Tollway) Alternative; therefore, impacts to golden eagle habitat would be up to approximately 111 acres higher in comparison. The HSR Alternative would increase the potential impact to this species proportional to the increase in scrubland community impacts. In addition, the HSR spur in Victorville that departs from the highway alignment would account for this additional impact for this alternative, affecting up to approximately 150 acres of scrubland habitat.

Main Alignment/Common Areas

Approximately 765.88 acres of foraging habitat exists within five miles of a known golden eagle nest within this segment. Approximately 459.74 acres would be permanently impacted and approximately 306.14 acres would be temporarily impacted. Through implementation of avoidance and minimization measures, impacts would be reduced.

Variation E Main

Approximately 328.99 acres of foraging habitat exists within five miles of a known golden eagle nest within this segment. Approximately 173.18 acres would be permanently impacted and approximately 155.81 acres would be temporarily impacted. Through implementation of avoidance and minimization measures, impacts would be reduced.

Variation E

Approximately 351.38 acres of foraging habitat exists within five miles of a known golden eagle nest within this segment. Approximately 236.45 acres would be permanently impacted and approximately 114.93 acres would be temporarily impacted. Through implementation of avoidance and minimization measures, impacts would be reduced.

Swainson's Hawk

Suitable foraging habitat was observed within the limits of the HDC Project; therefore, implementation of the proposed project has the potential to impact this species during the construction phase and during continued use of the facility after construction. Although no known nesting sites occur within the limits of the project, one potential impact may occur when individuals attempt to hunt in suitable habitat where nests are known to occur near the western end of the project site. Because adults of this species have the ability to fly away, direct impacts to individual adults are not expected during the construction phase of this project. Individuals hunting near the completed facility would have to avoid vehicles traveling at high speeds. Because vehicle/bird strikes are known to occur, there is potential for individual mortality. With the implementation of BTE-1, BTE-3, and BAN-6 [this measure requires installation of fencing that would reduce the potential for roadkill that may attract Swainson's hawk to the freeway], the potential for impacts would be reduced to the point where

Swainson’s hawk mortality is not expected.In addition, the accidental taking of a Swainson’s hawk by collision with a motor vehicle while the vehicle is being operated on a highway is not a violation of the FGC (Section 2000.5).

Implementation of the HDC Project would permanently convert suitable foraging habitat at the western end of the site to a paved highway/transit facility. The amount of suitable foraging habitat can be challenging to determine. The “Swainson’s Hawk Survey Protocols, Impact Avoidance, and Minimization Measures for Renewable Energy Projects in the Antelope Valley of Los Angeles and Kern Counties, California,” prepared by the State of California Energy Commission and California Department of Fish and Game (June 2010), was reviewed and provides guidance on this issue. It states that “monitoring/mitigation recommendations suggest surveys and acquisition of mitigation lands prior to construction of the project if nests are found within 5 miles of a project site.” When nest sites within a 5-mile radius of the proposed project are mapped relative to the project boundary, four nest foraging territories were found overlapping with the project limits. The amount of foraging habitat impacts presented in Tables 3.3.5-5, -6, and -7 were calculated using the suitable foraging habitat types presented in Table 3.3.5-2 within a 5 mile radius of the nest and within the temporary and permanent impact boundaries of each Variation/Alternative. These areas can be viewed on the map set in the Consolidated Raptor Survey Report in the *Natural Environment Study*. The amount of permanent foraging habitat depends on which alternative and variation are selected. The maximum amount of permanent impacts to foraging Swainson’s hawk habitat is 1,263.58 acres and the maximum amount of temporary impacts is 690.74 acres. Because suitable foraging habitat occurs only at the west and east ends of the project site, only differences among Main Alignment/Common Areas, Rail Options 1A, 1B, 1C, 7A, 7B, and 7C, Variation A, and Variation E; Freeway Expressway; and Freeway Expressway with HSR Alternative in the Palmdale and Victorville area are further discussed below.

<u>Freeway/Expressway and Freeway/Tollway Alternatives</u>

Because this alternative features only a highway, it is narrower in comparison to the Freeway/Expressway (Freeway/Tollway) with HSR Alternative; therefore, impacts to Swainson’s hawk habitat would occur to a lesser extent by up to approximately 85 acres because of the reduced area of impact.

Impacts to Swainson’s hawk foraging habitat located within five miles of known nest sites are described below.

Main Alignment/Common Areas

Approximately 781.73 acres of foraging habitat exists within five miles of a known Swainson’s hawk nest within this segment. Approximately 463.67 acres would be permanently impacted. Approximately 318.06 acres would be temporarily impacted. Through implementation of avoidance and minimization measures, impacts would be reduced.

Variation A Main

Approximately 303.51 acres of foraging habitat exists within five miles of a known Swainson's hawk nest within this segment. Approximately 206.73 acres would be permanently impacted and approximately 96.78 acres would be temporarily impacted. Through implementation of avoidance and minimization measures, impacts would be reduced.

Variation A

Approximately 308.06 acres of foraging habitat exists within five miles of a known Swainson's hawk nest within this segment. Approximately 209.09 acres would be permanently impacted and approximately 98.97 acres would be temporarily impacted. Through implementation of avoidance and minimization measures, impacts would be reduced.

Variation E Main

Approximately 398.40 acres of foraging habitat exists within five miles of a known Swainson's hawk nest within this segment. Approximately 299.05 acres would be permanently impacted and approximately 99.35 acres would be temporarily impacted. Through implementation of avoidance and minimization measures, impacts would be reduced.

Variation E

Approximately 376.70 acres of foraging habitat exists within five miles of a known Swainson's hawk nest within this segment. Approximately 168.45 acres would be permanently impacted and approximately 208.25 acres would be temporarily impacted. Through implementation of avoidance and minimization measures, impacts would be reduced.

<u>Freeway/Expressway and Freeway/Tollway with HSR Alternatives</u>

The Freeway/Expressway (Freeway/Tollway) with HSR Alternative has a wider corridor width compared to the Freeway/Expressway (Freeway/Tollway) without HSR Alternative; therefore, impacts to habitat for this species would be higher by up to approximately 10 acres. The HSR Alternative increases the potential impact to this species proportional to the increase in scrubland community impacts. In addition, the HSR spur in Victorville that departs from the highway alignment would be an additional impact for this alternative, affecting up to approximately 85 acres of scrubland habitat, thus resulting in increased impacts to habitat for this species.

Main Alignment/Common Areas

Approximately 786.90 acres of foraging habitat exists within five miles of a known Swainson's hawk nest within this segment. Approximately 503.14 acres would be permanently impacted and approximately 283.76 acres would be temporarily impacted. Through implementation of avoidance and minimization measures, impacts would be reduced.

Variation A Main

Approximately 385.79 acres of foraging habitat exists within five miles of a known Swainson’s hawk nest within this segment. Approximately 325.22 acres would be permanently impacted and approximately 60.57 acres would be temporarily impacted. Through implementation of avoidance and minimization measures, impacts would be reduced.

Variation E Main

Approximately 637.81 acres of foraging habitat exists within this segment. Approximately 397.73 acres would be permanently impacted and approximately 240.08 acres would be temporarily impacted. Through implementation of avoidance and minimization measures, impacts would be reduced.

Variation E

Approximately 622.17 acres of foraging habitat exists within five miles of a known Swainson’s hawk nest within this segment. Approximately 393.21 acres would be permanently impacted and approximately 228.96 acres would be temporarily impacted. Through implementation of avoidance and minimization measures, impacts would be reduced.

Rail Option 1A

Approximately 31.65 acres of foraging habitat exists within five miles of a known Swainson’s hawk nest within this segment. Approximately 1.34 acres would be permanently impacted and approximately 30.31 acres would be temporarily impacted. Through implementation of avoidance and minimization measures, impacts would be reduced.

Rail Option 1B

Approximately 29.60 acres of foraging habitat exists within five miles of a known Swainson’s hawk nest within this segment. Approximately 0.03 acres would be permanently impacted and approximately 29.57 acres would be temporarily impacted. Through implementation of avoidance and minimization measures, impacts would be reduced.

Rail Option 1C

Approximately 43.61 acres of foraging habitat exists within five miles of a known Swainson’s hawk nest within this segment. Approximately 5.48 acres would be permanently impacted and approximately 38.13 acres would be temporarily impacted. Through implementation of avoidance and minimization measures, impacts would be reduced.

Rail Option 7A

Approximately 71.20 acres of foraging habitat exists within five miles of a known Swainson’s hawk nest within this segment. Approximately 22.56 acres would be permanently impacted and approximately 48.64 acres would be temporarily impacted.

Through implementation of avoidance and minimization measures, impacts would be reduced.

Rail Option 7B

Approximately 70.35 acres of foraging habitat exists within five miles of a known Swainson’s hawk nest within this segment. Approximately 24.13 acres would be permanently impacted and approximately 46.22 acres would be temporarily impacted. Through implementation of avoidance and minimization measures, impacts would be reduced.

Rail Option 7C

Approximately 100.21 acres of foraging habitat exists within five miles of a known Swainson’s hawk nest within this segment. Approximately 32.01 acres would be permanently impacted and approximately 68.20 acres would be temporarily impacted. Through implementation of avoidance and minimization measures, impacts would be reduced.

Listed Mammals

Mohave Ground Squirrel

No impacts to this species are expected, due to the multiple focused trapping surveys that have not captured or had any incidental observations or detections of individuals. However, with the implementation of BAN-5 (HMMP), and BTE-31 (worker environmental awareness program) any impacts to suitable habitat would be reduced.

Townsend’s Big-Eared Bat

Although focused detection surveys were conducted for this species and they were not detected, not all areas of suitable habitat were able to be surveyed. In addition, suitable habitat (abandoned buildings) is likely to become more abundant prior to construction because if the building is within the footprint of the project, it will be demolished. There were many buildings in the BSA at the time of surveys that were currently occupied by humans or were on private property for which surveyors did not have access. Implementation of the HDC Project has the potential to impact this species during the construction phase. Because this species has the ability to fly away, direct impacts to individual adults are not expected. Potential exists for impacts to dependent juveniles, should they be present. With implementation of BTE-44 impacts to this species will be reduced.

Listed Reptile

Desert Tortoise

This species is known to occur within creosote bush scrub, saltbush scrub, Joshua tree woodland, and other native desert scrubland communities. Table 3.3.5-10 lists the acreage of each suitable vegetation type within each Variation under both Alternatives that will be permanently or temporarily affected by the project. The USFWS has issued a Biological Opinion (April 2016) for desert tortoise based on Variation E Main Freeway/Expressway and Freeway/Tollway Alternatives with HSR Feeder Service. The determination is that the project may affect, but is not likely to adversely affect. The project is not likely to adversely affect this biological resource because of low-quality existing habitat within the action area, project design, and the many project measures implemented to protect these resources. Acreages for these communities do not include acreage west of 240th Street East, as this is the limit of potentially occupied tortoise habitat according to the Biological Opinion issued by the USFWS (April 2016). Construction of each Variation, with the exception of Variation A, Variation D, and the Rail Options, will result in permanent impacts to occupied desert tortoise habitat. Desert tortoise occupied habitat permanent impacts is based on the location of the permanent Right-of-Way fence around the Project, not necessarily on the vegetation communities. The corridor that will be within the fenced ROW will permanently restrict tortoises from entering. Despite an area being only temporarily impacted, if that area occurs within the fenced ROW, it was considered a permanent impact. All other Variations of the Freeway/Expressway (Freeway/Tollway) Alternative and the Freeway/Expressway (Freeway/Tollway) with HSR Alternatives are discussed.

Direct and indirect impacts to desert tortoise have the potential to occur. Impacts to this species are expected to occur due to clearing and grubbing activities associated with the implementation of the proposed project. With the incorporation of mitigation measures BTE-11 through BTE-43 from the Biological Opinion, which were developed in consultation with CDFW to ensure consistency, the impacts to individuals of this species is expected to be low. Below is a discussion of direct and indirect impacts that could occur as a result of the implementation of the proposed project. The discussion is applicable to all Variations in each Alternative determined to have occupied habitat.

Direct Impacts

Depending on the Variations selected among each Alternative, a maximum of 1,686.89 acres of permanent impacts to occupied desert tortoise habitat has the potential to be impacted under the Highway and High Speed Rail compared to a maximum of 1,361.68 acres of permanent impacts to occupied desert tortoise habitat with the Highway only Alternative. Under the Preferred Alternative, a maximum of 1,686.89 acres would be permanently impacted. Under the Biological Opinion, it was stated that 1,554.83 acres would be permanently impacted as a result of the Preferred Alternative, however because of slight engineering modification to reduce impacts elsewhere, the acreage was increased slightly.

Permanent habitat loss can also occur due to the presence of non-native and invasive plant species introduced into adjacent areas once the roadway has been constructed. Seeds can be introduced to desert tortoise habitat through tires of vehicles traveling on the roadway and trucks hauling plant material, such as grains or ornamental plants, which have the potential to germinate and grow in areas adjacent to the roadway. This is not expected to have a substantial effect to desert tortoise habitat outside of the Preferred Alternative because Caltrans regularly conducts shoulder maintenance activities in areas immediately adjacent to the roadway that will inhibit the growth of non-native and invasive plants introduced via vehicle travel.

Depending on the Variations selected among each Alternative, a maximum of 692.60 acres of temporary impacts to occupied desert tortoise habitat has the potential to be impacted under the Highway and High Speed Rail compared to a maximum of 789.09 acres of temporary impacts to occupied desert tortoise habitat with the Highway only Alternative.

The temporary impact areas include those areas located immediately adjacent to the Variation/Alternative that will be outside of the permanent desert tortoise fencing. These areas may be subject to use for vehicles and equipment staging areas, storage areas, access roads and other construction related activities. Once construction of the selected Variation/Alternative has been completed, appropriate native habitat will be replanted in temporarily affected areas according to the Habitat Mitigation Monitoring Plan (HMMP), which will be prepared in coordination with the appropriate regulatory agencies.. Habitat for this species can be re-established within temporary impact zones between the highway and edge of the right-of-way. This area should be replanted with native plants similar to the natural surrounding area and the soil compacted only to a point necessary for construction purposes. This will allow any natural occurring individuals within the immediate vicinity to re-populate the temporary impact zone.

Mortality and/or injury of desert tortoises are not expected to occur during the construction phase of the project because of project measures implemented to exclude desert tortoises from the work areas (desert tortoise fencing and clearance surveys). Access and haul roads outside of the selected Variation/Alternative will be monitored and/or fenced on an as-needed basis and will contain appropriate signage and speed limits to reduce and/or eliminate impacts to desert tortoise outside of the selected Variation/Alternative. Furthermore, only approved access routes will be used for project access and equipment or material deliveries. Pets (including captive tortoises) will not be allowed in the work areas during construction, so the possibility of introduction of disease, such as upper respiratory tract disease during the construction phase, will not be an impact to desert tortoise.

Mortality and/or injury of desert tortoises are also not anticipated once the new roadway is open and operational because the entire area within occupied desert tortoise habitat will be fenced with fencing to exclude desert tortoises and other wildlife species to prevent vehicle-wildlife collisions and illegal collection of desert tortoises by the public. Introduction of disease to desert tortoises located outside of the selected Variation/Alternative is also not expected to be an impact with the presence of the desert tortoise/wildlife fence that will be constructed around the roadway.

It is possible that power poles will be constructed in association with the High Speed Rail component of the project. Current plans have not determined whether the train will be operated on diesel fuel or whether it will be operated electrically. If the train will be operated electrically, power poles in association with the train will be constructed and may provide perching sites for potential desert tortoise predators, including as common ravens. Anti-perch structures will be placed on the power poles, so this is not anticipated to be an impact to desert tortoises.

Trash may be associated with the new roadway once it is open for public use. Trash can attract desert tortoise predators, including common ravens and coyotes. The desert tortoise/wildlife fence will likely preclude coyotes from being attracted to the trash items, but fence will not provide a barrier to common ravens. Caltrans maintenance crews regularly remove trash from roadsides and wildlife-proof trash receptacles will be used at all rest stops.

Indirect Impacts

Indirect impacts could occur to desert tortoise from noise and vibration from construction activities and increased human activity, visual disturbance, dust, habitat fragmentation, growth inducement, and recreation. These impacts will be minimized through implementation of avoidance, minimization, and/or mitigation measures.

Noise from activities associated with the construction of the selected Variation/Alternative has the potential to indirectly affect desert tortoise behavior. If desert tortoises are present adjacent to the construction zones, then they may be subject to impacts from construction noise and ground vibrations. The use of large pieces of equipment with running engines, compaction equipment, drilling etc. has the potential to impact the natural behavior of the desert tortoise. Construction noise may disrupt the communication and damage the auditory system in desert tortoises. Tortoises use up to eleven different classes of vocalizations used many different social encounters (Patterson 1971, 1976). Human created noise such as that involved with construction may mask or cloud the tortoises' vocalizations and may hinder an individual's ability to communicate or respond appropriately. Construction noise could also mask the sounds of an approaching predator (USFWS1994). Past studies have found that lizards, when exposed to loud sounds even in short bursts, had damaged hearing and that repeated exposure was likely to result in even greater loss in auditory functions. While little research has been conducted on tortoises, it is likely that similar results would occur in desert tortoise (USFWS 1994). In addition, tortoises respond to ground vibrations, and construction related vibrations may encourage a desert tortoise to leave its burrow. In fact, it is fairly well known that slapping the pallet of a tortoise burrow several times will often cause the desert tortoise to emerge from its burrow to investigate the vibration. Furthermore, noise and ground disturbance has the potential to affect courtship/breeding activities of desert tortoises located in the areas adjacent to the selected Variation/Alternative.

Exceptionally noisy activities, such as blasting and pile driving, are expected to occur within the selected Variation/Alternative in desert tortoise habitat. Pile driving will not only be noisy but will create greater ground vibrations than operating construction equipment and vehicles within the selected Variation/Alternative. This impact is considered temporary, associated with the construction phase of the project only, and is not expected to be substantial to desert tortoise because tortoise densities are very low, and buffers will be established around pile driving activities that will dissipate the ground vibrations and noise by the time they reach potentially occupied desert tortoise habitat outside of the selected Variation/Alternative. Pile driving will occur where viaducts will be constructed and all work areas will be temporarily fenced during construction. The area that will be fenced is going to be at least 500 feet wide, with the pile driving occurring in a 100-foot span in the middle of the 500-foot temporary impact area, leaving a buffer of at least 200 feet on either side of pile driving activities. Some viaducts have an even larger temporary impact area, thus creating an even larger buffer around pile driving activities. With this buffer zone, it is not anticipated that effects from pile driving will have much of an impact to desert tortoises in the areas adjacent to the selected Variation/Alternative.

Once the selected Variation/Alternative has been constructed, the noise from the highway traffic and ground vibrations of the vehicles traveling over the pavement will cause permanent noise impacts to desert tortoises within the surrounding area.

Increased human activity and visual disturbances will be create permanent impacts to desert tortoise habitat located immediately adjacent to the selected Variation/Alternative once the roadway has been constructed. However, these affects are not expected to be substantial to desert tortoises because tortoise densities are low and they will only occur on the edges of desert tortoise habitat that abut the selected Variation/Alternative. The entire roadway will be fenced with desert tortoise fencing at a certain distance from the roadway to exclude desert tortoises from the area and this fencing will also create a buffer from the increased human activity and visual disturbances associated with the new roadway. Areas within the interior portions of desert tortoise habitat (further away from the roadway and associated desert tortoise fencing) will not be affected by this impact.

Temporary impacts from increased human activities and visual disturbance will occur during the construction phase of the project; however, these impacts are not expected to be different from the permanent impacts associated with the new roadway (discussed above).

Fugitive dust is a likely result of construction activities within the selected Variation/Alternative. This impact is considered a temporary impact because it will not occur once construction is completed. Because the selected Variation/Alternative is in a region that is subject to frequent windy conditions, the additional dust created by construction will likely be a minimal temporary impact. Additionally, dust control measures required by the Mojave Desert Air Quality Management District will minimize dust during construction.

Habitat fragmentation and road edge effects are expected to be a permanent impact associated with the project. The construction of the new roadway will further fragment habitat and create a new road effect zone that would affect desert tortoises in the area. The road effect zone is defined as a depressed population of desert tortoise adjacent to roadways existing up to 1,312 feet from the edge of roadway (Boarman and Sazaki, 2006). Not only does this impact reduce the amount of available habitat for desert tortoises in the area, it has the potential to decrease reproduction and gene flow through a regional tortoise population. Areas will remain connected through use of seven viaducts and 132 culverts designed for wildlife use. This is considered a permanent affect to desert tortoise.

With the construction of a new roadway within the selected Variation/Alternative, there is expected to be an increase in the number of travelers and accommodations along this route, and growth through the relocation and/or establishment of businesses along an area that is currently relatively undeveloped. The construction of these facilities may also permanently impact desert tortoise by reducing potential habitat.

With a high number of travelers expected on the new roadway, there is an increased potential for OHV activity. This may cause disturbance to desert tortoise habitat and potential direct impacts to desert tortoise.

Impacts to occupied desert tortoise habitat located within each Variation of each Alternative are described below.

Freeway/Expressway and Freeway/Tollway Alternatives

Because this alternative features only a highway, it is narrower in comparison to the Freeway/Expressway (Freeway/Tollway) with HSR Alternative; therefore, impacts to habitat for this species would occur to a lesser extent because of the reduced area of impact.

Main Alignment/Common Areas

Approximately 1,099.16 acres of occupied desert tortoise habitat exists within this segment. Approximately 738.28 acres would be permanently impacted. Approximately 360.88 acres would be temporarily impacted. Through implementation of avoidance and minimization measures, impacts would be reduced.

Variation B Main

Approximately 472.40 acres of occupied desert tortoise habitat exists within this segment. Approximately 296.94 acres would be permanently impacted. Approximately 175.46 acres would be temporarily impacted. Through implementation of avoidance and minimization measures, impacts would be reduced.

Variation B

Approximately 544.86 acres of occupied desert tortoise habitat exists within this segment. Approximately 341.92 acres would be permanently impacted. Approximately 212.94 acres would be temporarily impacted. Through implementation of avoidance and minimization measures, impacts would be reduced.

Variation B1

Approximately 503.30 acres of occupied desert tortoise habitat exists within this segment. Approximately 319.09 acres would be permanently impacted. Approximately 184.22 acres would be temporarily impacted. Through implementation of avoidance and minimization measures, impacts would be reduced.

Variation E Main

Approximately 357.36 acres of occupied desert tortoise habitat exists within this segment. Approximately 266.38 acres would be permanently impacted. Approximately 90.98 acres would be temporarily impacted. Through implementation of avoidance and minimization measures, impacts would be reduced.

Variation E

Approximately 357.36 acres of occupied desert tortoise habitat exists within this segment. Approximately 281.48 acres would be permanently impacted. Approximately 75.88 acres would be temporarily impacted. Through implementation of avoidance and minimization measures, impacts would be reduced.

Freeway/Expressway and Freeway/Tollway with HSR Alternatives

The Freeway/Expressway (Freeway/Tollway) with HSR Alternative has a wider footprint when compared to the Freeway/Expressway (Freeway/Tollway) Alternative; therefore, impacts to habitat for this species would be higher in comparison. The HSR Alternative increases the potential impact to this species proportional to the increase in scrubland community impacts. In addition to this, the HSR spur in Victorville that departs from the highway alignment would be an additional impact for this alternative, affecting up to approximately 85 acres of scrubland habitat, and thus, would result in increased impacts to habitat for this species.

Main Alignment/Common Areas

Approximately 1,044.24 acres of occupied desert tortoise habitat exists within this segment. Approximately 754.71 acres would be permanently impacted. Approximately 289.53 acres would be temporarily impacted. Through implementation of avoidance and minimization measures, impacts would be reduced.

Variation B Main

Approximately 564.28 acres of occupied desert tortoise habitat exists within this segment. Approximately 469.37 acres would be permanently impacted. Approximately 94.91 acres would be temporarily impacted. Through implementation of avoidance and minimization measures, impacts would be reduced.

Variation B

Approximately 636.16 acres of occupied desert tortoise habitat exists within this segment. Approximately 530.89 acres would be permanently impacted. Approximately 105.27 acres would be temporarily impacted. Through implementation of avoidance and minimization measures, impacts would be reduced.

Variation B1

Approximately 606.95 acres of occupied desert tortoise habitat exists within this segment. Approximately 542.93 acres would be permanently impacted.

Approximately 64.02 acres would be temporarily impacted. Through implementation of avoidance and minimization measures, impacts would be reduced.

Variation E Main

Approximately 582.14 acres of occupied desert tortoise habitat exists within this segment. Approximately 389.25 acres would be permanently impacted. Approximately 192.89 acres would be temporarily impacted. Through implementation of avoidance and minimization measures, impacts would be reduced.

Variation E

Approximately 588.58 acres of occupied desert tortoise habitat exists within this segment. Approximately 290.78 acres would be permanently impacted. Approximately 297.80 acres would be temporarily impacted. Through implementation of avoidance and minimization measures, impacts would be reduced.

Avoidance, Minimization, and/or Mitigation Measures

Listed Plants

Measure BAN-5 will be implemented to avoid and minimize impacts to listed plant species. Additionally, the mitigation measures BPL-1, BPL-2, and BPL-3 included in Section 3.3.3 (Plants) will be implemented to avoid/reduce impacts to listed plant species:

Golden Eagle and Swainson's Hawk

The following avoidance, minimization, and mitigation measures will be implemented to avoid or reduce impacts to golden eagle and Swainson's hawk:

BTE-1: A qualified biologist will recommend approved limits of disturbance, including construction staging areas and access routes, to minimize impacts to adjacent habitat. To ensure the avoidance of impacts to migratory birds, the following measures will be implemented pursuant to the FGC 3503 and Migratory Bird Treaty Act (MBTA). A qualified biologist shall be present a minimum of 1 week prior to and during clearing and grubbing activities to walk the proposed areas to be cleared and grubbed. Clearing and grubbing of vegetation will be conducted outside of the bird-nesting season. If clearing and grubbing of vegetation needs to be conducted during the bird-nesting season (February 15 to September 1) or if any other ground-disturbing activities are to begin during the bird-nesting season, a qualified biologist will monitor construction during clearing, grading, and/or trenching activities for any occurrence of the birds nesting. If birds are observed nesting, construction should stop until it is determined by the qualified biologist that the fledglings have left their nests or the nest becomes inactive. If this is not possible, coordination with a qualified biologist should take place to minimize the risk of violating the MBTA, and the following minimization measure should be considered: an environmentally sensitive area (ESA) fencing buffer shall be placed at a distance of 150 feet for songbirds and

500 feet for raptors, which must be maintained during all phases of construction, or a biological monitor shall be present during construction activities to monitor for signs of disturbance or modification of behavior.

BTE-2: Compensatory Mitigation: Depending on the alternative and variations that are chosen, up to approximately 696.19 acres of suitable foraging habitat for golden eagle could be permanently converted to a paved transit facility with the implementation of the proposed project. Conversations with USFWS and CDFW personnel suggest similar or greater quality habitat be preserved and managed for the benefit of golden eagle at the same amount that would be impacted to achieve a no net loss in habitat. Therefore, Caltrans will purchase and preserve in perpetuity at least the same amount of acres of suitable golden eagle foraging habitat that is permanently affected.

BTE-3: Compensatory Mitigation: Depending on the alternative, variation, and option that are chosen, up to approximately 1,263.58 acres of suitable foraging habitat for Swainson's hawk could be permanently converted to a paved transit facility with the implementation of the proposed project. The document "Swainson's Hawk Survey Protocols, Impact Avoidance, and Minimization Measures for Renewable Energy Projects in the Antelope Valley of Los Angeles and Kern Counties, California" and additional conversations with CDFW suggest similar or greater quality habitat be preserved and managed for the benefit of Swainson's hawk at the same amount that would be impacted to achieve a no net loss in habitat. Therefore, Caltrans will purchase and preserve in perpetuity at least the same amount of acres of suitable Swainson's hawk foraging habitat that is permanently affected.

Southwestern Willow Flycatcher and Least Bell's Vireo

The main alignment alternative would completely avoid or minimize impacts to these species. BTE-1, described above, will be implemented to avoid/reduce impacts to southwestern willow flycatcher and least Bell's vireo if any suitable riparian habitat is impacted. In addition, the following avoidance and minimization measures will be implemented:

BTE-4: Areas outside of the proposed construction zone will be designated as an ESA, and no work will be conducted within these areas to avoid potential impacts to southwestern willow flycatcher critical habitat. These areas will be fenced off clearly by use of obvious exclusion fencing prior to the onset of ground disturbance. The fencing will remain in place while the project is being constructed. An approved avian biologist will oversee the placement and design of this fencing. This measure applies to work activities in or around riparian vegetation within the Preferred Alternative.

BTE-5: Standard Best Management Practices (BMPs) will be implemented by Caltrans to protect ecologically important resources in the construction zone. General stormwater BMPs and conservation measures will be implemented during project construction to avoid any potential for downstream sedimentation effects to southwestern willow flycatcher critical habitat. The BMPs of the Storm Water Pollution Prevention Plan (SWPPP) will be designed to avoid potential indirect effects to southwestern willow flycatcher critical habitat downstream.

BTE-6: Noise effects will not exceed 60 A-weighted decibels (dBA) L_{eq} at 1,000 feet averaged over one hour from the Project boundaries.

BTE-7: Prior to the initiation of construction activities, all project personnel will be educated regarding the least Bell's vireo, southwestern willow flycatcher, and southwestern willow flycatcher critical habitat within and adjacent to the project area. Construction personnel are to remain outside of the critical habitat, unless within the approved work area.

BTE-8: The lighting on the new bridge over the Mojave River, the viaduct west of Gas Line Road, and along constructed roadways will consist of directional lighting that focuses the light on the roadway or the HSR.

BTE-9: During rock-blasting activities for bridge construction over the Mojave River, rockfall protection measures will be implemented to prevent any rock or debris resulting from the blasting to roll into the Mojave River to avoid impacts to water flow downstream. This measure applies to project activities in the Mojave River only.

BTE-10: In compliance with Executive Order (EO) 13112, a weed abatement program will be developed to minimize the importation of nonnative plant material during and after construction to avoid impacts to riparian vegetation downstream. Eradication strategies would be employed should an invasion occur.

Desert Tortoise

BTE-4 described above will also be implemented to avoid, minimization, and/or mitigate impacts to desert tortoise. The following additional measures will be implemented to avoid/reduce impacts to desert tortoise:

BTE-11: Compensatory Mitigation: The loss of desert tortoise habitat will be compensated for by paying compensation at a 1 to 1 ratio for permanent, adverse effects up to a maximum of 1,686.89 acres of desert tortoise habitat. Compensation will include the acquisition of land within a Desert Wildlife Management Area and/or contribution of an equivalent monetary value towards recovery actions in West Mojave. Recovery actions can include restoration, closing roads, fencing installation, repairs or purchase and discontinued use of Bureau of Land Management (BLM) grazing allotments. If the project design changes and increases or decreases the total amount of desert tortoise habitat that is adversely affected, Caltrans would pay compensation for the total amount of acres that are permanently lost.

Authorized Biologists and Desert Tortoise Monitors

BTE-12: An authorized biologist will be designated for the project prior to the start of construction. He/She is a person the USFWS has approved to conduct specific activities to protect desert tortoises during the implementation of a project (e.g., clearance surveys, handling of individuals, etc.). A desert tortoise monitor (monitor) is a person who assists the authorized biologists in protecting desert tortoises. The authorized biologist is responsible for supervising monitors and ensuring that monitors are sufficiently trained to perform assigned tasks, including the handling of desert tortoises. Authorized biologists and monitors are responsible for monitoring project activities within desert tortoise habitat, ensuring proper implementation of protective measures, and recording and reporting desert tortoise observations. Monitors report incidents of non-compliance to authorized biologists, and authorized biologists turn in reports of non-compliance to Caltrans and the USFWS immediately.

BTE-13: Caltrans will employ an appropriate number of authorized biologists and monitors during construction of the HDC transportation facility for the protection of the desert tortoise. Authorized biologists will monitor each activity where conditions exist that may result in injury or mortality of desert tortoise (e.g., clearing, grading, re-contouring, and restoration activities).

BTE-14: Caltrans will review and provide the credentials of all individuals seeking approval as authorized biologists to the USFWS at least 30 days prior to the time they are needed in the field.

BTE-15: Authorized biologists and monitors will have the authority to halt any activity immediately that does not comply with the protective measures described in the biological opinion and report non-compliance to Caltrans and then to the USFWS.

BTE-16: Individuals approved to capture and handle desert tortoises, perform pre-project clearance surveys, move desert tortoises out of harm's way, excavate burrows, handle nests and eggs, construct artificial burrows, and temporarily confine desert tortoises will do so in compliance with the Desert Tortoise Field Manual (USFWS 2009) or most up-to-date USFWS guidance. The Desert Tortoise Field Manual can be found at http://www.fws.gov/carlsbad/PalmSprings/DesertTortoise.html. Individuals approved to perform these tasks include authorized biologists and monitors who are under the direct supervision of an authorized biologist.

BTE-17: An authorized biologist will be present during the removal of desert tortoise habitat east of 240th Street East; if an authorized biologist is within the immediate area and directly overseeing the habitat removal, a monitor can directly supervise vegetation removal.

Installation of Exclusionary Fencing around Construction Area

BTE-18: Prior to construction, Caltrans will install a temporary desert tortoise exclusion fence around all project areas in desert tortoise habitat, including staging and storage areas, as determined by an authorized biologist between 240th Street East and the eastern end of the project. Roads crossing the HDC will terminate at the exclusion fence and turnarounds will be developed. Caltrans will install the exclusion fences as specified in the USFWS's Desert Tortoise Field Manual (2009) or most up-to-date USFWS guidance utilized

BTE-19: Authorized biologists and monitors will conduct daily clearance surveys of desert tortoise exclusion fence alignments during installation and monitor installation at all times. After exclusion fence construction is completed, authorized biologists and monitors will conduct 100 percent clearance surveys within the exclusion fence. Desert tortoises that are found inside the fence will be translocated, in accordance with the specifications established by the most up-to-date USFWS guidelines.

BTE-20: To the maximum extent practicable, Caltrans will place fence alignments and the features that they are enclosing (e.g., road alignment, etc.) in a manner that reduces the number of desert tortoises that must be moved off the project site.

BTE-21: The authorized biologist will use their best judgment regarding measures to use to ensure that desert tortoises do not immediately return to fenced areas or other areas they have been moved from to ensure their protection. The authorized biologist may use temporary penning, in accordance with the Desert Tortoise Field Manual (USFWS 2009) or most up-to-date USFWS guidance, to prevent desert tortoises from re-entering these areas during construction.

BTE-22: Caltrans will install shade structures, in accordance with the Desert Tortoise Field Manual (2009) or most up-to-date USFWS guidance, at regular intervals along exclusion fence to provide shade for desert tortoises that exhibit fence-pacing behavior.

BTE-23: Caltrans will inspect the temporary exclusion fence twice per week and repair, when necessary, during the construction of the HDC transportation facility to ensure that desert tortoises are excluded from the construction area.

BTE-24: Caltrans will confine all construction activities, project vehicles, and equipment to the area within the exclusion fence.

Translocation of Desert Tortoises

BTE-25: Authorized biologists will conduct health assessments, in accordance with the Health Assessment Handbook (USFWS 2013b) or most up-to-date USFWS guidelines, on all desert tortoises found during the clearance surveys for clinical signs of disease prior to translocation. If any desert tortoises are found with signs of disease, Caltrans will contact the USFWS to determine further actions. Any authorized biologist conducting health assessments must be approved by USFWS to perform these duties after attending and passing the USFWS health assessment course.

BTE-26: California Department of Fish and Wildlife (CDFW) and USFWS will approve Caltrans' translocation site(s) and translocation plan before construction commences. Caltrans will translocate desert tortoises to suitable habitat within the southern portion of the Fremont-Kramer Critical Habitat Unit or the Monkeyflower Area of Critical Environmental Concern as determined by USFWS and CDFW.

BTE-27: Desert tortoises will be translocated and released into suitable habitat and placed in the shade of a shrub. If an individual is found in a burrow, the desert tortoise will be excavated from the burrow and translocated to an unoccupied burrow similar to the hibernaculum in which it was found. Translocated desert tortoises will not be placed in existing occupied burrows. If an existing burrow that is similar in size, shape, and orientation to the original burrow is unavailable, the authorized biologist will construct one in accordance with the Desert Tortoise Field Manual (USFWS 2009) or most up-to-date USFWS guidance.

BTE-28: Caltrans will monitor survivorship and movement activity for translocated desert tortoises for up to five years using radio telemetry in accordance with the Desert Tortoise Monitoring Handbook (USFWS 2015c) or most up-to-date USFWS guidance.

Worker Environmental Awareness Program

BTE-29: Caltrans will ensure that all workers associated with the transportation facility receive worker environmental awareness training to ensure the protection of the desert tortoise and its habitat. Caltrans will develop and implement the program and an authorized biologist or monitor will administer the training to all personnel. The worker environmental awareness training will:

a. Be developed by or in consultation with an authorized biologist and consist of a presentation in which supporting written material and electronic media, including photographs of protected species, are made available to all participants;

b. Discuss general conditions of the Act, necessity for adhering to the requirements of the Act, potential for civil and criminal penalties associated with violating the provisions of the Act, and specific requirements for complying with the provisions of the Act as they relate to the project;

c. Place special emphasis on the natural history of the desert tortoise, including information on physical characteristics, photographs, distribution, behavior, ecology, and sensitivity to human activities;

d. Describe construction activities that may affect the desert tortoise and its habitat, the purpose and function of the desert tortoise avoidance and minimization measures, legal protections and penalties, reporting requirements and procedures for personnel if non-compliance of environmental requirements occurs;

e. Inform workers that the authorized biologists and monitors have the authority to halt work in any area where an unauthorized adverse impact to biological resources may occur if the activities continued;

f. Discuss general safety protocols such as hazardous substance spill prevention and containment measures and fire prevention and protection measures;

g. Describe project site boundaries within which project activities may be conducted;

h. Provide contact information for the authorized biologists and monitors to handle late comments and questions about the material discussed in the program, as well as notification of any dead or injured wildlife species encountered during project-related activities;

i. Direct all workers to report all observations of listed species and their sign to an authorized biologist for inclusion in the yearly compliance report;

j. Include a training acknowledgment form to be signed by each worker indicating that they received training and will abide by the guidelines;

k. Provide information regarding the effects of predation on the desert tortoise by common ravens (*Corvus corax*) and other predators and describe preventative measures that reduce the likelihood that predators will be attracted to the project area;

l. Warn of the potential for desert tortoises to take refuge under vehicles and to notify an authorized biologist in that event; and

m. Describe the specific procedures to be followed to move a desert tortoise that may be in imminent danger (i.e., on a heavily traveled road without an authorized biologist nearby).

Desert Tortoise Protective Measures

BTE-30: Caltrans will have an authorized biologist on-site during ground-disturbing activities to move any desert tortoises out of harm's way that may have been missed during clearance surveys. If a desert tortoise, whether dead, injured, or entrapped, is found in the project area after the 100 percent clearance survey is completed, all work within the area will halt.

BTE-31: All vehicles and equipment on project sites, including private automobiles parked outside of areas that have desert tortoise exclusion fencing, must be inspected by drivers prior to moving them to ensure that desert tortoises have not moved underneath the parked vehicle. If project personnel encounter a desert tortoise, they will contact an authorized biologist, and the desert tortoise will be allowed, under its own volition, to move a safe distance away prior to moving the vehicle. Inspection flags will be placed on heavy equipment at the end of the day to remind drivers to look under them prior to startup.

BTE-32: If a desert tortoise is found in a construction area where fencing was deemed unnecessary, work will cease until the individual leaves under its own volition to a safe distance out of harm's way. The authorized biologist will decide upon the extent of additional surveys and fencing needed.

BTE-33: No desert tortoise will be captured, moved, transported, released, or purposefully caused to leave its burrow for any reason when the ambient air temperature is above 95 degrees Fahrenheit (°F). No desert tortoise will be captured if the ambient air temperature is anticipated to exceed 95°F before handling or processing can be completed. If the ambient air temperature exceeds 95°F during handling or processing, desert tortoises will be kept shaded in an environment that does not exceed 95°F, and not released until ambient air temperature declines to below 95°F.

BTE-34: Caltrans will contain all trash associated with the project that could provide subsidies to predators in secure, self-closing receptacles. Caltrans will also remove and dispose of all road-killed animals on the project to prevent the introduction of subsidized food resources for common ravens and coyotes (*Canis latrans*).

BTE-35: Caltrans will ensure that workers do not bring firearms and pets into the project area. Firearms carried by authorized security and law enforcement personnel are exempt from this measure.

BTE-36: Caltrans and the contractor will follow the standard best management practice field manual (Caltrans 2003) with regard to dust, erosion, and sediment control.

BTE-37: Project personnel will ensure water used for construction does not create standing water that could attract desert tortoises or predators, such as common ravens and coyotes, to the site. When not in use, all water sources such as hydrants or open water trucks will be covered to prevent use by animals.

BTE-38: Culverts in desert tortoise habitat will have soft bottoms and will allow desert tortoises to enter and exit safely from each end.

BTE-39: Signs will be placed, as needed, to indicate the need to reduce speeds on roadways and strictly confine activities to the project area. All site personnel will adhere to a 35 miles per hour speed limit in unfenced areas (Caltrans 2016).

Prevention of Introducing Non-native and Invasive Plant Species

BTE-40: Caltrans will prevent the introduction or further spread of invasive and non-native species during and after construction to the work area by developing a weed abatement program.

Post-Construction

BTE-41: Permanent desert tortoise exclusion fencing, in accordance with the Desert Tortoise Field Manual (USFWS 2009) or most up-to-date USFWS guidance will be installed parallel to the outside edge of the operational areas of the project, not necessarily the rights-of-way edge, in areas of suitable habitat where bridges are not located. This fencing will be a part of standard highway inspections and maintained in perpetuity. Roads that cross the HDC in desert tortoise habitat will be terminated and turnarounds will be used.

BTE-42: Wildlife-proof trash containers will be installed and regularly emptied at all rest stops or train stations associated with the HDC transportation facility.

BTE-43: Perching opportunities for common ravens and raptors near habitat supporting desert tortoise will be limited, structures incorporating a design to discourage raven and raptor perching should be selected including Avian Power Line Interaction Committee guidelines (APLIC 2006) for avoiding unintended injuries to birds.

Townsend's Big-Eared Bat

Measure BAN-3 will be implemented to avoid and minimize impacts to Townsend's big-eared bat. Additionally, the following measures will be implemented to avoid/reduce impacts to Townsend's big-eared bat:

BTE-44: A qualified biologist will recommend approved limits of disturbance, including construction staging areas and access routes, to minimize impacts to adjacent habitat. To ensure the avoidance of impacts to bats, preconstruction surveys will be conducted of rock faces adjacent to the roadway and any trees designated for removal due to the initiation of construction-related activities to assess any potential presence of the species. This preconstruction survey would be conducted prior to start of construction within any potential bat roost habitat at any time of year. Clearing and grubbing of vegetation will be conducted outside of the bat maternity season (December 1 to February 14). If clearing and grubbing of vegetation needs to be conducted during the bat maternity season (February 15 to November 30), a qualified biologist will monitor construction during clearing, grading, and/or trenching activities for any occurrence of the species breeding. If any species are found during preconstruction surveys, they will be excluded using CDFW, U.S. Forest Service (USFS), and USFWS-approved methods. Alternate bat habitat will be provided for any excluded bats.

