

California High-Speed Rail Authority

Bakersfield to Palmdale ***Project Section***

Draft Project Environmental Impact Report/Environmental Impact Statement

Summary

February 2020



The environmental review, consultation, and other actions required by applicable Federal environmental laws for this project are being or have been carried out by the State of California pursuant to 23 U.S.C. 327 and a Memorandum of Understanding dated July 23, 2019, and executed by the Federal Railroad Administration and the State of California.

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Bakersfield to Palmdale Project Section

DRAFT PROJECT ENVIRONMENTAL IMPACT REPORT/ ENVIRONMENTAL IMPACT STATEMENT

SUMMARY

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NEPA: The environmental review, consultation, and other actions required by applicable federal environmental laws for this project are being or have been carried out by the State of California pursuant to 23 U.S.C. 327 and a Memorandum of Understanding dated July 23, 2019, and executed by the Federal Railroad Administration and the State of California. Pursuant to the Memorandum of Understanding, the California High-Speed Rail Authority is the federal lead agency.

CEQA: This document has been prepared pursuant to the California Environmental Quality Act. The California High-Speed Rail Authority is the state lead agency.

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California High-Speed Rail: Bakersfield to Palmdale Section

Draft Environmental Impact Report/Environmental Impact Statement

Pursuant to:
California Environmental Quality Act, P.R.C. 21000 et seq.; State of California CEQA Guidelines,
California Administrative Code, 15000 et seq. and
National Environmental Policy Act (42 U.S.C. 4332 et seq.),
40 C.F.R. Part 1500, 64 Fed. Reg. 28545, 49 U.S.C. 303 and 23 U.S.C. 327

Prepared by the
California High-Speed Rail Authority

Signed by Brian P. Kelly on February 21, 2020

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Abstract: The Bakersfield to Palmdale Project Section Draft EIR/EIS was prepared as a joint document to meet all pertinent requirements of both CEQA and NEPA. Following NEPA Assignment in July 2019, the Authority has assumed the role of Federal lead agency on the project.

This document considers, describes and summarizes the environmental impacts at a project level of analysis of a proposed high-speed rail system for intercity travel between Bakersfield and Palmdale, California. Four primary build alternatives are considered with two design options.

Impact Avoidance and Minimization Features along with mitigation measures are described to guide high speed rail environmental review to avoid or minimize potential impacts.

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Draft EIR/EIS — Bakersfield to Palmdale Section

Document Organization Guide

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SUMMARY

S.1 Introduction and Background

The California High-Speed Rail Authority (Authority), a state governing board formed in 1996, is responsible for planning, designing, constructing, and operating the California High-Speed Rail (HSR) System. Its mandate is to develop an HSR system that coordinates with the state’s existing transportation network, which includes intercity rail and bus lines, regional commuter rail lines, urban rail and bus transit lines, highways, and airports.

High-Speed Rail System

The system that includes the HSR guideways, structures, stations, traction-powered substations, and maintenance facilities

The California HSR System will provide intercity, high-speed service on more than 800 miles of tracks throughout California, connecting the major population centers of Sacramento, the San Francisco Bay Area, the Central Valley, Los Angeles, and San Diego. Figure S-1 shows the overall system. It will use state-of-the-art, electrically powered, high-speed, steel-wheel-on-steel-rail technology, with contemporary safety, signaling, and automated train-control systems, and trains capable of operating up to 220 miles per hour (mph) over a fully grade-separated, dedicated track alignment.

Implementation of the California HSR System is planned in two phases. Phase 1 is approximately 520 miles and would connect San Francisco to Los Angeles and Anaheim through the Central Valley. Phase 2 is approximately 300 miles and would connect the Central Valley (Merced Station) to Sacramento and Los Angeles to the San Diego Valley. The HSR system would meet the requirements of Proposition 1A,¹ including nonstop service between San Francisco and Los Angeles, designed to achieve a travel time of 2 hours and 40 minutes. The Bakersfield to Palmdale Project Section forms a critical link in the Phase 1 HSR system connecting San Francisco and the greater Bay Area to Los Angeles and Anaheim (Figure S-1).

Figure S-2 shows the Bakersfield to Palmdale Project Section, which extends approximately 80 miles between HSR stations in Bakersfield and Palmdale, from the southern San Joaquin Valley and northern Antelope Valley. The project section extends from Kern County in the north to Los Angeles County in the south, with the Bakersfield and Palmdale stations making up this section’s beginning and ending points, or the project termini.

The impact analysis presented in the Draft Environmental Impact Report/Environmental Impact Statement (EIR/EIS) for this project section considers four HSR alignment alternatives for the Bakersfield to Palmdale Project Section (Alternatives 1, 2, 3, and 5,² also known as the “B-P Build Alternatives”), as well as two design options, two station locations, several maintenance facility locations, and the various electrical connections and utility infrastructure needed to support the HSR project. The Draft EIR/EIS considers two design options, the César E. Chávez National Monument Design Option [CCNM Design Option] and the Refined CCNM Design Option, near the Nuestra Señora Reina de La Paz/César E. Chávez National Monument (La Paz) in the community of Keene in Kern County. Chapter 2, Section 2.4, Alternatives Considered during the Alternatives Screening Process, describes alternatives considered but eliminated during the alternative analysis screening process from further analysis in this EIR/EIS.

¹ Proposition 1A, or the Safe, Reliable High-Speed Passenger Train Bond Act for the 21st Century, was approved by California voters in 2008 and allocates funds to the HSR project. It now forms Chapter 20 of the California Streets and Highways Code.

² Chapter 2, Alternatives, and the Supplemental Alternatives Analysis (Authority 2016) describe how and why Alternative 4 was withdrawn from consideration.



Sources: California High-Speed Rail Authority, 2018; Esri/National Geographic, 2017

December 2019

Figure S-1 California High-Speed Rail System Alignments and Stations



Sources: California High-Speed Rail Authority, 2019; Esri/National Geographic, 2017

October 2019

Figure S-2 Bakersfield to Palmdale Project Section Alignment Alternatives

The Preferred Alternative is selected based on the information presented in this *Bakersfield to Palmdale Project Section Draft EIR/EIS*. The Preferred Alternative is also chosen based on comments provided by local communities and stakeholders. These comments were gathered in meetings held during project scoping in 2009 and during ongoing public outreach and agency consultation the Authority conducted since that time. In 2018, Authority staff recommended that Alternative 2 with the CCNM Design Option be identified as the Preferred Alternative in the EIR/EIS. The Authority's Board of Directors adopted Board Resolution #HSRA 18-18, concurring on this recommendation at its October 2018 meeting. Subsequently, the Authority developed the Refined CCNM Design Option, which is also analyzed in this EIR/EIS. Because the Refined CCNM Design Option avoids adverse visual effects at La Paz, Alternative 2 with the Refined CCNM Design Option is the Authority's Preferred Alternative for the Bakersfield to Palmdale Project Section. This refinement to the Authority's Preferred Alternative is consistent with Authority Board Resolution #HSRA 18-18, wherein the Authority Board directed Authority staff to "continue to consult and collaborate with the Cesar Chavez Foundation, and other consulting parties, regarding the CCNM Design Option." Compared to Alternatives 1, 3, and 5, Alternative 2 with the Refined CCNM Design Option would result in fewer impacts on historic resources, downtown areas, schools, motels that serve as affordable housing, minority and low-income communities, agricultural resources, and mining activities (Section S.5.2.6 provides detailed information about the Refined CCNM Design Option, and Section S.8.3 provides more explanation of the Preferred Alternative). Alternative 2 with the Refined CCNM Design Option would be built at a higher elevation when it crosses the Pacific Crest Trail in the Antelope Valley. The Preferred Alternative serves as the proposed project for CEQA.

Preferred Alternative

This term refers to the alternative identified as preferred by the lead agencies. For the Bakersfield to Palmdale Project Section, Alternative 2 with the Refined CCNM Design Option is the Preferred Alternative.

In 2014, the Authority and Federal Railroad Administration (FRA) issued the *Fresno to Bakersfield Project Section Final EIR/EIS*, which located the Bakersfield Station at the corner of Truxtun Avenue and Union Avenue/SR 204. Since the approved 2014 federal Record of Decision (ROD)³ was issued, the Authority and the City of Bakersfield agreed to consider an alternate station location at F Street at the intersection of F Street and SR 204 in the City of Bakersfield. This Locally Generated Alternative, or LGA, was evaluated through a Draft Supplemental EIR/EIS (Authority and FRA 2017), a Final Supplemental EIR (Authority 2018), and a Final Supplemental EIS (Authority 2019) for the Fresno to Bakersfield Project Section. The *Fresno to Bakersfield Section Draft Supplemental EIR/EIS* for the LGA was released for a 60-day public comment period beginning November 9, 2017, and ending January 16, 2018, and the HSR Board of Directors certified the *Fresno to Bakersfield Section Final Supplemental EIR* on October 16, 2018. The Authority approved the ROD on October 31, 2019. When the Authority Board certified the Final Supplemental EIR in October 2018, the Board also approved the LGA through the 34th Street and L Street intersection, including the F Street Station. In taking this action, the Authority Board reserved making a decision on the alignment from south of the F Street Station to Oswell Street to its future action on the Bakersfield to Palmdale Project Section.

The Bakersfield F Street Station analysis for the Fresno to Bakersfield Project Section has been incorporated by reference into this EIR/EIS, with summaries provided based on complete analyses prepared for the *Fresno to Bakersfield Section Final Supplemental EIR* (Authority 2018) and Final Supplemental EIS (Authority 2019). The impact analyses for the alignment from the F Street Station to Oswell Street are also incorporated by reference, with summaries of the analysis for this area included in applicable sections and chapters of this EIR/EIS. Therefore, this EIR/EIS incorporates the analysis from the intersection of 34th Street and L Street to Oswell Street.

³ The National Environmental Policy Act (NEPA) EIS process ends with a ROD that explains the agency's decision, describes the alternatives the agency considered, and discusses the agency's plans for mitigation.

The Palmdale Station would be located at the existing Palmdale Transportation Center, which would be expanded south to accommodate an HSR station. It would be bound by Technology Drive to the north and Palmdale Boulevard to the south (see Figure S-9 later in this summary).

The Bakersfield to Palmdale Project Section would also include one light maintenance facility (LMF), one maintenance of way facility (MOWF), and two maintenance of infrastructure siding (MOIS) facilities. The analysis in this EIR/EIS includes the construction and operation of the proposed LMF, MOWF, and MOIS facilities. The LMF and MOWF are likely to be situated in the Antelope Valley. This Draft EIR/EIS evaluates two options for the locations of the LMF and MOWF, shown in Figure S-3, including:

- LMF and MOWF co-located at the Lancaster North A site
- LMF at the Avenue M LMF site and MOWF located at the Lancaster North B site

The Authority will identify the final LMF/MOWF configuration in the Final EIR/EIS after the public has had a chance to weigh in on the proposed options evaluated in this Draft EIR/EIS.

The two MOIS facilities would likely be in Edison and in Tehachapi. The MOIS facility locations would generally be the same, regardless of which B-P Build Alternative is selected. MOIS facilities, substations, electrical connections, and other ancillary features are identified in Chapter 2 and integrated into the B-P Build Alternatives. These features will be included in the Preferred Alternative and approved with the project.

S.2 Tiered Environmental Review—California High-Speed Rail Authority Final Statewide Program EIR/EIS and Bakersfield to Palmdale Project Section EIR/EIS

The Council on Environmental Quality provides for National Environmental Policy Act (NEPA) (42 U.S. Code [U.S.C.] §4321 et seq.) decision-making through a phased process, called *tiered* decision-making. The phased decision-making process allows for broad-level programmatic decision, in which a first-tier EIS can be followed by more specific decisions at the second tier based on one or more second-tier EIS documents. The NEPA tiering process allows incremental decision-making for large projects that would be too extensive and cumbersome to analyze in the detail required by a traditional project EIS. The California Environmental Quality Act (CEQA) (Public Resources Code §21000 et seq.) encourages use of the same tiered analysis by allowing for first-tier program-level and second-tier project-level EIRs.

Light Maintenance Facility (LMF)

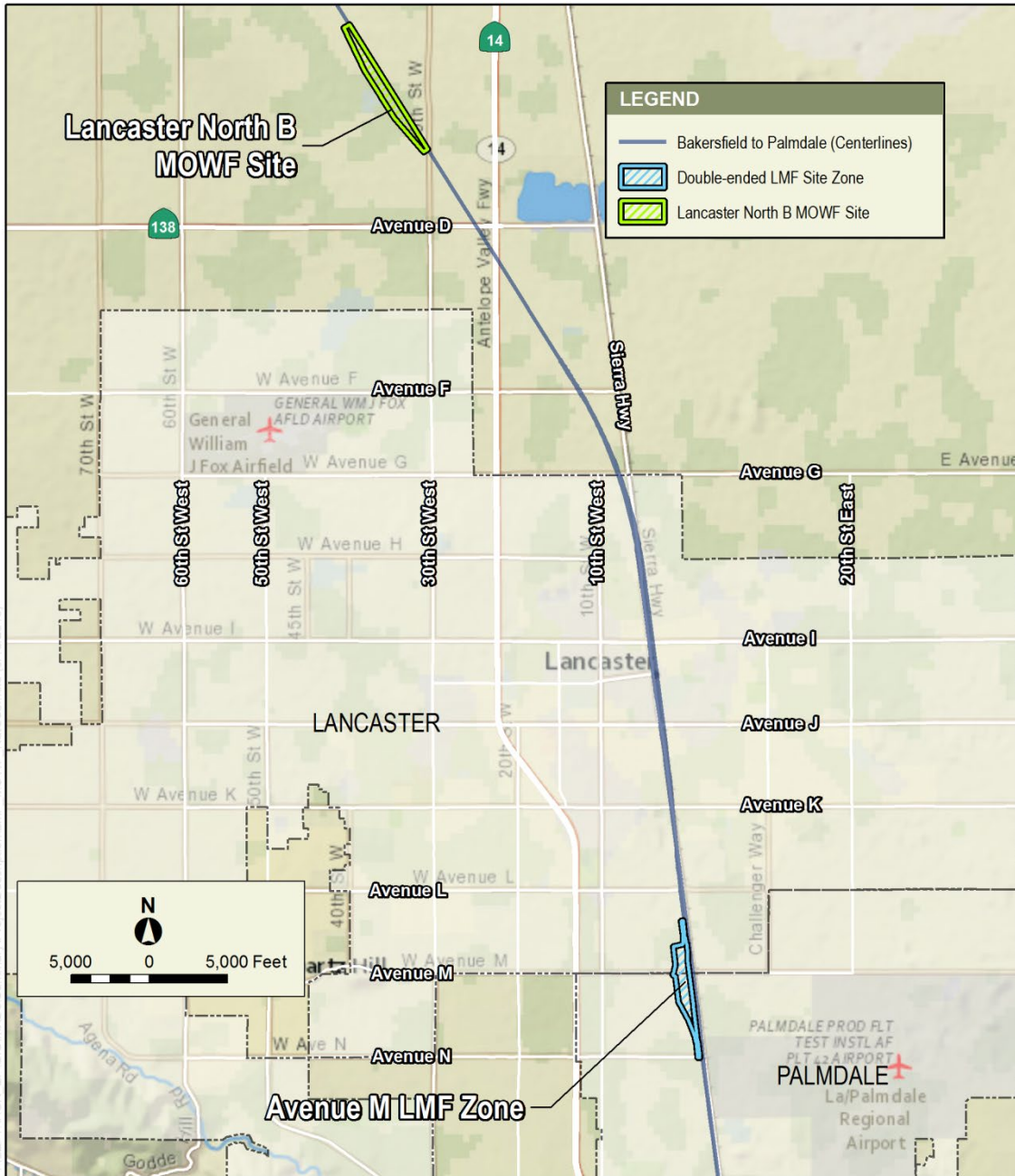
A facility that provides train storage and a place to conduct service examinations and maintenance inspections

Maintenance of Way Facility (MOWF)

A facility that includes regional maintenance machinery storage and materials storage, and a place for personnel, maintenance, and administration

Maintenance of Infrastructure Siding (MOIS) Facility

A facility that supports MOWF activities by providing a location for layover of maintenance of infrastructure equipment and temporary storage of materials and other resources needed in the MOWF



Sources: California High-Speed Rail Authority, 2018; Esri/National Geographic, 2017

October 2019

Figure S-3 Maintenance Facility Alternatives

The Bakersfield to Palmdale Project Section EIR/EIS is a second-tier analysis that builds on two first-tier, program EIR/EIS documents; it provides project-level information for decision-making on this project section of the California HSR System. The Authority and FRA prepared the 2005 *Final Program EIR/EIS for the Proposed California High-Speed Train System* (Statewide Program EIR/EIS) (Authority and FRA 2005) as a first-tier analysis of the general effects of implementing the HSR system across two-thirds of the state. The 2008 *Bay Area to Central Valley High-Speed Train Final Program EIR/EIS* (Bay Area to Central Valley Program EIR/EIS) (Authority and FRA 2008) and the 2012 *Bay Area to Central Valley High-Speed Train Partially Revised Final Program EIR* (Partially Revised Final Program EIR) (Authority and FRA 2012) are first-tier, programmatic analyses that focus on the Bay Area and Central Valley regions. These three, first-tier EIR/EIS documents provided the Authority with the environmental analyses necessary to evaluate the California HSR System overall and to make broad decisions about HSR alignments and station locations, in general, that would be followed by further study in the second-tier EIRs/EISs. Electronic copies of the Tier 1 documents are available on request by calling the Authority office at (916) 324-1541. The Tier 1 documents may also be reviewed at the Authority’s offices during business hours at: 770 L Street, Suite 620, Sacramento, CA 95814 and 355 S. Grand Avenue, Suite 2050, Los Angeles, CA.

This second-tier Bakersfield to Palmdale Project Section EIR/EIS analyzes the environmental impacts and benefits of implementing HSR in the area between the Bakersfield and Palmdale stations. It is based on more detailed project planning and engineering than the first-tier analyses. This analysis builds, therefore, on the earlier decisions of the program EIR/EIS documents, as it provides more site-specific and detailed analysis.

Cooperating Agency

Any agency invited by the lead federal agency that has agreed to participate in the NEPA process, and has legal jurisdiction over, or technical expertise regarding, environmental impacts associated with a proposed action.

Responsible Agency

A public agency other than the lead agency with discretionary approval power over the project.

Pursuant to U.S.C. Title 23 Section 327, under the NEPA Assignment Memorandum of Understanding between FRA and the State of California, effective July 23, 2019, the Authority is the project sponsor and the lead federal agency for compliance with NEPA and other federal laws for the HSR system, including the Bakersfield to Palmdale Project Section. The Authority is also the state lead agency under CEQA. Three cooperating agencies are included in the NEPA review process for the Bakersfield to Palmdale Project Section: the U.S. Army Corps of Engineers (USACE), the Bureau of Land Management, and the Surface Transportation Board.⁴

Several state and regional California agencies serve as CEQA-responsible agencies for the Bakersfield to Palmdale Project Section. These include the California Department of Fish and Wildlife, California Department of Transportation, California Public Utilities Commission, California State Lands Commission, Central Valley Regional Water Quality Control Board, Lahontan Regional Water Quality Control Board, San Joaquin Valley Air Pollution Control District, Eastern Kern Air Pollution Control District, and Antelope Valley Air Quality Management District.

S.3 Issues Raised during the Scoping Process

Scoping helps determine the focus and content of an EIR/EIS, including the range of actions, alternatives, environmental impacts, and mitigation measures to be analyzed. It also helps focus detailed study on those issues pertinent to the final decision on the proposed project.

⁴ The U.S. Army Corps of Engineers agreed by letter, dated December 30, 2009, to be a cooperating agency under NEPA. The Bureau of Land Management agreed by letter, dated September 25, 2013, to be a cooperating agency under NEPA. The Authority sent a letter dated April 8, 2013, to the Department of Defense, representing the U.S. Air Force, to confirm its status as a cooperating agency. A response letter from the Department of Defense was not received. The Authority attempted further consultation with the U.S. Air Force, but received no response. The Surface Transportation Board, by letter dated May 2, 2013, is also a cooperating agency under NEPA.

The scoping period for the Bakersfield to Palmdale Project Section environmental process occurred from August 24 to November 2, 2009. During this period, the Authority and FRA held three public and agency scoping meetings (September 15, 16, and 17, 2009) in the Bakersfield to Palmdale Project Section corridor. A total of 189 people attended the three meetings. During the scoping period, the Authority and FRA received 50 written comments from individuals and organizations (comment cards, emails, and transcriptions), 15 comments from agencies, and two comments from private businesses about the project. Major issues identified from the scoping effort include the following topics:

- Agricultural impacts
- Air quality impacts
- Natural resources impacts
- Earthquake/seismic concerns
- Economic growth impacts
- Floodplain impacts
- Natural resource impacts
- Native American land impacts
- Noise impacts
- Station parking and transit connection concerns
- Recreation impacts
- Soil contamination concerns
- Station and alignment locations
- System safety concerns
- Transportation system impacts

S.4 Purpose and Need for the High-Speed Rail System and the Bakersfield to Palmdale Project Section

S.4.1 Purpose of the High-Speed Rail System

The Statewide Program EIR/EIS established the purpose of the statewide HSR system and identified and evaluated alternative HSR corridor alignments and station locations as part of a statewide HSR system. According to the Statewide Program EIR/EIS, the purpose of the system is to:

...provide a reliable mode of travel, which links the major metropolitan areas of the state, and delivers predictable and consistent travel times. A further objective is to provide an interface with commercial airports, mass transit and the highway network and relieve capacity constraints of the existing transportation system as increases in intercity travel demand in California occur, in a manner sensitive to and protective of California's unique natural resources (Authority and FRA 2005).

S.4.2 Purpose of the Bakersfield to Palmdale Project Section

The purpose of this project is to implement the Bakersfield to Palmdale Section of the California HSR system in order to provide the public with electric-powered HSR service that provides predictable and consistent travel times between major urban centers consistent with Proposition 1A, and connectivity to airports, mass transit, and the highway network connecting the San Joaquin Valley to the Antelope Valley; and to connect the Northern and Southern portions of the statewide HSR system.

The purpose and need for the Bakersfield to Palmdale Project Section was developed through a process established by the Authority, the FRA, the USACE, and the U.S. Environmental Protection Agency pursuant to a November 2010 Memorandum of Understanding that was intended to facilitate the integration of NEPA, Section 404 of the Clean Water Act, and Section 14 of the Rivers and Harbor Act. The parties reached agreement on the purpose and need in July 2012.

S.4.3 CEQA Project Objectives of the High-Speed Rail System in California and in the Bakersfield to Palmdale Project Section Vicinity

The Authority's statutory mandate is to plan, build, and operate an HSR system that is coordinated with California's existing transportation network, particularly intercity rail and bus lines, commuter rail lines, urban rail lines, highways, and airports. The Authority has responded to this mandate by adopting the following objectives and policies for the proposed HSR system:

- Provide intercity travel capacity to supplement critically over-used interstate highways and commercial airports

- Meet future intercity travel demand that will be unmet by current transportation systems and increase capacity for intercity mobility
- Maximize intermodal transportation opportunities by locating stations to connect with local transit, airports, and highways
- Improve the intercity travel experience for Californians by providing comfortable, safe, frequent, and reliable high-speed travel
- Provide a sustainable reduction in travel time between major urban centers
- Increase the efficiency of the intercity transportation system
- Maximize the use of existing transportation corridors and rights-of-way to the extent feasible
- Develop a practical and economically viable transportation system that can be implemented in phases and generate revenues in excess of operations and maintenance (O&M) costs
- Provide intercity travel in a manner sensitive to and protective of the region's natural and agricultural resources and reduce emissions and vehicle miles traveled (VMT)⁵ for intercity trips

The approximately 80-mile-long Bakersfield to Palmdale Project Section is an essential component of the statewide HSR system. The Bakersfield to Palmdale Project Section would provide Bakersfield, Lancaster, Palmdale, and other communities near the proposed HSR stations access to a new transportation mode. The B-P Build Alternatives would close the passenger rail gap between Bakersfield and Palmdale, thereby providing a passenger rail connection between Northern California and Los Angeles. It would contribute to increased mobility throughout California and provide for construction of an LMF and MOWF, where the HSR trains would be inspected and light maintenance and repair activities would occur. Figure S-2 shows the Bakersfield to Palmdale Project Section corridor.

S.4.4 Need for the High-Speed Rail System, Statewide and in the Bakersfield to Palmdale Region

Figure S-1 shows the location of the Bakersfield to Palmdale Project Section in California. The need for an HSR system exists statewide as well as in regions such as Southern California, the Central Valley, and Northern California. The Bakersfield to Palmdale Project Section is an essential component of the statewide HSR system. As discussed in Chapter 1, Section 1.2.4.1, Travel Demand and Capacity Constraints, the Bakersfield to Palmdale Project Section contributes significantly to the statewide need for a new intercity transportation service that would connect the Bakersfield and Palmdale Areas to major population and economic centers and to other regions of the state.

By connecting the northern and southern portions of the statewide HSR system, the Bakersfield to Palmdale Project Section would close the existing passenger “rail gap” between Southern California and the rest of the state. This gap exists between the Los Angeles area and the southern San Joaquin Valley, where passengers are required to board Amtrak connecting buses from Los Angeles and Palmdale to the station in Bakersfield, where they can board a train once again. This gap exists due to topographic challenges with the Tehachapi and San Gabriel mountains, which have made constructing a passenger rail line at a suitable grade difficult.

The capacity of California's intercity transportation system, including that in the Bakersfield to Palmdale Project Section vicinity, is insufficient to meet existing and future travel demands. The current and projected future system congestion will continue to result in deteriorating air quality, reduced reliability, and increased travel times. The system has not kept pace with the tremendous increase in population and economic activity in the state, including that occurring in the project vicinity. From 2010 to 2040, Kern County is projected to grow at a higher rate (65 percent) than

⁵ Vehicle miles traveled, or VMT, is the total miles traveled by all vehicles in a specified area during a specified time.

California as a whole (26 percent), and Los Angeles County is expected to grow at a somewhat slower rate than the state (15 percent) (California Department of Finance 2014). Population growth and the increasing interconnectedness of the southern San Joaquin Valley, greater Tehachapi Area, and Antelope Valley are creating a surge in travel along the region's highways, including SR 14 and SR 58. Overall, intercity travel in California is forecast to increase by more than 58 percent between 2010 and 2040, from 610 million trips to approximately 965 million trips (Cambridge Systematics 2007). The project vicinity exemplifies the growth patterns and trends in California, where much of the intercity travel consists of trips of intermediate distance. With growing demand for intercity travel and growing capacity constraints, the total automobile travel time will increase in the southern San Joaquin Valley, greater Tehachapi Area, and Antelope Valley.

The interstate highway system, commercial airports, and conventional passenger rail system that serve the intercity travel market are operating at or near capacity and will require large public investments for maintenance and expansion to meet existing demand and growth over the next 25 years and beyond. Moreover, the feasibility of expanding many major highways and key airports is uncertain. Some needed expansions may be impractical or may be constrained by physical, political, and other factors. The need for improvements to intercity travel in California, including that between the Bakersfield to Palmdale Project Section vicinity and the Bay Area, Sacramento, and Southern California, is defined by the following issues:

- Future growth demand for intercity travel, including increased demand in the Bakersfield and Palmdale areas
- Capacity constraints that will result in increasing congestion and travel delays, including those along the SR 58, SR 14, and Sierra Highway corridors (Figure S-2)
- Unreliable travel conditions resulting from congestion and delays, weather conditions, accidents, and other factors that affect the quality of life and economic well-being of residents, businesses, and tourism in California, including in the project vicinity
- Reduced mobility in the project vicinity as a result of increasing demand on limited modal connections between major airports, transit systems, and passenger rail in the state
- Poor and deteriorating air quality and pressure on natural resources and agricultural lands as a result of expanded highways and airports, and urban development pressures, including those in the Bakersfield and Palmdale areas
- Legislative mandates to moderate the effects of transportation on climate change, including required reductions in greenhouse gas (GHG) emissions caused by vehicles powered by the combustion of carbon-based fuels⁶

⁶ Legislative mandates related to transportation and climate change include Assembly Bill 32, the "California Global Warming Solutions Act of 2006," which required California to reduce its GHG emissions to 1990 levels by 2020; Senate Bill 375, the "Sustainable Communities and Climate Protection Act of 2008," which targets reduction in GHG emissions from passenger vehicles in support of Assembly Bill 32 goals; and Senate Bill 32, the "California Global Warming Solutions Act of 2006: emissions limit" enacted in 2016, which requires California to reduce its GHG emissions to 40 percent below the 1990 levels by 2030.

S.5 Alternatives

This section summarizes the alternatives evaluated in the Bakersfield to Palmdale Project Section Draft EIR/EIS. The 2005 Statewide Program EIR/EIS (Authority and FRA 2005), the 2008 Bay Area to Central Valley Program EIR/EIS (Authority and FRA 2008), the 2012 Partially Revised Final Program EIR (Authority and FRA 2012), public and agency input from the scoping and alternatives analysis processes,⁷ and extensive local and agency involvement during Stakeholder Working Group⁸ meetings, agency consultation meetings, and other public meetings helped inform the development of these alternatives.

The track alignments, stations, and maintenance facilities have been through an alternatives analysis screening process that considered the effects of the alternatives on the social, natural, and built environment. In addition to the B-P Build Alternatives, the CCNM Design Option, and the Refined CCNM Design Option, this Draft EIR/EIS analyzes a No Project Alternative.

S.5.1 No Project Alternative

The No Project Alternative forms the basis for comparison of the project alternatives and represents conditions that would occur in the forecast year (in this case, 2040) if the proposed action (in this case, the Bakersfield to Palmdale Project Section) were not constructed. Specifically, the No Project Alternative reflects the effects of growth planned for the region and existing and planned improvements to the highway, aviation, conventional passenger rail, and freight rail systems in the Bakersfield to Palmdale Project Section area through the 2040 horizon for environmental analysis. The No Project Alternative includes several planned transportation, housing, commercial, and other development projects by the year 2040. Appendix 3.19-A of this EIR/EIS contains the cumulative project list, which includes reasonable foreseeable projects in Bakersfield to Palmdale Project Section vicinity.

S.5.2 Bakersfield to Palmdale Project Section Build Alternatives

The impact analysis presented in this Draft Project EIR/EIS evaluates four B-P Build Alternatives (Alternatives 1, 2, 3, and 5) that begin at the F Street Station in Bakersfield and end at the Palmdale Station in Palmdale (Figure S-2), as well as the CCNM Design Option and the Refined CCNM Design Option. The F-B LGA alignment from the intersection of 34th Street and L Street to Oswell Street is described in detail in the *Fresno to Bakersfield Project Section Draft Supplemental EIR/EIS* (Authority and FRA 2017). The Bakersfield to Palmdale Project Section extends approximately 80 miles between the proposed Bakersfield and Palmdale stations.

The dedicated, fully grade-separated infrastructure needed to operate high-speed trains has more stringent alignment requirements than those needed for lower-speed trains. The Bakersfield to Palmdale Project Section would include surface, underground, and elevated track sections with varying profiles. Surface tracks would be either at grade or on fill material. Underground tracks would be in areas with cut slopes and retaining walls or tunnels. Elevated tracks would be on bridge structures.

Table S-1 provides a high-level comparison of key design features associated with each of the B-P Build Alternatives, the CCNM Design Option, and the Refined CCNM Design Option evaluated in this Draft EIR/EIS.

⁷ The alternatives analysis process evaluated a range of alternatives to isolate concerns and to screen and refine the alternatives to avoid key environmental issues or improve performance. The alternatives not carried forward had greater direct and indirect environmental impacts, were impracticable, or failed to meet the project purpose. Chapter 2, Alternatives, of this EIR/EIS provides additional information on the alternatives analysis process.

⁸ Chapter 9, Public and Agency Involvement, provides details on the Stakeholder Working Groups and meetings.

Table S-1 Summary of Bakersfield to Palmdale Project Section Design Features

Design Options	Alternative 1	Alternative 2	Alternative 3	Alternative 5	CCNM Design Option ¹	Refined CCNM Design Option ²
Total Length (linear miles) ³	82.47	82.47	82.45	84.46	+0.02	+0.15
Surface Profile (linear miles) ³	58.31	57.39	56.39	58.30	-0.2	-0.77
Elevated Profile (linear miles) ³	14.87	15.79	14.63	14.87	+0.1	-0.54
Underground Profile (linear miles) ³	9.29	9.29	11.43	9.29	+0.12	+1.46
Number of Road Crossings	126	127	125	126	+1	0
Number of Public and Private Roadway Closures ⁴	49	49	50	49	0	0
Number of Roadway Overheads and Underpasses ⁵	74	75	75	74	0	-1

Source: Table 2-12, Summary of Design Features, in Chapter 2, Alternatives, of this EIR/EIS

¹ Numbers reflect changes brought by the addition of the CCNM Design Option to any of the B-P Build Alternatives.

² Numbers reflect changes brought by the addition of the Refined CCNM Design Option to any of the B-P Build Alternatives.

³ Total length and elevated profile length are measured from the intersection of 34th Street and L Street in Bakersfield to Spruce Court in Palmdale to illustrate features from station to station. Therefore, this includes the F-B LGA portion of the alignment from 34th Street and L Street to Oswald Street, which would be a common alignment for all B-P Build Alternatives.

