

SUMMARY

S.1 Introduction and Background

The California High-Speed Rail Authority (Authority), a state governing board formed in 1996, has responsibility 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 rail system that includes the high-speed rail trackway, bridges, tunnels, passenger stations, electrical power infrastructure, and maintenance facilities.

The California HSR System would 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, the Inland Empire, Orange County, and San Diego. Figure S-1 shows this proposed statewide system alignment. It will use state-of-the-art, electrically powered, high-speed, steel-wheel-on-steel-rail technology, including contemporary safety, signaling, and automated train-control systems, with trains capable of operating at speeds up to 220 miles per hour over a dedicated track alignment.

The Authority plans to implement the California HSR System in two phases. Phase 1¹ would connect San Francisco to Los Angeles/Anaheim via the Pacheco Pass and the Central Valley. The HSR system would meet the requirements of Proposition 1A, including nonstop service between San Francisco and Los Angeles designed to achieve a time of 2 hours and 40 minutes. Phase 2 would connect the Central Valley to the state capital, Sacramento, and would extend the system from Los Angeles to San Diego.

The approximately 31- to 38-mile Palmdale to Burbank Project Section would be a critical link in Phase 1 of the California HSR System. This project section footprint spans from the city of Palmdale near the vicinity of Spruce Court just west of Sierra Highway in the north, to Burbank in the south. The Palmdale to Burbank Project Section includes a station in the city of Burbank near the Hollywood Burbank Airport (formerly Bob Hope Airport). This Draft Environmental Impact Report/Environmental Impact Statement (EIR/EIS) evaluates facilities required to construct and operate the Palmdale to Burbank Project Section as well as the construction footprint. The Palmdale Station, proposed Maintenance Facility, and the alignment to Spruce Court in Palmdale, were fully evaluated as part of the Bakersfield to Palmdale Project Section. The Authority Board approved that Bakersfield to Palmdale Project Section, including the Palmdale Station, in August 2021; these elements are included throughout this Draft EIR/EIS for context, reference, and to provide additional information. Figure S-2 shows the general Palmdale to Burbank Project Section corridor that is analyzed in this Draft EIR/EIS.

¹ Phase 1 would be built in stages dependent on funding availability.

The Build Alternatives evaluated in this Draft EIR/EIS include the Refined SR14, SR14A, E1, E1A, E2, and E2A Build Alternatives. The Preferred Alternative for the proposed project is the SR14A Build Alternative, which includes the Burbank Airport Station (refer to Chapter 8, Preferred Alternative and Station Sites). Each of the Palmdale to Burbank Project Section Build Alternatives would require the construction of one adit and one intermediate window facility. This Draft EIR/EIS evaluates optional adit and intermediate window sites for each Build Alternative. The final adit and intermediate window facilities will be selected from the options evaluated in this Draft EIR/EIS during final design of the Preferred Alternative, after the issuance of the Authority's Record of Decision (ROD) and Notice of Determination (NOD).

Adits

An *adit* is an access shaft that facilitates construction of bored tunnels. An adit can serve as a tunnel boring machine entry or exit point. It can enable use of multiple tunnel boring machines to shorten construction time.

Intermediate Windows

An *intermediate window* is a vertical shaft connecting to an underground construction area. It includes an elevator and gantry cranes to provide access, water, power, ventilation, and other support during construction.



Source: Authority, 2021

Figure S-1 High-Speed Rail Statewide System



PRELIMINARY DRAFT/SUBJECT TO CHANGE - HSR ALIGNMENT IS NOT DETERMINED
 Source: Authority, 2020; National Geographic, 2021
 March 25, 2021

	Proposed HSR Station		Angeles National Forest
	General HSR Corridor		Magic Mountain Wilderness Areas
	Metrolink		San Gabriel Mountains National Monument
	Selected Highways		

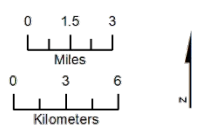


Figure S-2 Palmdale to Burbank Project Section Corridor

This summary provides an overview of the Palmdale to Burbank Project Section Draft EIR/EIS and addresses the topics listed below:

- The tiered environmental review
- Issues raised during the scoping process
- Purpose of and need for the California HSR System and the Palmdale to Burbank Project Section
- Description of the proposed No Project Alternative and the six Build Alternatives
- Design considerations to avoid and minimize impacts
- No Project Alternative impacts
- HSR alternatives evaluation, including:
 - HSR benefits
 - Comparison of impacts and mitigation measures
 - Capital and operating costs
- Section 4(f) and Section 6(f)
- Environmental justice
- Areas of controversy
- Environmental process
- Next steps in the environmental process

The full text of the environmental analysis in the Draft EIR/EIS is available on the Authority's website at: <https://hsr.ca.gov/programs/environmental-planning/>.

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

The Council on Environmental Quality (CEQ) regulations establish procedures for compliance with the National Environmental Policy Act (NEPA) (42 United States Code [U.S.C.] 4321 et seq.).^{2,3} CEQ regulations allow for a phased environmental review process. This process is referred to as “tiered decision-making.” This phased decision-making process supports a broad-level programmatic decision at the first tier to be followed by more specific decisions at the second tier, with one or more second-tier EISs. The NEPA tiering process allows incremental decision-making for large projects that would be too extensive and cumbersome to analyze in a traditional project EIS. The California Environmental Quality Act (CEQA) also encourages tiering and provides for first-tier and second-tier EIRs.

The Palmdale to Burbank Project Section Draft EIR/EIS is a second-tier EIR/EIS that tiers off of first-tier program EIR/EIS documents and provides project-level information for decision-making on this portion of the California HSR System. The Authority and the Federal Railroad Administration (FRA) prepared the 2005 *Final Program EIR/EIS for the Proposed California High-*

² While this EIR/EIS was being prepared, the FRA adopted new NEPA compliance regulations (23 C.F.R. 771). Those regulations only apply to actions initiated after November 28, 2018. See 23 C.F.R. 771.109(a)(4). Because this EIR/EIS was initiated prior to that date, it remains subject to FRA's Environmental Procedures rather than the Part 771 regulations.

³ The CEQ issued new regulations on July 14, 2020, effective September 14, 2020, updating the NEPA implementing procedures at 40 C.F.R. 1500. However, this project initiated NEPA before the effective date and is not subject to the new regulations, relying on the 1978 regulations at they existed prior to September 14, 2020. All subsequent citations to CEQ regulations in this environmental document refer to the 1978 regulations, pursuant to 40 C.F.R. 1506.13 (2020) and the preamble at 85 Fed. Reg. 43340.

Speed Train System (Statewide Program EIR/EIS) (Authority and FRA 2005), which provided a first-tier analysis of the general effects of implementing the California HSR System across two-thirds of the state. The 2008 *Bay Area to Central Valley High-Speed Train Program EIR/EIS* (Bay Area to Central Valley Program EIR/EIS) (Authority and FRA 2008) and the *Bay Area to Central Valley High-Speed Train Partially Revised Final Program EIR* (Authority 2012) were also first-tier and programmatic, focused on the Bay Area to Central Valley region. These first-tier EIR/EIS documents provided the Authority with the environmental analysis necessary for the evaluation of the overall California HSR System and for making broad decisions about general high-speed train alignments and station locations for further study in the second-tier EIR/EISs. Printed and/or electronic copies of the Draft EIR/EIS and Tier 1 documents are also available for review during business hours at the Authority's Headquarters at 770 L Street, Suite 620 MS-1, Sacramento, CA and by appointment at the Authority's Southern California Regional Office at 355 S. Grand Avenue, Suite 2050, Los Angeles, CA. To make an appointment to view the documents at the Southern California Regional Office, please call 800-630-1039.

The Palmdale to Burbank Project Section Draft EIR/EIS is a second-tier document and analyzes the environmental impacts and benefits of implementing the high-speed rail in the more geographically limited area between Palmdale and Burbank and is based on detailed project planning and engineering. The analysis therefore builds on the earlier decisions and program EIR/EISs and provides more site-specific and detailed analysis.

The Authority is preparing the Palmdale to Burbank Project Section EIR/EIS as a joint NEPA/CEQA document to reduce duplication between state and federal environmental review processes and to synchronize decision-making. The Authority is the project sponsor and lead agency under NEPA,⁴ pursuant to an assignment of FRA's authority under 23 U.S.C. 327 and is the state lead agency under CEQA. There are five cooperating agencies included in this Tier 2, project-level NEPA review process:

- United States Army Corps of Engineers (USACE), agreed by letter dated December 30, 2009
- Surface Transportation Board, agreed by letter dated May 2, 2013
- United States Forest Service (USFS), agreed by letter dated August 25, 2014
- U.S Department of the Interior, Bureau of Land Management, agreed by letter dated November 6, 2012
- Federal Aviation Administration (FAA) (requested participation as a cooperating agency under NEPA by letter, dated September 3, 2020)

The following California agencies serve as CEQA responsible agencies for the Palmdale to Burbank Project Section:

- California Department of Fish and Wildlife
- California Department of Transportation
- California State Historic Preservation Officer
- California Public Utilities Commission

Cooperating Agency

Agencies invited by the lead federal agency that have agreed to participate in the NEPA process and have legal jurisdiction over, and/or technical expertise regarding, environmental impacts associated with a proposed project

Responsible Agency

A public agency with some discretionary authority over a project but has not been designated the Lead Agency. A Responsible Agency complies with CEQA by considering the EIR or negative declaration prepared by the Lead Agency and by reaching its own conclusions on whether and how to approve the project.