3.3.6 Invasive Species

Regulatory Setting

On February 3, 1999, President William J. Clinton signed Executive Order (EO) 13112 requiring federal agencies to combat the introduction or spread of invasive species in the United States. The EO defines invasive species as “any species, including its seeds, eggs, spores, or other biological material capable of propagating that species, that is not native to that ecosystem whose introduction does or is likely to cause economic or environmental harm or harm to human health." Federal Highway Administration (FHWA) guidance issued August 10, 1999, directs the use of the State’s invasive species list, maintained by the California Invasive Species Council to define the invasive plants that must be considered as part of the National Environmental Policy Act (NEPA) analysis for a proposed project.

Affected Environment

Information for this section came from the *Natural Environment Study* (June 2016) for the project. Although EO 13112 also includes invasive animals and microorganisms, this discussion pertains specifically to invasive plants.

Twelve (12) non-native invasive plants occurring on the California Exotic Plant Council’s (Cal-IPC) Invasive Plant Inventory were identified throughout the project area. These species have been categorized as being High, Moderate, or Limited threat to wildlands. The invasive species identified in the project area with a high rating include giant reed *(Arundo donax),* Sahara mustard *(Brassica tornefortii),* red brome *(Bromus madritensis* ssp. *rubens.),* cheatgrass *(Bromus tectorum)* and Mediterranean tamarisk *(Tamarix ramosissima).* Moderate rated invasive species include ripgut brome *(Bromus diandrus),* shortpod mustard *(Hirschfeldia incana),* Bermuda grass *(Cynodon dactylon),* and foxtail barley *(Hordeum murium).* Limited rated invasive species include redstem stork’s bill *(Erodium cicutarium),* Russian thistle *(Salsola tragus),* and common Mediterranean grass *(Schismus barbatus).* Cal-IPC invasive plant threat ratings are as follows:

- **High** - These species have severe ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal and establishment. Most are widely distributed ecologically.
- **Moderate** - These species have substantial and apparent—but generally not severe—ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal, though establishment is generally dependent upon ecological disturbance. Ecological amplitude and distribution may range from limited to widespread.
- **Limited** - These species are invasive but their ecological impacts are minor on a statewide level or there was not enough information to justify a higher score. Their reproductive biology and other attributes result in low to moderate rates of

invasiveness. Ecological amplitude and distribution are generally limited, but these species may be locally persistent and problematic.

Environmental Consequences

No Build Alternative

There would be no change from existing conditions with the No Build Alternative.

Common to All Build Alternatives

The project has the potential to spread invasive plant species to adjacent native habitats and/or create conditions conducive to the natural establishment of invasive plant species. The spread of invasive plant species is anticipated due ingress/egress of construction equipment that could unknowingly be contaminated by invasive plant species. Post-construction revegetation materials could also harbor invasive plant seeds in materials such as seed mixes and mulch. O&M activities could also potentially spread invasive plant species.

Invasive plant species were observed during biological surveys and seed from these species will be present within and outside of the project area prior to commencement of construction. During the construction process, vehicles and equipment used could harbor seed from invasive plants that are windborn or stuck to materials/supplies from temporary laydown areas. The pre-project presence of invasive species may also become amplified due to the movement of vehicles and equipment as they are driven throughout the project area; seed trapped in dirt clods, mud, or adhered directly to vehicles and equipment can be transported unknowingly throughout the project site. The spread of invasive plant species during construction could result in a substantial impact because of the potential for such wide-spread dispersal throught the entire site and adjacent areas. However, with the implementation of Mitigation Measures BIN-1 through BIN-6 impacts would be less than substantial.

During the post-construction revegetation phase vehicles and equipment used by the landscaping contractor could spread invasive plant species in the same ways that construction vehicles and equipment would. In addition, inadvertent introduction of invasive plant species could occur through the use of landscaping materials such as seed mixes, mulch, and soil amendments. As during construction, revegetation work would occur throughout much of the project area and have the potential to spread invasive plant species that were not already present prior to construction. The spread if invasive plant species during the post construction revegetation phase would be less than substantial with the implementation of Mitigation Measures BIN-7 and BIN-8.

Long-term maintenance activities could also spread invasive plant species. Road shoulders would need to be maintained and maintenance activities could include grading and herbicide treatment of weeds. Both of the activities have the potential to spread invasive plant species throughout the project area. Storage yards and maintenance properties are not expected to contribute to the spread of invasive plant species because these facilities are typically developed and maintained free of vegetation. With the implementation of Mitigation Measures BIN-9 and BIN-10 impacts from long-term maintenance activities would be less than substantial.

Even if actions were taken to minimize the spread and establishment of invasive plant species within the project area during or post-construction, one contributing factor is the spread of invasive plant species due to vehicular traffic from the public during normal use of the facility after construction is completed. A multitude of vehicle types traveling along transportation corridors are known to deposit seed from unknown origin, some of which can be invasive. Since the public would not be held to maintaining their vehicles free of weed seed, it is inevitable there would be an influx of non-native plant species to the project area due to vehicular travel post construction. Longterm maintenance activities of the highway would reduce the presence of invasive plant species, as discussed previously, including those spread by the public and likely restrict the spread only to the immediately shoulder areas. Therefore, with implementation of Mitigation Measures BIN-9 and BIN-10 impacts would be less than substantial.

Avoidance, Minimization, and/or Mitigation Measures

In compliance with EO 13112, a Weed Abatement Program will be developed to minimize the importation of non-native plant material during and after construction. Eradication strategies would be employed should an invasion occur. At a minimum, this Program will include the following measures:

BIN-1: Inspect and clean construction equipment at the beginning and end of each day and prior to transporting equipment from one project location to another during construction. Remove as much plant material (roots, stems, leaves, seeds) from equipment and machinery as possible.

BIN-2: During construction, minimize soil and vegetation disturbance to the greatest extent feasible.

BIN-3: Ensure that all active portions of the construction site are watered a minimum of twice daily or in compliance with any current or future drought policy outlining water policies. This can be modified more often when needed due to dry or windy conditions. This measure is meant to prevent erosion due to wind and to minimize seed dispersal during construction.

BIN-4: Ensure that all material stockpiled is sufficiently stabilized (e.g., apply soil cement or equivalent) to prevent erosion due to wind to minimize non-native plant growth during construction; different specifications will apply to topsoil storage.

BIN-5: During construction, obtain soil/gravel/rock from weed-free sources.

BIN-6: Use only certified weed-free straw, mulch, and/or fiber rolls for erosion control.

BIN-7: Following construction, revegetate affected areas adjacent to native vegetation with plant species that are native to the vicinity and that have been approved by the District Biologist.

BIN-8: Avoid the use of species listed by Cal-IPC's California Invasive Plant Inventory Database for revegetation of disturbed areas following construction.

BIN-9: Following construction, monitor erosion control measures and revegetation sites for two to three years in order to detect and control the introduction/establishment of non-native invasive species.

BIN-10: Outline eradication procedures to be employed (e.g., manual, mechanical, chemical) should a non-native invasive plant infestation occur. The use of herbicides will be prohibited within and adjacent to native vegetation, except as specifically authorized and monitored by the District Biologist and Restoration Ecologist.

3.4 Relationship between Local Short-Term Uses of the Human Environment and the Maintenance and Enhancement of Long-Term Productivity

No Build Alternative

The No Build Alternative would not have construction impacts or use local resources, nor would it enhance long-term productivity. This alternative would not provide long-term benefits to the community or the High Desert region. Route continuity would not be implemented and congestion relief would not be provided within the project vicinity, and operations on local roadways would worsen as the region's population grows.

Build Alternatives

Implementation of the High Desert Corridor (HDC) Project build alternatives would result in attainment of long-term transportation objectives as identified in federal, state, and local/regional planning documents dating back to the 1930s/40s as described in Section 1.1.2, Planning Background. The proposed project would provide a substantial long-term benefit to the High Desert region by improving east-west mobility and addressing present and future travel demand needs. Other long-term benefits of the proposed project are listed in Section 1.2.1, Purpose. As a new transportation facility, the HDC Project is an integral component of long-range planning for the High Desert region of Los Angeles and San Bernardino counties, as well as the southern California region.

The build alternatives would have similar impacts and are discussed separately only if an impact would not apply to all four build alternatives. These impacts would vary in degree and severity for each alternative, but they are generally similar.

The following local short-term impacts are expected from the project:

- **Displacement of Households and Businesses.** Relocation of these uses would be required, resulting in temporary disruption of residents, neighborhoods, and businesses; however, this would not result in substantial changes to community character and potential impacts to neighborhood cohesion over the long term.
- **Construction Traffic Impacts.** Construction impacts related to travel lane closures and traffic detours would result in temporary inconveniences and lost productivity due to delays.
- **Construction Air Quality and Noise Impacts.** Properties in the vicinity of construction activities would be exposed to air and noise emissions and increased noise levels.
- **Temporary Natural Habitat Displacement.** Construction activities would displace natural habitat that is used by common and sensitive species; long-term adverse effects are not expected.
- **Increased Energy Usage during Construction.** A considerable amount of energy would be consumed during the operation of construction equipment and manufacture/fabrication of construction materials.

- **Increased Water Consumption during Construction.** A considerable amount of water would be consumed during construction for dust control, compacting of soil, and other construction-related uses.
- **Environmental Justice Impacts.** Low-income populations identified within the project area may be affected and deterred from utilizing the new facility if one of the two tolling alternatives is selected.

Compliance with standard conditions and implementation of minimization and mitigation measures would help to reduce these impacts. These measures, which are identified in each section and summarized in Appendix F, include the phased acquisition of property, development of a Traffic Management Plan (TMP), use of soil binders or a dust palliative in lieu of water to control dust, and compliance with regulations designed to reduce construction-related impacts. Though the impacts would be considered short term when compared to the long-term productivity of the project, the duration of construction (approximately 36 to 48 months per approximately 16-mile phase) may be viewed as a prolonged inconvenience to the residents and businesses in the immediate area of construction.

Short-term benefits would also result from the project. These benefits would include an increase in jobs and revenue in the local economy generated during construction activities.

The following long-term impacts are expected from the project:

- **Farmland Impacts.** The project would result in the permanent conversion of approximately 252 acres of designated Important Farmland and 2,965 acres of grazing lands to nonagricultural use. The alternative with HSR would involve the construction of station in the Palmdale area. This would affect about 650 acres of sheep grazing land in addition to the Important Farmland and grazing land under the alternatives without HSR.
- **Displacement of Households, Businesses, and Public Facilities.** Depending on the build alternative and variation, all of the build alternatives would result in the displacement of homes, businesses, and/or public facilities. Adequate replacement stock for residential and business units within the area has been identified.
- **Long-Term Loss of Habitat for Sensitive Species.** The project would remove about 5,700 acres of natural communities that could be used as habitat by various animal species.
- **Change in Visual Character.** The project would introduce a major transportation corridor in undeveloped areas of the High Desert region.
- **Potential Impacts to Archaeological and Paleontological Resources.** Previously unidentified cultural materials and/or paleontological resources could be unearthed and destroyed during construction activities.
- **Increased Noise.** Even with abatement, noise levels next to the roadway in some areas would be elevated with introduction of a new transportation facility.

- **Permanent Consumption of Construction Materials.** An irrevocable use of materials would be used during construction, including concrete, steel, and asphalt.

The project would provide long-term benefits both in and beyond the High Desert region. The following long-term benefits are expected from the project:

- **Improvement to Traffic Circulation.** The project would provide route continuity and relieve traffic congestion by providing a new 63-mile-long east-west continuous route from State Route (SR) 18 in Apple Valley to SR-14 in Palmdale. These transportation improvements would better distribute traffic on the region's roadway network. As a result, this would benefit the community and support the circulation demands of future development in the project vicinity by increasing access to and from the region, while reducing congestion on local streets and alternate highways.
- **Reduction of Truck Trips on Local Roadways.** With a high-speed roadway, the HDC Project would attract truck traffic that currently uses substandard state highways and local roadways between Apple Valley and Palmdale. This would improve operations on state and local roadways throughout the project vicinity.
- **Improvement to Interregional Goods Movement.** Together, SR-14, SR-18, Interstate 15 (I-15), and United States Highway 395 (US 395) provide a link to other state routes and interstate roadways that are used by trucks transporting goods beyond the local area; therefore, providing an improved route would allow more efficient goods movement in and beyond the HDC Project vicinity.

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3.5 Irreversible and Irretrievable Commitments of Resources that Would be Involved in the Proposed Project

No Build Alternative

The No Build Alternative would not result in the irretrievable commitment of the resources required to construct the High Desert Corridor (HDC) Project; however, with this alternative, resources would be committed for road and highway improvement projects that are planned or proposed by the California Department of Transportation (Caltrans) and local agencies in the High Desert over the next 25 years. Nevertheless, the irretrievable commitment of resources associated with the build alternatives is expected to far exceed the resources commitment associated with the No Build Alternative. These losses should be considered in the context of the benefits of reduced travel times and improved efficiency for the movement of vehicles, people, and goods that would result from implementation of the HDC Project.

Build Alternatives

Implementation of the proposed project would involve the commitment of a range of natural, physical, human, and fiscal resources. The commitment of these irretrievable resources for the build alternatives would vary in degree and amount; the two alternatives with rail components and their variations would consume more land and physical resources than the two highway-only alternatives and their variations. For all practical purposes, land used in construction of the HDC Project is considered an irreversible commitment of resources. In addition to these direct impacts on land resources, there would be irretrievable secondary project impacts associated with opening up new lands for development in areas that were previously inaccessible. These properties would mostly be in the immediate vicinity of proposed HDC interchanges and intersections, where highway-serving commercial uses are most likely to locate; however, with improved mobility and accessibility, residential developers could potentially be attracted to lands in the vicinity of HDC interchanges and intersections.

The following additional irreversible and irretrievable commitments of resources from the physical and natural environment would occur as a result of the build alternatives:

The build alternatives would require acquisition of developed residential and nonresidential properties for right-of-way (ROW). Loss of these properties and their reuse for transportation purposes would be an irreversible and long-term commitment of resources. As discussed in Section 3.1.4.2, Relocation and Property Acquisition, the demolished residential and nonresidential uses would, in most cases, be replaced within the High Desert region. While adequate replacement opportunities are available, the relocation of land uses would also result in a commitment of available resources as replacement opportunities. Although the number of replacement structures needed is a very small percentage of the projected long-term growth for the region, the relocated uses would reduce the amount of available inventory. New development would be needed to serve the projected growth for the region, so the loss of the current inventory may encourage new development, which would also require a commitment of similar nonrenewable resources.

In addition to the commitment of resources from the physical and natural environments, considerable amounts of fossil fuels, water, labor, and highway construction materials, such as concrete cement, aggregates (i.e., sand and gravel), asphalt, steel, paint, fencing, and plastics, would be expended during construction and would not be retrievable. Large amounts of labor and natural resources are used in the making of construction materials, and these materials are generally not retrievable; however, these resources are not in short supply, and their use for the proposed project would not have an adverse effect on their continued availability in the High Desert region.

During the public review period of the draft environmental document, concern was raised about the impact to water supply in the High Desert area from project construction and operation activities. Regarding water supply and availability, the project is not expected to result in the destruction of groundwater wells or the permanent lowering of groundwater levels. There would be no placement of impervious road surfaces in recharge areas. Furthermore, all of the offsite water would be conveyed through the facility and back to the environment. All onsite water would be treated and then released into the environment via the proposed infiltration basins, thereby augmenting the groundwater regime. Construction of the project would result in alterations to drainage; however, these drainage realignments are not anticipated to substantively affect ground surface permeability via paving and changes in topography via grading and excavation. A reduction in recharge is not expected to occur that could affect groundwater levels in the aquifers or existing and potential water supplies.

Plant establishment as part of the landscape activities would be accomplished with water trucks delivering water to either temporary irrigation systems or to a natural water delivery/storage system in the area. During plant establishment, irrigation would be managed such that adequate moisture is maintained for the plant species to become established. Once established, no further irrigation would be required. The temporary impact to water supply during plant establishment would be at the location where water trucks receive their water. The long-term impact to the local water supply would be the volume of water that the plant root systems require from local ground moisture. Because native plants from various vegetation communities along the corridor would be utilized, impacts to water supply and availability would be minimized.

During the construction phase, to reduce the need for potable water during drought conditions, Caltrans would direct the Contractor to use soil binders or a dust palliative to control dust (refer to Mitigation CI-UT-2 in section 3.6, Construction Impacts). Dust control binders and dust palliative materials would be directly applied to the surface without mixing with water, thereby minimizing the use of potable water during construction of the project. Another alternative that would conserve potable water may also be offered by the Victor Valley Wastewater Reclamation Authority's project, which includes construction of two subregional water reclamation facilities. Construction of the facilities began in April 2015, and the project is scheduled for completion by mid 2017. Potable water resources would be protected by utilizing reclaimed water for dust suppression and, if necessary, landscape irrigation.

Construction of the HDC Project would also require a substantial one-time expenditure of local, state, and federal funds, which are not retrievable; however, anticipated savings in energy consumption, travel time, improved transportation system efficiency, and improved public health and safety would offset this use of funds. In addition to the initial ROW and construction costs, there would be ongoing costs for roadway maintenance, including pavement, landscaping, roadside litter/sweeping, signs and markers, and electrical and storm drain maintenance; however, this long-term financial commitment would be balanced by the overall transportation benefits that the project would provide, as discussed in Chapter 1, Purpose and Need.

The commitment of these resources to the HDC Project should be considered in the context that residents, workers, travelers, and others in the immediate area, region, and state would benefit from the improved quality of the transportation system in the High Desert region of Los Angeles and San Bernardino counties. As such, improvements to local and regional mobility and accessibility are expected to outweigh the irreversible and irretrievable commitment of resources to construct and implement the project.

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3.6 Construction Impacts

This section discusses impacts on various environmental resources from construction of the High Desert Corridor (HDC) project build alternatives.

Affected Environment

To understand the temporary construction impacts associated with the HDC build alternatives, a typical construction sequence is provided.

Construction Sequence

Project construction would commence after acquisition by the California Department of Transportation (Caltrans) of all right-of-way (ROW). The construction sequence would begin with site clearing of all improvements, which includes demolition of buildings and structures, followed by utility relocation, facility construction, and landscaping/finishing work. Construction of any of the HDC build alternatives is estimated to take approximately 4 years if the project were to be constructed entirely at one time. For traffic study and emission estimation purposes, project construction is assumed to start in early 2017 and be completed in late 2020, which is the scheduled opening year. This schedule assumes that funding is available from the start to build the entire project. Should funding not be available to construct the entire project at one time, a phasing plan would be developed. The proposed project would then be built incrementally over several years as funding becomes available.

Several potential construction phasing scenarios were developed and presented in the Draft Environmental Impact Report (EIR)/Environmental Impact Statement (EIS) prepared for this project (September 2014) in case funding to construct the entire project cannot be immediately obtained. In that event, an analysis of logical termini and independent utility indicates that construction phasing would likely be divided into the following segments:

- Segment 1 (about 9 miles), in Los Angeles County from State Route (SR) 14 to 90th Street East
- Segment 2 (about 33 miles), which is the toll section, located in both counties from 90th Street East to United States Highway 395 (US 395)
- Segment 3 (about 12 miles) in San Bernardino County, from US 395 to Dale Evans Parkway
- Segment 4 (about 9 miles), located in San Bernardino County, from Dale Evans Parkway to SR-18

It is likely that Segments 1 and 3 would be funded first and would be constructed concurrently. Segment 2 would potentially be built by a private developer after the completion of Segments 1 and 3. Segment 4 would be the last segment to be constructed.

For impact analysis purposes, a construction schedule of about 36 to 48 months is assumed to complete each of the project segments, as shown in Table 3.6-1. Should funding not be immediately available, the project would be built in phases (as described above) over a period of several years. In that case, the construction schedule is expected to extend from 2016 to 2040, with the opening year for initial segment of 2020.

A Traffic Management Plan (TMP) would be developed to reduce the impacts of traffic congestion and detours during construction. Except for short-term closures to install bridge falsework (i.e., temporary supports while the bridge is being built), most of the arterial roadways and most secondary streets crossing the construction corridor would remain open during construction. The project would be designed so that existing passenger and freight railway operations would not be interrupted during construction. Some nighttime work would be planned on busy thoroughfares to minimize traffic disruption, especially when temporary lane or road closures are required.

The generalized construction sequence for a project of this type and scale is described below for the purpose of impact assessment. The actual construction process would be determined by the contractor in accordance with requirements of the construction contract. Construction would be done in phases to minimize impacts to local residents and businesses. The timing of construction in certain areas, such as in the vicinity of active bird nests, would have to be scheduled in accordance with the seasonal restrictions established by the regulatory agencies, as described below under Avoidance, Mitigation, and/or Minimization Measures.

The contractor would require temporary laydown and staging areas for field trailers, storage and equipment, and construction-related activities within the vicinity of the project corridor. The contractor may propose to set up temporary rock-crushing equipment on the construction site to recycle concrete and asphalt rubble for use as base material to be placed under the street pavement. The contractor may also propose to set up and operate an onsite batch plant to prepare Portland cement concrete or hot-mix asphalt. Soil disposal would be undertaken according to the regulatory requirements. The contractor would be responsible for identifying sites to obtain borrow/fill material.

Step 1: Mobilization and Staging

The first step in the construction process involves contractor preparation of the site for construction activities. This would be done after all required preconstruction surveys are conducted and permits are obtained.

Step 2: Site Clearing and Demolition

Under this step, the roadway/railway alignment would be cleared of conflicting structures and vegetation to prepare the site for construction. Asphalt and concrete from roadways, parking lots, and walkways would be removed and disposed.

Table 3.6-1 Typical[1] Construction Sequencing for Each Phase

Step	Activity	Months																																			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
1	Mobilization and Staging																																				
2	Site Clearing and Demolition																																				
3	Utility Relocation																																				
4	Construct Guideway & Highway (including structures)																																				
5	Install Tollway/ Railroad Infrastructure																																				
6	Manufacture & Commission Rolling Stock																																				
7	Pre-revenue Testing																																				
8	Landscaping and Finish Work																																				

[1] Actual construction process to be determined by the contractor in accordance with requirements of the construction contract.

Source: Parsons, 2014.

Step 3: Utility Relocation

Utilities that would interfere with construction would be removed and relocated, or encased for continuing service, by the utility provider or their contractors. This work would involve close coordination with utility companies that meet a variety of service needs, including electric and gas power, water and wastewater distribution, stormwater, cable, and other providers. Each utility would be restored or replaced in accordance with design plans and within close proximity to its former location to allow access in conjunction with the new highway or highway/railway facility. Not all utility relocations would occur at the beginning of the project; some could be done at a later stage of construction, as appropriate.

Step 4: Construct Guideway and Highway

Roadway or roadway/railway construction activities would involve site excavation, grading, fill, and pavement installation. Bridges, overcrossings, undercrossings, soundwalls, and retaining walls along the alignment would be built in parallel with roadway or roadway/rail guideway construction.

Grading. Construction of the proposed project would require a substantial amount of grading and excavation. The freeway/expressway/tollway component of the project would require approximately 9 feet of fill above grade upon which to build the highway. The high-speed rail (HSR) component of the project would require approximately 15 feet of fill above grade. Given the amount of soil needed to construct the new infrastructure, the import of fill material from offsite locations would be required in addition to fill material produced during earth-moving activities within the ROW. Table 3.6-2 shows the total estimated fill required, the amount of fill that can be supplied with onsite excavation, and the amount of imported offsite soil required for the project alternatives. Two types of truck trips would be required as a result of earthwork activities: (1) Earthwork Balance – truck trips within the project site to utilize excess material as fill wherever possible; and (2) Imported Fill – truck trips to import borrow material from nearby mines. The potential sources for offsite fill supply are provided in Figure 3.6-1.

Table 3.6-2 Projected Fill Required for Construction of Build Alternatives

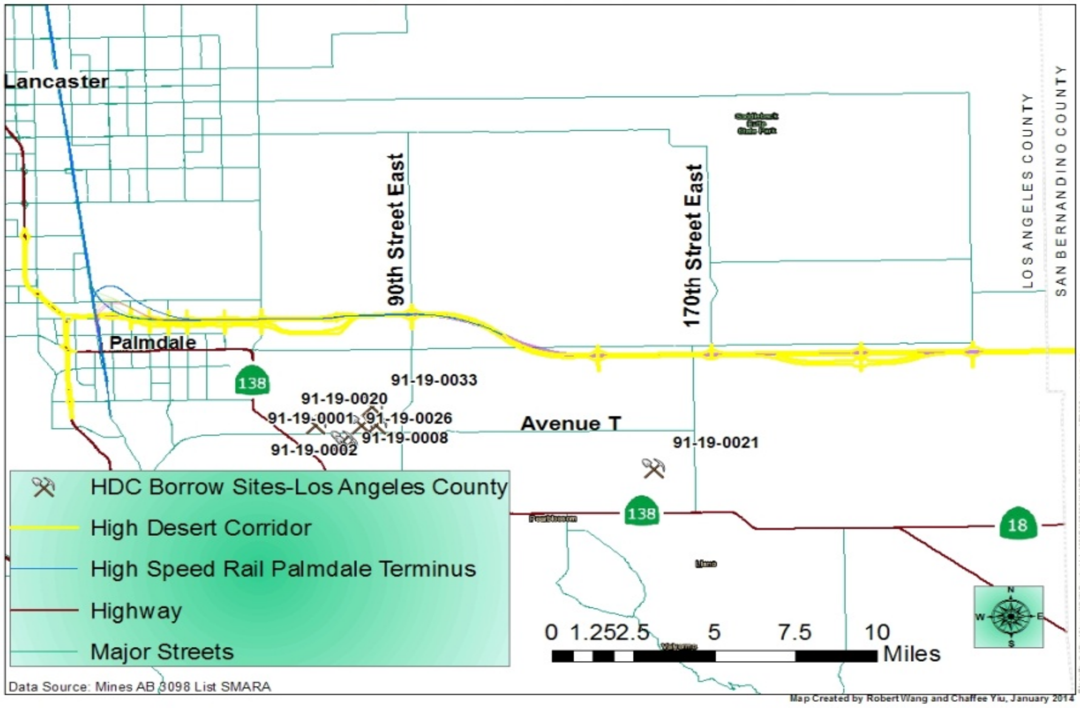
Alternative	Quantity and Type of Earthwork (million cubic yards)[1]			
	Onsite Fill Excavated	Imported Soil Offsite	Total Fill	Soil Disposal Offsite
Highway Alternatives	12	22	34	0
Highway with HSR	12	31	43	0

[1] Assumes a 1.5-foot fill for the at-grade portion of the Transportation System Management (TSM)/Transportation Demand Management (TDM), 9-foot fill for the Highway Alternatives, 15-foot fill for the HSR.

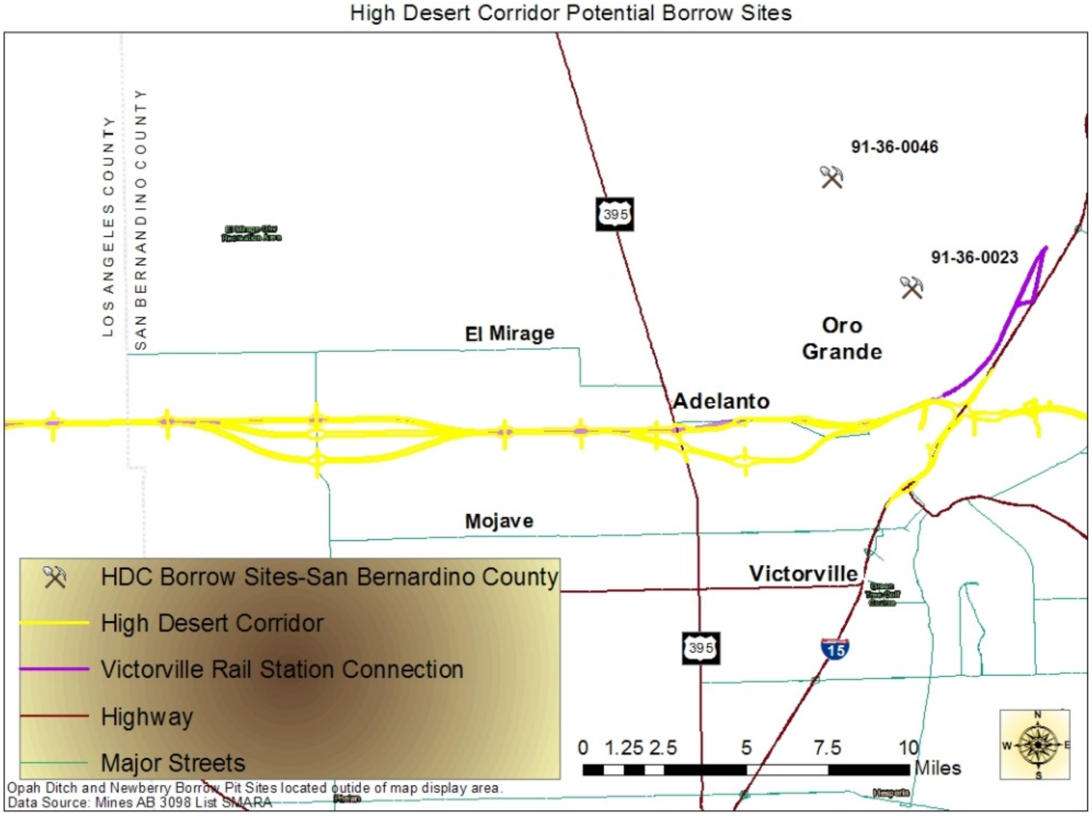
Source: Caltrans, 2014.

Figure 3.6-1 Potential Source Mines in High Desert for Borrow Material

High Desert Corridor Potential Borrow Sites



High Desert Corridor Potential Borrow Sites



Guideway and Highway. While grading and fill operations are being conducted to establish the roadbed for both the highway and railroad, simultaneous construction of aerial structures, grade separations, highway realignments, and surface street modifications would occur.

Step 5: Install Tollway and Railroad Infrastructure

For the tollway, the contractor would install the electronic toll collection (ETC) system, violation enforcement system, variable message and other signage, barriers, lane striping, and enforcement areas. Traffic signals on surface streets at ramp termini would also be installed.

Because the contractor would essentially be building the roadbed from the ground up, the overhead catenary system (OCS) would most likely be installed using off-track vehicles. Catenary pole and wire construction would typically occur along 1- to 2-mile sections of the route and would involve several “passes” per track – one pass to install the foundations, a second to place the poles, and another to install the feeder wires and support arms. These passes would then be followed by additional passes for installation of the messenger and contact wires. While this sequence is consecutive, construction would likely occur along several segments simultaneously, with different activities occurring at any or all of those locations.

Duct banks, or raceways contained in concrete-encased conduits, would be installed parallel to the guideway to carry the wiring for interconnections between electrical equipment. For construction of substation, switching, and paralleling stations, a ground grid composed of copper wire and driven ground rods would be installed below each traction power facility and covered with fill. Concrete foundations would be required for mounting of freestanding electrical transformers, circuit breakers, and disconnect switches, as well as for the prefabricated control and switchgear building. The equipment would be connected together by cable or by buss (open air comer or aluminum tubes). The primary service from the local utility network would be via either overhead or underground transmission lines. Station sites would typically be finished with fencing and landscaping along their periphery.

Step 6: Manufacture and Commission Rolling Stock

The California HSR Project is going forward using an electric multiple unit train (EMU) system. For XpressWest, an EMU is being evaluated. Ensuring interoperability between the HSR and XpressWest rail systems is a priority for the project, especially given the ultimate goal of a one-seat ride concept; therefore, the HDC HSR is expected to also be an EMU system. The rolling stock would be manufactured at a remote factory and transported to the project site for assembly and commissioning.

A computer-based automatic train control (ATC) system would be designed and installed to control the trains. The ATC system would provide for the Federal Railroad Administration (FRA)-mandated positive train control (PTC) safety requirements, including safe separation of trains, over-speed prevention, and work zone protection.

Step 7: Pre-revenue Testing

During the pre-revenue service period, the system (e.g., train control system, OCS, communication system) would be tested, accepted, and commissioned. Implementation of the testing, acceptance, and commissioning activities would be conducted on a mainline test track of several miles in length. This process would take several months.

Step 8: Landscaping and Finish Work

Work under this step would include installation of irrigation systems and plant materials, street lighting, lane striping, signage installation, closing of detours, removal of temporary structures, and site cleanup. Permanent best management practices (BMPs) would be installed and maintained until the Notice of Termination is issued in compliance with the General Construction Stormwater Permit.

Environmental Consequences

The analysis presented in this EIR/EIS assumes that all construction and staging areas would occur within the project footprint. In the event additional construction and staging areas are required, additional impact assessment will be conducted as a supplement to this environemtnal document.

No Build Alternative

Under this alternative, there would be no construction of the new corridor; therefore, no construction impacts would occur.

Freeway/Highway and Freeway/Tollway Alternatives

The two alternatives would have the same construction footprint; therefore, the construction impacts would be similar with the exception that the Freeway/Tollway Alternative would require the installation of an ETC system and related signage and striping, which is considered a minor construction activity when compared to the scale of work within the entire corridor. Impacts to various environmental resources as a result of project construction are discussed below. Applicable measures to reduce these potential impacts are provided below under Avoidance, Minimization, and/or Mitigation Measures.

Parks and Recreation

Indirect noise and air emission impacts during construction of the proposed HDC Project may diminish the enjoyment of recreational uses at Desert Sands Park in Palmdale and Rockview Nature Park in Victorville. These impacts, while temporary inconveniences, would not substantially alter the use of these parks.

With implementation of the measure identified under Avoidance, Minimization, and/or Mitigation Measures – Parks and Recreation Impacts, Standard Conditions, adverse impacts would be minimized.

Farmlands

Construction activities and traffic detours would result in localized increases in traffic, which could affect access and mobility issues for farm equipment and vehicles. This could result in some delays in getting farm products to market and affect worker safety. Construction activities may also disrupt utilities and utility lines. Utility disruptions could jeopardize farm productivity, potentially putting some farmland at risk for conversion to nonagricultural use. Uncontrolled dust from construction activities could affect crop production on nearby farms.

Community Impacts

During construction of the HDC, delays would be experienced by local residents, particularly to those living in neighborhoods next to the selected build alternative. At times, local traffic detours would be required, requiring residents and business patrons to use slightly longer alternate routes to avoid construction zones on the way to their preferred destination; however, although some neighborhoods would be disrupted in this regard, access to residential and business properties within the proposed project vicinity would be maintained throughout construction. Appropriate signage would be required to alert drivers about detours and that businesses are open. These temporary impacts would mostly occur where the alignment crosses urbanized areas in the Antelope and Victor valleys.

Construction impacts would include temporary increases in noise and dust, visual changes, and traffic congestion related to temporary road closures or detours. These impacts would be temporary and would not disproportionately affect a low-income or minority population because everyone in the project area would experience these impacts.

With implementation of the measures identified under Avoidance, Minimization, and/or Mitigation Measures – Community Impacts, Standard Conditions, adverse impacts would be minimized.

Utilities

Several utility facilities and lines would be removed and relocated during project construction, particularly in the more populated municipalities on both ends of the corridor. This would be done through standard engineering practices to minimize any disruption of service those utilities provide. With implementation of the measures identified under Avoidance, Minimization, and/or Mitigation Measures – Utilities/ Emergency Services, Standard Conditions, adverse impacts would be minimized.

Water supply interruptions during construction could affect water pressure and the ability of fire protection services to suppress fires. In general, the amount of water required for fire protection varies with the land use type, building structure, and fire intensity. During construction, there could be sporadic short-term localized disruptions to water supply. All construction work would be conducted to comply with county and municipal fire codes.

During the public review period of the draft environmental document, concern was raised about the impact to water supply in the High Desert area from project construction and operation activities. Regarding water supply and availability, the project is not expected to result in the destruction of or the permanent lowering of groundwater levels. There would be no placement of impervious road surfaces in recharge areas. Furthermore, all of the offsite water would be conveyed through the facility and back to the environment. All onsite water would be treated and then released into the environment via the proposed infiltration basins, thereby augmenting the groundwater regime. Construction of the project would result in alterations to drainage; however, these drainage realignments are not anticipated to substantively affect ground surface permeability via paving or changes in topography via grading and excavation. A reduction in recharge that could affect groundwater levels in the aquifers or existing and potential water supplies is not expected to occur.

Plant establishment as part of the landscape activities would be accomplished with water trucks delivering water to either temporary irrigation systems or to a natural water delivery/storage system in the area. During plant establishment, irrigation would be managed such that adequate moisture is maintained for the plant species to become established. Once established, no further irrigation would be required. The temporary impact to water supply during plant establishment would be at the location where water trucks receive their water. The long-term impact to the local water supply would be the volume of water that the plant root systems require from local ground moisture. Because native plants from various vegetation communities along the corridor would be utilized, impacts to water supply and availability would be minimized.

During the construction phase, to reduce the need for potable water during drought conditions, Caltrans would direct the contractor to use soil binders or a dust palliative to control dust. Dust control binders and dust palliative materials would be directly applied to the surface without mixing with water, thereby minimizing the use of potable water during construction. Another alternative that would conserve potable water may also be offered by the Victor Valley Wastewater Reclamation Authority's project, which includes construction of two subregional water reclamation facilities. Construction of the facilities began in April 2015, and the project is scheduled for completion by mid 2017. Potable water resources would be protected by utilizing reclaimed water for dust suppression and, if necessary, landscape irrigation.

Emergency Services

While emergency vehicle access for emergency services would be maintained at all times during construction, occasional travel delays would occur due to traffic detours, off-peak lane closures, shoulder closures, and lane shifts. These delays could slightly increase response times for police, fire, and other emergency service providers on a short-term basis. In addition to increased congestion from construction vehicles, construction activities would require detours and some road closures that would adversely affect emergency response times. Local roads that cross the HDC alignment may be partially or fully closed when required to install falsework and or scaffolding for overcrossing construction. To the extent feasible, half the road would be open to traffic in most cases or closed for very short durations. These intermittent traffic disruptions would be temporary and should not substantially affect emergency response times with implementation of the TMP discussed above.

Traffic and Transportation/Pedestrian and Bicycle Facilities

The project would temporarily affect motoring vehicular, bicycle, and pedestrian traffic during construction. The potential for traffic disruption would mostly exist where bridge crossings would be built and at connections to existing road and highway facilities. The duration of travel-time delays could be expected to last from a few days to more than a year in various construction zones and may require motorists to adjust their schedules to accommodate longer travel times. Based on the temporary nature of the roadway closures, implementation of a TMP and a public outreach program would minimize impacts related to increased travel time and distance.

Construction within the public ROW would also affect transit service on a temporary basis, from delays due to traffic detours and work zone operations. Some bus routes could be affected, and coordination would be necessary to arrange for temporary nearby route and/or stop relocations.

Temporary construction easements (TCEs) would be required at various roadway segments under construction to accommodate construction activities. Access in and out of any residential homes and businesses would not be blocked, and obstructions would be minimized to the extent possible. In addition, there may be a need for temporary parking space acquisitions for construction easement purposes. These areas required for temporary easements would be restored during construction to pre-project conditions. It is also possible that on-street parking could be restricted in and surrounding work areas to accommodate construction equipment and materials. If necessary, on-street parking would be restored after construction in the area is completed.

Short-term bicycle and pedestrian detours could be required during construction. Implementation of both the TMP and public outreach program throughout the construction period would minimize impacts in this regard.

With implementation of the measures identified under Avoidance, Minimization, and/or Mitigation Measures – Traffic and Transportation/Pedestrian and Bicycle Facilities, Standard Conditions, impacts during project construction would be minimized and are not considered adverse.

Visual/Aesthetics

Because the project would be constructed in phases, each with a duration of approximately 3 to 4 years, the selected build alternative would cause a short-term reduction in visual quality during construction within each segment. Construction activities would temporarily alter the visual and aesthetic environment from the vantage point of homes and other properties surrounding the construction site. Temporary visual intrusions, such as night lighting, dust, temporary structures, increased truck and other vehicle movements, and staging area yards, would occur. In addition, required safety devices, such as orange cones, as well as fencing and signage, would affect views. Workers would be present and visible throughout the construction phases. Additional vehicles, equipment, materials, safety devices, and workers would not be unexpected visual elements seen at a construction site. These images, including the presence and operation of construction equipment (e.g., heavy trucks, cranes, or excavators), would generally be visually disruptive and may be undesirable to some affected individuals or groups.

With implementation of the measures identified under Avoidance, Minimization, and/or Mitigation Measures – Visual/Aesthetics Impacts, Standard Conditions, impacts during project construction would be minimized and are not considered adverse.

Cultural Resources

As reported in the *Historic Property Survey Report* (HPSR) for the project, 43 archaeological resources have either been previously recorded or were encountered during a survey of the Area of Potential Effects (APE). Of this total, 3 prehistoric archaeological resources were determined eligible for listing in the National Register of Historic Places (NRHP). The sites make up 1 assumed eligible archaeological district. Three assumed eligible archaeological sites with potentially adverse effect determinations require continued phased evaluation and application of Criteria of Adverse Effect for these resources as the project alternatives are refined prior to project implementation. One multicomponent archaeological resource was determined eligible for listing in the NRHP. There are 6 historic-era linear properties in the APE, all located within San Bernardino County, that were previously determined eligible for the NRHP located in the APE. The Undertaking will affect segments of these 6 linear resources, but the effects will not be adverse to these historic properties. Caltrans assumed NRHP eligibility for 8 properties (i.e., 2 prehistoric and 6 historic-era archaeological sites) in accordance with Section 106 Programmatic Agreement (PA) Stipulation VIII.C.4. These properties were subject to effects from an alignment variation that has since been discarded. These sites lie far enough outside the ADI so that direct or indirect effects are not expected, and the Undertaking will not affect 8 assumed eligible historic properties. Despite measures identified under Avoidance, Minimization, and/or Mitigation Measures, all of the HDC build alternatives would result in a finding of Adverse Effect to cultural resources during construction in accordance with the Section 106 PA Stipulation X.C.2 and 36 *Code of Federal Regulations* (CFR) 800.5(d)(2).

A project-level PA was executed on March 30, 2016, between Caltrans and SHPO; therefore, the Section 106 process is complete. The project-level PA outlines how Caltrans will proceed pursuant to 36 CFR § 800.6(a)(1)(i)(C) to complete the final identification and evaluation of potential historic properties and provide for the resolution of any adverse effects on historic properties within the APE subsequent to its approval of the Undertaking. The agreement document between Caltrans and SHPO defines the roles and responsibilities of each agency involved in the Undertaking, describes how Caltrans will treat the historic properties during project implementation, and provides an opportunity for one concurring party to be a signatory to the document.

Hydrology and Floodplain

The build alternatives would encroach into the base floodplain areas, which could potentially impact property. Construction activities could exacerbate the effects of flooding during some storm events, including increases in peak discharge rates associated with new impervious surfaces, scouring from erosive velocities, risks to life and property, and potential damage or degradation of natural habitat or groundwater recharge.