⁴ Accounts for closures due to HSR road crossings

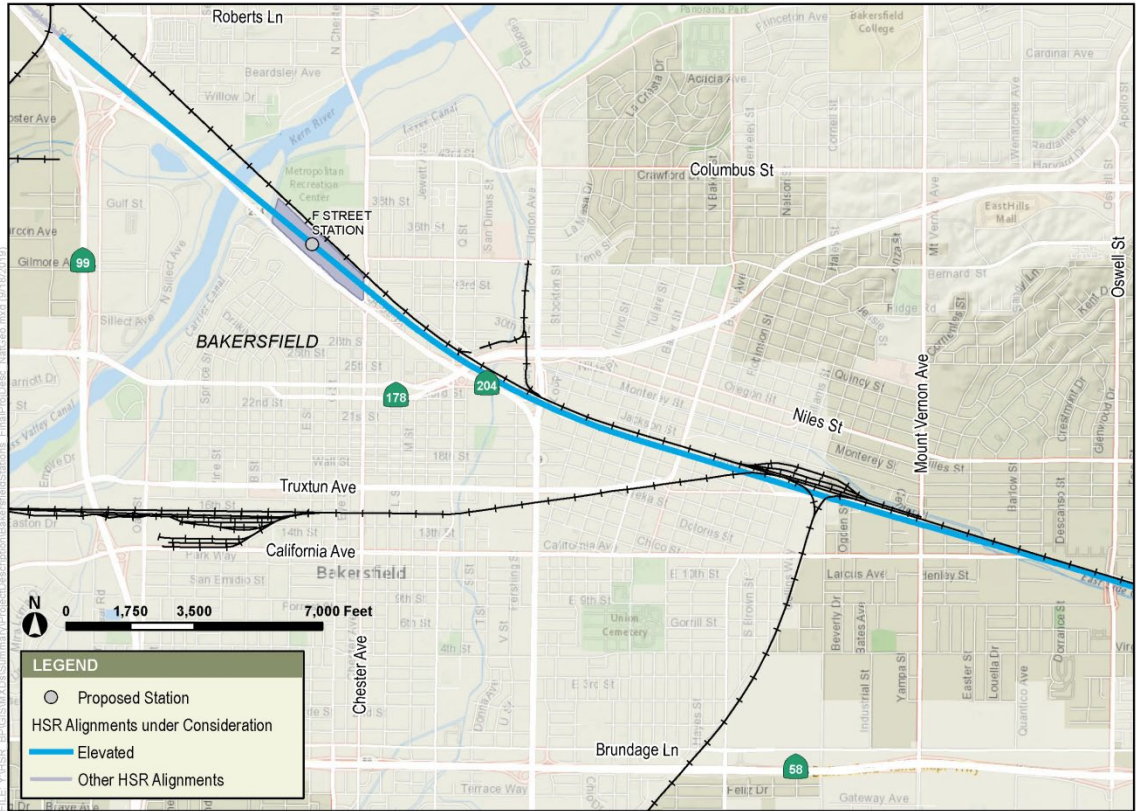
⁵ All proposed grade-crossing configurations are pending California Public Utilities Commission approval.

S.5.2.1 Alternative 1

Figure S-2 shows the entire Alternative 1 alignment. Figure S-4 shows a detail map of the Bakersfield Station area including the portion of the F-B LGA from the intersection of 34th Street and L Street. The portion of the alignment from 34th Street and L Street to Oswald Street would begin at the Bakersfield Station near this intersection on a viaduct. Generally, it would run parallel to the west side of SR 204 until it would reach the SR 178 crossing, where the alignment would turn east and parallel the Union Pacific Railroad (UPRR) corridor. From there the alignment would continue generally east in the Sumner Street and Edison Highway corridors.

Viaduct

A bridge that conveys a road or a railroad over a valley, often constructed of a series of arches supported by piers

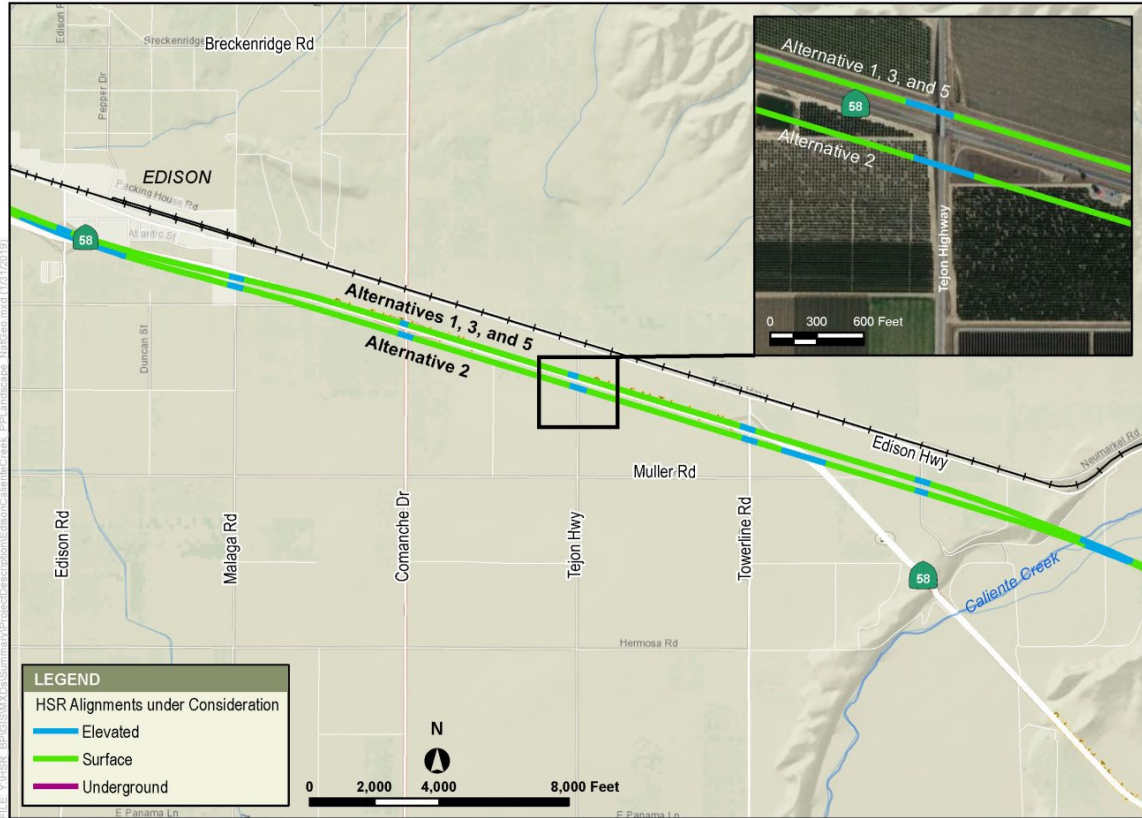


Sources: California High-Speed Rail Authority, 2018; Esri/National Geographic, 2017

October 2019

Figure S-4 Bakersfield Station Detail Map

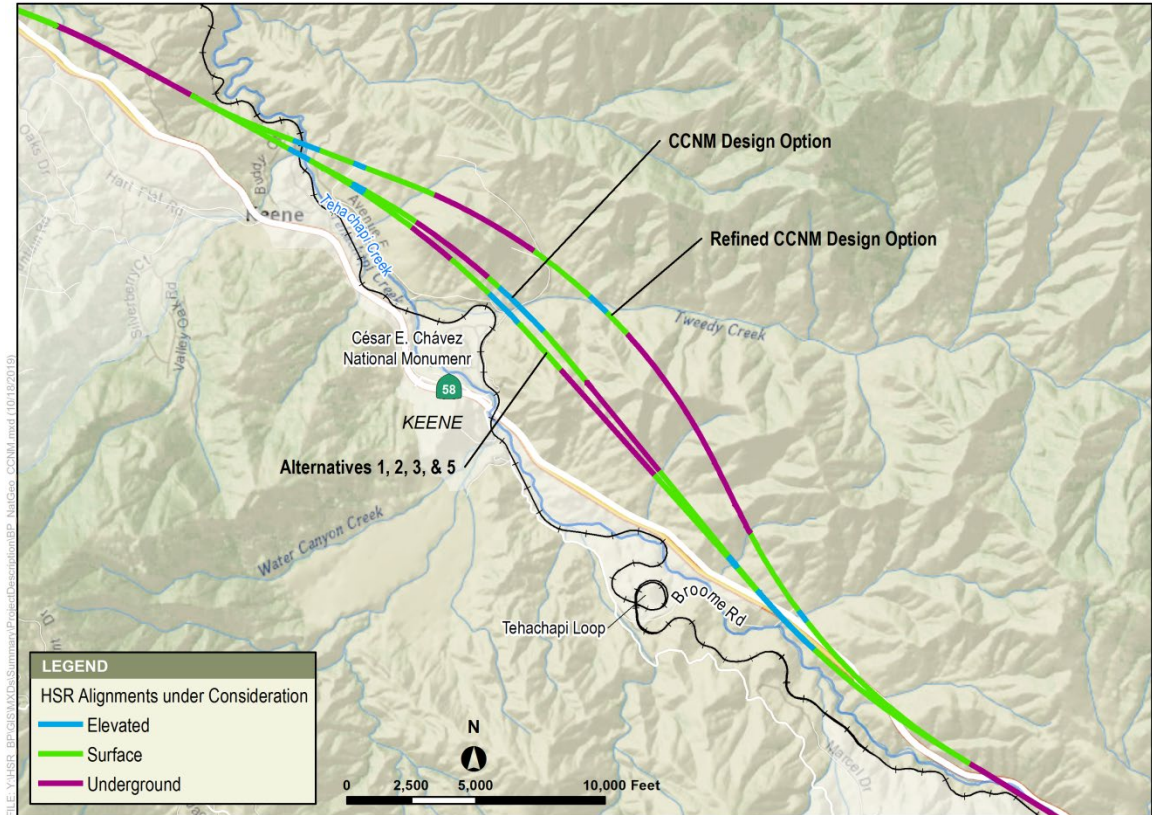
From Oswell Street to Morning Drive (SR 184), Alternative 1 would be situated on the north side of Edison Highway. East of Morning Drive, the Alternative 1 alignment would transition from the Edison Highway corridor to the SR 58 corridor, to the freeway corridor at Edison Road. Figure S-5 provides a detail map of the Edison area. At Edison Road, the freeway would shift to the south, allowing the HSR alignment to run in the existing freeway right-of-way, parallel to the relocated SR 58 alignment along its north side. The Alternative 1 alignment would continue eastbound, parallel to Edison Highway toward Caliente Creek, and then it would continue southeast through the community of Keene before it would begin to climb the Tehachapi Mountains. Figure S-6 provides a detail map of the Keene area.



Sources: California High-Speed Rail Authority, 2018; Esri/National Geographic, 2017

January 2019

Figure S-5 Edison Area Detail Map

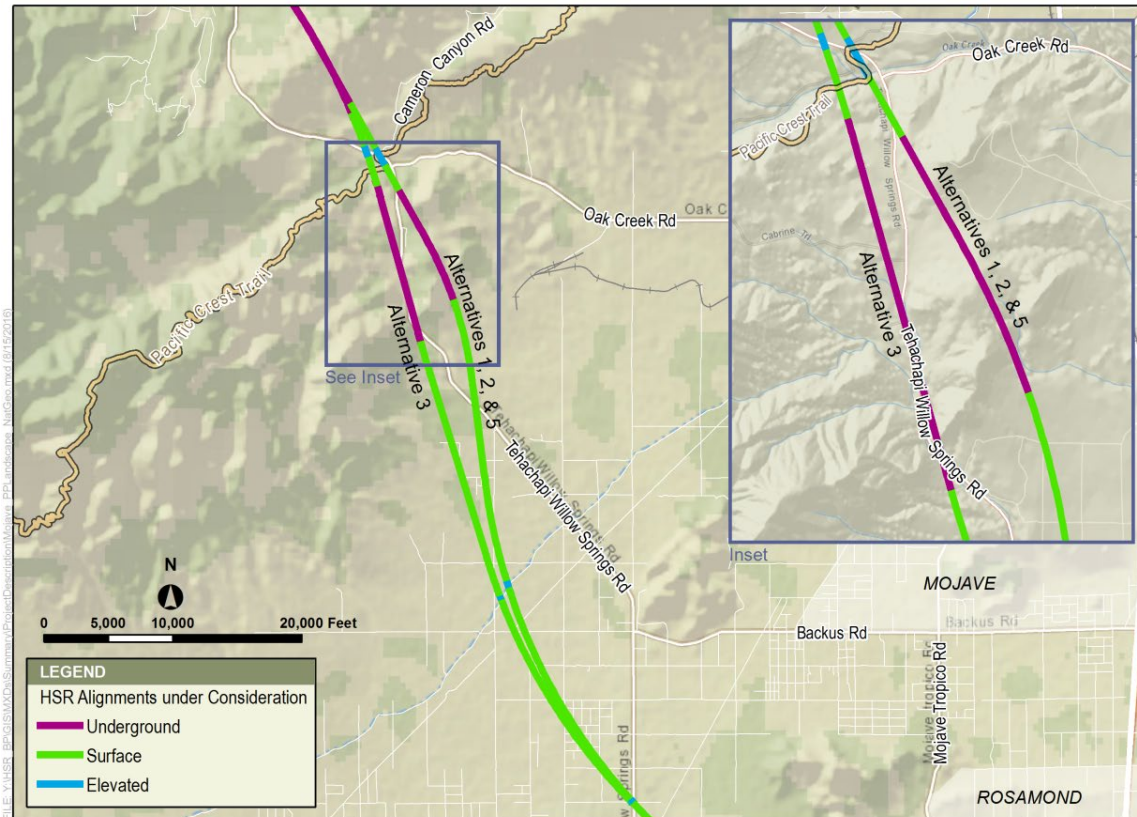


Sources: California High-Speed Rail Authority, 2018; Esri/National Geographic, 2017

October 2019

Figure S-6 Keene Area Detail Map

The alignment would include a combination of cuts, fills, tunnels, and viaducts through the Tehachapi Mountains, crossing SR 58 at various points. As SR 58 turns south approaching Tehachapi, Alternative 1 would continue on an easterly path, along the edge of the city. The alignment would then curve farther south and pass east of the city. Alternative 1 would cross the Tehachapi Valley on a straight alignment and pass through the mountains southeast of Tehachapi in a tunnel. It would then proceed into the Mojave Desert, across the Antelope Valley through Rosamond, toward the north end of the city of Lancaster. Figure S-7 provides a detail map of the Mojave area.

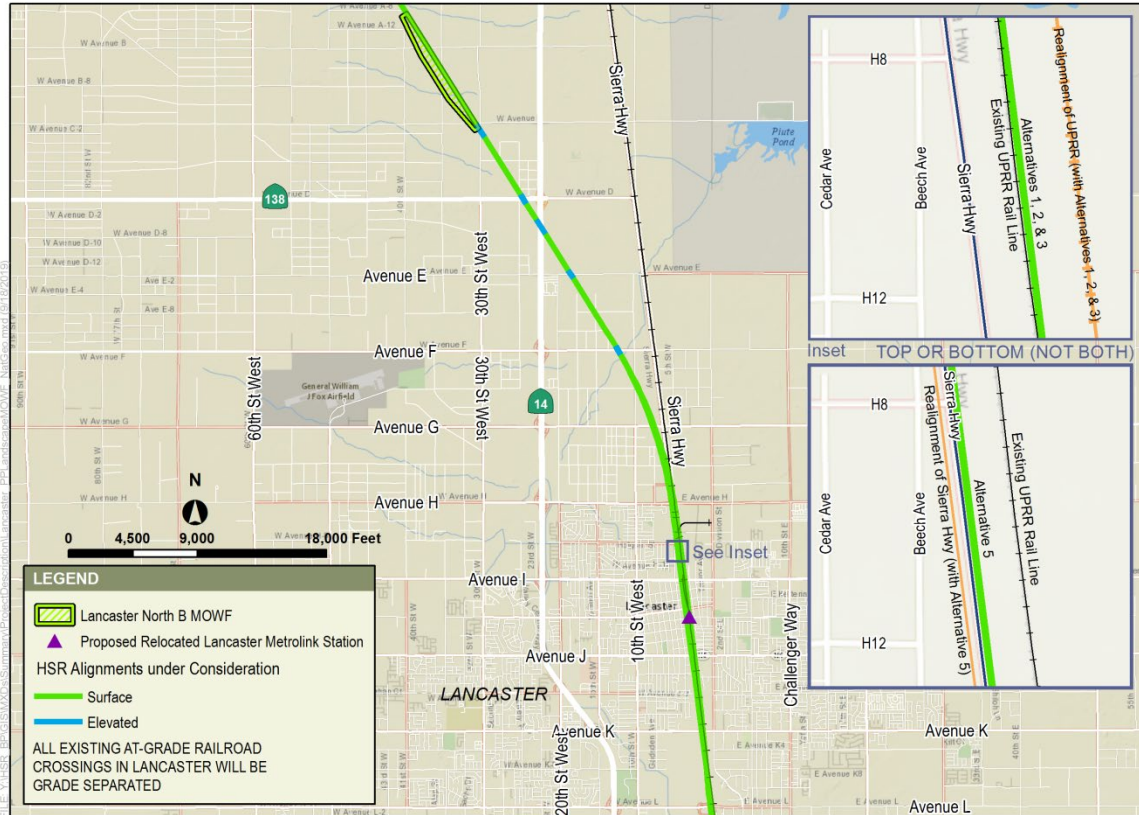


Sources: California High-Speed Rail Authority, 2018; Esri/National Geographic 2017

January 2019

Figure S-7 Mojave Area Detail Map

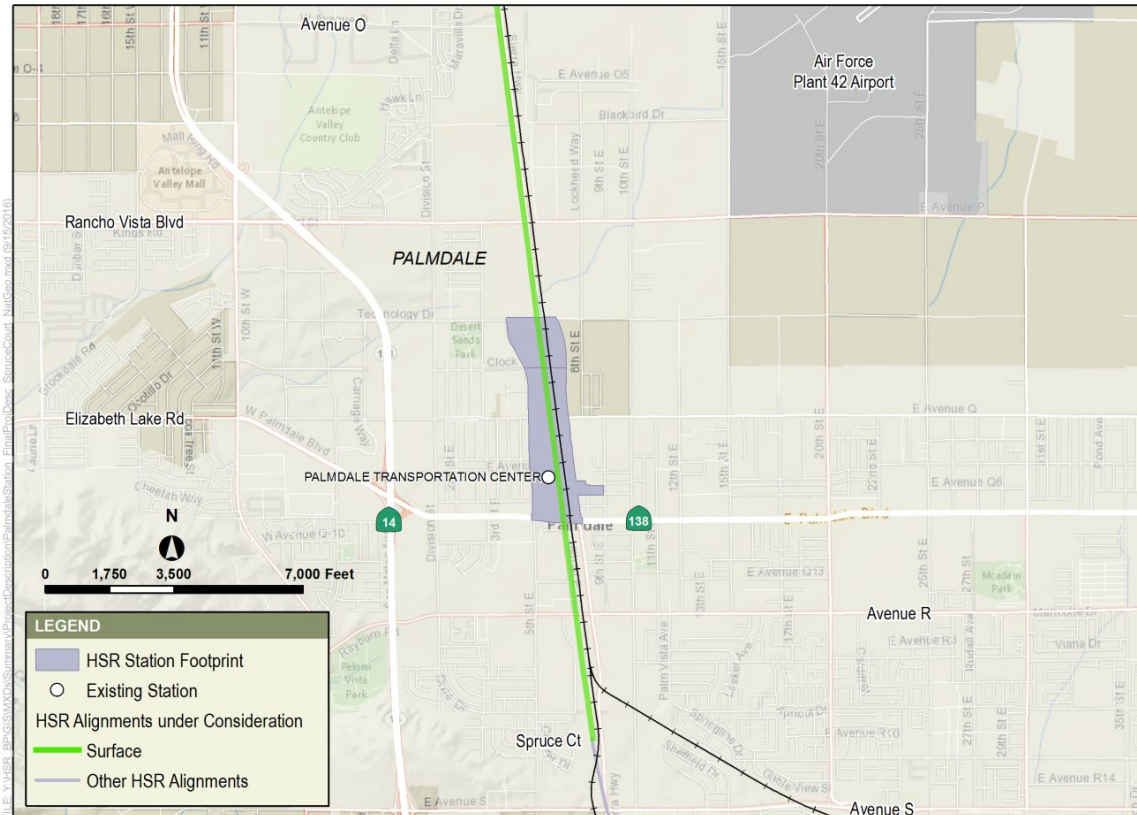
The alignment would pass over SR 138 and SR 14 near the interchange of the two highways, where it would enter Lancaster at Avenue H, running parallel to the Sierra Highway/UPRR corridor through Lancaster and Palmdale. Figure S-8 shows a detail map of the Lancaster area. From Avenue H through Lancaster, Alternative 1 would combine the HSR, UPRR, and Metrolink rail corridors into one combined corridor. Under Alternative 1, the new combined rail corridor would match the current westerly extent of the existing rail right-of-way and widen the corridor to the east, as necessary, to accommodate all three rail systems and their respective separation requirements. The alternative would require the relocation of all the UPRR and Metrolink facilities in the corridor from north of Avenue H to approximately Avenue L, and it would create separate rights-of-way for the UPRR and the Metrolink rail corridors east of the HSR right-of-way. Therefore, Alternative 1 would align east of Sierra Highway and west of the UPRR corridor. The Alternative 1 alignment would begin a transition to the west at Avenue K. It would continue this transition to Avenue M, where the HSR alignment would be situated west of the existing UPRR/Metrolink right-of-way, which would remain in its existing location. The Alternative 1 alignment would then continue south, parallel to and on the west side of the existing rail corridor until the section would terminate at the Palmdale Station, in the Palmdale Transportation Center. Figure S-9 provides a Palmdale Station area map.



Sources: California High-Speed Rail Authority, 2018; Esri/National Geographic, 2017

October 2019

Figure S-8 Lancaster Area Detail Map



Sources: California High-Speed Rail Authority, 2018; Esri/National Geographic, 2017

January 2019

Figure S-9 Palmdale Station Area Detail Map

S.5.2.2 Alternative 2

Alternative 2 would follow the same alignment as Alternative 1 from Bakersfield to Palmdale except through the community of Edison. Figure S-5 shows the alternative alignment in the Edison area. Alternative 2 would vary from Alternative 1 between Edison Road and Towerline Road, where the HSR alignment would pass over SR 58 instead of running along the south side of existing SR 58 on an elevated embankment. Under Alternative 2, SR 58 would remain in its current alignment, but this alternative would require an elevated structure for the HSR to diagonally span the SR 58/Edison Road interchange. Another elevated structure crossing back over SR 58 would be necessary just past Towerline Road, and three more elevated structures would be necessary for the HSR to cross over existing north-south roads (Malaga Road, Comanche Drive, and Tejon Highway), spaced approximately 1 mile apart between Edison Road and Towerline Road.

S.5.2.3 Alternative 3

Alternative 3 would follow the same alignment from Bakersfield to Palmdale as Alternative 1, except along the southern base of the Tehachapi Mountains near Mojave. Figure S-7 shows the alternative alignments in the Mojave area. Alternative 3 varies from Alternative 1 just south of Tehachapi, in the vicinity of the CalPortland Company quarry, where the alignment would travel closer to Tehachapi Willow Springs Road. It would cross Tehachapi Willow Springs Road farther west than Alternative 1 but still near the Cameron Canyon Road intersection. South of Tehachapi, Alternative 3 would split off in a more westerly direction than Alternative 1 until it would reconnect approximately 17 miles south of Tehachapi, the same place where Alternative 1 would connect.

S.5.2.4 Alternative 5

Alternative 5 would follow the same alignment from Bakersfield to Palmdale as Alternative 1 except in Lancaster. Figure S-8 shows the alternative alignment in the Lancaster area. Between Avenue H and Avenue M, Alternative 5 would be situated west of the existing UPRR and Metrolink facilities, avoiding the need to relocate them, except for the Lancaster Metrolink station building and parking facilities. Approximately 4 miles of Sierra Highway would need to be relocated west of the HSR alignment under Alternative 5. Alternative 5 would end at the Palmdale Station.

S.5.2.5 CCNM Design Option

In 2017 and 2018, the Authority and FRA conducted Section 106 consultation⁹ for La Paz, and alignment options were studied that would avoid and minimize adverse noise and visual effects on the National Historic Landmark. In 2018, the Authority issued the *Avoidance and Minimization Options Screening Memorandum for the César E. Chávez/Nuestra Señora Reina de la Paz National Historic Landmark* (Authority and FRA 2018), which evaluates five potential design options developed to avoid or minimize impacts on the CCNM. This process resulted in the CCNM Design Option for the project section.

The CCNM Design Option is near La Paz in the community of Keene and is illustrated on Figure S-6. It would diverge from the B-P Build Alternatives approximately 1.05 miles northwest of the intersection of East Bear Mountain Boulevard and SR 58 and would rejoin all of the B-P Build Alternatives approximately 0.04-mile northeast of Burnett Road in Tehachapi. In the vicinity of La Paz, the CCNM Design Option would transition from a 0.63-mile tunnel, run at grade for 0.15 mile, and then transition to a 0.42-mile-long viaduct and cross over Woodford-Tehachapi Road. The CCNM Design Option would be approximately 0.31 mile farther east from the property line of La Paz than would the alignments described under Alternatives 1, 2, 3, and 5. The CCNM Design Option would include an approximately 2,800-foot-long, and minimum 12-foot-high, sound wall along the guideways.

S.5.2.6 Refined CCNM Design Option

In response to concerns expressed by consulting parties between June 2017 and February 2019, the Authority developed additional design options that either avoid or minimize adverse effects to the National Historic Landmark. In 2019, the Authority issued the *Design Options Screening Report for the César E. Chávez/Nuestra Señora Reina de la Paz National Historic Landmark* (Authority 2019a) and the *Addendum to the Design Options Screening Report for the César E. Chávez/Nuestra Señora Reina de la Paz National Historic Landmark* (Authority 2019b), which evaluate 10 potential design options developed to avoid or minimize impacts on La Paz. This process resulted in the Refined CCNM Design Option for the project section.

The Refined CCNM Design Option, illustrated on Figure S-6, would begin 180 feet east of Bealville Road in Keene and would begin at grade for 1.15 miles and then continue underground for about 1.04 miles. The Refined Design Option would transition to at grade for 0.81 mile and cross an access road and the UPRR on a 0.17-mile-long viaduct. The Refined CCNM Design Option would then continue east at grade for 0.30 mile, cross over an existing access road on a 0.06-mile long viaduct, then back to at grade for 0.59 mile where the Design Option transitions underground for 0.80 mile. The Refined CCNM Design Option would then emerge where it would pass La Paz. The Refined CCNM Design Option would be 0.53 mile (2,798 feet) north of La Paz at its closest proximity when it emerges from the tunnel.

⁹ Section 106 of the National Historic Preservation Act requires that effects on historic properties be considered during any federal undertaking. The process has four steps: (1) starting the Section 106 process, which includes identifying and initiating consultation with Native American tribes, local governments, and other interested parties; (2) identifying historic properties; (3) assessing adverse effects; and (4) delineating stipulations by which adverse effects can be resolved in an agreement document. The implementing regulations for Section 106 are at 36 Code of Federal Regulations. Part 800.

While passing La Paz, the Refined CCNM Design Option would be at grade for 0.57 mile at a distance ranging from 0.53 mile (2,693 feet) to 0.73 mile (3,860 feet) from the boundary of La Paz before crossing a 0.13 mile viaduct over Tweedy Creek and a local access road. The Refined CCNM Design Option would travel at grade for approximately 0.25 mile before going underground in a 1.7-mile-long tunnel. The Refined Design Option would then transition to at-grade for 0.71 mile before crossing over an access road for 0.06 mile and back to at-grade for 1.71 miles. The Refined CCNM Design Option would then go over SR 58 and Tehachapi Creek on a 0.89 mile long viaduct, back to at-grade for 0.87 mile before entering a tunnel for 1.68 miles. The Refined CCNM Design Option would emerge from the tunnel north of the City of Tehachapi at grade for 1.48 miles before finally ending in a 0.13-mile-long viaduct, where it would tie back into the B-P Build Alternatives at SR 58 in the City of Tehachapi. A paralleling station would be required for the Refined CCNM Design Option. In addition, a 100-foot communications pole would be co-located with HSR facilities.

To further avoid anticipated audible adverse effects of the Refined CCNM Design Option, an approximately 1,700-foot berm would be constructed to the same height as the catenary for the track. The berm would be an average of 80 feet in height from the existing ground in order to minimize project noise to a level that is considered to have no impact, per FRA guidelines. Additionally, areas of ground disturbance would be recontoured and revegetated to minimize the visual effects associated with the earthwork required to construct the project.

The B-P Build Alternative alignments would achieve a balanced earthwork condition by use of varying slope ratios; all excavations would be placed within the project limits as embankment. With the addition of the Refined CCNM Design Option, the earthwork balance would not be achievable and would result in a range of about 2 to 14 million cubic yards of excess materials, depending on which of the B-P Build Alternative alignments the Refined CCNM Design Option is coupled. Those materials would be stockpiled in the area north of SR 58 in the vicinity of Bealville Road.

S.5.2.7 Common Design Features

Project Footprint

The project footprint includes all project components and right-of-way needed to build, operate, and maintain all permanent HSR features. The project footprint primarily consists of the rail right-of-way, which would include a northbound and a southbound track in a corridor ranging from 60 feet wide where the track would be elevated on a viaduct to several hundred feet wide where the track would be on an embankment or in a cut. Additional right-of-way would be required to accommodate associated facilities and improvements, such as maintenance facilities and equipment storage areas, permanent access roads, traction power substations, switching and paralleling stations, train signaling and communication facilities, grade separations (overheads and underpasses), intrusion protection barriers, and wildlife crossing structures. The project footprint also includes areas for utility relocations, roadway relocations, electrical power connections, and construction activities (e.g., laydown, storage, and similar areas). Because the locations of the electric power utility infrastructure and communications infrastructure (described below) are integrated into the footprints, no extra action by the Authority Board is required to select their locations.

Footprint

The total area covered by a facility or affected by construction activities

Safety and Security

The HSR alignment for the Bakersfield to Palmdale Project Section would be entirely grade-separated, meaning crossings with roads, railroads, and other transportation facilities would be at different heights (overheads or underpasses) so the HSR would neither interrupt nor interface with other modes of transport. The HSR system would be fully access-controlled with intrusion-monitoring systems. This means the HSR infrastructure (e.g., mainline tracks and maintenance and storage facilities) would be designed to prevent access by unauthorized vehicles, people, animals, and objects. The system would also include appropriate barriers (fences and walls) and

state-of-the-art communication, access control, and monitoring and detection systems. Unfenced areas in the HSR right-of-way include openings to drainage culverts and areas under viaducts, where wildlife crossings, drainage, and roadways are proposed under the HSR alignment. All aspects of the HSR system would conform to the latest federal requirements regarding transportation security.

Electric Power Utility Infrastructure

Power for the HSR system would be drawn from California’s existing electricity grid and distributed to trains by means of an overhead contact system that would consist of a series of mast poles approximately 23.5 feet higher than the top of the rail. The mast poles would be spaced approximately every 200 feet along straight portions of the track, and as close as every 70 feet in tight-turn track areas. Upgrades to the existing electricity grid may be required and could include the extension or improvement of power lines and electrical infrastructure to a series of power substations along the HSR corridor. Electricity transformation and distribution would occur in the following three types of stations:

- **Substations** to transform high-voltage electricity supplied by public utilities to the voltage necessary for operating the train. Substations would be located next to the HSR alignment, approximately every 30 miles throughout the project section. Each substation would be about 35,200 square feet (generally 220 feet by 160 feet).
- **Switching stations** to connect and balance the electrical load between tracks and switch power on or off tracks in the event of a power outage or emergency. Switching stations would be located midway between the substations, approximately 15 miles away and adjacent to the HSR alignment. Each switching station would be approximately 14,400 square feet (generally 160 feet by 90 feet).
- **Paralleling stations**, or autotransformer stations, to provide voltage stabilization and equalize electric current flow. These stations would be located adjacent to the HSR alignment, approximately every 5 miles in the areas between the substations and the switching stations. Each paralleling station would be approximately 9,600 square feet (generally 120 feet by 80 feet).

Section 2.5 in Chapter 2, Alternatives, of this EIR/EIS provides additional detail and proposed locations of utility infrastructure.

Signaling and Train-Control Elements

A computer-based, enhanced automated train control system would control the trains. The enhanced automated train control system would comply with FRA-mandated positive train control requirements, including safe separation of trains, over-speed prevention, and work zone protection. The system would use a radio-based communications network that would include a fiber-optic backbone and communications towers at intervals of approximately 3 miles or less, depending on the terrain selected, radio frequency, and locations of other facilities. Signaling and train control elements within the right-of-way would include 18- by 15-foot communications shelters or signal huts/bungalows that house signal relay components and microprocessor components, cabling to the field hardware and track, signals, and switch machines on the track. Train control facilities ranging from 2,450 square feet (70 by 35 feet) to 7,175 square feet (110 by 65 feet) would be located along the track and within the project footprint. Communications towers within these facilities would use a 6- to 8-foot-diameter, 100-foot-tall pole. The communications facilities would be located in the vicinity of track switches and would be grouped with other traction power, maintenance, station, and similar HSR facilities where possible. Where communications towers cannot be located with traction power substations or other HSR facilities, the communications facilities would be located near the HSR corridor in a fenced area of approximately 40 feet by 25 feet.

S.5.3 Station Sites

One station in Bakersfield and one in Palmdale would serve the Bakersfield to Palmdale Project Section. The location of the Bakersfield Station is shown in Figure S-4. The F Street Station would be located at the intersection of F Street and SR 204. To facilitate vehicle circulation at the proposed F Street Station, F Street would cross under SR 204 (grade-separated). The entire site would be approximately 46 acres, with approximately 2.2 acres of the site designated for the two station buildings.

Analysis of the Bakersfield Station (including the subsection extending from the Bakersfield Station to Oswell Street) is included in the Fresno to Bakersfield Project Section documents (including the *Fresno to Bakersfield Section Draft Supplemental EIR/EIS* [Authority and FRA 2017], the *Fresno to Bakersfield Section Final Supplemental EIR* [Authority 2018], and the *Fresno to Bakersfield Section Locally Generated Alternative Final Supplemental EIS* [Authority 2019] for the LGA) and is incorporated by reference in this document.

The Palmdale Station would be located along the proposed HSR alignment, parallel to the existing rail corridor shown in Figure S-9. The existing Palmdale Transportation Center would be expanded to the south to accommodate the HSR and would be bounded by Technology Drive to the north and Palmdale Boulevard to the south. Additional plans are under way to connect the Palmdale Station with rail service to other parts of Southern California and Las Vegas, Nevada. The XpressWest project is a proposed high-speed passenger train that would connect Victorville, California to Las Vegas. In 2011, FRA published a Record of Decision for the project (U.S. Department of Transportation 2011). The High Desert Corridor is a proposed rail feeder line between the Palmdale Station and the XpressWest Victorville station. A rail alternatives analysis is under way, which would consider the HSR feeder service options and identify feasible rail connections to the Palmdale Station and the proposed XpressWest station in Victorville.