⁴ Memorandum of Understanding for the National Environmental Policy Act Assignment (FRA and State of California 2019).

- California Department of Water Resources
- California State Lands Commission
- State Water Resources Control Board
- Antelope Valley Air Quality Management District
- South Coast Air Quality Management District
- Los Angeles County Flood Control District

S.3 Issues Raised During the Scoping Process

On July 24, 2014, public scoping for the Palmdale to Burbank Project Section Draft EIR/EIS was initiated with the distribution of a Notice of Preparation to the State Clearinghouse; elected officials; local, regional, and state agencies; and the interested public, and the publication of a Notice of Intent in the *Federal Register*. During the public scoping period, the Authority hosted 916 attendees at seven public meetings and one federal agency meeting between August 5 and August 19, 2014:

- Santa Clarita – August 5, 2014
- Burbank – August 6, 2014
- Palmdale – August 7, 2014
- Acton/Agua Dulce – August 11, 2014
- Sylmar – August 12, 2014
- Lake View Terrace – August 14, 2014
- Downtown Los Angeles – August 19, 2014
- Los Angeles – August 8, 2014 (federal agency meeting)

Follow-up public meetings were also held in December of 2014, as Build Alternatives that would traverse the Angeles National Forest (ANF) including the San Gabriel Mountains National Monument (SGMNM) were introduced. Close to 1,000 people attended the following meetings:

- Santa Clarita – December 2, 2014
- Shadow Hills – December 3, 2014
- Palmdale – December 4, 2014
- Burbank – December 8, 2014
- San Fernando – December 9, 2014
- Sylmar – December 10, 2014
- Acton/Agua Dulce – December 13, 2014

Throughout the scoping process, the Authority received 938 comment submittals from federal, state, and local agencies; elected officials; businesses; organizations; and individuals. The *Palmdale to Burbank Section 2014 Scoping Report* and the *Open House Meetings Summary Report* (Authority 2014, 2015) describes comments received during the public scoping period for the Palmdale to Burbank Project Section. The following list summarizes major topics identified during the scoping process:

- Build Alternatives
- Station locations
- Impacts on environmental justice communities

- Socioeconomic impacts, including impacts on residences, schools, religious institutions, and employment
- Negative visual impacts on nearby communities including glare
- Conversion of agricultural lands and forest land
- Air pollution and greenhouse gas emissions
- Impacts on cultural resources, including archaeological and Native American sites
- Impacts on biological and aquatic resources and wetlands
- Electromagnetic interference/fields (EMI/EMF) impacts on adjacent land uses
- Geology, soils, seismicity, and paleontological resources
- Release of hazardous materials at existing oil wells and from project maintenance
- Impacts on streams and groundwater
- Noise and vibration impacts on schools, residences, communities, rural areas, and wildlife
- Impacts on parks, recreation, and open space areas such as the ANF, including SGMNM
- Use of renewable energy for project operation
- Conflicts with existing utilities
- Safety of passengers in the event of terrorist attacks, earthquakes, and other emergencies
- Safety of nearby schools in the event of an accident
- Impacts on adjacent land uses and the Hollywood Burbank Airport
- Transit access to HSR stations
- Impacts on nearby intersections especially regarding tunneling
- Technical/engineering concerns
- Use of tax dollars on the California HSR System

S.4 Purpose of and Need for the California HSR System and the Palmdale to Burbank Project Section

S.4.1 Purpose of the California HSR System

The Statewide Program EIR/EIS established the purpose of the California HSR System and identified and evaluated Build Alternative alignments and station locations as part of a statewide system:

The purpose of the statewide California HSR System is to provide a reliable high-speed electrified train system that links the major metropolitan areas of the state and that delivers predictable and consistent travel times. Two objectives of the California HSR System include provision of 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 Palmdale to Burbank Project Section

The purpose of the Palmdale to Burbank Project Section of the California HSR System is to provide the public with electric-powered HSR service that provides predictable and consistent travel times between the Antelope Valley and the San Fernando Valley, provide connectivity to

airports, mass transit systems, and the highway network in the Antelope Valley and the San Fernando Valley; and to connect the Northern and Southern portions of the Statewide California HSR System.

The project would construct, maintain, and operate an electrified, high-speed train system connecting the Palmdale Transportation Center in Palmdale to the Hollywood Burbank Airport in Burbank. The project includes the construction, improvement, upgrade, operation, and maintenance of new and existing facilities and infrastructure necessary to support the system.

S.4.3 CEQA Objectives and Policies for the California HSR System in California and within the Palmdale to Burbank Region

As the lead agency, the Authority is preparing this Draft EIR/EIS consistent with specific CEQA EIR content and processing requirements. CEQA Guidelines Section 15124 requires an EIR to include a statement of objectives that will support the underlying purpose of the project. In response to its statutory mandate and CEQA requirements, the Authority's mandate is to plan, build, and operate a California HSR System that is coordinated with California's existing transportation network by adopting the following objectives and policies for the proposed California HSR System:

- Provide intercity travel capacity to supplement critically overused interstate highways and commercial airports
- Meet future intercity travel demand that will be unmet by present transportation systems and increase capacity for intercity mobility
- Maximize intermodal transportation opportunities by locating stations to connect with local transit systems, 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 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) for intercity trips

The approximately 31- to 38-mile-long Palmdale to Burbank Project Section is an essential part of the statewide California HSR System. This project section would provide Palmdale, the San Fernando Valley, Burbank, and other communities near the proposed HSR stations access to a new transportation mode. The Build Alternatives would help to improve passenger rail service between Palmdale and Burbank and would provide a passenger rail connection between Northern California and Los Angeles which would contribute to increased mobility throughout California through more direct and efficient travel.

S.4.4 Need for the California HSR System Statewide and within the Palmdale to Burbank Region

The need for an HSR system exists statewide, with regional areas contributing to this need. The 31- to 38-mile-long Palmdale to Burbank Project Section is an essential component of the statewide California HSR System.

The capacity of California's intercity transportation system, including the Palmdale and Burbank region, is insufficient to meet existing and future travel demands. The current and projected future

congestion of the transportation system will continue to result in deteriorating air quality, reduced reliability, and increased travel times. The current transportation system has not kept pace with the increase in population, economic activity, and tourism within the state. The interstate highway system, commercial airports, and conventional passenger rail system serving 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 future growth over the next 25 years and beyond. Moreover, the feasibility of expanding many major highways and key airports is uncertain; some needed expansions might be impractical or are constrained by physical, political, and other factors. The need for improvements to intercity travel systems in California, including intercity travel between the southern San Joaquin Valley, the Bay Area, Sacramento, and Southern California, relates to the following issues:

- Future growth in demand for intercity travel
- Capacity constraints that will result in increasing congestion and travel delays, including capacity constraints on the existing transportation system in Los Angeles County
- Safety issues and unreliability of travel stemming from congestion and delays, weather conditions, accidents, and other factors that affect the quality of life and economic wellbeing of residents, businesses, and tourism in California
- Reduced mobility resulting from the 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 resulting from highway and airport expansions and urban development pressures

Figure S-2 shows the area of the Palmdale to Burbank Project Section within the Los Angeles County region and the state of California. The Los Angeles County region contributes significantly to the statewide need for a new intercity transportation service connecting the major population and economic centers and other regions of the state.

S.5 Alternatives

S.5.1 Background of the Palmdale to Burbank Project Section

In 2005, the Authority and FRA relied on the California HSR System program EIR/EIS documents to identify the Soledad Canyon and Los Angeles County Metropolitan Transportation Authority (Metro)/Metrolink corridors for study of alternative routes between Palmdale and Burbank. Therefore, the Palmdale to Burbank Project Section Draft EIR/EIS analyzes the State Route (SR) 14 alignment, which generally follows the Soledad Canyon and Metro/Metrolink corridors.

Metrolink

A commuter rail service operating seven routes in six Southern California counties.

The 2005 Statewide Program EIR/EIS examined potential alignments between the city of Bakersfield and the Sylmar neighborhood of Los Angeles, and between Sylmar and downtown Los Angeles (Figure S-3). Between Bakersfield and Sylmar, two alignments were considered that would have followed either the Interstate (I)-5/Grapevine corridor or SR 58 and the Metrolink rail corridor through the Antelope Valley via SR 14/Soledad Canyon. Both corridors included one station option each: at a site bounded by the SR 126/I-5 interchange, Magic Mountain Parkway, and the Old Ridge Route for the I-5/Grapevine corridor, and at the Palmdale Transportation Center for the SR 58/Soledad Canyon corridor.



Source: Authority, 2005

Figure S-3 Potential Alignments from the 2005 Statewide Program EIR/EIS

As reflected in the 2005 Statewide EIR/EIS, the Authority and FRA selected the SR 58/Soledad Canyon and Metro/MetroLink corridors as the preferred alignment between Bakersfield and Sylmar, with a station in the city of Palmdale. This alignment would extend east from Bakersfield generally following SR 58 through the Tehachapi Mountains to Mojave, along Metro/MetroLink corridors through the Antelope Valley and Soledad Canyon, and then generally following SR 14 from the city of Santa Clarita to the Sylmar neighborhood of the city of Los Angeles. The alignment would provide superior connectivity and accessibility to the Antelope Valley and would have a higher potential for serving long-distance commuters to Los Angeles.