The project would include design components intended to minimize hydrological and floodplain impacts during construction. For example, the existing drainage flow pattern would be retained to the extent feasible. During rough grading, infiltration basins would be excavated to provide controls for temporary stormwater runoff. Also at this stage of construction, culvert drainage facilities would be installed underneath alignment embankments, where required, to maintain existing stormwater runoff patterns in the study area.

The project would use appropriate BMPs designed to provide temporary stormwater management. Site-specific BMPs would be evaluated in the Storm Water Pollution Prevention Plan (SWPPP) to prevent and attenuate construction impacts to the floodplains, waterways, and hydrologic systems. Stormwater runoff from the construction site would be managed so that uncontrolled construction-related drainage would not flow onto adjacent properties or public streets and would not adversely affect existing drainage systems. BMPs would also need to be implemented during pile development and other work necessary within wash channels. Work would not be conducted within the channels when water is flowing during storm events. Channel bottom contours would be restored to pre-existing conditions after the bridge crossings are constructed.

Compliance with existing regulations would apply to project design and construction. This would minimize construction impacts to floodplains, as presented in Section 3.2.1, Hydrology and Floodplain.

Water Quality and Stormwater Runoff

A water quality impact would occur if construction activities substantially affect surface water or groundwater quality. HDC construction activities could contribute pollutants to receiving water bodies from stormwater runoff and non-stormwater discharges. Pollutants that could be generated by construction activities include sediment, oils, fuels, paints, solvents, nutrients, trace metals, and hydrocarbons.

A risk analysis was done for the project based on characteristics of the project area, construction dates, and receiving waters. The risk level within the Antelope Valley Watershed and the Mojave Watershed was determined to be Risk Level 1 (i.e., lowest risk level) based on the findings of the construction site sediment and receiving water risk determination. On April 12, 2012, members of the project team held a meeting with a representative from the Lahontan Regional Water Quality Control Board (RWQCB), during which it was concluded that the area shown in Figure 3.6-2 where the HDC alignment crosses the Mojave River in Victorville should be designated as

Risk Level 2. A higher risk level is often associated with additional BMP and monitoring requirements.

Figure 3.6-2 Mojave River Crossing

Source: HDC Water Quality Assessment Report, 2014.

It is estimated that the freeway/expressway and freeway/tollway alternatives would result in temporary disturbed soil areas (DSAs) of about 2,350 acres. Soil-disturbance work would include earth-moving activities such as excavation and trenching, soil compaction, cut and fill operations, and grading. Disturbed soils are susceptible to high rates of erosion from wind and rain, resulting in sediment transport via stormwater runoff. Sediment and other pollutants can lead to turbidity (i.e., cloudiness), which can block light transmission and penetration, reduce oxygen levels, create changes in water temperature, and obscure sources of food, habitats, refuges, and nesting sites of fish.

Erosion and sediment control techniques to be implemented during construction would retain soil and sediment on the proposed project site. The SWPPP would include a description of erosion- and sediment-control BMPs to be applied.

Pollutants in stormwater runoff from the site could also cause chemical degradation and aquatic toxicity in receiving waters, resulting in adverse effects to plant and animal species, their populations, and the ecosystem structure. The chemical contamination of site runoff during construction activities would pose a potentially adverse impact to water quality. The SWPPP would include good housekeeping practices and other controls to be implemented for non-stormwater discharges to minimize the potential water quality effect of these flows during construction.

In most locations along the alignment, the groundwater table is more than 50 feet below ground surface, so dewatering would not be required during construction. Where removal of groundwater from excavations may be required, perhaps at Little Rock and Big Rock washes during bridge piles erection, it is possible that dewatering activities could result in the release of unsuitable and untreated water if discharged directly to the environment. There is the potential of discharging pollutants (i.e., primarily by entraining silt and clay, but also from encountering chemicals and other contaminants) through release of construction water directly to the environment.

Compliance with the Construction General Permit (Order No. 2009-0009-DWQ, as amended by 2010-0014-DWQ), would minimize construction water quality impacts. This includes development and application of construction site BMPs to be included in the SWPPP to minimize pollutants in stormwater and non-stormwater discharges during project construction. Given these considerations, and with implementation of the measures listed under Avoidance, Minimization, and/or Mitigation Measures – Water Quality and Stormwater Runoff, Standard Conditions, water quality and stormwater runoff construction impacts would not be adverse.

Geology/Soils/Seismic/Topography

As described in Section 3.2.3, the site is generally suitable for construction provided site development is performed in accordance with Caltrans standard design and construction procedures. Additional site-specific subsurface investigations and analyses are required to further evaluate soils. Some soils encountered during excavation activities could be susceptible to caving; however, use of standard construction practices would protect construction workers from the collapse of slopes within excavation areas and trenches. This would apply to all areas where excavation and trenching are required. These practices are stipulated by the Occupational Safety and Health Administration's (OSHA) Safety and Health regulations for construction. No adverse impacts associated with geology, soils, seismic, or topography are anticipated during construction.

Paleontology

Grading, excavation, and other subsurface excavation in defined areas of the proposed project have the potential to impact significant nonrenewable fossil resources of Pleistocene and Pliocene age. Vertical impacts of construction are expected to be as much as 30 feet deep in bridge construction areas, approximately 30 to 40 feet for bents and other structural supports, and 5 to 10 feet for general grading. Due to the depth, these excavations have the potential to impact fossils in any of the Quaternary deposits. Even shallow excavations in areas mapped as Quaternary older alluvium (Qoa), particularly near the Mojave River and the Anaverde Formation (Tac, Tas), have the potential to encounter significant paleontological resources.

With implementation of the measures listed under Avoidance, Minimization, and/or Mitigation Measures – Paleontology, impacts to paleontological resources would be minimized.

Hazardous Waste or Materials

During the demolition and construction phases of the project, there is a limited risk of accidental release of hazardous materials such as gasoline, oil, or other fluids in the operation and maintenance of construction equipment. As a result of construction activities, asbestos, lead-based paint (LBP), and/or aerially deposited lead (ADL) may also be encountered. Implementation of the measures listed under Avoidance, Minimization, and/or Mitigation Measures – Hazardous Materials and Waste would minimize impacts pertinent to hazardous materials and wastes. Compliance with federal, state, and local regulations would also address worker safety handling such materials.

Air Quality

Criteria Pollutants

Construction of the project has the potential to create air quality impacts through the use of heavy-duty construction equipment within the construction site and through vehicle trips generated from haul trucks and construction workers traveling to and from the project site. In addition, fugitive dust emissions would result from earthwork (e.g., grading, excavation) and onsite construction activities. Off-road (onsite) mobile source emissions, primarily nitrogen oxides (NO_X) and carbon monoxide (CO), would result from the use of construction equipment such as excavators, bulldozers, and loaders. During the finishing phase, paving operations and application of architectural coatings and other building materials would release reactive organic compounds and off-gassing products (e.g., paints and asphalt). Construction emissions can vary substantially from day to day, depending on the level of activity, the specific mix of construction equipment, and for dust, the prevailing weather conditions.

Construction-related emissions of criteria pollutants were estimated using the Sacramento Metropolitan Air Quality Management District's *Road Construction Emissions Model, Version 7.1.4*. The model was developed for the Sacramento Metropolitan Air Quality Management District and approved by the California Air Resources Board (ARB).

Estimated construction emissions generated by the aforementioned model are summarized in Table 3.6-3. Construction activities associated with each phase of the build alternatives are estimated to be completed within 36 to 48 months. For the purpose of emission analysis, it is assumed that all phases would be constructed concurrently over the 4-year period; therefore, construction emissions are not considered for conformity purposes. Compliance with measures listed under Avoidance, Minimization, and/or Mitigation Measures – Air Quality (CI-AQ-1 and CI-AQ-7) would control fugitive emissions during construction.

Table 3.6-3 Summary of Construction Emissions for Roadways

Constituent	Grubbing Land Clearing (lbs/day)	Grading Excavation (lbs/day)	Drainage Utilities Subgrade (lbs/day)	Paving (lbs/day)	Maximum (lbs/day)	Total (tons)
Reactive Organic Gases (ROG)	1.1 54.0	111.2	70.0	38.9	111.2	52.4
Carbon Monoxide (CO)	266.8	589.9	435.3	263	589.9	280.0
Nitrogen Oxides (NO_X)	327.8	1,581.4	520.4	236.4	1,581.4	501.2
Inhalable Particulate Matter (PM_{10})	417.5	456.7	427.6	13.1	456.7	379.5
Fine Particulate Matter ($PM_{2.5}$)	98.6	128.2	107.9	11.6	128.2	53.7
Carbon Dioxide (CO_2)	49,620.5	292.600.0	79,728.7	42,932.5	292,600.0	97,411.0

Source: HDC Air Quality Technical Report, 2015.

Air Toxics and Asbestos

The amounts of air toxics emitted during construction would be related to the amounts of diesel particulate matter (DPM) emitted by heavy equipment operations. The effects of carcinogenic air toxics on the health of sensitive receptors would be considered less than significant, however, for several reasons:

- DPM would be emitted intermittently over the course of the construction day, and the sources of DPM would be spread out over a large construction site, so air toxics concentrations would be substantially diluted before reaching offsite receptors;
- Ventilation along the HDC is generally good, further diluting concentrations of project-related air toxics between their sources and the nearest receptors;
- Air toxics would mostly be emitted between about 7:00 a.m. and 5:00 p.m. on weekdays when most individuals would be at work rather than at home; and
- Indoor concentrations of project-related air toxics, where most sensitive receptors would spend most of their day, would generally be lower during daytime hours than outdoor concentrations, the degree depending on the ventilation rate of the building.

Potential impacts on sensitive receptors from air toxics emitted during construction would not be substantial, and no mitigation measures are required.

Please note that the health risk values assigned to air toxics are generally based on a 70-year lifetime exposure, while exposures along any one construction segment are anticipated to last 3 to 4 years; therefore, a quantitative assessment of the health effects of project-related DPM on sensitive receptors would need to reduce these values by about 94 percent (1 – (4 years/70 years) = 0.94), or to about 6 percent of their original value, to account for the length of exposure.

According to the California Division of Mines and Geology (2011), areas in Los Angeles and San Bernardino counties where the project is located are not listed as containing naturally occurring asbestos; therefore, the potential for construction activities to disturb naturally occurring asbestos is low, and mitigation measures are not required.

Asbestos-containing materials (ACMs) may be present in structures acquired for demolition. Compliance with measure CI-AQ-3 listed under Avoidance, Minimization, and/or Mitigation Measures – Air Quality, would control asbestos during demolition.

Odors

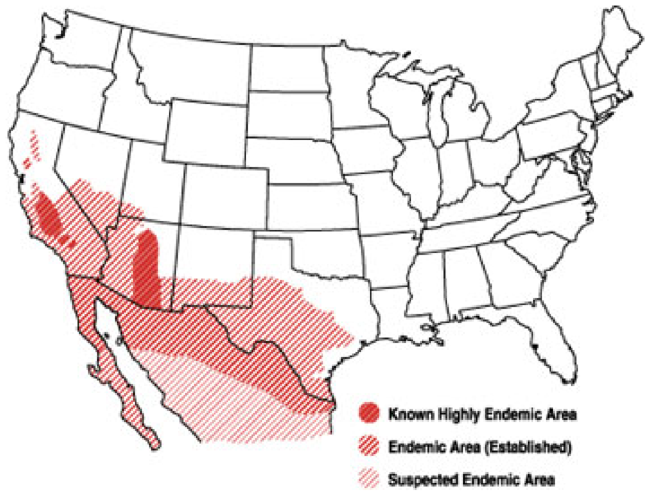
During project construction, objectionable odors would be related mainly to operation of diesel-powered equipment and to off-gas emissions during road-building activities, such as paving and asphalting. Antelope Valley Air Quality Management District's (AVAQMD) and Mojave Desert Air Quality Management District's (MDAQMD) Rule 401 and 402 (Visible Emissions and Nuisance, respectively) and South Coast Air Quality Management District's (SCAQMD) District Rule 1113 (Architectural Coatings) limit the amount of reactive organic gas (ROG) emissions from paving, asphalt, concrete curing, and cement coating operations. Construction of the project would be performed in compliance with SCAQMD's, AVAQMD's, and MDAQMD's rules.

While construction equipment onsite would generate some objectionable odors (mainly from diesel exhaust), these emissions would generally be limited to the project site vicinity and would be temporary. Most potential sensitive receptors are far enough from the project site that odors would not affect a substantial number of people. No mitigation measures would be required; however, Avoidance and Minimization Measure CI-AQ-2 would further reduce diesel odors to sensitive receptors during construction.

Valley Fever

The Centers for Disease Control and Prevention (CDC) has extensively studied Valley Fever (www.cdc.gov/fungal/diseases/coccidioidomyosis/). CDC indicates that *Coccidioides immitis* is a fungus found in the soil of dry, low rainfall areas and is native and common in many areas of the southwestern United States, Mexico, and Central and South America (see Figure 3.6-3). As shown, the project is in an endemic area for *Coccidioides*. Coccidioidomycosis, also known as Valley Fever, is a common cause of pneumonia in the areas where *Coccidioides* occurs. *Coccidioides* spores circulate in the air after contaminated soil and dust are disturbed by such human or natural activities as winds, construction, farming, animal burrows, or burial. The spores are typically inhaled, although in rare cases spores can enter the skin through cuts or abrasions and cause infection. After the fungal spores are settled in the lungs, they change into a multicellular structure called a spherule. Fungal growth in the lungs occurs as the spherule grows and bursts, releasing endospores, which then develop into more spherules.

Figure 3.6-3 Endemic Regions of *Coccidioides immitis* in the United States and Northern Mexico



Source: USGS, 2000.

At least 30 to 60 percent of people who live in endemic areas such as the High Desert where the fungus is present are exposed to the fungus at some point during their lives. In most people, the infection will go away on its own, but for a small segment of the population, including people of Asian descent (particularly those of Filipino descent), African-American, pregnant women, and people with weakened immune systems, the risk for the disease is increased. It is difficult to avoid exposure to *Coccidioides*, but people who are at higher risk should try to avoid breathing in large amounts of dust if they are in endemic areas.

Most people who are exposed to the fungus do not develop symptoms or have mild flu-like symptoms that go away on their own. In severe cases, patients develop pneumonia or meningitis, which can sometimes lead to death. Meningitis, the most lethal complication of disseminated Valley Fever, may cause a stiff neck, severe and persistent headache, nausea, vomiting, and various other central nervous system symptoms such as disorientation, loss of balance or equilibrium, inability to think clearly, and loss of consciousness. In addition to humans, Valley Fever affects many species of domestic and wild animals. Because the spores of *Coccidioides immitis* can become airborne during soil disturbance, dust suppression is an important aspect of managing its spread.

Valley fever is not contagious; therefore, it cannot be passed on from person to person. Most of those who are infected will recover without treatment within 6 months and will have a life-long immunity to the fungal spores. In severe cases, such as patients with rapid and extensive primary illnesses, those who are at risk for dissemination of disease, and those who have disseminated disease, anti-fungal drug therapy is used. Only 1 to 2 percent of those exposed who seek medical attention will develop a disease that disseminates to other parts of the body than the lungs.

There are measures that can be implemented to lower the incidence of infection and also reduce the number of spores inhaled, thereby decreasing the chances of developing a more serious form of the disease. These measures include dust control and prevention; use of dust masks with appropriate filters; use of construction equipment with enclosed, air-conditioned cabs; and/or positioning of construction workers upwind when possible. Furthermore, infection risk can also be lowered by conducting outdoor activities, such as field studies or construction activities, in the winter months; avoiding sites favorable for *Coccidioides immitis* growth; seeking prompt medical treatment if flu-like or respiratory illness occurs during or within a few weeks following fieldwork or construction activities; getting a coccidioidin skin test to determine susceptibility to the disease; or by educating all members of the field party and construction crew about the possibilities and consequences of infection.

Construction of the proposed project would occur in an endemic area where *Coccidioides immitis* naturally occurs. Temporary soil disturbance during construction grading activities could cause fungal spores, if present, to become airborne, potentially putting construction personnel, residents, and wildlife at risk of contracting Valley Fever; however, as noted above, most Valley Fever cases are very mild, and more than half of infected people either have no symptoms or experience flu-like symptoms and never seek medical attention. There are many preventive and precautionary measures that can be undertaken to reduce exposure, including the use of dust masks when conducting outdoor activities, such as field studies, or performing construction activities in the winter months; seeking prompt medical treatment if flu-like or respiratory illness occurs during or within a few weeks following fieldwork or construction activities; getting a coccidioidin skin test to determine susceptibility to the disease; and educating all members of the field party and construction crew about the possibilities and consequences of infection. Dust control measures are the main defense against infection, although all persons residing or traveling through the High Desert would be susceptible to the disease, regardless of whether the project is implemented.

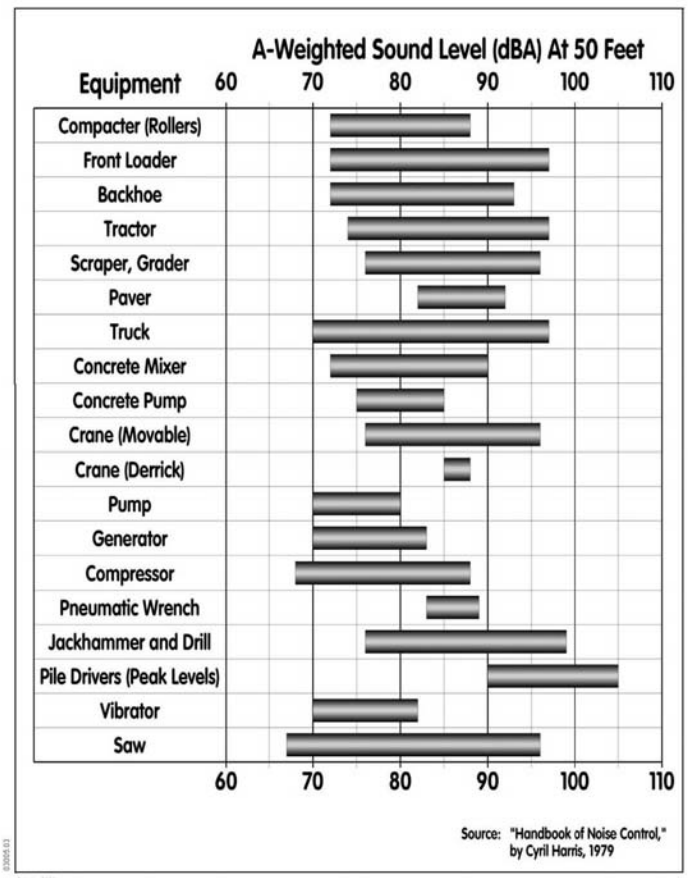
Compliance with measures listed under Avoidance, Minimization, and/or Mitigation Measures – Air Quality would control dust during project construction. As a result, this measure would reduce the potential for contact with *Coccidioides immitis* spores, and the potential for health impacts during construction of the project associated with Valley Fever would be minimized. As for the construction workers, adhering to the OSHA rules (including Injury and Illness Prevention, Control of Harmful Exposures, Respiratory Protection) would adequately provide protection of the project's workforce from Valley Fever.

Noise and Vibration

During the construction phases of the project, noise from construction activities may intermittently dominate the noise environment in the immediate area of construction. Construction noise is regulated by Caltrans standard specifications, Section 7-1.01I, Sound Control Requirements. These requirements state that noise levels generated during construction shall comply with applicable local, State, and federal regulations.

Figure 3.6-4 summarizes typical noise levels produced by construction equipment commonly used on roadway construction projects. As indicated, equipment involved in construction is expected to generate noise levels ranging from 70 to 90 A-weighted decibels (dBA) at a distance of 50 feet. Noise produced by construction equipment would be reduced over distance at a rate of about 6 dBA per doubling of distance. Normally, construction noise levels should not exceed 86 dBA (L_{max}) at a distance of 50 feet. No adverse noise impacts from construction are anticipated, because construction would be conducted in accordance with Caltrans standard specifications and would be short term, intermittent, and dominated by local traffic noise.

Figure 3.6-4 Construction Equipment Noise Levels



Sound control shall conform to the provisions in Section 14-8.02, "Noise Control," of the Standard Specifications and Section 14-8.02, "Noise Control," of the Standard Special Provisions. According to requirements of these specifications, construction noise cannot exceed 86 dBA at 50 feet from the job site activities from 9:00 p.m. to 6:00 a.m.

It is possible that certain construction activities could cause intermittent localized concern from vibration in the project area. During certain construction phases, processes, such as earth moving with bulldozers, the use of vibratory compaction rollers, impact pile driving, demolitions, or pavement braking, may cause construction-related vibration impacts such as human annoyance or, in some cases, building damages. It may be necessary to use this type of equipment close to residential buildings. Implementation of minimization measure CI-1 would eliminate or minimize vibration impacts during construction activities.

Mitigation techniques for control of equipment noise and vibration plus administrative measures, when properly implemented, can provide the most effective means to minimize the effects of construction activity impacts. These measures are listed under Avoidance, Minimization, and/or Mitigation Measures – Noise and Vibration, Standard Conditions.

Energy

Energy consumed for construction and maintenance is referred to as indirect energy usage. The project would result in one-time nonrecoverable energy costs associated with construction activities. In addition to energy expenditures for preparing the ground surface and building new facilities, there would also be energy consumption associated with the manufacture of building materials and rolling stock for the two build alternatives involving rail.

Energy use for maintenance comprises day-to-day upkeep of equipment and systems, as well as the energy embedded in any replacement equipment, materials, and supplies. The indirect energy impacts associated with construction and maintenance of the build alternatives are directly related to the total project capital cost and maintenance cost. Table 3.6-4 shows the estimated construction and energy consumption for the highway and highway with HSR alternatives.

Table 3.6-4 Projected Construction and Maintenance Energy Consumption for the Build Alternatives

Annual Indirect Energy	Freeway/ Expressway and Freeway/Tollway Alternatives	Freeway/Expressway and Freeway/Tollway with HSR Alternatives[1]
Construction		
Lane Miles[2]	630	756
Conversion Factor[3] (Million BTU/lane-mile)	13,885	13,885/130,739
Energy Use (Trillion BTUs)	8.8	25.2
Maintenance		
Energy Use (Trillion BTUs)[4]	2.2	6.3
Total Indirect Energy Usage (Trillion BTUs)	10.9	31.5

[1] HSR was analyzed as a fully grade-separated two-lane facility.
[2] Assumed maximum buildout of 4 lanes + HOV in each direction of the 63-mile-long alignment.
[3] Construction energy factors from Oakridge Laboratory, 1993.
[4] Maintenance costs assumed to be 20% of total indirect costs.

Source: HDC Energy Technical Study, 2014.

Construction of the project would require a substantial amount of grading and excavation. As previously described, the new facility would be built several feet above existing grade; therefore, the import of fill material from offsite locations would be required in addition to fill material produced during earth-moving activities within the ROW. Table 3.6-5 shows types of truck trips, associated truck hours, and the equivalent British thermal units (BTUs) consumed to acquire the fill material for the project alternatives. The estimated construction energy associated with the import of soil and truck activity for the Freeway/Expressway and Freeway/Tollway alternatives is 115.5 billion BTUs as opposed to 167.3 billion BTUs for the alternatives with HSR.

Table 3.6-5 Projected Construction Energy Consumption Required for Truck Activity for the Build Alternatives

Alternative	Truck-Miles			BTUs (billions)[1]
	Earthwork Balance (Onsite)	Import	Total	
Freeway/Expressway and Freeway/Tollway Alternatives	5,674,240	38,563,270	44,237,510	900.6
Freeway/Expressway and Freeway/Tollway with HSR	8,216,462	55,840,721	64,057,183	1,304.1

[1] Assumes 20,539 BTUs per truck-mile for heavy duty trucks.

Source: HDC Energy Technical Study, 2014.

It should be noted that the energy consumption numbers are estimated values and are not time dependent on when the construction takes place and/or its duration. Indirect energy consumption is estimated at approximately 11 trillion BTUs for the Freeway/ Expressway and Freeway/Tollway alternatives (as opposed to 32 trillion BTUs for the alternatives with HSR). Although construction would require the use of nonrenewable resources, including fossil fuels and natural gas, the use of these resources would not substantially deplete existing supplies. The energy consumed during construction of the proposed project would be a small proportion of regional energy consumption; therefore, construction of the build alternatives is not anticipated to create a substantial impact on short-term energy demand during project construction.

In addition, the proposed green energy infrastructure would further offset some or all of the direct and indirect energy consumption associated with the proposed project; therefore, no substantial impacts related to indirect energy consumption would occur for the build alternatives.

Biological Environment

Construction work would involve the use of heavy equipment to clear vegetation and grade the project site. In February 1999, Executive Order (EO) 13112 was signed, requiring federal agencies to work on preventing and controlling the introduction and spread of invasive species. The project has the potential to spread invasive species to adjacent native habitats in the Biological Study Area (BSA) by entering and exiting construction equipment contaminated by invasive species, the inclusion of invasive species in seed mixtures and mulch, and the improper removal and disposal of invasive species so that seed is spread along the highway.

The proposed project may have adverse effects to the desert tortoise, which is federally and State listed as threatened. With the selection of specific alternatives and implementation of avoidance measures discussed below, the project is not likely to have adverse effects to the federally and State-listed southwestern willow flycatcher or least Bell's vireo. The proposed project would not result in adverse effects to the State-listed as threatened Mohave ground squirrel.

Project construction activities would cause permanent and temporary impacts to jurisdictional waters. Permanent impacts are discussed in Section 3.3.2, Wetlands and Other Waters. Temporary construction impacts to Waters of the U.S. and Waters of the State of California will be determined as the final design in each phase proceeds. As described in the *Natural Environment Study*, impact calculations are based on mapped drainages within the BSA; therefore, impacts are expected to decrease once designs are finalized. Compensatory mitigation for impacts to jurisdictional features of the U.S. Army Corps of Engineers (USACE), RWQCB, and California Department of Fish and Wildlife (CDFW) will be determined during the permitting process with the agencies.

Project construction activities would create noise, dust, and vibration that could adversely affect animals within and next to the construction site. This disturbance could cause animals to move away from construction. Habitat next to the construction site may not be used by species sensitive to construction noise, dust, and vibration effects. Vibration could collapse the burrows or dens of burrowing animals.

Silt runoff from the project site or improper disposal of petroleum and chemical products from construction equipment could adversely affect water quality during construction. Adverse effects on water quality could affect plants, animals, and habitats downstream of construction areas.

Night lighting during construction of the project could spill over into the adjacent open space and could adversely affect foraging activities of nocturnal species (e.g., burrowing owl, bats, and other small mammals), and it may also increase predation of small mammals; therefore, the project's night lighting may affect nocturnal wildlife.

If construction limits are not clearly marked, construction operators could inadvertently remove habitat that should not be removed. Because the project includes numerous sensitive habitat areas, this effect could be potentially substantial.

Compliance with the standard condition and minimization and mitigation measures presented in Section 3.3, Biological Environment, would reduce construction impacts.

Freeway/Highway and Freeway/Tollway with HSR Alternatives

These two alternatives would have the same construction footprint; therefore, the construction impacts would be similar with the exception that the Freeway/Tollway Alternative would require the installation of an ETC system and related signage and striping, which is considered a minor construction activity when compared to the scale of the work within the entire corridor. Impacts to various environmental resources under the alternatives with HSR would be similar to those described under the Freeway/Highway and Freeway/Tollway alternatives, with the exception that the alternative with HSR would require the construction of station connections and the installation of rail lines in the median of the freeway/tollway. The DSA of the alternatives with HSR is estimated at approximately 3,000 acres as opposed to 2,350 acres for the alternatives without HSR. Because the construction would most likely be divided into phases, each phase of construction would have similar impacts to environmental resources as described under the alternatives without HSR. Overall, the energy consumption required to construct and maintain the alternatives with HSR would be higher, as demonstrated in the energy discussion above.

Avoidance, Minimization, and/or Mitigation Measures

Parks and Recreation Impacts

CI-PAR-1: To minimize impacts on recreational lands during the construction phase, no equipment staging will occur within the boundaries of the adjacent parks, golf course, and other recreational facilities.

Community Impacts

CI-COM-1: To the extent practical, street closures required during construction shall be scheduled to occur during nighttime hours. This requirement will be addressed in the TMP to be prepared during the final design phase of project development.

CI-COM-2: To the extent practical, the contractor will avoid limiting access to businesses during construction during normal business hours. Businesses will be contacted and advised of nearby construction activities before they commence.

CI-COM-3: Caltrans will notify emergency service providers, such as fire, police, and ambulance services, in advance of construction of the timing, location, and duration of construction activities and the locations of detours and lane closures.

CI-COM-4: During the final design phase, in coordination with affected facility owners or operators, Caltrans will develop and implement access plans for highly sensitive land uses such as police and fire stations, transit stations, hospitals, and schools.

Implementation of the TMP, as outlined in CI-T-1 under Traffic and Transportation/Pedestrian and Bicycle Facilities subsection below, would avoid and/or minimize impacts to the communities along the construction zones.

Utilities/Emergency Services

CI-UT-1: In accordance with the requirements in the California Code of Regulations, prior to the initiation of construction, the contractor will coordinate and notify the operators of underground or overhead utility and service lines prior to any excavation activities. Surveyors will meet onsite with utility company workers to locate, mark, and identify conflicting utility lines to avoid damage and limit disruption to utility services.

CI-UT-2: During a severe drought period, Caltrans will direct the contractor to use soil binders or a dust palliative to control dust and minimize the use of potable water during construction.

Implementation of the TMP, as outlined in CI-T-1 under Traffic and Transportation/ Pedestrian and Bicycle Facilities subsection below, would avoid and/or minimize adverse effects of the HDC on emergency services.

Traffic and Transportation/Pedestrian and Bicycle Facilities

CI-T-1: Caltrans will require the design team to develop a TMP to offset the effects of access restrictions and traffic congestion during construction of the freeway, ramps, and on local streets. The TMP will consider methods such as adjustment of signal timing and/or signal coordination to increase roadway efficiency; turn restrictions at intersections and roadways necessary to reduce congestion and improve safety; and parking restrictions on detour routes during work hours to increase capacity, reduce traffic conflicts, and improve access. The TMP will include a traffic contingency plan with procedures to be implemented for possible unforeseen circumstances and emergencies.

CI-T-2: Caltrans will require the contractor to provide motorist alert and awareness information during construction, as appropriate for the conditions, to include the following options: changeable message signs, stationary ground-mounted signs, traffic radio announcements, and the Caltrans Highway Information Network.

CI-T-3: Caltrans, in coordination with the affected local jurisdictions, will coordinate with Antelope Valley Transit Authority and Victor Valley Transit Authority (VVTA) to request and comply with applicable procedures for any required temporary bus stop relocations or other disruptions to transit service during construction.

Visual/Aesthetics

CI-V-1: During construction, existing vegetation in the corridor will be saved and protected to the extent that is feasible.

CI-V-2: Caltrans will require construction contractors to shield construction and storage areas from nearby public use areas (i.e., streets, private yards or recreation) to the extent feasible and where the safety of construction and traffic operations is not compromised.

Cultural Resources

CI-CUL-1: Caltrans has developed a PA (executed March 30, 2016) in consultation with the SHPO to identify mitigation measures for purposes of reducing potential impacts to NRHP-eligible archaeological sites. Caltrans will prepare an HPTP in consultation with SHPO to plan for additional fieldwork, including phased archaeological evaluation of the sites, data recovery of some sites, and post-review discovery and monitoring for areas with high archaeological sensitivity. The HPTP will include sections that provide an archaeological context, including prehistoric and historic-era research themes and questions appropriate to the known site types; the proposed archaeological evaluation work at each of the sites; general field, laboratory, curation, and documentation methods; an ESA Action Plan; Data Recovery Plan (DRP); and a Post-Review Discovery and Monitoring Plan that includes delineation of Archaeological Monitoring Areas (AMAs). Additional mitigation, if identified during preparation of the HPTP and in consultation with SHPO, would also be incorporated. Specifically, the HPTP will address the following:

1. Three phased sites are assumed eligible for the purposes of this Undertaking. These properties consist of one prehistoric archaeological site and two historic-era archaeological sites (i.e., P-19-004362 [CA-LAN-4362H], P-36-000158 [CA-SBR-158], and P-36-026769 [CA-SBR-16916H]). Evaluation and treatment of the three phased historic properties will continue as the project is refined, and SHPO consultation on the eligibility and any revised findings of effect will continue throughout phasing.
2. Continue to phase evaluation of the assumed eligible *Topipabit* Archaeological District to obtain SHPO concurrence on determinations of eligibility under Criterion A for the district and its three contributing archaeological sites (i.e., P-36-000066 [CA-SBR-66], P-36-000182 [CA-SBR-182], and P-36-012609 [CA-SBR-12336]) for their association with the area’s ethnic history.
3. The HPTP will address whether the July 2015 research design will be employed to evaluate the phased sites or whether a revised research design is necessary due to conflicting information in the December 2015 FOE. Evaluations of P-19-004362 (CA-LAN-4362H) and P-36-026769 (CA-SBR-16916H) should clearly demonstrate how the collected artifacts and surface artifacts answer or fail to answer research questions posed in the research design. Evaluation of P-36-000158 (CA-SBR-158) should clearly demonstrate whether the site is eligible under Criterion A

and/or Criterion D. The revised evaluation of P-36-000158 (CA-SBR-158) should clearly argue how/why the resource contains or is likely to contain data potential under Criterion D.

4. Develop an ESA Action Plan to protect portions of the *Topipabit* Archaeological District and portions of the three contributing archaeological sites (i.e., P-36-000066 [CA-SBR-66], P-36-000182 [CA-SBR-182], and P-36-012609 [CA-SBR-12336]). The portions of these three sites that will not be directly affected will be protected by establishment and enforcement of an ESA Action Plan that will prevent inadvertent effects to remaining portions of these historic properties. The ESA Action Plan will also include protection measures to protect rock art site P-36-000158 (CA-SBR-158) in its entirety, and to protect and avoid a portion of P-36-026769 (CA-SBR-16916H), which is adjacent to the Direct APE/ADI.

5. A DRP will be implemented to mitigate the effects to the portions of the *Topipabit* sites within the Direct APE/ADI that will be adversely affected. If any additional phased sites are determined eligible as a result of phasing, a DRP or additional research will be implemented for those sites as appropriate. The DRP will include a Burial Treatment Plan if burials are encountered.

6. Prepare a Geoarchaeological Sensitivity Analysis/Study of the soils within the ADI in relationship to proximity to water sources, known archaeological resources, and likelihood for the presence of buried deposits to plan for as of yet unknown buried historic archaeological properties that may be present in the ADI. A soils analysis study and a ground-penetrating radar study prepared for previous draft project documents indicate that the ADI has a high potential to encounter an unknown number of buried sites during project-related ground disturbance.

7. Develop a Post-Review and Monitoring Plan that includes delineation of AMAs that would include, but not be limited to, the portions of the *Topipabit* sites within the ADI, during the construction phases. Develop a Post-Review Discovery and Monitoring Plan in the areas with the highest geoarchaeological sensitivity. The Post-Review Discovery and Monitoring Plan may include ground truthing with trenching in areas of the highest sensitivity.

8. In consultation with CSO and SHPO, District will consider planning for educational and/or interpretive programs based on the findings of the DRP in accordance with Attachment 6 of the Section 106 PA.

9. The District, in coordination with CSO, shall submit the HPTP to the SHPO for review and concurrence. The SHPO shall respond within 30 days of the receipt of the submission. If the SHPO does not respond within 30 days after receipt, Caltrans may either extend the review period in consultation with the SHPO or proceed to the next step prescribed in Stipulation II.A. The District shall also provide a submittal to concurring parties and appropriate Native American consulting parties (as identified in Stipulation III) for review and comment, concurrently with the SHPO submittal.

Water Quality and Stormwater Runoff

CI-WQ-1: To ensure that the project does not impede the attainment of water quality standards, the project will conform to the requirements of the Caltrans' National Pollutant Discharge Elimination System (NPDES) Statewide Storm Water Permit (Order No. 2012-0011-DWQ, NPDES No. CAS000003), adopted by the State Water Resources Control Board (SWRCB) on July 1, 2013, and any subsequent permit in effect at the time of construction. In addition, the contractor will comply with the requirements of the General NPDES Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Order No. 2009-0009-DWQ, NPDES No. CAS000002, as amended by 2010-0014-DWQ), also referred to as the Construction General Permit, as well as implementation of the BMPs specified in the Caltrans Storm Water Management Plan (SWMP), to be prepared during final design of the project.

CI-WQ-2: To avoid and minimize impacts to water resources, the contractor will develop an acceptable SWPPP containing proven Temporary Construction Site BMPs to minimize stormwater pollution that has the potential to affect water quality. All construction site BMPs will follow the latest edition of the Storm Water Quality Handbooks and the Construction Site Best Management Practices Manual. In addition, the SWPPP will include implementation of specific stormwater effluent monitoring requirements based on the project's risk level to ensure water quality standards are met.

CI-WQ-3: During construction, should dewatering be required, the contractor will fully conform to the requirements specified in either the NPDES General Permit, Limited Threat Discharges to Surface Waters, Board Order R6T-2008-0023, or General Waste Discharge Requirements for Discharges to Land with a Low Threat To Water Quality, WQO-2003-0003, both issued by the Lahontan RWQCB.

CI-WQ-4: To avoid and minimize impacts to water resources, the contractor will comply with all requirements of permits to be issued by USACE under Section 404 of the Clean Water Act (CWA) for the discharge of dredged or fill material into Waters of the U.S.

CI-WQ-5: To avoid and minimize impacts to water resources, the contractor will comply with all requirements of Water Quality Certifications to be issued by the Lahontan RWQCB under Section 401 of the CWA to ensure that all discharges comply with applicable federal and state effluent limitations and water quality standards.

CI-WQ-6: To avoid and minimize impacts to water resources, per agreement with the Lahontan RWQCB, for the area where the project corridor crosses the Mojave River in Victorville, the contractor shall manage this area as a Risk Level 2 construction site and comply with all requirements in Attachment D of the Construction General Permit.

CI-WQ-7: All temporary impact areas will be recontoured and revegetated to approximately their pre-project conditions. Where feasible, existing top soil will be stockpiled and used as final cover during restoration of temporary impact areas.

Paleontology

CI-PAL-1: A Paleontological Mitigation Plan (PMP) shall be prepared by a qualified Principal Paleontologist possessing a current Bureau of Land Management (BLM) statewide paleontology permit, when design is at or near completion and shall include elements specified as components of a PMP in Caltrans Standard Environmental Reference (SER) Chapter 8, such as a copy of the curation agreements(s) with the repository(ies) that will accept fossils found. Examples of repositories in the region include the Natural History Museum of Los Angeles County (LACM) and the San Bernardino County Museum (SBCM).

CI-PAL-2: Paleontological monitoring, sampling, and fossil recovery shall be conducted as specified in the PMP by qualified paleontologists.

CI-PAL-3: All recovered fossils shall be prepared to permit identification by experts and cataloged.

CI-PAL-4: Fossils meeting significance criteria shall be submitted to the appropriate repository, along with copies of all records, photos, and maps, to obtain permanent accession numbers.

CI-PAL-5: The Paleontological Mitigation Report (PMR) shall include all elements specified in SER Chapter 8 as components of a PMR and shall include all results, including specimens recovered with permanent accession numbers.

Hazardous Waste or Materials

CI-HAZ-1: A Health and Safety Plan (HSP) for the protection of construction workers will be prepared and implemented during construction. The HSP will include, among other things, safety measures for conducting deep excavations or deep soil borings for bridge columns located near abandoned oil and gas wells to avoid exposure of construction personnel to harmful concentrations of naturally occurring hydrocarbons, methane, and hydrogen sulfide. Soil test results will be the basis for developing the Health and Safety Plans for the protection of construction workers at these locations. Other avoidance and minimization measures that would be considered include ventilation of work areas, excavation of impacted soils, and revising column design to avoid contaminated areas.

CI-HAZ-2: Prepare and implement an HSP that will address worker safety when working with potentially hazardous materials including ACM, LBP, ADL, and/or other construction-related materials.

CI-HAZ-3: Implement the Construction Contingency Plan (CCP) prepared during the final design phase (refer to Mitigation Measure HAZ-3) during all construction phases.

CI-HAZ-4: If there is an unexpected release of hazardous substances that exceeds reportable quantities during the construction phase, cease work immediately at the general location of the release and immediately report the release to the National Response Center at 1-800-424-8802. The construction contractor will be responsible for cleanup of all unexpected releases under the appropriate federal, State, or local agency oversight and in accordance with federal, State, and local regulations.

Air Quality

CI-AQ-1: Per contract specifications, the contractor shall comply with the AVAQMD's Rule 403 (Fugitive Dust) and MDAQMD's Rule 403.2 (Fugitive Dust Control for the Mojave Desert Planning Area), and SCAQMD's Rules 401, 402, and 403.

CI-AQ-2: To minimize the temporary exhaust emissions from heavy-duty trucks and construction equipment adjacent to certain sensitive receptors, certain construction activities (e.g., extended idling, material storage, and equipment maintenance) will need to be conducted in areas at least 500 feet away from those sensitive receptors.

CI-AQ-3: Per contract specifications the contractor shall comply with the limitations of the National Emissions Standards for Hazardous Air Pollutants regulations as listed in the CFR requiring notification and inspection for the construction activities that are involved with demolition, renovation, or removal of ACMs. Before starting any demolition or renovation of any building, Caltrans will require the contractor to consult with AVAQMD's and the MDAQMD's Compliance Division to determine inspection and compliance requirements.

CI-AQ-4: Truck traffic routes shall be established away from schools, daycares, and residences, or at locations with the least impact if those areas are unavoidable.

CI-AQ-5: Concrete batch plants will be sited and operated in accordance with all applicable air pollution control requirements and will not be located near sensitive receptors. Nearby sensitive receptors shall be notified of construction periods and the expected amount of heavy truck traffic.

CI-AQ-6: Crossing guards shall be provided in areas where construction activities are located near places where children congregate.

CI-AQ-7: A Construction Emissions Mitigation Plan for fugitive dust and diesel particulate matter shall be prepared that includes the following components:

Fugitive Dust Source Controls:

- Stabilize open storage piles and disturbed areas by covering and/or applying water or chemical/organic dust palliative where appropriate. This applies to both inactive and active sites, during workdays, weekends, holidays, and windy conditions.
- Install wind fencing and phase grading operations where appropriate, and operate water trucks for stabilization of surfaces under windy conditions.
- When handling material and operating non-earth-moving equipment, prevent spillage and limit speeds to 15 miles per hour (mph). Limit speed of earth-moving equipment to 10 mph.

Mobile and Stationary Source Controls:

- Minimize use, trips, and unnecessary idling of heavy equipment.
- Maintain and tune engines per manufacturer's specifications to perform at U.S. Environmental Protection Agency (EPA) certification levels, where applicable, and to perform at verified standards applicable to retrofit technologies.
- Employ periodic, unscheduled inspections to limit unnecessary idling and to ensure that construction equipment is properly maintained, tuned, and modified consistent with established specifications.
- Prohibit any tampering with engines and require continuing adherence to manufacturer's recommendations.
- Commit to the best available emissions control technologies for project equipment.