S.5.4 Maintenance Facilities

The California HSR System includes four types of maintenance facilities: MOWFs, MOIS facilities, heavy maintenance facilities (HMF), and LMFs. The California HSR System would require one HMF for the entire system, but it would not be located in this project section. The design and spacing of maintenance facilities along the HSR alignment would require the Bakersfield to Palmdale Project Section to include four maintenance sites; an LMF, an MOWF and two MOIS facilities. The LMF and MOWF would be located in the Antelope Valley. The two MOIS facilities would be situated in Edison and in Tehachapi. The locations of the MOIS would be the generally same under each of the B-P Build Alternatives.

The MOWF would provide regional maintenance machinery servicing storage, materials storage, personnel, and maintenance and administration. The LMF facility would include double-ended access, which facilitates movements of trains entering and exiting the site and allows connections to the HSR mainline at each end of the LMF site. The LMF, including lead tracks, would require approximately 160 acres, with space for all activities associated with fleet storage, cleaning, repair, and servicing facilities. The LMF site would be sized to support the level of daily service dispatched by the nearby terminal station (the first or last station on the route). The Authority defines three levels of maintenance that can be performed at an LMF:

- **Level I:** Daily inspections, including pre-departure cleaning and testing
- **Level II:** Monthly inspections
- **Level III:** Quarterly inspections, including wheel condition diagnostics and re-profiling (wheel-truing)

Two alternatives are under consideration for the LMF and MOWF locations. Figure S-3 shows the proposed location of each maintenance facility alternative. An LMF could be co-located with an MOWF at the Lancaster North A site because it is large enough to accommodate both. The combined facility would require approximately 210 acres, including lead tracks. The site under

consideration is west of the Antelope Valley Freeway (SR 14), generally between West Avenue C and West Avenue B.

Alternatively, the LMF and MOWF could be placed at separate locations: the Avenue M LMF site and Lancaster North B site, respectively. Under this configuration, the LMF would be placed on the west side of the HSR alignment, west of the existing Sierra Highway, generally between W Avenue L and Avenue M-12. The MOWF would be situated at the Lancaster North B site, a smaller area inside the boundary of the Lancaster North A site. The facility would occupy a linear configuration, adjacent to the HSR tracks, and would be approximately 84 acres to accommodate the MOWF, including lead tracks.

S.6 Impact Avoidance and Minimization Features

The Authority has pledged to integrate programmatic impact avoidance and minimization features (IAMF) into the HSR project, consistent with the following: (1) 2005 Statewide Program EIR/EIS, (2) 2008 Bay Area to Central Valley Program EIR/EIS, and (3) 2012 Partially Revised Final Program EIR. Table S-5 at the end of this summary lists the IAMFs that would be part of the project and describes what they would involve. The Authority would implement these features during project design and construction, as relevant to the particular HSR project section, to avoid or reduce impacts.

Impact Avoidance and Minimization Feature

An action that the Authority will incorporate into the project design and construction that would avoid or minimize the environmental or community impacts

Project design includes considerations to avoid and minimize environmental and community impacts through incorporation of the following additional measures:

- Follow existing transportation corridors to the extent feasible
- Span water crossings where practical
- Use shared right-of-way when feasible
- Include passages for wildlife movement
- Include narrowed footprint in elevated sections
- Avoid sensitive environmental resources to the extent practical

S.7 No Project Alternative Impacts

Under the No Project Alternative, the HSR project would not be built. The discussion of the No Project Alternative considers the condition of the Bakersfield to Palmdale Project Section study area without the HSR project at the Year 2040 horizon. Projected growth and conversion of land to urbanized uses associated with the No Project Alternative would generally have a greater environmental impact than that of the HSR project in the study area over the 2015 to 2040 planning period.

From 2015 to 2040, Kern and Los Angeles Counties are projected to grow at an average rate of 0.7 percent per year. The study area is projected to grow from a population of approximately 10.7 million in 2015 to 12.9 million by 2040, for a net increase of 2.2 million people or 21 percent (California Department of Finance 2016; Kern Council of Governments 2015; Southern California Association of Governments [SCAG] 2016). Increased population at this level will require construction of new housing and support infrastructure. The average household size for occupied housing units is 3.20 persons per household in Kern County and 3.02 persons per household in Los Angeles County (Kern Council of Governments 2014; SCAG 2016). Applying these occupancy rates to the projected 2.2 million additional residents would indicate in the need for approximately 678,000 new dwelling units by 2040.

Future development would be subject to general plans and area plans applicable in the study area, all of which support transit-oriented and “smart growth” development patterns that concentrate higher-density, mixed-use development at transportation stations (Kern County 2007, City of Bakersfield and Kern County 2016, City of Tehachapi 2012, City of Lancaster 2009, City of

Palmdale 1993, Los Angeles County 2015). Regardless of development patterns, population and employment growth would result in increased demand for travel between destinations. Daily VMT is the regional measure for transportation growth in travel. As shown in Table 2-7 in Chapter 2, Alternatives, VMT is projected to increase 71.8 percent between 2005 and 2040 in the Kern County region, and VMT per year in southern California is projected to increase by 16 million, from approximately 22 million to over 38 million in 2035 (Kern Council of Governments 2014, Table 4-6). As shown in Table 2-8 in Chapter 2, Alternatives, between 2012 and 2040, VMT growth in Los Angeles County is projected to occur at a rate of 9.0 percent, but with implementation of SCAG's adopted 2016 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS),¹⁰ VMT is projected to decrease by 0.7 percent between 2012 and 2040 (SCAG 2016). Development to accommodate population and employment growth would affect environmental resources in the study area.

The project footprint is within two air basins: the San Joaquin Valley Air Basin and the Mojave Desert Air Basin. In general, land development and population growth in the region through 2040 would increase regional VMT under the No Project Alternative. However, increasingly stringent federal and state emission control requirements and replacement of older, higher-polluting vehicles with newer, less-polluting ones would reduce basin-wide air pollutant emissions under the No Project Alternative compared to existing conditions. Conformity with air district rules and plans would reduce emissions under the No Project Alternative, notwithstanding growth. Therefore, overall air quality is expected to improve in the two air basins under the No Project Alternative, compared to existing conditions.

Under the No Project Alternative, planned development projects that would occur through 2040 would likely include project design features and mitigation to reduce impacts related to noise and vibration. Any increases in noise and vibration from planned projects would be regulated by local general plans and noise and vibration ordinances. Consistency with local noise and vibration regulations and ordinances would avoid or reduce permanent increases in noise and vibration levels.

Future development necessary to accommodate growth would likely result in increased use of electricity and radio frequency communications, consistent with that currently under way in the urban and rural environments in the study area. It is reasonable to assume that by 2040, the use of electricity and radio frequency communications will increase because of continued development, greater use of electrical devices, and technological advances in wireless transmission. As a result, generation of electromagnetic fields (EMF) and electromagnetic interference (EMI) that might affect sensitive receptors would continue in the project vicinity through 2040 under the No Project Alternative. Land uses that are particularly sensitive to EMF or EMI include businesses and institutions that use equipment that may be highly susceptible to EMI, or that engage in medical imaging or medical research activities that might experience impacts from HSR-related EMF. People that are sensitive to EMF include those that are implanted with medical devices that are sensitive to EMF. Therefore, the No Project Alternative could result in EMI and EMF impacts similar to the B-P Build Alternatives.

To accommodate future development through 2040 under the No Project Alternative, additional and improved public utility infrastructure would be required. Demand for energy would also increase at a level commensurate with population growth which would require additional electricity generation and transmission capacity. Petroleum demand could rise in the Bakersfield

¹⁰ The Sustainable Communities and Climate Protection Act of 2008 requires California's 18 metropolitan planning organizations to adopt an SCS as part of their RTPs. The SCS works to reduce GHG emissions from automobiles and light trucks to meet emission targets set by the California Air Resources Board. Emission targets for SCAG are to reduce GHG emissions by 8 percent per capita by 2020 and 13 percent per capita by 2035, compared to 2005 emissions. On April 7, 2016, SCAG adopted the *2016-2040 RTP/SCS: A Plan for Mobility, Accessibility, Sustainability, and a High Quality of Life* (SCAG 2016). For more information about SCAG's RTP/SCS, refer to Appendix 2-H, Detailed Plan Consistency Analysis, of this EIR/EIS.

to Palmdale region because of the potential increase in VMT through 2040 under the No Project Alternative.

Under the No Project Alternative, existing negative trends affecting biological and aquatic resources, including habitat loss from development, mortality from vehicle strikes, and habitat degradation from pollution (e.g., polluted runoff from stormwater, inadvertent spills of hazardous materials), as well as indirect impacts such as noise and dust from development and global climate change, are expected to continue or worsen through 2040. Although existing regulatory programs, such as the Clean Water Act and conservation programs, would continue to abate the amount of habitat loss and degradation (when feasible), future development necessary to accommodate the projected population growth in the region would continue the historical trend of converting native plant communities to agricultural uses or developed land, further compromising the biological complexity of the region. While the conditions associated with the No Project Alternative would likely have negative impacts on biological and aquatic resources in the region, it would not have direct adverse effects on biological and aquatic resources in the project vicinity.

Impacts on hydrologic and water resources, such as an increase in contaminated stormwater runoff from new impervious surfaces associated with future development in the project vicinity, could occur under the No Project Alternative through 2040. In addition, the general increase in VMT in the project vicinity would degrade water quality because of increased pollutants in stormwater from vehicles on roadways. Water or wind erosion from development projects could affect water quality, but stormwater facilities associated with future development would reduce potential hydrology and water quality impacts on receiving waters. With regard to net water demand in the region, the No Project Alternative would decrease demand generally because of a projected reduction in irrigated agricultural uses.

California, including the project vicinity, is prone to geologic and seismic hazards brought on by earthquakes. Future development projects under the No Project Alternative could be at risk from geologic and seismic hazards, such as ground shaking, surface fault rupture, slope instability near rivers, and liquefaction in areas of liquefiable soils. Future development would be subject to the Title 24 Building Code requirements, which require application of engineering design features to address and minimize such risks. Future development could also constrain mineral resource extraction if future project sites contain mineral resources. Paleontological resources could be damaged or destroyed by future development, but assessment of impacts on paleontological resources from future development projects at this time would be speculative. Such impacts would be analyzed through separate future environmental analyses.

Construction and operation of development projects through 2040 under the No Project Alternative could result in accidental spills or releases of hazardous materials during the transport, use, storage, and disposal of such materials. However, compliance with federal, state, and local regulations, as well implementation of standard best management practices, would avoid or reduce potential impacts.

Under the No Project Alternative, traffic in the project vicinity would continue to increase through 2040, which could lead to an increase traffic accidents and associated injuries and fatalities. However, planned roadway improvements and capacity expansions would incorporate design features that would reduce the potential for vehicular accidents. Population increases under the No Project Alternative would also result in increased demand for fire, police, and emergency response services. However, future development projects would likely be required to contribute fair-share impact fees to local service providers to increase staff and facilities for fire, police, and emergency response services, as required by local jurisdictions.

Future development projects could also disrupt existing communities; cause displacement of residences, commercial and industrial businesses, agricultural operations, and sensitive populations; and result in impacts on community facilities, access to agricultural operations, county and city funding provided by property and sales taxes, property values, and children's health and safety. However, an assessment of socioeconomic and community effects of future development projects at this time would be speculative and would be analyzed in separate future environmental analyses as appropriate.

Applicable local general plans and regional transportation plans encourage infill and higher-density development in urban areas, as well as increased availability of transit modes, to help reduce the generation of GHG emissions. However, assessment of the future development projects' consistency with applicable planning documents at this time would be speculative and would be analyzed in future environmental analyses as appropriate.

Population growth and associated future development projects under the No Project Alternative would result in the continued decrease in productive agricultural operations and associated agricultural land, including Important Farmland,¹¹ at a rate similar to the current rate of decline in the project vicinity. Impacts on agricultural resources from future development projects would likely be avoided or reduced by implementation of mitigation measures, as appropriate.

As future development projects under the No Project Alternative would likely result in conversion of rural agricultural settings to urbanized ones, there would be corresponding alterations in visual quality. The significance of such alterations would vary depending on specific future project locations and the size and mass of future development. Collectively, future projects would likely degrade visual quality in and near the project vicinity. However, assessment of impacts on aesthetics and visual resources from future development projects at this time would be speculative. Therefore, such impacts would be analyzed through separate environmental analyses conducted in the future, as necessary.

Impacts on park, recreation, and open space resources associated with construction and operation of future development projects under the No Project Alternative could result from acquisition, partial or full closure, reconfiguration, relocation, or other changes of such resources. Future projects could also result in indirect air quality, noise, visual degradation, or access impacts on park, recreation, and open space resources. In addition, population growth through 2040 under the No Project Alternative would likely result in increased use of existing neighborhood and regional parks and other recreational facilities. This could cause substantial physical deterioration of such facilities, requiring new or expanded park, recreation, and open space resources. However, assessment of impacts on park, recreation, and open space resources related to future development projects at this time would be speculative. Future environmental analyses would analyze such impacts as appropriate.

Future development projects that would occur under the No Project Alternative could result in impacts on historic properties, known or buried archaeological resources, or traditional cultural properties.¹² Significant impacts could occur if such affected resources are listed in or determined to be eligible for listing in the National Register of Historic Places, the California Register of Historical Resources, or a local register of historic resources (pursuant to Section 5020.1[k] of the California Public Resources Code). To be listed or eligible for listing in one or more of these registers, resources must meet certain criteria set forth in federal, state, and local laws and regulations. This is discussed in detail in Section 3.17, Cultural Resources, of the Draft EIR/EIS.

S.8 Bakersfield to Palmdale Project Section Build Alternatives Evaluation

The following section provides an overview of the impacts, including benefits, of the B-P Build Alternatives, the CCNM Design Option, the Refined CCNM Design Option, and the portion of the F-B LGA alignment from the intersection of 34th Street and L Street to Oswell Street. This section also compares differences among the impacts and costs of the B-P Build Alternatives (including the CCNM Design Option and Refined CCNM Design Option) and identifies the Preferred Alternative in Section S.8.3.

¹¹ Important Farmland includes Prime Farmland, Farmland of Statewide Importance, Unique Farmland, and Farmland of Local Importance, as defined by Section 1540(c)(1) of the Farmland Protection Policy Act.

¹² Traditional cultural properties are places important to Native Americans or other living communities or ethnic groups.

S.8.1 Bakersfield to Palmdale Project Section Alternatives Benefits and Impacts

This section summarizes the impacts that would result from construction and operation of the B-P Build Alternatives. This section is intended to compare the benefits and impacts between Alternatives 1, 2, 3, and 5. Because the portion of the F-B LGA alignment from the intersection of 34th Street and L Street to Oswell Street is common to all of the alternatives, benefits and impacts associated with that alignment are similar. Therefore, impacts that would occur from the portion of the F-B LGA alignment are only summarized when significant impacts would occur. Furthermore, impacts associated with the CCNM Design Option and Refined CCNM Design Option are only listed to compare between the design options and B-P Build Alternatives where appropriate.

Construction impacts occur during construction of the HSR system. Construction impacts that occur for a limited time are considered temporary, and construction impacts that result in long-term changes to the physical environment are considered permanent. Operations impacts occur once the system is built and are related to ongoing activities of the HSR system, such as train pass-bys, maintenance activities along the HSR alignment and at specialized facilities and guideway, and facility security patrols. The B-P Build Alternatives include tracks, stations, maintenance facilities, and electrical power utility infrastructure, unless otherwise noted.

This section summarizes the significance determinations made under CEQA but not for NEPA, which does not require significance determinations for individual impacts. Where feasible, mitigation measures would be applied to avoid or reduce impacts from construction and operations. A determination of the level of significance after mitigation measures also is required under CEQA. In most cases these mitigation measures would reduce the impacts to a less than significant level.

The following resources would not have significant impacts under CEQA for any of the B-P Build Alternatives, CCNM Design Option, Refined CCNM Design Option, and the portion of the F-B LGA alignment from the intersection of 34th Street and L Street to Oswell Street and would not require mitigation:

- Air quality during operation
- Geology, soils, seismicity, and paleontological resources
- Hazardous materials and wastes during operation
- Aesthetics and visual quality during operation

Table S-6 at the end of this summary identifies potential impacts that would occur with all B-P Build Alternatives and the CCNM Design Option or Refined CCNM Design Option, as well as proposed mitigation measures. Table S-6 does not include potential impacts associated with the portion of the F-B LGA alignment from the intersection of 34th Street and L Street to Oswell Street as impacts associated in that area would be the same regardless of which B-P Build Alternative is selected.

The following discussion summarizes the benefits and impacts for each issue area:

- **Transportation.** Access and circulation disruptions would occur throughout the construction period with varying levels of disruption depending on the type of construction activities that occur. However, construction impacts would be minimized through implementation of mitigation to require flaggers and temporary traffic control personnel, compliance with the IAMF requiring preparation of a Construction Transportation Plan, as well as other IAMFs. Therefore, during construction, transportation impacts would be less than significant under CEQA with implementation of IAMF and mitigation. The HSR Project would provide benefits to the regional transportation system by reducing vehicle trips on the freeways through the diversion of intercity trips to HSR. This reduction in future vehicle trips would improve the levels-of-service of the regional roadway system compared with existing conditions and compared to future conditions without development of the HSR project. The overall reduction of vehicle trips and the improvement to regional roadway level-of-service would contribute to the beneficial effects of the project. Under CEQA, traffic congestion (including changes to

level-of-service) is not considered a significant environmental impact. The HSR project would reduce VMT. Therefore, overall impacts would be beneficial under CEQA.

The majority of the B-P Build Alternatives footprint would not result in significant or adverse impacts to the 70 intersections and 53 roadway segments evaluated in the resource study area (RSA). In general, the traffic analysis varies very little among the B-P Build Alternative alignments and the CCNM Design Option and Refined CCNM Design Option because the project includes grade separations for most of the affected roads; therefore, traffic operations on those roads would not change. Permanent road closures would occur on some low-volume roads, so little traffic would be rerouted because of the B-P Build Alternatives. Furthermore, very few intersections or roadway segments operate at or near capacity under existing conditions, so the potential for impacts is limited.

- **Air Quality and Global Climate Change.** Project construction for all B-P Build Alternatives would result in emissions of ozone precursors (volatile organic compounds and nitrogen oxides), carbon monoxide (CO), sulfur dioxide, particulate matter smaller than or equal to 2.5 microns in diameter (PM_{2.5}), particulate matter smaller than or equal to 10 microns in diameter (PM₁₀), and GHG emissions. All B-P Build Alternatives and the F-B LGA from the intersection of 34th Street and L Street to Oswell Street would have significant and unavoidable CO air quality impacts after mitigation measures during the construction period. Construction emissions of volatile organic compounds and nitrogen oxides (NO_x) would be reduced with the purchase of emission offsets; however, CO emissions offsets are not available to reduce project impacts from CO emissions to a less than significant level. Construction emissions would be slightly increased with the CCNM Design Option and the Refined CCNM Design Option over those anticipated for Alternatives 1, 2, 3, and 5; however, no additional significant and unavoidable air quality impacts would result due to the CCNM Design Option or the Refined CCNM Design Option.

Once built, operation of all B-P Build Alternatives would result in a net benefit to air quality because the HSR project would result in lower mobile-source air toxics, GHG emissions, volatile organic compounds, nitrogen oxides, CO, sulfur dioxide, PM_{2.5}, and PM₁₀ emissions compared with the No Project Alternative and existing conditions. Operation of the B-P Build Alternatives would reduce regional VMT and consequently would reduce reactive organic gases, nitrogen oxides, PM₁₀, and PM_{2.5} emissions compared with the No Project Alternative and existing conditions. The B-P Build Alternatives would reduce GHG emissions because they would reduce VMT and intrastate airplane travel; they would also require a similar amount of electricity for operation. Impacts related to air quality and GHG emissions would be less than significant under CEQA.

- **Noise and Vibration.** Noise and vibration impacts from the construction of the B-P Build Alternatives would be significant under CEQA, but the implementation of mitigation measures would reduce noise and vibration impacts to a less than significant level under CEQA.

With mitigation, vibration impacts from long-term operations of the HSR rail corridor, HSR stationary facilities, and electric power utility improvements would be less than significant.

Operation of the B-P Build Alternatives would result in moderate and severe noise impacts on noise-sensitive receivers,¹³ as well as noise impacts classified as “no impact.” All B-P Build Alternatives and the F-B LGA from the intersection of 34th Street and L Street to Oswell Street, would have a significant and unavoidable impact on some noise-sensitive receivers even after mitigation measures are applied because they are located outside the area where

¹³ Noise-sensitive receivers fall into the following categories: Category 1—recording studios, concert halls, and historic properties; Category 2—single-family and multifamily residences, hospitals, homeless shelters, hotels/models; Category 3—schools, churches, parks, prison/correctional facilities, disability services, day cares, theatres, mortuaries, museums, and meeting halls.

a noise barrier would be fully effective or because the noise barrier would not fully mitigate the impact.

However, if noise barriers are not implemented, secondary abatement considerations, including property insulation, could be provided to reduce noise exposure. Overall, long-term operations impacts would be significant but mitigable at some noise-sensitive receivers and significant and unavoidable under CEQA at other noise-sensitive receivers.

The CCNM Design Option would include a 12-foot-high track-side noise barrier. This project feature would reduce impacts associated with long-term operation of the project in the vicinity of La Paz to less than significant under CEQA with the CCNM Design Option. The Refined CCNM Design Option would also include a 12-foot-high noise barrier, as well as a berm. Because of the proposed berm and because of the distance between the Refined CCNM Design Option and La Paz, long-term operation of the project in the vicinity of La Paz would be less than significant under CEQA with the Refined CCNM Design Option. For the B-P Build Alternatives without the CCNM Design Option or Refined CCNM Design Option, HSR operations would have a severe impact on La Paz. Maps of noise sensitive receivers and the associated impact conclusions are included in Section 3.4, Noise and Vibration, of this Draft EIR/EIS.

- **Electromagnetic Fields and Electromagnetic Interference.** Implementation of the B-P Build Alternatives, design options, and ancillary facilities would have similar impacts related to EMI and EMF. The populations and facilities close to the HSR system that would experience effects from exposure to HSR-related EMFs and EMI include dense housing developments, schools and colleges, medical laboratories, research and technology parks, underground pipelines and cables, fences, and existing railroads. However, the project would incorporate IAMFs to control EMI and EMF and prevent interference with railroads. Mitigation would be required to protect sensitive equipment from EMI and EMF during construction and operation. With implementation of mitigation, impacts would be less than significant under CEQA.
- **Public Utilities and Energy.** Construction of the HSR system would require relocating some public utilities and energy infrastructure. Therefore, service interruptions may occur. However, incorporation of IAMFs would minimize service interruptions and other impacts that may occur during construction. Additionally, to address the reconfiguration or relocation of electrical substations or substation components and potential conflicts with oil wells, mitigation measures would be applied. During operation, increased demand for public utilities and energy may occur to operate the HSR system. IAMFs, standard engineering design measures, and best management practices would minimize operations impacts related to increased demand for utilities and energy. Overall, with implementation of mitigation measures, impacts would be less than significant under CEQA.
- **Biological and Aquatic Resources.** The HSR project would cause habitat disturbances to important habitat for special status species (including substantial temporary impacts during construction). The Bakersfield to Palmdale Project Section would traverse valley, mountain, and high desert terrain, as well as urban, rural, and agricultural lands. Approximately 40 percent of the B-P Build Alternative alignments would be at grade and adjacent to an existing, operating freight rail line, and most of the remaining areas would be in areas of existing human disturbance; there are exceptions, such as the La Paz area and the Tehachapi Mountains, where the alignments would be elevated or in tunnels.

Implementation of the B-P Build Alternatives would result in permanent impacts on approximately 11,006 acres of suitable habitat for endangered or threatened species. A portion of the direct impacts on vegetation and wildlife would occur during construction at bridge crossings, which would disturb approximately 11 acres of riparian vegetation. Additionally, some of the direct impact area would occur at at-grade and cut locations that have already been heavily modified by human activity, such as railroad rights-of-way and industrial, commercial, and residential areas. Security fencing and retaining walls in these disturbed locations would not be likely to affect any important areas for wildlife movement. In

accordance with project IAMFs, overhead wires, masts, electric lines, communication towers, and fencing would be designed to be bird and raptor-safe. Impacts related to wildlife movement would be less than significant under CEQA.

The B-P Build Alternatives may affect, and are likely to adversely affect the following species:

- Bakersfield cactus (*Opuntia basilaris* var. *treleasei* [*O. treleasei*])
- Kern primrose sphinx moth (*Euproserpinus euterpe*)
- blunt-nosed leopard lizard (*Gambelia sila*)
- desert tortoise (*Gopherus agassizii*)
- tricolored blackbird (*Agelaius tricolor*)
- yellow-billed cuckoo (Western Distinct Population Segment; *Coccyzus americanus*)
- southwestern willow flycatcher (*Empidonax traillii extimus*)
- California condor (*Gymnogyps californianus*)
- least Bell's vireo (*Vireo bellii pusillus*)
- Tipton kangaroo rat (*Dipodomys nitratoides nitratoides*)
- San Joaquin kit fox (*Vulpes macrotis mutica*)

All B-P Build Alternative alignments for the project section may affect, but are not likely to adversely affect the following species:

- California jewelflower (*Caulanthus californicus*)
- Kern mallow (*Eremalche kernensis*)
- San Joaquin woolly-threads (*Monolopia congdonii*)
- San Joaquin adobe sunburst (*Pseudobahia peirsonii*)

Finally, the B-P Build Alternative alignments would have no effect on designated or proposed critical habitat for the following species:

- desert tortoise
- yellow-billed cuckoo
- southwestern willow flycatcher
- California condor
- least Bell's vireo

Due to the finding of “may affect, and likely to adversely affect,” the Authority will request initiation of formal consultation with the U.S. Fish and Wildlife Service in accordance with Section 7 of the federal Endangered Species Act of 1973. With implementation of conservation measures, the Authority anticipates requesting concurrence from the U.S. Fish and Wildlife Service regarding the determination that the proposed action would have no effect on critical habitat and “may affect, but is not likely to adversely affect,” various species, as noted above. Additionally, if warranted, the Authority will obtain take authorization through a Section 2081 Incidental Take Permit from the California Department of Fish and Wildlife.

For aquatic resources, the B-P Build Alternatives would result in direct, permanent impacts on between 94.4 and 103.7 acres of state-regulated aquatic resources in the study area (depending on the B-P Build Alternative). The project would also have temporary impacts on 17.1 to 18.7 acres of aquatic resources. However, because they are considered isolated (i.e., non-navigable, intrastate waters that do not have a continuous hydrologic surface connection to downstream waters), the USACE has determined that it will not assert jurisdiction under Section 404 of the Clean Water Act over any delineated aquatic resources within the project footprint. A California Department of Fish and Wildlife Section 1600 Streambed Alteration Agreement would be obtained for impacts to state-regulated waters. While the HSR project could cause disturbances to aquatic resources, they would be considered minimal after IAMFs and mitigation measures have been implemented.

With implementation of the IAMFs and mitigation measures, biological impacts would be less than significant under CEQA.

- Hydrology and Water Resources.** The hydrology and water resources analysis evaluated the potential for construction and operation of the B-P Build Alternatives or design options to result in impacts on floodplains, hydraulics, surface waters, and groundwater in the project vicinity. All B-P Build Alternatives and design options would be required to comply with applicable permits and the state and regional requirements to reduce potential construction and operations impacts resulting from changes to drainage, impervious surfaces, stormwater runoff, and water quality, as specified in the hydrology IAMFs and mitigation measures. With implementation of these IAMFs and mitigation measures, impacts on hydrology and water resources would be less than significant under CEQA.

- Geology, Soils, Seismicity, and Paleontological Resources.** The B-P Build Alternatives and design options are located in one of the most seismically active areas in the U.S., crossing major active fault zones, so geologic-related risks are of particular concern in this region. Geologic risks, as well as potential operations impacts for the alignment alternatives, stations, and maintenance facilities, are considered during design and construction, while paleontological resources are generally restricted to the construction phase of project implementation. Where hazards exist, the project would use proven methods to address these hazards, such as subsidence monitoring, slope monitoring, suspension of operations during an earthquake, and ground rupture early warning systems.

Geologic features in the study area would affect the engineering design for all B-P Build Alternatives and design options. The geologic factors expected to present the greatest challenges to construction are unstable soils, soil settlement, soil erosion, difficult excavation, potential exposure to hazardous gas and hazardous minerals, and abandoned mines. With mitigation, none of the geologic or soil conditions would preclude completing the project. Implementation of the B-P Build Alternatives or design options would not prevent any mineral extraction opportunities.

Potential direct impacts on paleontological resources include destruction or damage by breakage and crushing, typically in construction-related activities, and the loss of information associated with these resources. In areas containing paleontologically sensitive geologic units, construction of any of the B-P Build Alternatives or design options could affect an unknown quantity of surface and subsurface fossils. Project IAMFs requiring construction monitoring by a qualified paleontologist and procedures for identification, collection, and preservation (should fossils be uncovered during construction activities) would assist in avoiding or minimizing these impacts.

During construction, the project would incorporate appropriate construction best management practices, standard engineering design measures, and IAMFs to address risks associated with geology, soils, and seismicity, as well as appropriate IAMFs to address paleontological resources. The project would also use IAMFs requiring slope monitoring, gas monitoring, seismic monitoring, subsidence monitoring, and water and wind erosion to address operational hazards. These IAMFs include adherence to guidelines issued by the American Association of State Highway and Transportation Officials, the American Railway Engineers and Maintenance-of-Way Association, the California Department of Transportation, the Federal Highway Administration, and the International Building Code. Impacts would be less than significant under CEQA.

- Hazardous Materials and Wastes.** Construction of the B-P Build Alternatives or design options would result in a temporary increase in the regional transport, use, and disposal of construction-related hazardous materials and wastes. Dangerous conditions (such as extreme weather events), accidents, or encounters with existing contamination in the environment during construction could also cause hazards to the public or the environment. Numerous laws, regulations, and ordinances govern the transport, use, storage, and disposal of hazardous materials and are designed to limit the potential for adverse effects. With compliance with federal, state, and local regulations, as well as implementation of IAMFs to establish procedures for preventing contamination and addressing existing contamination at construction sites, the HSR project would not create a significant hazard to the public or the

environment associated with the routine transport, use, or disposal of hazardous materials during construction. Therefore, impacts would be less than significant under CEQA.

There is one site in the Bakersfield to Palmdale Project Section corridor, U.S. Air Force Plant 42, that has been tentatively identified as a Cortese List site pursuant to Government Code § 65962.5. This parcel covers 5,832 acres of land, but only a portion of the parcel falls within the study area of the B-P Build Alternatives. The release location is 0.45 mile east of the study area and due to this distance and that groundwater has not been impacted, the project would not affect this site such that it would create a significant hazard to the public or environment.

Construction activities associated with any B-P Build Alternative and the F-B LGA could emit hazardous air emissions or introduce extremely hazardous substances or mixtures within 0.25 mile of a school, introducing a health or safety hazard to students or employees. Mitigation would be required to avoid impacts associated with the use or handling of acutely hazardous materials during construction near schools. With mitigation to limit the use of extremely hazardous materials near schools during construction, impacts would be less than significant under CEQA.

No acutely hazardous materials would be required to operate the passenger rail service; therefore, operations impacts would be less than significant under CEQA.

- **Safety and Security.** The HSR system would provide a safe, secure, and reliable means of intercity and regional travel by operating a fully grade-separated, dedicated track alignment using contemporary safety, signaling, and automatic train control systems. The system design would prevent conflicts with other vehicles, pedestrians, and bicyclists and allow the trains to operate year-round under varied weather conditions. Most criminal offenses onboard typical rail systems are nonviolent crimes, such as trespassing and disorderly conduct on vehicles, and theft and vandalism of automobiles at station parking lots. The HSR project's design would include access-control and security-monitoring systems that could deter such acts and facilitate early detection. Overall, the B-P Build Alternatives or design options would not substantially increase hazards because of a design feature; impair implementation of or interfere with an adopted emergency response plan; conflict with adopted policies, plans, or programs or otherwise decrease the safety or security of public transit, bicycle, or pedestrian facilities; or otherwise result in a safety hazard for people residing or working in the project vicinity. Impacts would be less than significant under CEQA.

The Los Angeles County Sheriff's Department Lancaster Station would be displaced under Alternative 5. With implementation of mitigation, the new Los Angeles County Sheriff's Department Lancaster Station would be designed and constructed to be consistent with local land use plans and would be subject to separate site-specific analysis under CEQA. Development of new and/or expanded facilities would comply with local site development and permitting processes, including impact fees and CEQA analysis. However, because the exact location and extent of construction that would be required for the relocation of such facilities is unknown, it is conservatively determined that the impact of relocating the Los Angeles County Sheriff's Department Lancaster Station under Alternative 5 would be significant and unavoidable under CEQA.

- **Socioeconomics and Communities.** For the most part, the B-P Build Alternatives would have less than significant impacts or no impact under CEQA on socioeconomics and communities. However, all of the B-P Build Alternatives would result in significant and unavoidable impacts related to the permanent displacement and relocation of community facilities from construction. Alternatives 1, 2, and 3 would displace two community facilities, and Alternative 5 would displace five community facilities. The CCNM Design Option and Refined CCNM Design Option would not result in any additional displacements and relocations of community facilities. Although implementation of mitigation measures will reduce impacts related to disruptions to activities and services at those facilities, because the exact location and extent of the construction that would be required to relocate such facilities is unknown, it is conservatively determined that the impact of relocating these community

facilities would be a significant and unavoidable impact for all B-P Build Alternatives. The B-P Build Alternatives would also result in benefits related to socioeconomics and communities. They would generate temporary and permanent gains in sales tax revenues because of project spending during construction and operation of the HSR system. During operations, the B-P Build Alternatives would provide circulation and economic benefits, and revenue losses anticipated during construction would not be expected to result in long-term economic changes to the regional economy in affected jurisdictions. These benefits would reduce the likelihood of physical deterioration in communities along the alignment.

All of the B-P Build Alternatives would result in the permanent closure of smaller unpaved roads at their crossings of the HSR alignment. However, the implementation of IAMFs would minimize the potential for operation to indirectly convert Important Farmland due to access disruptions and permanently affect agricultural access under all Build Alternatives. Neither the CCNM Design Option nor the Refined CCNM Design Option would permanently convert any Important Farmland to nonagricultural use. The B-P Build Alternatives would not indirectly convert Important Farmland to nonagricultural use from parcel severance caused by access disruptions or result in permanent agricultural access impacts with the implementation of mitigation. Therefore, these impacts would be less than significant with the implementation of mitigation.