As part of the 2005 Statewide Program EIR/EIS, the Authority considered corridors between Sylmar and Los Angeles Union Station that would generally follow the I-5 freeway or the Metro/MetroLink Antelope Valley Line. Station options in the neighborhoods of Sylmar and Sun Valley and in the cities of San Fernando and Burbank were evaluated. The Authority determined that sharing existing commuter and freight tracks would not meet the California HSR System's purpose and that dedicated tracks would be necessary to achieve the performance goals of the California HSR System.

The Palmdale to Los Angeles Section alternatives were then defined through the following:

- Public scoping conducted for the 2005 Statewide Program EIR/EIS
- Scoping conducted for the Palmdale to Los Angeles Section in 2007
- The alignment and station screening evaluation process described in the *Palmdale to Los Angeles Preliminary Alternatives Analysis Report* (Authority and FRA 2010) and Palmdale to

Los Angeles Supplemental Alternatives Analysis (SAA) Reports (Authority and FRA 2011; 2012; 2014).

Figure S-4 shows the evolution of alternatives for the Palmdale to Burbank Project Section over time.

In May 2014, the 2014 SAA Report recommended that the Palmdale to Los Angeles Section be divided into two project sections (Palmdale to Burbank and Burbank to Los Angeles). Following this recommendation, a second public scoping period took place from July to September 2014. Following the second public scoping period and additional follow-up meetings held in December 2014, a subsequent SAA Report for the Palmdale to Burbank Subsection (Authority and FRA 2015) was presented to the Authority Board of Directors in June 2015.

During the Authority's June 9, 2015, board meeting, issues were raised about the alternatives presented in the 2015 SAA Report. Concerns encompassed a variety of topics including air quality, aesthetics, cultural resources, impacts on environmental justice communities, impacts on ANF including SGMNM, and project costs. After the board meeting, the Authority explored ways to refine the alternatives to address concerns raised at the board meeting and during previous stakeholder outreach. The 2016 SAA Report refined the alignments and stations presented in the 2015 SAA Report by reducing tunnel depth, reducing community impacts, minimizing impacts on ANF including SGMNM, avoiding impacts near Big Tujunga Wash, and improving travel time by reducing route length.

The SAA Report process was also informed by various working groups. Community and stakeholder working groups were formed to facilitate meaningful public comments from organizations and residents along the Palmdale to Burbank Project Section corridor in 2014, 2015, and 2016. Working groups included Environmental Justice communities and members of Native American tribes. Community working groups included local community members invited by the Authority, and stakeholder working groups included leaders from various constituencies along the Palmdale to Burbank Project Section corridor. Stakeholder working groups included members conversant with land use, transportation, environmental sustainability, and societal topics within the region.

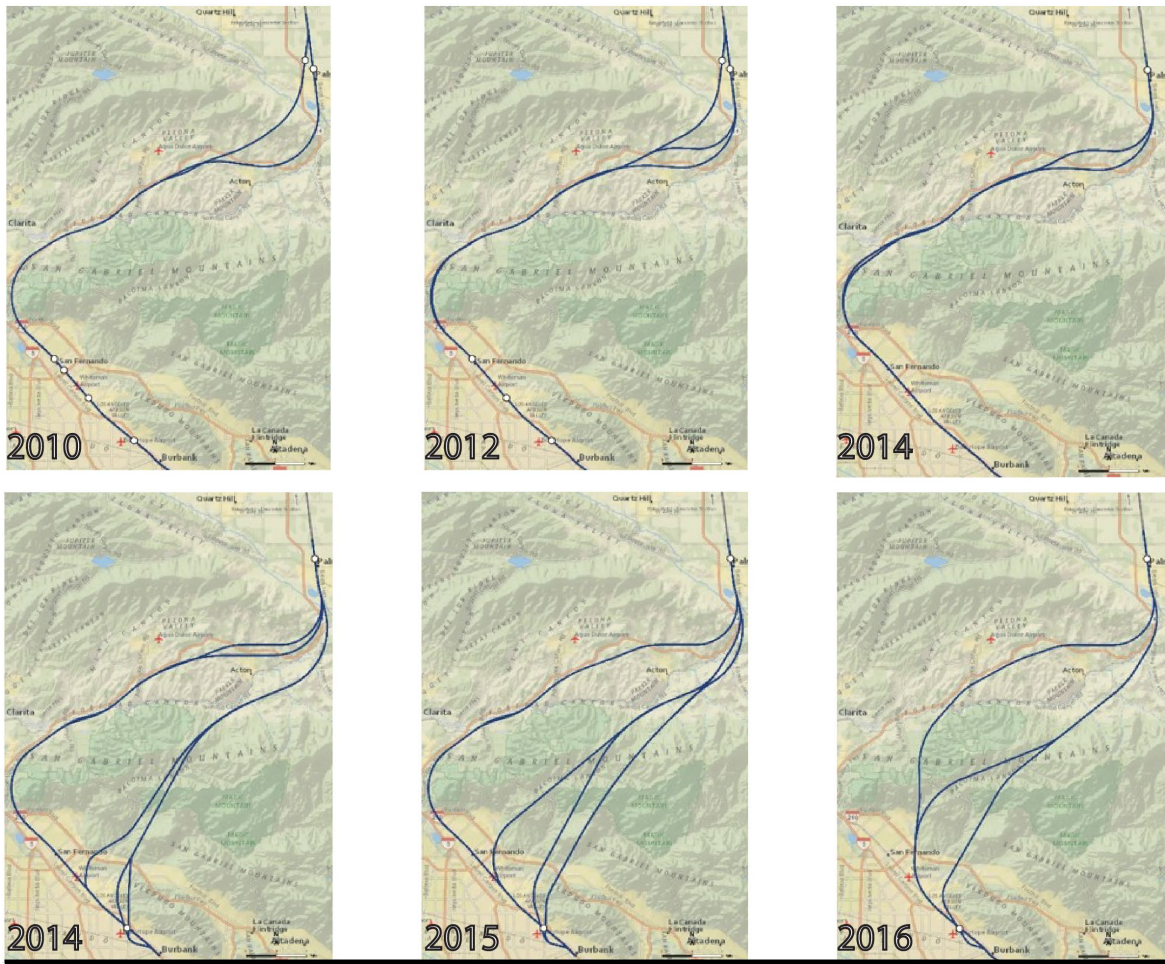
Based on the SAA Reports and comments received from working groups, the Authority carried forward the six Build Alternatives for detailed study in this Draft EIR/EIS: the Refined SR14, SR14A, E1, E1A, E2, and E2A Build Alternatives.

S.5.2 No Project Alternative

The No Project Alternative represents the state's transportation system (highway, air, bus, conventional rail) as it is currently and as it would be after implementation of programs or projects that are in regional transportation plans, which have identified funds for implementation and are expected to be in place by 2040, as well as major planned land use changes. Inclusion of the No Project Alternative enables decision-makers and the public to compare the impacts of the proposed Build Alternatives against future conditions that would occur without the project.⁵

Between 2015 and 2040, the population of Los Angeles County is expected to increase by nearly 1.5 million residents, from approximately 10 million to more than 11 million. Los Angeles County is expected to add 551,200 new jobs by 2040 (SCAG 2016). The general plans for Palmdale and Burbank, the two main urban centers in the Palmdale to Burbank Project Section study area, also anticipate growth associated with new and improved transportation hubs and surrounding transit-oriented development. Since workers are anticipated to commute from nearby counties to fill in new employment opportunities as new jobs are added in Los Angeles County, stresses on the local transportation system associated with this employment growth would likely occur under the No Project Alternative.

⁵ NEPA requires the evaluation of a "no action" alternative in an EIS (CEQ Regulations Section 1502.14(d)). Similarly, CEQA requires that an EIR include the evaluation of a "no project" alternative (CEQA Guidelines Section 15126.6(e)).



PRELIMINARY DRAFT/SUBJECT TO CHANGE - HSR ALIGNMENT IS NOT DETERMINED

August 30, 2019

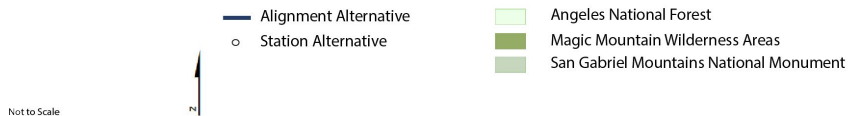


Figure S-4 Evolution of Palmdale to Burbank Project Section Alternatives

Foreseeable future projects servicing this population include shopping centers, industrial parks, other transportation projects, and residential developments. These development and transportation infrastructure projects are planned to accommodate the growth projections in the area. Such projects would encourage both compact development and greater investment in local transit modes as a means of reducing vehicle trips. Overall, development would be focused within the urbanized portions of the Antelope and San Fernando Valleys. Between these urban centers, areas within the ANF including SGMNM would likely remain intact and undisturbed because of their protected status.

S.5.3 Palmdale to Burbank Project Section High-Speed Rail Build Alternatives

There are six end-to-end Build Alternatives proposed for the Palmdale to Burbank Project Section: Refined SR14, SR14A, E1, E1A, E2, and E2A. Figure S-5 shows the alignments of the Build Alternatives and key project features. The six Build Alternative alignments would begin in the Antelope Valley, within the city of Palmdale. Farther south, the Build Alternative alignments

would tunnel beneath the ANF including SGMNM, before terminating in Burbank at the Burbank Airport Station. South of the ANF, the Refined SR14, SR14A, E1, and E1A Build Alternative alignments would traverse several city of Los Angeles neighborhoods including Sylmar, Pacoima, and Sun Valley in the San Fernando Valley. Located farther to the east, the E2 and E2A Build Alternative alignments would traverse the Lake View Terrace and Shadow Hills neighborhoods. Table S-1 provides a high-level comparison of key design features associated with each of the Build Alternatives. The sections that follow describe each of the Build Alternatives in more detail.