CI-AQ-8: The Contractor shall be required to provide a formal Environmental Awareness Program related to Valley Fever to construction and maintenance workers. The program shall include training on:

- Health hazards of Valley Fever and its symptoms
- Proper work procedures to minimize exposure
- Use of personal protective equipment
- Reporting procedures

Noise and Vibration

CI-NOI-1: Equipment noise control shall be implemented as follows:

- Effective mufflers shall be fitted on all new equipment and existing equipment shall have their mufflers retrofitted to yield an immediate noise reduction at all types of road construction sites.
- The tracks on crawler-mounted equipment shall be kept in excellent condition through periodic maintenance and lubrication.
- The height of exhaust pipe exits shall be lowered closer to the ground, where feasible, to reduce offsite noise.
- State-of-the-art technology shall be applied to new equipment or the repair of old equipment to maintain original equipment noise levels.

CI-NOI-2: In-use site noise control is necessary to prevent existing equipment from producing noise levels in excess of specified limits. Any equipment that produces noise levels less than the specified limits will not be affected; however, those exceeding the limit will be required to meet compliance by repair, retrofit, or replacement. New equipment with the latest noise-sensitive components and noise-control devices is generally quieter than older equipment, if properly maintained and inspected regularly. They shall be repaired or replaced if necessary to maintain the in-use noise limit. All equipment applying the in-use noise limit will achieve an immediate noise reduction if properly enforced.

CI-NOI-3: Site restrictions will be applied, where feasible, to achieve noise reduction in the local community. Methods may include the following, depending on the type of construction involved and the site characteristics:

- Shielding with barriers shall be implemented at an early stage of a project to reduce construction equipment noise.
- Efficient rerouting of trucks and control of traffic activity on construction site will reduce noise due to vehicle idling, gear shifting, and accelerating under load.
- Time scheduling of activities shall be implemented to minimize noise impact on exposed areas. Sequencing the use of equipment with relatively low noise levels versus equipment with relatively high noise levels during noise-sensitive periods is an effective noise control measure.
- Equipment location shall be as far from noise-sensitive land use areas as possible. The contractor shall substitute quieter equipment or use quieter construction processes at or near noise sensitive areas.

CI-NOI-4: A training program for equipment operators and supervisors shall be implemented to instruct them in methods of operating their equipment to minimize environmental noise.

Biological Resources

CI-BIO-1: The contractor will comply with all requirements of the Streambed Alteration Agreements to be issued by CDFW per Section 1602 of the California Fish and Game Code.

CI-BIO-2: The contractor shall implement a Noise and Vibration Monitoring and Mitigation Plan, prepared by a qualified Acoustical Engineer and approved by Caltrans. The plan must outline noise- and vibration-monitoring procedures at predetermined noise- and vibration-sensitive sites, as well as historic properties. The plan also must include calculated noise and vibration levels for various construction phases and mitigation measures that may be needed to meet the project specifications. The contractor will not start any construction work or operate any noise-generating construction equipment at the construction site before approval of the plan. The plan must be updated every 3 months or sooner if there are any changes to the construction activities.

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3.7 Cumulative Impacts

Regulatory Setting

Cumulative impacts are those that result from past, present, and reasonably foreseeable future actions, combined with the potential impacts of this project. A cumulative effect assessment looks at the collective impacts posed by individual land use plans and projects. Cumulative impacts can result from individually minor but collectively substantial impacts taking place over a period of time.

Cumulative impacts to resources in the project area may result from residential, commercial, industrial, and highway development, as well as from agricultural development and the conversion to more intensive agricultural cultivation. These land use activities can degrade habitat and species diversity through consequences such as displacement and fragmentation of habitats and populations, alteration of hydrology, contamination, erosion, sedimentation, disruption of migration corridors, changes in water quality, and introduction or promotion of predators. They can also contribute to potential community impacts identified for the project, such as changes in community character, traffic patterns, housing availability, and employment.

The California Environmental Quality Act (CEQA) Guidelines Section 15130 describes when a cumulative impact analysis is necessary and what elements are necessary for an adequate discussion of cumulative impacts. The definition of cumulative impacts under CEQA can be found in Section 15355 of the CEQA Guidelines. A definition of cumulative impacts under the National Environmental Policy Act (NEPA) can be found in 40 *Code of Federal Regulations* (CFR) Section 1508.7 of the Council on Environmental Quality (CEQ) Regulations.

Affected Environment

Cumulative impacts identified for the High Desert Corridor (HDC) are those impacts that result from past, present, and reasonably foreseeable future actions within the cities of Palmdale, Adelanto, Victorville, and Apple Valley, as well as unincorporated Los Angeles and San Bernardino counties in the High Desert region. The study area for each of the resources potentially affected by the cumulative projects is defined below. The affected environment for each of these resources has been previously discussed in their respective portions of Chapter 3.

Long-term growth projections are also considered because they help identify future actions that could contribute to potential cumulative impacts; the project design year (2040) is used as the planning horizon for considering future projects and actions. Table 3.7-1 summarizes the reasonably foreseeable projects considered in the cumulative impact analysis of this project. The table identifies regionally relevant projects, such as transportation and green energy projects located within 5 miles of the proposed alignment and all other development within 2 miles. Projects completed within 3 years, as well as projects within the planning or construction phases, were included in this list. The approximate locations of the cumulative projects are shown in Figure 3.7-1.

Table 3.7-1 Cumulative Projects

	Project Title	Project Description	Lead Agency	Project Status
Transportation Projects				
1	California High-Speed Rail System (HSR)	The California High-Speed Rail Authority proposes a train system capable of operating at speeds in excess of 200 miles per hour (mph) on a fully grade-separated track serving the major metropolitan centers of California. Project segments relevant for the proposed project include Bakersfield to Palmdale and Palmdale to Los Angeles.	The California High-Speed Rail Authority and the Federal Railroad Administration (FRA)	The Bakersfield to Palmdale and Palmdale to Los Angeles segments are still in the environmental review phase. The statewide Environmental Impact Report (EIR)/ Environmental Impact Statement (EIS) is finalized.
2	State Route (SR) 138 Safety Improvement Project	Caltrans proposes to widen the shoulders from 2 to 8 feet, provide 2-foot-wide rumble strips near the edge of traveling roadway in each direction and provide 4-foot-wide median buffer with rumble strips on SR-138 between SR-138/SR-18 Junction (PM 69.3) and the San Bernardino County Line (PM 75.0).	Caltrans	The Mitigated Negative Declaration was issued in April 2013.
3	Route 395 Expressway	The project will reconstruct the existing United States Highway 395 (US 395) to a four-lane expressway facility. It will also provide at-grade intersections for existing street crossings. Phase I is a project to widen US 395 from SR-18/Palmdale Road to Chamberlaine Way in Adelanto and install left-turn pockets at various intersections. Phase II is expected to be a similar widening operation from Chamberlaine Way to Desert Flower Road. Phase III will involve work from Interstate 15 (I-15) to SR-18.	Caltrans	Project planning is anticipated to be completed in 2017.
4	National Trails Highway Bridge Replacement Project	Replace the existing National Trails Highway Bridge over the Mojave River.	City of Victorville	Project is in the planning phase.
5	I-15/La Mesa/ Nisqualli Interchange	New full-service interchange between the Bear Valley Road and Palmdale Road interchanges.	San Bernardino Associated Governments (SANBAG)	Project completed in 2013.
6	XpressWest (formerly DesertXpress)	The project involves construction, operation, and maintenance of a high-speed passenger train along the 200-mile corridor between Victorville and Las Vegas, Nevada. The project would include stations and maintenance facilities at each end of the rail alignment in Victorville and Las Vegas.	FRA	Completed the privately funded planning and engineering stages; in process of acquiring funding for construction.

Table 3.7-1 Cumulative Projects

	Project Title	Project Description	Lead Agency	Project Status
7	SR-18 and Apple Valley Road Intersection Realignment Environmental and Civil Design Project	This project includes, but is not limited to, drainage improvements, road improvements, and traffic signal improvements where Apple Valley Road and SR-18 meet. The primary goal is to have shelf-ready plans for State or federal funding to be able to construct and realign the portion of Apple Valley Road that is north of SR-18 to line up directly with the portion of Apple Valley Road that is south of SR-18.	Town of Apple Valley	Project is in the design phase; however, there are no current plans for construction.
8	Yucca Loma Road/ Yates Road/Green Tree Boulevard Transportation Improvement	The proposed project will establish a new route across the Mojave River linking Apple Valley and Victorville. The project will widen Yucca Loma Road from Apple Valley Road to its current terminus east of Kasanka Trail, construct a new bridge crossing over the Mojave River extending to Yates Road, widen Yates Road, realign the Ridgecrest Road/Yates Road intersection, and construct an extension of Green Tree Boulevard from the new Ridgecrest Road/Yates Road intersection with a bridge over the Burlington Northern Santa Fe (BNSF) tracks to Hesperia Road.	Town of Apple Valley	Construction completed in 2015.
9	Rancherias Road Rehabilitation Project	This project will consist of the reconstruction of Rancherias Road between SR-18 and Zuni Road. The road will be widened to 44 feet and will add a center turn lane and bike lanes. Drainage improvements will include the installation of a drywell system and intersection improvements.	Town of Apple Valley	Construction completed in 2015.
Energy Projects				
10	Palmdale Hybrid Power Project (PHPP)	The PHPP is located near the Los Angeles/Palmdale Regional Airport, 0.33 mile south of Avenue M, east of Sierra Highway, adjacent to Air Force Plant 42 (AFP-42). It is an innovative 570–megawatt (MW) electric generating facility. This “hybrid” facility combines the ultra-high efficiency clean-burning natural gas technology with renewable solar equipment.	City of Palmdale	Awaiting Power Purchase Agreement (PPA) with Southern California Edison (SCE) before beginning construction.
11	Victor Phelan Solar	This project is an 18-MW generating solar facility on 160 acres. Located in Adelanto at the east corner of Seneca Road and Caughlin Road.	SCE	Project completed in 2013.
12	Native Sun Power	Native Sun Power has proposed a 4-MW photovoltaic (PV) plant on 35 acres near Rancho and Vinton roads in Adelanto. The plant aims to provide discounted electricity to nearby correctional facilities.	City of Adelanto	Project is in the planning phase.

Table 3.7-1 Cumulative Projects

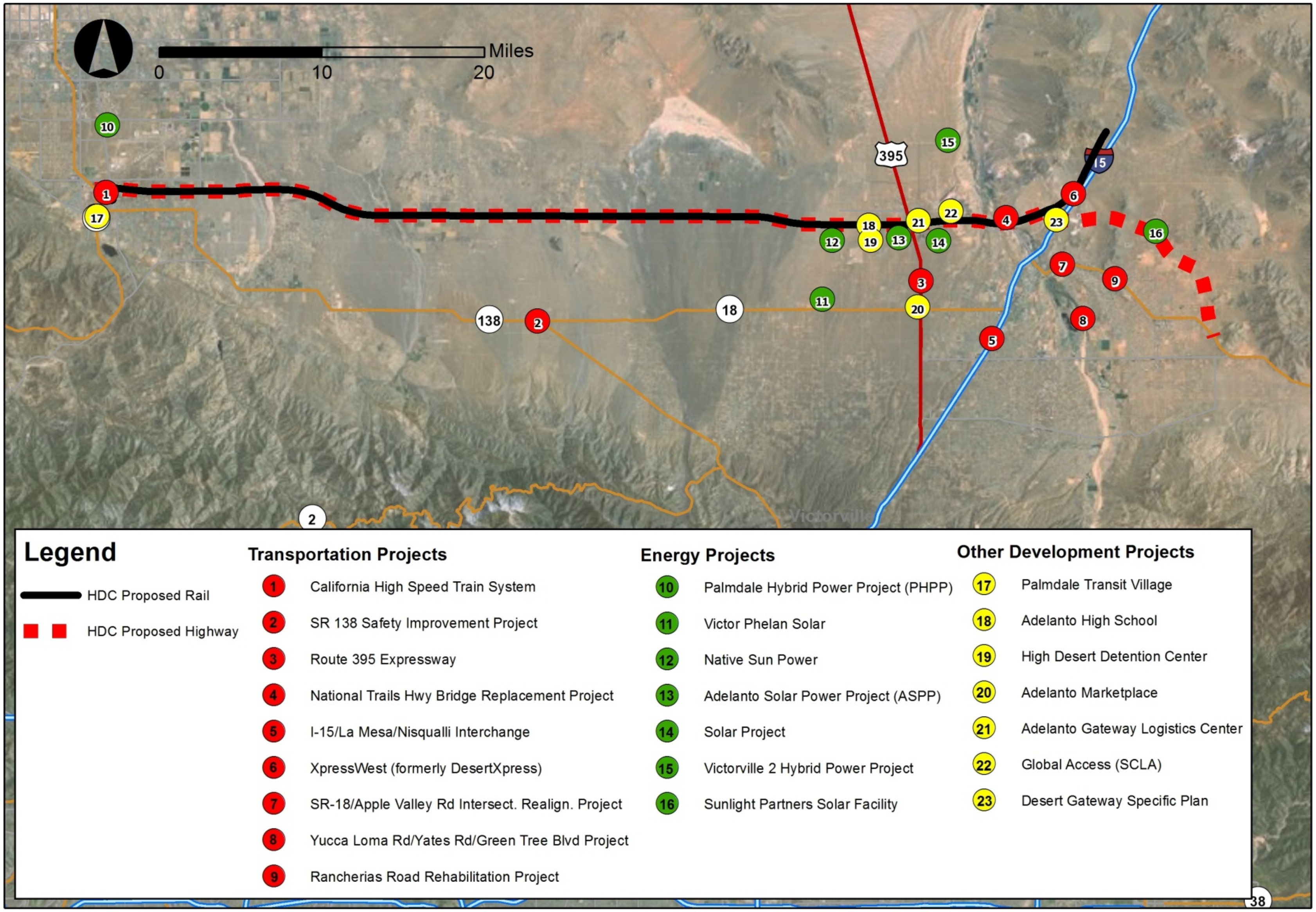
	Project Title	Project Description	Lead Agency	Project Status
13	Adelanto Solar Power Project (ASPP)	This solar PV project is located at Los Angeles Department of Water and Power's (LADWP) existing Adelanto Switching Station. The 10-MW utility-scale solar array is owned and operated by LADWP. It is located in Adelanto at Bellflower Street and Rancho Road.	LADWP	Project completed in 2012.
14	Solar Project	A 27-MW PV facility proposed for 205 acres of land at the southeast corner of Rancho and Emerald roads.	City of Adelanto	Project was approved in 2014.
15	Victorville 2 Hybrid Power Project	The project would consist of a hybrid natural gas-fired and solar thermal power plant in Victorville, San Bernardino County. Construction of the proposed Victorville 2 would require three areas that total 388 acres, located immediately north of the Southern California Logistics Airport (SCLA).	City of Victorville	Project is in the planning phase.
16	Sunlight Partners Solar Facility	This solar power facility is located in Apple Valley at the southeast corner of Navajo Road and Papago Road.	Town of Apple Valley	Project is in the planning phase.
Other Development Projects				
17	Palmdale Transit Village Specific Plan	Development of 156 apartment units and 122 townhomes. Located at the north side of Avenue Q and 4th Street East in Palmdale.	City of Palmdale	Phase 1 is complete.
18	Adelanto High School	The project is Adelanto's first public high school. The 60-acre property is located on Mojave Drive between Raccoon Avenue and Joshua Road.	City of Adelanto	Project completed in 2014.
19	High Desert Detention Center (formerly Adelanto Detention Center)	Construction of a 2,200-bed correctional facility. Located at the northeast corner of Rancho Road and Raccoon Avenue.	City of Adelanto	Phase 1 constructed in 2014. Phases 2 and 3 are anticipated to be constructed by 2017.
20	Adelanto Marketplace	Adelanto Marketplace is a multitenant retail center consisting of 27,489 square feet. Tenants include Stater Bros. Market, Starbucks, Rubio's, Denny's, and Bank of America.	City of Adelanto	Project completed in 2013.
21	Adelanto Gateway Logistics Center	This 400-acre industrial project is located across from the SCLA at Air Expressway and Adelanto Road. The center will consist of 10 to 15 industrial buildings ranging from 0.5 to 1.5 million square feet each.	City of Adelanto	Project is in the planning phase.

Table 3.7-1 Cumulative Projects

	Project Title	Project Description	Lead Agency	Project Status
22	Global Access (SCLA Development)	Under Phase 1, more than 2.8 million square feet will be constructed with 6.4 million square feet of industrial space (360 acres) planned in Phase 1 (SCLA – 43.5 million square feet, Southern California Logistics Centre – 65 million square feet, Southern California Rail Complex – 60 million square feet).	City of Victorville	Phases 1 and 2 completed. Phase 3 in planning phase.
23	Desert Gateway Specific Plan	The Desert Gateway Specific Plan represents a vision for a new 10,203-acre community in the High Desert with transit-oriented development (TOD) principles central to its character. Desert Gateway would be located at the interchange of the proposed project and I-15. It is projected the plan will create 26,100 housing units for 82,900 residents. Land uses would include a mixture of residential, commercial, mixed-use, industrial, and open space.	City of Victorville	Specific Plan was approved in 2010.

Source: Cities of Palmdale, Adelanto, Victorville, Apple Valley, 2015.

Figure 3.7-1 Cumulative Projects



Source: Data collected by Parsons, 2014.

Environmental Consequences

This section discusses potential impacts to various resources that could occur as a result of the HDC Project together with the other related projects listed in Table 3.7-1.

Cumulative transportation, energy, and other development projects identified above indicate that most development occurred, is planned, or is occurring within the Victor Valley area surrounding United States Highway 395 (US 395). Rural communities within the project area have witnessed limited development and are not expected to significantly expand in the near future; however, the desert area is becoming an important location for furthering green energy strategies, as shown by the large number of solar projects located within 5 miles of the proposed project alignment. Other than transportation improvement projects, the predominant development within the High Desert region is solar energy.

There are almost as many solar energy projects in planning, construction, or completion phases as there are other types of development, including transportation within the study area. Most of these solar projects are located in or near Adelanto. By taking advantage of the sustainable, natural resource and vacant land in the area, these projects will be able to create a substantial offset of power usage in the area. Two of the projects in the area are already completed and beginning to offset electricity usage.

The two other major transportation projects proposed in the project area consist of the California High Speed Rail (HSR) System and XpressWest. Other transportation projects include the realignment and widening of US 395 and the Yucca Loma Road/ Yates Road/Green Tree Boulevard Transportation Improvement (Yucca Loma) Project, which will provide a new link between Victorville and Apple Valley over the Mojave River. Developments associated with the rail projects include rail stations in Palmdale and Victorville to connect the HSR with the HDC in Palmdale, and the HDC with XpressWest in Victorville.

Other types of development projects geared toward transit-oriented development (TOD) consist of the Desert Gateway Specific Plan, which would be a mixed-use, high-density, new community associated with the future site of the new rail station in Victorville. Another TOD project proposed for the study area is the Palmdale Transit Village, which will create new multi-family residential opportunities at the west end of the proposed project. Commercial projects are proposed in Adelanto, and there is an addition proposed for the High Desert Detention Center in Adelanto, which will create more space for the prison. In addition, Adelanto’s first public high school opened in 2014.

Located immediately adjacent to the proposed HDC, the City of Victorville and Stirling, a Foothill Ranch, California-based development company, have partnered to redevelop the former George Air Force Base (GAFB) into Global Access. Global Access in Victorville combines air, ground, and rail connections within a master-planned 8,500-acre multimodal freight transportation hub. Global Access is comprised of the Southern California Logistics Airport (SCLA), Southern California

Logistics Centre, and Southern California Rail Complex. The airport and logistics centre are constructed, while the rail complex is still in the planning phase.

According to the Southern California Association of Governments (SCAG), the greater Antelope Valley and Victorville areas have grown significantly in the last 20 years and are projected to continue to grow in the future, despite the economic slowdown since 2008. Implementation of the proposed project would accommodate long-range development proposed in the project vicinity by improving traffic circulation and relieving anticipated future traffic congestion.

If multiple projects are built during the same general time frame, it would likely result in increased localized construction-related traffic congestion and construction air emissions and noise impacts. The Route 395 Expressway Project, XpressWest, the HSR, and development associated with the rail stations in Palmdale and Victorville are examples of other actions that would occur immediately adjacent to the HDC and have the potential to contribute to cumulative construction impacts if they are constructed within the same time frame. The California Department of Transportation (Caltrans) would work together with other lead agencies to ensure overlapping construction from multiple projects in the same vicinity would be managed to avoid or lessen cumulative impacts.

Timing of the HSR and XpressWest, which would connect to the HDC Project at the west and east ends, respectively, is uncertain at this time. If the HSR and XpressWest projects were to be in construction at the same time as the HDC, there would be cumulative impacts for construction air quality, noise, and traffic. Both projects would generate these types of impacts and, because the construction areas overlap, the surrounding areas would experience the impacts of the projects at the same time.

The analysis concludes that there may be cumulative impacts for several resources:

- Community Resources, including land use, parks and recreation, growth, farmland/grazing land, community character and cohesion, relocation and property acquisition, and environmental justice
- Utilities/Emergency Services
- Traffic and Transportation/Pedestrian and Bicycle Facilities
- Visual/Aesthetics
- Cultural Resources
- Water Quality and Stormwater Runoff
- Geology/Soils/Seismic/Topography
- Paleontology
- Hazardous Waste or Materials
- Air Quality
- Energy
- Noise
- Biological Resources

Hydrology and floodplain is not considered in the cumulative impact analysis because any impacts would be fully mitigated with implementation of stormwater best management practices (BMPs).

Analysis of cumulative impacts for these resources is presented below. The affected environment for each of these resources has been previously discussed in its respective portion of Chapter 3. Analysis focuses on the cumulative impacts of the build alternatives.

Community Resources

As stated above, the community resources analysis includes the following topic areas: land use, parks and recreation, growth, farmland/grazing land, community character and cohesion, relocation and property acquisition, and environmental justice.

Resource Study Area

The HDC Project is located in the Antelope and Victor valleys of Los Angeles and San Bernardino counties. The HDC would pass through larger and smaller cities and rural communities between Palmdale and Apple Valley. The effects to land use were considered by evaluating consistency with policy plans and identifying the property acquisitions that would be required as a result of the proposed project.

Jurisdictions covered in the analysis include the City of Palmdale, City of Adelanto, City of Victorville, Town of Apple Valley, and communities within unincorporated areas within Los Angeles and San Bernardino counties.

Current Condition and Historical Context

The HDC study area is largely rural and undeveloped, with larger cities flanking the endpoints of the proposed project corridor. Existing land uses throughout the project corridor consist of a mix of uses from agricultural to industrial to residential to resource conservation areas. The Mojave River, a major natural resource, flows between Adelanto and Victorville within the study area.

In its existing condition, there is no direct route between Palmdale and Victorville and Apple Valley. The HDC would improve mobility in the area and create more opportunities for development along the proposed corridor.

Project Impacts

Land Use

Construction of the HDC Project would result in conversion of a varied mix of existing land uses, including farmland, industrial, commercial, resource conservation, airport, and residential. The proposed freeway would provide greater access to existing areas, which may provide economic benefits for those particular industries. The increased accessibility created by the HDC would allow existing land uses located adjacent to the proposed interchange locations within Victorville and Palmdale to shift towards greater commercial and industrial use. The existing rural character within the unincorporated areas would likely be maintained in unincorporated Los Angeles County, as businesses would be drawn to the existing business activity in the urban areas.

Parks and Recreation

Construction of the proposed HDC alignment, except for Variation E, would require minor acquisition of Westwinds Golf Course, but no substantial impact was determined. In addition, indirect impacts to Rockfield Nature Park in Victorville may result from the acquisition of right-of-way (ROW) for the HDC alignment, in which a segment of the Los Angeles Department of Water and Power (LADWP) parking lot that serves the park may be acquired as part of the project. No impact would occur to the park use feature because the project would replace the parking area for LADWP.

Growth

The HDC Project would tend to shift some future development toward the new interchanges in Palmdale and Victorville/Adelanto. The alternatives with HSR would tend to change current low-density development patterns to higher density and mixed uses near the proposed rail stations in Palmdale and Victorville. The tolled alternatives would tend to spread some residential development along the toll-free highway network, but they would still attract commercial and industrial development near the interchanges in the eastern and western ends of the project. Conversely, the HDC is not expected to shift development to the proposed interchanges to be located in the undeveloped areas in the central and somewhat isolated rural region of the corridor, largely due to the lack of utilities, market demand, and supportive public land use policies.

Farmland/Grazing Land

The HDC would directly affect farmland by converting approximately 252 acres of Important Farmland and approximately 2,965 acres of Grazing Land to nonagricultural use, which could be a substantial impact. Alternatives that include rail would affect an additional 650 acres of sheep grazing land. The farmland and grazing lands would be acquired for the new transportation facility ROW.

Community Character and Cohesion

The proposed project may include changes to existing access and circulation, increased urbanization, growth, and quality of life. Proposed community enhancements as a result of the project include construction of a bike path/lane adjacent to the HDC, which would provide the community with additional mobility options and promote community character by improving connectivity within communities.

Relocation and Property Acquisition

Implementation of any of the build alternatives would result in property acquisitions, with differences identified for the highway-only alternatives and highway and rail alternatives. Depending on the highway alternative/variation that is selected, there could be up to 95 residential units and 68 nonresidential properties that may be acquired. For the rail alternatives, there could be up to 49 residential units and up to

53 nonresidential units that may be acquired depending on the alternative/variation that is chosen. Furthermore, if Option 1 is chosen, there would be 17 additional nonresidential acquisitions; and if Option 7 is selected, there would be 18 additional residential acquisitions and 14 additional nonresidential acquisitions. Most of the residential acquisitions would occur in Victorville and Apple Valley, while most of the nonresidential acquisitions would be in Palmdale.

Environmental Justice

Implementation of the build alternatives would not cause disproportionately adverse effects on any minority or low-income populations; however, for the alternatives that include the tollway, toll pricing may be considered a deterrent for lower-income populations to use the tollway. These issues need to be considered when determining toll prices.

Reasonable Foreseeable Actions

Increased mobility in the High Desert region would lead to changes in land use and an increase in development projects in the area. Planned roadway and infrastructure projects would also change existing land uses as a more developed roadway system is built. Roadway and infrastructure projects that require ROW acquisition could also lead to potential demolition and displacement. TOD proposed for the Palmdale Transit Village Specific Plan and the Desert Gateway Specific Plan projects would also create changes to land use and circulation patterns in the study area. The Yucca Loma Project would require 26 partial or full property acquisitions, as well as partial acquisition of the Mojave Narrows Park; however, the improved access would be considered a beneficial impact.

Cumulative Impacts

Land Use

Cumulative projects and planned growth in the High Desert region would lead to changes in land use and an increase in development intensity in the area. With this growth, there would be pressure for urbanized areas to expand to vacant lands and agricultural lands next to existing urban development. Historically, this has happened in San Bernardino County, in particular, but future development would be managed to be consistent with adopted General Plans, which encourage development in the urbanized portions of the city.

The proposed project would provide support to the existing and planned developments in the study area. All of the relevant projects planned for the project area are consistent with land use policies; thus, no cumulative impacts to resources are anticipated. Therefore, the project would not cumulatively contribute to considerable cumulative land use impacts.

Parks and Recreation

A review of cumulative projects indicates that planned projects that are mainly related to transportation would not result in new demand for recreational services but would instead facilitate access to recreational facilities. Mixed-use projects identified in the cumulative projects list would create additional demand for recreational services. As required by the Quimby Act, future land development projects would be required to provide additional parkland based on the population generated by the project. Implementation of the project would affect some parkland, but mitigation would be provided to mitigate the impacts; therefore, the project would not contribute to cumulative effects on parkland.

Growth

Cumulatively, it is anticipated that the planned HSR, extending from northern California to Los Angeles via the Palmdale Transportation Center, would have a transformational effect on growth. The HSR would greatly improve access to the High Desert region and decrease travel times into the Los Angeles Basin and beyond. With superior accessibility and considering lower housing prices compared with the Los Angeles Basin, HSR should attract new residents to the Palmdale/Lancaster metropolitan area because commutes to jobs in the Los Angeles Basin and San Fernando Valley would be much quicker than under present conditions. Moreover, this increased accessibility and substantial investment in public transportation infrastructure, coupled with lower land costs and increased market demand, would be expected to also attract new commercial, industrial, and other employment opportunities within the High Desert region, thus helping address the current housing/ jobs imbalance. Also from a cumulative perspective, the rail alternatives for the HDC Project would facilitate connections into Palmdale for passengers on XpressWest, a privately proposed HSR project between Las Vegas and Victorville. This would add to the transformational effect on development. Given these considerations, the cumulative impacts of new growth in the High Desert region would be considerable, much more than the HDC Project alone.

Another beneficial cumulative impact of the proposed project, together with the other cumulative projects, is job creation. Cumulative construction jobs could create economic benefits for the communities and jurisdictions in which the construction occurs. The initial phase of the XpressWest project between Victorville and Las Vegas is estimated to create approximately 80,000 jobs, either directly and indirectly, during construction; these will be principally in Clark County, Nevada and San Bernardino County, California. Upon completion, over 2,100 long-term permanent jobs (770 primary and 1,339 secondary) will be created.

The rail service would make it possible to work in the higher paying Los Angeles Basin and live in the less expensive HDC region with an easy commute; however, this transformation may eventually lead, among other things, to more environmental benefits. The principles of TOD could initiate a more compact form of mixed-use, pedestrian-oriented development that does not currently exist in the High Desert region. The proposed project, combined with other related projects, would contribute to cumulative effects on growth.

Farmland/Grazing land

According to the San Bernardino County General Plan Environmental Impact Report (EIR), San Bernardino County ranks in the top 15 agricultural-producing counties in

California; however, agricultural use within the county continues to decline with urban expansion. As mentioned in the land use section, when urban expansion encroaches into agricultural areas, remaining agricultural lands become surrounded by urban uses, further exacerbating the conversion of farmland to nonagricultural use. The decreasing air quality, increasing water costs, and decreasing viability also contribute to the conversion of farmland to other uses.

The proposed project, in combination with the transportation improvements around the east end of the project; implementation of the Desert Gateway Specific Plan, the HSR project, and the solar energy projects; as well as other projects and development in San Bernardino County, would continue the regional trend of converting farmland to nonagricultural uses. Indirect cumulative farmland impacts could occur due to improved access and desirability of land adjacent to the HDC alignment and interchanges and its subsequent impacts to open space and natural resources and infrastructures. Due to improved access, farmland could be under pressure for conversion to a higher-value residential and commercial land use. Smaller-size farmland properties are at higher risk of conversion because they are more affordable to purchase and may require an easier process for obtaining environmental clearances and permits. The Desert Gateway Specific Plan would also encourage development surrounding the proposed Victorville rail station, which could further affect agricultural resources in the area.

Based on SCAG's adopted 2012-2035 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS), future growth is anticipated and planned to be sustainable and context sensitive (i.e., directed toward protecting open space and agricultural resources).

The proposed project would have a considerable contribution to cumulative impacts related to farmland.

Relocation and Property Acquisition

Implementation of any of the alternatives would result in property acquisitions. Cumulative impacts may result from the replacement properties that would need to be acquired for various projects located within the cumulative impact study area.

Compliance with the California Relocation Assistance Act, the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act, regarding fair compensation and relocation assistance for displaced individuals and businesses would minimize cumulative impacts as a result of ROW acquisition, but combined, these projects would add to the demand for residential units and business properties in the High Desert region. The timing of the property acquisition process would be important in phasing the impact on replacement housing.

ROW acquisition required for the HDC Project would slightly diminish the property tax base of the project area, resulting in minor losses of property tax revenue. Several public projects listed above would also result in the acquisition of private property, further diminishing the local property tax base. Taken altogether, however, this potential cumulative impact would likely be offset by the ongoing and expanding residential, industrial, and commercial property development identified in the cumulative projects list.

Potential cumulative impacts associated with the proposed project, however, would likely be offset by the ongoing and expanding development identified in the cumulative projects list.

Utilities/Emergency Services

Resource Study Area

Potential impacts to public utilities and services were determined by inventorying those facilities that were within 0.5 mile of the HDC.

Current Condition and Historical Context

Public utilities analyzed for the HDC Project include electrical power, natural gas, telephone service, cable television services, and communication services. Emergency services include medical facilities and fire and police stations.

Project Impacts

Public and Private Utilities

It is estimated that the proposed project would have an impact on utilities at approximately 300 locations for the highway alternatives and 500 locations for the alternatives with the HSR component within the different communities within the alignment.

Emergency Services

The proposed project would not result in direct impacts to medical facilities or fire or police stations. It is likely the proposed project may improve response times for emergency services to other areas that do not currently have direct access to a major travel route, which would reduce congestion on existing local roadways. The project could create the need for additional personnel and equipment in the areas of California Highway Patrol (CHP) and possibly emergency services. This need would be mitigated by the fact that the project would increase the economic vitality of the region, and it is anticipated to improve the overall local and regional fiscal conditions.

Reasonable Foreseeable Actions

Reasonable foreseeable actions include construction of additional residential uses as part of the mixed-use developments. Specific Plans mentioned above and facilities associated with transportation development would result in an increase in demand for utility and emergency services.

Cumulative Impacts

Public and Private Utilities

The proposed project, in combination with the related projects, would place additional demand on the existing public utilities and emergency service providers. Projects in the cumulative study area collectively could result in adverse impacts to utilities related to increased demand for facilities, requiring new or expansion of facilities and/or the need to relocate or modify to accommodate proposed development. Buildout of the land uses assumed in development could require the upgrade/expansion of existing utilities to accommodate anticipated demand on the utility grid. Where feasible, appropriate minimization measures have been identified to reduce individual project impacts to utilities. These may include relocation or upgrading of facilities or payment of in-lieu fees.

The build alternatives would require utility relocation during construction; however, because the cumulative projects are not anticipated to adversely affect utilities, the impacts to utilities are not anticipated to contribute to a cumulative impact. Utility disruption due to highway construction would be minimized with the development of and implementation of a Utility Relocation Plan for the HDC alignment; therefore, the project's contribution to cumulative effects to utilities would not be adverse.

Emergency Services

Intensification of land uses associated with other related projects could result in the increased demand for emergency services and may affect response times. At the same time, the increased accessibility may also increase response times for fire and emergency service vehicles.

The build alternatives would involve construction that would contribute to short-term cumulative effects to emergency services in delayed response times. This could occur with the closure of some north-south streets, but it would be offset by construction of either new overcrossings and or undercrossings. The effect would also be minimized by implementation of a Traffic Management Plan (TMP) that would contain detailed plans of access routes and detours during construction. Because the cumulative projects are not anticipated to adversely affect emergency services, the impacts due to the proposed project are not anticipated to be cumulatively substantial.

Intensification of land uses indentified in the cumulative projects would serve to provide additional funds to increase law enforcement officers or facilities, offsetting the cost of any increased demand.

All of the build alternatives would require some level of demolition to accommodate the proposed HDC; therefore, all of the alternatives would create demolition and construction debris. These short-term impacts could potentially be adverse when considered with the waste disposal needs of the other cumulative projects in the area. Recycling of material either onsite or offsite would minimize the impacts of the build alternatives; however, these alternatives would not result in long-term cumulative impacts on solid waste disposal because it is a transportation facility and would result in only a minor increase in collection of roadside debris.

The projects in the study area would potentially increase solid waste demand due to intensification of land uses and could incrementally reduce capacity within the County of Los Angeles sanitary landfills. Application of State-mandated recycling requirements for construction and operational activities would reduce the total increase and minimize solid waste.

Several projects, including Desert Gateway Specific Plan and XpressWest, would create additional demand on water supply and emergency resources. Because the proposed project would also create substantial demand for additional emergency response personnel, the cumulative impact could be considerable.

Traffic and Transportation/Pedestrian and Bicycle Facilities

Resource Study Area

The traffic analysis study area runs west to east along the proposed corridor from State Route (SR) 14 in Palmdale on the west to east of Joshua Road in Apple Valley on the east, for a total length of 64 miles. In the north-south direction on the west end, the study area covers the area from the intersection of Interstate 15 (I-15) and Dale Evans Parkway on the north to Bear Valley Road on the south. On the east side, the study area covers the area from the intersection of SR-14 and West Avenue N on the north to the intersection of SR-14 and East Avenue S on the south.

Current Condition and Historical Context

The High Desert portion of the corridor is currently served by a sparse network of county and local roads that are typically two lanes. Sporadic, short sections of roadway have been widened along frontages of newer land developments as a condition of approval. Few of these roadways are continuous throughout the High Desert region. East Palmdale Boulevard is one of the longest east–west roadways, extending from Palmdale to 240th Street East; continuing east as El Mirage Road/East Avenue P. Sheep Creek Road is one of the longest north–south roadways, extending from SR-138 in Phelan to just north of El Mirage Road.

Project Impacts

The project would have a beneficial impact on long-term traffic and transportation operations in the corridor by accommodating future population growth, relieving future congestion, and improving safety. All of the project alternatives include access improvements and new interchanges. In addition, two of the project alternatives include providing passenger rail service, with rail stations located in Palmdale and Victorville.

The proposed project would affect local circulation by causing several street closures and loss of direct connectivity on both sides of the proposed facility. Bus service would not be affected by construction of the project.

In addition, the project is planned to support a variety of transportation facilities as part of the local jurisdiction plans. Additional parking facilities would be provided as part of the railroad stations to meet the need created by the expansion of train service, along with other facilities to accommodate nonmotorized transportation.

Reasonable Foreseeable Actions

Reasonable foreseeable actions, including construction of the projects listed above, would provide improved access, as well as create traffic congestion in the study area. The Yucca Loma Project, Desert Gateway Specific Plan, HSR, XpressWest, US 395 Widening, and the Palmdale Transit Village would create substantial traffic impacts during project construction. At the same time, beneficial impacts would result from these projects once they are completed.

Cumulative Impacts

The various rail projects in the study area would create a beneficial cumulative impact on freeway volumes. With the various HSR opportunities, people would forgo using their cars and take public transportation.

Development could cumulatively combine to adversely affect intersection operations near the proposed rail stations. With the implementation of avoidance, minimization, and mitigation measures, it is not anticipated that the project would have negative impacts on access, circulation, parking, and public transit, and it would not contribute to cumulative project impacts.

Visual/Aesthetics

Resource Study Area

The entire project is located in the Mojave Desert of southern California. The existing visual context is characterized by low-density residential, rural desert, and commercial developments of various sizes spread throughout the area. The landscape is characterized by desert chaparral consisting of desert scrub, Joshua trees, and California junipers.

Current Condition and Historical Context

The land use within the corridor is primarily rural and suburban residential, but it also includes areas of commercial, industrial, recreational, open space, and agricultural land uses throughout. The High Desert region of the proposed project is primarily undeveloped, with long stretches of open landscapes. There are no scenic resources within the project area, and no portion of the project is within an officially designated scenic highway.

Project Impacts

This project would change the rural appearance of some of the communities through which it passes with the implementation of large, widened, urban, transportation infrastructure and concrete urban structures. The primary overall visual effect of the project, regardless of alternative, would be the increased urban character caused by the additional highway lanes, reduction of desert landscape, and, at some locations, the construction of soundwalls and structures that would block views. The inherent visual change associated with an increase in visual scale and additional hardscape would be unavoidable and noticeable.

In addition, several additional components of the project are proposed, including infiltration basins, solar facilities, HSR stations, traction power substation (TPSS), and radio tower sites, which would change the visual landscape of the project area. Because of their large size, strong regular geometry, and highly reflective surfaces, solar energy facilities may contrast strongly with the natural or rural settings in which they are located.

Reasonable Foreseeable Actions

New structures and infrastructure would be introduced primarily by roadway projects, solar energy projects, and nonresidential developments that have been proposed in the study area. Future development in the study area would add to the increasing intensity and density of urban development in the project area through construction of new buildings and infrastructure systems, including roadways.

Cumulative Impacts

Future development would expand the urbanized area, but the High Desert region would continue to be surrounded by agricultural land or low-density uses in the outlying areas, thereby maintaining a semirural character.

The solar energy projects discussed in this section would introduce utilitarian visual features, such as solar panels, buildings, wind turbines, and additional overhead transmission lines, into the existing visual environment and could cumulatively alter the visual environment of this largely undeveloped area. These related projects, in combination with the proposed project, could result in cumulative changes to the existing visual character. These projects could cumulatively introduce an industrial visual character to the nonurbanized visual landscape, but they would not result in a rapid change in visual character due to their dispersed locations throughout the desert.

The cumulative impact of the HDC Project and the Global Access multimodal project would change the visual character of the area around northwest Victorville from semiurban to more urban. Motorists and residential viewers would be affected by this change. The cumulative change would be slightly adverse.

Additionally, development within the Desert Gateway Specific Plan area, XpressWest, HST, and the proposed project facilities would cumulatively affect the existing lighting and glare, particularly in the areas within limited development along the project corridor.

While cumulative effects would introduce new urban visual features into the open, expansive undeveloped desert, as well as changes to urban areas, cumulative visual effects would be isolated to the viewshed in the related projects' sites. The proposed project, in combination with the past, present, and future projects within the area of cumulative analysis would have the potential to create a cumulative impact to visual resources.

Cultural Resources

Resource Study Area

The Resource Study Area includes all cultural resources located within the designated Area of Potential Effect (APE). In Palmdale, the APE parallels Avenue P-8 for a distance of approximately 10 miles to 100th Street East. From 100th Street East, the APE curves south and continues east parallel to East Palmdale Boulevard. In San Bernardino County, the APE parallels Air Expressway Boulevard and then crosses the Mojave River and I-15 and enters Apple Valley. In Apple Valley, near Corwin Road, the APE turns south and terminates at SR-18. The vertical limits of the

APE would vary depending on location along the ROW. In most areas of the APE, grading to prepare the APE for fill and paving would be limited to 5 to 10 feet below the existing ground surface.

Current Condition and Historical Context

Based on ethnographic research conducted for the project, the study area was traditionally occupied by the Kawaiisu and Vanyume/Serrano peoples. The built environment within the APE reflects the historical evolution of the desert area of northern Los Angeles and San Bernardino counties. Postwar tract-style houses located on subdivided lots are the predominant building type identified within the project alternative study areas. Commercial buildings are also a dominant building type within the APE. Several linear resources, including former roads and trails, transmission lines, and railroads are also located within the project area.

For the portion of the project alternatives lying within Los Angeles County, record searches revealed 106 cultural resource surveys have been conducted within a 1-mile radius of the project APE. In total, 33 cultural resources were previously recorded within 1 mile of the APE, including 23 historical archaeological sites, 1 historical structure, and 9 prehistoric isolates. No Points of Historical Interest, California Historical Landmarks, California Register of Historical Resources (CRHR), National Register of Historic Places (NRHP) listed, or Historic Resources Inventory listings were identified within a 1-mile radius of the project APE portion located within Los Angeles County.

For the portion of the project area that lies within San Bernardino County, record searches revealed that 174 cultural resource surveys have been conducted within a 1-mile radius of the project APE. In total, 213 resources were identified within a 1-mile radius of the project APE, with 37 within the APE. There are 9 NRHP-eligible properties and 3 California Historic Landmark listings located within a 1-mile radius of the project APE portion located within San Bernardino County.