Employment growth from HSR project construction and operation would be a benefit for the region, because it would provide jobs in areas with unemployed workers and workers who want to change employment. The number of short-term construction-related jobs would vary by B-P Build Alternative, ranging from an estimated 25,100 to 26,000 direct, indirect, and induced jobs¹⁴ during the peak construction year, 13,700 to 14,500 of which would be direct jobs in the construction sector. The B-P Build Alternatives would result in up to 27,400 long-term jobs from operation and maintenance of the Bakersfield to Palmdale Project Section. These impacts would be less than significant under CEQA.

- Station Planning, Land Use, and Development.** Construction of the B-P Build Alternatives or design options would result in the temporary alteration of existing land use patterns and the permanent conversion of existing and planned land uses to transportation uses. However, the implementation of IAMFs pertaining to land use, air quality, noise and vibration, aesthetics, and parks and recreation would minimize potential impacts related to the temporary alteration of existing land use patterns and the permanent conversion of existing and planned land uses to transportation uses. The B-P Build Alternatives and design options would result in less than significant impacts related to the permanent conversion of existing and planned land use to transportation use.

The B-P Build Alternatives would result in significant and unavoidable impacts on planned development. All B-P Build Alternatives would conflict with a proposed residential tract to be built in Lancaster and would require the minor reconfiguration of a proposed truck stop in Tehachapi. No feasible mitigation is available to minimize or mitigate the permanent disruption to planned development; therefore, impacts would remain significant and unavoidable.

- Agricultural Farmland and Forest Land.** Construction of the B-P Build Alternatives would result in the temporary conversion of Important Farmland¹⁵ outside of the permanent HSR

¹⁴ Direct employment refers to the jobs created to construct the project and primarily involves employment in the construction sector. Indirect employment refers to the jobs created in existing businesses in the region (e.g., material and equipment suppliers) that provide goods and services to project construction. Induced employment refers to jobs created in new or existing businesses (e.g., retail stores, gas stations, banks, restaurants, service companies) that supply goods and services to workers and their families.

¹⁵ For the purpose of the Agricultural Farmland analysis, Important Farmland includes Prime Farmland, Farmland of Statewide Importance, Unique Farmland, and Farmland of Local Importance as designated by the California Department of Conservation's Farmland Mapping and Monitoring Program.

right-of-way to a nonagricultural use for construction and staging activities. Construction of each B-P Build Alternative would also result in temporary use of Important Farmland under a Williamson Act contract¹⁶ and of Important Farmland zoned for agricultural use to accommodate staging areas. Temporary impacts on Important Farmland would not be significant under CEQA because Important Farmland would be restored and returned to agricultural use after project construction. Construction of either the CCNM Design Option or the Refined CCNM Design Option would not require the temporary use of Important Farmland, including Important Farmland under a Williamson Act contract and Important Farmland zoned for agricultural use. Therefore, temporary impacts to Important Farmland for construction of the B-P Build Alternatives would be the same with or without the CCNM Design Option or the Refined CCNM Design Option.

Construction of the B-P Build Alternatives would also result in the permanent conversion of Important Farmland to nonagricultural use. Permanent conversions of Important Farmland would result from either direct conversion to nonagricultural use to accommodate HSR facilities or indirect impacts related to conversion of Important Farmland to nonagricultural use through the creation of remnant parcels because of parcel severance. By converting hundreds of acres of Important Farmland, both directly and indirectly, to a nonagricultural use, construction of each of the B-P Build Alternatives would result in significant and unavoidable impacts under CEQA. Construction of either the CCNM Design Option or the Refined CCNM Design Option would not permanently convert, either directly or indirectly, Important Farmland, including Important Farmland under a Williamson Act contract and Important Farmland zoned for agricultural use, to a nonagricultural use. Therefore, the permanent conversion of Important Farmland for construction of the B-P Build Alternatives would be the same with or without the CCNM Design Option or the Refined CCNM Design Option.

Operation of any of the B-P Build Alternatives (not including the CCNM Design Option or Refined CCNM Design Option) has the potential to interfere with aerial spraying activities and generate wind-induced effects, but these effects would not permanently convert Important Farmland to nonagricultural use. Therefore, impacts related to operation of the B-P Build Alternatives would be less than significant under CEQA.

- **Parks, Recreation, and Open Space.** For all B-P Build Alternatives, project construction would result in permanent acquisitions of land and/or permanent easements from the Pacific Crest Trail, Rex Parris High School, and Dr. Robert C. St. Clair Parkway (see Section 3.15, Parks, Recreation, and Open Space for maps of these locations). Under Alternatives 1, 2, and 5, the Pacific Crest Trail would be realigned to reduce the number of trail crossings under the proposed HSR viaduct. The proposed Pacific Crest Trail realignment would require a permanent easement for the trail and maintenance easement from the property owner. With implementation of mitigation measures, the acquisition of land and/or easements from park and recreation resources would have a less than significant impact under CEQA. (Impacts related to parks and recreational resources under Section 4(f) of the U.S. Department of Transportation Act of 1966 discussed in Section S.9).

Construction and operation of all B-P Build Alternatives, the CCNM Design Option, and Refined CCNM Design Option would be near La Paz, which is a considered a parks and recreation resource. During construction, users of the activity center could experience short-term air quality, noise, and visual impacts associated with construction activities, including grading and equipment operations. No land from La Paz would be in the temporary impact area. With the CCNM Design Option, the alignment would be 850 feet from La Paz. Visual impacts from the prominence of the B-P Build Alternatives with the CCNM Design Option from La Paz would degrade the visual quality of the surrounding area. With the Refined

¹⁶ Important Farmland that is under a Williamson Act contract is Important Farmland that is covered by a contract per the California State Land Conservation Act of 1965.

CCNM Design Option, the alteration to the views would be minimal, distant, and low within the view sheds, only visible from a few locations within the historic property, and would not reduce the isolation of the setting. Therefore, visual impacts to La Paz would be avoided under the Refined CCNM Design Option.

Operation of all B-P Build Alternatives would place the HSR alignment immediately adjacent to the Pacific Crest Trail. Therefore, trail users would have views of the trains, and noise from passing trains would be perceptible. Mitigation would reduce the contrasting urban appearance of the project with the natural environment; however, the impact would remain significant and unavoidable due to the substantial change in character of this recreation resource and its value in the long term. Impacts would be significant and unavoidable under CEQA.

All of the B-P Build Alternatives would require the permanent acquisition of the entire R. Rex Parris High School property, including the related recreation areas. This acquisition would permanently prevent use of the school play areas at this resource. This would be a significant impact under CEQA. All of the B-P Build Alternatives would require the permanent acquisition of a minor amount of land for column footings from the existing Dr. Robert C. St. Clair Parkway. All B-P Build Alternatives would locate footings for four pedestrian overcrossings in the existing parkway. After mitigation, the B-P Build Alternatives would have a less than significant impact under CEQA.

- **Aesthetics and Visual Quality.** The B-P HSR system would represent a visual change, with the degree of change dependent on the surrounding environment. All of the B-P Build Alternatives and the F-B LGA from the intersection of 34th Street and L Street to Oswell Street would result in adverse changes to visual quality in some areas, either by blocking scenic views or by visual intrusion of the HSR, guideways, associated road crossings, and other project structures that would be out of character or scale with the surroundings. Impacts would mostly occur where project components would be near historic resources or residential areas with high-sensitivity viewers,¹⁷ such as La Paz, Pacific Crest Trail, and residences within 0.25 mile of the alignment in East Bakersfield, Edison, Tehachapi, and Rosamond. In those contexts, the degradation of visual quality would be a significant and unavoidable impact under CEQA. In other instances, where the HSR features would be compatible with the existing environment or where no sensitive viewers are located, such as most locations in the Tehachapi Mountain Range, impacts would be less than significant under CEQA. The CCNM Design Option would result in significant and unavoidable impacts from certain viewpoints in La Paz, though it would reduce the number of key viewpoints significantly affected compared to the B-P Build Alternatives without the CCNM Design Option. The Refined CCNM Design Option would not result in significant and unavoidable impacts related to aesthetics and visual quality.
- **Cultural Resources.** There are 57 cultural resources¹⁸ considered historic properties under the National Historic Preservation Act and NEPA that are also considered historical resources under CEQA.¹⁹ These cultural resources include 8 historic architectural built resources (or built resources) and 49 archaeological resources (52 archaeological resources with the

¹⁷ Viewer sensitivity is the degree to which viewers are sensitive to changes in the visual character of visual resources. High-sensitivity viewers are those considered highly sensitive to visual changes, such as residents, park users, and viewers from scenic viewpoints or historic districts.

¹⁸ Cultural resources include prehistoric- and historic-era archaeological resources, architectural/built-environment resources, and traditional cultural properties listed in or found eligible for listing in the National Register of Historic Places or the California Register of Historical Resources.

¹⁹ For discussions under NEPA and the National Historic Preservation Act, the term “historic property” means any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places, as maintained by the Secretary of the Interior. Under CEQA, the term “historical resources” can be broadly defined as an object, building, structure, site, area, place, record, or manuscript that a lead agency determines to be historically significant.

Refined CCNM Design Option). Impacts on built and archaeological resources would occur with implementation of all of the B-P Build Alternatives. However, the number of resources that would be affected differs among the alternatives. Impacts on archaeological and built resources were analyzed both for NEPA, through the Section 106 process of the National Historic Preservation Act, and for purposes of CEQA.

Application of the Section 106 process of the National Historic Preservation Act results in a finding that adverse effects to built properties would result from each of the B-P Build Alternatives. Effects determinations to archaeological resources would be determined following a phased evaluation process. Impacts on cultural resources analyzed under CEQA include substantial changes to historical resources under each of the B-P Build Alternatives. Implementation of Alternatives 1 and 2 would each result in a phased evaluation process for 47 potentially eligible archaeological properties, whereas implementation of Alternatives 3 and 5 would each result in a phased evaluation process for 46 potentially eligible archaeological properties. However, these adverse changes to archaeological resources could be minimized and mitigated to less than significant levels under any of the B-P Build Alternatives. All B-P Build Alternatives would result in direct adverse effects on the Big Creek Hydroelectric System Historic District in Bakersfield, which is a historic architectural (or built) property. All B-P Build Alternatives and the CCNM Design Option would also result in direct adverse effects on La Paz. Additionally, implementation of Alternative 5 would result in demolition of Denny's Restaurant No. 30.

The substantial adverse changes to the Big Creek Hydroelectric System Historic District could be mitigated and minimized to less than significant levels. However, Alternative 5 would result in significant and unavoidable impacts under CEQA even after minimization efforts and mitigation measures are applied, because the Denny's Restaurant No. 30 historical resource would be demolished. Further, substantial adverse changes to the César E. Chávez National Monument would result in a finding of significant and unavoidable under CEQA.

- **Regional Growth.** In the two-county region consisting of Kern and Los Angeles Counties, employment and population growth attributable to construction and operation of the B-P Build Alternatives would be limited compared to the overall level of growth that would occur under the No Project Alternative. The number of short-term construction-related jobs would vary by B-P Build Alternative or design option, ranging from an estimated 33,100 to 34,800 direct, indirect, and induced jobs during the peak construction year. These jobs would account for an additional 0.7 percent of the approximately 4,889,900 total jobs projected in the two-county region at the peak of construction, which would not be substantial in the context of the region's overall economy. However, of these jobs, 16,900 to 17,800 would be direct jobs in the construction sector, which would represent approximately 11.1 percent of the approximately 161,100 construction jobs projected in the two-county region at the peak of construction. The Authority has been implementing a variety of programs to help local residents gain skills to compete for available HSR jobs, as well as the Community Benefits Agreement, which requires contractors to commit 30 percent of all construction dollars to hiring small businesses. The emphasis on job training for local workers and contract requirements to use small businesses should provide employment opportunities for construction workers in the two-county region. Additionally, because construction activities would be temporary, it is unlikely that construction workers from outside the study area that work on the project would relocate to communities in the study area. Therefore, construction of the project would not result in a substantial number of workers relocating to the project vicinity from outside the region

The number of long-term jobs associated with operation of the HSR project would be the same for all B-P Build Alternatives or design option because employment effects associated with operation and maintenance of the any of the B-P Build Alternatives and increased accessibility provided by the HSR system would be the same. Operation of the HSR system would result in up to 12,300 long-term jobs in the two-county region from operation and maintenance of the Bakersfield to Palmdale Project Section, and improved accessibility of the region. The size of the two-county region, with a projected 2040 employment of 5,692,000, is

so large relative to the additional employment projected under operation of the Bakersfield to Palmdale Project Section that the HSR project employment projection would represent a 00.2 percent increase above the 2040 No Project Alternative employment projection. Therefore, the potential additional employment would have minimal effect on total employment in the two-county region.

Long-term employment in the two-county region has the potential to result in increased population and associated land use development. Given that long-term employment is the same for all B-P Build Alternatives, regardless of the CCNM Design Option or Refined CCNM Design Option, population and land use impacts would also be the same for all B-P Build Alternatives. The B-P Build Alternatives would contribute to a relatively small incremental increase of up to 27,000 people (0.2 percent) above the 2040 population projection of approximately 12,927,100 people. Based on existing city and county general plans, there is adequate land development capacity to accommodate planned growth by 2040, as well as HSR-induced growth in the project vicinity.

Operation of the HSR system has the potential to induce additional population growth in exurban communities as a result of lower cost of housing in these communities relative to those in the major employment centers of Los Angeles. Based on analysis of the tradeoffs between lower housing costs and higher transportation costs afforded by exurban communities with proposed HSR stations, some households may relocate to these areas. Therefore, any such increases in population in these exurban cities would not be growth stimulated by local economic expansion, but rather a redistribution of existing residents in the RSA. Furthermore, it is anticipated that housing constructed in these communities to accommodate such population growth would be consistent with the adopted land use plans, policies, and regulations of local governments.

- Environmental Justice.** The HSR project would result in beneficial effects related to sales tax gains, regional employment, regional transportation, regional air quality, and transportation safety. The HSR project would result in disproportionate, adverse effects on minority and low-income populations (called Environmental Justice [EJ] under CEQA) related to noise, community cohesion, and displacements and relocation. Noise from construction activities would temporarily exceed noise standards and would affect sensitive noise receptors predominantly in areas with EJ populations. Most of the HSR alignment (including the CCNM Design Option and Refined CCNM Design Option) passes through sparsely populated, rural areas. Where the HSR alignment enters urban and suburban population centers, all populations along the HSR alignment would experience adverse effects concerning community cohesion as a result of project construction, but the HSR project would displace more community facilities that serve low-income and homeless populations than those that serve more affluent populations. All B-P Build Alternatives would result in the potential displacement of a homeless services center, affordable housing complexes, and older motels that appear to rent rooms on a weekly or monthly basis to low-income populations. All B-P Build Alternatives would result in displacements and relocations predominantly in areas with EJ populations. The CCNM Design Option and Refined CCNM Design Option are in an area without any EJ populations; therefore, it would not have impacts on these populations.
- Cumulative Impacts.** The B-P Build Alternatives, in combination with other past, present, and reasonably foreseeable probable future actions or projects (cumulative projects), would result in the following construction-period impacts that would be significant and cumulatively considerable under CEQA: air quality, population and community; agricultural farmland; and cultural resources. In addition, the B-P Build Alternatives, in combination with cumulative projects, would result in result in a significant and cumulatively considerable operational noise impact under CEQA.

Environmental Justice

Identifying and addressing the potential for disproportionately high and adverse effects of programs, policies, and activities on minority and low-income populations

S.8.2 Comparison of Bakersfield to Palmdale Project Section Build Alternatives

Table S-7 at the end of the Summary lists the key impacts that differentiate each of the B-P Build Alternatives, the CCNM Design Option, the Refined CCNM Design Option, and the portion of the F-B LGA alignment from the intersection of 34th Street and L Street to Oswell Street. Impacts for the portion F-B LGA from the intersection of 34th Street and L Street to Oswell Street are included in a separate column because there is a common alignment among all B-P Build Alternatives north of Oswell Street. The impacts associated with the CCNM Design Option and Refined CCNM Design Option are also shown in separate columns, and these numbers reflect changes that would occur with the addition of the CCNM Design Option or Refined CCNM Design Option to any of the B-P Build Alternatives. There are other environmental impacts associated with the alignment alternatives, as described in Section S.8.1, that are not listed in Table S-7 because they are of similar magnitude among the alternatives and therefore do not provide a means of differentiating between alternatives.

S.8.3 Preferred Alternative

The B-P Build Alternatives analyzed in this EIR/EIS differ from each other in three geographic areas: the community of Edison, the Mojave area south of Tehachapi, and the city of Lancaster. The CCNM Design Option and the Refined CCNM Design Option differ from the B-P Build Alternatives in the community of Keene. Many impacts on the natural environment and community resources would be the same across all B-P Build Alternatives and therefore do not always provide enough meaningful information to distinguish between the relative merits of the alternatives. Because of the similarity of the B-P Build Alternatives, various differentiators were determined based on stakeholder, agency, and community input in order to identify a Preferred Alternative. Table S-2 and the discussion below the table provide further information on what differentiates the B-P Build Alternatives, the CCNM Design Option, and the Refined CCNM Design Option. The portion of the F-B LGA alignment from the intersection of 34th Street and L Street to Oswell Street is not included in the table as that portion of the alignment is common to alternatives.

Table S-2 Bakersfield to Palmdale Project Section Build Alternatives Differentiators

Community Area	Preferred Alternative 2	Alternative 1	Alternative 3	Alternative 5	CCNM Design Option	Refined CCNM Design Option
Entire Alignment						
Grade separations	52	59	58	59	N/A	N/A
Edison Area						
Relocation of State Route 58	No	Yes	Yes	Yes	N/A	N/A
Farther from key community resources (e.g., reduces impacts from noise, vibration, and access)	610 feet from Edison Middle School	450 feet from Edison Middle School	450 feet from Edison Middle School	450 feet from Edison Middle School	N/A	N/A
Additional visual impacts on Edison Middle School	Yes	No	No	No	N/A	N/A
Keene Area						
Reduces noise and visual impacts to La Paz	No	No	No	No	Yes	Yes
Mojave Area						
Additional tunnel miles	0 miles	0 miles	1 mile	0 miles	N/A	N/A
Avoidance of future mining areas	Yes	Yes	No	Yes	N/A	N/A

Community Area	Preferred Alternative 2	Alternative 1	Alternative 3	Alternative 5	CCNM Design Option	Refined CCNM Design Option
Lancaster Area						
Combines existing rail corridor (fewer residential and affordable housing displacements) ¹	155 rooms, 96 units	155 rooms, 96 units	155 rooms, 96 units	372 rooms, 132 units	N/A	N/A
Results in no impacts on Whit Carter Park	Yes	Yes	Yes	No	N/A	N/A
Avoids impacts to historic property (Village Grille)	Yes	Yes	Yes	No	N/A	N/A

Source: Table 8-2 in Chapter 8, Preferred Alternative and Station Sites, of this EIR/EIS

¹ "Rooms" describes the number of rooms affected in motels that service as de-facto affordable housing, and "units" describes the number of affordable housing units affected.

La Paz = Nuestra Señora Reina de la Paz/César E. Chávez National Monument

N/A = not applicable

In the community of Edison, compared to Alternatives 1, 3, and 5 (which all have the same alignment in Edison), Alternative 2 would not require relocation of SR 58. This would result in fewer impacts on access and also would reduce the construction time period, which in turn would reduce the duration of construction-related impacts (e.g., noise, vibration, air pollution emissions) In addition, with its location south of SR 58, Alternative 2 is farther from key community resources, including Edison Middle School, low-income housing, and agricultural packing houses. This would reduce impacts related to noise, vibration, and access. However, because Alternative 2 would be on an elevated structure, it would have a greater effect on visual quality in the Edison area.

In the Mojave area, compared to Alternatives 1, 2, and 5 (which all have the same alignment in the Mojave area), Alternative 3 would require an additional mile of tunnel. Furthermore, Alternative 3 would avoid impeding areas permitted for future mining (e.g., Cal Portland Mojave cement plant).

In Lancaster, Alternatives 1, 2, and 3 (which all have the same alignment in Lancaster), would combine existing rail facilities into a narrower corridor while also providing room for any expansion needed by UPRR and Metrolink. This would eliminate the need to realign Sierra Highway in Lancaster. As a result, Alternatives 1, 2, and 3 would have fewer residential and commercial displacements in the downtown area. Furthermore, Alternatives 1, 2, and 3 would affect fewer motels that serve as de-facto affordable housing in this area.

In the community of Keene, compared to Alternatives 1, 2, 3, and 5 and the CCNM Design Option, the Refined CCNM Design Option would be located farther from La Paz and would have reduced noise and visual impacts. The Refined CCNM Design Option would not be visible from many vantage points in La Paz and would include some combination of vegetative screening and coloring and/or texturing of the viaduct to such that it would match the natural setting to minimize visual contrast with the landscape. This would reduce visual impacts overall compared to the B-P Build Alternatives and the CCNM Design Option. In addition, the Refined CCNM Design Option would include a noise barrier at least 12 feet in height along a 0.57 mile at-grade section and the 0.13-mile bridge structure over Tweedy Creek to reduce noise exposure to La Paz staff and visitors.

In summary, when compared to Alternatives 1, 3, 5, and the CCNM Design Option, Alternative 2 with the Refined CCNM Design Option would result in fewer impacts on Section 4(f) properties (see Section S.9 for a definition and additional information about Section 4(f) properties), downtown areas, schools, EJ communities, and mining activities. Alternative 2 with the Refined CCNM Design Option would also result in fewer construction-related impacts, such as noise, vibration, hauling traffic, and air pollution emissions, because it does not require the relocation of

SR 58, has fewer miles of tunnel construction, and has the fewest number of grade separations with local roadways. Therefore, Alternative 2 with the Refined CCNM Design Option is recommended as the Preferred Alternative, and serves as the proposed project for CEQA. Additional information comparing the alternative alignments is presented in Chapter 8, Preferred Alternative and Station Sites.

S.8.4 Comparison of High-Speed Rail Stations

Section S.5.3 describes the Bakersfield F Street (Locally Generated Alternative) and the Palmdale Transportation Center stations. Only one station option is under consideration for the stations which would be located in Bakersfield and Palmdale. Table S-7 at the end of this Summary lists all significant project impacts and proposed mitigation measures for the two station sites.

S.8.5 Comparison of Light Maintenance Facility and Maintenance of Infrastructure Site Alternatives

The Bakersfield to Palmdale Project Section would include one LMF, one MOWF, and two MOIS facilities. The two MOIS facilities would be in Edison and Tehachapi and would be generally in the same location no matter which B-P Build Alternative is selected. The LMF and MOWF would be located in the Antelope Valley. This Draft EIR/EIS evaluates two alternatives for these facilities, which are shown on Figure S-3:

- LMF and MOWF co-located at the Lancaster North A site
- LMF at the Avenue M LMF site and MOWF located at the Lancaster North B site

Table S-9 at the end of this Summary lists all significant project impacts and proposed mitigation measures for the two alternative LMF and MOWF sites. As shown in the table, development of either the Lancaster North A or Lancaster North B site would reduce impacts related to operational noise and impacts on special-status plant communities and riparian areas, whereas development of the Avenue M LMF site would result in impacts related to hydrology and water quality. Nonetheless, development of either the Lancaster North A/Lancaster North B site or the Avenue M LMF site would not result in significant and unavoidable impacts under CEQA.

S.8.6 Capital and Operational Costs

Table S-3 provides a capital cost estimate in 2016 dollars for the B-P Build Alternatives, the CCNM Design Option, and the Refined CCNM Design Option. The cost estimates include the total labor and materials necessary to construct the Bakersfield to Palmdale Project Section, including stations, maintenance facilities, utility relocations, electrical infrastructure and substations, and modifications to roadways required to accommodate grade-separated guideways. The cost estimates do not include acquiring vehicles because those are part of the statewide system cost and are not associated with construction of individual sections.

Table S-3 Capital Costs of the B-P Build Alternatives from Bakersfield Station to Palmdale Station (2016\$ in millions)

Cost Category	Alternative 1 ¹	Alternative 2 ¹	Alternative 3 ¹	Alternative 5 ¹	CCNM Design Option ²	Refined CCNM Design Option ³
10 Track structures and track	\$9,308	\$9,516	\$9,880	\$9,262	+\$35	+\$422
20 Stations, ⁴ terminals, intermodal	\$745	\$675	\$745	\$760	\$0	+\$7
30 Support facilities: yards, shops, administration buildings	\$490	\$490	\$490	\$482	\$0	\$0
40 Site work, right-of-way, land, existing improvements ⁵	\$3,668	\$3,487	\$3,731	\$3,638	\$4	-\$24
50 Communications and signaling	\$247	\$248	\$248	\$248	\$0	\$0
60 Electric traction ⁶	\$614	\$615	\$615	\$614	\$0	\$0
70 Vehicles	Considered a systemwide cost and not included as part of individual B-P Build Alternatives or design options					
80 Professional services (applies to categories 10–60)	\$2,239	\$2,182	\$2,303	\$2,165	+\$6	+\$80
90 Unallocated contingency ⁷	\$933	\$933	\$965	\$930	+\$2	+\$24
100 Finance Charges	Estimate to be developed prior to project construction					
Total	\$18,244	\$18,146	\$18,977	\$18,099	+\$47	+\$509

Source: Appendix 6-B, Bakersfield to Palmdale Project Section Cost Estimate Report, of this EIR/EIS; Simon 2020.

¹ Includes costs from Bakersfield Station to Palmdale Station, including the portion of the F-B LGA alignment from the intersection of 34th Street and L Street to Oswell Street and Avenue O to Spruce Court in Palmdale.

² Numbers reflect changes brought by the addition of the CCNM Design Option to any of the B-P Build Alternatives.

³ Numbers reflect changes brought by the addition of the Refined CCNM Design Option to any of the B-P Build Alternatives.

⁴ Station costs overlap with the Bakersfield to Palmdale Project Section and the Palmdale to Burbank Project Section.

⁵ Traction power substation costs are accounted for in this cost category.

⁶ Electrical infrastructure and utility relocation costs are accounted for in this cost category.

⁷ All cost categories include allocated contingencies. Category 90 is only unallocated monies.

B-P = Bakersfield to Palmdale Project Section

EIR/EIS = Environmental Impact Report/Environmental Impact Statement

O&M costs in 2015 dollars as apportioned to the Bakersfield to Palmdale Project Section are shown in Table S-4 and are based on Phase 1 of the California HSR System, total cost per route mile.²⁰ The costs associated with O&M are apportioned on the basis of trainset miles²¹ operated in the Bakersfield to Palmdale Project Section. The costs associated with maintenance of infrastructure are apportioned as a ratio of 80 route miles to 520 Phase 1 total route miles (miles of track).

Table S-4 Annual Operations and Maintenance Costs Apportioned to the Bakersfield to Palmdale Project Section (2015\$ in millions)

Operations and Maintenance Activity	2040 Medium Ridership Forecast	2040 High Ridership Forecast
Train operations	\$46	\$50
Dispatching	\$5	\$5
Maintenance of equipment	\$21	\$23
Maintenance of infrastructure	\$20	\$21
Station and train cleaning	\$11	\$12
Commercial	\$15	\$16
General and administrative	\$8	\$9
Insurance	\$8	\$9
Unallocated contingency	\$6	\$6
Total	\$140	\$153

Source: Appendix 6-A, High-Speed Rail Operating and Maintenance Cost for Use in EIR/EIS Project-Level Analysis, of this EIR/EIS

Totals may not sum due to rounding.

The ridership forecasts used in this environmental analysis correspond to forecasts in the 2016 Business Plan. For the year 2040, the "medium" ridership forecast assumes 42.8 million riders and the "high" ridership forecast assumes 56.8 million riders for Phase 1. For additional information, see Chapter 3.1, Introduction, of this EIR/EIS.

EIR/EIS = Environmental Impact Report/Environmental Impact Statement

S.9 Section 4(f)

Under Section 4(f) of the U.S. Department of Transportation Act (49 U.S.C. 303), an operating administration of the U.S. Department of Transportation may not approve a project that uses properties protected under this section of the law unless there are no prudent or feasible alternatives and the project includes all possible planning to minimize harm to such properties, or a finding of *de minimis* impact is made. Properties protected under Section 4(f) are publicly owned lands that are a part of a park, recreation area, or wildlife and waterfowl refuge, or land belonging to a historical site (publicly or privately owned) of national, state, or local significance as determined by the federal, state, regional, or local officials having jurisdiction over the resource.

- The Big Creek Hydroelectric System–Historic District is a historic property protected under Section 4(f) that would incur a permanent use²² regardless of which B-P Build Alternative is

²⁰ Route mile is defined as the distance traveled over tracks between two points. Route miles may have one or multiple sets of parallel tracks.

²¹ Trainset mile is defined as the movement of a train over one mile.

²² "Permanent use" of a Section 4(f) resource occurs when property is permanently incorporated into a proposed transportation facility. This might occur as a result of partial or full acquisition, permanent easements, or temporary easements that exceed the conditions for temporary occupancy. For additional explanation of Section 4(f) requirements, see Chapter 4.

selected. Only under Alternative 5, the Denny's Restaurant #30 (Village Grille) historic property would incur a permanent use under Section 4(f).

- Whit Carter Park is protected under Section 4(f) and would incur a permanent use under Alternative 5.
- All B-P Build Alternatives would result in a *de minimis*²³ impact on the Pacific Crest Trail and Dr. Robert C. St. Clair Parkway.
- None of the B-P Build Alternatives, the CCNM Design Option, or the Refined CCNM Design Option would result in a permanent use or constructive use²⁴ of La Paz.
- None of the temporary occupancies²⁵ under the B-P Build Alternatives at resources in the study area would constitute a use under Section 4(f).

S.10 Section 6(f)

Section 6(f) (54 U.S.C. 200305(f)) properties are recreation resources funded by the Land and Water Conservation Fund Act. Parklands acquired or developed with Land and Water Conservation Fund funds cannot be converted to other uses without the approval of the National Park Service, and approval is granted only if replacement parkland of “reasonably equivalent usefulness and location” is provided. Based on review of the California Department of Parks and Recreation and National Park Service websites, there are no Section 6(f) properties in the Bakersfield to Palmdale Project Section for the B-P Build Alternatives.

S.11 Environmental Justice

The following laws and regulations govern EJ-related issues:

- Title VI of the Civil Rights Act (Public Law 88-352); Presidential Executive Order 12898, known as the Federal Environmental Justice Policy and the Presidential Memorandum accompanying Presidential Executive Order 12898
- U.S. Department of Transportation Order 5610.2(a), which updates the original Environmental Justice Order
- The Council on Environmental Quality’s Environmental Justice Guidance under NEPA (1997)
- Americans with Disabilities Act (42 U.S.C. § 12101 et seq.)
- Uniform Relocation Assistance and Real Property Program (42 U.S.C. § 4601 et seq.)

Although federal agencies are required to conduct an EJ analysis to assess the potential for their actions to have disproportionately high and adverse environmental and health impacts on minority and low-income populations, pursuant to Executive Order 12898, such an analysis is not required by the state.

Additionally, the Authority’s Title VI policy and plan and a limited English proficiency policy and plan address the Authority’s commitment to nondiscrimination on the basis of race, color, national

²³ For parks and recreation resources, a *de minimis* impact determination may be made if the Authority concludes that the transportation project would not adversely affect the activities, features, and attributes qualifying the resource for protection under Section 4(f) after mitigation.

²⁴ A “constructive use” of a Section 4(f) resource occurs when a transportation project does not permanently incorporate property from a protected resource, but the proximity of the project results in impacts (e.g., noise, vibration, visual, access, ecological) that are so severe that the protected activities, features, or attributes that qualify the resource for protection under Section 4(f) are substantially impaired.

²⁵ A “temporary occupancy” of a Section 4(f) resource occurs when a Section 4(f) property, in whole or in part, is required for construction-related activities. A temporary occupancy would be considered a use if the property is not permanently incorporated into a transportation facility but the activity is considered adverse in terms of the preservationist purposes of the Section 4(f) statute.

origin, age, sex, or disability, and commitment to provide language assistance to individuals with limited English proficiency. These policies and plans do not directly relate to the EJ analysis; however, they demonstrate that the Authority is dedicated to implementing an inclusive planning and construction process that respects every member of California's diverse population in compliance with all applicable laws and regulations.

The discussion that follows presents a summary of the impacts analysis included in Chapter 5, Environmental Justice, of this EIR/EIS. Only those impacts that cannot be mitigated fully are discussed below. Chapter 5, Environmental Justice, lists the mitigation measures that would be applied to reduce the project's impacts. A brief discussion of the potential benefits that could offset the project's disproportionately high and adverse effects on EJ populations is also provided.

Residences, schools, hospitals, libraries, and other institutions are considered noise-sensitive receivers for the purpose of the noise analysis. Of the noise-sensitive receivers expected to be severely affected by the B-P Build Alternatives, 69 percent are located in areas where EJ populations live. Of the noise-sensitive receivers expected to be moderately affected by the B-P Build Alternatives, 93 percent are located in areas where EJ populations live. Therefore, EJ populations would bear a higher burden of the noise impacts associated with operation of the B-P Build Alternatives when compared to the larger reference community. Mitigation measures to address impacts related to noise, listed in Table S-6, and would also serve to reduce impacts on EJ communities.

Construction of the B-P Build Alternatives could displace community facilities along the alignment, including several facilities in Lancaster. Because the majority of the community facilities that would be displaced serve low-income and homeless populations, the adverse impacts associated with the relocation of community facilities would, therefore, be borne primarily by EJ populations. The removal of homes, businesses, and community services or amenities during construction would result in displacements and the division of some communities. In addition, the HSR project would result in the loss of housing that is subject to long-term affordability covenants (income-restricted housing). The B-P Build Alternatives would also displace a critical community resource for homeless populations and motels that provide de-facto affordable housing to low-income populations in Lancaster. All B-P Build Alternatives would displace a homeless service center and Alternatives 1, 2, and 3 would displace eight older motels along Sierra Highway in Lancaster that appear to rent rooms on a weekly and monthly basis to low-income populations. Alternative 5 would also displace residential units at an affordable housing complex and three additional motels along Sierra Highway. However, the alternatives would not displace a similar number of facilities that are important to non-low-income populations. Because adverse impacts would be borne primarily by EJ populations, construction of the B-P Build Alternatives would result in disproportionately high and adverse effects related to community cohesion and displacement on these populations in Lancaster and Palmdale. The CCNM Design Option and Refined CCNM Design Option are in an area without EJ populations and would not result in any changes in impacts on low-income and minority populations.