Table S-1 Summary of Key Design Features of the Build Alternatives

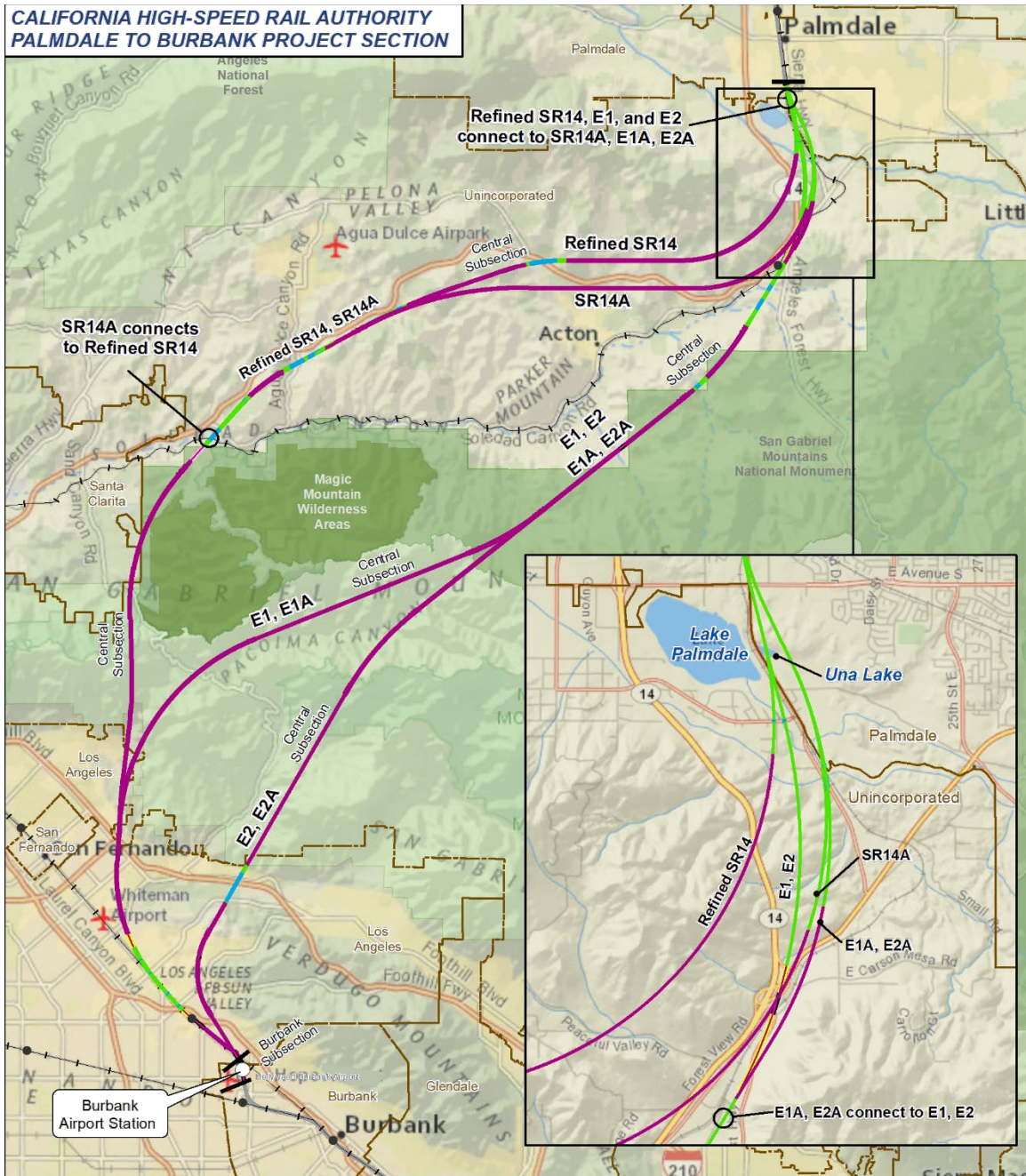
Design Feature	Refined SR14	SR14A	E1A	E1A	E2	E2A
Total length (linear miles) ¹	37	38	35	35	31	31
At-grade profile (linear miles)	7	7	8	7	7	5
At-grade covered tunnel (linear miles)	1	1	0	0	0	0
Cut-and-cover tunnel (linear miles)	1	1	2	1	1	1
Bored/Mined tunnel (linear miles)	25	28	24	26	22	24
Elevated profile (linear miles)	3	1	1	1	1	1
Number of straddle bents ²	1	2	1	2	1	2
Number of railroad crossings	3	5	3	5	2	5
Number of major water crossings ³	25	19	12	12	13	13
Number of at-grade road crossings	0	0	0	0	0	0
Number of public and private roadway closures	9	5	13	12	11	10
Number of new roadway overcrossings and undercrossings	11	9	10	9	11	10

¹ Lengths are rounded to the nearest whole number and may not sum accurately due to rounding.

² A straddle bent consists of a platform supported by columns. This platform supports the HSR alignment.

³ Major waterbodies crossings include Una Lake, the East Branch California Aqueduct, the Santa Clara River System, Pacoima Wash, Tujunga Wash, and the Big Tujunga Creek System.

HSR = high-speed rail



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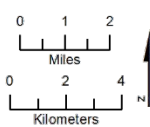
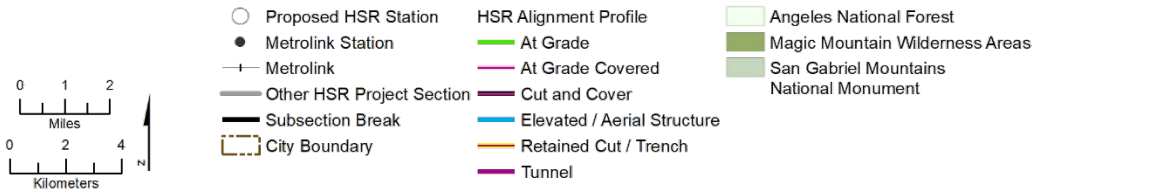


Figure S-5 Palmdale to Burbank Build Alternatives and Station Locations

S.5.3.1 Refined SR14 Build Alternative

The Refined SR14 Build Alternative (Figure S-6) would begin in the city of Palmdale near Spruce Court on the west side of Sierra Highway. The Refined SR14 Build Alternative would pass south through the city of Palmdale and then continue in a westerly direction through a series of tunnels, on viaducts, and at grade, roughly following the SR 14 freeway. After crossing Soledad Canyon Road and the Santa Clara River, the Refined SR14 Build Alternative would enter a 12-mile-

long tunnel with a maximum depth of approximately 2,080 feet⁶ continuing in a southerly direction beneath ANF including SGMNM. Construction of a portion of this tunnel would occur within the existing Vulcan Mine site, which would be regraded and restored to a condition better reflecting the surrounding topography at the outset of construction. The finished southern tunnel opening near the Vulcan Mine site would be located inside the ANF including SGMNM. After entering a tunnel near the Vulcan Mine, the Refined SR14 Build Alternative would pass beneath portions of ANF including SGMNM. The Refined SR14 Build Alternative would continue beneath the Sylmar neighborhood of the city of Los Angeles, before emerging from the tunnel and transitioning to an at-grade alignment in the Pacoima neighborhood of Los Angeles. It would then continue at grade, on viaduct, and underground through the Sun Valley neighborhood of Los Angeles and the city of Burbank until reaching the Burbank Airport Station.

S.5.3.2 SR14A Build Alternative

The SR14A Build Alternative alignment (Figure S-7) would begin in the city of Palmdale near Spruce Court on the west side of Sierra Highway. South of East Avenue S, the Refined SR14 Build Alternative alignment would curve eastward and south approximately 300 feet east of Una Lake. South of Una Lake, the SR14A Build Alternative alignment would curve westward, cross over the Metrolink Antelope Valley Line, Sierra Highway, and the Soledad Siphon, and continue southwest, entering a tunnel portal approximately 0.5 mile northeast of the Sierra Highway/Pearblossom Highway intersection. The SR14A Build Alternative alignment would then continue westward in an approximately 13-mile tunnel before surfacing approximately 0.75 mile east of Agua Dulce Canyon Road. The alignment would transition between at-grade and elevated profiles closely paralleling SR 14 before entering an approximately 1-mile tunnel. Transitioning from tunnel to at grade, the SR14A Build Alternative alignment would converge with the Refined SR14 Build Alternative alignment at the Vulcan Mine site. The remaining SR14A Build Alternative alignment south of the Vulcan Mine site would be identical to the Refined SR14 Build Alternative alignment.

Viaduct

An elevated train track often used in urban, uneven, or rugged terrain, or to cross streams or rivers.

At Grade

Describes a section of track built on the ground surface.

⁶ After construction of the project is completed, a small permanent structure and associated power facilities for emergency egress, maintenance, and ventilation equipment could be installed at the selected adit locations. Refer to Section Chapter 2, Alternatives, for further discussion of adit features.