Project Impacts

All HDC build alternatives would result in a finding of an Adverse Effect in accordance with the Section 106 Programmatic Agreement (PA). Effects to cultural resources would apply equally to all of the build alternatives. An Adverse Effect finding as a result of the project alternatives was found for one historic property – prehistoric archaeological site CA-SBR-12336.

All of the HDC build alternatives have the following five NRHP-eligible properties (linear resources) within their immediate or adjacent footprint, and the impacts would be similar for all. National Old Trails Highway; Atchison, Topeka and Santa Fe (ATSF) Railroad; Kramer-Victor, Kramer-Roadway, and Victor-Roadway Transmission Lines and Towers; the Southern California Edison Company (SCE) Ivanpah-Baker-Coolwater-Dunn-Siding-Mountain Pass 115-kilovolt (kV) Transmission Line; SCE Kramer-Victor and Victor-Roadway Power Lines and Towers; and an NRHP-eligible prehistoric archaeological site.

Reasonable Foreseeable Actions

New development proposed in the High Desert region, along with several transportation projects planned throughout the area, may have the further effect of reducing certain historic properties from the existing inventory. XpressWest would affect archaeological resources in the study area.

Cumulative Impacts

Construction activities may cause the loss or impairment of cultural resources in the study area. These include demolition or relocation, as well as increases in vibration and the introduction of new visual elements out of character with the setting of the historic property. Development and other changes induced over time may eliminate or reduce the number of certain types of built environment properties and archaeological resources that represent the High Desert region's cultural history.

For cumulative impacts to occur to archaeological resources, important examples of these resources would have to be permanently removed from the existing inventory of the study area. XpressWest, combined with the proposed project, would not permanently remove the existing inventory in the study area; therefore, cumulative impacts related to archaeological resources are not expected to be substantial.

The related projects would likely be required to incorporate similar types of mitigation measures prior to development. With these mitigation measures, cumulative impacts to cultural resources would not likely be substantial.

Water Quality and Stormwater Runoff

Resource Study Area

The geographic context for the analysis of cumulative impacts associated with water quality is the area covered by the Antelope Valley and Mojave River watersheds, and the geographic context for the analysis of cumulative impacts associated with groundwater is the area underlain by the Antelope Valley Groundwater Basin and the Mojave River Groundwater Basin.

Current Condition and Historical Context

The project corridor traverses two watersheds – Antelope Valley and Mojave River. The hydrologic regime along the entire corridor exhibits the characteristics of an alluvial fan, with several channels that cross the project alignment. The project area has a High Desert-type climate, characterized by long, dry, hot summers and cold and windy winters. In the Antelope River and Mojave River valleys, the summer months are hot with little or no precipitation, and all areas within this region can be affected by summer monsoonal thunderstorms. Precipitation occurs as rainfall, with snow common in the high mountains.

Historically, groundwater flowed north from the San Gabriel Mountains and south and east from the Tehachapi Mountains toward Rosamond Lake, Rogers Lake, and Buckhorn Lake. Groundwater pumping has caused subsidence of the ground surface, as well as earth fissures to appear in Lancaster and on Edwards Air Force Base (EAFB). By 1992, 292 square miles of Antelope Valley had subsided by more than

1 foot. This subsidence has permanently reduced aquifer system storage by about 50,000 acre-feet.

Groundwater is recharged into the basin predominantly by infiltration of water from the Mojave River, which accounts for approximately 80 percent of the total basin natural recharge. Other recharge sources include infiltration of storm runoff from the mountains and recharge from human activities such as irrigation return flows, wastewater discharge, and enhanced recharge with imported water.

Project Impacts

The proposed project would result in an increase in impervious surface areas, which could potentially increase stormwater runoff. This could potentially modify the natural timing of drainage in the watershed through changes in the time required for runoff to reach local streams and changes in peak runoff rates and runoff volumes. Once the new facility is completed, potential pollutant sources would be associated with motor vehicle operations, highway maintenance activities, illegal dumping, accidental spills, and landscaping care.

Reasonable Foreseeable Actions

Development of the HDC Project, in combination with all other development that would occur in the watershed areas, would involve construction activities, increases in stormwater runoff from new impervious surface area, and possibly reduction in groundwater recharge areas. Construction of new development throughout the watershed areas could result in the erosion of soil, thereby cumulatively degrading water quality. In addition, the increase in impervious surface area resulting from future development may also adversely affect water quality by increasing the amount of stormwater runoff, transportation-related pollutants, and associated targeted design constituents (TDCs) entering the storm drain system. New development, however, would have to comply with existing regulations regarding construction practices that minimize risks of erosion and runoff.

Cumulative Impacts

The increase in impervious surface could cumulatively contribute to stormwater runoff, primarily near the proposed rail stations and Specific Plan areas in Palmdale and Victorville. Compliance with applicable regulatory requirements identified in Section 3.2.2, Water Quality and Stormwater Runoff, which require implementation of BMPs during the construction and post-construction phases, would ensure that water quality is maintained to the maximum extent practicable for potential development projects within the watershed areas. Therefore, water quality impacts associated with implementation of the HDC Project and the proposed projects would be minimized and would not have a cumulatively considerable contribution to the cumulative effects related to water quality.

Intensification of development and addition of impervious surfaces as a result of implementation of the transportation, energy, and other development projects, as well as the HDC Project, would not have a cumulatively considerable contribution to the adverse effects on groundwater recharge in the basins. Although the overall development associated with all of the projects that may be planned within the basins could directly and/or indirectly result in the loss of groundwater volume and recharge areas, this loss would be mitigated by groundwater recharge programs that have already been designed and implemented within the two basins to ensure that groundwater will continue to be a viable water supply in the future. In addition, all of the projects would be required to comply with the post-construction standards referenced in the Construction General Permit (Order No. 2009-0009-DWQ), which requires the use of structural treatment practices (i.e., Treatment BMPs) to capture stormwater runoff. These structural treatment practices must be approved by the Regional Water Quality Control Board (RWQCB) to ensure that they are implemented to the maximum extent practicable. Structural Treatment BMPs, such as infiltration devices, augment groundwater by retaining stormwater runoff, which subsequently infiltrates into the groundwater regime; therefore, new development, as well as the proposed project, would not have a cumulatively considerable contribution to the cumulative effects related to groundwater recharge.

Geology/Soils/Seismic/Topography

Resource Study Area

The study area for the geology/soils/seismic/topography impacts is the maximum footprint of all of the build alternatives.

Current Condition and Historical Context

The proposed project, located within the High Desert region, is within the geologic region of California known as the Mojave Desert Geomorphic Province. This geologic region consists of unique defining features based on geology, faults, topographic relief, and climate. The Mojave Desert is bounded on the southwest by the San Andreas Fault Zone and Transverse Ranges, which includes the San Gabriel Mountains on the south; on the north and northwest by the Garlock Fault and Tehachapi and Sierra Nevada mountains; and to the east by the Sonoran Desert region. The Mojave Desert is characterized by desert alluvial fans with internal drainages, alluvial valley plains, and lacustrine basins (located north of the alignments).

Project Impacts

Impacts related to erosion occurring during construction and after completion of the project that may affect the traveling public or the project facilities would be reduced through project design, including the use of appropriate grading techniques.

The proposed project alignment is not located within an Alquist-Priolo Earthquake Fault Zone and is not located over a previous well-defined fault trace. The potential for impacts from geologic and seismic hazards to the components under each build alternative is considered low. In addition, the potential of exposure of construction workers and the traveling public, once the HDC is operational, to these hazards is considered low.

As a beneficial impact, the HDC may facilitate the movement of economic mineral resources (i.e., aggregate base, sand, and gravel) from the area. It may also facilitate the development of more sand and gravel quarries.

Reasonable Foreseeable Actions

Development of the HDC Project, in combination with all other development that would occur in the study area, would involve construction activities that would create additional geologic impacts. New development, however, would have to comply with existing regulations regarding construction practices that minimize ground shaking, liquefaction and other soils, seismic, and topographical constraints.

Cumulative Impacts

Ground shaking, liquefaction and other soils, seismic, and topographical constraints pose a potential hazard for all development projects in southern California; however, these effects are evaluated on a site-specific basis, and potential impacts are minimized via site-specific design features. Measures, such as adherence to geotechnical consultant recommendations regarding soil preparation, earthquake structure design, and grading methods, would minimize potential effects for each project; therefore, they do not result in substantial cumulative effects.

Paleontology

Resource Study Area

The paleontological study area includes all locations that would be subjected to subsurface ground disturbance under all of the alternatives of the proposed project. The paleontological study area is the same as the project construction area.

Current Condition and Historical Context

Four geologic units in the project area have been classified as having high potential to contain scientifically significant paleontological resources. These units are: Holocene to Pleistocene low terraces, alluvial fans, and colluvial aprons of fine to medium sand (Q6m); Holocene to Pleistocene low terraces, alluvial fans, and colluvial aprons of pebble gravel with a sand and silt matrix or very coarse to coarse sand with gravel (Q6c); Pleistocene high-terrace deposits and alluvial fans of pebble gravel with a sand and silt matrix or very coarse to coarse sand with gravel (Q3c); and Pleistocene intermediate terraces, alluvial fans, and Pleistocene colluvial aprons of pebble gravel with a sand and silt matrix or very coarse to coarse sand with gravel (Q4c).

Project Impacts

The proposed project could affect Holocene to Pleistocene and Pleistocene deposits. Construction would include excavation and grading during proposed roadway improvements. Most of the construction limits in the project area remains largely undeveloped. The potential to find undisturbed, native surficial deposits would be greatest in these undisturbed areas. Ground disturbance from proposed construction of supporting facilities, including temporary construction offices and construction staging areas, could also disturb native materials, with some potential for impacts on paleontological resources.

Reasonable Foreseeable Actions

Reasonable foreseeable actions include excavation and grading during proposed roadway improvements. The increased construction, particularly on undeveloped land, may result in the excavation of unknown paleontological resources.

Cumulative Impacts

Cumulative impacts to paleontological resources can occur when development of an area results in the removal of paleontological resources, which could degrade the physical historical record of an area. While impacts associated with such resources tend to be limited to individual project sites and do not generally result in substantial cumulative impacts, the proposed project, in combination with the related projects, could result in cumulative impacts to such resources. For example, the capacity improvements to US 395 or the rail improvements associated with the HSR and XpressWest projects would have the potential to cumulatively affect the same paleontological resources that would be affected by the proposed project alternative where the rail alignment is located within the same vicinity. The Desert Gateway Specific Plan could also cumulatively affect the same resources as the proposed project in the immediate vicinity; however, minimization and mitigation measures provided would reduce any impacts to paleontological resources. The proposed project is not anticipated to have a considerable contribution to the cumulative effects to paleontological resources.

Hazardous Waste or Materials

Resource Study Area

Due to the length and scope of this project, the corridor was broken down into sections and segments.

Current Condition and Historical Context

The HDC study area is largely rural and undeveloped with larger cities flanking the endpoints of the proposed project corridor. Existing land uses throughout the proposed project corridor consist of a mix of uses from agricultural to industrial to residential to resource conservation areas.

Project Impacts

Construction of the HDC Project has the potential to expose construction personnel to asbestos-containing material (ACM) and lead-based paint (LBP) if these materials are not removed prior to construction. Workers and the general public may be exposed to aerially deposited lead (ADL) during construction and operation of the HDC in the San Bernardino County portion of the project area. The potential for exposure of construction personnel to hydrocarbons, methane, and hydrogen sulfide is likely during deep excavation or boring for bridge columns on the two plugged and abandoned oil well sites located in the project area. The groundwater gradient beneath the site is estimated to follow the gradient of the existing topography (i.e., south-southeast); therefore, any potential contaminant sources from the north and northwest directions of the site may have potential to affect the site. The former Meadowbrook Dairy Farm at the northwest corner of the Sheep Creek Road/Parkdale Road intersection and Krey Field (Variation B) may have aboveground and/or underground storage tanks, although a search of GeoTracker did not yield any results for these sites.

Reasonable Foreseeable Actions

Reasonable foreseeable actions include construction activities that would increase the hazardous materials in the study area from demolition and other construction activities. Other actions include discovery of unidentified underground storage tanks and other hazardous materials.

Cumulative Impacts

For hazardous materials and waste, the concern would not be from contamination caused by the project, but rather from materials that are currently present in the environment, and hazardous materials transported on the areawide roadway system on a daily basis. Federal, state, and local management and disposal requirements address the handling of these materials. There would be an incremental increase in the generation of hazardous materials in the study area during construction; however, long-term operational impacts of the HDC would not contribute to the generation of hazardous materials.

Project impacts related to hazardous wastes and materials would be mitigated by implementing the mitigation measures provided. It is reasonable to assume that similar mitigation measures would be implemented as part of the related projects to alleviate potential adverse effects related to hazardous materials. Each individual project would be required to investigate and report any findings of contaminated soil or groundwater; therefore, it is not anticipated that there would be any cumulative impact related to hazardous waste or materials.

Air Quality

Resource Study Area

The project site is located in the Mojave Desert Air Basin (MDAB) within the jurisdictional boundaries of the Antelope Valley Air Quality Management District (AVAQMD) and Mojave Desert Air Quality Management District (MDAQMD). The MDAB is comprised of four air districts; the Kern County Air Pollution Control District (APCD), the AVAQMD, the MDAQMD, and the eastern portion of the South Coast Air Quality Management District (SCAQMD). The AVAQMD covers the western portion of the proposed project in Los Angeles County, while the MDAQMD covers the eastern portion of the proposed project in San Bernardino County. The MDAQMD's boundaries encompass San Bernardino County's High Desert and the Blythe portion of Riverside County.

Current Condition and Historical Context

The climate of the Antelope Valley is characterized by hot summers, mild winters, infrequent rainfall, moderate afternoon breezes, and generally fair weather. The most important weather pattern is associated with the daily onshore sea breeze, which funnels through Soledad Canyon into the upper desert to the north of the heavily developed portions of the Los Angeles Basin. This daily air flow brings polluted air into the area late in the afternoon from late spring to early fall.

The primary Antelope Valley air quality concern is that there is a general transport of air from the polluted Los Angeles Basin through the Santa Clarita Valley, and then toward the normally cleaner upper desert, especially during the summer smog season. In addition to winds that control the rate and direction of pollution dispersal, southern California is notorious for strong temperature inversions that limit the vertical depth through which pollution can be mixed.

Project Impacts

Particulate matter less than 10 microns in diameter (PM_{10})/particulate matter less than 2.5 microns in diameter ($PM_{2.5}$) hot-spot analysis indicates results would be below federal standards but would be higher than the State's 24-hour PM_{10} and annual $PM_{2.5}$. Future mobile source air toxic (MSAT) emissions in 2020 (opening year) and 2040 (horizon year) were calculated to compare the build condition against no-build condition and the build condition against existing condition. The results of the calculation show an increase from both the existing and no-build conditions along the proposed HDC; however, a decrease of MSAT levels in many areas outside the immediate vicinity along the proposed HDC was also exhibited.

Reasonable Foreseeable Actions

The Palmdale Transit Village project would exceed operational impacts of PM_{10}.

Cumulative Impacts

The proposed project, in combination with past, present, and future projects in year 2040, is predicted to result in an increase in greenhouse gas (GHG) emissions, representing a cumulative impact. On a regional basis, the U.S. Environmental Protection Agency's (EPA) and California's vehicle and fuel regulations, coupled with fleet turnover, will over time cause substantial reductions that, in almost all cases, will cause regionwide MSAT levels to be significantly lower than today.

The proposed project would not substantially contribute to the cumulative impact because criteria pollutants and GHG emissions would decrease in association with the diversion of passenger vehicles. In addition, the project intends to incorporate the sustainable energy components into the project corridor, thus offsetting the GHG emissions that would occur as a result of project implementation.

Energy

Resource Study Area

Implementation of the proposed project would affect the use of energy resources in Los Angeles and San Bernardino counties. The analysis of these impacts is at the regional level.

Current Condition and Historical Context

Energy is currently consumed in the study area for construction of public and private projects; operation of motor vehicles; and to power a variety of existing land use functions. According to the California Energy Commission (CEC), the transportation sector represents the largest portion of California's energy consumption, as energy use continues to be dominated by growth in passenger vehicles. As such, consumption associated with vehicular movement is almost entirely fossil fuel (i.e., gasoline and diesel) based. California contains abundant sources of renewable and nonrenewable energy sources.

Project Impacts

Implementation of the HDC Project would affect the use of energy resources in Los Angeles and San Bernardino counties. The alternatives that incorporate rail would consume more energy than the highway alternatives. The vehicle miles traveled (VMT) would increase for each of the build alternatives compared to the No Build Alternative. These increases could be interpreted to indicate that the project would create trips, when in fact, it would primarily redistribute trips; however, this increase in VMT represents a worst-case scenario because the project would decrease travel times of delay by creating a shorter direct route with faster travel speeds.

The sustainability or green energy components of the HDC Project would result in an established, self-sustaining, energy-neutral corridor. Due to the energy requirements to become an energy-neutral corridor, a centralized solar array would need to be configured to provide the most amount of energy in an efficient manner. It has been determined that the most efficient configuration would involve a rectangular area adjacent to the HDC to power recharging stations for electric cars and overhead lighting. Excess energy could be returned to the local grid.

Reasonable Foreseeable Actions

Several projects identified on the related impacts list would create solar energy facilities within the High Desert region. There would be increased renewable energy sources created from these projects. Other development projects would also create additional energy demands for construction and operation.

Cumulative Impacts

Development projects, such as the Desert Gateway Specific Plan, would cumulatively contribute to energy consumption within the area of cumulative analysis. The allowable development would require the consumption of energy for development and operation of the proposed urban uses within the previously open, low-density area.

The HSR and XpressWest projects would have similar energy effects as the proposed project because they are also HSR projects and would provide a mode shift from automobile and air travel, which would have the potential to have a net positive effect on energy consumption.

Conversely, the proposed solar energy projects could result in beneficial energy effects in California. These projects would use renewable energy resources to create power and electricity to serve California, reducing the need for new or expanded power plants that utilize nonrenewable sources (e.g., oil, gas, nuclear). Energy produced by these solar energy projects could potentially contribute to the electricity required by the proposed project, thus promoting the use of renewable resources and the reduction of petroleum dependence.

Because the proposed project would have a beneficial overall effect of reducing energy use over time, the proposed project would not have a considerable contribution to the cumulative energy effect.

Noise

Resource Study Area

The analysis evaluated the effects of noise on affected receivers next to the build alternatives. The entire area within the project limits was acoustically represented by 88 noise site locations. Traffic noise readings were taken at 68 locations and modeled at 20 sites.

Current Condition and Historical Context

The project study area consists of a mix of land uses, with the more urbanized areas located at the far west and east ends, and the more rural and undeveloped areas located throughout the High Desert region. Sensitive receptors within the project area include single- and multi-family residences, schools, parks, recreation areas, playgrounds, golf courses, places of worship, medical facilities, and cemeteries, hotels/motels, restaurants. Existing noise levels were recorded at 66 locations and modeled at 32 locations, which were acoustically representative of the entire area within the limits of the project. The existing ambient noise levels measured were between 42 and 70 A-weighted decibels (dBA).

Project Impacts

There would be substantial increases in noise in most of the areas because the mainline alignment is a new freeway and noise-sensitive receivers have no existing traffic. In contrast, some areas would experience a drop in noise levels after the project is constructed because the retaining walls for the new connectors would shield mainline traffic noise to the receptors.

The traffic noise analysis indicates that residential areas, a school, a park, and a church within the project limits would be impacted after project completion under the Freeway/Expressway Alternative (i.e. the noise level will approach or exceed Federal Highway Administration [FHWA] Noise Abatement Criteria [NAC]). Noise abatement is considered where noise impacts are predicted, where frequent human use occurs, and where a lowered noise level would be of benefit.

The rail noise study was also conducted, and the results reveal that the highway noise is predominant. Rail noise effect is considered negligible for this project.

Reasonable Foreseeable Actions

Reasonable foreseeable actions include construction of additional residential uses, which would result in an increase in the number of receptors that may be exposed to traffic noise associated with the HDC Project, and generation of additional traffic that would use the HDC and other roadway projects identified above. The Desert Gateway Specific Plan has residential properties proposed within close proximity of the proposed project; however, there is no approved residential project at this time. A portion of the HSR, XpressWest, and their respective rail stations would also be within the resource study area.

Cumulative Impacts

The project long-range analysis (year 2040) reflected the growth projections approved by SCAG. As a result, the 2035 noise analysis of traffic noise reflects the anticipated population growth and traffic that would be associated with cumulative projects; therefore, except for the HSR and XpressWest, cumulative noise levels would be the same as those evaluated for the project. The noise impacts associated with the HSR would occur only as the train is passing the affected receivers. As a result, the extent of the impacts would depend on the number and timing of the trips. The HSR also proposed noise abatement to reduce the impacts associated with the rail activity; however, even with abatement, there would still be increased noise levels for those receptors that are exposed to noise levels of the HDC, HSR, and XpressWest.

The proposed project, in combination with related transportation, energy, and other development projects, would primarily affect noise levels in urbanized areas along the alignment. The cumulative impact would not be considerable.

Biological Resources

Resource Study Area

The resource study area for biological resources is generally 500 feet in width over most of the 63-mile length with a few exceptions at interchanges, intersections with on-/off-ramps, where the rail line and highway separate, and in few areas where the roadway narrows. The total area within the biological study area (BSA) is approximately 8,459 acres; however, each alternative alignment would disturb a subset of the BSA.

Current Condition and Historical Context

The proposed project would connect large urban areas on the west (Palmdale) and east (Adelanto, Victorville, Apple Valley) ends of the HDC. The central portion of the proposed HDC is largely undeveloped; however, despite the urban development on the west and east end of the proposed HDC, there are important landform and hydrological features that provide habitat for biological resources. Particularly near the Mojave River, natural resources are able to flourish. The Mojave River, and several other waterways, provide for wildlife movement within the study area. Most of the plant habitat in the study area consists of native species. The project area provides habitat for many special-status, threatened, and endangered species.

Project Impacts

The project would have temporary and permanent impacts to sensitive plant and animal species and their habitats. Plant communities that could be affected by the proposed project generally represent a very small percentage of similar plant communities that occur in the project vicinity, especially within the overall western Mojave Desert, with the exception of communities described below. Table 3.7-2 lists the acreage of each vegetation community/land cover type within the BSA and the percentage of that community compared to the acreages of each community in the western Mojave Desert. The data for the overall western Mojave Desert natural communities and land cover types has been taken from the Desert Renewable Energy Conservation Plan (DRECP) West Mojave and Eastern Slopes Ecoregion Subarea (DRECP EIR/EIS August 2015). As shown in Table 3.7-2, the vegetation communities in the BSA only constitute a small percentage of the same vegetation communities available in the West Mojave and Eastern Slopes Ecoregion Subarea. Plant communities within the BSA that generally represent a larger percentage of that community's occurrence within the western Mojave Desert include big sagebrush alliance (4.23 percent), creosote bush scrub alliance (3.05 percent), and disturbed black willow alliance (9.20 percent). It should be noted that this percentage represents all of the entire community found within the BSA, and not all of a particular community would be impacted by any alternative. Even though the BSA contains a relatively high percentage of big sagebrush alliance, creosote bush scrub alliance, and disturbed black willow thickets alliance, their loss would not result in a substantial impact to special-status wildlife habitat. Special-status wildlife species with the potential to occur within the BSA, with the exception of riparian birds, are not habitat specialists limited to only big sagebrush alliance, creosote bush scrub alliance, or black willow thickets, and they will use available suitable habitat in all vegetation communities in the vicinity of the BSA. As such, impacts to special-status wildlife habitat from the loss of vegetation communities would be less than substantial. Furthermore, the preparation and implementation of a HMMP (BAN-5) and compensatory mitigation for impacts to habitat for various sensitive plant and wildlife species (BNC-4, BAN-7, BTE-2, BTE-3, and BTE-11) would further reduce impacts from the loss of vegetation communities.

Table 3.7-2 Vegetation Community and Land Cover Type Acreage

Vegetation Community/Land Cover Types in the BSA	Total Acres in BSA*	Percentage of Vegetation Community/Land Cover Type within the West Mojave and Eastern Slopes Ecoregion Subarea	Vegetation Community/Land Cover Types in the West Mojave and Eastern Slopes Ecoregion Subarea*	Alliance	Acres within the West Mojave and Eastern Slopes Ecoregion Subarea
Agriculture	208.14	0.35%	Agriculture	N / A	60,000
Allscale scrub Alliance	262.98	0.14%	Lower bajada and fan Mojavean–Sonoran desert scrub	*Atriplex polycarpa*	193,000
Big sagebrush Alliance	21.15	4.23%	Mojavean semi-desert wash scrub	*Artemisia tridentata* ssp. *parishii*	500
Black willow thickets	1.2	2.00%	Southwestern North American riparian/wash scrub	*Salix lasiolepis*	60
California buckwheat scrub Alliance	5.76	0.01%	Central and south coastal Californian coastal sage scrub	*Eriogonum fasciculatum*	39,000
California bulrush-American bulrush marsh	1.53	1.53%	Arid West freshwater emergent marsh	*Typha (angustifolia, domingensis, latifolia)*	100
Cheesebush scrub Alliance	2.14	0.03%	Mojavean semi-desert wash scrub	*Ambrosia salsola*	7,000
Creosote bush scrub Alliance	3,778.01	3.05%	Lower bajada and fan Mojavean–Sonoran desert scrub	*Larrea tridentata*	124,000
Creosote bush scrub/Allscale scrub Alliance	0.39	0.00031%	Lower bajada and fan Mojavean–Sonoran desert scrub	*Larrea tridentata*	124,000
Creosote bush/white bursage scrub series	0.44	0.000033%	Lower bajada and fan Mojavean–Sonoran desert scrub	*Larrea tridentata–Ambrosia dumosa*	1,315,000
Developed	1,058.18	0.34%	Developed and disturbed areas	N / A	310,000
Disturbed	585.75	0.19%	Developed and disturbed areas	N / A	310,000
Disturbed Allscale scrub Alliance	90.46	0.05%	Lower bajada and fan Mojavean–Sonoran desert scrub	*Atriplex polycarpa*	193,000
Disturbed Black willow thickets	5.52	9.20%	Southwestern North American riparian/wash scrub	*Salix lasiolepis*	60
Disturbed Creosote bush scrub Alliance	405.53	0.33%	Lower bajada and fan Mojavean–Sonoran desert scrub	*Larrea tridentata*	124,000

Table 3.7-2 Vegetation Community and Land Cover Type Acreage

Vegetation Community/Land Cover Types in the BSA	Total Acres in BSA*	Percentage of Vegetation Community/Land Cover Type within the West Mojave and Eastern Slopes Ecoregion Subarea	Vegetation Community/Land Cover Types in the West Mojave and Eastern Slopes Ecoregion Subarea*	Alliance	Acres within the West Mojave and Eastern Slopes Ecoregion Subarea
Disturbed Fourwing saltbush scrub Alliance	137.49	0.55%	Shadscale–saltbush cool semi-desert scrub	*Atriplex canescens*	25,000
Disturbed Joshua tree woodland Alliance	92.54	0.09%	Mojave and Great Basin upper bajada and toeslope	*Yucca brevifolia*	107,000
Disturbed Rubber rabbitbrush scrub Alliance	572.43	0.92%	Intermontane seral shrubland	*Ericameria nauseosa*	62,000
Disturbed Salt grass flats Alliance	8.76	2.19%	Southwestern North American salt basin and high marsh	*Distichlis spicata*	400
Disturbed White bursage scrub Alliance	89.57	0.10%	Lower bajada and fan Mojavean–Sonoran desert scrub	*Ambrosia dumosa*	86,000
Fourwing saltbush scrub Alliance	317.87	1.27%	Shadscale–saltbush cool semi-desert scrub	*Atriplex canescens*	25,000
Fremont cottonwood forest Alliance	21.38	0.71%	Southwestern North American riparian evergreen and deciduous woodland	*Populus fremontii*	3,000
Joshua tree woodland Alliance	511.53	0.48%	Mojave and Great Basin upper bajada and toeslope	*Yucca brevifolia*	107,000
Mojave yucca scrub Alliance	22.62	2.26%	Mojave and Great Basin upper bajada and toeslope	*Yucca schidigera*	1,000
Nevada Joint Fir Scrub	5.23	0.07%	Intermontane deep or well-drained soil scrub	*Ephedra nevadensis*	8,000
Non-native grassland	15.83	0.02%	California annual and perennial grassland	*Mediterranean California naturalized annual and perennial grassland*	69,000
Red brome grasslands	6.32	0.01%	California annual and perennial grassland	*Mediterranean California naturalized annual and perennial grassland*	69,000

Table 3.7-2 Vegetation Community and Land Cover Type Acreage

Vegetation Community/Land Cover Types in the BSA	Total Acres in BSA*	Percentage of Vegetation Community/Land Cover Type within the West Mojave and Eastern Slopes Ecoregion Subarea	Vegetation Community/Land Cover Types in the West Mojave and Eastern Slopes Ecoregion Subarea*	Alliance	Acres within the West Mojave and Eastern Slopes Ecoregion Subarea
Red willow thickets	1.77	2.95%	Southwestern North American riparian/wash scrub	*Salix lasiolepis*	60
Rock outcrop	24.7	0.09%	North American warm desert bedrock cliff and outcrop	*N / A*	29,000
Rubber rabbitbrush scrub Alliance	125.35	0.20%	Intermontane seral shrubland	*Ericameria nauseosa*	62,000
Sandbar willow thickets Alliance	3.8	1.90%	Southwestern North American riparian/wash scrub	*Salix exigua*	200
Scale broom scrub Alliance	24.99	0.50%	Mojavean semi-desert wash scrub	*Lepidospartum squamatum*	5,000
Southern cattail marsh	0.55	0.55%	Arid West freshwater emergent marsh	*Typha (angustifolia, domingensis, latifolia)*	100
Unvegetated wash	10.31	0.15%	Madrean warm semi-desert wash woodland/scrub	*N / A*	7,000
White bursage scrub Alliance	37.81	0.04%	Lower bajada and fan Mojavean–Sonoran desert scrub	*Ambrosia dumosa*	86,000
Windrow	0.59	0.00019%	Developed and disturbed areas	*N / A*	310,000
Grand Total	**8,458.62**				

*Please note that not all acreages of each community would be impacted by an alternative.
Source: Desert Renewable Energy Conservation Plan (DRECP) and Environmental Impact Report/Environmental Impact Statement (August 2014)

Complete avoidance of permanent impacts to waters of the U.S., SWRCB waters of the State, and CDFW jurisdictional features was determined not possible in achieving the project purpose. The project has been designed to minimize temporary and permanent impacts to waters of the U.S., waters of the State, and CDFW jurisdictional areas to the maximum extent practicable. Due to the topography associated with the eastern portion of the project within the Mojave River valley, the proposed main alignment will be constructed with an above-grade separation supported by piers. This preliminary design will ease the fluctuations of the transportation corridor over the terrain and avoid or minimize impacts to the following jurisdictional features: Mojave River and several contributing unnamed washes; Bell Mountain Wash and several contributing unnamed washes; Ossum Wash; and Turner Wash and a contributing unnamed wash. Compensatory mitigation for impacts to jurisdictional features of USACE, SWRCB, and CDFW will be determined during the permitting process with the agencies with considerations to onsite restoration, offsite mitigation, and in-lieu fees. Impacts to waters of the U.S. and waters of the State will be mitigated sufficiently to meet the federal and state no net loss standards.

Several sensitive plant and wildlife species have been observed and/or detected within the BSA, including alkali mariposa lily *(calochortus striatus),* white pygmy poppy *(canbya candida),* silvery legless lizard *(Anniella pulchra pulchra),* Cooper's hawk *(Accipiter cooperii),* northern harrier *(Circus cyaneus),* tricolored blackbird *(Agelaius tricolor),* short-eared owl *(Asio flammeus),* and long-eared owl *(Asio otus).* Please note that the sensitive species listed above do not include all of the species detected within the BSA. For a complete list, please refer to Section 3.3.3, Plant Species, and Section 3.3.4, Animals, of this EIR/EIS. With avoidance and minimization measures and compensatory mitigation, impacts to sensitive plant and wildlife species would be less than substantial.

Several listed species were also observed and/or detected, including southwestern willow flycatcher *(Empidonax trailii extimus),* Least Bell's vireo *(vireo bellii pusillus),* and desert tortoise *(gopherus agassizii).* The USFWS has issued a Biological Opinion (April 2016) for southwestern willow flycatcher, southwestern willow flycatcher critical habitat, and least Bell's vireo based on Variation E Main Freeway/Expressway and Freeway/Tollway Alternatives with HSR Feeder Service. The determination is that the project is not likely to adversely affect these species or the southwestern willow flycatcher critical habitat. The project is not likely to adversely affect these biological resources because of low-quality existing habitat within the action area, project design, and the many project measures implemented to protect these resources. The USFWS has also issued a Biological Opinion (April 2016) for desert tortoise based on Variation E Main Freeway/Expressway and Freeway/Tollway Alternatives with HSR Feeder Service. The determination is that the project may affect, but is not likely to adversely affect. The project is not likely to adversely affect this biological resource because of low-quality existing habitat within the action area, project design, and the many project measures implemented to protect these resources.

Reasonable Foreseeable Actions

Future development and planned transportation projects would result in permanent and temporary loss of habitat for plant and wildlife species in the area. The Victorville 2 Hybrid Power Plant is anticipated to affect three special-status animal species, including the desert tortoise, Mohave ground squirrel, and burrowing owl; it may also affect special-status plants. The Yucca Loma Project would affect more than 1 acre of Mojave riparian forest. XpressWest would affect plant and animal species and their habitats. The HSR project has the potential to affect State and federal threatened and endangered species, as well as their habitats.

Cumulative Impacts

The disturbance of plant and animal species and loss of habitat that would accompany future development and infrastructure and roadway projects in the project area would adversely affect sensitive species and their habitats in the study area.

The project and cumulative projects could also indirectly affect adjacent habitat during construction or operation. During construction, noise or vibration could affect burrowing animals or nesting raptors. Runoff from the construction sites or operational roadways could affect water quality next to the project sites, which could degrade habitat quality. Night lighting during construction or operation of the projects could interfere with typical foraging or predation of nocturnal species in adjacent open space areas, increasing the potential for some wildlife to avoid these areas.

Should Variation E with HSR be part of the preferred alternative, this project may have a substantial impact on the southwestern willow flycatcher and the least Bell's vireo, which are identified as endangered at both the State and federal levels. Although no other projects have impacts to this species, the small size of this area in comparison to the desert region makes the impact high; therefore, it contributes to a cumulative effect on this species.

To avoid or offset potential cumulative effects on biological resources, individual projects would implement avoidance, minimization, and/or mitigation measures. These measures include, but are not limited to, preconstruction biological surveys, biological monitoring, BMPs, construction contract standard provisions, contract nonstandard provisions, environmental awareness training, and habitat compensation to mitigate for potential effects to federally and State-listed species.

As previously discussed, plant communities that would be affected by the proposed project generally represent a very small percentage of similar plant communities that occur in the project vicinity, especially within the overall western Mojave Desert. Complete avoidance of permanent impacts to waters of the U.S., SWRCB waters of the State, and CDFW jurisdictional features was determined not possible in achieving the project purpose. Several sensitive plant and wildlife species were detected within the BSA. With the implementation of avoidance and minimization measures and compensatory mitigation, impacts to plant communities, jurisdictional resources, and sensitive plant and wildlife species would be less than substantial.

The proposed project, in combination with the related projects, would result in the conversion of special habitat areas and other biological resources in the area of cumulative analysis. There would be an associated loss of common plant and animal species, and a cumulative loss of habitat for common special-status species. Transportation, energy, and development projects would cumulatively affect plant and animal species, including the desert tortoise, southwestern willow flycatcher, burrowing owl, and other special-status plant and animal species, particularly near the Mojave River area of the proposed project.

While mitigation would reduce impacts to biological resources, when taken collectively, the proposed project would have a considerable contribution to the cumulative effects to biological resources.

Avoidance, Minimization, and/or Mitigation Measures

Avoidance, minimization, and/or mitigation measures identified in each topical section in this document would serve to minimize cumulative impacts to the extent feasible. Caltrans will continue to work closely with the HSR and XpressWest project teams to consolidate alignments and utilize the same footprint wherever practicable and feasible to minimize cumulative impacts. As each project is evaluated for environmental impacts, project-specific mitigation measures would apply, which would reduce the cumulative impact.

Chapter 4 California Environmental Quality Act Evaluation

4.1 Determining Significance under the California Environmental Quality Act

The project is subject to federal and State environmental review requirements because the California Department of Transportation (Caltrans) and the Los Angeles County Metropolitan Transportation Authority (Metro) propose the use of federal funds from the Federal Highway Administration (FHWA) and/or the project requires an approval from FHWA. Project documentation, therefore, has been prepared in compliance with the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA). Caltrans and Metro are the project proponents and the lead agencies under CEQA. FHWA's responsibility for environmental review, consultation, and any other action required in accordance with NEPA and other applicable federal laws for this project is being, or has been, carried out by Caltrans under its assumption of responsibility pursuant to 23 United States Code (U.S.C.) 327.

One of the primary differences between NEPA and CEQA is the way significance is determined. Under NEPA, significance is used to determine whether an Environmental Impact Statement (EIS), or a lower level of documentation, will be required. NEPA requires that an EIS be prepared when the proposed federal action (project) *as a whole* has the potential to "significantly affect the quality of the human environment." The determination of significance is based on context and intensity. Some impacts determined to be significant under CEQA may not be of sufficient magnitude to be determined significant under NEPA. Under NEPA, once a decision is made regarding the need for an EIS, it is the magnitude of the impact that is evaluated, and no judgment of its individual significance is deemed important for the text. NEPA does not require that a determination of significant impacts be stated in the environmental documents.

CEQA, on the other hand, does require Caltrans to identify each "significant effect on the environment" resulting from the project and ways to mitigate each significant effect. If the project may have a significant effect on any environmental resource, then an Environmental Impact Report (EIR) must be prepared. Each and every significant effect on the environment must be disclosed in the EIR and mitigated if feasible. In addition, the CEQA Guidelines list a number of mandatory findings of significance, which also require the preparation of an EIR. There are no types of actions under NEPA that parallel the findings of mandatory significance of CEQA. This chapter discusses the effects of this project and CEQA significance.

4.2 Discussion of Significance of Impacts

With the absence of timberland (forest land), coastal zones, and wild and scenic rivers in or near the project area, the project would have no impacts on these resources. No further discussion of these issues is provided in this chapter. In addition, there would be no traffic/transportation impacts except temporary delays during construction. The project would have beneficial effects on circulation. Traffic and transportation are discussed in Section 3.1.6 of this EIS/EIR.

Questions on the CEQA Environmental Checklist (Appendix A) have been addressed based on the discussions in Chapter 3 and below. The discussion below applies to all four build alternatives (including their variations), unless specifically noted otherwise. As previously discussed in Chapter 3, the environmental baseline for this project is 2010 because that is the year the Notice of Preparation (NOP) was filed.

4.2.1 Less than Significant Effects of the Project

All four build alternatives have the potential for environmental impacts on resources in the area, as analyzed in Chapter 3; however, with standard conditions and avoidance and minimization measures incorporated, the following impacts would have a less than significant effect on the environment (refer to Chapter 3 for further information):

Common to All Build Alternatives

- Air Quality
- Geology and Soils
- Hazards and Hazardous Materials
- Hydrology and Water Quality
- Public Services, other than parks
- Recreation
- Utilities and Service Systems

Analyses of these topics are provided in Chapter 3.

No Build Alternative

The No Build Alternative would not lead to any physical changes in the existing environment in the following resource areas:

- Aesthetics
- Air Quality
- Agriculture
- Biological Resources
- Cultural Resources
- Geology And Soils
- Hazards and Hazardous Materials
- Land Use and Planning
- Population and Housing
- Public Services
- Recreation
- Utilities and Service Systems

4.2.2 Significant Environmental Effects of the Project

Common to All Build Alternatives

Significant adverse impacts before mitigation measures would occur with the build alternatives in the following resource areas:

- Agriculture
- Aesthetics
- Biological Resources
- Cultural Resources
- Paleontological Resources
- Land Use and Planning
- Noise
- Transportation/Traffic

Analyses of these topics are provided in Chapter 3.

4.2.3 Unavoidable Significant Environmental Effects

Measures have been proposed to mitigate potentially significant adverse impacts of the build alternatives; however, the following impacts would remain significant and unavoidable and are summarized below. Detailed impact analyses are presented in Chapter 3.

Common to All Build Alternatives

Agriculture

The proposed project would require acquisition of land for the proposed High Desert Corridor (HDC) right-of-way (ROW). It would directly impact farmland by converting approximately 252 acres of Important Farmland to nonagricultural use, which could be a potentially significant impact (see discussion in Section 3.1.3, Farmland/Grazing Land).

The HDC base alignment would pass through approximately 215 acres of designated Grazing Land in Los Angeles County and 2,360 acres *in San Bernardino County. Most of the alignment in San Bernardino County would traverse Farmland Mapping and Monitoring Program (FMMP)-classified "grazing land." However, due to the availability of abundant grazing land, the impact from the project's contribution to incremental loss of grazing land is not considered significant.*

Land Use and Planning

Existing land uses directly within the project footprint would be converted to transportation-related use. Over a period of time, adjacent land uses at these locations may potentially see changes from existing use towards commercial, business, and/or residential-based land uses. In addition, shifts in land use are expected to occur along interchanges located within developed areas.

Many residential, commercial, industrial, agricultural, and nonprofit properties would be affected through partial or full acquisition. All property acquisition and relocations would be handled in accordance with the Uniform Relocation Act of 1970, as amended, which mandates certain relocation services and payments by Caltrans be made available to eligible residents, businesses, and nonprofit organizations displaced by Caltrans projects. Design refinements to avoid or minimize impacts to existing land uses related to temporary construction use and/or permanent acquisition of properties would be incorporated in the final engineering design of the selected build alternative to the extent practicable.

Despite measures required by the Uniform Relocation Act, available mitigation measures would not reduce all community impacts. Impacts would remain significant and unavoidable.

California Environmental Quality Act Noise Analysis

When determining whether a noise impact is significant under CEQA, a comparison is made between the existing noise level (i.e., baseline) and the build alternative noise levels. The CEQA noise analysis is independent of the NEPA analysis, which is centered on Noise Abatement Criteria (NAC). Under CEQA, the assessment looks at the setting of the noise impact and then how large or perceptible any noise increase would be in the given area. The following are key considerations: uniqueness of the setting, sensitive nature of the noise receptor(s), magnitude of the noise increase, number of residences affected, and project noise level.

If a proposed project is determined to have a significant noise impact under CEQA, then the act dictates that mitigation measures must be incorporated into the project unless such measures are not feasible.

It is generally accepted that people are able to begin to detect sound level increases of 3 decibels (dB) in typical noisy environments, and that a 5-dB increase is perceived as a distinctly noticeable increase. A 10-dB increase is generally perceived as a doubling of loudness. Therefore, a doubling of sound energy, such as doubling the volume of traffic on a highway that would result in a 3-dB increase in sound would generally be perceived as barely detectable.