The Bakersfield Station—F Street (Locally Generated Alternative) would result in disproportionately high and adverse effects on EJ populations related to community cohesion and cumulative effects during construction. Development of the station site would also result in disproportionately high and adverse effects on EJ populations related to noise and vibration; community cohesion; displacements and relocations; parks, recreation, and open space; aesthetics and visual quality; and cumulative effects during operation.

Similar to the B-P Build Alternatives, the Palmdale Station would result in disproportionately high and adverse effects on EJ populations related to community cohesion, displacements and relocations, and cumulative effects during construction, and related to noise, community cohesion, and cumulative effects during operation.

The Lancaster North B MOWF and the Avenue M LMF Zone would not result in disproportionately high and adverse effects on EJ populations during construction or operation because all construction and operations impacts from the Lancaster North B MOWF and the Avenue M LMF Zone would be experienced within a sparsely populated, rural area where EJ populations do not reside.

The B-P Build Alternatives, the Bakersfield Station–F Street (Locally Generated Alternative), the Palmdale Station, the Lancaster North B MOWF, and the Avenue M LMF Zone would result in adverse effects that would be appreciably more severe or greater in magnitude on EJ populations than the adverse effects experienced by non-EJ populations after taking offsetting benefits into account.

The HSR project would also result in beneficial effects on all populations, including low-income and minority populations. The HSR project would result in beneficial effects related to sales tax gains, regional employment, regional transportation, transportation safety, and regional air quality during operation. The operation of the HSR project could also result in beneficial sales tax gains in all of the communities along the B-P Build Alternatives; however, those benefits would be particularly concentrated in the vicinity of the Bakersfield and Palmdale station sites, which are located in or near areas where low-income and minority populations live. Construction of the HSR project would result in a beneficial effect on regional employment, and the Authority has programs (i.e., a Community Benefits Policy, a Community Benefits Agreement, a Small and Disadvantaged Business Policy, and a Targeted Work program) in place to ensure that low-income and minority populations would benefit from HSR construction.

The B-P Build Alternatives would provide benefits to the regional transportation system by providing another mode of transportation for intercity passenger trips, thereby reducing vehicle trips on freeways. All communities, including minority and low-income populations, would benefit from the reduction in roadway congestion and increase in transportation options. At the regional level, operation of the HSR system would result in lower pollutant emissions, resulting in a net benefit to regional air quality. All communities would experience regional air quality benefits resulting from the reduction of vehicle trips, including low-income and minority populations. The HSR project would improve safety and security for motor vehicles, pedestrians, and bicycles through the replacement of at-grade crossings over existing railroad lines adjacent to the alignments of the B-P Build Alternatives. In addition, the HSR system would use contemporary signaling and be fully grade-separated to prevent conflicts with vehicles, pedestrians, and bicyclists. This effect would benefit all communities in the region, including minority and low-income populations.

S.12 Areas of Controversy

Based on the scoping meetings and public outreach efforts throughout the environmental review process, the following are known areas of controversy:

- Selection of the preferred B-P Build Alternative
- Impacts on plants, wildlife, and wildlife habitat
- Impacts on corridor communities (including noise, visual quality loss of community character and cohesion, EJ populations, and right-of-way acquisition)
- Impacts on farmlands (including severance of farmlands, loss of productive farmland, and loss of agricultural enterprises)
- Impacts on the south side of Edison Highway
- Impacts on pedestrian and equestrian access on local roadways and trails
- Impacts on green energy generation facilities
- Impacts on military and aerospace facilities and related activities
- Impacts on the Exotic Feline Breeding Compound in Rosamond
- Impacts on seismic safety
- Potential for valley fever
- Impacts on drainage, flooding, and water wells

- Impacts on wildlife migration and natural lands
- Impacts on access to and use of Pacific Crest Trail
- Potential for wildfires
- Impacts on motel properties along Sierra Highway
- Impacts on air quality
- Impacts on economic growth
- Impacts on Native American land
- Parking and transit connections at stations
- Impacts on recreational facilities
- Impacts related to soil contamination
- Safety of the HSR system
- Impacts on the transportation system
- Impacts on La Paz

S.13 Next Steps in the Environmental Process

The Authority is circulating the Draft EIR/EIS to affected local jurisdictions, state and federal agencies, tribes, community organizations, other interest groups, interested individuals, and the public. The document also is available at the Authority offices, public libraries, and community centers in the study area, and on the Authority's website (www.hsr.ca.gov). The following discussion outlines the next steps in the environmental process, from public and agency comment on the Draft EIR/EIS to construction and operation.

S.13.1 Public and Agency Comment

The Draft EIR/EIS will be circulated for a 45-day comment period that will include public hearings. Information about the schedule of public hearings is available on the Authority's website at www.hsr.ca.gov.

S.13.2 Final EIR/EIS

The Authority will prepare the Bakersfield to Palmdale Project Section Final EIR/EIS that will include responses to comments on the Draft EIR/EIS. The Final EIR/EIS may also include the ROD.

S.13.2.1 Federal Railroad Administration Decision-Making

The environmental review, consultation, and other actions required by applicable federal environmental laws for this project are being or have been carried out by the State of California pursuant to 23 U.S.C. 327 and a Memorandum of Understanding dated July 23, 2019, and executed by the FRA and the State of California. Upon completion of the environmental process with publication of the Bakersfield to Palmdale Project Section Final EIR/EIS, the Authority expects to issue a ROD. The ROD will describe the project and alternatives considered; describe the selected alternative; make environmental findings and determinations with regard to the Endangered Species Act, Section 106, Section 4(f), and environmental justice; and required mitigation measures. Issuance of the ROD is a prerequisite for any federal funding or approvals. The FRA will make findings and determinations with regard to air quality conformity under the Clean Air Act.

S.13.2.2 Surface Transportation Board Decision Making

On completion of the environmental process and issuance of a ROD by the Authority, the U.S. Surface Transportation Board (STB) will issue a final decision on whether to approve the

proposed project (the final decision also serves as the STB's ROD under NEPA). No project-related construction may begin until the STB's final decision has been issued and has become effective.

S.13.2.3 California High-Speed Rail Authority Decision-Making

After completion of the environmental process, the Authority will consider whether to certify the Final EIR/EIS for compliance with CEQA. Once the Authority certifies the Final EIR/EIS, it can approve the project and make related CEQA decisions (findings, mitigation plan, and potential statement of overriding considerations). The required CEQA findings prepared for each significant impact will be one of the following:

- Changes or alternatives have been required or incorporated into the project that avoid or substantially lessen the significant environmental effect as identified in the Final EIR.
- Changes or alternatives are within the responsibility and jurisdiction of another public agency and not the agency making the finding. Such changes have been adopted by such other agency or can and should be adopted by such other agency.
- Specific economic, legal, social, technological, or other considerations, including provision of employment opportunities for highly trained workers, make infeasible the mitigation measures or B-P Build Alternatives identified in the Final EIR.

If the Authority proceeds with project approval, it will file a Notice of Determination that describes the project and states whether the project will have a significant effect on the environment. If the Authority approves a project that will result in the occurrence of significant effects identified in the Final EIR that cannot be avoided or substantially lessened, CEQA requires the preparation of a Statement of Overriding Considerations that provides specific reasons to support the project. These may include economic, legal, social, technological, or other benefits of the proposed project that outweigh unavoidable adverse environmental effects. If such a statement is prepared, it will be referenced in the Authority's Notice of Determination.

For purposes of this Bakersfield to Palmdale Project Section EIR/EIS, project approval would include selection of a north-south alignment alternative, selection of LMF and MOWF locations, approval of electrical power infrastructure locations, and approval of the Palmdale Station location.

S.13.2.4 Project Implementation

After the issuance of the ROD and the Notice of Determination, the Authority would complete final design, obtain permits, and acquire property prior to construction.

Table S-5 Impact Avoidance and Minimization Features

IAMF	Description
Transportation	
TR-IAMF#1: Protection of Public Roadways during Construction	Requires the Contractor to provide a photographic survey documenting the condition of the public roadways along truck routes providing access to the construction sites.
TR-IAMF#2: Construction Transportation Plan	Requires the Contractor to prepare a detailed Construction Transportation Plan for minimizing the impact of construction and construction traffic on adjoining and nearby roadways.
TR-IAMF#3: Off-Street Parking for Construction-Related Vehicles	Requires the Contractor to identify adequate off-street parking for all construction-related vehicles and to use these spaces throughout the construction period, thereby reducing impacts on local on-street parking supply.
TR-IAMF#4: Maintenance of Pedestrian Access	Requires the Contractor to prepare and implement specific construction management plans to address maintenance of pedestrian access during the construction period.
TR-IAMF#5: Maintenance of Bicycle Access	Requires the Contractor to prepare and implement specific construction management plans to address maintenance of bicycle access during the construction period.
TR-IAMF#6: Restriction on Construction Hours	Limits construction material deliveries and the number of construction employees arriving or departing the site during peak-period travel, resulting in reduced impacts on roadway performance levels.
TR-IAMF#7: Construction Truck Routes	Requires the Contractor to deliver all construction-related equipment and materials on the appropriate truck routes, avoiding impacts on streets not designed to accommodate truck traffic.
TR-IAMF#8: Construction during Special Events	Requires the Contractor provide a mechanism to prevent roadway construction activities from reducing roadway capacity during major athletic or other special events.
TR-IAMF#9: Protection of Freight and Passenger Rail during Construction.	Requires the Contractor to repair any structural damage to freight or public railways and to return any damaged sections to their original structural condition.
TR-IAMF#11: Maintenance of Transit Access	Requires the Contractor to prepare and implement specific construction management plans to address maintenance of public transit access during the construction period, including bus and rail transit service, stops, stations, and layover facilities.
TR-IAMF#12: Pedestrian and Bicycle Safety	Requires the Contractor to preserve or enhance pedestrian and bicycle accessibility across the HSR corridor, to and from stations and on station property.
Air Quality	
AQ-IAMF#1: Fugitive Dust Emissions	Requires the preparation of a fugitive dust control plan which will identify the minimum features that will be implemented during ground-disturbing activities.
AQ-IAMF#2: Selection of Coatings	Limits the type of paint to those containing volatile organic compounds of less than 10 percent (low) to be used during construction.

IAMF	Description
AQ-IAMF#3: Renewable Diesel	Requires the Contractor to use renewable diesel fuel to minimize and control exhaust emissions from all heavy-duty, off-road, diesel-fueled construction diesel equipment and on-road diesel trucks.
AQ-IAMF#4: Reduce Criteria Exhaust Emissions from Construction Emissions	Requires utilizing equipment that meets U.S. Environmental Protection Agency Tier 4 emission standards, instead of a mix of equipment meeting various engine tiers.
AQ-IAMF#5: Reduce Criteria Exhaust Emissions from On-Road Construction Equipment	Requires utilizing model year 2010 or newer on-road engines, instead of mix of vehicles with various engine model years.
AQ-IAMF#6: Reduce the Potential Impact of Concrete Batch Plant	Requires documentation of concrete batch plant location and design requirements and concrete batch plants to be sited at least 1,000 feet from sensitive receptors.
Noise and Vibration	
NV-IAMF#1: Noise and Vibration	Requires the Contractor to document how federal guidelines for minimizing noise and vibration will be employed when construction occurs near sensitive receptors (such as hospitals, residential neighborhoods and schools).
Electromagnetic Fields/Electromagnetic Interference	
EMI/EMF-IAMF#1: Preventing Interference with Adjacent Railroads	Requires the Contractor to work with railroad engineering departments and apply standard design practices to prevent interference with the electronic equipment operated on parallel railroad facilities.
EMI/EMF-IAMF#2: Controlling Electromagnetic Fields/ Electromagnetic Interference	Requires the Contractor to design the HSR to international guidelines and comply with federal and state laws and regulations related to Electromagnetic Fields and Electromagnetic Interference.
Public Utilities and Energy	
PUE-IAMF#1: Design Measures	Requires that HSR project design incorporates utilities and design elements that minimize electricity consumption.
PUE-IAMF#2: Irrigation Facility Relocation	Requires that when relocating an irrigation facility, the Contractor will provide a new operational facility prior to disconnecting the original facility, where feasible.
PUE-IAMF#3: Public Notifications	Provides utility users an opportunity to plan appropriately for the service interruption.
PUE-IAMF#4: Utilities and Energy	Provides utility providers an opportunity to plan appropriately for the service interruption.
Biological Resources	
BIO-IAMF#1: Designate Project Biologist, Designated Biologists, Species-Specific Biological Monitors and General Biological Monitors	Establishes a Project Biologist(s) position, responsible for overseeing timely implementation of biological resource mitigation features and permit conditions, overseeing regulatory compliance and monitoring construction activities.

IAMF	Description
BIO-IAMF#2: Facilitate Agency Access	Provides resource agency staff easy access to the construction site when warranted.
BIO-IAMF#3: Prepare WEAP Training Materials and Conduct Construction Period WEAP Training	Provides Worker Environmental Awareness Program (WEAP) training on regulatory agency terms and conditions contained in permits and approvals, federal and state environmental regulations, and IAMFs to project construction crews.
BIO-IAMF#4: Conduct Operation and Maintenance Period WEAP Training	Provides training on regulatory agency terms and conditions contained in permits and approvals, federal and state environmental regulations, and IAMFs to HSR maintenance employees.
BIO-IAMF#5: Prepare and Implement a Biological Resources Management Plan	Requires preparation of a Biological Resources Management Plan to define responsibilities and timing to allow for the timely and appropriately implemented conservation and mitigation features.
BIO-IAMF#6: Establish Monofilament Restrictions	Enacts monofilament restrictions in erosion control materials to eliminate a source of monofilament debris that can result in injury or death to wildlife through entanglement or ingestion.
BIO-IAMF#7: Prevent Entrapment in Construction Materials and Excavations	Avoids construction practices that could allow wildlife to become trapped in construction trenches, pipes, culverts, or similar structures.
BIO-IAMF#8: Delineate Equipment Staging Areas and Traffic Routes	Locates equipment staging areas within areas ultimately to be occupied by permanent HSR facilities to avoid the potential for increased impacts to sensitive biological resource areas.
BIO-IAMF#9: Dispose of Construction Spoils and Waste	Allows Contractor to temporarily store construction waste materials at or near the construction site to reduce construction truck trips and, wherever possible, to return excavated soil to its original location to be used as backfill.
BIO-IAMF#10: Clean Construction Equipment	Requires construction vehicles to be cleaned prior to moving equipment onto and off of the construction site so that mud and plant materials containing seeds that could introduce noxious and invasive weeds to adjacent natural areas are removed.
BIO-IAMF#11: Maintain Construction Sites	Requires preparation of a construction site best management practice field manual that contains construction site housekeeping practices to be implemented by the Contractor.
BIO-IAMF#12: Design the Project to be Bird Safe	Requires the Authority to evaluate the catenary system, masts, and other structures for designs that are bird and raptor-safe in accordance with the applicable standards.
Hydrology and Water Resources	
HYD-IAMF#1: Stormwater Management	Requires the preparation of a stormwater management and treatment plan to capture runoff and provide treatment prior to discharge of pollutant-generating surfaces.
HYD-IAMF#2: Flood Protection	Requires the Contractor to prepare a Flood Protection Plan for Authority review and approval.
HYD-IAMF#3: Prepare and Implement a Construction Stormwater Pollution Prevention Plan	Requires the Contractor to prepare a construction-period Stormwater Pollution Prevention Plan that will include best management practices to minimize potential short-term increases in sediment transport caused by construction.

IAMF	Description
HYD-IAMF#4: Prepare and Implement an Industrial Stormwater Pollution Prevention Plan	Requires the Contractor to prepare an industrial facility Stormwater Pollution Prevention Plan that will include best management practices to control stormwater runoff from HSR industrial facilities such as vehicle maintenance yards.
Geologic Resources	
GEO-IAMF#1: Geologic Hazards	Requires the Contractor to prepare a Construction Management Plan addressing groundwater withdrawal, unstable soils, subsidence, water and wind erosion, and soils with shrink-swell potential.
GEO-IAMF#2: Slope Monitoring	Requires slope monitoring where potential for long-term instability exists.
GEO-IAMF#3: Gas Monitoring	Includes practices to reduce hazards related to potential migration of hazardous gases due to the presence of known oil fields, gas fields, or other subsurface sources.
GEO-IAMF#4: Historic or Abandoned Mines	Includes options for mitigation to address abandoned mines.
GEO-IAMF#5: Hazardous Minerals	Requires preparation of a hazards management plan addressing how the Contractor will minimize or avoid impacts related to hazardous minerals during construction.
GEO-IAMF#6: Ground Rupture Early Warning Systems	Requires project design to provide for the installation of early warning systems, triggered by strong ground motion associated with ground rupture.
GEO-IAMF#7: Evaluate and Design for Large Seismic Ground Shaking	Requires evaluation and design for large seismic ground shaking in the engineering of all HSR components.
GEO-IAMF#8: Suspension of Operations During an Earthquake	Requires motion-sensing instruments to be part of HSR design and requires a control system to shut down HSR operations temporarily during or after a potentially damaging earthquake.
GEO-IAMF#9: Subsidence Monitoring	Provides a remote monitoring program. Trains with autonomous equipment for daily track surveys will monitor and detect reduced track tolerance resulting in changed operations until track tolerances are restored to design specifications.
GEO-IAMF#10: Geology and Soils	Requires the Contractor to incorporate established engineering design guidelines and standards during the HSR design phase so HSR facilities are constructed to accepted engineering standards.
GEO-IAMF#11: Engage a Qualified Paleontological Resources Specialist	Requires the Contractor to designate a paleontological resource specialist (approved by the Authority) who will be responsible for determining where and when paleontological resource monitoring should be conducted and to prepare a Paleontological Resource Monitoring and Mitigation Plan.
GEO-IAMF#12: Perform Final Design Review and Triggers Evaluation	Designates the Paleontological Resources Specialist to evaluate the 90 percent design submittal to identified portions of the construction package that would involve work in paleontologically sensitive geological units.

IAMF	Description
GEO-IAMF#13: Prepare and Implement a Paleontological Resource Monitoring and Mitigation Plan (PRMMP)	Requires development of a construction-package-specific PRMMP that contains monitoring, sampling, and data-recovery procedures.
GEO-IAMF#14: Provide WEAP Training for Paleontological Resources	Requires the Contractor to provide paleontological resources WEAP training for all management and supervisory personnel and construction workers involved with ground-disturbing activities.
GEO-IAMF#15: Halt Construction, Evaluate, and Treat if Paleontological Resources Are Found	Halts construction in the immediate area surrounding the found resource until an evaluation can be completed in accordance with the Paleontological Resource Monitoring and Mitigation Plan.
Hazardous Materials and Wastes	
HMW-IAMF#1: Property Acquisition Phase I and Phase 2 Environmental Site Assessments	Requires completion of a Phase I environmental site assessment during the right-of-way acquisition phase and Phase 2 environmental site assessment and remediation of hazardous waste if necessary.
HMW-IAMF#2: Work Barriers	Requires additional construction procedures that limit the potential release of subsurface containments during construction.
HMW-IAMF#3: Undocumented Contamination	Requires preparation of a Construction Management Plan addressing procedures for disturbing undocumented contaminated soil.
HMW-IAMF#4: Demolition Plans	Requires a demolition plan for the safe dismantling and removal of building components and debris including a plan for lead and asbestos abatement. Lead and asbestos can be prevalent in older structures.
HMW-IAMF#5: Spill Prevention	Requires a written Construction Management Plan, including a construction period spill prevention plan to identify procedures designed to contain and prevent accidental spills, including procedures to clean up any accidental hazardous material release.
HMW-IAMF#6: Transport of Materials	Requires a written hazardous materials and waste plan describing responsible parties and procedures for hazard waste transport in order to reduce the risk of hazardous waste spills.
HMW-IAMF#7: Permit Conditions	Requires a written hazardous materials and waste plan describing responsible parties and procedures for hazard waste transport, containment, and storage.
HMW-IAMF#8: Environmental Management System	Requires an annual review of hazardous materials used during construction and operation to determine if there are acceptable nonhazardous materials substitutes.
HMW-IAMF#9: Hazardous Materials Plans	Requires preparation of a hazardous materials business plan addressing HSR operations.

IAMF	Description
Safety and Security	
SS-IAMF#1: Construction Safety Transportation Management Plan	Requires the Contractor to prepare a construction transportation plan that describes the Contractor's coordination efforts with local jurisdictions for maintaining emergency vehicle access during HSR construction.
SS-IAMF#2: Safety and Security Management Plans	Requires the Contractor to prepare a Safety and Security Management Plan to document how applicable regulatory safety guidelines were considered in HSR design, construction, and eventual operation.
SS-IAMF#3: Hazard Analyses	Requires the Contractor to prepare a preliminary hazard analysis, collision hazard analysis, and threat and vulnerability assessment.
SS-IAMF#4: Oil and Gas Wells	Requires the Contractor to identify and inspect all active and abandoned oil and gas wells within 200 feet of the HSR tracks and abandon and relocate active wells in accordance with standards.
Socioeconomics and Communities	
SOCIO-IAMF#1: Construction Management Plan	Requires the Contractor to prepare a Construction Management Plan that includes measures that minimize impacts on community residents and businesses.
SOCIO-IAMF#2: Compliance with Uniform Relocation Assistance and Real Property Acquisition Policies Act	Requires compliance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act, which requires provision of relocation benefits to all eligible persons regardless of race, color, religion, sex, or national origin.
SOCIO-IAMF#3: Relocation Mitigation Plan	Requires the Authority to develop a relocation mitigation plan to minimize the economic disruption related to relocation.
Land Use and Development, Station Planning	
LU-IAMF#1: HSR Station Area Development: General Principals and Guidelines	Implements the Authority's station area development principles and guidelines.
LU-IAMF#2: Station Area Planning and Local Agency Coordination	Requires the Authority to prepare a memorandum for each station describing the local agency coordination and station area planning conducted to prepare the station area for HSR operations
LU-IAMF#3: Restoration of Land Use Temporarily During Construction	Requires land used temporarily during construction to be returned to a condition equal to the pre-construction staging condition.
Agricultural Farmland and Forest Land	
AG-IAMF#1: Restoration of Important Farmland Used for Temporary Staging Areas	Conserves agricultural land top soil through temporary stockpiling and reuse of soil to restore agricultural lands.
AG-IAMF#2: Farmland Consolidation Program	Administers a farmland consolidation program to sell remnant agricultural parcels to neighboring landowners for combining with adjacent farmland properties and continued agricultural productivity.

IAMF	Description
AG-IAMF#3: Notification to Agricultural Property Owners	Requires notification to agricultural property owners or leaseholders immediately adjacent to the disturbance limits to indicate the intent to begin construction, including an estimated date for the start of construction.
AG-IAMF#4: Temporary Livestock and Equipment Crossings	Requires coordinate with agricultural property owners or leaseholders to provide temporary livestock and equipment crossings.
AG-IAMF#5: Equipment Crossings	Requires affected access roads to be realigned to ensure agricultural equipment crossings are maintained.
Parks, Recreation and Open Space	
PRO-IAMF#1: Parks, Recreation and Open Space	Requires the Contractor to incorporate design features into HSR design that provide for safe and attractive access to present park and recreation facilities.
Aesthetics and Visual Quality	
AVQ-IAMF#1: Aesthetic Options	Applies principles emphasizing that structures shall be designed and constructed with aesthetic character and visual harmony with the surrounding environment.
AVQ-IAMF#2: Aesthetic Review Process	Defines the process that the Contractor must follow to implement the Authority's aesthetic review process.
Cultural Resources	
CUL-IAMF#1: Geospatial Data Layer and Archaeological Sensitivity Map	Requires use geospatial data layering to identify the locations of known archaeological resources and built historic resources in relation to the project footprint.
CUL-IAMF#2: WEAP Training Session	Requires training on measures to avoid or protect built historic resources and to recognize archaeological resources that may be encountered, and requires mandatory procedures to follow should potential cultural resources be exposed during construction.
CUL-IAMF#3: Pre-construction Cultural Resource Surveys	Requires pre-construction cultural resource surveys on any areas not yet surveyed once access is acquired.
CUL-IAMF#4: Relocation of Project Features when Possible	Provides for access areas and laydown sites to be relocated if their proposed location is found to be on newly discovered archaeological resources. Access areas and laydown sites may also be relocated should a built historic resource have the potential to be affected.
CUL-IAMF#5: Archaeological Monitoring Plan and Implementation	Requires preparation of an archaeological sensitivity monitoring plan that identifies and maps areas of archaeological sensitivity and provides a systematic approach to cultural resource monitoring to reduce impacts on cultural resources.
CUL-IAMF#6: Pre-Construction Conditions Assessment, Plan for Protection of Historic Built Resources, Repair of Inadvertent Damage	Requires preparation of a Plan for Protection of Historic Built Resources and Repair of Inadvertent Damage that identifies techniques to minimize inadvertent damage in order to reduce potential impacts on historic cultural resources.

IAMF	Description
CUL-IAMF#7: Built Environment Monitoring Plan	Requires a Built Environment Monitoring Plan that details an implementation strategy for monitoring historic structures and tying implementation of the measures to discrete steps in the construction process.
CUL-IAMF#8: Implement Protection and/or Stabilization Measures	Requires implementation of measures to stabilize and protect historic buildings and structures susceptible to damage during construction.

Source: Appendix 2-E, Avoidance and Mitigation Features, of this EIR/EIS

Authority = California High-Speed Rail Authority

HSR = high-speed rail

IAMF = impact avoidance and minimization feature

Table S-6 Comparison of Potential Adverse Impacts of Bakersfield to Palmdale Project Section Build Alternatives

Impact	Alt 1	Alt 2	Alt 3	Alt 5	CCNM Design Option	Refined CCNM Design Option	Mitigation Measures	CEQA Level of Significance after Mitigation
Transportation								
Construction Impacts								
Impact TR#2: Circulation and Emergency Access During Construction	X	X	X	X	X	X	TRAN-MM#2: Earthwork Haul Routes	Less than significant
Operations Impacts —Less than significant with project features and incorporation of IAMFs; no mitigation measures are required								
Air Quality and Global Climate Change								
Construction Impacts								
Impact AQ#1: Regional Air Quality Impacts During Construction	X	X	X	X	X	X	AQ-MM#1: Offset Project Construction Emissions Through Off-Site Emission Reduction Programs	Significant and unavoidable (for CO emissions only)
Impact AQ#2: Compliance with Air Quality Plans During Construction	X	X	X	X	X	X	AQ-MM#1: Offset Project Construction Emissions Through Off-Site Emission Reduction Programs	Less than significant
Impact AQ#8: Cumulative Impacts During Construction	X	X	X	X	X	X	AQ-MM#1: Offset Project Construction Emissions Through Off-Site Emission Reduction Program	Significant and unavoidable (for CO emissions only)
Operations Impacts —Operation of the project would result in a net benefit to regional air quality; no mitigation measures are required								
Noise and Vibration								
Construction Impacts								
Impact N&V#1: Construction Noise	X	X	X	X	X	X	N&V-MM#1: Construction Noise Mitigation Measures	Less than significant
Impact N&V#2: Construction Vibration	X	X	X	X	N/A	N/A	N&V-MM#2: Construction Vibration Mitigation Measures	Less than significant

Impact	Alt 1	Alt 2	Alt 3	Alt 5	CCNM Design Option	Refined CCNM Design Option	Mitigation Measures	CEQA Level of Significance after Mitigation
Operations Impacts								
Impact N&V#3: Moderate and Severe Noise Impacts from Project Operation to Sensitive Receivers	X	X	X	X	X	N/A	N&V-MM#3: Implement California High-Speed Rail Project Noise Mitigation Guidelines N&V-MM#4: Vehicle Noise Specification N&V-MM#5: Special Trackwork N&V-MM#6: Additional Noise and Vibration Analysis Following Final Design	Significant and unavoidable ¹
Impact N&V#4: Noise Effects on Wildlife and Domestic Animals	X	X	X	X	NA	NA	N&V-MM#8: Startle Effect Warning Signage (applies to PCT area only)	Less than significant
Impact N&V#5: Impacts from Project Vibration	X	X	X	X	X	X	N&V-MM#4: Vehicle Noise Specification N&V-MM#5: Special Trackwork N&V-MM#6: Additional Noise and Vibration Analysis Following Final Design	Less than significant
Impact N&V#7: Noise from HSR Stationary Facilities	X	X	X	X	N/A	N/A	N&V-MM#7: Station, Maintenance-of-Way Facility, and Traction Power Substation	Less than significant
Electromagnetic Fields and Electromagnetic Interference								
Construction Impacts								
Impact EMI/EMF#1: Impacts during Construction	X	X	X	X	X	X	EMI/EMF-MM#1: Protect Sensitive Equipment	Less than significant
Operations Impacts								
Impact EMI/EMF#5: Effects on Sensitive Equipment from Electromagnetic Interference	X	X	X	X	X	X	EMI/EMF-MM#1: Protect Sensitive Equipment	Less than significant
Public Utilities and Energy								
Construction Impacts —Less than significant with project features and incorporation of IAMFs; no mitigation measures are required								
Operations Impacts								

Impact	Alt 1	Alt 2	Alt 3	Alt 5	CCNM Design Option	Refined CCNM Design Option	Mitigation Measures	CEQA Level of Significance after Mitigation
Impact PU&E#6: Conflicts with Existing Utilities	X	X	X	X	X	X	PU&E-MM#1: Reconfigure or Relocate Substations and/or Substation Components	Less than significant
Biological and Aquatic Resources								
Construction Impacts								
Impact BIO#1: Impacts to Suitable Habitat that has the Potential to Support Special-Status Plant Species	X	X	X	X	X	X	BIO-MM#1: Conduct Protocol-Level or Presence/Absence Pre-construction Surveys for Special-Status Plant Species and Special-Status Plant Communities BIO-MM#2: Prepare and Implement Plan for Salvage and Relocation of Special-Status Plant Species BIO-MM#6: Prepare and Implement a Restoration and Revegetation Plan BIO-MM#38: Compensate for Impacts to Listed Plant Species BIO-MM#47: Prepare and Implement a Compensatory Mitigation Plan (CMP) for Impacts to Aquatic Resources BIO-MM#50: Implement Measures to Minimize Impacts During Offsite Habitat Restoration, or Enhancement, or Creation on Mitigation Sites BIO-MM#53: Prepare a Compensatory Mitigation Plan (CMP) for Species and Species Habitat BIO-MM#55: Prepare and Implement a Weed Control Plan BIO-MM#56: Conduct Monitoring of Construction Activities BIO-MM#58: Establish Environmentally Sensitive Areas and Non-Disturbance Zones BIO-MM#61: Establish and Implement a Compliance Reporting Program BIO-MM#75: Minimize Impacts on Kern Primrose Sphinx Moth Host Plants	Less than significant

Impact	Alt 1	Alt 2	Alt 3	Alt 5	CCNM Design Option	Refined CCNM Design Option	Mitigation Measures	CEQA Level of Significance after Mitigation
<p>Impact BIO#2: Disturbance of Suitable Habitat that has the Potential to Support Special-status Reptile, Amphibian, and Insect Species</p>	X	X	X	X	X	X	<p>BIO-MM#7: Conduct Pre-construction Surveys for Special-Status Reptile and Amphibian Species</p> <p>BIO-MM#8: Implement Avoidance and Minimization Measures for Special-Status Reptile and Amphibian Species</p> <p>BIO-MM#11: Conduct Surveys for Blunt-Nosed Leopard Lizard</p> <p>BIO-MM#13: Implement Avoidance Measures for Blunt-Nosed Leopard Lizard</p> <p>BIO-MM#36: Install Aprons or Barriers within Security Fencing</p> <p>BIO-MM#42: Provide Compensatory Mitigation for Impacts to Habitat for Blunt-Nosed Leopard, Tipton Kangaroo Rat, and Nelson’s Antelope Squirrel</p> <p>BIO-MM#47: Prepare and Implement a Compensatory Mitigation Plan (CMP) for Impacts to Aquatic Resources</p> <p>BIO-MM#50: Implement Measures to Minimize Impacts During Offsite Habitat Restoration, or Enhancement, or Creation on Mitigation Sites</p> <p>BIO-MM#53: Prepare a Compensatory Mitigation Plan (CMP) for Species and Species Habitat</p> <p>BIO-MM#55: Prepare and Implement a Weed Control Plan</p> <p>BIO-MM#58: Establish Environmentally Sensitive Areas and Non-Disturbance Zones</p> <p>BIO-MM#61: Establish and Implement a Compliance Reporting Program</p> <p>BIO-MM#62: Prepare Plan for Dewatering and Water Diversions</p> <p>BIO-MM#63: Work Stoppage</p> <p>BIO-MM#79: Mitigation for Desert Tortoise</p> <p>BIO-MM#80: Conduct Surveys and Implement Avoidance Measures for Crotch Bumble Bee</p>	Less than significant

Impact	Alt 1	Alt 2	Alt 3	Alt 5	CCNM Design Option	Refined CCNM Design Option	Mitigation Measures	CEQA Level of Significance after Mitigation
<p>Impact BIO#2: Disturbance to Suitable Habitat that has the Potential to Support Special-status Bird Species (Including Raptors)</p>	X	X	X	X	X	X	<p>BIO-MM#14: Conduct Pre-construction Surveys and Delineate Active Nest Exclusion Areas for Other Breeding Birds</p> <p>BIO-MM#15: Conduct Pre-construction Surveys and Monitoring for Raptors</p> <p>BIO-MM#16: Implement Avoidance Measures for California Condor</p> <p>BIO-MM#17: Conduct Surveys for Swainson’s Hawk Nests and implement Avoidance and Minimization Measures</p> <p>BIO-MM#18: Implement Avoidance and Minimization Measures for Swainson’s Hawk Nests</p> <p>BIO-MM#20: Conduct Protocol Surveys for Burrowing Owls</p> <p>BIO-MM#21: Implement Avoidance and Minimization Measures for Burrowing Owl</p> <p>BIO-MM#43: Provide Compensatory Mitigation for Loss of Swainson’s Hawk Nesting Trees and Habitat</p> <p>BIO-MM#44: Provide Compensatory Mitigation for Loss of Active Burrowing Owl Burrows and Habitat</p> <p>BIO-MM#47: Prepare and Implement a Compensatory Mitigation Plan (CMP) for Impacts to Aquatic Resources</p> <p>BIO-MM#50: Implement Measures to Minimize Impacts During Offsite Habitat Restoration, or Enhancement, or Creation on Mitigation Sites</p> <p>BIO-MM#53: Prepare a Compensatory Mitigation Plan (CMP) for Species and Species Habitat</p> <p>BIO-MM#56: Conduct Monitoring of Construction Activities</p> <p>BIO-MM#58: Establish Environmentally Sensitive Areas and Non-Disturbance Zones</p> <p>BIO-MM#61: Establish and Implement a Compliance Reporting Program</p>	Less than significant