PRELIMINARY DRAFT/SUBJECT TO CHANGE - HSR ALIGNMENT IS NOT DETERMINED
 Source: Authority, 2020; National Geographic, 2021

March 25, 2021

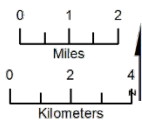
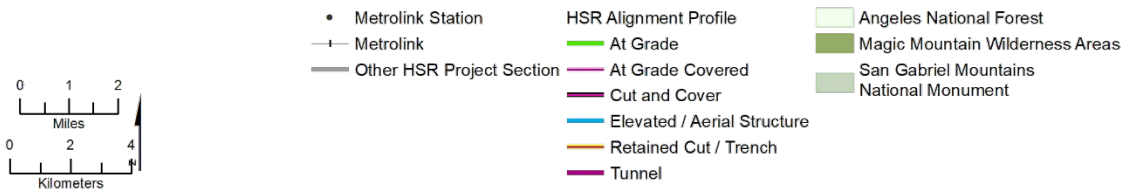


Figure S-6 Refined SR14 Build Alternative Overview Map



PRELIMINARY DRAFT/SUBJECT TO CHANGE - HSR ALIGNMENT IS NOT DETERMINED
 Source: Authority, 2020; National Geographic, 2021

March 25, 2021

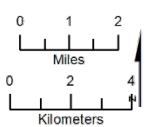
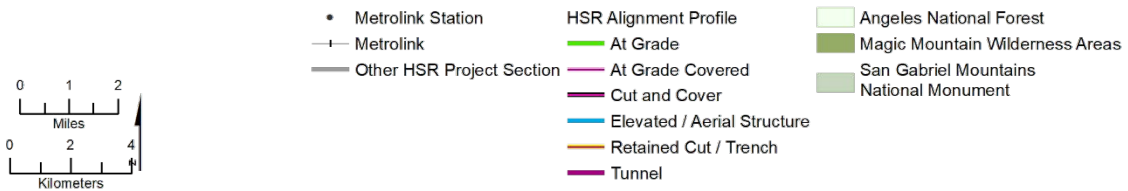


Figure S-7 SR14A Build Alternative Overview Map

S.5.3.3 E1 Build Alternative

The E1 Build Alternative (Figure S-8) would begin in the city of Palmdale near Spruce Court on the west side of Sierra Highway. The E1 Build Alternative would continue south through the city of Palmdale and would be identical to the Refined SR14 Build Alternative until north of the intersection of East Avenue S and Sierra Highway. After crossing the California Aqueduct, the E1 Build Alternative would transition into a tunnel approximately 0.6 mile north of ANF including SGMNM. The tunnel would continue southwest for approximately 1.6 miles and end in Aliso Canyon to cross a tributary of the Santa Clara River on viaduct. After this crossing, the E1 Build Alternative would enter a second tunnel continuing southwest. This tunnel would be 21.7 miles in length and would reach a maximum depth of 2,063 feet,⁷ curving south-southwest while traversing ANF including SGMNM. Moving south from where the tunnel would leave the boundaries of ANF including SGMNM, the E1 Build Alternative would follow a path identical to that of the Refined SR14 Build Alternative. The E1 Build Alternative would traverse underneath the Sylmar neighborhood of Los Angeles and emerge from this tunnel in the Pacoima neighborhood of Los Angeles. It would then continue southeast at grade, on viaduct, and underground through the Sun Valley neighborhood of the city of Los Angeles and the city of Burbank until reaching the Burbank Airport Station.

S.5.3.4 E1A Build Alternative

The E1A Build Alternative alignment (Figure S-9) would diverge from the E1 Build Alternative alignment south of East Avenue S, following a more easterly route approximately 300 feet east of Una Lake. In contrast to the E1 Build Alternative alignment, the E1A Build Alternative alignment would cross over the California Aqueduct on elevated structures before entering a tunnel portal approximately 2,600 feet southwest of the Sierra Highway/Pearblossom Highway intersection. After continuing underground for approximately 1.7 miles, the E1A Build Alternative alignment would transition to an at-grade profile approximately 350 feet north of Vincent View Road. Just south of Vincent View Road, the E1A Build Alternative alignment would converge with the E1 Build Alternative alignment. The remaining E1A alignment south of Vincent View Road would be identical to the E1 Build Alternative alignment.

⁷ After construction of the project is completed, a small permanent structure and associated power facilities for emergency egress, maintenance, and ventilation equipment could be installed at the selected adit locations. Refer to Chapter 2, Alternatives, for further discussion of adit features.



PRELIMINARY DRAFT/SUBJECT TO CHANGE - HSR ALIGNMENT IS NOT DETERMINED
 Source: Authority, 2020; National Geographic, 2021

March 25, 2021

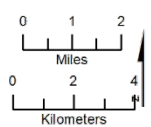
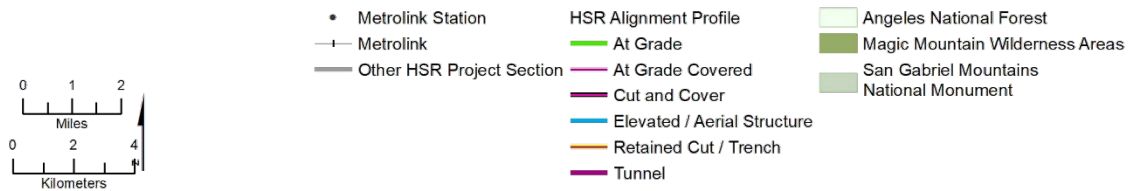


Figure S-8 E1 Build Alternative Overview Map



PRELIMINARY DRAFT/SUBJECT TO CHANGE - HSR ALIGNMENT IS NOT DETERMINED
 Source: Authority, 2020; National Geographic, 2021

March 25, 2021

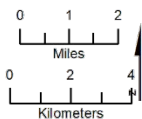
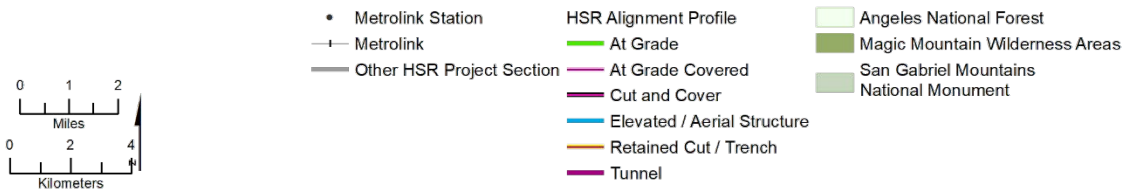


Figure S-9 E1A Build Alternative Overview Map

S.5.3.5 E2 Build Alternative

The northern 18 miles of the E2 Build Alternative would be identical to the E1 Build Alternative. The E2 Build Alternative (Figure S-10) would begin in the city of Palmdale, cross the California Aqueduct, and transition into a tunnel approximately 0.6 mile north of ANF including SGMNM. This tunnel would continue southwest for approximately 1.6 miles and end in Aliso Canyon to cross a tributary of the Santa Clara River on viaduct. After this crossing, the E2 Build Alternative would enter a second tunnel continuing southwest. After continuing for approximately 5 miles along the same path as the E1 alignment, the E2 alignment would shift to a more westerly direction through ANF including SGMNM. This second tunnel would be 16.6 miles in length and would reach a maximum depth of 2,670 feet, curving south-southwest while traversing ANF including SGMNM. The E2 Build Alternative would exit this tunnel in the hills above the Lake View Terrace neighborhood. The E2 Build Alternative would then cross Big Tujunga Wash on viaduct and enter a tunnel that would lead to the Burbank Airport Station.

S.5.3.6 E2A Build Alternative

The E2A Build Alternative (Figure S-11) alignment would follow a similar route to the E1A Build Alternative to Vincent View Road, where it would follow the E2 Build Alternative alignment. The remaining E2A Build Alternative alignment would be identical to the E2 Build Alternative alignment, south of Vincent View Road, under the ANF, into the San Fernando Valley, and to the southern terminus of the Central Subsection.



PRELIMINARY DRAFT/SUBJECT TO CHANGE - HSR ALIGNMENT IS NOT DETERMINED
 Source: Authority, 2020; National Geographic, 2021

March 25, 2021

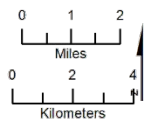
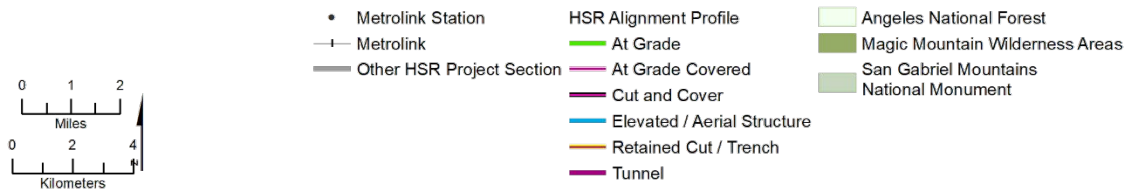


Figure S-10 E2 Build Alternative Overview Map



PRELIMINARY DRAFT/SUBJECT TO CHANGE - HSR ALIGNMENT IS NOT DETERMINED
 Source: Authority, 2020; National Geographic, 2021
 March 25, 2021

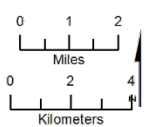
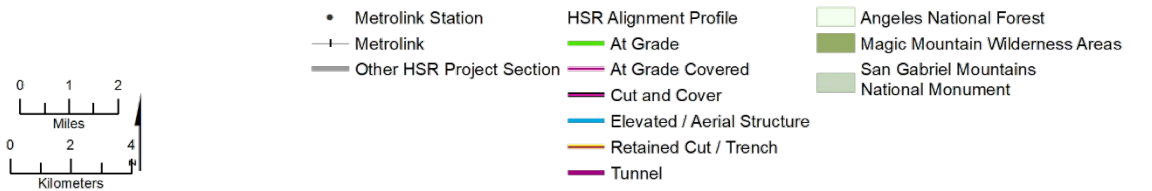