A two-tier impact criterion for traffic noise significance analysis is used for CEQA. A 5-dB increase from existing noise levels is considered an impact for areas presently exposed to freeway traffic noise; a 12-dB increase is used for areas that presently are not exposed to freeway traffic noise. This allows less noise increase for areas that are along an existing freeway because the areas are already exposed to high traffic noise levels. The reasoning for this two-tier approach is that people already exposed to high levels of noise should be expected to tolerate a small increase in the amount of noise in their community. In contrast, if the existing noise levels are quite low, it is reasonable to allow a greater change in community noise for the equivalent difference in annoyance. Typically, a 5-dB noise increase in a noisy environment is more annoying and intruding than a similar noise increase in a quieter environment.

Because a decibel, which is used to report noise levels, is a logarithm, the required increase in energy to increase 1 dB is much less when the noise level is 50 dBA versus when it is 70 dBA. An increase of 5 dB from 67 to 72 dB requires approximately 4.5 times more energy than required to increase 52 dB by 12 dB to 64 dBA; therefore, an increase of 12 dB at a lower noise level will not cause more energy exposure than an increase of 5 dB at a higher noise level. The higher the increase for areas that presently have low background noise levels would bring their noise levels about the same as the areas along existing freeways.

A project is considered to have a significant noise impact when it causes an adopted noise standard to be exceeded at a sensitive receptor and when it substantially increases noise exposure.

At noise receiver locations, the existing baseline noise traffic level was compared to the future build traffic noise level for each of the build alternatives. Feasible traffic noise abatement was considered at locations where a significant noise impact was identified. Construction of noise barriers at these locations was considered a practical traffic noise abatement measure. For purposes of CEQA, Caltrans considers the reasonableness and feasibility of noise abatement the same as discussed in Section 3.2.7, Noise.

4.3 Significant Irreversible Environmental Changes

As discussed in Section 3.5, the impacts of the build alternatives would be similar to each other, and construction would require the commitment of natural, physical, human, and fiscal resources. The loss of developed and undeveloped properties and use of the land that would be acquired for the project would be an irreversible and long-term commitment of this resource. Construction would also require use of fossil fuels, water, and construction materials such as concrete cement, aggregate (i.e., sand and gravel), asphalt, steel, paint, fencing, pipes, and other materials that are generally not retrievable once they have been used to build a road and/or rail facility. Labor would be needed to produce construction materials, demolish existing structures and infrastructure, and build the HDC facility; however, as a beneficial impact, the project would provide employment for local labor resources and would not adversely affect the availability of labor resources in the affected communities.

Lastly, construction of the project would require a substantial one-time expenditure of local, State, and federal funds, which are not retrievable; however, commitment of these resources would benefit residents, workers, travelers, businesses, and others throughout the area, region, and State from the improved quality of the transportation system in the High Desert region. Improvements to local and regional mobility and accessibility are expected to outweigh the irreversible and irretrievable commitment of resources.

4.4 Minimization and Mitigation Measures for Significant Impacts under the California Environmental Quality Act

Impacts are avoided or minimized through implementation of standard conditions, minimization measures, and mitigation measures (identified at the end of each topic in Chapter 3). Implementation of standard conditions is assumed prior to making a determination if an impact is significant, because these are regulatory requirements or practices that Caltrans applies to all projects. Other mitigation measures would reduce impacts identified as significant. Mitigation measures are listed in Chapter 3 and summarized in Appendix F, Environmental Commitments Record. No mitigation measures are proposed for the No Build Alternative because the project would not be built.

4.5 Environmentally Superior Alternative

CEQA requires that an EIR identify the environmentally superior alternative of a project other than the No Build Alternative *(CEQA Guidelines* Section 15126.6 (e)(2)). The determination of an environmentally superior alternative is based on the consideration of how the alternative: fulfills the project objectives; reduces significant unavoidable impacts; or substantially reduces the impacts to the surrounding environment. The proposed project is considered the environmentally superior alternative because it meets all the project objectives and does not result in any significant, unavoidable impacts that would otherwise be avoided by implementing one of the other project alternatives. Table 4-1 summarizes the impacts of the alternatives.

Table 4-1 Summary of Alternatives Analysis

	Freeway/ Expressway Alternative	**Freeway/ Tollway Alternative**	**Freeway/ Expressway Alternative with HSR Feeder Service**	**Freeway/ Tollway Alternative with HSR Feeder Service (Preferred Alternative)**	**No Build Alternative**
Meets Project Objectives	**Partial**	**Partial**	**Yes**	**Yes**	**No**
Issue					
Land Use	LSM/SU	LSM/SU	LSM/SU	LSM/SU	NI
Recreation	LTS	LTS	LTS	LTS	NI
Public Services	LTS	LTS	LTS	LTS	NI
Agriculture	SU	SU	SU	SU	NI
Utilities/ Emergency Services	LTS	LTS	LTS	LTS	NI
Traffic and Transportation/ Pedestrian and Bicycle Facilities	LSM	LSM	LSM	LSM	NI
Visual/ Aesthetics	LSM	LSM	LSM	LSM	NI
Cultural Resources	LSM	LSM	LSM	LSM	NI
Hydrology and Floodplain	LTS	LTS	LTS	LTS	NI
Water Quality and Stormwater Runoff	LTS	LTS	LTS	LTS	NI
Geology/Soils/ Seismic/ Topography	LTS	LTS	LTS	LTS	NI

Table 4-1 Summary of Alternatives Analysis

	Freeway/ Expressway Alternative	Freeway/ Tollway Alternative	Freeway/ Expressway Alternative with HSR Feeder Service	Freeway/ Tollway Alternative with HSR Feeder Service (Preferred Alternative)	No Build Alternative
Meets Project Objectives	**Partial**	**Partial**	**Yes**	**Yes**	**No**
Issue					
Paleontology	LSM	LSM	LSM	LSM	NI
Hazardous Waste or Materials	LTS	LTS	LTS	LTS	NI
Air Quality	LTS	LTS	LTS	LTS	NI
Noise	LSM/SU	LSM/SU	LSM/SU	LSM/SU	NI
Biological Resources	LSM	LSM	LSM	LSM	NI

NI – No impact
LTS – Less than significant
LSM – Less than significant with mitigation
SU – Significant and unavoidable

4.6 Climate Change under CEQA

Climate change refers to long-term changes in temperature, precipitation, wind patterns, and other elements of the earth's climate system. An ever-increasing body of scientific research attributes these climatological changes to greenhouse gas (GHG) emissions, particularly those generated from the production and use of fossil fuels.

While climate change has been a concern for several decades, the establishment of the Intergovernmental Panel on Climate Change (IPCC) by the United Nations and World Meteorological Organization in 1988 has led to increased efforts devoted to GHG emissions reduction and climate change research and policy. These efforts are primarily concerned with the emissions of GHGs generated by human activity including carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), tetrafluoromethane, hexafluoroethane, sulfur hexafluoride (SF_6), HFC-23 (fluoroform), HFC-134a (s, s, s, 2-tetrafluoroethane), and HFC-152a (difluoroethane).

In the U.S., the main source of GHG emissions is electricity generation, followed by transportation. In California, however, transportation sources (including passenger cars, light-duty trucks, other trucks, buses, and motorcycles) make up the largest source of GHG-emitting sources. The dominant GHG emitted is CO_2, mostly from fossil fuel combustion.

There are typically two terms used when discussing the impacts of climate change: “Greenhouse Gas Mitigation” and “Adaptation.” “Greenhouse Gas Mitigation” is a term for reducing GHG emissions to reduce or “mitigate” the impacts of climate change. “Adaptation" refers to the effort of planning for and adapting to impacts resulting from climate change (e.g., adjusting transportation design standards to withstand more intense storms and higher sea levels).[17]

There are four primary strategies for reducing GHG emissions from transportation sources: (1) improving the transportation system and operational efficiencies, (2) reducing travel activity, (3) transitioning to lower GHG-emitting fuels, and (4) improving vehicle technologies/efficiency. To be most effective, all four strategies should be pursued cooperatively.[18]

Regulatory Setting

State

With the passage of several pieces of legislation, including State Senate and Assembly Bills and Executive Orders, California launched an innovative and proactive approach to dealing with GHG emissions and climate.

Assembly Bill (AB) 1493, Pavley, Vehicular Emissions: Greenhouse Gases, 2002: This bill requires the California Air Resources Board (ARB) to develop and implement regulations to reduce automobile and light-truck GHG emissions. These stricter emissions standards were designed to apply to automobiles and light trucks beginning with the 2009-model year.

Executive Order (EO) S-3-05 (June 1, 2005): The goal of this EO is to reduce California’s GHG emissions to (1) year 2000 levels by 2010, (2) year 1990 levels by the 2020, and (3) 80 percent below the year 1990 levels by 2050. In 2006, this goal was further reinforced with the passage of AB 32.

AB 32, Núñez and Pavley, The Global Warming Solutions Act of 2006: AB 32 sets the same overall GHG emissions reduction goals as outlined in EO S-3-05, while further mandating that ARB create a scoping plan and implement rules to achieve “real, quantifiable, cost-effective reductions of greenhouse gases.”

EO S-20-06 (October 18, 2006): This EO establishes the responsibilities and roles of the Secretary of the California Environmental Protection Agency (Cal/EPA) and state agencies with regard to climate change.

EO S-01-07 (January 18, 2007): This order set forth the low carbon fuel standard for California. Under this EO, the carbon intensity of California’s transportation fuels is to be reduced by at least 10 percent by 2020.

Senate Bill (SB) 97, Chapter 185, 2007, Greenhouse Gas Emissions: SB 97 required the Governor's Office of Planning and Research (OPR) to develop

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17 http://climatechange.transportation.org/ghg_mitigation/.

18 http://www.fhwa.dot.gov/environment/climate_change/mitigation/.

recommended amendments to the CEQA Guidelines for addressing GHG emissions. The amendments became effective on March 18, 2010.

SB 375, Chapter 728, 2008, Sustainable Communities and Climate Protection: This bill requires the ARB to set regional emissions reduction targets from passenger vehicles. The Metropolitan Planning Organization (MPO) for each region must then develop a "Sustainable Communities Strategy" (SCS) that integrates transportation, land use, and housing policies to plan for the achievement of the emissions target for their region.

SB 391 Chapter 585, 2009 California Transportation Plan: This bill requires the State's long-range transportation plan to meet California's climate change goals under AB 32.

Federal

Although climate change and GHG reduction are a concern at the federal level, currently no regulations or legislation have been enacted specifically addressing GHG emissions reductions and climate change at the project level. Neither the U.S. Environmental Protection Agency (EPA) nor FHWA has issued explicit guidance or methods to conduct project-level GHG analysis.[19] FHWA supports the approach that climate change considerations should be integrated throughout the transportation decision-making process, from planning through project development and delivery. Addressing climate change mitigation and adaptation up front in the planning process will assist in decision making and improve efficiency at the program level, and it will inform the analysis and stewardship needs of project-level decision making. Climate change considerations can be integrated into many planning factors, such as supporting economic vitality and global efficiency, increasing safety and mobility, enhancing the environment, promoting energy conservation, and improving the quality of life.

The four strategies outlined by FHWA to lessen climate change impacts correlate with efforts that the State is undertaking to deal with transportation and climate change; these strategies include improved transportation system efficiency, cleaner fuels, cleaner vehicles, and a reduction in travel activity.

Climate change and its associated effects are being addressed through various efforts at the federal level to improve fuel economy and energy efficiency, such as the "National Clean Car Program" and EO 13514 - *Federal Leadership in Environmental, Energy and Economic Performance*.

EO 13514 (October 5, 2009): This order is focused on reducing GHGs internally in federal agency missions, programs, and operations, but it also directs federal agencies to participate in the Interagency Climate Change Adaptation Task Force, which is engaged in developing a national strategy for adaptation to climate change.

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[19] To date, no national standards have been established regarding mobile source GHGs, nor has EPA established any ambient standards, criteria, or thresholds for GHGs resulting from mobile sources.

EPA's authority to regulate GHG emissions stems from the U.S. Supreme Court decision in *Massachusetts v. EPA* (2007). The Supreme Court ruled that GHGs meet the definition of air pollutants under the existing Clean Air Act (CAA) and must be regulated if these gases could be reasonably anticipated to endanger public health or welfare. Responding to the Court's ruling, EPA finalized an endangerment finding in December 2009. Based on scientific evidence, it found that six GHGs constitute a threat to public health and welfare. Thus, it is the Supreme Court's interpretation of the existing Act and EPA's assessment of the scientific evidence that form the basis for EPA's regulatory actions. EPA, in conjunction with National Highway Traffic Safety Administration (NHTSA), issued the first of a series of GHG emission standards for new cars and light-duty vehicles (LDVs) in April 2010.[20]

EPA and NHTSA are taking coordinated steps to enable the production of a new generation of clean vehicles with reduced GHG emissions and improved fuel efficiency from on-road vehicles and engines. These next steps include developing the first-ever GHG regulations for heavy-duty engines and vehicles, as well as additional LDV GHG regulations.

The final combined standards that made up the first phase of this national program apply to passenger cars, light-duty trucks, and medium-duty passenger vehicles, covering model years 2012 through 2016. The standards implemented by this program are expected to reduce GHG emissions by an estimated 960 million metric tons (MMT) and 1.8 billion barrels of oil over the lifetime of the vehicles sold under the program (model years 2012-2016).

On August 28, 2012, EPA and NHTSA issued a joint Final Rulemaking to extend the National Program for fuel economy standards to model year 2017 through 2025 passenger vehicles. Over the lifetime of the model year 2017-2025 standards, this program is projected to save approximately 4 billion barrels of oil and 2 billion metric tons of GHG emissions.

The complementary EPA and NHTSA standards that make up the Heavy-Duty National Program apply to combination tractors (semi trucks), heavy-duty pickup trucks and vans, and vocational vehicles (including buses and refuse or utility trucks). Together, these standards will cut GHG emissions and domestic oil use significantly. This program responds to President Barack Obama's 2010 request to jointly establish GHG emissions and fuel efficiency standards for the medium- and heavy-duty highway vehicle sector. The agencies estimate that the combined standards will reduce CO_2 emissions by about 270 MMT and save about 530 million barrels of oil over the life of model year 2014 to 2018 heavy-duty vehicles.

Project Analysis

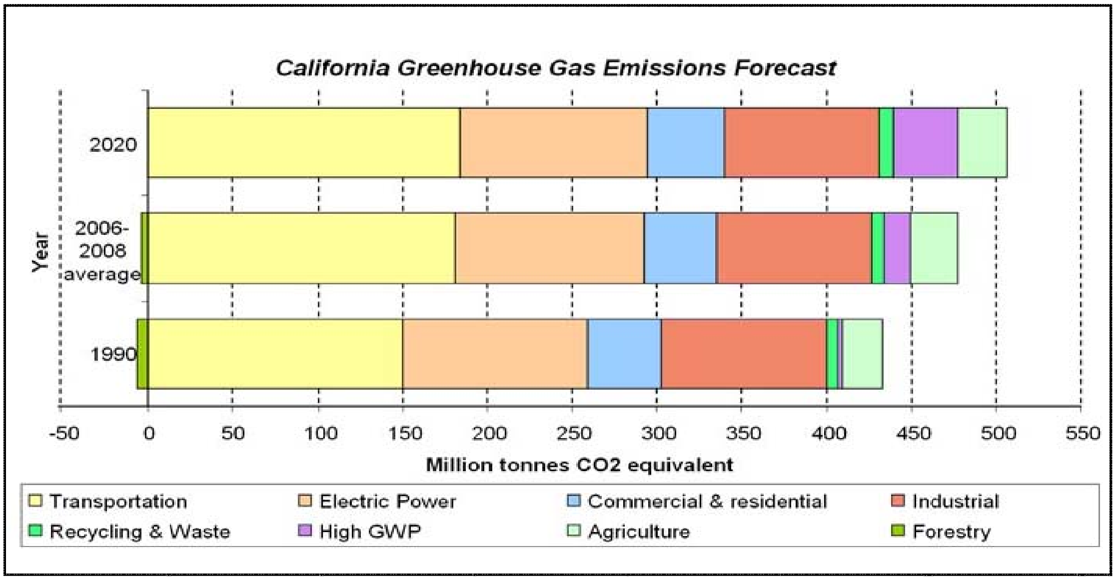
An individual project does not generate enough GHG emissions to significantly influence global climate change. Rather, global climate change is a cumulative impact.

[20] http://www.c2es.org/federal/executive/epa/greenhouse-gas-regulation-faq.

This means that a project may contribute to a potential impact through its *incremental* change in emissions when combined with the contributions of all other sources of GHG.[21] In assessing cumulative impacts, it must be determined if a project's incremental effect is "cumulatively considerable" (CEQA Guidelines Sections 15064(h)(1) and 15130). To make this determination, the incremental impacts of the project must be compared with the effects of past, current, and probable future projects. To gather sufficient information on a global scale of all past, current, and future projects to make this determination is a difficult, if not impossible, task.

The AB 32 Scoping Plan mandated by AB 32 includes the main strategies California will use to reduce GHG emissions. As part of its supporting documentation for the Draft Scoping Plan, ARB released the GHG inventory for California (forecast last updated: October 28, 2010). The forecast is an estimate of the emissions expected to occur in 2020 if none of the foreseeable measures included in the Scoping Plan were implemented. The base year used for forecasting emissions is the average of statewide emissions in the GHG inventory for 2006, 2007, and 2008 (see Figure 4-1).

Figure 4-1 California Greenhouse Gas Forecast



Source: http://www.arb.ca.gov/cc/inventory/data/forecast.htm.

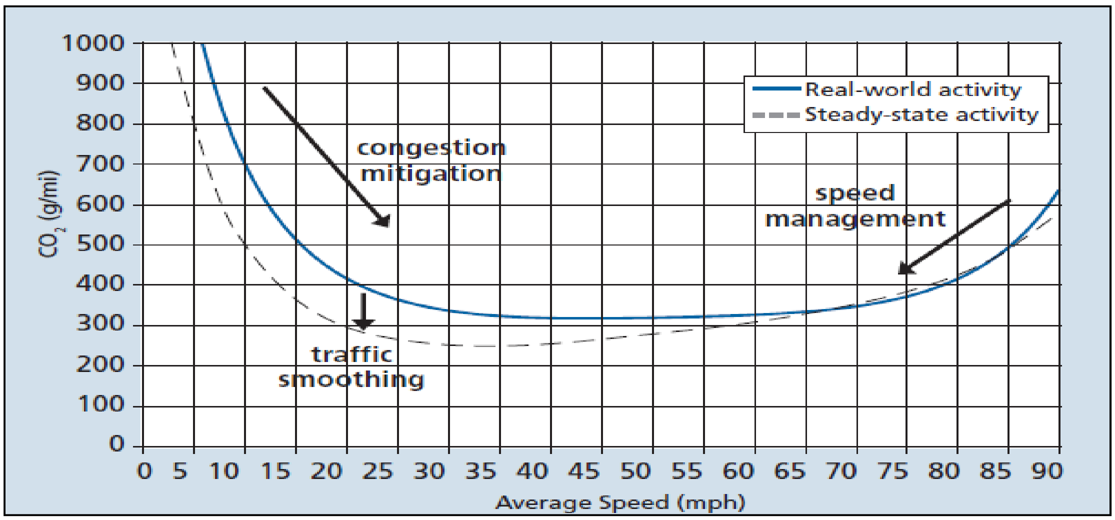
Caltrans and its parent agency, the Transportation Agency, have taken an active role in addressing GHG emission reduction and climate change. Recognizing that 98 percent of California's GHG emissions are from the burning of fossil fuels and 40 percent of all human-made GHG emissions are from transportation, Caltrans has

[21] This approach is supported by the AEP: *Recommendations by the Association of Environmental Professionals on How to Analyze GHG Emissions and Global Climate Change in CEQA Documents* (March 5, 2007), as well as the South Coast Air Quality Management District (Chapter 6: The CEQA Guide, April 2011) and the U.S. Forest Service (Climate Change Considerations in Project Level NEPA Analysis, July 13, 2009).

created and is implementing the Climate Action Program at Caltrans that was published in December 2006.[22]

One of the main strategies in Caltrans' Climate Action Program to reduce GHG emissions is to make California's transportation system more efficient. The highest levels of CO_2 from mobile sources, such as automobiles, occur at stop-and-go speeds (zero to 25 miles per hour [mph]) and speeds over 55 mph; the most severe emissions occur from zero to 25 mph (see Figure 4-2). To the extent that a project relieves congestion by enhancing operations and improving travel times in high congestion travel corridors, GHG emissions, particularly CO_2, may be reduced.

Figure 4-2 Possible Effect of Traffic Operation Strategies in Reducing On-Road CO_2 Emission



Source: Traffic Congestion and Greenhouse Gases: Matthew Barth and Kanok Boriboonsomsin (TR News 268 May-June 2010)<http://onlinepubs.trb.org/onlinepubs/trnews/trnews268.pdf>.

Quantitative Analysis

The HDC Project is included in the Southern California Association of Governments' (SCAG) 2012-2035 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS). Since 2000, SCAG has worked actively with the people and institutions of southern California to create a dynamic regional growth vision based on the following principles: *mobility, economy, and sustainability*. Charged by federal law with preparing an RTP every 4 years, SCAG has traditionally focused most on the mobility aspects of the region's growth. Under State law, SCAG is also charged with working with its member local governments on planning for an adequate regional housing supply; however, the recent passage of SB 375 at the State level gives SCAG

[22] Caltrans Climate Action Program is located at the following Web address: http://www.dot.ca.gov/hq/tpp/offices/ogm/key_reports_files/State_Wide_Strategy/Caltrans_Climate_Action_Program.pdf.

a new area of responsibility—and provides the region with a renewed opportunity to focus on an integrated planning effort for the future.

Under SB 375, the primary goal of the SCS is to provide a vision for future growth in southern California that will decrease per-capita GHG emissions from automobiles and light trucks. The strategies contained in the RTP/SCS will produce benefits for the region far beyond simply reducing GHG emissions. Because it is the latest refinement of an evolving regional blueprint that SCAG has been working on since 2000, the RTP/SCS will help the region deal with many ongoing issues across a wide range of concerns, including placemaking, the cost of living, the environment, health, responsiveness to the marketplace, and mobility.

To meet the SCS, the proposed project is planned to be a multipurpose corridor that would incorporate the rail system, green energy production and transmission facility, and a bicycle facility, as outlined in Chapter 1 of this environmental document.

GHG emissions for transportation projects can be divided into those produced during construction and those produced during operations as discussed below.

Operational Emissions

GHG emissions were calculated for the opening year 2020 and horizon year 2040, as presented in Table 4-2. The emission factors needed for the analysis were obtained from the CT-EMFAC and EMFAC 2011. The project is a transportation facility; therefore, the GHG emissions would include operational GHG emissions from vehicle traffic along the project corridor. Sources of operational GHG emissions are the same as those analyzed for mobile source air toxics (MSATs) and include GHG emissions from travel activities along the project corridor, as well as activities in the project region. Project-related GHG emissions were estimated using the emission factors for on-road mobile sources and vehicle miles traveled (VMTs) within the analysis area in the same fashion as the MSAT analysis, comprised of an area 606 mile-by-mile square. The following GHG emissions estimate is presented for the purpose of disclosing project-related emissions.

The project GHG emissions were compared to the following baselines:

- The changes in the future GHG emissions within the analysis area in comparison to the CEQA baseline (i.e., emissions in 2010); and
- The changes in GHG emissions for the build alternatives within the analysis area in comparison to the emissions of the no-build scenario in the same year.

Table 4-2 Summary of Regional Operational GHG Emissions

	Summary of VMT Used for GHG Calculation (Mile)*	GHG Emissions (Million MTPY)	
		CO_2	CO_2 with Pavley Clean Standards
Base Year, 2010	7,722,930	1.217	1.266
Opening Year, 2020			
No-Build	10,071,438	1.732	1.323
Change from Base Year		*0.462*	*0.058*
FWY/EXP or FWY/EXP with HSR	12,369,704	2.107	1.614
Change from Base Year		*0.837*	*0.349*
Change from No-Build		*0.375*	*0.291*
FWY/Toll or FWY/Toll with HSR	11,736,991	1.990	1.518
Change from Base Year		*0.719*	*0.253*
Change from No-Build		*0.257*	*0.195*
Horizon Year, 2040			
No-Build	13,666,032	2.353	1.628
Change from Base Year		*1.083*	*0.363*
FWY/EXP or FWY/EXP with HSR	17,012,874	2.835	1.966
Change from Base Year		*1.564*	*0.700*
Change from No-Build		*0.482*	*0.337*
FWY/Toll or FWY/Toll with HSR (Preferred Alternative)	16,234,481	2.709	1.872
Change from Base Year		*1.438*	*0.606*
Change from No-Build		*0.356*	*0.247*

Note:
* VMT presented here is a summary of VMT within each of the 606 mile-by-mile square grid. Speed at each grid varies depending on type of roadway and traffic volume. Note also that these VMT data were provided by the traffic analysis team for use as input to the GHG calculations.

Source: Modified from Air Quality Report, 2015.

These comparisons provide estimated changes in project GHG emissions based on forecast traffic data. These GHG emissions estimates are only useful when comparing alternatives or analysis years. The estimates are not an accurate reflection of actual GHG emissions because GHG emissions are dependent on other factors such as the fuel mix and consumption, rate of acceleration, and the aerodynamics and efficiency of the vehicles. CT-EMFAC's model emission rates are only for direct engine-out CO_2 emissions and do not account for a full fuel cycle. Fuel cycle emission rates can vary dramatically depending on the amount of additives such as ethanol and the source of the fuel components.

CO_2 emissions for the baseline year (2010) were estimated at about 1.3 million metric ton per year (MTPY). CO_2 emissions are the main GHG of concern, as vehicle operation does not result in appreciable amounts of other GHGs (e.g., CH_4, N_2O). With the project, in the opening year (2020), the CO_2 emissions are estimated to increase from 2010 levels by about 0.8 million MTPY for the alternatives without a toll and about 0.7 million MTPY for the alternatives with a toll; and increase from the no-build level of the same year about 0.4 million MTPY for the alternatives without a toll and about 0.3 million MTPY for the alternatives with a toll. In the horizon year (2040), the CO_2 emissions are estimated to increase from 2010 levels by about 1.6 million MTPY for the alternatives without a toll and about 1.4 million MTPY for the alternatives with a toll; and increase from the no-build level of the same year about 0.5 million MTPY for the alternatives without a toll and about 0.4 million MTPY for the alternatives with a toll.

Table 4-2 also presents estimates of operational emissions of GHGs reflecting implementation of two important California rules/standards (AB 1439 [Pavley] and AB 32 via the Low Carbon Fuels Standard), which establish stricter standards to reduce GHG emissions from passenger cars and light-duty trucks. These emissions were estimated using the EMFAC2011 Model, which includes data for CO_2 emissions for the fleet mix with implementation of these new standards.

The emissions of CO_2 with the Pavley Clean Car Standards were also estimated for each segment along the proposed corridor based on the corridor-level VMT data. A summary of total corridor-level emissions is provided in Table 4-3 only for the proposed HDC build alternatives.

Table 4-3 Summary of Corridor-Level CO_2 Emissions with Pavley Clean Car Standards

	Summary of VMT Used for GHG Calculation (Mile)*	CO_2 Emissions with Pavley Clean Car Standards (Million MTPY)
Opening Year, 2020**		
FWY/EXP or FWY/EXP with HSR	4,305,895	0.532
FWY/Toll or FWY/Toll with HSR	6,892,708	0.386
Horizon Year, 2040		
FWY/EXP or FWY/EXP with HSR	5,991,701	0.668
FWY/Toll or FWY/Toll with HSR **(Preferred Alternative)**	8,303,004	0.514

Notes:

* VMT presented here is a summary of VMT at four different time periods of the day. Speed at each time period varies depending on traffic volume. Note also that these VMT data were provided by the traffic analysis team for use as input to the GHG calculations.

** Data for Base Year and No Build are not available because there was no corridor in 2010 (Base Year) and there would be no corridor to project the no-build condition.

Source: Modified from Air Quality Report, 2015.

These comparisons provide illustrations of estimated changes in project emissions of GHG based on forecast traffic data. Note that GHG emissions are only useful for a comparison between alternatives or between analysis years. It should be noted that, while the CO_2 emissions factor does assume certain reductions in vehicle emissions due to future vehicle models operating more efficiently, additional reductions in vehicle emissions would also occur in response to new and stricter legislated standards as they become implemented. Therefore, the numbers are not an accurate reflection of what the true CO_2 emissions would be and may actually overstate the expectations because CO_2 emissions depend on other factors that are not part of the model representation, such as fuel mix, rate of acceleration, and aerodynamics and efficiency of the vehicles themselves.

ARB's EMFAC model emission rates are only for direct engine-out CO_2 emissions and do not account for a full fuel cycle. Fuel-cycle emission rates can vary dramatically depending on the amount of additives, such as ethanol and the source of the fuel components. Tables in Appendix I of the Air Quality Report summarize changes in GHG emissions of the build alternatives in comparison to the baselines as discussed above. Appendix J of the Air Quality Report provides illustrations of the changes in GHG emissions in comparison to the baselines.

Construction Emissions

Construction GHG emissions include emissions produced as a result of material processing, emissions produced by onsite construction equipment, and emissions arising from traffic delays due to construction. These emissions will be produced at different levels throughout the construction phase; their frequency and occurrence can be reduced through innovations in plans and specifications and by implementing better traffic management during construction phases.

In addition, with innovations such as longer pavement lives, improved traffic management plans, and changes in materials, the GHG emissions produced during construction can be mitigated to some degree by longer intervals between maintenance and rehabilitation events. Based on the preliminary information on construction duration and engineering, the construction CO_2 emissions for the Freeway/Tollway with HSR Alternative (Preferred Alternative) alignment have been estimated using Sacramento Metropolitan Air Quality Management District's *Road Construction Emissions Model, Version 7.1.4* and are summarized in Table 4-4. While the model was developed for Sacramento conditions in terms of fleet emission factors, silt loading, and other modeling assumptions, it is considered adequate for estimating road construction emissions by the San Joaquin Valley Air Pollution Control District under its Indirect Source regulations and the South Coast Air Quality Management District (SCAQMD) in its CEQA guidance, and it is used for that purpose in this project analysis. See Appendix A of the Air Quality Report for construction emissions calculation based on the engineer's estimate of construction activities.

Table 4-4 Estimate of Carbon Dioxide Emissions during Construction for Preferred Alternative Alignment

Project Parameter	CO_2 Emissions
Total Project CO_2 (Tons)	97,411.0
Annual CO_2 (Tons/Year)	24,353.0

Source: Air Quality Report, 2015.

Limitations and Uncertainties with Modeling

EMFAC

Although EMFAC can calculate CO_2 emissions from mobile sources, the model does have limitations when it comes to accurately reflecting changes in CO_2 emissions due to impacts on traffic. The ARB is currently not using EMFAC to create its inventory of GHG emissions. It is unclear why the ARB has made this decision. Its Website only states:

> REVISION: Both the EMFAC and OFFROAD Models develop carbon dioxide (CO_2) and methane (CH_4) emission estimates; however, they are not currently used as the basis for [California Air Resources Board's] official [greenhouse gas] inventory which is based on fuel usage information. http://www.arb.ca.gov/cc/inventory/inventory.htm. However, Air Resources Board is working towards reconciling the emission estimates from the fuel usage approach and the models.[23]

Other Variables

With the current science, project-level analysis of GHG emissions has limitations. Although a GHG analysis is included for this project, there are numerous key GHG variables that are likely to change dramatically during the design life of the proposed project and would thus dramatically change the projected CO_2 emissions.

First, vehicle fuel economy is increasing. EPA's annual report, "Light-Duty Automotive Technology and Fuel Economy Trends: 1975 through 2012,"[24] which provides data on the fuel economy and technology characteristics of new LDVs, including cars, minivans, sport utility vehicles, and pickup trucks, confirms that average fuel economy has improved each year beginning in 2005, and is now at a record high. Corporate Average Fuel Economy (CAFE) standards remained the same between model years 1995 and 2003 and subsequently began setting increasingly higher fuel economy standards for future vehicle model years. EPA estimates that light-duty fuel economy rose by 16 percent from 2007 to 2012. Table 4-5 shows the increases in required fuel economy standards for cars and trucks between Model Years 2012 and 2025 as available from the NHTSA for the 2012-2016 and 2017-2025 CAFE Standards.

Table 4-5 Average Required Fuel Economy (mpg)

	2012	2013	2014	2015	2016	2018	2020	2025
Passenger Cars	33.3	34.2	34.9	36.2	37.8	41.1-41.6	44.2-44.8	55.3-56.2
Light Trucks	25.4	26	26.6	27.5	28.8	29.6-30.0	30.6-31.2	39.3-40.3
Combined	29.7	30.5	31.3	32.6	34.1	36.1-36.5	38.3-38.9	48.7-49.7

Source: EPA 2013, http://www.epa.gov/fueleconomy/fetrends/1975-2012/420r13001.pdf

[23] http://www.arb.ca.gov/msei/offroad.htm.
[24] http://www.epa.gov/oms/fetrends.htm.

Second, near zero carbon vehicles will come into the market during the design life of this project. According to the 2013 Annual Energy Outlook (AEO2013):

> "LDVs [light duty vehicles] that use diesel, other alternative fuels, hybrid-electric, or all-electric systems play a significant role in meeting more stringent greenhouse gas emissions and Corporate Average Fuel Economy Standards over the projection period. Sales of such vehicles increase from 20 percent of all new LDV sales in 2011 to 49 percent in 2040 in the Annual Energy Outlook 2013 Reference case."[25]

The greater percentage of alternative fuel vehicles on the road in the future will reduce overall GHG emissions compared to scenarios in which vehicle technologies and fuel efficiencies do not change.

Third, California recently adopted a low-carbon transportation fuel standard in 2009 to reduce the carbon intensity of transportation fuels by 10 percent by 2020. The regulation became effective on January 12, 2010 (codified in Title 17, California Code of Regulations, Sections 95480-95490). Beginning January 1, 2011, transportation fuel producers and importers must meet specified average carbon intensity requirements for fuel in each calendar year.

Lastly, driver behavior has been changing as the U.S. economy and oil prices have changed. In its January 2008 report, "Effects of Gasoline Prices on Driving Behavior and Vehicle Market,"[26] the Congressional Budget Office found the following results based on data collected from California: (1) freeway motorists adjust to higher gas prices by making fewer trips and driving slower; (2) the market share of sports utility vehicles is declining; and (3) the average prices for larger, less-fuel-efficient models declined from 2003 to 2008 as average prices for the most-fuel-efficient automobiles have risen, showing an increase in demand for the more fuel-efficient vehicles. More recent reports from the Energy Information Agency[27] and Bureau of Economic Analysis[28] also show slowing regrowth of vehicle sales in the years since its dramatic drop in 2009 due to the Great Recession as gasoline prices continue to climb to $4 per gallon and beyond.

Limitations and Uncertainties with Impact Assessment

Taken from p. 5-22 of the NHTSA Final EIS for Mid-Year 2017–2025 Corporate Average Fuel Economy Standards (July 2012), Figure 4-3 illustrates how the range of uncertainties in assessing GHG impacts grows with each step of the analysis:

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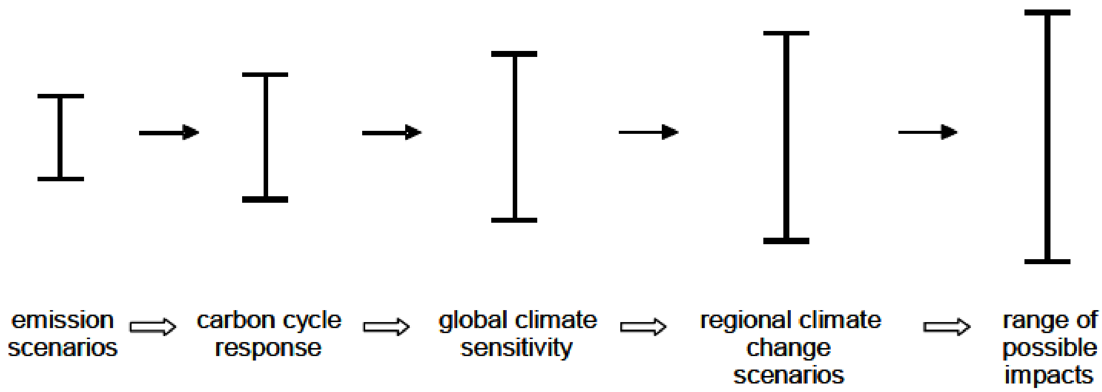
[25] http://www.eia.gov/forecasts/aeo/pdf/0383(2013).pdf.
[26] http://www.cbo.gov/ftpdocs/88xx/doc8893/01-14-GasolinePrices.pdf.
[27] http://www.eia.gov/oiaf/aeo/tablebrowser/aeo_query_server/?event=ehExcel.getFile&study=AEO2013 &region=0-0&cases=ref2013-d102312a&table=114-AEO2013&yearFilter=0.
[28] Historical Vehicle Sales: www.bea.gov/national/xls/gap_hist.xls.

> "Moss and Schneider (2000) characterize the "cascade of uncertainty" in climate change simulations (Figure 4-3). As indicated in Figure 4-3, the emission estimates used in this EIS have narrower bands of uncertainty than the global climate effects, which are less uncertain than regional climate change effects. The effects on climate are, in turn, less uncertain than the impacts of climate change on affected resources (such as terrestrial and coastal ecosystems, human health, and other resources […] Although the uncertainty bands broaden with each successive step in the analytic chain, all values within the bands are not equally likely; the mid-range values have the highest likelihood."[29]

Figure 4-3 Cascade of Uncertainties



Much of the uncertainty in assessing an individual project's impact on climate change surrounds the global nature of the climate change. Even assuming that the target of meeting the 1990 levels of emissions is met, there is no regulatory or other framework in place that would allow for a ready assessment of what any modeled increase in CO_2 emissions would mean for climate change given the overall California GHG emissions inventory of approximately 430 million tons of CO_2 equivalent. This uncertainty only increases when viewed globally. The IPCC has created multiple scenarios to project potential future global GHG emissions, as well as to evaluate potential changes in global temperature, other climate changes, and their effect on human and natural systems. These scenarios vary in terms of the type of economic development, the amount of overall growth, and the steps taken to reduce GHG emissions. Nonmitigation IPCC scenarios project an increase in global GHG emissions by 9.7 up to 36.7 billion metric tons CO_2 from 2000 to 2030, which represents an increase between 25 and 90 percent.[30]

The assessment is further complicated by the fact that changes in GHG emissions can be difficult to attribute to a particular project because the projects often cause shifts in the locale for some type of GHG emissions, rather than causing "new" GHG

[29] http://www.nhtsa.gov/staticfiles/rulemaking/pdf/cafe/FINAL_EIS.pdf. page 5-22.

[30] Intergovernmental Panel on Climate Change (IPCC). February 2007. Climate Change 2007: The Physical Science Basis: Summary for Policy Makers. http://www.ipcc.ch/SPM2feb07.pdf.

emissions. It is difficult to assess the extent to which any project-level increase in CO_2 emissions represents a net global increase, reduction, or no change; there are no models approved by regulatory agencies that operate at the global or even statewide scale.

CEQA Conclusion

As discussed above, both the future with project and future no build show increases in CO_2 emissions over the existing levels; the future build CO_2 emissions are higher than the future no-build emissions.

In addition, as discussed above, there are also limitations with EMFAC and with assessing what a given CO_2 emissions increase means for climate change. Therefore, it is Caltrans' determination that in the absence of further regulatory or scientific information related to GHG emissions and CEQA significance, it is too speculative to make a determination regarding significance of the project's direct impact and its cumulative contribution to climate change. However, Caltrans is firmly committed to implementing measures to help reduce the potential effects of the project. These measures are outlined in the following section.

Greenhouse Gas Reduction Strategies

Caltrans continues to be involved on the Governor's Climate Action Team as ARB works to implement EOs S-3-05 and S-01-07 and help achieve the targets set forth in AB 32. Many of the strategies Caltrans is using to help meet the targets in AB 32 come from former Governor Arnold Schwarzenegger's Strategic Growth Plan for California. The Strategic Growth Plan targeted a significant decrease in traffic congestion below 2008 levels and a corresponding reduction in GHG emissions, while accommodating growth in population and the economy. The Strategic Growth Plan relies on a complete systems approach to attain CO_2 reduction goals: system monitoring and evaluation, maintenance and preservation, smart land use and demand management, and operational improvements, as shown in Figure 4-4.

Figure 4-4 The Mobility Pyramid

Caltrans is supporting efforts to reduce VMT by planning and implementing smart land use strategies: job/housing proximity and developing transit-oriented communities and high-density housing along transit corridors. Caltrans works closely with local jurisdictions on planning activities but does not have local land use planning authority. Caltrans also assists efforts to improve the energy efficiency of the transportation sector by increasing vehicle fuel economy in new cars and light- and heavy-duty trucks; Caltrans is doing this by supporting ongoing research efforts at universities, supporting legislative efforts to increase fuel economy, and participating on the Climate Action Team. It is important to note, however, that control of fuel economy standards is held by EPA and ARB.

Caltrans is also working towards enhancing the State's transportation planning process to respond to future challenges. Similar to requirements for regional transportation plans under SB 375 (Steinberg 2008), SB 391(Liu 2009) requires the State's long-range transportation plan to meet California's climate change goals under AB 32.

The California Transportation Plan (CTP) is a statewide, long-range transportation plan to meet our future mobility needs and reduce GHG emissions. The CTP defines performance-based goals, policies, and strategies to achieve our collective vision for California's future, statewide, integrated, multimodal transportation system.

The purpose of the CTP is to provide a common policy framework that will guide transportation investments and decisions by all levels of government, the private sector, and other transportation stakeholders. Through this policy framework, the CTP 2040 will identify the statewide transportation system needed to achieve maximum feasible GHG emission reductions while meeting the State's transportation needs.

Table 4-6 summarizes Caltrans and statewide efforts that it is implementing to reduce GHG emissions. More detailed information about each strategy is included in the Climate Action Program at Caltrans (December 2006).

Caltrans Director's Policy 30 (DP-30) Climate Change (June 22, 2012) is intended to establish a Caltrans policy that will ensure coordinated efforts to incorporate climate change into Caltrans' decisions and activities.

Caltrans Activities to Address Climate Change (April 2013)[31] provides a comprehensive overview of activities undertaken by Caltrans statewide to reduce GHG emissions resulting from agency operations.

[31] http://www.dot.ca.gov/hq/tpp/offices/orip/climate_change/projects_and_studies.shtml.