Impact	Alt 1	Alt 2	Alt 3	Alt 5	CCNM Design Option	Refined CCNM Design Option	Mitigation Measures	CEQA Level of Significance after Mitigation
<p>Impact BIO#2: Disturbance to Suitable Habitat that has the Potential to Support Special-status Bird Species (Including Raptors) (Continued from previous page)</p>							<p>BIO-MM#62: Prepare Plan for Dewatering and Water Diversions</p> <p>BIO-MM#63: Work Stoppage</p> <p>BIO-MM#66: Implement Avoidance Measures for Active Eagle Nests</p> <p>BIO-MM#67: Provide Compensatory Mitigation for Loss of Eagle Nests</p> <p>BIO-MM#68: Avoid and Minimize Impacts to White-tailed kite</p> <p>BIO-MM#69: Conduct Surveys and Implement Avoidance Measures for Active Tricolored Blackbird Nest Colonies</p> <p>BIO-MM#70: Provide Compensatory Mitigation for Impacts on Tricolored Blackbird Habitat</p> <p>BIO-MM#71: Implement California Condor Avoidance Measures During Helicopter Use</p> <p>BIO-MM#72: Implement Avoidance of Nighttime Light Disturbance for California Condor</p> <p>BIO-MM#74: Implement Bird Nest and Avian Special Status Species Avoidance Measures for Helicopter-Based Construction Activities</p> <p>BIO-MM#76: Implement Wildlife Rescue Measures</p> <p>BIO-MM#80: Conduct Surveys and Implement Avoidance Measures for Crotch Bumble Bee</p>	

Impact	Alt 1	Alt 2	Alt 3	Alt 5	CCNM Design Option	Refined CCNM Design Option	Mitigation Measures	CEQA Level of Significance after Mitigation
<p>Impact BIO#2: Disturbance to Suitable Habitat that has the Potential to Support Special-status Mammal Species</p>	X	X	X	X	X	X	<p>BIO-MM#22: Conduct Pre-Construction Surveys for Nelson’s Antelope Squirrel, Tipton Kangaroo Rat, Dulzura Pocket Mouse, and Tulare Grasshopper Mouse</p> <p>BIO-MM#23: Implement Avoidance and Minimization Measures for Nelson’s Antelope Squirrel, Tipton Kangaroo Rat, Dulzura Pocket Mouse, and Tulare Grasshopper Mouse</p> <p>BIO-MM#25: Conduct Pre-construction Surveys for Special-Status Bat Species</p> <p>BIO-MM#26: Implement Bat Avoidance and Relocation Measures</p> <p>BIO-MM#27: Implement Bat Exclusion and Deterrence Measures</p> <p>BIO-MM#28: Conduct Pre-construction Surveys for Ringtail and Ringtail Den Sites and Implement Avoidance Measures</p> <p>BIO-MM#29: Conduct Pre-construction Surveys for Ringtail and Ringtail Den Sites and Implement Avoidance Measures</p> <p>BIO-MM#30: Conduct Pre-construction Surveys for San Joaquin Kit Fox</p> <p>BIO-MM#31: Minimize Impacts on San Joaquin Kit Fox</p> <p>BIO-MM#36: Install Aprons or Barriers within Security Fencing</p> <p>BIO-MM#42: Provide Compensatory Mitigation for Impacts to Habitat for Blunt-Nosed Leopard Lizard, Tipton Kangaroo Rat, and Nelson’s Antelope Squirrel</p> <p>BIO-MM#47: Prepare and Implement a Compensatory Mitigation Plan (CMP) for Impacts to Aquatic Resources</p> <p>BIO-MM#50: Implement Measures to Minimize Impacts During Offsite Habitat Restoration, or Enhancement, or Creation on Mitigation Sites</p>	Less than significant

Impact	Alt 1	Alt 2	Alt 3	Alt 5	CCNM Design Option	Refined CCNM Design Option	Mitigation Measures	CEQA Level of Significance after Mitigation
							<p>BIO-MM#53: Prepare a Compensatory Mitigation Plan (CMP) for Species and Species Habitat</p> <p>BIO-MM#56: Conduct Monitoring of Construction Activities</p> <p>BIO-MM#58: Establish Environmentally Sensitive Areas and Non-Disturbance Zones</p> <p>BIO-MM#60: Limit Vehicle Traffic and Construction Site Speeds</p> <p>BIO-MM#61: Establish and Implement a Compliance Reporting Program</p> <p>BIO-MM#62: Prepare Plan for Dewatering and Water Diversions</p> <p>BIO-MM#63: Work Stoppage</p> <p>BIO-MM#76: Implement Wildlife Rescue Measures</p> <p>BIO-MM#77: Implement Wildlife Height Requirements for Enhanced Security Fencing</p> <p>BIO-MM#78: Install Wildlife Jump-outs</p>	

Impact	Alt 1	Alt 2	Alt 3	Alt 5	CCNM Design Option	Refined CCNM Design Option	Mitigation Measures	CEQA Level of Significance after Mitigation
<p>Impact BIO#3: Disturbance to Special-status Plant Communities and Riparian Areas</p>	X	X	X	X	X	X	<p>BIO-MM#1: Conduct Protocol-Level or Presence/Absence Pre-construction Surveys for Special-Status Plant Species and Special-Status Plant Communities</p> <p>BIO-MM#6: Prepare and Implement a Restoration and Revegetation Plan</p> <p>BIO-MM#47: Prepare and Implement a Compensatory Mitigation Plan (CMP) for Impacts to Aquatic Resources</p> <p>BIO-MM#50: Implement Measures to Minimize Impacts During Offsite Habitat Restoration, or Enhancement, or Creation on Mitigation Sites</p> <p>BIO-MM#53: Prepare a Compensatory Mitigation Plan (CMP) for Species and Species Habitat</p> <p>BIO-MM#54: Prepare and Implement an Annual Vegetation Control Plan</p> <p>BIO-MM#58: Establish Environmentally Sensitive Areas and Non-Disturbance Zones</p> <p>BIO-MM#61: Establish and Implement a Compliance Reporting Program</p> <p>BIO-MM#75: Minimize Impacts on Kern Primrose Sphinx Moth Host Plants</p>	Less than significant

Impact	Alt 1	Alt 2	Alt 3	Alt 5	CCNM Design Option	Refined CCNM Design Option	Mitigation Measures	CEQA Level of Significance after Mitigation
Impact BIO#4: Direct and Indirect Impacts on Aquatic Resources	X	X	X	X	X	X	BIO-MM#6: Prepare and Implement a Restoration and Revegetation Plan BIO-MM#33: Restore Aquatic Resources Subject to Temporary Impacts BIO-MM#34: Monitor Construction Activities within Aquatic Resources BIO-MM#47: Prepare and Implement a Compensatory Mitigation Plan (CMP) for Impacts to Aquatic Resources BIO-MM#50: Implement Measures to Minimize Impacts During Offsite Habitat Restoration, or Enhancement, or Creation on Mitigation Sites BIO-MM#58: Establish Environmentally Sensitive Areas and Non-Disturbance Zones BIO-MM#61: Establish and Implement a Compliance Reporting Program BIO-MM#62: Prepare Plan for Dewatering and Water Diversions	Less than significant
Impact BIO#5: Project Impacts Would Temporarily Reduce the Functionality of Wildlife Movement Corridors and Habitat Linkages	X	X	X	X	X	X	BIO-MM#36: Install Aprons or Barriers within Security Fencing BIO-MM#37: Minimize Effects to Wildlife Movement Corridors During Construction BIO-MM#50: Implement Measures to Minimize Impacts During Offsite Habitat Restoration, or Enhancement, or Creation on Mitigation Sites BIO-MM#56: Conduct Monitoring of Construction Activities BIO-MM#64: Establish Wildlife Crossings BIO-MM#77: Implement Wildlife Height Requirements for Enhanced Security Fencing BIO-MM#78: Install Wildlife Jump-outs	Less than significant

Impact	Alt 1	Alt 2	Alt 3	Alt 5	CCNM Design Option	Refined CCNM Design Option	Mitigation Measures	CEQA Level of Significance after Mitigation
Impact BIO#6: Temporary Effects to Protected Trees During Construction	X	X	X	X	X	X	BIO-MM#35: Implement Transplantation and Compensatory Mitigation Measures for Protected Trees BIO-MM#50: Implement Measures to Minimize Impacts During Offsite Habitat Restoration, or Enhancement, or Creation on Mitigation Sites BIO-MM#56: Conduct Monitoring of Construction Activities BIO-MM#58: Establish Environmentally Sensitive Areas and Non-Disturbance Zones BIO-MM#61: Establish and Implement a Compliance Reporting Program	Less than significant
Operations Impacts								
Impact BIO#7: Direct or Indirect Impacts to Suitable Habitat that has the Potential to Support Special-Status Plant Species	X	X	X	X	X	X	BIO-MM#1: Conduct Protocol-Level or Presence/Absence Pre-construction Surveys for Special-Status Plant Species and Special-Status Plant Communities BIO-MM#2: Prepare and Implement Plan for Salvage, Relocation and/or Propagation of Special-Status Plant Species BIO-MM#6: Prepare and Implement a Restoration and Revegetation Plan BIO-MM#38: Compensate for Impacts on Special-Status Plant Species BIO-MM#47: Prepare and Implement a Compensatory Mitigation Plan (CMP) for Impacts to Aquatic Resource BIO-MM#50: Implement Measures to Minimize Impacts During Offsite Habitat Restoration, or Enhancement, or Creation on Mitigation Sites BIO-MM#53: Prepare a Compensatory Mitigation Plan (CMP) for Species and Species Habitat BIO-MM#54: Prepare and Implement an Annual Vegetation Control Plan	Less than significant

Impact	Alt 1	Alt 2	Alt 3	Alt 5	CCNM Design Option	Refined CCNM Design Option	Mitigation Measures	CEQA Level of Significance after Mitigation
<p>Impact BIO#8: Disturbance to Suitable Habitat that has the Potential to Support Special-Status Reptile, Amphibian, and Insect Species</p>	X	X	X	X	X	X	<p>BIO-MM#36: Install Aprons or Barriers within Security Fencing</p> <p>BIO-MM#42: Provide Compensatory Mitigation for Impacts to Habitat for Blunt-Nosed Leopard Lizard, Tipton Kangaroo Rat, and Nelson’s Antelope Squirrel</p> <p>BIO-MM#47: Prepare and Implement a Compensatory Mitigation Plan (CMP) for Impacts to Aquatic Resource</p> <p>BIO-MM#50: Implement Measures to Minimize Impacts During Offsite Habitat Restoration, or Enhancement, or Creation on Mitigation Sites</p> <p>BIO-MM#53: Prepare a Compensatory Mitigation Plan (CMP) for Species and Species Habitat</p> <p>BIO-MM#79: Mitigation for Desert Tortoise</p> <p>BIO-MM#81: Provide Compensatory Mitigation for Impacts to Crotch Bumble Bee</p>	Less than significant

Impact	Alt 1	Alt 2	Alt 3	Alt 5	CCNM Design Option	Refined CCNM Design Option	Mitigation Measures	CEQA Level of Significance after Mitigation
<p>Impact BIO#8: Permanent Impacts to Suitable Habitat that has the Potential to Support Special-Status Bird Species</p>	X	X	X	X	X	X	<p>BIO-MM#43: Provide Compensatory Mitigation for Loss of Swainson’s Hawk Nesting Trees and Habitat</p> <p>BIO-MM#44: Provide Compensatory Mitigation for Loss of Active Burrowing Owl Burrows and Habitat</p> <p>BIO-MM#47: Prepare and Implement a Compensatory Mitigation Plan (CMP) for Impacts to Aquatic Resource</p> <p>BIO-MM#50: Implement Measures to Minimize Impacts During Offsite Habitat Restoration, or Enhancement, or Creation on Mitigation Sites</p> <p>BIO-MM#53: Prepare a Compensatory Mitigation Plan (CMP) for Species and Species Habitat</p> <p>BIO-MM#67: Provide Compensatory Mitigation for Loss of Eagle Nests</p> <p>BIO-MM#70: Provide Compensatory Mitigation for Impacts on Tricolored Blackbird Habitat</p> <p>BIO-MM#71: Implement California Condor Avoidance Measures During Helicopter Use</p> <p>BIO-MM#73: Implement Removal of Carrion that may Attract Condors and Eagles</p> <p>BIO-MM#76: Implement Wildlife Rescue Measures</p>	Less than significant

Impact	Alt 1	Alt 2	Alt 3	Alt 5	CCNM Design Option	Refined CCNM Design Option	Mitigation Measures	CEQA Level of Significance after Mitigation
<p>Impact BIO#8: Permanent Impacts to Suitable Habitat that has the Potential to Support Special-Status Mammal Species</p>	X	X	X	X	X	X	<p>BIO-MM#36: Install Aprons or Barriers within Security Fencing</p> <p>BIO-MM#42: Provide Compensatory Mitigation for Impacts to Habitat for Blunt-Nosed Leopard Lizard, Tipton Kangaroo Rat, and Nelson’s Antelope Squirrel</p> <p>BIO-MM#45: Provide Compensatory Mitigation for Impacts to San Joaquin Kit Fox Habitat</p> <p>BIO-MM#47: Prepare and Implement a Compensatory Mitigation Plan (CMP) for Impacts to Aquatic Resource</p> <p>BIO-MM#50: Implement Measures to Minimize Impacts During Offsite Habitat Restoration, or Enhancement, or Creation on Mitigation Sites</p> <p>BIO-MM#53: Prepare a Compensatory Mitigation Plan (CMP) for Species and Species Habitat</p> <p>BIO-MM#76: Implement Wildlife Rescue Measures</p> <p>BIO-MM#77: Implement Wildlife Height Requirements for Enhanced Security Fencing</p> <p>BIO-MM#78: Install Wildlife Jump-outs</p>	Less than significant

Impact	Alt 1	Alt 2	Alt 3	Alt 5	CCNM Design Option	Refined CCNM Design Option	Mitigation Measures	CEQA Level of Significance after Mitigation
Impact BIO#9: Permanent Impacts to Special-status Plant Communities and Riparian Areas	X	X	X	X	X	X	<p>BIO-MM#6: Prepare and Implement a Restoration and Revegetation Plan</p> <p>BIO-MM#32: Restore Temporary Riparian Habitat Impacts</p> <p>BIO-MM#46: Provide Compensatory Mitigation for Permanent Impacts to Riparian Habitat</p> <p>BIO-MM#47: Prepare and Implement a Compensatory Mitigation Plan (CMP) for Impacts to Aquatic Resource</p> <p>BIO-MM#50: Implement Measures to Minimize Impacts During Offsite Habitat Restoration, or Enhancement, or Creation on Mitigation Sites Offsite Habitat Restoration, Enhancement, and Preservation</p> <p>BIO-MM#53: Prepare a Compensatory Mitigation Plan (CMP) for Species and Species Habitat</p> <p>BIO-MM#54: Prepare and Implement an Annual Vegetation Control Plan</p>	Less than significant
Impact BIO#10: Permanent Effects to Aquatic Resources	X	X	X	X	X	X	<p>BIO-MM#6: Prepare and Implement a Restoration and Revegetation Plan</p> <p>BIO-MM#33: Restore Aquatic Resources Subject to Temporary Impacts</p> <p>BIO-MM#47: Prepare and Implement a Compensatory Mitigation Plan (CMP) for Impacts to Aquatic Resources</p> <p>BIO-MM#50: Implement Measures to Minimize Impacts During Offsite Habitat Restoration, or Enhancement, or Creation on Mitigation Sites</p> <p>BIO-MM#58: Establish Environmentally Sensitive Areas and Non-Disturbance Zones, Enhancement, or Creation on Mitigation Sites</p>	Less than significant

Impact	Alt 1	Alt 2	Alt 3	Alt 5	CCNM Design Option	Refined CCNM Design Option	Mitigation Measures	CEQA Level of Significance after Mitigation
Impact BIO#11: Permanent Reduction of the Functionality of Wildlife Movement Corridors and Habitat Linkages	X	X	X	X	X	X	BIO-MM#64: Establish Wildlife Crossings BIO-MM#76: Implement Wildlife Rescue Measures BIO-MM#77: Implement Wildlife Height Requirements for Enhanced Security Fencing BIO-MM#78: Install Wildlife Jump-outs	Less than significant
Impact BIO#12: Permanent Impacts on Protected Trees	X	X	X	X	X	X	BIO-MM#35: Implement Transplantation and Compensatory Mitigation Measures for Protected Trees BIO-MM#50: Implement Measures to Minimize Impacts During Offsite Habitat Restoration, or Enhancement, or Creation on Mitigation Sites	Less than significant

Hydrology and Water Resources

Construction Impacts

Impact HWR#1: Temporary Construction Impacts to Floodplains and Floodways	X	X	X	X	X	X	WQ-MM#1: Floodplain Protection: Construction BIO-MM#32: Restore Temporary Riparian Habitat Impacts	Less than significant
Impact HWR#3: Temporary Construction Impacts to Surface Water Quality	X	X	X	X	X	X	WQ-MM#2: Regional Dewatering Permits BIO-MM#34: Monitor Construction Activities Within Aquatic Resources BIO-MM#62: Prepare Plan for Dewatering and Water Diversions	Less than significant
Impact HWR#4: Temporary Construction Impacts to Groundwater Volume, Quality, and Recharge	X	X	X	X	X	X	WQ-MM#3: Tunnel constructability and hydrogeological monitoring	Less than significant

Operations Impacts

Impact HWR#5: Permanent Operation Impacts to Floodplains and Floodways	X	X	X	X	X	X	WQ-MM#4: Floodplain Protection: Operation	Less than significant
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Impact	Alt 1	Alt 2	Alt 3	Alt 5	CCNM Design Option	Refined CCNM Design Option	Mitigation Measures	CEQA Level of Significance after Mitigation
Impact HWR#7: Permanent Operation Impacts to Surface Water Quality	X	X	X	X	X	X	WQ-MM#4: Floodplain Protection: Operation	Less than significant
Geology, Soils, Seismicity, and Paleontological Resources								
Construction Impacts —Less than significant with project features and incorporation of IAMFs; no mitigation measures are required								
Operations Impacts —Less than significant with project features and incorporation of IAMFs; no mitigation measures are required								
Hazardous Materials and Wastes								
Construction Impacts								
Impact HMW#3: Potential for handling extremely hazardous materials within 0.25 mile of a school	X	X	X	X	N/A	N/A	HMW-MM#1: Limit use of extremely hazardous materials near schools during construction	Less than significant
Operations Impacts —Less than significant with project features and incorporation of IAMFs; no mitigation measures are required								
Safety and Security								
Construction Impacts								
Impact S&S#12: Need for Expansion of Existing Fire, Rescue, and Emergency Services Facilities	N/A	N/A	N/A	X	N/A	N/A	S&S-MM#2: Los Angeles County Sheriff Facility Replacement	Significant and Unavoidable
Operations Impacts								
Impact S&S#12: Need for Expansion of Existing Fire, Rescue, and Emergency Services Facilities	X	X	X	X	X	X	S&S-MM #1: Response of Local Fire, Rescue, and Emergency Service Providers to Incidents at Stations and Provide a Fair-Share Cost of Service	Less than significant

Impact	Alt 1	Alt 2	Alt 3	Alt 5	CCNM Design Option	Refined CCNM Design Option	Mitigation Measures	CEQA Level of Significance after Mitigation
Socioeconomics and Communities								
Construction Impacts								
Impact SO#5: Permanent Displacement and Relocation of Local Businesses from Construction	X	X	X	X	X	X	No mitigation measures identified	Significant and unavoidable
Impact SO#7: Permanent Displacement and Relocation of Community Facilities from Construction	X	X	X	X	X	X	SO-MM#3: Implement Measures to Reduce Impacts Associated with the Relocation of Important Facilities	Significant and unavoidable
Operations Impacts — Less than significant with project features and incorporation of IAMFs; no mitigation measures are required								
Impact SO#21: Permanent Agricultural Access Impacts and Road Closures from Operation	X	X	X	X	X	X	SO-MM#4: Provide access modifications to affected farmlands.	Less than Significant
Station Planning, Land Use, and Development								
Construction Impacts								
Impact LU#4: Potential for Construction to Permanently Disrupt Planned Development	X	X	X	X	N/A	N/A	No mitigation measures identified	Significant and unavoidable
Operations Impacts —Less than significant with project features and incorporation of IAMFs; no mitigation measures are required								
Agricultural Farmland and Forest Land								
Construction Impacts								
Impact AG#5: Permanent Conversion of Important Farmland to Nonagricultural Use	X	X	X	X	N/A	N/A	AG-MM#1: Conserve Important Farmland (Prime Farmland, Farmland of Statewide Importance, Farmland of Local Importance, and Unique Farmland)	Significant and unavoidable

Impact	Alt 1	Alt 2	Alt 3	Alt 5	CCNM Design Option	Refined CCNM Design Option	Mitigation Measures	CEQA Level of Significance after Mitigation
Impact AG#6: Permanent Indirect Impacts to Important Farmland from Parcel Severance	X	X	X	X	N/A	N/A	AG-MM#1: Conserve Important Farmland (Prime Farmland, Farmland of Statewide Importance, Farmland of Local Importance, and Unique Farmland) SO-MM#4: Provide Access Modifications to Affected Farmlands to allow continued use of agricultural lands and facilities where partial property acquisitions result in division of agricultural parcels by the HSR alignment or facilities	Significant and unavoidable
Impact AG#7: Permanent Impacts to Important Farmland Under Williamson Act or FSZ Contracts, Local Zoning, or Agricultural Conservation Easement Lands	X	X	X	X	N/A	N/A	AG-MM#1: Conserve Important Farmland (Prime Farmland, Farmland of Statewide Importance, Farmland of Local Importance, and Unique Farmland)	Significant and unavoidable

Operations Impacts—Less than significant with project features and incorporation of IAMFs; no mitigation measures are required

Parks, Recreation, and Open Space

Construction Impacts

Impact PK#1: Temporary Impact Areas, Temporary Facility Closures, or Temporary Detours	X	X	X	X	X	X	PC-MM#1: Temporary Use of Land from Park, Recreation, or School Play Areas During Construction	Less than significant
Impact PK#2: Temporary Access, Air Quality, Noise, and Visual Impacts	X	X	X	X	X	X	Mitigation measures provided in Sections 3.2, Transportation; 3.3, Air Quality and Global Climate Change; 3.4, Noise and Vibration; and 3.16, Aesthetics and Visual Resources	Less than significant
Impact PK#3: Permanent Partial Acquisition of Property from Parks, Recreation, and School Play Area Resources	X	X	X	X	X	X	PP-MM#1: Permanent Acquisition of Property from Park, Recreation, and School Play Areas PP-MM#3: Permanent Easement from Parks, Recreation Resources, and/or Trails	Less than significant

Impact	Alt 1	Alt 2	Alt 3	Alt 5	CCNM Design Option	Refined CCNM Design Option	Mitigation Measures	CEQA Level of Significance after Mitigation
Impact PK#4: Permanent Acquisition of Property from Publicly Owned Parks	X	X	X	X	X	X	PP-MM#2: Permanent Acquisition of Property from Publicly Owned Parks Under the California Park Preservation Act PP-MM#3: Permanent Easement from Parks, Recreation Resources, and/or Trails PP-MM#4: Permanent Changes to Access to Parks, Recreation Resources, and/or Trails	Less than significant
Impact PK#5: Project Changes to Planned Parks and Recreation Resources	X	X	X	X	X	X	PP-MM#5: Permanent Acquisition of Property from Land Planned for Recreational Uses and/or Planned Trails	Less than significant
Operations Impacts								
Impact PK#6: Project Changes to Park or Recreation Facility Use or Character	X	X	X	X	X	X	Mitigation measures provided in Sections 3.4, Noise and Vibration, and 3.16, Aesthetics and Visual Resources PCT-MM#1: Temporary and Permanent Effects on the Pacific Crest Trail	Significant and unavoidable ¹
Aesthetics and Visual Quality								
Construction Impacts								
Impact AVQ#1: Construction staging, equipment, lighting, and spoils would introduce new visual elements that may conflict with the existing natural and cultural environments	X	X	X	X	X	X	AVQ-MM#1: Minimize Visual Disruption during Construction and from Construction Activities AVQ-MM#2: Minimize Light Disturbance during Construction	Less than significant

Impact	Alt 1	Alt 2	Alt 3	Alt 5	CCNM Design Option	Refined CCNM Design Option	Mitigation Measures	CEQA Level of Significance after Mitigation
Impact AVQ#3: The permanent construction of a large HSR structure would introduce a new visual element into the existing cultural and natural environments	X	X	X	X	X	N/A	<p>AVQ-MM#3: Incorporate Design Aesthetic Preferences into Final Design and Construction of Non-Station Structures</p> <p>AVQ-MM#4: Provide Vegetative Screening along At-Grade and Elevated Guideways Adjacent to Residential Areas</p> <p>AVQ-MM#5: Replant Unused Portions of Land Acquired for the HSR</p> <p>AVQ-MM#6: Plant Landscape Treatments along the HSR Project Overheads, Embankment, and Retained-Fill Elements</p> <p>AVQ-MM#7: Provide Sound Barrier Treatments</p> <p>AVQ-MM#8: Minimize Vertical Cut-Slopes in Tehachapi Mountains with Retaining Walls</p>	Significant and unavoidable ¹
Operations Impacts —Less than significant; no mitigation measures are required								
Cultural Resources								
Construction Impacts								
Impact CUL#1: Permanent Construction-Period: Potential Adverse Effects on Archaeological Resources due to Construction Activities	X	X	X	X	X	X	<p>CUL-MM#1: Mitigate Adverse Effects to Archaeological and Built Environment Resources Identified During Phased Identification. Comply with the Stipulations Regarding the Treatment of Archaeological and Historic Built Resources in the Programmatic Agreement (PA) and Memorandum of Agreement (MOA)</p> <p>CUL-MM#2: Halt Work in the Event of an Archaeological Discovery and Comply with the Programmatic Agreement (PA), Memorandum of Agreement (MOA), Archaeological Treatment Plan (ATP), and all State and Federal Laws, as applicable</p> <p>CUL-MM#3: Other Mitigation for Effects to Pre-Contact Archaeological Sites</p>	Less than significant

Impact	Alt 1	Alt 2	Alt 3	Alt 5	CCNM Design Option	Refined CCNM Design Option	Mitigation Measures	CEQA Level of Significance after Mitigation
Impact CUL#2: Permanent Construction-Period: Potential Adverse Effects on Built Resources due to Construction Activities	X	X	X	X	X	X	CUL-MM#1: Mitigate Adverse Effects to Archaeological and Built Environment Resources Identified During Phased Identification. Comply with the Stipulations Regarding the Treatment of Archaeological and Historic Built Resources in the Programmatic Agreement (PA) and Memorandum of Agreement (MOA) CUL-MM#34 Minimize Adverse Effects through Relocation of Historic Buildings and Structures	Significant and unavoidable
Operations Impacts								
Impact CUL#3: Permanent Operations – Potential Adverse Effects on Archaeological Resources	X	X	X	X	X	X	CUL-MM#1: Mitigate Adverse Effects to Archaeological and Built Environment Resources Identified During Phased Identification. Comply with the Stipulations Regarding the Treatment of Archaeological and Historic Built Resources in the Programmatic Agreement (PA) and Memorandum of Agreement (MOA) CUL-MM#2: Halt Work in the Event of an Archaeological Discovery and Comply with the Programmatic Agreement (PA), Memorandum of Agreement (MOA), Archaeological Treatment Plan (ATP), and all State and Federal Laws, as applicable CUL-MM#3: Other Mitigation for Effects to Pre-Contact Archaeological Sites	Less than significant
Impact CUL#4: Permanent Operations – Potential Adverse Effects on Built Resources	X	X	X	X	X	N/A	CUL-MM#5: Minimize Adverse Operational Noise Effects CUL-MM#6: Prepare and Submit Additional Recordation and Documentation CUL-MM#7: Prepare Interpretive or Educational Materials CUL-MM#8: Repair of Inadvertent Damage CUL-MM#9: Visual Screening CUL-MM#10: Station Design Consistent with the Secretary of Interior’s Standards for the Treatment of Historic Properties CUL-MM#11: Statewide Historical Interpretation Program	Significant and unavoidable

Impact	Alt 1	Alt 2	Alt 3	Alt 5	CCNM Design Option	Refined CCNM Design Option	Mitigation Measures	CEQA Level of Significance after Mitigation
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Regional Growth

Construction Impacts— Less than significant with project features and incorporation of IAMFs, no mitigation measures are required

Operations Impacts— Less than significant with project features and incorporation of IAMFs, no mitigation measures are required

Cumulative Impacts

Construction Impacts

Cumulative population and communities impacts related to disruption or division of communities and permanent displacements and relocations	X	X	X	X	N/A	N/A	CUM-S&C-MM#1: Cumulative construction impacts on communities	Significant and unavoidable
Cumulative agricultural farmland impacts	X	X	X	X	N/A	N/A	No additional mitigation available to address the cumulative impact	Significant and unavoidable
Cumulative cultural resources impacts related to potential exposure of and permanent disruption to cultural resources	X	X	X	X	N/A	N/A	No additional mitigation available to address the cumulative impact	Significant and unavoidable

Operations Impacts

Cumulative noise impacts to sensitive receptors	X	X	X	X	N/A	N/A	No additional mitigation available to address the cumulative impact	Significant and unavoidable
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¹ Impact conclusions are shown for the greatest impact in the issue area (i.e., if impacts after mitigation were found to remain significant and unavoidable in some locations and be reduced to less than significant in some locations, the table indicates the overall impact in that issue area to be significant and unavoidable).