Figure S-11 E2A Build Alternative Overview Map

S.5.4 Electrical Interconnections and Infrastructure

The Palmdale to Burbank Project Section would include the extension of power transmission lines to a series of traction power substations (TPSS) located at approximately 30-mile intervals along the HSR corridor. Each traction power substation would be approximately 32,000 square feet (200 feet by 160 feet). Switching and paralleling stations would balance the electrical load between tracks and switch power off or on to either track in the event of an emergency. Switching stations would be required at approximately 15-mile intervals, midway between the TPSSs. Paralleling stations would be required at approximately 5-mile intervals along the Build Alternative alignment between the switching stations and the TPSSs; paralleling stations would be located underground when the alignment is in tunnel. The paralleling stations would need to be approximately 9,600 square feet (120 feet by 80 feet). Each station would include an approximately 450-square-foot (18 feet by 25 feet) control room. Permanent emergency standby generators are anticipated to be located at passenger stations and terminal lay-up/storage. Electrical interconnections and infrastructure are included in the Build Alternative footprints evaluated in this Draft EIR/EIS. The ultimate electrical interconnections and infrastructure locations will be selected from the options evaluated in this Draft EIR/EIS during final design of the Preferred Alternative, after the issuance of the Authority’s ROD and NOD.

S.5.5 Adits and Intermediate Windows

Several potential adit location options have been identified for each of the Build Alternatives. Adits are access shafts intended to facilitate underground tunnel construction and maintenance. Adits may also facilitate construction of fault chambers and other similar design requirements, that would provide added safety for HSR operations and maintenance in the vicinity of or when crossings hazardous fault zones. After construction is completed, a small permanent structure and facilities for emergency egress, maintenance, and ventilation would be installed at the adit locations.

Several intermediate window locations are also identified for each of the Build Alternatives. An intermediate window is a vertical shaft that can provide access, water, power, ventilation, and other support to tunnel construction areas. After construction is complete, a small structure for permanent access, and possibly ventilation equipment, would remain at the surface.

Fault Chamber

A wide, underground chamber constructed to protect trains from earthquakes and fault rupture.

This Draft EIR/EIS evaluates multiple options for adit and intermediate window sites for each Build Alternative which are described in Table S-2 below. The ultimate adit and intermediate window facility locations will be selected from the options evaluated in this Draft EIR/EIS during final design of the Preferred Alternative, after the issuance of the Authority’s ROD and NOD.

Table S-2 Palmdale to Burbank Project Section Build Alternative Adit and Intermediate Window Options

Feature Name	Location	Build Alternative
Adit		
SR14-A1	Located within the ANF along Little Tujunga Canyon Road	Refined SR14, SR14A
SR14-A2	Located just south of Pacoima Dam; would surface west of the Refined SR14 alignment and connect to Gavina Avenue	Refined SR14, SR14A
SR14-A3	Located just south of Pacoima Dam; would surface east of the Refined SR14 alignment and connect to Wallabi Avenue	Refined SR14, SR14A

Feature Name	Location	Build Alternative
E1-A1	Located along Little Tujunga Canyon Road, within the ANF. Would extend east from the underground cavern to a CSA north of Little Tujunga Canyon Road	E1, E1A
E1-A2	Located along Little Tujunga Canyon Road, within the ANF. Would extend west from the underground cavern to a CSA along Little Tujunga Canyon Road	E1, E1A
E2-A1	Connects to Little Tujunga Canyon Road within the ANF; extends west from the underground cavern to a temporary CSA within an in-holding approximately 0.4 mile north of Gold Creek Road	E2, E2A
E2-A2	Connects to Little Tujunga Canyon Road within the ANF; extends west from the underground cavern to a temporary CSA within an in-holding along Gold Creek Road	E2, E2A
Intermediate Window		
SR14-W1	Located directly north of the I-210/SR 118 interchange	Refined SR14, SR14A
SR14-W2	Located directly south of the I-210/SR 118 interchange	Refined SR14, SR14A
E1-W1	Located north of Arrastre Canyon, just outside the ANF boundary	E1, E1A
E1-W2a	Located directly north of the intersection of the I-210 and SR 118 freeways	E1, E1A
E1-W2b3	Located directly south the intersection of the I-210 and SR 118 freeways	E1, E1A
E2-W1	Located just outside the ANF, north of Arrastre Canyon	E2, E2A
E2-W2	Located at the current site of the CalMat Mine in Sun Valley	E2, E2A

ANF = Angeles National Forest; CSA = construction staging area; I- = Interstate; SR = State Route

S.5.6 Station Area Development

The Palmdale to Burbank Project Section would include a station in the city of Burbank (Figure S-12), which would be designed to optimize connections to local transit, airports, highways, and bicycle and pedestrian networks. HSR stations would include the following elements:

- Passenger platforms
- Station house with ticketing, waiting areas, passenger amenities, administration and employee areas, and baggage and freight-handling service
- Short-term and long-term vehicle parking
- Passenger pick-up and drop-off areas
- Motorcycle/scooter parking
- Bicycle parking
- Waiting areas and queuing space for taxis and shuttle buses
- Pedestrian walkway connections

S.5.7 Burbank Airport Station

The Burbank Airport Station, which is located at the southern end of the Palmdale to Burbank Project Section, was also evaluated as part of the Burbank to Los Angeles Project Section. See Section 2.5.2.2 in Chapter 2, Alternatives, for a depiction of the Burbank Airport Station area that is an overlap (common element) between the two HSR project sections. The Burbank to Los Angeles Project Section Final EIR/EIS was released on November 5, 2021, and the Authority’s Board approved the Burbank to Los Angeles Project Section Preferred Alternative, including the Burbank Airport Station, on January 20, 2022. The information regarding the Burbank Airport Station included in this document is informational and for reference only.

The Burbank Airport Station site (Figure S-12) would be located east of the Hollywood Burbank Airport. This site would be bordered by San Fernando Road to the north, Hollywood Way to the east, and Winona Avenue to the south. Airport facilities occupy much of the land south of this proposed station site, industrial and light industrial land uses occupy land to the east of this station site, and residential land uses are located to the north of this station site. The station site is near the I-5 freeway, which is approximately 0.25 mile to the north.

The HSR tracks and train boarding platforms would be underground at the Burbank Airport Station. The aboveground facilities would include a station building (to house ticketing areas, passenger waiting areas, restrooms, and related facilities), passenger pick-up/drop-off facilities for private autos, a transit center for buses and shuttles, and surface parking areas. Aboveground facilities would encompass approximately 65 acres and would provide up to approximately 3,000 surface parking spaces.

S.6 Impact Avoidance and Minimization Features

The Authority committed to implementing design features to avoid and minimize impacts of the statewide HSR system to the maximum extent possible consistent with the Tier 1 environmental documents, including the 2005 Statewide Program EIR/EIS, 2008 Bay Area to Central Valley Program EIR/EIS, and the 2012 Partially Revised Final Program EIR. These Impact Avoidance and Minimization Features (IAMFs) are described in Appendix 2-E, and are included as applicable, in the analysis of each of the Build Alternatives. Table S-3 below lists the IAMFs that would be part of the project. The Authority would implement these features during project design and construction, as relevant to the particular project section, to avoid and minimize impacts.

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

- Follow existing transportation corridors
- Span water crossings
- Use shared rights-of-way
- Include passages for wildlife movement
- Include narrowed footprint with elevated or retained cut profile
- Avoid sensitive environmental resources to the extent practical

Table S-3 Impact Avoidance and Minimization Features

IAMF Number	IAMF Title
Transportation	
TR-IAMF#1	Protection of Public Roadways during Construction
TR-IAMF#2	Construction Transportation Plan
TR-IAMF#3	Off-Street Parking for Construction-Related Vehicles
TR-IAMF#4	Maintenance of Pedestrian Access