Table 4-6 Climate Change/CO_2 Reduction Strategies

Strategy	Program	Partnership		Method/Process	Estimated CO_2 Savings Million Metric Tons (MMT)	
		Lead	Agency		2010	2020
Smart Land Use	Intergovernmental Review (IGR)	Caltrans	Local governments	Review and seek to mitigate development proposals	Not Estimated	Not Estimated
	Planning Grants	Caltrans	Local and regional agencies & other stakeholders	Competitive selection process	Not Estimated	Not Estimated
	Regional Plans and Blueprint Planning	Regional Agencies	Caltrans	Regional plans and application process	0.975	7.8
Operational Improvements & Intelligent Transportation System (ITS) Deployment	Strategic Growth Plan	Caltrans	Regions	State ITS; Congestion Management Plan	0.07	2.17
Mainstream Energy & GHG into Plans and Projects	Office of Policy Analysis & Research; Division of Environmental Analysis	Interdepartmental effort		Policy establishment, guidelines, technical assistance	Not Estimated	Not Estimated
Educational & Information Program	Office of Policy Analysis & Research	Interdepartmental, Cal/EPA, ARB, California Energy Commission (CEC)		Analytical report, data collection, publication, workshops, outreach	Not Estimated	Not Estimated
Fleet Greening & Fuel Diversification	Division of Equipment	Department of General Services		Fleet Replacement B20 B100	.0045	0.0065 0.045 0.0225
Nonvehicular Conservation Measures	Energy Conservation Program	Green Action Team		Energy Conservation Opportunities	0.117	0.34
Portland Cement	Office of Rigid Pavement	Cement and Construction Industries		2.5 % limestone cement mix 25% fly ash cement mix > 50% fly ash/slag mix	1.2 0.36	4.2 3.6
Goods Movement	Office of Goods Movement	Cal/EPA; ARB; Business, Transportation and Housing Agency (BT&H); MPOs		Goods Movement Action Plan	Not Estimated	Not Estimated
Total					2.72	18.18

The following measures will also be included in the project to reduce the GHG emissions and potential climate change impacts from the project:

- Improve mobility by providing dedicated bicycle lanes within the ROW.
- Enhance choice by providing an alternate mode of transportation with the high-speed rail (HSR).
- Incorporate energy production/transmission facility into the corridor. Based on the Draft Green Energy Feasibility Study prepared for this project (June 2014), the following technologies are being recommended for further detailed study: photovoltaic (PV) solar highways; nonfossil fuel refueling stations; and opportunity for utility utilization of highway ROW. Inclusion of the green energy component into the proposed project would further improve energy efficiency and reduce GHG.
- Caltrans and the California Highway Patrol (CHP) are working with regional agencies to implement Intelligent Transportation Systems (ITS) to help manage the efficiency of the existing highway system. ITS commonly consists of electronics, communications, or information processing used singly or in combination to improve the efficiency or safety of a surface transportation system.
- Support intermodal travel, including park-and-ride, rideshare, bicycle, rail, and transit programs.
- Support increased mass transit connectivity and accessibility.
- Promote landscaping strategies that will reduce GHG.
- The project would incorporate the use of energy-efficient lighting, such as light-emitting diode (LED) traffic signals. LED bulbs cost $60 to $70 each, but last 5 to 6 years, compared to the 1-year average lifespan of the incandescent bulbs previously used. The LED bulbs themselves consume 10 percent of the electricity of traditional lights, which will also help reduce the project’s CO_2 emissions.[32]
- According to Caltrans Standard Specifications, the contractor must comply with all local Air Quality Management District’s (AQMD) rules, ordinances, and regulations for air quality restrictions, including idling restrictions by ARB and Mojave Desert Air Quality Management District (MDAQMD) and Antelope Valley Air Quality Management District’s (AVAQMD) Rule 403.

Adaptation Strategies

“Adaptation strategies” refer to how Caltrans and others can plan for the effects of climate change on the State’s transportation infrastructure and strengthen or protect the facilities from damage. Climate change is expected to produce increased variability in precipitation, rising temperatures, rising sea levels, variability in storm surges and intensity, and the frequency and intensity of wildfires. These changes may affect the transportation infrastructure in various ways, such as damage to roadbeds from longer periods of intense heat; increasing storm damage from flooding and

[32] Knoxville Business Journal, “[Light-Emitting Diode] Lights Pay for Themselves,” May 19, 2008 at http://www.knoxnews.com/news/2008/may/19/led-traffic-lights-pay-themselves/.

erosion; and inundation from rising sea levels. These effects will vary by location and may, in the most extreme cases, require that a facility be relocated or redesigned. There may also be economic and strategic ramifications as a result of these types of impacts to the transportation infrastructure.

At the federal level, the Climate Change Adaptation Task Force, co-chaired by the Council on Environmental Quality (CEQ), the Office of Science and Technology Policy (OSTP), and the National Oceanic and Atmospheric Administration (NOAA), released its interagency task force progress report on October 28, 2011,[33] outlining the federal government's progress in expanding and strengthening the Nation's capacity to better understand, prepare for, and respond to extreme events and other climate change impacts. The report provides an update on actions in key areas of federal adaptation, including building resilience in local communities, safeguarding critical natural resources such as freshwater, and providing accessible climate information and tools to help decision makers manage climate risks.

Climate change adaptation must also involve the natural environment. Efforts are underway on a statewide level to develop strategies to cope with impacts to habitat and biodiversity through planning and conservation. The results of these efforts will help California agencies plan and implement mitigation strategies for programs and projects.

On November 14, 2008, former Governor Arnold Schwarzenegger signed EO S-13-08, which directed many state agencies to address California’s vulnerability to sea level rise caused by climate change. This EO set in motion several agencies and actions to address the concern of sea level rise.

In addition to addressing projected sea-level rise, the California Natural Resources Agency (Resources Agency) was directed to coordinate with local, regional, State, and federal public and private entities to develop The California Climate Adaptation Strategy (December 2009),[34] which summarizes the best-known science on climate change impacts to California, assesses California's vulnerability to the identified impacts, and then outlines solutions that can be implemented within and across State agencies to promote resiliency.

The strategy outline is in direct response to EO S-13-08, which specifically asked the Resources Agency to identify how State agencies can respond to rising temperatures, changing precipitation patterns, sea-level rise, and extreme natural events. Numerous other State agencies were involved in the creation of the Adaptation Strategy document, including the Cal/EPA; Business, Transportation and Housing Agency (BT&H); Health and Human Services; and the Department of Agriculture. The document is broken down into strategies for different sectors that include Public Health; Biodiversity and Habitat; Ocean and Coastal Resources; Water Management;

[33] http://www.whitehouse.gov/administration/eop/ceq/initiatives/adaptation.
[34] http://www.energy.ca.gov/2009publications/CNRA-1000-2009-027/CNRA-1000-2009-027-F.PDF.

Agriculture; Forestry; and Transportation and Energy Infrastructure. As data continues to be developed and collected, the State's adaptation strategy will be updated to reflect current findings.

The National Academy of Science was directed to prepare a Sea Level Rise Assessment Report[35] to recommend how California should plan for future sea-level rise. The report was released in June 2012 and included:

- Relative sea-level rise projections for California, Oregon, and Washington taking into account coastal erosion rates, tidal impacts, El Niño and La Niña events, storm surge, and land subsidence rates.
- The range of uncertainty in selected sea-level rise projections.
- A synthesis of existing information on projected sea-level rise impacts to State infrastructure (e.g., roads, public facilities, and beaches), natural areas, and coastal and marine ecosystems.
- A discussion of future research needs regarding sea-level rise.

In 2010, interim guidance was released by The Coastal Ocean Climate Action Team (CO-CAT), as well as Caltrans, as a method to initiate action and discussion of potential risks to the State's infrastructure due to projected sea-level rise. Subsequently, CO-CAT updated the Sea Level Rise guidance to include information presented in the National Academy of Science study.

All State agencies that are planning to construct projects in areas vulnerable to future sea-level rise are directed to consider a range of sea-level rise scenarios for the years 2050 and 2100 to assess project vulnerability and, to the extent feasible, reduce expected risks and increase resiliency to sea-level rise. Sea-level rise estimates should also be used in conjunction with information on local uplift and subsidence, coastal erosion rates, predicted higher high water levels, storm surge, and storm wave data.

All projects that have filed an NOP as of the date of EO S-13-08, and/or are programmed for construction funding through 2013, or are routine maintenance projects may, but are not required to, consider these planning guidelines. The proposed project is outside the coastal zone, and direct impacts to transportation facilities due to projected sea-level rise are not expected.

EO S-13-08 also directed BT&H to prepare a report to assess vulnerability of transportation systems to sea-level rise affecting safety, maintenance and operational improvements of the system, and economy of the state. Caltrans continues to work on assessing the transportation system vulnerability to climate change, including the effect of sea-level rise.

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[35] *Sea Level Rise for the Coasts of California, Oregon, and Washington: Past, Present, and Future* (2012) is available at: http://www.nap.edu/catalog.php?record_id=13389.

Currently, Caltrans is working to assess which transportation facilities are at greatest risk from climate change effects; however, without statewide planning scenarios for relative sea-level rise and other climate change effects, Caltrans has not been able to determine what change, if any, may be made to its design standards for its transportation facilities. Once statewide planning scenarios become available, Caltrans will be able review its current design standards to determine what changes, if any, may be needed to protect the transportation system from sea-level rise.

Climate change adaptation for transportation infrastructure involves long-term planning and risk management to address vulnerabilities in the transportation system from increased precipitation and flooding; the increased frequency and intensity of storms and wildfires; rising temperatures; and rising sea levels. Caltrans is an active participant in the efforts being conducted in response to EO S-13-08 and is mobilizing to be able to respond to the National Academy of Science Sea Level Rise Assessment Report.

Chapter 5 Comments and Coordination

Early and continuing coordination with the general public and appropriate public agencies is an important part of the environmental process. It helps planners determine the necessary scope of environmental documentation and the level of analysis required, and it assists in identifying potential impacts, mitigation measures, and related environmental requirements. Agency consultation and public participation for this project have been accomplished through a variety of formal and informal methods, including Project Development Team (PDT) meetings, interagency coordination meetings, and an extensive public outreach program. This process, known as scoping, allows public agencies and the general public to learn about the project and to provide suggestions on alternatives and the types of impacts to be evaluated.

This chapter summarizes the results of the California Department of Transportation's (Caltrans) efforts to identify, address, and resolve project-related issues through early and continuing coordination.

5.1 Coordination Plan

When this project was initiated, the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) required the development of a Coordination Plan for projects where an Environmental Impact Statement (EIS) was being prepared. The purpose of the plan was to improve agency and public involvement in the environmental process for transportation projects. The SAFETEA-LU legislation has been replaced with the 2012 passage of Moving Ahead for Progress in the 21st Century Act (MAP-21). Many of the requirements in the SAFETEA-LU legislation pertaining to coordination with other agencies have been carried forward into the MAP-21 requirements. A Coordination Plan was prepared by Caltrans in February 2011, and it was updated in March 2012 and again in August 2014 to describe a communication process with participating and cooperating agencies. The following provides an overview of the agency coordination conducted to date.

5.1.1 Project Initiation

23 United States Code (U.S.C.) 139 requires the project sponsor (Caltrans) to notify the Secretary of Transportation of the type of work proposed, including the general location, length and termini of the project, when the environmental review process would begin, and any anticipated federal permits and approvals. This notification was provided via transmittal of the Notice of Intent (NOI) to the Secretary on October 12, 2007. A revised NOI was published in the *Federal Register* on August 1, 2013, to address the introduction of the two rail alternatives.

5.1.2 Process for Inviting Cooperating/Participating Agencies

Under the National Environmental Policy Act (NEPA), cooperating agencies are governmental agencies that either have approval authority on part of the project (e.g., issuing a permit) or special expertise with respect to an environmental issue being evaluated in the EIS (or joint EIS/Environmental Impact Report [EIR]). Under MAP-21, participating agencies can be federal, state, tribal, regional, or local agencies, nongovernmental organizations, or private entities that may have an interest in the project. Being a cooperating or participating agency does not mean that the agency supports a project.

On March 30, 2011, Caltrans sent letters of invitation to 57 agencies to become a participating agency, 5 agencies of which became a cooperating agency on the project. Subsequently, on February 13, 2013, one additional agency, the Federal Railroad Administration (FRA), was invited to become a cooperating agency. A federal agency is assumed to be a participating or cooperating agency unless it formally declines an invitation or it fits into one of the following categories: (1) it has no jurisdiction or authority for the project; (2) it has no expertise or information relevant to the project; or (3) it does not intend to submit comments on the project.

During the public review period, Caltrans recognized an oversight in sending the invitation letter during the initial stage of the project; therefore, on June 11, 2015, two additional agencies were invited, including the Surface Transportation Board and the U.S. Air Force (USAF).

Cooperating and participating agencies are shown in Table 5-1.

Table 5-1 Cooperating and Participating Agencies List

Agency	Contact Person, Title	Accepted Invitation	Declined Invitation	Did not Respond	Agency (yes/no)
Cooperating Agencies (Also Participating Agency)					
Advisory Council on Historic Preservation (ACHP)	Carol Legard Federal Highway Liaison Office of Federal Agency Programs	X			Yes
Federal Bureau of Prisons	Craig F. Meyers Federal Bureau of Prisons Associate General Counsel Real Estate and Environmental Law	X			Yes
U.S. Federal Aviation Administration (FAA), Western Pacific Region	Mr. Patrick Lammerding Assistant ADO Manager, Western Pacific Region Airports Division	X			Yes
U.S. Army Corps of Engineers (USACE)	Mark Cohen Regulatory Division, Los Angeles District	X			Yes

Table 5-1 Cooperating and Participating Agencies List

Agency	Contact Person, Title	Accepted Invitation	Declined Invitation	Did not Respond	Agency (yes/no)
U.S. Environmental Protection Agency (EPA), Region IX	Tom Plenys Susan Sturges EPA-Environmental Review Office	X			Yes
Federal Railroad Administration (FRA)	David Valenstein Chief Environment and Systems Planning Division	X			Yes
Surface Transportation Board	Victoria Rutson Director, Office of Environmental Analysis	X			Yes
U.S. Air Force (USAF)	Department of Air Force, Plant 42 (AFP-42)			X	No
Participating Agencies					
U.S. Fish and Wildlife Services (USFWS)	Jonathan Snyder Carlsbad Fish and Wildlife Service Office			X	Yes
U.S. Department of Housing and Urban Development Los Angeles Field Office	William Vasquez, CPD Field Office Director			X	Yes
U.S. Department of Commerce	Environmental Review Section			X	Yes
U.S. Department of Homeland Security Federal Emergency Management Agency (FEMA)	Gregor Blackburn, CFM, Branch Chief Floodplain Management and Insurance Branch		X		No
U.S. Department of Energy Environmental Review Section	Environmental Review Section			X	No
Natural Resources Conservation Office	Jae Lee District Conservationist, Lancaster Service Center			X	No
Natural Resources Conservation Service (NRCS) Office	James Earsom District Conservationist Redlands Service Center			X	No
NRCS Office	Jesse “Rick” Aguayo Victorville Service Center			X	No
Bureau of Land Management (BLM)	Hector Villalobos Field Manager Ridgecrest Field Office			X	No

Table 5-1 Cooperating and Participating Agencies List

Agency	Contact Person, Title	Accepted Invitation	Declined Invitation	Did not Respond	Agency (yes/no)
BLM	Roxie Trost Field Manager Barstow Field Office			X	No
California Department of Fish and Wildlife[1] (CDFW) - South Coast Region	Scott Harris	X			Yes
CDFW - Eastern Sierra-Inland Deserts Region	Regional Manager		X		No
Antelope Valley Air Quality Management District (AVAQMD)	Eldon Heaston Executive Director	X			Yes
Mojave Desert Air Quality Management District (MDAQMD)	Eldon Heaston Executive Director	X			Yes
California Public Utilities Commission (CPUC)	Rosa Munoz, PE Utilities Engineer	X			Yes
California Air Resources Board (ARB)	Jonathan Taylor - Chief Transportation Planning Branch		X		No
California Energy Commission (CEC)	Media and Public Communications Office			X	No
California Department of Conservation	Division of Land and Resource Protection			X	No
California Regional Water Quality Control Board (RWQCB)	Jay Cass Lahontan Region-Victorville Branch Office	X			Yes
California RWQCB	Los Angeles RWQCB 401 Water Quality Certification and WDR Program	X			Yes
Native American Heritage Commission (NAHC)	Dave Singleton Program Analyst			X	No
California Highway Patrol (CHP)	Officer Eric Phipps	X			Yes
Planning Department, City of Palmdale	Asoka Herath Planning Director City of Palmdale	X			No
Planning Department, City of Lancaster	Brian S. Ludicke Planning Director City of Lancaster			X	No
Traffic Division/GIS Section, City of Palmdale	Mike Behen Senior Transportation Planner/GIS Coordinator	X			No

Table 5-1 Cooperating and Participating Agencies List

Agency	Contact Person, Title	Accepted Invitation	Declined Invitation	Did not Respond	Agency (yes/no)
City of Palmdale, Parks, Recreation and Special Events Office	Keri Brady Parks and Recreation Manager	X			No
Public Works Department, City of Lancaster	Nicole Rizzo Management Analyst Public Works Department City of Lancaster			X	No
Town of Apple Valley	Kenneth J. Henderson Assistant Town Manager, Economic and Community Development			X	No
Town of Apple Valley	Ralph Wright Parks and Recreation Manager	X			Yes
City of Adelanto	Public Works Engineering Department Nathan Coapstick Engineering Project Coordinator			X	No
City of Adelanto	Parks Department Superintendent, Nan Moore			X	No
City of Victorville	Bill Webb, AICP Planning Department			X	No
City of Victorville	Brian Gengler Assistant City Engineer	X			Yes
City of Victorville	Maria Martinez Parks and Facilities, Parks Yard			X	No
City of Victorville	Parks and Facilities Attn: Facilities	X			Yes
City of Hesperia	Mike Podegracz City Manager	X			Yes
City of Barstow	Richard Rowe City Manager			X	No
County of San Bernardino Department of Public Works	Chief, Transportation Planning Brendon Biggs			X	No
County of San Bernardino Department of Public Works	Deputy Director for Transportation Mazin Kasey	X			Yes
Los Angeles World Airports (LAWA), Airports and Facilities Planning Division	Eileen Schoetzow Airport/Facilities Planner	X			Yes

Table 5-1 Cooperating and Participating Agencies List

Agency	Contact Person, Title	Accepted Invitation	Declined Invitation	Did not Respond	Agency (yes/no)
Los Angeles Department of Water and Power (LADWP)	Hal Messinger, Environmental Planning and Assessment	X			Yes
Los Angeles County Department of Regional Planning	Jon Sanabria Acting Director of Planning Anthony Curzi Regional Planning Assistant II for Project	X			Yes
County of Los Angeles Department of Public Works	Hank Fung, PE Federal Programs Section-Programs Development Division			X	No
Los Angeles County Department of Public Works	Toan Duong, AICP Land Development Division			X	No
Southern California Regional Rail Authority (SCRRA)—Metrolink	Laurene Lopez Community Relations/ Environmental Review Administrator	X			Yes
Palmdale School District	Mat Havens Facilities Manager			X	No
Palmdale School District	Al Tsai Maintenance and Operations Administrator	X			Yes
Los Angeles County Metropolitan Transportation Authority (Metro)	Teresa Fong Transportation Planner-San Fernando Valley/ North County Area Team			X	No
Desert Mountains Conservancy	Paul Edelman Chief of Natural Resources and Planning			X	No
Southern California Association of Governments (SCAG)	Ryan Kuo Senior Regional Planner Transportation Planning	X			Yes
San Bernardino Associated Governments (SANBAG)	Deborah Robinson Barmack	X			Yes
Los Angeles County Department of Parks and Recreation	Russ Guiney Director	X			Yes
[1] Effective January 1, 2013, the California Department of Fish and Game changed its name to the California Department of Fish and Wildlife.					

Coordination Meeting

A coordination meeting was held at the Caltrans District 7 office in downtown Los Angeles on March 30, 2011, for those agencies that had accepted the invitation to be a participating or cooperating agency.

The purpose of the meeting was to update the attendees on the progress of the project; gain input on the project Purpose and Need and range of alternatives; and discuss a number of issues/concerns related to the project, such as the crossings at Little Rock Wash, Big Rock Wash, and the Mojave River; encroachment upon Los Angeles/ Palmdale Regional Airport, Southern California Logistics Airport (SCLA), and Federal Bureau of Prisons property; and potential impacts to Rockview Park. In addition, the meeting provided an opportunity to identify the permits and approvals needed for project implementation. The permits and approvals needed, as well as the status of these permits, is summarized in Tables S-2 and 2-6.

A copy of the invitation letter has been included in Appendix K, Key Correspondence, provided in Volume 2.

5.2 Scoping Process

The scoping process started with widespread notice to government agencies via publication of an NOI/Notice of Preparation (NOP) announcing the start of work on an EIR/EIS. The NOI was published in the *Federal Register* on September 24, 2010, in accordance with NEPA. The NOP was filed with the State Clearinghouse on September 28, 2010, in accordance with the California Environmental Quality Act (CEQA). The State Clearinghouse posted the NOP on its Web site and distributed it to State agencies. A revised NOI was published in the *Federal Register* on August 1, 2013, to address the introduction of the two rail alternatives. A copy of the NOI and NOP are provided in Appendix H in Volume 2. Comments on the NOI/NOP were received from eight agencies and included comments on a variety of environmental issues. Table 5-2 provides a summary of the issues raised in the responses to the NOP.

5.2.1 Mailings

Letters were sent to federal, State, regional, and local government agencies on September 20, 2010, inviting them to an agency scoping meeting, which was held on September 27, 2010, in Adelanto.

Table 5-2 High Desert Corridor Notice of Preparation Agency Comment Summary

Topic Category	# of Comments
General	
Existing Environment	1
Environmental Document	3
Purpose and Need	
General	4
Alternatives	
General	4
No-Build	1
Design Features	9
Transportation System Management (TSM)/ Transportation Demand Management (TDM)	2
Rail	3
Transit	1
Toll	1
Human Environment	
Traffic	2
Community Growth	3
Historical/Archaeological	2
Native Americans	3
Physical Environment	
Air Quality	3
Flooding	3
Water and Wetlands	3
Biological Environment	
Wildlife/Habitat	2
Mitigation	2
Permits	1
Total	**53**

5.2.2 Public Noticing

Because of the large scale of this project, geographic information system (GIS) mapping was used to identify the parcels and property owners within a 0.5-mile buffer around the proposed alignment (Figure 2-2).

From this information, a contact list was generated and 25,040 scoping postcards were prepared and sent out to notify the public about the upcoming scoping meetings. The postcards were sent out in 2 separate mailings on September 14 and 16, 2010.

Public meeting notices were also sent to the public libraries listed in Table 5-3 in the communities where the meetings were to be held:

Table 5-3 Public Libraries Scoping Meeting Notices

Apple Valley, Newton T. Bass Branch 14901 Dale Evans Parkway Apple Valley, CA 92307-3061	Lancaster Regional Library 601 West Lancaster Boulevard Lancaster, CA 93534-3398
Palmdale City Library 700 East Palmdale Boulevard Palmdale, CA 93550	Victorville City Library 15011 Circle Drive Victorville, CA 92395

The notices, in both English and Spanish, were posted at the library kiosks and could easily be viewed by the public. Scoping notices were also published in local newspapers, as shown in Table 5-4.

Table 5-4 Newspapers with Scoping Notices

Apple Valley News September 24, 2010	*Antelope Valley Press* September 23 & 26, 2010
Daily Press September 19 & 23, 2010	*Mountaineer Progress* September 23, 2010
The Sun (San Bernardino) September 22 & 26, 2010	*La Opinion* (Spanish) September 20 & 26, 2010

In addition, letters were sent to the appropriate local, State, and federal agencies and elected officials notifying them of the formal initiation of studies.

5.2.3 Scoping Meetings

Public Scoping Meetings

Four public scoping meetings were held at the locations shown in Table 5-5. The purpose of the meetings was to provide the public with information on the project and alternatives, answer any questions, and gather comments from anyone who had input.

Table 5-5 Public Scoping Meetings

September 27, 2010, 6:00 P.M. to 8:00 P.M. Larry Chimbole Cultural Center 38350 N. Sierra Highway Palmdale, CA 93550	September 28, 2010, 6:00 P.M. to 8:00 P.M. Lancaster City Hall Emergency Operations Center 44933 Fern Avenue Lancaster, CA 93534
September 29, 2010, 6:00 P.M. to 8:00 P.M. Town of Apple Valley Parks and Recreation Department, Development Services – Conference Center 14955 Dale Evans Parkway Apple Valley, CA 92307	September 30, 2010, 6:00 P.M. to 8:00 P.M. City of Victorville Conference Room D 14343 Civic Drive Victorville, CA 92393

The public scoping meetings were attended by at least 369 people (some people may not have signed in). Based on the sign-in sheets, attendance at each meeting was as follows:

- September 27 – 96 people
- September 28 – 44 people
- September 29 – 142 people
- September 30 – 87 people

The meetings were held in an open house type forum. A Spanish interpreter was present at each of the meetings, and all information handed out at the meetings was provided in English and Spanish.

A total of 543 comments were received from 206 people either verbally at the meetings or via letters, e-mails, or comment cards. Table 5-6 provides a summary of the issues that were raised.

Table 5-6 Public Comments by Topic

Topic Category	# of Comments
General	
Construction Schedule	2
Request for More Project Information	22
Website	8
Funding	11
EIR/EIS Process	11
Existing Environment	18
Environmental Consequences	16
Purpose and Need	
General	8
Alternatives	
General	30
Design Features	65
Modes – Transit	8
Modes – Rail	14
Modes – Highway	8
Modes – Trucks	14
Modes	17
Tolls	15
Human Environment	
Traffic Study	7
System Linkage	18
Transportation, Travel Patterns Accessibility and Highway/Traffic Safety	27
Traffic Congestion	13
Traffic Capacity	12
Neighborhoods and Community Cohesion	33

Table 5-6 Public Comments by Topic

Topic Category	# of Comments
Relocation	26
Economic Consequences	14
Community Facilities and Public Services	14
Environmental Justice	1
Land Use	22
Agriculture	2
Off-Highway Vehicle Trail Use	2
Economic Vitality	18
Historic Resources	13
View Shed	3
Light Disturbance	4
Physical Environment	
Noise	8
Air Quality	8
Groundwater Resources	6
Flooding	10
Biological Environment	
Natural – Wildlife	8
Mitigation	7
Total Scoping Written/Oral Comments Received	**543**

Agency Scoping Meeting

An Agency Scoping Meeting was held on September 27, 2010, at the City of Adelanto Parks and Recreation Center (11555 Cortez Avenue). The purpose of the meeting was to explain the project and alternatives to agencies, answer any questions they might have, and gather comments from anyone who had input.

In addition to staff from Caltrans District 7, District 8, and Los Angeles County Metropolitan Transportation Authority (Metro), three representatives from the San Bernardino County Department of Public Works and the City of Palmdale Planning Department attended the meeting.

5.3 Consultation and Coordination with Public Agencies

5.3.1 Resource and Regulatory Agencies

Numerous early coordination meetings occurred between Caltrans and resource agencies such as United States Fish and Wildlife Service (USFWS), California Department of Fish and Wildlife (CDFW), and United States Army Corps of Engineers (USACE). In general, the purpose of these meetings was to provide agency personnel with the latest project design information, proposed approaches to survey protocol, impact analysis, and to evaluate potential mitigation measure potential. The input from agencies was also helpful with regard to all of these topics, especially design criteria, survey protocol, and impact analysis.

On October 19, 2010, Caltrans (Paul Caron and Jeff Johnson) met with CDFW (Jamie Jackson, Eric Weiss, and Scot Harris) to present project alignment and discuss survey needs. Caltrans and CDFW (formerly California Department of Fish and Game) also met in June 2011 and February 2012 to discuss changes to the alignment and potential impacts to special-status species. In March 2013, Caltrans personnel (Paul Caron and Jeff Johnson) met with CDFW (Jamie Jackson) and USFWS (Ray Bransfield) in the USFWS Ventura Office to specifically discuss survey needs, impact analysis, and potential mitigation measures for the desert tortoise and southwestern willow flycatcher. An additional meeting occurred with CDFW (Becky Jones) in April 2013 to further discuss desert tortoise survey needs, impact analysis, design criteria, and mitigation measures. Numerous telephone conversations occurred between Caltrans (Jeff Johnson) and CDFW (Jamie Jackson) during 2011-2013 to discuss project alignment shifts and survey results, and to request input on culvert design with regard to wildlife crossing.

A Biological Assessment was prepared and submitted to USFWS on August 14, 2015, for their preparation of a Biological Opinion. Formal consultation was initiated on September 16, 2015. A site visit with USFWS (Ray Bransfield and Tara Callaway), ECORP Consulting (Brad Haley), and Caltrans (Jeff Johnson), was conducted on October 1, 2015. Areas of impact were visited and evaluated. Formal consultation was concluded on April 6, 2016 and a Biological Opinion was issued on April 6, 2016.

A jurisdictional determination and delineation was submitted to USACE on August 14, 2015, for their review and approval. A site visit was held on February 4, 2016 which included the USACE (Spencer MacNeil and Crystal Huerta), Caltrans (Ron Kosinski, Jeff Johnson, and Mary Ngo), and ECORP Consulting (Margaret Bornyasz). As a result of that visit, it was determined that it would be more appropriate to supplement and resubmit the documentation with a request for, 1) a Preliminary Jurisdictional Determination (PJD), and 2) an Approved Jurisdictional Determination (AJD). The request for the PJD was submitted on February 12, 2016 and the request for the AJD was submitted on March 30, 2016. The USACE concurred with the Preliminary Jurisdictional Determination on April 11, 2016 and the Approved Jurisdictional Determination on May 16, 2016. The concurrence letters are provided in Appendix L of this Final EIR/EIS.

5.3.2 Intergovernmental Consultation for Air Quality

Intergovernmental coordination through the Southern California Association of Governments (SCAG) Transportation Conformity Working Group (TCWG) began in May 2011 regarding Clean Air Act (CAA) conformity requirements. The agencies involved included SCAG, Caltrans, U.S. Environmental Protection Agency (EPA), Federal Highway Administration (FHWA), Mojave Desert Air Quality Management District (MDAQMD), South Coast Air Quality Management District (SCAQMD), and California Air Resources Board (ARB).

A summary of methods and assumptions applied in the quantitative analysis for this project was submitted and concurred with by the TCWG in June 2011. Subsequently, Caltrans coordinated with EPA for consultation and concurrence on key input parameters and strategy for the quantitative analysis. A quantitative analysis was prepared per the EPA Guidance for quantitative hot-spot analysis and submitted to the TCWG in March 2014 for review and concurrence. Comments were provided by EPA and the TCWG, and a revised quantitative hot-spot analysis was submitted to the TCWG in May 2014. The TCWG provided concurrence on the quantitative hot-spot analysis in June 2014.

Since the concurrence by TCWG in June 2014, a preferred alternative was selected and EPA released a new version of AERMOD and AERMET. The air quality modeling was updated according to the preferred alternative and was run using the latest EPA AERMET and AERMOD version 15181. The updated and final quantitative particulate matter less than 10 microns in diameter (PM_{10}) hot-spot analysis was submitted to SCAG in September 2015 for review and concurrence by the TCWG. On September 22, 2015, in their monthly meeting, TCWG reaffirmed their concurrence, and the analysis was deemed acceptable for NEPA circulation. FHWA was not present at the September 2015 monthly meeting, but they provided their concurrence separately on October 15, 2015, via e-mail.

An Air Quality Conformity Analysis was prepared and submitted on November 18, 2015, to FHWA to request project-level conformity determination because Caltrans is not allowed to approve the Final EIR/EIS without the determination by FHWA. Following their review, FHWA provided their project-level conformity determination for the project on January 4, 2016. Appendix M provides a copy of the project-level conformity determination by FHWA.

5.3.3 Native American Heritage Commission and Associated Cultural Resources Consultation

Caltrans cultural resources staff contacted the Native American Heritage Commission (NAHC) regarding the area west of 100th Street East on March 23, 2011, and the area east of 100th Street East on November 1, 2013; responses were received from the commission on March 25, 2011, and November 7, 2013. These indicated that no sites within or adjacent to the Area of Potential Effects (APE) have been designated as sacred lands, according to a search of the Sacred Lands File (SLF). The NAHC also provided a list of Native American groups and individuals who might have knowledge of cultural resources in the project area. The parties listed on the NAHC contact list were all contacted by certified letter on July 30 or September 25, 2007. The letters were followed by e-mails and/or telephone calls to each individual to ensure that the contacts received the original letter and had a chance to respond in time. Caltrans consulted the NAHC again in early 2014 regarding the expanded project footprint; no sacred lands or new groups/individuals were identified in the area.

On August 28, 2014, all Native American groups and individuals (9 groups and 19 individuals) were sent a letter updating the status of the cultural studies, including the archaeological sites present in the project area, and requested additional information on cultural resources. As part of planning additional survey and testing activities, the San Manuel Band of Mission Indians was requested to recommend a tribal monitor. Meetings and field visits with Caltrans staff, Caltrans consultants, and cultural resources representatives from San Manuel Band of Mission Indians occurred on September 20 and November 22 and 25, 2014. The San Manuel Cultural Resources Department reviewed the results of all excavations and commented on the Phase I and Phase II Evaluation Report (June 2015) on September 17, 2015.

Between October 8 and 16, 2015, Caltrans District Native American Coordinator Alex Kirkish received no response in an attempt to personally contact representatives from the Morongo Band of Mission Indians, the San Fernando Band of Mission Indians, and the Fernandeno Tataviam Band of Mission Indians.

The Historic Property Survey Report (HPSR) was submitted to the State Historic Preservation Office (SHPO) on September 4, 2014, for their review and concurrence. In a letter dated September 29, 2014, the SHPO concurred that 36 resources are ineligible for listing on the NRHP and 4 resources are eligible for listing on the NRHP. As of October 15, 2015, Caltrans is continuing consultation with SHPO regarding the phased identification, evaluation, and findings of effect for 14 resources that remain within the project area.

Caltrans has prepared and submitted the Finding of Effect (FOE) on historic properties and a Programmatic Agreement (PA) that contained the measures to minimize effects to historic properties. The FOE was concurred by SHPO on March 22, 2016 and Caltrans and SHPO entered into the agreement outlined in the PA on March 30, 2016. A copy of the PA is included in Appendix K of this Final EIR/EIS.

5.3.4 Bureau of Land Management

A small portion of the project (the rail connection to the XpressWest station) crosses into Bureau of Land Management (BLM) land. Caltrans cultural staff unsuccessfully attempted to contact BLM cultural staff by phone several times during July and August 2014. The intent of the contact is to notify them of proposed activities and discuss any known resources or other issues that may be of concern.

5.3.5 Agency Coordination on Parks and Recreation Facilities

Extensive coordination has occurred (via phone, e-mail, and in-person meetings) between Caltrans and the following agencies regarding the existing and planned parks and recreation facilities and wildlife refuges in the vicinity of the project. Agency personnel were made aware of the project alternatives and given an opportunity to provide input on potential impacts and avoidance/minimization measures:

- City of Palmdale, Parks and Recreation Department
- City of Victorville, Community Services Department

- Town of Apple Valley, Parks Department
- City of Adelanto, Parks and Facilities Department
- County of Los Angeles, Department of Parks and Recreation
- County of San Bernardino, Department of Park and Recreation

Coordination has also occurred with the City of Los Angeles Department of Water and Power (LADWP) regarding the land ownership, designated function, and purpose of the parcel south of Rockview Nature Park in Victorville. The City of Victorville Community Services Department was also consulted, including a field meeting at Rockview Nature Park, regarding the indirect and proximity impacts to Rockview Nature Park, and the parking compensation/enhancement for Rockview Nature Park, as well as the property for the Land and Water Conservation Fund grants (Section 6(f)(3) of 16 U.S.C. §4601-4).

In addition, coordination with the City of Victorville's Community Services Department has been ongoing regarding the Westwinds Golf Course. On August 25, 2015, the Director of the Victorville's Community Services Department concurred that the project would not adversely affect the activities, features, or attributes of the park as a recreation facility (See Appendix K – Key Correspondence, Volume 2, under Section 4(f) Related Correspondences Subsection).

5.3.6 Los Angeles World Airports

Extensive conversations have taken place over the years between the Caltrans Project Manager and Los Angeles World Airports (LAWA) representatives regarding the need to acquire property at the Los Angeles/Palmdale Regional Airport, many of which even preceded publication of the NOI for this project. These conversations resulted in the signing of a Cooperative Agreement (District Agreement No. 07-4542) on April 13, 2003, which outlined the conditions under which LAWA would transfer land to the State for purposes of building a new freeway.

More recently, LAWA attended the Coordination Plan meeting on March 30, 2011, to gain an understanding of the scope of the project. Subsequent conversations have occurred as the project footprint has been refined and the potential need to acquire additional land became apparent. On October 8, 2013, a meeting was held at the LAWA offices at Los Angeles International Airport to further discuss this need. The conversation centered around the rail wye connection to the Palmdale Transportation Center, potential impacts resulting from the shifted highway alignment, and the need to obtain additional approval for the potential new alignment.

On March 5, 2014, LAWA submitted a letter to Caltrans containing "5% Conceptual Approval" for the High Desert Corridor (HDC) Project. This provided conceptual approval for the revised alignment and identified many conditions that must be met and steps that must occur before any development can take place on the property.

5.3.7 Federal Aviation Administration

The Federal Aviation Administration (FAA) was invited to be a cooperating agency and accepted that role in a letter dated April 25, 2011, in which they also identified several areas of concern that the project team should be aware.

FAA submitted a letter to Metro dated May 15, 2014, in which they reiterated the concerns expressed in their previous letter and requested that efforts be made for additional coordination with their agency. Both Metro and Caltrans provided written responses to FAA. The Caltrans letter, dated July 2, 2014, provided a summary of activities that have occurred to address the concerns expressed in FAA's original (April 25, 2011) letter. As a follow-up, an in-person meeting was held at FAA's office in Lawndale, California, to discuss these issues.

5.3.8 California High-Speed Rail Authority, Metrolink, and City of Palmdale

Caltrans and Metro staff members have met numerous times with representatives from the California High-Speed Rail Authority, Metrolink, and the City of Palmdale to discuss the design compatibility of a potential HDC rail component with the California High-Speed Rail (HSR), Metrolink, and the Palmdale Transportation Center. These meetings were intended to facilitate integration of these four elements into a seamless and interconnected rail network.

5.3.9 XpressWest

Caltrans and Metro staff have met numerous times with representatives from XpressWest to discuss compatibility of a potential HDC rail component with the XpressWest system. These meetings were intended to facilitate integration of these elements into a seamless and interconnected rail network.

5.3.10 Federal Railroad Administration

Because of the addition of rail to the project scope, Caltrans sent a letter to FRA on February 13, 2013, formally requesting that they accept cooperating agency status. FRA formally accepted the invitation on March 7, 2013. Caltrans and Metro staff have had conversations with FRA staff regarding adding a rail component into the HDC on October 16, 2012; June 4, 2013; December 10, 2013; March 5, 2014; March 26, 2014; and May 13, 2014. The discussions focused on ensuring compatibility with the proposed California HSR and XpressWest systems, projected rail ridership, and the rail noise study, including protocols and integrating it into the standard Caltrans highway noise study. Technical studies (noise and traffic) were provided for their review and comment.

5.3.11 Hydromodification Working Group

Caltrans initiated and coordinated a Hydromodification Working Group early in the project development process. The Working Group provided advice to the HDC PDT on ways to avoid, minimize, and mitigate potential project impacts due to changes in the flow of water that could result from this project. The group focused on issues involving water quality and drainage patterns, sensitive species, and wildlife crossings, as well as wetlands and regulatory issues related to waters of the U.S.

The first coordination meeting occurred on August 16, 2011, and included representatives from EPA, USFWS, USACE, CDFW, two Regional Water Quality Control Boards (RWQCBs), several Caltrans functional units, and a consultant representative. This meeting laid the foundation for future activities/discussions of the Working Group. A general overview of the project was provided, and the range of issues to be addressed was established. Subsequently, several field trips were conducted to further evaluate the project area. In addition, numerous e-mails were exchanged in an effort to exchange information and provide discussion amongst the group members.

On April 12, 2012, members of the project team met with a representative from the Lahontan RWQCB to discuss the Mojave River crossing. At this meeting, Caltrans proposed, and the RWQCB agreed, that the river crossing was a unique feature along the corridor and should be treated differently than other drainages. Whereas other drainages along the corridor were classified as Risk Level 1 (low risk) when considering potential impacts, it was agreed that the Mojave River would be designated as Risk Level 2 (moderate risk) in recognition of its significance and its sensitivity to disturbances and sedimentation.

Caltrans coordinated with the Department of Conservation (DOC) concerning matters related to farmland conservation programs in the state, important farmland easement ratios, and recommendations on measures to minimize or mitigate impacts. DOC staff provided information regarding the conservation easement development process, guidance on mitigation ratios, and a sample of recently approved conservation easement measures. In addition, the Antelope Valley Conservancy (i.e., land trust) provided information about agricultural conservation easements. Caltrans also contacted the San Bernardino County Farm Bureau, San Bernardino County Agricultural Commissioner, BLM, SCAG, and California Cattle Association concerning matters related to grazing allotments in San Bernardino County. In addition, the Natural Resources Conservation Service (NRCS) and Caltrans evaluated farmland conversion impacts on agricultural land and resources through completion of Form NRCS-CPA-106.

5.3.12 Southern California Edison

During the public circulation period of the draft environmental document for the HDC Project, Southern California Edison (SCE) submitted a written comment letter (dated December 2, 2014) raising some concern regarding the impacts to transmission lines as a result of the HDC construction. Caltrans and Metro staffs arranged a meeting with SCE staff on June 30, 2015, to discuss the proposed project and to provide responses to various comments raised by SCE. Responses to SCE’s comments are documented in the Final EIR/EIS Volume 3 (Comment Letter L-9).

5.4 Public Participation

Metro and Caltrans have implemented a comprehensive outreach program to support the HDC Project that engaged key stakeholders and provided the general public with opportunities for involvement during the project development process. Due to the large and expansive project study area, the public involvement program included traditional and innovative communication strategies and tools to ensure stakeholders along the 63-mile-long corridor were informed and engaged in the project process.

A total of 138 project update meetings, focus groups, webinars, events, and elected official and stakeholder briefings have taken place after the official public scoping meetings held by Caltrans initiated the environmental studies in late 2010. To support these meetings, a project database, including approximately 2,200 records, was compiled, refined, and maintained. A host of collateral materials was also developed and distributed at all meetings, including topical fact sheets and frequently asked questions.