"X" denotes the adverse impact conclusion and mitigation applies to that alternative. "N/A" denotes the impact conclusion and mitigation are not applicable to that alternative or design option

CEQA = California Environmental Quality Act

CCNM = César E. Chávez National Monument Design Option

Table S-7 Comparison of Bakersfield to Palmdale Project Section Build Alternatives

Impact	Alternative 1	Alternative 2	Alternative 3	Alternative 5	F-B LGA 34th Street/L Street Intersection to Oswell Street	CCNM Design Option ¹	Refined CCNM Design Option ²
Noise and Vibration							
Construction Impacts —No differentiating impacts							
Operations Impacts							
Number of severe operational noise impacts on sensitive receivers between stations (Oswell Street in Bakersfield to O Street in Palmdale)	Residential: 1,845 Nonresidential: 12	Residential: 1,803 Nonresidential: 12	Residential: 1,843 Nonresidential: 12	Residential: 1,943 Nonresidential: 12	Residential: 2,726 Nonresidential: 32	Residential: No change in impacts Nonresidential: -1	Residential: -1 Nonresidential: -1
Public Utilities and Energy							
Construction Impacts							
Number of substations affected	1	1	0	1	0	No change in impacts with the CCNM Design Option	No change in impacts with the Refined CCNM Design Option
Number of oil wells affected	7	6	7	7	0	No change in impacts with the CCNM Design Option	No change in impacts with the Refined CCNM Design Option
Operations Impacts —No differentiating impacts							
Biological and Aquatic Resources							
Suitable habitat for special-status plant species (acres of overall habitat permanently affected)	10,175.6	9,974.4	10,391.5	10,138.4	22.24	-52.9	+1,904.6
Suitable habitat for special-status wildlife species (acres of overall habitat permanently affected)	59,297.7	58,671.0	59,567.9	58,685.3	100.79	-215.5	+12,142.9

Impact	Alternative 1	Alternative 2	Alternative 3	Alternative 5	F-B LGA 34th Street/L Street Intersection to Oswell Street	CCNM Design Option ¹	Refined CCNM Design Option ²
Suitable habitat for modeled federal and state threatened/endangered species (acres of overall habitat permanently affected)	27,507.8	26,986.4	227,651.5	27,335.5	107	-53.8	+5,430.2
Special-status plant communities (acres permanently impacted)	1,161.5	1,166.6	1,160.7	1,161.6	0	-13.9	+555.4
Wetlands and other waters—ordinary high water mark or edge of wetland (acres permanently impacted)	56.9	54.7	56.6	53.5	N/A	+0.1	+1.81
Waters of the state—top of bank or edge of riparian (acres permanently impacted)	87.6	85.3	89.0	84.0	N/A	+0.20	+5.54
Hydrology and Water Resources							
Construction Impacts							
Acres of disturbed surface area	9,825	8,757	8,864	8,733	78	+4.0	+577
Operations Impacts							
Net increase in impervious surface area (acres)	764	770	743	760	30	-1.0	-5.9
Total length of floodplains crossed (miles)	19.5	19.5	19.4	19.5	0	-0.014	-0.019
Total length of groundwater basins crossed (miles)	61	61	60.5	61	4.01	No change in impacts with the CCNM Design Option	No change in impacts with the CCNM Design Option

Impact	Alternative 1	Alternative 2	Alternative 3	Alternative 5	F-B LGA 34th Street/L Street Intersection to Oswell Street	CCNM Design Option ¹	Refined CCNM Design Option ²
Geology, Soils, Seismicity, and Paleontological Resources							
Construction Impacts							
Approximate total miles of “high” paleontological sensitivity	8.9	8.88	8.35	8.9	0	- 0.02 mile	No change in impacts with the Refined CCNM Design Option
Approximate total miles of “high below 5 feet” paleontological sensitivity	48.32	48.33	47.40	48.32	4.01	No change in impacts with the CCNM Design Option	No change in impacts with the Refined CCNM Design Option
Hazardous Materials and Wastes							
Construction Impacts							
Potential environmental concern sites and hazardous materials sites	73 PEC sites (50 high-ranked) 38 oil and gas wells	73 PEC sites (50 high-ranked) 40 oil and gas wells	73 PEC sites (50 high-ranked) 39 oil and gas wells	71 PEC sites (48 high-ranked) 38 oil and gas wells	89 PEC sites (6 high-ranked) 11 oil and gas wells	No change in impacts with the CCNM Design Option	+1 additional high-ranked PEC site
Safety and Security							
Construction Impacts							
Number of fire, rescue, and emergency services facilities affected	None	None	None	1 (Los Angeles County Sheriff's Department Lancaster Station)	None	No change in impacts with the CCNM Design Option	No change in impacts with the Refined CCNM Design Option
Need for expansion of existing fire, rescue, and emergency service facilities	None	None	None	Yes	None	No change in impacts with the CCNM Design Option	No change in impacts with the Refined CCNM Design Option
Operations Impacts—No differentiating impacts							

Impact	Alternative 1	Alternative 2	Alternative 3	Alternative 5	F-B LGA 34th Street/L Street Intersection to Oswell Street	CCNM Design Option ¹	Refined CCNM Design Option ²
Socioeconomics and Communities							
Construction Impacts							
Disruption to community cohesion or division of existing communities from project construction	Yes	Yes (but alignment is positioned 240 feet further southwest of Edison Middle School)	Yes	Yes	Yes	No change in impacts with the CCNM Design Option	No change in impacts with the Refined CCNM Design Option
Estimated number of displaced residential units	253	253	255	368	36	No change in impacts with the CCNM Design Option	No change in impacts with the Refined CCNM Design Option
Estimated number of displaced businesses	311	311	311	329	192	No change in impacts with the CCNM Design Option	No change in impacts with the Refined CCNM Design Option
Estimated number of partial agricultural parcel acquisitions	188	175	188	188	0	+1	+4

Impact	Alternative 1	Alternative 2	Alternative 3	Alternative 5	F-B LGA 34th Street/L Street Intersection to Oswell Street	CCNM Design Option ¹	Refined CCNM Design Option ²
Displaced community facilities	Lancaster Community Homeless Shelter Lancaster Metrolink Station Solid Rock Bible Church	Lancaster Community Homeless Shelter Lancaster Metrolink Station Solid Rock Bible Church	Lancaster Community Homeless Shelter Lancaster Metrolink Station Solid Rock Bible Church	Los Angeles County Sheriff's Station Lancaster Metrolink Station Grace Resources Center University of Antelope Valley Iglesia de Cristo Solid Rock Bible Church	Golden Empire Gleaners, Iglesia do Dios Pentecostes La Hermosa, Mercado Latino, Bakersfield Homeless Center, Kern County Veteran Affairs, Kern County Parks and Recreation, and a City-owned storage facility	No change in impacts with the CCNM Design Option	No change in impacts with the Refined CCNM Design Option
Displacement of affordable housing units at the Laurel Crest Apartments in Lancaster	No	No	No	Yes	Not Applicable – not located in this area	Not Applicable – not located in this area	Not Applicable – not located in this area
Estimated amount of displaced de-facto affordable housing in motels in Lancaster and Palmdale	8 motels (155 rooms)	8 motels (155 rooms)	8 motels (155 rooms)	11 motels (527 rooms)	Not Applicable – not located in this area	Not Applicable – not located in this area	Not Applicable – not located in this area
Diminished air quality at community facilities during construction	14 facilities affected	14 facilities affected	14 facilities affected	19 facilities affected	7 facilities affected	No change (La Paz would still experience increased emission levels)	-1 facility affected (La Paz would not experience increased emission levels)
Increased traffic at community facilities during construction	13 facilities affected	13 facilities affected	13 facilities affected	19 facilities affected	7 facilities affected	No change in impacts with the CCNM Design Option	No change in impacts with the Refined CCNM Design Option

Impact	Alternative 1	Alternative 2	Alternative 3	Alternative 5	F-B LGA 34th Street/L Street Intersection to Oswell Street	CCNM Design Option ¹	Refined CCNM Design Option ²
Changes in school districts funding during construction	Loss of \$1.3 million	Loss of \$1.3 million	Loss of \$1.3 million	Loss of \$1.7 million	Loss of \$0.2 million ¹	No change in impacts with the CCNM Design Option	No change in impacts with the Refined CCNM Design Option
Temporary road closures in agricultural areas	4	0	4	4	0	No change in impacts with the CCNM Design Option	No change in impacts with the Refined CCNM Design Option
Construction-related economic impacts on agricultural revenue	Loss of \$8.6 million	Loss of \$8.1 million	Loss of \$8.6 million	Loss of \$8.6 million	None	No change in impacts with the CCNM Design Option	No change in impacts with the Refined CCNM Design Option
Construction-related economic impacts on agricultural jobs	Loss of 42 jobs	Loss of 42 jobs	Loss of 42 jobs	Loss of 42 jobs	None	No change in impacts with the CCNM Design Option	No change in impacts with the Refined CCNM Design Option
Construction-related property tax revenue losses	Loss of \$754,134	Loss of \$760,126	Loss of \$759,483	Loss of \$853,787	Loss of \$477,949	-\$32 in annual property tax losses	+\$94 in annual property tax losses
Construction-related sales tax revenue losses	Loss of \$532,375	Loss of \$532,375	Loss of \$532,375	Loss of \$638,575	Loss of \$57,145	No change in impacts with the CCNM Design Option	No change in impacts with the Refined CCNM Design Option
Construction-related sales tax revenue gains	Gain of \$24.4 million per year during construction	Gain of \$24.3 million per year during construction	Gain of \$25.4 million per year during construction	Gain of \$24.2 million per year during construction	Not specifically analyzed in the F-B LGA Supplemental EIR or EIS	+\$62,951 per year during construction	+\$681,744 per year during construction

Operations Impacts– No differentiating impacts

Station Planning, Land Use, and Development

Construction Impacts

Number of acres of existing land uses subject to temporary conversion	1,672	1,637	1,644	1,694	54	+15	-66
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Impact	Alternative 1	Alternative 2	Alternative 3	Alternative 5	F-B LGA 34th Street/L Street Intersection to Oswell Street	CCNM Design Option ¹	Refined CCNM Design Option ²
Number of acres of existing land uses subject to permanent conversion	5,816	5,658	5,670	5,510	53	-12	+774
Number of general plan designated land uses subject to permanent conversion	6,111	6,056	6,164	6,098	53	-12	+784
Number of acres of general plan designated land uses subject to temporary conversion	1,795	1,784	1,768	1,820	54	+15	-81

Operations Impacts—No differentiating impacts

Agricultural Farmland and Forest Land

Construction Impacts

Temporary use of Important Farmland	322 acres, 29 acres of which are under Williamson Act contracts	276 acres, 30 acres of which are under Williamson Act contracts	Approximately the same as Alternative 1	Same as Alternative 1	0 acres	0 acres	0 acres
Permanent conversion of Important Farmland to nonagricultural use, including Important Farmland under Williamson Act contracts or zoned for agricultural use	708 acres converted from project construction and an additional 54 acres from parcel severance: <ul style="list-style-type: none"> 93 acres are under Williamson Act contracts 674 acres are zoned for agricultural use 	738 acres converted from project construction and an additional 43 acres converted from parcel severance: <ul style="list-style-type: none"> 106 acres are under Williamson Act contracts 721 acres are zoned for agricultural use 	705 acres converted from project construction and an additional 54 acres converted from parcel severance: <ul style="list-style-type: none"> 93 acres are under Williamson Act contracts 671 acres are zoned for agricultural use 	Same as Alternative 1	0 acres	0 acres	0 acres

Impact	Alternative 1	Alternative 2	Alternative 3	Alternative 5	F-B LGA 34th Street/L Street Intersection to Oswell Street	CCNM Design Option ¹	Refined CCNM Design Option ²
Operations Impacts—No differentiating impacts							
Parks, Recreation, and Open Space							
Construction Impacts							
Number of existing parks, recreation resources, trails, bike paths, or school play areas with acquisitions and/or easements.	7	7	7	8	1 (0.099 acre of Weill Park)	No change in impacts with the CCNM Design Option	No change in impacts with the Refined CCNM Design Option
Number of linear feet included in the Pacific Crest Trail realignment.	845	845	0	845	Not Applicable – not located in this area	Not Applicable – not located in this area	Not Applicable – not located in this area
Operations Impacts—No differentiating impacts							
Aesthetics and Visual Quality							
Construction Impacts—No differentiating impacts							
Operations Impacts							
Number of key viewpoints with significant and unavoidable decreased visual quality	9	10	9	9	2	-1	-4
Cultural Resources							
Construction Impacts							
Potential impacts on significant prehistoric and historic-era archaeological resources.	47	47	46	46	0	No change in impacts with the CCNM Design Option	+3
Operations Impacts							
Effect on historically significant built environment resources.	2	2	2	3	9	+1	-1

Impact	Alternative 1	Alternative 2	Alternative 3	Alternative 5	F-B LGA 34th Street/L Street Intersection to Oswell Street	CCNM Design Option ¹	Refined CCNM Design Option ²
Regional Growth							
Construction Impacts							
Number of short-term jobs created by project construction (annual job years, including direct, indirect, and induced)	154,900	154,600	162,000	154,300	1,323	+400	+4,500
Operations Impacts—No differentiating impacts							

Source: Table 8-1 in Chapter 8, Preferred Alternative and Station Sites, of this EIR/EIS

¹ This column shows the change with the addition of the CCNM Design Option.

² This column shows the change with the addition of the Refined CCNM Design Option

CCNM = César E. Chávez National Monument

F-B LGA = Fresno to Bakersfield Locally Generated Alternative

HSR = high-speed rail

OHWM = ordinary high water mark

PEC = potential environmental concern

Table S-8 Comparison of Potential Adverse Impacts of Station Sites

Impact	Bakersfield Station–F Street (Locally Generated Alternative)	Palmdale Station	Mitigation Measures	CEQA Level of Significance after Mitigation
Transportation				
Construction Impacts –Less than significant with project features and incorporation of IAMFs; no mitigation measures are required				
Operations Impacts				
F-B LGA Impact TR#13: Impacts on the Local Roadway Network due to Station Activity:	X	N/A	Mitigation measures as outlined in Section 3.2, Transportation of the Fresno to Bakersfield Section Final Supplemental EIR (Authority 2018) including: F-B LGA TR-MM#2: Modify Signal Phasing at F St at 30th St F-B LGA TR-MM#3: Install Traffic Signal at Mohawk St at Hageman Rd, SR 99 SB Ramps at Olive Drive, and Beale Ave at Jefferson St/SR 178 WB Ramps F-B LGA TR-MM#4: Restripe Intersection at Mohawk St at Rosedale Hwy F-B LGA TR-MM#5: Re-time Signal at F St at 23rd St, Oak St at Truxtun Ave, F Street at 24th St, and Union Ave at California Ave F-B LGA TR-MM#6: Widen Approaches to Intersection at F St at 23rd St, Oak St at Rosedale Hwy/24th St, and M St /SR 204/28th St F-B LGA TR-MM#7: Add Exclusive Turn Lanes to Intersection at F St at 23rd St, Oak St at Rosedale Hwy/24th St, and M St /SR 204/28th St F-B LGA TR-MM#8: Add New Lanes to Roadway at F St at 23rd St F-B LGA TR-MM#9: Restripe Roadway Segment at F St between 30th & 24th and 30th St between F St & H St	Less than significant

Impact	Bakersfield Station–F Street (Locally Generated Alternative)	Palmdale Station	Mitigation Measures	CEQA Level of Significance after Mitigation
Impact TR #2: Circulation and Emergency Access During Construction	N/A	X	TRAN-MM#3: Intersection and Roadway Segment Improvements <ul style="list-style-type: none"> • SR 14 Southbound on-ramp at Rancho Vista Boulevard: Provide a traffic signal • 20th Street E at Avenue Q: Widen intersection and add an eastbound through lane • 50th Street E/47th Street E at Palmdale Boulevard: Add additional lane on each intersection approach • Fort Tejon Road/Pearblossom Highway at Pearblossom Highway/Avenue T: Modify signal phasing and timing • U.S. Route 395 at Palmdale Road: Modify signal timing • 3rd Street at Avenue Q: Provide traffic signal. • 10th Street E Between Avenue R and Avenue S: Widen roadway • Avenue Q Between 10th Street E and 20th Street E: Widen roadway 	Less than significant
Air Quality and Global Climate Change				
Construction Impacts —Less than significant with project features and incorporation of IAMFs; no mitigation measures are required				
Operations Impacts —Less than significant with project features and incorporation of IAMFs; no mitigation measures are required				
Noise and Vibration				
Construction Impacts				
Impact N&V#1: Construction Noise	X	X	N&V-MM#1: Construction Noise Mitigation Measures	Less than significant
Operations Impacts				
Impact N&V#7: Noise Impacts from HSR Stationary Facilities	X	N/A	N&V-MM#7: Station, Maintenance-of-Way Facility, and Traction Power Substation	Less than significant
Electromagnetic Fields and Electromagnetic Interference				

Impact	Bakersfield Station–F Street (Locally Generated Alternative)	Palmdale Station	Mitigation Measures	CEQA Level of Significance after Mitigation
Construction Impacts				
Impact EMI/EMF#1: Impacts During Construction	X	X	EMI/EMF-MM#1: Protect Sensitive Equipment	Less than significant
Operations Impacts —Less than significant with project features and incorporation of IAMFs; no mitigation measures are required				
Public Utilities and Energy				
Construction Impacts —Less than significant with project features and incorporation of IAMFs; no mitigation measures are required				
Operations Impacts —Less than significant with project features and incorporation of IAMFs; no mitigation measures are required				

Impact	Bakersfield Station–F Street (Locally Generated Alternative)	Palmdale Station	Mitigation Measures	CEQA Level of Significance after Mitigation
Biological and Aquatic Resources				
Construction Impacts				
<p>Impact BIO#1: Effects to Suitable Habitat that has the Potential to Support Special-Status Plant Species</p>	<p>X</p>	<p>N/A</p>	<p>BIO-MM#1: Conduct Protocol-Level or Presence/Absence Pre-construction Surveys for Special-Status Plant Species and Special-Status Plant Communities</p> <p>BIO-MM#2: Prepare and Implement Plan for Salvage and Relocation of Special-Status Plant Species</p> <p>BIO-MM#6: Prepare and Implement a Restoration and Revegetation Plan</p> <p>BIO-MM#38: Compensate for Impacts to Listed Plant Species</p> <p>BIO-MM#47: Prepare and Implement a Compensatory Mitigation Plan (CMP) for Impacts to Aquatic Resources</p> <p>BIO-MM#50: Implement Measures to Minimize Impacts During Offsite Habitat Restoration, or Enhancement, or Creation on Mitigation Sites</p> <p>BIO-MM#53: Prepare a Compensatory Mitigation Plan (CMP) for Species and Species Habitat</p> <p>BIO-MM#55: Prepare and Implement a Weed Control Plan</p> <p>BIO-MM#56: Conduct Monitoring of Construction Activities</p> <p>BIO-MM#58: Establish Environmentally Sensitive Areas and Non-Disturbance Zones</p> <p>BIO-MM#61: Establish and Implement a Compliance Reporting Program</p> <p>BIO-MM#75: Minimize Impacts on Kern Primrose Sphinx Moth Host Plants</p>	<p>Less than significant</p>

Impact	Bakersfield Station–F Street (Locally Generated Alternative)	Palmdale Station	Mitigation Measures	CEQA Level of Significance after Mitigation
<p>Impact BIO#2: Disturbance of Suitable Habitat that has the Potential to Support Special-Status Reptile, Amphibian, and Insect Species</p>	<p>X</p>	<p>X</p>	<p>BIO-MM#7: Conduct Pre-construction Surveys for Special-Status Reptile and Amphibian Species BIO-MM#8: Implement Avoidance and Minimization Measures for Special-Status Reptile and Amphibian Species BIO-MM#11: Conduct Surveys for Blunt-Nosed Leopard Lizard BIO-MM#13: Implement Avoidance Measures for Blunt-Nosed Leopard Lizard BIO-MM#36: Install Aprons or Barriers within Security Fencing BIO-MM#42: Provide Compensatory Mitigation for Impacts to Habitat for Blunt-Nosed Leopard, Tipton Kangaroo Rat, and Nelson’s Antelope Squirrel BIO-MM#47: Prepare and Implement a Compensatory Mitigation Plan (CMP) for Impacts to Aquatic Resources BIO-MM#50: Implement Measures to Minimize Impacts During Offsite Habitat Restoration, or Enhancement, or Creation on Mitigation Sites BIO-MM#53: Prepare a Compensatory Mitigation Plan (CMP) for Species and Species Habitat BIO-MM#55: Prepare and Implement a Weed Control Plan BIO-MM#58: Establish Environmentally Sensitive Areas and Non-Disturbance Zones BIO-MM#61: Establish and Implement a Compliance Reporting Program BIO-MM#62: Prepare Plan for Dewatering and Water Diversions BIO-MM#63: Work Stoppage BIO-MM#79: Mitigation for Desert Tortoise BIO-MM#80: Conduct Surveys and Implement Avoidance Measures for Crotch Bumble Bee</p>	<p>Less than significant</p>

Impact	Bakersfield Station–F Street (Locally Generated Alternative)	Palmdale Station	Mitigation Measures	CEQA Level of Significance after Mitigation
<p>Impact BIO#2: Disturbance to Suitable Habitat that has the Potential to Support Special-Status Bird Species (Including Raptors)</p>	<p>X</p>	<p>X</p>	<p>BIO-MM#14: Conduct Pre-construction Surveys and Delineate Active Nest Exclusion Areas for Other Breeding Birds</p> <p>BIO-MM#15: Conduct Pre-construction Surveys and Monitoring for Raptors</p> <p>BIO-MM#16: Implement Avoidance Measures for California Condor</p> <p>BIO-MM#17: Conduct Surveys for Swainson’s Hawk Nests and implement Avoidance and Minimization Measures</p> <p>BIO-MM#18: Implement Avoidance and Minimization Measures for Swainson’s Hawk Nests</p> <p>BIO-MM#20: Conduct Protocol Surveys for Burrowing Owls</p> <p>BIO-MM#21: Implement Avoidance and Minimization Measures for Burrowing Owl</p> <p>BIO-MM#43: Provide Compensatory Mitigation for Loss of Swainson’s Hawk Nesting Trees and Habitat</p> <p>BIO-MM#44: Provide Compensatory Mitigation for Loss of Active Burrowing Owl Burrows and Habitat</p> <p>BIO-MM#47: Prepare and Implement a Compensatory Mitigation Plan (CMP) for Impacts to Aquatic Resources</p> <p>BIO-MM#50: Implement Measures to Minimize Impacts During Offsite Habitat Restoration, or Enhancement, or Creation on Mitigation Sites</p> <p>BIO-MM#53: Prepare a Compensatory Mitigation Plan (CMP) for Species and Species Habitat</p> <p>BIO-MM#56: Conduct Monitoring of Construction Activities</p> <p>BIO-MM#58: Establish Environmentally Sensitive Areas and Non-Disturbance Zones</p> <p>BIO-MM#61: Establish and Implement a Compliance Reporting Program</p> <p>BIO-MM#62: Prepare Plan for Dewatering and Water Diversions</p> <p>BIO-MM#63: Work Stoppage</p> <p>BIO-MM#66: Implement Avoidance Measures for Active Eagle Nests</p> <p>BIO-MM#67: Provide Compensatory Mitigation for Loss of Eagle Nests</p> <p>BIO-MM#68: Avoid and Minimize Impacts to White-tailed kite</p>	<p>Less than significant</p>

Impact	Bakersfield Station–F Street (Locally Generated Alternative)	Palmdale Station	Mitigation Measures	CEQA Level of Significance after Mitigation
			<p>BIO-MM#69: Conduct Surveys and Implement Avoidance Measures for Active Tricolored Blackbird Nest Colonies</p> <p>BIO-MM#70: Provide Compensatory Mitigation for Impacts on Tricolored Blackbird Habitat</p> <p>BIO-MM#71: Implement California Condor Avoidance Measures During Helicopter Use</p> <p>BIO-MM#72: Implement Avoidance of Nighttime Light Disturbance for California Condor</p>	
<p>Impact BIO#2: Disturbance to Suitable Habitat that has the Potential to Support Special-Status Mammal Species</p>	X	N/A	<p>BIO-MM#22: Conduct Pre-Construction Surveys for Nelson’s Antelope Squirrel, Tipton Kangaroo Rat, Dulzura Pocket Mouse, and Tulare Grasshopper Mouse</p> <p>BIO-MM#23: Implement Avoidance and Minimization Measures for Nelson’s Antelope Squirrel, Tipton Kangaroo Rat, Dulzura Pocket Mouse, and Tulare Grasshopper Mouse</p> <p>BIO-MM#25: Conduct Pre-construction Surveys for Special-Status Bat Species</p> <p>BIO-MM#25: Conduct Pre-construction Surveys for Special-Status Bat Species</p> <p>BIO-MM#26: Implement Bat Avoidance and Relocation Measures</p> <p>BIO-MM#27: Implement Bat Exclusion and Deterrence Measures</p> <p>BIO-MM#28: Conduct Pre-construction Surveys for Ringtail and Ringtail Den Sites and Implement Avoidance Measures</p> <p>BIO-MM#29: Conduct Pre-construction Surveys for Ringtail and Ringtail Den Sites and Implement Avoidance Measures</p> <p>BIO-MM#30: Conduct Pre-construction Surveys for San Joaquin Kit Fox</p> <p>BIO-MM#31: Minimize Impacts on San Joaquin Kit Fox</p> <p>BIO-MM#36: Install Aprons or Barriers within Security Fencing</p> <p>BIO-MM#42: Provide Compensatory Mitigation for Impacts to Habitat for Blunt-Nosed Leopard Lizard, Tipton Kangaroo Rat, and Nelson’s Antelope Squirrel</p> <p>BIO-MM#47: Prepare and Implement a Compensatory Mitigation Plan (CMP) for Impacts to Aquatic Resources</p>	Less than significant

Impact	Bakersfield Station–F Street (Locally Generated Alternative)	Palmdale Station	Mitigation Measures	CEQA Level of Significance after Mitigation
			<p>BIO-MM#50: Implement Measures to Minimize Impacts During Offsite Habitat Restoration, or Enhancement, or Creation on Mitigation Sites</p> <p>BIO-MM#53: Prepare a Compensatory Mitigation Plan (CMP) for Species and Species Habitat</p> <p>BIO-MM#56: Conduct Monitoring of Construction Activities</p> <p>BIO-MM#58: Establish Environmentally Sensitive Areas and Non-Disturbance Zones</p> <p>BIO-MM#60: Limit Vehicle Traffic and Construction Site Speeds</p> <p>BIO-MM#61: Establish and Implement a Compliance Reporting Program</p> <p>BIO-MM#62: Prepare Plan for Dewatering and Water Diversions</p> <p>BIO-MM#63: Work Stoppage</p> <p>BIO-MM#76: Implement Wildlife Rescue Measures</p> <p>BIO-MM#77: Implement Wildlife Height Requirements for Enhanced Security Fencing</p>	
<p>Impact BIO#4: Direct and Indirect Impacts on Aquatic Resources</p>	<p>N/A</p>	<p>X</p>	<p>BIO-MM#6: Prepare and Implement a Restoration and Revegetation Plan</p> <p>BIO-MM#33: Restore Aquatic Resources Subject to Temporary Impacts</p> <p>BIO-MM#34: Monitor Construction Activities within Aquatic Resources</p> <p>BIO-MM#47: Prepare and Implement a Compensatory Mitigation Plan (CMP) for Impacts to Aquatic Resources</p> <p>BIO-MM#50: Implement Measures to Minimize Impacts During Offsite Habitat Restoration, or Enhancement, or Creation on Mitigation Sites</p> <p>BIO-MM#58: Establish Environmentally Sensitive Areas and Non-Disturbance Zones</p> <p>BIO-MM#61: Establish and Implement a Compliance Reporting Program</p> <p>BIO-MM#62: Prepare Plan for Dewatering and Water Diversions</p>	<p>Less than significant</p>

Impact	Bakersfield Station–F Street (Locally Generated Alternative)	Palmdale Station	Mitigation Measures	CEQA Level of Significance after Mitigation
Operations Impacts				
<p>Impact BIO#7: Direct or Indirect Effects to Suitable Habitat that has the Potential to Support Special-Status Plant Species</p>	X	N/A	<p>BIO-MM#1: Conduct Protocol-Level or Presence/Absence Pre-construction Surveys for Special-Status Plant Species and Special-Status Plant Communities</p> <p>BIO-MM#2: Prepare and Implement Plan for Salvage, Relocation and/or Propagation of Special-Status Plant Species</p> <p>BIO-MM#6: Prepare and Implement a Restoration and Revegetation Plan</p> <p>BIO-MM#38: Compensate for Impacts on Special-Status Plant Species</p> <p>BIO-MM#47: Prepare and Implement a Compensatory Mitigation Plan (CMP) for Impacts to Aquatic Resource</p> <p>BIO-MM#50: Implement Measures to Minimize Impacts During Offsite Habitat Restoration, or Enhancement, or Creation on Mitigation Sites</p> <p>BIO-MM#53: Prepare a Compensatory Mitigation Plan (CMP) for Species and Species Habitat</p> <p>BIO-MM#54: Prepare and Implement an Annual Vegetation Control Plan</p>	Less than significant
<p>Impact BIO#8: Disturbance to Suitable Habitat that has the Potential to Support Special-Status Reptile, Amphibian, and Insect Species</p>	X	X	<p>BIO-MM#36: Install Aprons or Barriers within Security Fencing</p> <p>BIO-MM#42: Provide Compensatory Mitigation for Impacts to Habitat for Blunt-Nosed Leopard Lizard, Tipton Kangaroo Rat, and Nelson’s Antelope Squirrel</p> <p>BIO-MM#47: Prepare and Implement a Compensatory Mitigation Plan (CMP) for Impacts to Aquatic Resource</p> <p>BIO-MM#50: Implement Measures to Minimize Impacts During Offsite Habitat Restoration, or Enhancement, or Creation on Mitigation Sites</p> <p>BIO-MM#53: Prepare a Compensatory Mitigation Plan (CMP) for Species and Species Habitat</p> <p>BIO-MM#79: Mitigation for Desert Tortoise</p> <p>BIO-MM#81: Provide Compensatory Mitigation for Impacts to Crotch Bumble Bee</p>	Less than significant

Impact	Bakersfield Station–F Street (Locally Generated Alternative)	Palmdale Station	Mitigation Measures	CEQA Level of Significance after Mitigation
<p>Impact BIO#8: Permanent Impacts to Suitable Habitat that has the Potential to Support Special-Status Mammal Species</p>	<p>X</p>	<p>X</p>	<p>BIO-MM#36: Install Aprons or Barriers within Security Fencing BIO-MM#42: Provide Compensatory Mitigation for Impacts to Habitat for Blunt-Nosed Leopard Lizard, Tipton Kangaroo Rat, and Nelson’s Antelope Squirrel BIO-MM#45: Provide Compensatory Mitigation for Impacts to San Joaquin Kit Fox Habitat BIO-MM#47: Prepare and Implement a Compensatory Mitigation Plan (CMP) for Impacts to Aquatic Resource BIO-MM#50: Implement Measures to Minimize Impacts During Offsite Habitat Restoration, or Enhancement, or Creation on Mitigation Sites BIO-MM#53: Prepare a Compensatory Mitigation Plan (CMP) for Species and Species Habitat BIO-MM#76: Implement Wildlife Rescue Measures BIO-MM#77: Implement Wildlife Height Requirements for Enhanced Security Fencing BIO-MM#78: Install Wildlife Jump-outs</p>	<p>Less than significant</p>
<p>Impact BIO#10: Permanent Effects to Aquatic Resources</p>	<p>N/A</p>	<p>X</p>	<p>BIO-MM#6: Prepare and Implement a Restoration and Revegetation Plan BIO-MM#33: Restore Aquatic Resources Subject to Temporary Impacts BIO-MM#47: Prepare and Implement a Compensatory Mitigation Plan (CMP) for Impacts to Aquatic Resources BIO-MM#50: Implement Measures to Minimize Impacts During Offsite Habitat Restoration, or Enhancement, or Creation on Mitigation Sites BIO-MM#58: Establish Environmentally Sensitive Areas and Non-Disturbance Zones, Enhancement, or Creation on Mitigation Sites</p>	<p>Less than significant</p>
<p>Impact BIO#11: Permanent Reduction of the Functionality of Wildlife Movement Corridors and Habitat Linkages</p>	<p>N/A</p>	<p>X</p>	<p>BIO-MM#64: Establish Wildlife Crossings BIO-MM#76: Implement Wildlife Rescue Measures BIO-MM#77: Implement Wildlife Height Requirements for Enhanced Security Fencing BIO-MM#78: Install Wildlife Jump-outs</p>	<p>Less than significant</p>

Impact	Bakersfield Station–F Street (Locally Generated Alternative)	Palmdale Station	Mitigation Measures	CEQA Level of Significance after Mitigation
Hydrology and Water Resources				
Construction Impacts				
Impact HWR#1: Temporary Construction Impacts to Floodplains and Floodways	X	X	WQ-MM#1: Floodplain Protection: Construction BIO-MM#32: Restore Temporary Riparian Habitat Impacts	Less than significant
Impact HWR#3: Temporary Construction Impacts to Surface Water Quality	X	X	WQ-MM#2: Regional Dewatering Permits BIO-MM#34: Monitor Construction Activities Within Aquatic Resources BIO-MM#62: Prepare Plan for Dewatering and Water Diversions	Less than significant
Operations Impacts				
Impact HWR#5: Permanent Operation Impacts to Floodplains and Floodways	X	X	WQ-MM#4: Floodplain Protection: Operation	Less than significant
Geology, Soils, Seismicity, and Paleontological Resources				
Construction Impacts —Less than significant with project features and incorporation of IAMFs; no mitigation measures are required				
Operations Impacts —Less than significant with project features and incorporation of IAMFs; no mitigation measures are required				
Hazardous Materials and Wastes				
Construction Impacts				
Impact HMW#3: Potential for handling extremely hazardous materials within 0.25 mile of a school.	X	X	HMW-MM#1: Limit use of extremely hazardous materials near schools during construction	Less than significant
Operations Impacts —Less than significant with project features and incorporation of IAMFs; no mitigation measures are required				
Safety and Security				
Construction Impacts – Less than significant with project features and incorporation of IAMFs; no mitigation measures are required.				