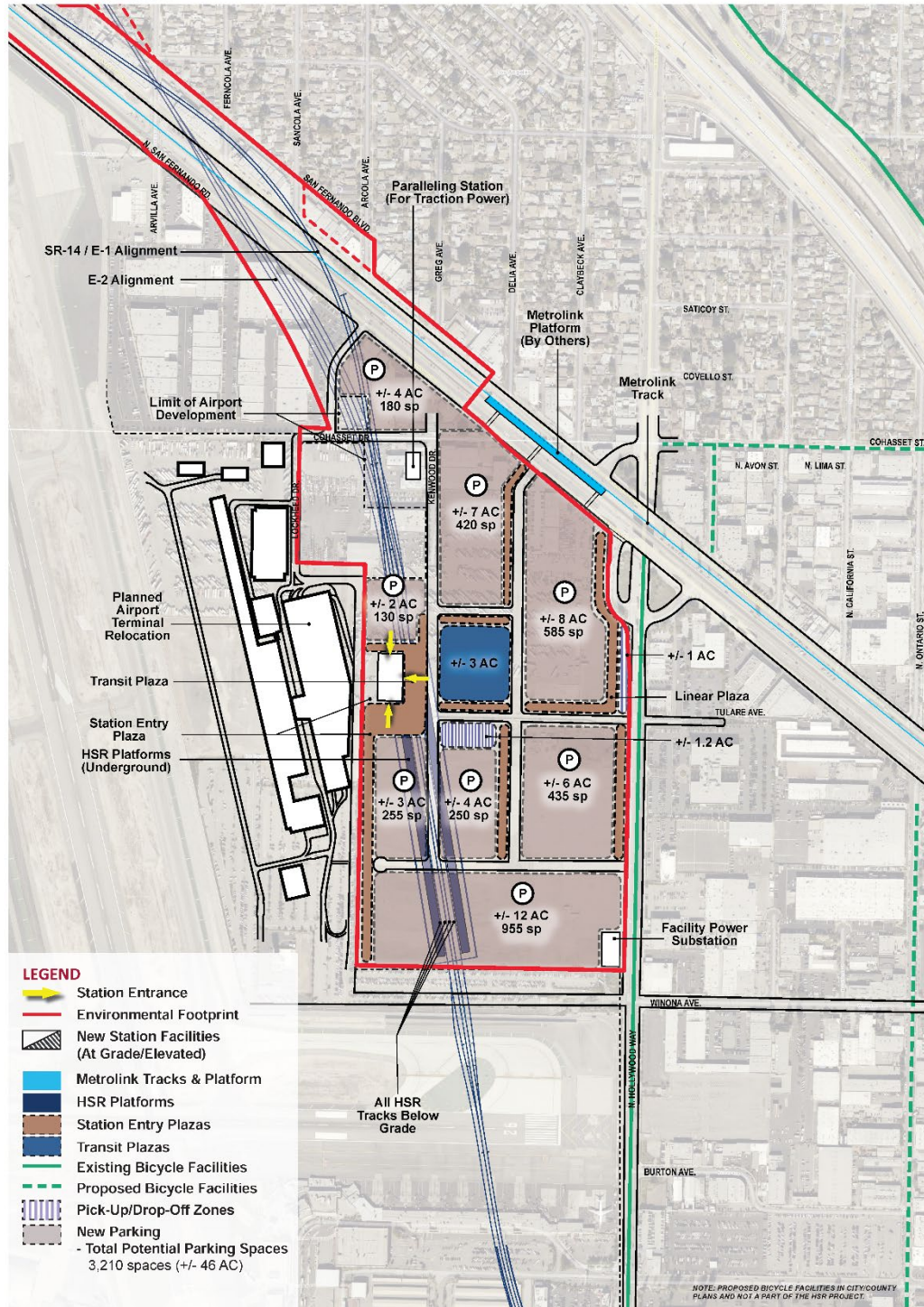
IAMF Number	IAMF Title
TR-IAMF#5	Maintenance of Bicycle Access
TR-IAMF#6	Restriction on Construction Hours
TR-IAMF#7	Construction Truck Routes
TR-IAMF#8	Construction during Special Events
TR-IAMF#9	Protection of Freight and Passenger Rail during Construction
TR-IAMF#11	Maintenance of Transit Access
TR-IAMF#12	Pedestrian and Bicycle Safety
Air Quality and Global Climate Change	
AQ-IAMF#1	Fugitive Dust Emissions
AQ-IAMF#2	Selection of Coatings
AQ-IAMF#3	Renewable Diesel
AQ-IAMF#4	Reduce Criteria Exhaust Emissions from Construction Equipment
AQ-IAMF#5	Reduce Criteria Exhaust Emissions from On-Road Construction Equipment
AQ-IAMF#6	Reduce the Potential Impact of Concrete Batch Plants
Noise and Vibration	
NV-IAMF#1	Noise and Vibration
Electromagnetic Interference and Electromagnetic Fields	
EMI/EMF-IAMF#1	Preventing Interference with Adjacent Railroads
EMI/EMF-IAMF#2	Controlling Electromagnetic Fields/Electromagnetic Interference
Public Utilities and Energy	
PUE-IAMF#1	Design Measures
PUE-IAMF#2	Irrigation Facility Relocation
PUE-IAMF#3	Public Notifications
PUE-IAMF#4	Utilities and Energy
Biological Resources	
BIO-IAMF#1	Designate Project Biologist, Designated Biologists, Species-Specific Biological Monitors and General Biological Monitors
BIO-IAMF#2	Facilitate Agency Access
BIO-IAMF#3	Prepare WEAP Training Materials and Conduct Construction Period WEAP Training
BIO-IAMF#4	Conduct Operation and Maintenance Period WEAP Training
BIO-IAMF#5	Prepare and Implement a Biological Resources Management Plan
BIO-IAMF#6	Establish Monofilament Restrictions
BIO-IAMF#7	Prevent Entrapment in Construction Materials and Excavations
BIO-IAMF#8	Delineate Equipment Staging Areas and Traffic Routes

IAMF Number	IAMF Title
BIO-IAMF#9	Dispose of Construction Spoils and Waste
BIO-IAMF#10	Clean Construction Equipment
BIO-IAMF#11	Maintain Construction Sites
BIO-IAMF#12	Design the Project to be Bird Safe
Hydrology and Water Resources	
HYD-IAMF#1	Storm Water Management
HYD-IAMF#2	Flood Protection
HYD-IAMF#3	Prepare and Implement a Construction Stormwater Pollution Prevention Plan
HYD-IAMF#4	Prepare and Implement an Industrial Stormwater Pollution Prevention Plan
HYD-IAMF#5	Tunnel Boring Machine Design and Features
HYD-IAMF#6	Tunnel Lining Systems
HYD-IAMF#7	Grouting
Geologic Resources	
GEO-IAMF#1	Geologic Hazards
GEO-IAMF#2	Slope Monitoring
GEO-IAMF#3	Gas Monitoring
GEO-IAMF#4	Historic or Abandoned Mines
GEO-IAMF#5	Hazardous Minerals
GEO-IAMF#6	Ground Rupture Early Warning Systems
GEO-IAMF#7	Evaluate and Design for Large Seismic Ground Shaking
GEO-IAMF#8	Suspension of Operations During an Earthquake
GEO-IAMF#9	Subsidence Monitoring
GEO-IAMF#10	Geology and Soils
GEO-IAMF#11	Engage a Qualified Paleontological Resources Specialist
GEO-IAMF#12	Perform Final Design Review and Triggers Evaluation
GEO-IAMF#13	Prepare and Implement Paleontological Resources Monitoring and Mitigation Plan (PRMMP)
GEO-IAMF#14	Provide WEAP Training for Paleontological Resources
GEO-IAMF#15	Halt Construction, Evaluate, and Treat if Paleontological Resources Are Found
Hazardous Materials and Waste	
HMW-IAMF#1	Property Acquisition Phase 1 and Phase 2 Environmental Site Assessments
HMW-IAMF#2	Landfill
HMW-IAMF#3	Work Barriers
HMW-IAMF#4	Undocumented Contamination

IAMF Number	IAMF Title
HMW-IAMF#5	Demolition Plans
HMW-IAMF#6	Spill Prevention
HMW-IAMF#7	Transport of Materials
HMW-IAMF#8	Permit Conditions
HMW-IAMF#9	Environmental Management System
HMW-IAMF#10	Hazardous Materials Plans
Safety and Security	
SS-IAMF#1	Construction Safety Transportation Management Plan
SS-IAMF#2	Safety and Security Management Plan
SS-IAMF#3	Hazard Analyses
SS-IAMF#4	Oil and Gas Wells
SS-IAMF#5	Aviation Safety
SS-IAMF#6	Stakeholder Coordination for the Hollywood Burbank Airport
Socioeconomics and Communities	
SOCIO-IAMF#1	Construction Management Plan
SOCIO-IAMF#2	Compliance with Uniform Relocation Assistance and Real Property Acquisition Policies Act
SOCIO-IAMF#3	Relocation Mitigation Plan
Land Use and Development, Station Planning	
LU-IAMF#1	HSR Station Area Development: General Principles and Guidelines
LU-IAMF#2	Station Area Planning and Local Agency Coordination
LU-IAMF#3	Restoration of Land Used Temporarily During Construction
Agricultural Farmland and Forest Land	
AG-IAMF#1	Restoration of Important Farmland Used for Temporary Staging Areas
AG-IAMF#2	Permit Assistance
AG-IAMF#3	Farmland Consolidation Program
AG-IAMF#4	Notification to Agricultural Property Owners
AG-IAMF#5	Temporary Livestock and Equipment Crossings
AG-IAMF#6	Equipment Crossings
Parks, Recreation and Open Space	
PK-IAMF#1	Parks, Recreation, and Open Space
Aesthetics and Visual Quality	
AVQ-IAMF#1	Aesthetic Options
AVQ-IAMF#2	Aesthetic Review Process

IAMF Number	IAMF Title
Cultural Resources	
CUL-IAMF#1	Geospatial Data Layer and Archaeological Sensitivity Map
CUL-IAMF#2	WEAP Training Session
CUL-IAMF#3	Pre-construction Cultural Resource Surveys
CUL-IAMF#5	Archaeological Monitoring Plan and Implementation
CUL-IAMF#6	Pre-Construction Conditions Assessment, Plan for Protection of Historic Built Resources, and Repair of Inadvertent Damage
CUL-IAMF#7	Built Environment Monitoring Plan
CUL-IAMF#8	Implement Protection and/or Stabilization Measures

Source: Appendix 2-E, Impact Avoidance and Minimization Features
 Authority = California High-Speed Rail Authority
 HSR = high-speed rail
 IAMF = impact avoidance and minimization feature



Burbank Station General Site Plan
 Source: PlaceWorks
 Date: May 2, 2019

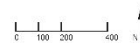


Figure S-12 Proposed Burbank Airport Station

S.7 No Project Alternative Impacts

In assessing future conditions, the No Project Alternative assumes that the California HSR System would not be built, but programmed and funded improvements to the intercity transportation system (highway, rail, and transit) as well as reasonably foreseeable local development projects (with funding sources already identified) would be developed as planned by 2040. Section S.5.2 describes the No Project Alternative conditions.