Notification

A good cross section of the residential communities, businesses, and interested agencies was engaged in the study process and remains active participants in the project process moving forward. Notification efforts for public meetings have included a broad array of communication tools and techniques, including:

- Local newspapers and online advertisements
- Bilingual direct mail
- E-mail invitations
- Project partner coordination
- Web site postings and links
- E-newsletters
- E-mails to constituent mailing lists
- Facebook and Twitter postings to share meeting invitations

General Summary of Input

Throughout the development process, stakeholder comments and concerns have been received, answered, and documented in a timely manner. Comments and questions were received primarily via the project helpline, e-mail, interactive map, community meetings, and briefings. Common concerns that were raised and categorized throughout the outreach efforts include:

Interest in:

- Integration of land use and zoning policies throughout the planning process
- Pedestrian and public safety
- Local residential and business benefits; not just mitigation strategies, but also enhancement of the corridor
- Ensuring public input is reflected in the study and decision-making process
- Access to increased transportation networks

- Public-Private Partnerships (PPP) and potential funding mechanisms

Concern about:

- Development of an equitable mitigation program that addresses construction and operational impacts
- Right-of-way (ROW) impacts
- Toll road fees and the impact to local residents
- Potential impacts to local roads and traffic circulation
- Maintaining rural character in rural communities
- Adequate infrastructure for communities seeking growth
- Impacts of light pollution
- Noise impacts and soundwall criteria
- Visual impacts and light pollution to current scenery
- Unsafe street conditions (i.e., lack of pedestrian sidewalks along United States Highway 395 [US 395])

Support for:

- Bike route option – more defined connections from the highway to local destinations (i.e., train stations)
- Continued access to equestrian paths
- Increased transportation infrastructure
- Increased separation of “local” and “regional” traffic

5.4.1 Social Media

Throughout the outreach process, the HDC developed a high level of stakeholder interest in the project, including a significant social media following of approximately 350 Facebook fans and 280 Twitter followers (accessible through http://www.dot.ca.gov/dist07/travel/projects/details.php?id=11 and http://www.metro.net/projects/high-desert-corridor/). Given the large project area, social media was instrumental for the project team to deliver timely information and gather valuable feedback. Caltrans and Metro also maintained project Web sites throughout the study process, providing a true set of public portals for stakeholders to review project information and provide comments. The project Web sites and social media sites provided stakeholders with useful information regarding the HDC’s project background, status, environmental process, alternatives, and variations. Innovative outreach tools were also developed for the program, including the geo-social interactive map, allowing users to navigate the project map dynamically to find useful information and also to post geo-coded comments.

5.4.2 Public Information Meetings/Open Houses

In addition to the legally required scoping and public hearing meetings required as part of CEQA and NEPA, four rounds of public information meetings/open houses were also held during preparation of the environmental documents. For each round, four meetings were held, two in Los Angeles County and two in San Bernardino County, with at least one meeting streamed live via the Internet. The community meetings were spread out geographically to make it convenient for stakeholders to participate along the linear project study area.

The meetings were formatted with an open house session followed by a project presentation and concluding with questions and answers. During the open house session, display boards, including the project's Purpose and Need, project alternatives and variations under consideration, maps, development process, project schedule, contacts, and next steps were placed throughout the room for attendees to view and ask questions from the project team. For those who participated online, a video was played during the open house session to explain the boards. Handouts were available at the meetings, including the project fact sheets and maps. These were distributed in English during the first round and later in Spanish and Korean.

Approximately 1,390 people attended or participated online throughout the four rounds of meetings.

Round 1 (April 11 – April 14, 2011)

The purpose of the first round of project meetings was to introduce partner agencies and provide a project review, an overview on the environmental process, and a summary of findings from the scoping meetings held by Caltrans in September 2010.

More than 330 stakeholders participated in the Round 1 meetings, with 13 written, verbal, or online comments received. Stakeholders attending the community meetings were generally supportive of the HDC Project and encouraged Caltrans and Metro to move forward with the project schedule and initiate construction. Stakeholders discussed the need for employment opportunities and safer transportation routes to facilitate mobility for residents, businesses, and visitors. Meeting attendees expressed their concerns regarding the ROW requirements and future construction impacts. Other issues raised included hydrology, traffic, earthquake faults in the area, project schedule, and plans for tolling on the project.

At the Town of Apple Valley meeting, stakeholders expressed opposition to Variation C, which would result in significant impacts to privately owned property. Stakeholders suggested Caltrans and Metro analyze transportation needs to ensure the HDC Project meets future demands and includes various transportation modes, including HSR service and bike lanes.

Round 2 (January 24 – February 1, 2012)

The purpose of the Round 2 project meetings was to review the refined project alternatives and variations, specifically the removal of Variation C in Apple Valley. The meetings also updated stakeholders on the status of the ongoing project development process and next steps. The new HDC Geo-Social Interactive Map was introduced as a demonstration outreach tool that allowed stakeholders the opportunity to easily view the alternatives; zoom in and out of areas of interest; learn valuable information on alignments, variations, cities, and counties; and leave geo-coded comments.

A total of 340 stakeholders participated in the Round 2 meetings and provided valuable input on the project, with nearly 59 written, verbal, or online comments submitted. Similar to Round 1, stakeholders were generally supportive of the project and appreciated the removal of Variation C from further consideration. Stakeholders also voiced their appreciation for the project update meetings and were interested in learning how soon the project could move into the final phases, including construction.

Stakeholders were generally concerned about the potential impacts the HDC would have on north-south freeways and arterials, especially if the HDC is tolled. There was a perception that truckers may bypass the HDC to avoid tolling fees and would use local streets. Tolling questions and concerns included boundaries and the potential for a resident discount. Other comments/concerns included local economic impacts and cumulative impacts, including air quality, noise, hydrology, glare, and visual impacts related to potential green energy technologies, especially near educational and correctional facilities.

Round 3 (December 5 – December 11, 2012)

The purpose of the Round 3 project update meetings was to provide a project update and introduce new project components, including the incorporation of a rail and bike component, as well as green energy technology. In addition, stakeholders were informed of the new project schedule, modified purpose and need statement, and next steps.

A total of 334 stakeholders participated and provided valuable input on the project, with nearly 60 written, verbal, or online comments received. Stakeholders attending the community meetings were generally supportive of the HDC Project and encouraged bike route options and valuable connections to local destinations, including train stations. General concerns included potential impacts on local streets from motorists avoiding toll road portions of the HDC, visual impacts and light pollution to current scenery, and current unsafe street conditions (i.e., lack of pedestrian sidewalks along US 395).

Round 4 (July 15 – July 22, 2013)

The purpose of the Round 4 public meetings was to discuss the potential rail connections to the Palmdale Transportation Center in Palmdale and XpressWest connection in Victorville. The project team also discussed the multipurpose features of the HDC currently under study, including the rail, bikeway, and green energy technology components. Stakeholders were also informed of the modified project schedule, modified purpose and need statement, and next steps.

A total of 390 stakeholders participated and provided valuable input on the project, with nearly 59 written, verbal, or online comments received. Stakeholders attending the community meetings were generally supportive of the HDC Project and encouraged Caltrans and Metro to move forward with the project schedule and study. Specific comments of note included the importance of integration of land use and zoning policies throughout the planning process, pedestrian and public safety, and local residential and business benefits. Comments regarding PPPs and potential funding mechanisms were also presented. Concerns generally focused on identifying an equitable mitigation program that addresses a variety of potential project impacts, including construction, operational, ROW, traffic circulation, visual, and noise. Stakeholders were interested not only in mitigation strategies, but also enhancements and amenities for the project corridor and access to other transportation networks.

5.4.3 Focus Groups

Four HDC focus groups were held to ensure the community had the opportunity to understand the physical project variations. The first focus group was held on February 17, 2012, and was specifically hosted for the Victorville neighborhood that resides and has businesses near Variation E. During the meeting, the project team provided a project overview and the need to study an additional variation to avoid potential impacts to existing land uses such as the SCLA and the federal prison.

In addition, three variation workshops were held July 24, 26, and 30, 2014, to explore and discuss the issues related to each physical variation area. These focus group meetings were organized by:

1. Variation A and the HSR connection to the Palmdale Transportation Center
2. Variations D and B
3. Variation E and HSR connection to the XpressWest station

During these focus group sessions, stakeholders were presented with aerial maps and cross sections that helped demonstrate some of the physical alignments and configurations that are being evaluated in the environmental document and encourage a dialogue to improve project understanding and specifically how the project relates to their respective residence or business. The focus groups were held in the vicinity of each variation to help maximize participation.

5.4.4 Webinars

Two HDC webinars were conducted at key project milestones as a cost-effective way to update interested stakeholders on specific components of the project. The first webinar was held November 4, 2011. The purpose of the webinar was to discuss the status of the HDC study, as well as describe the functional differences of the alternatives and the physical variations. Online viewers had the opportunity to post questions for Caltrans and Metro staff to respond live. The broadcast attracted more than 166 live views.

The second HDC webinar was held February 26, 2014. A total of 120 participants joined the live webinar, which provided information regarding the HDC Rail Alternatives Analysis and offered the community an opportunity to learn more about the connections to the Palmdale Transportation Center in Palmdale and the XpressWest station in Victorville. During the webinar, participants shared comments and asked questions.

5.4.5 Local Government and Elected Officials’ Briefings

A total of 33 local government and elected officials’ briefings have been conducted throughout development of the Draft EIR/EIS. Briefings for elected officials were typically held prior to each round of Project Update Meetings/Open Houses to ensure the elected offices were aware of the latest project information and had an opportunity to view project materials that were to be subsequently presented to their constituents. Separate elected officials' briefings were held in Los Angeles and San Bernardino counties to encourage participation and focus the discussion.

In a separate effort, Caltrans and Metro conducted city/county staff working meetings and City Council briefings to ensure the local jurisdictions were properly informed of the project status and technical issues, as well as the anticipated schedule of the Draft EIR/EIS release and scheduled outreach activities.

5.4.6 Agency Partner Meetings

Seven agency project partner meetings were conducted throughout development of the Draft EIR/EIS. The partner meeting participants were limited to the corridor cities, counties, and agencies including:

- HDC Joint Powers Authority
- SANBAG
- SCAG
- Metro
- Caltrans

Project partner meetings were held on a quarterly basis to discuss opportunities, constraints, and project updates, including findings of the various analyses. These meetings provided high-level project collaboration and cooperation among the project partners.

5.4.7 Stakeholder and Interest Group Briefings

Throughout the project study process, Metro and Caltrans met with 40 stakeholders and interest groups to ensure the local community was well informed about the HDC Project and to allow one-on-one dialogue. Stakeholders and interest groups included town councils, service clubs, school districts, and other interested parties requesting briefings.

5.4.8 Events

To increase project awareness and maximize exposure to a wide stakeholder audience, Caltrans and Metro participated in 16 local events. These public events were extremely effective in helping the project reach audiences that otherwise would not be captured through traditional methods of outreach. The HDC Project team has made presentations at business events such as Mobility 21 and The High Desert Opportunity Conference and participated in festivals targeting the general public, including the Los Angeles County Air Show and the Poppy Seed Festival.

5.4.9 Media Briefings

To promote project transparency and encourage media coverage, three media briefings were hosted at key project milestones. This helped clarify project issues with reporters and provided useful project education that resulted in a higher level of accuracy in reporting on the HDC. Because of the large study area, media coverage has been viewed as an important communication tool by Caltrans and Metro.

5.4.10 Public Review of the Draft Environmental Document

A full-color postcard and flyer for the draft environmental document and notice of public hearings were sent to 1,796 stakeholders in the project database and 20,400 parcel owners and occupants located within 0.25 mile of the corridor. A total of 500 postcards/flyers were distributed by direct mail and placed on 11 city and chamber public counters for distribution.

Public notices announcing the availability of the draft environmental document included the date, time, and locations of the public hearings. The public hearings were advertised in announcements that appeared in the *Antelope Valley Press* on October 1, October 2, October 28, and October 29, 2014; *Victorville Daily Press* on October 1 and October 28, 2014; Adelanto Bulletin on October 2 and October 31, 2014; Apple Valley News on October 3 and October 31, 2014; and *La Opinion* on October 28 and 29, 2014. Online electronic advertisements were also placed on the Web sites for *Antelope Valley Press* and *Victorville Daily Press*, and on Facebook. Each of the ads linked directly to Metro's project Web site where detailed meeting information was provided.

The Draft EIR/EIS was circulated for a 60-day review by agencies and members of the public between September 30 and December 2, 2014. The document was made available for public viewing at the following locations:

- California Department of Transportation (Caltrans) District 7 Office, 100 South Main Street, Los Angeles, CA 90012
- California Department of Transportation (Caltrans) District 8 Office, 464 West 4th Street, San Bernardino CA 92401
- Metro-Dorothy Payton Gray Transportation Library (15th Floor), One Gateway Plaza, Los Angeles, CA 90012
- County of Los Angeles Public Library-Lake Los Angeles Library 16921 East Avenue O, #A, Palmdale, CA 93591
- County of Los Angeles Public Library-Littlerock Library 35119 80th Street E, Littlerock, CA 93543
- County of Los Angeles Public Library-Quartz Hill Library 42018 50th Street W, Quartz Hill, CA 93536
- County of Los Angeles Public Library-Lancaster Library 601 W. Lancaster Boulevard, Lancaster, CA 93534
- San Bernardino County Library-Apple Valley Newton T. Bass Branch 14901 Dale Evans Parkway, Apple Valley, CA 92307
- San Bernardino County Library-Adelanto Branch 11497 Bartlett Avenue, Adelanto, CA 92301
- San Bernardino County Law Library, 15455 Seneca Road, Victorville, CA 92392

- City of Palmdale Public Library,
  700 East Palmdale Boulevard, Palmdale, CA 93550
- City of Victorville Public Library, 15011 Circle Drive, Victorville, CA 92395
- Antelope Valley College Library, 3041 West Avenue K, Lancaster, CA 93536
- Victor Valley College Library, 18422 Bear Valley Road, Victorville, CA 92395

The Draft EIR/EIS was available on the Metro and Caltrans project Web sites at http://www.metro.net/hdc and http://www.dot.ca.gov/dist07/HDC. Flash drives of the Draft EIS/EIR were also available upon request.

A copy of this Final EIR/EIS will be made available at these same locations and on the Metro and Caltrans project Web sites.

5.4.11 Public Hearings

Metro and Caltrans hosted four public hearings for the project in November 2014. Two hearings were held in each county, spread out geographically to make it convenient for stakeholders throughout the project study area to attend. Public hearing No. 1 was held at Lake Los Angeles Elementary School, 16310 East Avenue Q, Palmdale, California, on November 5, 2014, from 7:00 to 9:30 p.m. Public hearing No. 2 was held at Endeavour School of Exploration, 12403 Ridgecrest Road, Victorville, California, on November 6, 2014, from 6:00 to 8:30 p.m. Public hearing No. 3 was held at Larry Chimbole Cultural Center, 38350 Sierra Highway, Palmdale, California, on November 12, 2014, from 6:00 to 8:30 p.m. Public hearing No. 4 was held at Apple Valley Conference Center, 14975 Dale Evans Parkway, Apple Valley, California, on November 13, 2014, from 6:00 to 8:30 p.m.

The public hearing format included an open house with project display boards, followed by a presentation made by Metro and Caltrans, and a formal public comment period. During the 30-minute open house period, participants were asked to sign in and received an information packet. Attendees were encouraged to review approximately 40 display boards that presented information from the Draft EIR/EIS. Project team members were stationed around the room to answer questions.

During the presentation and public comment period, Ron Kosinski, Caltrans Division of Environmental Planning, served as the hearing officer. He initiated the presentation by providing the public a general description of the purpose of the hearing with Robert Machuca, Metro, and Karl Price, Caltrans, presenting information on the results of the environmental analysis. During the public comment forum, speakers were invited up to the microphone to provide their comments on the Draft EIR/EIS, which were transcribed by a court reporter. Spanish interpreters were available.

The public hearings held on November 6 and November 12, 2014, were streamed live via the Internet using the project’s Ustream channel. Stakeholders had the opportunity to join the meeting remotely at their convenience. Concurrently, the project team used the social media chat features through Ustream, Facebook, and Twitter to communicate with the online audience and encourage participation.

5.4.12 Summary of Comments on Draft Environmental Document

Comments received during the public review period are summarized below.

Type of Comment	Number Received
Written comments from federal agencies	6
Written comments from state agencies	5
Written comments from local agencies and organizations	26
Written comments from businesses	11
Written comments from individuals (representing the general public)	43
Electronic comments from individuals (representing the general public)	72
Oral comments received at the November 5, 2014, public hearing	9
Oral comments received at the November 6, 2014, public hearing	6
Oral comments received at the November 12, 2014, public hearing	8
Oral comments received at the November 13, 2014, public hearing	14

Comments received on the Draft EIR/EIS during the public review period and at the public hearings consist of the following topics:

- Project Design and Alternatives
- Land Use
- Growth
- Farmland/Grazing Land
- Community Impacts
- Utilities/Emergency Services
- Traffic and Transportation/Pedestrian and Bicycle Facilities
- Visual Aesthetics
- Cultural Resources
- Hydrology and Floodplain
- Water Quality and Stormwater Runoff
- Geology/Soils/Seismic/Topography
- Paleontology
- Hazardous Waste or Materials
- Air Quality
- Noise
- Energy
- Biological Environment
- Construction Impacts
- Cumulative Impacts
- Other/General
- Purpose

All public comments were individually reviewed and addressed through a formal response, as documented in Volume 3 of this Final EIR/EIS and/or through revisions made to the environmental document as reflected in this final environmental document.

Chapter 6 List of Preparers

6.1 California Department of Transportation

Ronald Kosinski, Deputy District Director, B.A. Geography, California State University, Long Beach, Masters in Urban Planning, California State Polytechnic University, Pomona; 39 years of environmental planning experience. Contribution: Management, including analysis, document editing, and approval.

Karl Price, Senior Environmental Planner. B.S. Biology, California State Polytechnic University, Pomona; 17 years of environmental planning experience. Contribution: Environmental project management, environmental document preparation, and oversight.

Maria Reynolds Brooks, Associate Right-of-Way Agent, B.A. Journalism with Minor in Public Relations, Ohio State University; 25 years of experience in right-of-way acquisition, relocation, property management, appraisal and excess land sales. Contribution: Assisted in the preparation of the Draft Relocation Impact Report.

Paul Caron, Senior Environmental Planner (Natural Science). B.S. Environmental & Systematic Biology, California State Polytechnic State University, San Luis Obispo; 23 years of experience in biological surveys, biological technical reports, and ecological restoration; 11 of those years as a supervisor of biologists. Contribution: Review of all biological technical reports for this project, as well as planning all necessary survey work and coordination with resource agency personnel.

Angus Chan, Associate Right-of-Way Agent. B.A. Management Science, California State University, Fullerton; M.B.A. Statistics & Operation Research, California State University, Fullerton; 11 years of experience in transportation planning and 2 years of experience in right-of-way. Contribution: Assisted in the preparation of the Draft Relocation Impact Report.

Kelly Ewing-Toledo, Senior Environmental Planner (Architectural History). B.A. History, California State University, Sacramento; M.A. Public History, California State University, Fullerton; 15 years of experience in cultural resources management and environmental planning. Contribution: Review of all cultural resources technical reports, coordination with Office of Historic Preservation, and environmental document preparation.

Kristin Fusello, Associate Environmental Planner. B.A. Geography, California State University, Northridge; 13 years of experience in environmental and cultural surveys and document preparation. Contribution: Cultural resource surveys and environmental document preparation.

Billy Ho, Environmental Planner, B.A. Geography/Environmental Studies, University of California, Los Angeles; Masters of Urban & Regional Planning, University of Michigan; 4 years of experience in geographic information system (GIS) and environmental document preparation. Contribution: GIS mapping and data analysis and environmental document preparation.

Aye Htoon, Transportation Engineer, B.S. Civil Engineering, Rangoon Institute of Technology (Myanmar); 15 years of experience in civil engineering, including construction and design. Contribution: Performed technical noise study and prepared Noise Study Report.

Jeff Johnson, Associate Environmental Planner (Natural Science). M.S. Biology, B.S. Biology, California State University Long Beach. 25 years of experience conducting biological studies, impact analysis, managing National Wildlife Refuge, and habitat restoration. Contribution: Conducted numerous field studies, preparation of Natural Environment Study (NES), oversight and coordination with consultants, and coordination with resource agency personnel.

Andrew Johnstone, Associate Environmental Planner (Natural Science). B.S. Biology, San Diego State University. 6 years of experience conducting habitat restoration and biological studies. Contribution: conducted numerous field surveys, preparation of the Natural Environment Study Report, and coordination with resource agency personnel.

Alex Kirkish, Associate Environmental Planner (Archaeologist). B.A. University of California, Santa Barbara; M.A. University of California, Riverside; Ph.D. University of Leicester; 35 years of experience in cultural resource management. Contribution: Oversight of cultural and paleontological surveys and report preparation, prepared Supplemental Archaeological Survey Report (ASR).

Thoa Le, Associate Environmental Planner. B.S. Biology, Hanoi University of Education; M.S. Environmental Sciences, University of East Anglia, UK; 13 years of experience in environmental research, environmental document preparation, and reviews. Contribution: Section 4(f) analysis, documentation, and coordination.

Munshi Mohsin, Transportation Engineer (Range D). B.S. Civil Engineering, Bangladesh University of Engineering & Technology; M.S. Civil Engineering, New Mexico State University at Las Cruces; 15 years of experience in environmental investigation and remediation studies for hazardous waste sites. Contribution: Initial Site Assessment (ISA).

Samer Momani, Associate Environmental Planner. B.S. Biology, University of Jordan; M.S. Environmental Studies, California State University, Fullerton; 10 years of experience in environmental studies and document preparation.

Contribution: Farmland Impact Assessment and environmental document preparation.

Ali Nili, Associate Engineering Geologist. M.S. Geology, University of Texas, El Paso; M.A. Geology, University of California, Los Angeles; 25 years of experience in conducting and overseeing hazardous material site investigation and remediation. Contribution: Preparation of Supplementary Site Assessment and Supplementary ISA.

Mary Ngo, Associate Environmental Planner (Natural Sciences). M.A. Geography, B.A. Geography and Environmental Science & Policy, California State University, Long Beach. 12 years of experience in environmental research and impact analysis. Contribution: conducted numerous field studies and data analysis, and assisted in the preparation of the Natural Environment Study (NES) report.

Keith Sellers, Landscape Associate, RLA #5288. Bachelors of Landscape Architecture, University of Nevada, Las Vegas; 13 years of experience in Visual Impact Assessments. Contribution: Visual Impact Assessment and environmental document preparation.

Daniel Tran, Associate Environmental Planner. B.A. Environmental Analysis and Design, University of California, Irvine; Masters in Public Administration, California State University, Long Beach; 7 years of experience in environmental analysis and environmental document preparation. Contribution: Community Impact Assessment (CIA) and environmental document preparation.

Robert John Wang, Associate Environmental Planner/GIS Coordinator. B.A. Geography/Environmental Studies, University of California at Los Angeles; GIS Certificate, California State University, Los Angeles; M.A. Geography/ Urban Planning, California State University, Los Angeles; 14 years of experience in environmental planning, document preparation, global positioning system (GPS) resource data acquisition, and GIS map preparation. Contribution: Environmental document preparation and GIS map and exhibit preparation.

Andrew Yoon, Senior Transportation Engineer. B.S. Civil and Environmental Engineering, University of California, Los Angeles; 17 years of experience in civil and environmental engineering for infrastructure and development projects. Contribution: Air quality impacts assessment.

Chaffee Yui Yiu, Environmental Planning Intern. B.S. Civil Engineering, California State University, Long Beach; M.S. Civil Engineering, California State University, Long Beach; 6 years of experience in environmental planning and engineering, GPS resource data acquisition, and GIS map preparation. Contribution: GIS map and exhibit preparation.

Sharon He Yiu, Volunteer. B.A. Geography and GIS, University of California, Los Angeles; 4 years of experience in environmental planning and engineering, GPS resource data acquisition, and GIS map preparation. Contribution: Preparation of GIS maps and exhibits.

6.2 Metropolitan Transportation Authority

Moises Hernandez, Highway Program Trainee. B.A. Urban Studies, University of California, Berkeley; Growing experience in environmental document preparation and support for transportation projects. Contribution: Environmental document review support, schedule planning, and coordination.

Will Lamborn, Transportation Planner. B.A. Political Science, Davidson College; Masters in Urban and Regional Planning, University of Buenos Aires; 3 years of experience in transportation planning. Contribution: Project Management.

Roberto Machuca, Transportation Planning Manager. B.A. Political Science/Public Administration, California State University, Los Angeles; Masters in Urban and Regional Planning, California State Polytechnic University, Pomona; 9 years of experience in transportation planning and management. Contribution: Project management.

6.3 Consultant Staff

Parsons

Rosemarie Ampil, Sustainability Manager, CEM, LEED AP. Biological Sciences, Cal-State University, Northridge; 15 years of facilities, regulatory compliance, and energy experience. Contribution: Author of the Green Energy Feasibility Report.

Jennifer Anderson, Environmental Planner. B.A. Environmental Studies, University of Southern California; 4 years of environmental planning experience. Contribution: Author of the natural communities, plant species, and threatened and endangered species sections, and co-author of the CIA.

Randy Britt, Director of Sustainability. Illinois State University; 34 years of experience in facility, energy efficiency, and renewable energy project and program management experience. Contribution: Co-author of the Green Energy Feasibility Study Report.

Bruce Campbell, Environmental Project Manager. M.S. Environmental Management, AICP. More than 40 years of experience in project management, environmental studies, impact assessment, and site investigations. Contribution: Electromagnetic Interference Technical Study and Environmental Impact Report (EIR)/Environmental Impact Statement (EIS) section.

Dan Conaty, Principal Environmental Planner. M.A. Geography, San Diego State University; 33 years of environmental planning experience. Contribution: Author of purpose and need, construction chapter; consistency reviewer of growth, farmland, energy, and miscellaneous sections; and preparer of Bike Path Technical Study.

Eric Coumou, GIS Analyst. M.A. Geography, San Jose State University; 25 years of GIS Analysis experience. Contribution: Cartography and map analysis.

David J. Finnegan, Transportation Planner. Master of Urban and Regional Planning, University of Iowa; 27 years of transportation and transit planning experience. Contribution: Co-author of traffic section.

Elvira V. Gaddi, PE, STP; Principal Project Manager. M.S. Chemical Engineering, University of Idaho; 30 years of environmental engineering and planning experience. Contribution: Author of executive summary, consistency reviewer for land use, community impacts, utilities/emergency services, geology/soils/seismic/topography, paleontology, and hazardous waste or materials sections.

Areg Gharabegian, Noise and Vibration Engineer. M.S. Energy, Resources, and Environment, George Washington University and B.S. in Mechanical Engineering; 35 years of experience in analyzing noise impacts and recommending mitigation measures. Contribution: Technical oversight and quality control of the Noise Study Report, as well as noise and vibration section of the EIR/EIS.

Christopher Hinds, Principal Environmental Planner. Bachelors of Soil Science, California Polytechnic University, San Luis Obispo; 5 years of environmental planning experience. Contribution: Water quality and quality control reviewer.

Greg King, Principal Environmental Planner. M.A. Public Historical Studies, University of California, Santa Barbara; 30 years of environmental planning experience. Contribution: Cultural resources chapter consistency reviewer; provided peer review of the Historic Property Survey Report (HPSR), Historic Resources Evaluation Report (HRER), and Finding of Adverse Effect Report.

Anne Kochaon, Qualified Environmental Professional, Environmental Senior Project Manager. M.S. Environmental Engineering, Asian Institute of Technology, Bangkok, Thailand; 29 years of experience in environmental planning and impact assessment. Contribution: Technical Studies and EIR/EIS task management, Peer review of Energy Technical Study, Green Energy Technical Study, Draft EIR/EIS preparation manager, and overall technical edit of EIR/EIS.

Liz Koos, Senior Technical Editor. 27 years of editing experience. Contribution: Draft EIR/EIS technical editor.

Thanh Luc, Technical Staff Manager, Noise and Vibration. B.S. Mechanical Engineering, California State Polytechnic University, Pomona; 24 years of experience in noise and vibration analysis. Contribution: Noise and vibration section.

Nathan Oum, Design Engineer. B.S. Civil Engineering, California State University Long Beach; 13 years of design experience. Contribution: Track alignment design.

Gary Petersen, Principal Project Manager. Master of Planning, University of Southern California; 38 years of environmental planning experience. Contribution: Peer review and quality assurance/quality control of the Bike Path Technical Study, Energy Technical Study, Green Energy Technical Study, and Draft EIR/EIS.

Leslie Provenzano, Environmental Planner. Master of Planning, University of Southern California; 7 years of environmental planning experience. Contribution: Author of the cumulative impacts section, visual/aesthetics consistency reviewer, and overall Draft EIR/EIS preparation.

Rabindra “Ravi” Puttagunta, Principal Transportation Engineer. M Sc. (Transportation), University of Saskatchewan, Canada; more than 20 years of transportation/traffic experience. Contribution: Traffic operations/analysis/ circulation.

Sharon Queiro, Senior Graphic Designer. 18 years of graphic design experience. Contribution: Preparation of CDs and report printing coordination.

Andrea Reeves Engelman, Senior Environmental Planner. B.S. Arizona State University; 15 years of environmental planning experience. Contribution: Author of the biological environment sections from NES, preparation of Volume 3 – Response to Comments on the Draft EIS/EIR..

Julio Rodriguez, Associate Planner. Master of Urban and Regional Planning, California State Polytechnic University, Pomona; 2 years of experience in environmental planning. Contribution: Author of the energy section, irreversible commitments section, relationship between local short-term uses of the human environment section, and overall GIS technical support.

Gilberto Ruiz, Senior Project Manager. M.A. Urban and Regional Planning, University of California, Los Angeles; 22 years of experience in environmental planning and impact assessment. Contribution: Quality assurance/quality control for the Palmdale Transportation Center Station analysis.

Kami Sangha, Senior Proposal Coordinator. 29 years of word processing experience. Contribution: Document formatting/layout for all submittal stages.

Robert Scales, Senior Program Director, Transportation Planning and Traffic Engineering. Master of Engineering (Transportation), University of South Carolina. 43 years of experience in transportation/traffic engineering. Contribution: Traffic Study technical report lead and principal author.

Angela Schnapp, Principal Planner. M.S. University of Illinois at Urbana-Champaign; 14 years of experience in environmental planning. Contribution: Author of air quality and climate change sections.

Veronica Seyde, Water Quality Manager. Master of Environmental Studies, California State University Fullerton; more than 25 years of experience in water quality sciences, with more than 10 years of experience providing environmental documentation for water resource sections and analyzing the implications of stormwater and dry weather urban runoff. Contribution: Primary author of Water Quality Assessment Report; consistency reviewer of hydrology and floodplain and water quality and storm water runoff; and quality control of the Geomorphology Technical Report and the Hydrology/ Hydraulics Technical Report.

Sowmya Venkatasubramanian, Engineer I. Master of Professional Studies – Environmental Resources Engineering, State University of New York – College of Environmental Science and Forestry; 6 years of experience in environmental engineering. Contribution: Co-author/contributor for the Green Energy Feasibility Study Report.

Terry A. Hayes Associates, Inc. (TAHA)

Sam Silverman, Senior Associate. M.S. Environmental Health, University of California Los Angeles; 13 years of experience in planning. Contribution: Task manager and technical editor for Energy Technical Report.

Mike Sullivan, Environmental Planner. B.S. Environmental Science, University of California Riverside; 7 years of experience in planning. Contribution: Author of the Energy Technical Report.

Cogstone, Inc.

Pamela Daly, Architectural Historian. M.S. Historic Preservation; University of Vermont; 16 years of experience. Contribution: Secondary author of Finding of Effect.

Sherri Gust, Program Manager. M.S. Anatomy, University of Southern California; 34 years of experience. Contribution: Project Manager and secondary author of Extended Phase I Report.

Dustin Keeler, Field Director. Ph.D. Anthropology, State University of New York at Buffalo; 5 years of experience. Contribution: Secondary author of Extended Phase I Report.

Nancy Sikes, Principal Archaeologist. Ph.D. Anthropology, University of Illinois, Urbana-Champaign; 20 years of experience. Contribution: Primary author of Extended Phase I Report and Finding of Effect.

Molly Valasik, GIS Manager. M.A. Anthropology, Kent State University; 6 years of experience. Contribution: Secondary author of Extended Phase I Report.

ECORP Consulting

Alfredo Aguirre, AICP, CEQA Specialist/Biologist/GIS Specialist. B.S. Urban and Regional Planning with Minor in Geographic Information Systems, California State Polytechnic University, Pomona. Co-author and GIS specialist for biological and jurisdictional waters technical reports and environmental document sections.

Margaret Bornyasz, Senior Biologist/Wetlands Specialist. M.S. Soil and Water Science, University of California, Riverside; 16 years of experience in environmental consulting. Contribution: Co-lead for jurisdictional delineation and author of biological technical reports.

Josh Corona-Bennett, Senior Restoration Ecologist. B.S. Biology, San Diego State University, California; 19 years of experience in environmental consulting. Contribution: Lead botanist and author of biological technical reports.

Marc Guidry, GIS Specialist. M.S. Geographic Information Systems, University of Redlands, California. Seven years of environmental consulting experience. GIS specialist for biological and jurisdictional waters technical reports.

Brad Haley, Senior Biologist. B.A. Environmental Studies, University of Redlands, California; 10 years of experience in environmental consulting. Contribution: Wildlife biologist and author of biological technical reports.

Ben Lardiere, Restoration Ecologist. B.S. Environmental Science (Systems Ecology), Boston University, Massachusetts; 14 years of experience in environmental consulting. Contribution: Lead botanist and restoration specialist.

Anthony Mann, Senior Biologist. B.A. Applied Geography with minors in Biology, Environmental Studies, and Geology, California State University, Stanislaus; 20 years of experience in biological research and consulting. Contribution: Task lead for wildlife movement studies and author of biological technical reports.

Kerry Meyers, Botanist. B.S. Biology, California State University, San Bernardino; 10 years of experience in botany and biology. Contribution: Lead botanist.

Donald R. Mitchell, Principal Biologist. M.S. Zoology, Northwestern State University of Louisiana, Natchitoches; 26 years of experience in environmental consulting. Contribution: Manager for biological studies, author and quality assurance/quality control lead for biological technical reports.

Benjamin Smith, Wildlife Biologist. M.S. Environmental Studies, California State University, Fullerton; 8 years of experience in environmental consulting. Contribution: Avian studies task lead and author of biological technical reports.

Cara Snellen, Biologist. M.S. Biology, California State University Long Beach; 6 years of experience in environmental consulting. Contribution: Lead botanist and author of biological technical reports.

Anne Surdzial, AICP, CEQA Specialist. B.S. Environmental Science, University of California, Riverside. 26 years of environmental consulting experience. Co-author and QA/QC specialist for environmental document biology and jurisdictional waters sections.

Jeffrey Swager, GIS Manager. M.A. Sc. Environmental Management with specialization in GIS, Lincoln University, Christchruch, New Zealand. 12 years of environmental consulting experience. GIS specialist and GIS QA/QC lead for biological and jurisdictional waters technical reports.

Scott Taylor, Senior Biologist/Wetlands Specialist. B.A. Point Loma Nazarene University, San Diego, California; 24 years of experience in environmental consulting. Contribution: Co-lead for jurisdictional delineation and author of biological technical reports.

Kristen (Mobraaten) Wasz, Senior Biologist. B.A. Environmental Studies, University of Redlands, California; 10 years of experience in environmental consulting. Contribution: Wildlife biologist and author of biological technical reports.

Phillip Wasz, Wildlife Biologist. B.S. Wildlife Biology, Colorado State University, Fort Collins; 6 years of experience in biological survey. Contribution: Wildlife biologist and author of biological technical reports.

Melissa Whittemore, CEQA Specialist/Biologist. B.S. Biology with emphasis in Ecology, San Diego State University, California. 14 Years of environmental consulting experience. Biologist and CEQA specialist for biological technical reports and environmental document sections.

Parsons Brinkerhoff

Maisoon Afaneh, Lead Environmental Planner. Masters of Regional and Community Planning, Kansas State University; 18 years of experience in transportation and environmental planning. Contribution: Prepared sections and conducted overall review of the CIA.

Allan A. Hodges, FAICP, Senior Planning Manager, Senior Professional Associate. B.S. Community Development, Southern Illinois University; Master of Urban Planning, Michigan State University; 48 years of experience in transportation and environmental planning. Contribution: Prepared Growth Impact Study and the growth chapter of the CIA.

Stephanie S. Oslick, AICP, Environmental Manager. B.S. Biological Sciences, University of Southern California; M.S. Environmental Studies, California State University, Fullerton; 18 years of experience in environmental planning. Contribution: Managed preparation and conducted quality assurance/quality control review of sections of the CIA prepared by Parsons Brinkerhoff; conducted overall review of the entire CIA.

Jessica C. Wilkinson, AICP, Senior Planner. A.S. Architectural Technology, Mount San Antonio College, Walnut; B.A. Political Science/Public Administration, California State Polytechnic University, Pomona; Master of Urban and Regional Planning, California State Polytechnic University, Pomona; 12 years of experience in municipal and environmental planning. Contribution: Contributed to sections of the CIA.

Galvin Preservation Associates, Inc.

Andrea Galvin, Architectural Historian. B.A. University of California, Davis; M.A. University of Pennsylvania. Contribution: Architectural Historian Manager and preparation of HRER.

ICF Jones and Stokes

James A. Alen, Professional Geologist (#8335). 20 years of experience in geological analysis. Contribution: Preparation of the Paleontological Report.

Karolina Chmiel, Staff Archeologist. M.A. Northern Arizona University; 5 years of experience in California archaeology. Contribution: Preparation of the ASR.

Mark Robinson, Senior Archaeologist consultant. M.S. University of Oregon; 21 years of experience in southern California archaeology. Contribution. Preparation of the HPSR.

Chapter 7 Distribution List

Notices of Availability of this Environmental Impact Report/Environmental Impact Statement (EIR/EIS) have been sent to all property owners within 300 feet of the build alternatives (including the Variations). In addition, notices have been sent to interested parties that have attended public meetings on the project or requested to be added to a notification list for the project.

Copies of the document have been provided on disks (DVDs) to the following agencies, elected officials, and organizations:

Federal Agencies

Federal Emergency Management Agency
Environment and Historic Preservation, Region IX
Alessandro Amaglio
1111 Broadway, Suite 1200
Oakland, CA 94607-4052

Federal Transit Administration
Leslie T. Rogers, Regional Administrator for Region 9
201 Mission Street, Suite 1650
San Francisco, CA 94105-1839

Federal Aviation Administration
Regional Administrator
William C. Withycombe
P.O. Box 92007
Los Angeles, CA 90009-2007

U.S. Department of Agriculture
Natural Resources Conservation Service
Bruce J. Newton, Director
44811 N. Date Avenue
Lancaster, CA 93534-3136

Federal Emergency Management Agency
Region IX
Media and Public Contact
John Hamill
1111 Broadway, Suite 1200
Oakland, CA 94607-4052

Office of Environmental Policy and Compliance
U.S. Department of the Interior
Patricia Port, Regional Env. Officer
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Jackson Center One
333 Bush Street, Suite 515
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Advisory Council on Historic Preservation
Carol Legard
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1100 Pennsylvania Avenue NW
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Washington, D.C. 20004

U.S. Federal Aviation Administration, Western Pacific Region
Mr. Ruben Cabalbag
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Federal Bureau of Prisons
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Federal Bureau of Prisons
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US EPA, 75 Hawthorne St (ENF-4-2)
San Francisco, CA 94105

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Ridgecrest Field Office
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Bureau of Land Management
Roxie Trost
Field Manager
Barstow Field Office
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United States Army Corps of Engineers
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U.S. Fish and Wildlife Service
Jonathan Snyder
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6010 Hidden Valley Road, Suite 101
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Ventura Fish and Wildlife Office
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Ventura, CA 93022

U.S. Department of Housing and Urban Development
Los Angeles Field Office
William Vasquez
CPD Field Office Director
611 West 6th Street, Suite 800
Los Angeles, CA 90017

U.S. Department of Commerce
Environmental Review Section
14th and Constitution NW, Room 6800
Washington, D.C. 20230

National Park Service, U.S. Dept. of the Interior, Pacific West Region
Christine Lehnertz, Regional Director
1111 Jackson Street, Suite 700
Oakland, CA 94607

United States Department of the Interior
Regional Environmental Officer
Oakland Region
Patricia Port
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San Francisco, CA 94104

United States Department of the Interior
Natural Resources Management
Willie R. Taylor
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U.S. Department of Homeland Security Federal Emergency Management Agency
Gregor Blackburn, CFM
Branch Chief
Floodplain Management and Insurance Branch
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U.S. Department of Energy
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Washington, D.C. 20585

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Natural Resources Conservation Office
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Redlands Service Center
25864 Business Center Drive, Suite K
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Natural Resources Conservation Office
Jesse "Rick" Aguayo
Victorville Service Center
14393 Park Avenue, Suite 200
Victorville, CA 92392-3302

Federal Railroad Administration
David Valenstein
Chief Environment and Systems Planning (RPD-13)
Office of Railroad Policy and Development
1200 New Jersey Avenue
Washington, D.C. 20590

State Agencies

State of California Department of Parks and Recreation
Cristelle Taillon
Office of Grants and Local Services
P.O. Box 942896
Sacramento, CA 94296

California High-Speed Rail Authority
Southern California Regional Office
Michele Boehm, Regional Director
700 N Alameda, Room 3-532
Los Angeles, CA 90012

California Transportation Commission
Laura Pennebaker
Senior Transportation Planner
1120 N Street, Room 2221 (MS-52)
Sacramento, CA 95814

California Public Utilities Commission
Rosa Munoz, PE
Utilities Engineer
Public Utilities Commission
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California Department of Fish and Wildlife
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California Regional Water Quality Control Board Region 6
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Lahontan Region
Victorville Branch Office
14440 Civic Drive, Suite 200
Victorville, CA 92392

California Regional Water Quality Control Board Region 4
Mr. Ken Harris
Attn: Mr. Dana Cole
401 Certification Coordinator
Los Angeles Region
320 West 4th Street, Suite 200
Los Angeles, CA 90013

California Highway Patrol
Officer Eric Phipps
14210 Amargosa Road
Victorville, CA 92392

California Department of Fish and Wildlife
Eastern Sierra-Inland Deserts Region 6
Regional Manager
3602 Inland Empire Boulevard
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Ontario, CA 91764

Antelope Valley Air Quality Management District
Eldon Heaston
Executive Director -
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Lancaster, CA 93535-4649

Mojave Desert Air Quality Management District
Eldon Heaston
Executive Director
14306 Park Avenue
Victorville, CA 92392

California Air Resources Board
1001 "I" Street
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California Energy Commission
Media and Public Communications Office
1516 Ninth Street, MS-29
Sacramento, CA 95814-5512

California Department of Conservation
801 K Street, MS-24-01
Sacramento, CA 95814

Caltrans
Division of Rail
1120 N Street, MS 74
Sacramento, CA 95814

Native American Heritage Commission
Dave Singleton
Program Analyst
915 Capitol Mall, Room 364
Sacramento, CA 95814

Local/Regional Agencies

City of Adelanto
Rick Gomez
Director of Development Services
11600 Air Expressway
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City of Adelanto
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City of Adelanto
Parks Department
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City of Adelanto
Brianna Wilson
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City of Barstow
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California State Assembly #33
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County of San Bernardino Planning Commission
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County of Los Angeles Board of Supervisors
District 5
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Libraries

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Lake Los Angeles Library
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County of Los Angeles Public Library
Littlerock Library
35119 80th Street E
Littlerock, CA 93543

County of Los Angeles Public Library
Quartz Hill Library
42018 50th Street W
Quartz Hill, CA 93536

County of Los Angeles Public Library
Lancaster Library
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San Bernardino County Library
Apple Valley Newton T. Bass Branch
14901 Dale Evans Parkway
Apple Valley, CA 92307

San Bernardino County Library
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11497 Bartlett Avenue
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San Bernardino County Law Library
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700 East Palmdale Boulevard
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