Impact	Bakersfield Station–F Street (Locally Generated Alternative)	Palmdale Station	Mitigation Measures	CEQA Level of Significance after Mitigation
Operations Impacts —Less than significant with project features and incorporation of IAMFs; no mitigation measures are required				
Socioeconomics and Communities				
Construction Impacts				
Impact SO#1: Temporary Disruption to Community Cohesion or Division of Existing Communities from Project Construction	N/A	X	SO-MM#3: Implement Measures to Reduce Impacts Associated with the Relocation of Important Facilities	Less than significant
Impact SO#7: Permanent Displacement and Relocation of Community Facilities from Construction	N/A	X	SO-MM#3: Implement Measures to Reduce Impacts Associated with the Relocation of Important Facilities	Significant and unavoidable
Impact SO#7: Displacement of the Bakersfield Homeless Shelter	X	N/A	SO-MM#3: Implement Measures to Reduce Impacts Associated with the displacement of the Fresno Rescue Mission and associated facilities, and the Bakersfield Homeless Shelter (Section 3.12, Socioeconomics and Communities of the Fresno to Bakersfield Section Final EIR/EIS [Authority and FRA 2014]) SO-MM#3: Implement measures to reduce impacts associated with displacement of key community facilities (Section 3.12, Socioeconomics and Communities of the Fresno to Bakersfield Section Final Supplemental EIR [Authority 2018])	Less than significant
Impact SO#7: Displacement of the Kern County Mental Health Facility	N/A	N/A	SO-MM#3: Implement measures to reduce impacts associated with the displacement of facilities (Section 3.12, Socioeconomics and Communities of the Fresno to Bakersfield Section Final EIR/EIS [Authority and FRA 2014])	Less than significant
Impact SO#7: Displacement of a building at the Mercy Hospital medical complex	N/A	N/A	SO-MM#3: Implement measures to reduce impacts associated with the displacement of Mercy Hospital medical complex facilities (Section 3.12, Socioeconomics and Communities of the Fresno to Bakersfield Section Final EIR/EIS [Authority and FRA 2014])	Less than significant

Impact	Bakersfield Station–F Street (Locally Generated Alternative)	Palmdale Station	Mitigation Measures	CEQA Level of Significance after Mitigation
Impact SO#7: Displacement of religious facilities	X	N/A	SO-MM#3: Implement measures to reduce impacts associated with the displacement of religions facilities (Section 3.12, Socioeconomics and Communities of the Fresno to Bakersfield Section Final EIR/EIS [Authority and FRA 2014]) SO-MM#3: Implement measures to reduce impacts associated with displacement of key community facilities (Section 3.12, Socioeconomics and Communities of the Fresno to Bakersfield Section Final Supplemental EIR [Authority 2018])	Less than significant
Impact SO#7: Division of existing community in the Bakersfield Northeast and Central Districts	N/A	N/A	SO-MM#2: Implement measures to reduce impacts associated with the division of communities (Section 3.12, Socioeconomics and Communities of the Fresno to Bakersfield Section Final EIR/EIS [Authority and FRA 2014])	Significant and unavoidable
Impact SO#7: Displacement of Bakersfield High School’s Industrial Arts building	N/A	N/A	SO-MM#3: Implement measures to reduce impacts associated with the displacement of Bakersfield high school facilities (Section 3.12, Socioeconomics and Communities of the Fresno to Bakersfield Section Final EIR/EIS [Authority and FRA] 2014))	Less than significant
Impact SO#7: Displacement of the Mercado Latino Tianguis	X	N/A	SO-MM#3: Implement measures to reduce impacts associated with the displacement of the Mercado Latino Tianguis (Section 3.12, Socioeconomics and Communities of the Fresno to Bakersfield Section Final EIR/EIS [Authority and FRA 2014]) SO-MM#3: Implement measures to reduce impacts associated with displacement of key community facilities (Section 3.12, Socioeconomics and Communities of the Fresno to Bakersfield Section Final Supplemental EIR [2018])	Less than significant

Operations Impacts—Less than significant with project features and incorporation of IAMFs; no mitigation measures are required

Station Planning, Land Use, and Development

Construction Impacts—Less than significant impact; no mitigation measures are required

Operations Impacts—Less than significant with project features and incorporation of IAMFs; no mitigation measures are required

Agricultural Farmland and Forest Land

Construction Impacts—No impact; no mitigation measures are required

Impact	Bakersfield Station–F Street (Locally Generated Alternative)	Palmdale Station	Mitigation Measures	CEQA Level of Significance after Mitigation
Operations Impacts — No impact; no mitigation measures are required				
Parks, Recreation, and Open Space				
Construction Impacts — Less than significant with project features and incorporation of IAMFs; no mitigation measures are required				
Operations Impacts				
Impact PK#4: Kern River Parkway. HSR operation for the Bakersfield Hybrid Alternative would substantially degrade the existing visual character of the site and its surroundings.	X	N/A	Mitigation measures as outlined in Section 3.16, Aesthetics and Visual Resources of the Fresno to Bakersfield Section Final EIR/EIS [Authority and FRA 2014] including: AVR-MM#2a: Incorporate Design Criteria for Elevated and Station Elements That Can Adapt to Local Context AVR-MM#2b: Integrate Elevated Guideway into Affected Cities, Parks, Trail, and Urban Core Designs AVR-MM#2c: Screen At-Grade and Elevated Guideways Adjacent to Residential Areas AVR-MM#2d: Replant Unused Portions of Lands Acquired for the HSR project AVR-MM#2e: Provide Offsite Landscape Screening Where Appropriate AVR-MM#2f: Landscape Treatments along the HSR Project Overcrossings and Retained Fill Elements of the HSR Project	Significant and unavoidable
Aesthetics and Visual Quality				
Construction Impacts — Less than significant with project features and incorporation of IAMFs; no mitigation measures are required				
Operations Impacts — Less than significant with project features and incorporation of IAMFs; no mitigation measures are required				

Impact	Bakersfield Station–F Street (Locally Generated Alternative)	Palmdale Station	Mitigation Measures	CEQA Level of Significance after Mitigation
Cultural Resources				
Construction Impacts				
Impact CUL#1: Permanent Construction-Period: Potential Adverse Effects on Archaeological Resources from Construction Activities	X	X	<p>CUL-MM#1: Mitigate Adverse Effects to Archaeological and Built Environment Resources Identified During Phased Identification. Comply with the Stipulations Regarding the Treatment of Archaeological and Historic Built Resources in the Programmatic Agreement (PA) and Memorandum of Agreement (MOA)</p> <p>CUL-MM#2: Halt Work in the Event of an Archaeological Discovery and Comply with the Programmatic Agreement (PA), Memorandum of Agreement (MOA), Archaeological Treatment Plan (ATP), and all State and Federal Laws, as applicable</p> <p>CUL-MM#3: Other Mitigation for Effects to Pre-Contact Archaeological Sites</p>	Less than significant
Impact CUL#2: Permanent Construction-Period: Potential Adverse Effects on Built Resources from Construction Activities	N/A	X	<p>CUL-MM#1: Mitigate Adverse Effects on Archaeological and Built Environment Resources Identified During Phased Identification. Comply with the Stipulations Regarding the Treatment of Archaeological and Historic Built Resources in the Programmatic Agreement (PA) and Memorandum of Agreement (MOA)</p> <p>CUL-MM#4: Minimize Adverse Effects through Relocation of Historic Buildings and Structures</p>	Significant and unavoidable
Operations Impacts				
Impact CUL#3: Permanent Operations – Potential Adverse Effects on Archaeological Resources	X	X	<p>CUL-MM#1: Mitigate Adverse Effects to Archaeological and Built Environment Identified During Phased Identification. Comply with the Stipulations Regarding the Treatment of Archaeological and Historic Built Resources in the Programmatic Agreement (PA) and Memorandum of Agreement (MOA)</p> <p>CUL-MM#2: Halt Work in the Event of an Archaeological Discovery and Comply with the Programmatic Agreement (PA), Memorandum of Agreement (MOA), Archaeological Treatment Plan (ATP), and all State and Federal Laws, as applicable</p>	Less than significant

Impact	Bakersfield Station-F Street (Locally Generated Alternative)	Palmdale Station	Mitigation Measures	CEQA Level of Significance after Mitigation
Impact CUL#4: Permanent Operations – Potential Adverse Effects on Built Resources	N/A	X	CUL-MM#5: Minimize Adverse Operational Noise Effects CUL-MM#6: Prepare and Submit Additional Recordation and Documentation CUL-MM#7: Prepare Interpretive or Educational Materials CUL-MM#8: Repair of Inadvertent Damage CUL-MM#9: Visual Screening CUL-MM#10: Station Design Consistent with the Secretary of Interior’s Standards for the Treatment of Historic Properties CUL-MM#11: Statewide Historical Interpretation Program	Significant and unavoidable

Regional Growth

Construction Impacts— Less than significant with project features and incorporation of IAMFs; no mitigation measures are required

Operations Impacts— Less than significant with project features and incorporation of IAMFs; no mitigation measures are required

For additional analysis of the Bakersfield Station-F Street LGA refer to *the Fresno to Bakersfield Section Draft Supplemental EIR/EIS (California High-Speed Rail Authority and Federal Railroad Administration 2017)*. Cumulative analysis considers all project components together; therefore, cumulative impacts associated with stations are included in the cumulative impact analysis for the B-P Build Alternatives in Table S-6. “X” denotes the adverse impact conclusion and mitigation applies to that alternative. “N/A” denotes the impact conclusion and mitigation are not applicable to that alternative

- Authority = California High-Speed Rail Authority
- B-P = Bakersfield to Palmdale Project Section
- CEQA = California Environmental Quality Act
- EIR = Environmental Impact Report
- EIS = Environmental Impact Statement
- FRA = Federal Railroad Administration
- HSR = high-speed rail
- IAMF = impact avoidance and minimization feature
- LGA = Locally Generated Alternative

Table S-9 Comparison of Potential Adverse Impacts of Maintenance Facility Alternatives

Impact	Maintenance Facility Alternatives		Mitigation Measure	CEQA Level of Significance after Mitigation
	Lancaster North A and Lancaster North B Sites	Avenue M LMF Zone		
Transportation				
Construction Impacts —Less than significant with project features and incorporation of IAMFs; no mitigation measures are required				
Operations Impacts —Less than significant with project features and incorporation of IAMFs; no mitigation measures are required				
Air Quality and Global Climate Change				
Construction Impacts — Less than significant with project features and incorporation of IAMFs; no mitigation measures are required				
Operations Impacts — Less than significant with project features and incorporation of IAMFs; no mitigation measures are required				
Noise and Vibration				
Construction Impacts				
Impact N&V#1: Construction Noise	X	X	N&V-MM#1: Construction Noise Mitigation Measures	Less than significant
Operations Impacts				
Impact N&V#7: Noise Impacts from HSR Stationary Facilities	N/A	X	N&V-MM#7: Station, Maintenance-of-Way Facility, and Traction Power Substation	Less than significant
Electromagnetic Fields and Electromagnetic Interference				
Construction Impacts				
Impact EMI/EMF#1: Impacts During Construction	X	X	EMI/EMF-MM#1: Protect Sensitive Equipment	Less than significant
Operations Impacts —Less than significant with project features and incorporation of IAMFs; no mitigation measures are required				
Public Utilities and Energy				
Construction Impacts —Less than significant with project features and incorporation of IAMFs; no mitigation measures are required				
Operations Impacts —Less than significant with project features and incorporation of IAMFs; no mitigation measures are required				
Biological and Aquatic Resources				
Construction Impacts				

Impact	Maintenance Facility Alternatives		Mitigation Measure	CEQA Level of Significance after Mitigation
	Lancaster North A and Lancaster North B Sites	Avenue M LMF Zone		
<p>Impact BIO#1: Impacts to Suitable Habitat that has the Potential to Support Special-Status Plant Species</p>	X	X	<p>BIO-MM#1: Conduct Protocol-Level or Presence/Absence Pre-construction Surveys for Special-Status Plant Species and Special-Status Plant Communities</p> <p>BIO-MM#2: Prepare and Implement Plan for Salvage and Relocation of Special-Status Plant Species</p> <p>BIO-MM#6: Prepare and Implement a Restoration and Revegetation Plan</p> <p>BIO-MM#38: Compensate for Impacts to Listed Plant Species</p> <p>BIO-MM#47: Prepare and Implement a Compensatory Mitigation Plan (CMP) for Impacts to Aquatic Resources</p> <p>BIO-MM#50: Implement Measures to Minimize Impacts During Offsite Habitat Restoration, or Enhancement, or Creation on Mitigation Sites</p> <p>BIO-MM#53: Prepare a Compensatory Mitigation Plan (CMP) for Species and Species Habitat</p> <p>BIO-MM#55: Prepare and Implement a Weed Control Plan</p> <p>BIO-MM#56: Conduct Monitoring of Construction Activities</p> <p>BIO-MM#58: Establish Environmentally Sensitive Areas and Non-Disturbance Zones</p> <p>BIO-MM#61: Establish and Implement a Compliance Reporting Program</p> <p>BIO-MM#75: Minimize Impacts on Kern Primrose Sphinx Moth Host Plants</p>	Less than significant

Impact	Maintenance Facility Alternatives		Mitigation Measure	CEQA Level of Significance after Mitigation
	Lancaster North A and Lancaster North B Sites	Avenue M LMF Zone		
<p>Impact BIO#2: Disturbance of Suitable Habitat that has the Potential to Support Special-Status Reptile, Amphibian, and Insect Species</p>	X	X	<p>BIO-MM#7: Conduct Pre-construction Surveys for Special-Status Reptile and Amphibian Species</p> <p>BIO-MM#8: Implement Avoidance and Minimization Measures for Special-Status Reptile and Amphibian Species</p> <p>BIO-MM#11: Conduct Surveys for Blunt-Nosed Leopard Lizard</p> <p>BIO-MM#13: Implement Avoidance Measures for Blunt-Nosed Leopard Lizard</p> <p>BIO-MM#36: Install Aprons or Barriers within Security Fencing</p> <p>BIO-MM#42: Provide Compensatory Mitigation for Impacts to Habitat for Blunt-Nosed Leopard, Tipton Kangaroo Rat, and Nelson’s Antelope Squirrel</p> <p>BIO-MM#47: Prepare and Implement a Compensatory Mitigation Plan (CMP) for Impacts to Aquatic Resources</p> <p>BIO-MM#50: Implement Measures to Minimize Impacts During Offsite Habitat Restoration, or Enhancement, or Creation on Mitigation Sites</p> <p>BIO-MM#53: Prepare a Compensatory Mitigation Plan (CMP) for Species and Species Habitat</p> <p>BIO-MM#55: Prepare and Implement a Weed Control Plan</p> <p>BIO-MM#58: Establish Environmentally Sensitive Areas and Non-Disturbance Zones</p> <p>BIO-MM#61: Establish and Implement a Compliance Reporting Program</p> <p>BIO-MM#62: Prepare Plan for Dewatering and Water Diversions</p> <p>BIO-MM#63: Work Stoppage</p> <p>BIO-MM#79: Mitigation for Desert Tortoise</p> <p>BIO-MM#80: Conduct Surveys and Implement Avoidance Measures for Crotch Bumble Bee</p>	Less than significant

Impact	Maintenance Facility Alternatives		Mitigation Measure	CEQA Level of Significance after Mitigation
	Lancaster North A and Lancaster North B Sites	Avenue M LMF Zone		
<p>Impact BIO#2: Disturbance to Suitable Habitat that has the Potential to Support Special-Status Bird Species (Including Raptors)</p>	X	X	<p>BIO-MM#14: Conduct Pre-construction Surveys and Delineate Active Nest Exclusion Areas for Other Breeding Birds</p> <p>BIO-MM#15: Conduct Pre-construction Surveys and Monitoring for Raptors</p> <p>BIO-MM#16: Implement Avoidance Measures for California Condor</p> <p>BIO-MM#17: Conduct Surveys for Swainson’s Hawk Nests and implement Avoidance and Minimization Measures</p> <p>BIO-MM#18: Implement Avoidance and Minimization Measures for Swainson’s Hawk Nests</p> <p>BIO-MM#20: Conduct Protocol Surveys for Burrowing Owls</p> <p>BIO-MM#21: Implement Avoidance and Minimization Measures for Burrowing Owl</p> <p>BIO-MM#43: Provide Compensatory Mitigation for Loss of Swainson’s Hawk Nesting Trees and Habitat</p> <p>BIO-MM#44: Provide Compensatory Mitigation for Loss of Active Burrowing Owl Burrows and Habitat</p> <p>BIO-MM#47: Prepare and Implement a Compensatory Mitigation Plan (CMP) for Impacts to Aquatic Resources</p> <p>BIO-MM#50: Implement Measures to Minimize Impacts During Offsite Habitat Restoration, or Enhancement, or Creation on Mitigation Sites</p> <p>BIO-MM#53: Prepare a Compensatory Mitigation Plan (CMP) for Species and Species Habitat</p> <p>BIO-MM#56: Conduct Monitoring of Construction Activities</p> <p>BIO-MM#58: Establish Environmentally Sensitive Areas and Non-Disturbance Zones</p> <p>BIO-MM#61: Establish and Implement a Compliance Reporting Program</p>	Less than significant

Impact	Maintenance Facility Alternatives		Mitigation Measure	CEQA Level of Significance after Mitigation
	Lancaster North A and Lancaster North B Sites	Avenue M LMF Zone		
			<p>BIO-MM#62: Prepare Plan for Dewatering and Water Diversions</p> <p>BIO-MM#63: Work Stoppage</p> <p>BIO-MM#66: Implement Avoidance Measures for Active Eagle Nests</p> <p>BIO-MM#67: Provide Compensatory Mitigation for Loss of Eagle Nests</p> <p>BIO-MM#68: Avoid and Minimize Impacts to White-Tailed Kite</p> <p>BIO-MM#69: Conduct Surveys and Implement Avoidance Measures for Active Tricolored Blackbird Nest Colonies</p> <p>BIO-MM#70: Provide Compensatory Mitigation for Impacts on Tricolored Blackbird Habitat</p> <p>BIO-MM#71: Implement California Condor Avoidance Measures During Helicopter Use</p> <p>BIO-MM#72: Implement Avoidance of Nighttime Light Disturbance for California Condor</p>	
<p>Impact BIO#2: Disturbance to Suitable Habitat that has the Potential to Support Special-status Mammal Species</p>	X	X	<p>BIO-MM#22: Conduct Pre-Construction Surveys for Nelson’s Antelope Squirrel, Tipton Kangaroo Rat, Dulzura Pocket Mouse, and Tulare Grasshopper Mouse</p> <p>BIO-MM#23: Implement Avoidance and Minimization Measures for Nelson’s Antelope Squirrel, Tipton Kangaroo Rat, Dulzura Pocket Mouse, and Tulare Grasshopper Mouse</p> <p>BIO-MM#25: Conduct Pre-construction Surveys for Special-Status Bat Species</p> <p>BIO-MM#25: Conduct Pre-construction Surveys for Special-Status Bat Species</p> <p>BIO-MM#26: Implement Bat Avoidance and Relocation Measures</p> <p>BIO-MM#27: Implement Bat Exclusion and Deterrence Measures</p>	Less than significant

Impact	Maintenance Facility Alternatives		Mitigation Measure	CEQA Level of Significance after Mitigation
	Lancaster North A and Lancaster North B Sites	Avenue M LMF Zone		
			<p>BIO-MM#28: Conduct Pre-construction Surveys for Ringtail and Ringtail Den Sites and Implement Avoidance Measures</p> <p>BIO-MM#29: Conduct Pre-construction Surveys for Ringtail and Ringtail Den Sites and Implement Avoidance Measures</p> <p>BIO-MM#30: Conduct Pre-construction Surveys for San Joaquin Kit Fox</p> <p>BIO-MM#31: Minimize Impacts on San Joaquin Kit Fox</p> <p>BIO-MM#36: Install Aprons or Barriers within Security Fencing</p> <p>BIO-MM#42: Provide Compensatory Mitigation for Impacts to Habitat for Blunt-Nosed Leopard Lizard, Tipton Kangaroo Rat, and Nelson’s Antelope Squirrel</p> <p>BIO-MM#47: Prepare and Implement a Compensatory Mitigation Plan (CMP) for Impacts to Aquatic Resources</p> <p>BIO-MM#50: Implement Measures to Minimize Impacts During Offsite Habitat Restoration, or Enhancement, or Creation on Mitigation Sites</p> <p>BIO-MM#53: Prepare a Compensatory Mitigation Plan (CMP) for Species and Species Habitat</p> <p>BIO-MM#56: Conduct Monitoring of Construction Activities</p> <p>BIO-MM#58: Establish Environmentally Sensitive Areas and Non-Disturbance Zones</p> <p>BIO-MM#60: Limit Vehicle Traffic and Construction Site Speeds</p> <p>BIO-MM#61: Establish and Implement a Compliance Reporting Program</p> <p>BIO-MM#62: Prepare Plan for Dewatering and Water Diversions</p> <p>BIO-MM#63: Work Stoppage</p>	

Impact	Maintenance Facility Alternatives		Mitigation Measure	CEQA Level of Significance after Mitigation
	Lancaster North A and Lancaster North B Sites	Avenue M LMF Zone		
			BIO-MM#76: Implement Wildlife Rescue Measures BIO-MM#77: Implement Wildlife Height Requirements for Enhanced Security Fencing	
Impact BIO#3: Disturbance to Special-status Plant Communities and Riparian Areas	X	X	BIO-MM#1: Conduct Protocol-Level or Presence/Absence Pre-construction Surveys for Special-Status Plant Species and Special-Status Plant Communities BIO-MM#6: Prepare and Implement a Restoration and Revegetation Plan BIO-MM#47: Prepare and Implement a Compensatory Mitigation Plan (CMP) for Impacts to Aquatic Resources BIO-MM#50: Implement Measures to Minimize Impacts During Offsite Habitat Restoration, or Enhancement, or Creation on Mitigation Sites BIO-MM#53: Prepare a Compensatory Mitigation Plan (CMP) for Species and Species Habitat BIO-MM#54: Prepare and Implement an Annual Vegetation Control Plan BIO-MM#58: Establish Environmentally Sensitive Areas and Non-Disturbance Zones BIO-MM#61: Establish and Implement a Compliance Reporting Program BIO-MM#75: Minimize Impacts on Kern Primrose Sphinx Moth Host Plants	Less than significant

Impact	Maintenance Facility Alternatives		Mitigation Measure	CEQA Level of Significance after Mitigation
	Lancaster North A and Lancaster North B Sites	Avenue M LMF Zone		
Impact BIO#4: Direct and Indirect Impacts on Aquatic Resources	X	X	BIO-MM#6: Prepare and Implement a Restoration and Revegetation Plan BIO-MM#33: Restore Aquatic Resources Subject to Temporary Impacts BIO-MM#34: Monitor Construction Activities within Aquatic Resources BIO-MM#47: Prepare and Implement a Compensatory Mitigation Plan (CMP) for Impacts to Aquatic Resources BIO-MM#50: Implement Measures to Minimize Impacts During Offsite Habitat Restoration, or Enhancement, or Creation on Mitigation Sites BIO-MM#58: Establish Environmentally Sensitive Areas and Non-Disturbance Zones BIO-MM#61: Establish and Implement a Compliance Reporting Program BIO-MM#62: Prepare Plan for Dewatering and Water Diversions	Less than significant
Impact BIO#6: Temporary Effects to Protected Trees During Construction	X	X	BIO-MM#35: Implement Transplantation and Compensatory Mitigation Measures for Protected Trees BIO-MM#50: Implement Measures to Minimize Impacts During Offsite Habitat Restoration, or Enhancement, or Creation on Mitigation Sites BIO-MM#58: Establish Environmentally Sensitive Areas and Non-Disturbance Zones BIO-MM#61: Establish and Implement a Compliance Reporting Program	Less than significant

Impact	Maintenance Facility Alternatives		Mitigation Measure	CEQA Level of Significance after Mitigation
	Lancaster North A and Lancaster North B Sites	Avenue M LMF Zone		
Operations Impacts				
Impact BIO#7: Direct or Indirect Impacts to Suitable Habitat that has the Potential to Support Special-Status Plant Species	X	X	<p>BIO-MM#1: Conduct Protocol-Level or Presence/Absence Pre-construction Surveys for Special-Status Plant Species and Special-Status Plant Communities</p> <p>BIO-MM#2: Prepare and Implement Plan for Salvage, Relocation and/or Propagation of Special-Status Plant Species</p> <p>BIO-MM#6: Prepare and Implement a Restoration and Revegetation Plan</p> <p>BIO-MM#38: Compensate for Impacts on Special-Status Plant Species</p> <p>BIO-MM#47: Prepare and Implement a Compensatory Mitigation Plan (CMP) for Impacts to Aquatic Resource</p> <p>BIO-MM#50: Implement Measures to Minimize Impacts During Offsite Habitat Restoration, or Enhancement, or Creation on Mitigation Sites</p> <p>BIO-MM#53: Prepare a Compensatory Mitigation Plan (CMP) for Species and Species Habitat</p> <p>BIO-MM#54: Prepare and Implement an Annual Vegetation Control Plan</p>	Less than significant

Impact	Maintenance Facility Alternatives		Mitigation Measure	CEQA Level of Significance after Mitigation
	Lancaster North A and Lancaster North B Sites	Avenue M LMF Zone		
<p>Impact BIO#8: Disturbance to Suitable Habitat that has the Potential to Support Special-status Reptile, Amphibian, and Insect Species</p>	X	X	<p>BIO-MM#36: Install Aprons or Barriers within Security Fencing</p> <p>BIO-MM#42: Provide Compensatory Mitigation for Impacts to Habitat for Blunt-Nosed Leopard Lizard, Tipton Kangaroo Rat, and Nelson’s Antelope Squirrel</p> <p>BIO-MM#47: Prepare and Implement a Compensatory Mitigation Plan (CMP) for Impacts to Aquatic Resource</p> <p>BIO-MM#50: Implement Measures to Minimize Impacts During Offsite Habitat Restoration, or Enhancement, or Creation on Mitigation Sites</p> <p>BIO-MM#53: Prepare a Compensatory Mitigation Plan (CMP) for Species and Species Habitat</p> <p>BIO-MM#79: Mitigation for Desert Tortoise</p> <p>BIO-MM#81: Provide Compensatory Mitigation for Impacts to Crotch Bumble Bee</p>	Less than significant

Impact	Maintenance Facility Alternatives		Mitigation Measure	CEQA Level of Significance after Mitigation
	Lancaster North A and Lancaster North B Sites	Avenue M LMF Zone		
<p>Impact BIO#8: Permanent Impacts to Suitable Habitat that has the Potential to Support Special-status Bird Species</p>	X	X	<p>BIO-MM#43: Provide Compensatory Mitigation for Loss of Swainson’s Hawk Nesting Trees and Habitat</p> <p>BIO-MM#44: Provide Compensatory Mitigation for Loss of Active Burrowing Owl Burrows and Habitat</p> <p>BIO-MM#47: Prepare and Implement a Compensatory Mitigation Plan (CMP) for Impacts to Aquatic Resource</p> <p>BIO-MM#50: Implement Measures to Minimize Impacts During Offsite Habitat Restoration, or Enhancement, or Creation on Mitigation Sites</p> <p>BIO-MM#53: Prepare a Compensatory Mitigation Plan (CMP) for Species and Species Habitat</p> <p>BIO-MM#67: Provide Compensatory Mitigation for Loss of Eagle Nests</p> <p>BIO-MM#70: Provide Compensatory Mitigation for Impacts on Tricolored Blackbird Habitat</p> <p>BIO-MM#71: Implement California Condor Avoidance Measures During Helicopter Use</p> <p>BIO-MM#73: Implement Removal of Carrion that may Attract Condors and Eagles</p> <p>BIO-MM#76: Implement Wildlife Rescue Measures</p>	Less than significant

Impact	Maintenance Facility Alternatives		Mitigation Measure	CEQA Level of Significance after Mitigation
	Lancaster North A and Lancaster North B Sites	Avenue M LMF Zone		
<p>Impact BIO#8: Permanent Impacts to Suitable Habitat that has the Potential to Support Special-status Mammal Species</p>	X	X	<p>BIO-MM#36: Install Aprons or Barriers within Security Fencing</p> <p>BIO-MM#42: Provide Compensatory Mitigation for Impacts to Habitat for Blunt-Nosed Leopard Lizard, Tipton Kangaroo Rat, and Nelson’s Antelope Squirrel</p> <p>BIO-MM#45: Provide Compensatory Mitigation for Impacts to San Joaquin Kit Fox Habitat</p> <p>BIO-MM#47: Prepare and Implement a Compensatory Mitigation Plan (CMP) for Impacts to Aquatic Resource</p> <p>BIO-MM#50: Implement Measures to Minimize Impacts During Offsite Habitat Restoration, or Enhancement, or Creation on Mitigation Sites</p> <p>BIO-MM#53: Prepare a Compensatory Mitigation Plan (CMP) for Species and Species Habitat</p> <p>BIO-MM#76: Implement Wildlife Rescue Measures</p> <p>BIO-MM#77: Implement Wildlife Height Requirements for Enhanced Security Fencing</p> <p>BIO-MM#78: Install Wildlife Jump-outs</p>	Less than significant

Impact	Maintenance Facility Alternatives		Mitigation Measure	CEQA Level of Significance after Mitigation
	Lancaster North A and Lancaster North B Sites	Avenue M LMF Zone		
Impact BIO#9: Permanent Impacts to Special-Status Plant Communities and Riparian Areas	N/A	X	<p>BIO-MM#6: Prepare and Implement a Restoration and Revegetation Plan</p> <p>BIO-MM#32: Restore Temporary Riparian Habitat Impacts</p> <p>BIO-MM#46: Provide Compensatory Mitigation for Permanent Impacts to Riparian Habitat</p> <p>BIO-MM#47: Prepare and Implement a Compensatory Mitigation Plan (CMP) for Impacts to Aquatic Resource</p> <p>BIO-MM#50: Implement Measures to Minimize Impacts During Offsite Habitat Restoration, or Enhancement, or Creation on Mitigation Sites Offsite Habitat Restoration, Enhancement, and Preservation</p> <p>BIO-MM#53: Prepare a Compensatory Mitigation Plan (CMP) for Species and Species Habitat</p> <p>BIO-MM#54: Prepare and Implement an Annual Vegetation Control Plan</p>	Less than significant
Impact BIO#10: Permanent Effects to Aquatic Resources	X	X	<p>BIO-MM#6: Prepare and Implement a Restoration and Revegetation Plan</p> <p>BIO-MM#33: Restore Aquatic Resources Subject to Temporary Impacts</p> <p>BIO-MM#47: Prepare and Implement a Compensatory Mitigation Plan (CMP) for Impacts to Aquatic Resources</p> <p>BIO-MM#50: Implement Measures to Minimize Impacts During Offsite Habitat Restoration, or Enhancement, or Creation on Mitigation Sites</p> <p>BIO-MM#58: Establish Environmentally Sensitive Areas and Non-Disturbance Zones, Enhancement, or Creation on Mitigation Sites</p>	Less than significant

Impact	Maintenance Facility Alternatives		Mitigation Measure	CEQA Level of Significance after Mitigation
	Lancaster North A and Lancaster North B Sites	Avenue M LMF Zone		
Impact BIO#12: Permanent Impacts on Protected Trees	X	X	BIO-MM#35: Implement Transplantation and Compensatory Mitigation Measures for Protected Trees BIO-MM#50: Implement Measures to Minimize Impacts During Offsite Habitat Restoration, or Enhancement, or Creation on Mitigation Sites	Less than significant
Hydrology and Water Resources				
Construction Impacts				
Impact HWR#1: Temporary Construction Impacts to Floodplains and Floodways	X	N/A	WQ-MM#1: Floodplain Protection: Construction BIO-MM#32: Restore Temporary Riparian Habitat Impacts	Less than significant
Impact HWR#3: Temporary Construction Impacts to Surface Water Quality	X	X	WQ-MM#2: Regional Dewatering Permits BIO-MM#34: Monitor Construction Activities Within Aquatic Resources BIO-MM#62: Prepare Plan for Dewatering and Water Diversions	Less than significant
Operations Impacts				
Impact HWR#2: Permanent Operation Impacts to Floodplains and Floodways	X	N/A	WQ-MM#4: Floodplain Protection: Operation	Less than significant
Geology, Soils, Seismicity, and Paleontological Resources				
Construction Impacts —Less than significant with project features and incorporation of IAMFs; no mitigation measures are required				
Operations Impacts —Less than significant with project features and incorporation of IAMFs; no mitigation measures are required				
Hazardous Materials and Wastes				
Construction Impacts —Less than significant with project features and incorporation of IAMFs; no mitigation measures are required				
Operations Impacts —Less than significant with project features and incorporation of IAMFs; no mitigation measures are required				
Safety and Security				
Construction Impacts —Less than significant with project features and incorporation of IAMFs; no mitigation measures are required.				

Impact	Maintenance Facility Alternatives		Mitigation Measure	CEQA Level of Significance after Mitigation
	Lancaster North A and Lancaster North B Sites	Avenue M LMF Zone		
Operations Impacts				
Impact S&S#11: Need for Expansion of Existing Fire, Rescue, and Emergency Services Facilities	X	X	S&S-MM#1: Emergency Response of Local Fire, Rescue, and Emergency Service Providers to Incidents at Stations and Provide a Fair-Share Cost of Service S&S-MM#2: Los Angeles County Sheriff Facility Replacement	Less than significant
Socioeconomics and Communities				
Construction Impacts —Less than significant with project features and incorporation of IAMFs; no mitigation measures are required				
Operations Impacts —Less than significant with project features and incorporation of IAMFs; no mitigation measures are required				
Station Planning, Land Use, and Development				
Construction Impacts —Less than significant; no mitigation measures are required				
Operations Impacts —Less than significant with project features and incorporation of IAMFs; no mitigation measures are required				
Agricultural Farmland and Forest Land				
Construction Impact —No impact; no mitigation measures are required				
Operations Impact —No impact; no mitigation measures are required				
Parks, Recreation, and Open Space				
Construction Impacts —Less than significant with project features and incorporation of IAMFs; no mitigation measures are required				
Operations Impacts —Less than significant with project features and incorporation of IAMFs; no mitigation measures are required				
Aesthetics and Visual Quality				
Construction Impacts —Less than significant with project features and incorporation of IAMFs; no mitigation measures are required				
Operations Impacts —Less than significant with project features and incorporation of IAMFs; no mitigation measures are required				

Impact	Maintenance Facility Alternatives		Mitigation Measure	CEQA Level of Significance after Mitigation
	Lancaster North A and Lancaster North B Sites	Avenue M LMF Zone		
Cultural Resources				
Construction Impacts				
Impact CUL#1: Permanent Construction-Period – Potential Adverse Effects on Archaeological Resources due to Construction Activities	X	X	<p>CUL-MM#1: Mitigate Adverse Effects to Archaeological and Built Environment Resources Identified During Phased Identification. Comply with the Stipulations Regarding the Treatment of Archaeological and Historic Built Resources in the Programmatic Agreement (PA) and Memorandum of Agreement (MOA)</p> <p>CUL-MM#2: Halt Work in the Event of an Archaeological Discovery and Comply with the Programmatic Agreement (PA), Memorandum of Agreement (MOA), Archaeological Treatment Plan (ATP), and all State and Federal Laws, as applicable</p> <p>CUL-MM#3: Other Mitigation for Effects to Pre-Contact Archaeological Sites</p>	Less than significant
Impact CUL#2: Permanent Construction-Period: Potential Adverse Effects on Built Resources due to Construction Activities	X	X	<p>CUL-MM#1: Mitigate Adverse Effects to Archaeological and Built Environment Resources Identified During Phased Identification. Comply with the Stipulations Regarding the Treatment of Archaeological and Historic Built Resources in the Programmatic Agreement (PA) and Memorandum of Agreement (MOA)</p> <p>CUL-MM#4: Minimize Adverse Effects through Relocation of Historic Buildings and Structures</p>	Significant and unavoidable

Impact	Maintenance Facility Alternatives		Mitigation Measure	CEQA Level of Significance after Mitigation
	Lancaster North A and Lancaster North B Sites	Avenue M LMF Zone		
Operations Impacts				
Impact CUL#3: Permanent Operations – Potential Adverse Effects on Archaeological Resources	X	X	CUL-MM#1: Mitigate Adverse Effects to Archaeological and Built Environment Resources Identified During Phased Identification. Comply with the Stipulations Regarding the Treatment of Archaeological and Historic Built Resources in the Programmatic Agreement (PA) and Memorandum of Agreement (MOA) CUL-MM#2: Halt Work in the Event of an Archaeological Discovery and Comply with the Programmatic Agreement (PA), Memorandum of Agreement (MOA), Archaeological Treatment Plan (ATP), and all State and Federal Laws, as applicable	Less than significant
Impact CUL#4: Permanent Operations – Potential Adverse Effects on Built Resources	X	X	CUL-MM#5: Minimize Adverse Operational Noise Effects CUL-MM#6: Prepare and Submit Additional Recordation and Documentation CUL-MM#7: Prepare Interpretive or Educational Materials CUL-MM#8: Repair of Inadvertent Damage CUL-MM#9: Visual Screening CUL-MM#10: Station Design Consistent with the Secretary of Interior’s Standards for the Treatment of Historic Properties CUL-MM#11: Statewide Historical Interpretation Program	Significant and unavoidable

Regional Growth

Construction Impacts—Less than significant with project features and incorporation of IAMFs; no mitigation measures are required

Operations Impacts—Less than significant with project features and incorporation of IAMFs; no mitigation measures are required

Cumulative analysis considers all project components together; therefore, cumulative impacts associated with stations are included in the cumulative impact analysis for the B-P Build Alternatives in Table S-6.

“X” denotes the adverse impact conclusion and mitigation applies to that alternative. “N/A” denotes the impact conclusion and mitigation are not applicable to that alternative

B-P = Bakersfield to Palmdale Project Section

CEQA = California Environmental Quality Act

HSR = high-speed rail

IAMF = impact avoidance and minimization feature

LMF = light maintenance facility