Because some future projects considered under the No Project Alternative are in the early planning process, specific impacts cannot always be determined, but each project would require environmental review under CEQA. Projects seeking federal funding or approvals would also need to conduct a NEPA-specific analysis. Environmental resources that would be affected under the No Project Alternative are described below.

- Transportation**—No Project Alternative conditions are based on the Regional Travel Demand Forecasting Models⁸ that assume completion of new trip-generating land-use projects (i.e., residential, commercial, and industrial developments) and capacity-increasing projects (i.e., highway widening and installation of new roadways) throughout the Palmdale to Burbank region. Such projects could encourage compact development and greater investment in local transit modes as a means of reducing vehicle traffic. However, even with these improvements, a growing regional population would continue to exacerbate roadway congestion, resulting in an overall increase in VMT.
- Air Quality and Global Climate Change**—No Project Alternative air quality assumptions estimate that total emissions for volatile organic compounds, carbon monoxide, and nitrogen oxides would decrease from 2015 to 2040 as newer, lower-emitting vehicles replace older, higher-emitting vehicles. These decreases would offset VMT increases resulting from population growth throughout the Los Angeles region. In contrast, emissions of sulfur dioxide, particulate matter less than or equal to 10 microns and 2.5 microns (PM₁₀, and PM_{2.5}) in 2040 would be higher than the levels in 2015 because emissions of these pollutants are dependent on factors other than vehicle emission technology, such as wood-burning stoves and industrial processes. Improvements in vehicle emission technology would not reduce PM₁₀ and PM_{2.5} emissions from noncombustion processes, such as from brake wear or other sources of on-road dust. Emissions of sulfur dioxide, which are most commonly generated from power plants and other industrial facilities, are expected to

Vehicle Miles Traveled (VMT)

VMT is a metric of the total miles traveled by vehicles in a defined area over a defined period and is often used to estimate the environmental impacts of driving, such as GHG and air pollutant emissions.

Volatile Organic Compounds

A compound of carbon, excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides, or carbonates and ammonium carbonate, which participates in atmospheric photochemical reactions, except those designated by U.S. Environmental Protection Agency as having negligible photochemical reactivity.

Carbon Monoxide

A colorless, odorless gas generated in the urban environment primarily by the incomplete combustion of fossil fuels in motor vehicles.

Nitrogen Oxides

A class of pollutant compounds that includes nitrogen dioxide and nitric oxide, both of which are emitted by motor vehicles.

Sulfur Dioxides

Sulfur-oxygen compounds that include the important criteria pollutants sulfur dioxide and sulfur trioxide.

Particulate Matter (PM₁₀ and PM_{2.5})

Liquid and solid particles of a wide range of sizes and compositions; of particular concern for air quality are particles smaller than or equal to 10 microns and 2.5 microns in size (PM₁₀ and PM_{2.5}, respectively).

⁸ The Regional Travel Demand Forecasting Models are produced by the Southern California Association of Governments.

increase as demand for energy and industrial products rises along with population and economic growth. Under the No Project Alternative, these increases in emissions would lead to a degradation of regional air quality in air basins throughout the state.

- Noise and Vibration**—Existing highways, airports, and railways would continue to generate noise throughout the period to 2040. Highways would experience greater VMT over time, resulting in gradually increasing noise levels in the region. Although infrastructure projects are subject to regulations to minimize new sources of noise, reasonably foreseeable projects would also maintain or increase vibration impacts along transportation corridors throughout the region.
- Electromagnetic Fields and Electromagnetic Interference**—As the regional population increases, so too would the use of electrical infrastructure and communications equipment, such as high-voltage transmission lines and cellular broadcast antennas. Although such electromagnetic field (EMF)/electromagnetic interference (EMI)-generating equipment currently exists between Palmdale and Burbank, installation of new equipment to meet demand would increase EMF and EMI generation throughout the region.

Electromagnetic Field (EMF)

A force field that extends outward from any moving electrical current, consisting of magnetic and electrical fields

Electromagnetic Interference (EMI)

An electrical emission or disturbance that disrupts electrical or electronic equipment or systems
- Public Utilities and Energy**—Planned growth throughout the Palmdale to Burbank Project Section region would increase use of, and demand for, public utilities, such as water, sanitary sewer, solid waste, and energy services. However, current and future projects would undergo project-specific environmental review to compensate for increased utility and energy demands.
- Biological and Aquatic Resources** — Development pressure throughout Los Angeles County would continue to affect wildlife habitat and aquatic resources by converting rural or undeveloped land into urban and suburban residential communities and commercial and industrial uses, and infrastructure consistent with adopted local government general plans. Such impacts include loss, fragmentation, or degradation of habitat; and the loss of special-status plants and animals. Each present and future project would undergo environmental review to evaluate and minimize impacts on plants, wildlife, and habitat through avoidance, minimization, and compensatory mitigation measures. Nevertheless, irreversible loss of natural communities could occur as development pressure increases throughout the region.
- Hydrology and Water Resources**—Growth in communities between Palmdale and Burbank would install new structures and infrastructure within regional watersheds and groundwater basins. Construction projects could alter surface water drainage patterns, degrade surface water or groundwater quality, increase flood risks, or reduce groundwater recharge. However, new development projects would be subject to federal, state, and local regulations designed to minimize and prevent impacts on water resources.
- Geology, Soils, Seismicity, and Paleontological Resources**—New projects constructed between Palmdale and Burbank would encounter a variety of engineering and safety constraints related to geology, soils, seismicity, and mineral resources. Safety and engineering constraints could be influenced by hazards associated with active faults in the region, including the San Andreas Fault. In addition, construction activities are likely to encounter paleontological resources (i.e., fossils), which are likely to be present in regions throughout Los Angeles County. New development would also be subject to environmental review to identify appropriate hazard mitigation and resource protection.

- **Hazardous Materials and Wastes**—Accidental spills or releases of hazardous materials could result from their continued use, storage, or transportation throughout the Palmdale to Burbank region. Proposed projects on contaminated sites would also encounter hazardous waste. Such accidents might pose hazards that could affect public and environmental health. Best management practices, avoidance measures, and regulatory oversight would reduce potential risks associated with hazardous materials and wastes.
- **Safety and Security**—New residential, commercial, industrial, recreational, and transportation projects would increase the demand for fire protection, law enforcement, and emergency medical services. Regional and local plans address future community conditions regarding safety and security needs. New development would also be subject to environmental review to identify appropriate hazard mitigation and resource protection.
- **Socioeconomics and Communities**—New projects throughout the Palmdale to Burbank region may displace residences and businesses, disrupt, or divide established communities, and/or reduce community cohesion. Such projects could also create economic opportunities (through job creation and larger tax revenue) or economic losses (through community disruption or displacement). Future projects would undergo individual environmental review to evaluate community cohesion and socioeconomic disruptions and identify mitigations.
- **Station Planning, Land Use, and Development**—Local and regional land use plans encourage growth management through urban infill near transit corridors to minimize VMT. However, local and regional land use policies assume completion of the California HSR System and include policies that consider HSR stations as elements of transit-oriented development. Therefore, the No Project Alternative would not support land use planning goals to encourage high-density development around HSR stations.
- **Agricultural Farmland and Forestland**—Local and regional land use plans encourage urban infill, which would minimize development pressure on lands that contain agricultural and forest resources. However, there is very little agricultural farmland between Palmdale and Burbank, so the No Project Alternative would not result in substantial farmland conversions. Land use restrictions within ANF including SGMNM would generally preclude development projects from affecting forest lands in these areas managed by the United States Forest Service (USFS).
- **Parks, Recreation, and Open Space**—Regional and local land use plans contain provisions for funding, acquiring, and maintaining public parks and recreation facilities to meet the needs resulting from population growth throughout the Palmdale and Burbank region. Future developments planned under the No Project Alternative would require individual environmental review to avoid impacts on parks, recreational facilities, and open space.
- **Aesthetics and Visual Quality**—Planned growth between Palmdale and Burbank would add infrastructure to undeveloped, rural, suburban, and urban landscapes. Future projects would influence the visual character of the resource study area (RSA). Project-level environmental review would require that projects avoid, minimize, or mitigate visual changes.
- **Cultural Resources**—Future projects would encounter archaeological and historic built resources between Palmdale and Burbank. Future development projects would be subject to federal and state laws and local regulations requiring minimization of impacts on historic properties. However, permanent loss of cultural resources could occur at new development sites throughout the region.
- **Regional Growth**—Urban and suburban areas such as Palmdale, Los Angeles, and Burbank are highly developed and are expected to experience population and employment growth. Transportation projects under the No Project Alternative could have the potential to induce growth in these areas. Conversely, land use restrictions within the ANF would generally preclude development and growth within the boundaries of the ANF.

- Cumulative Impacts**— General plans and other planning documents for Los Angeles County and cities in the region project locations and types of growth likely to occur under buildout of the plans. Accommodating the buildout of these general plans and other planning documents will require land and the construction of new residential areas, roadways, electric power generation facilities, utilities, schools, hospitals, and commercial and industrial facilities.
- Section 4(f) and Section 6(f)**—New development projects throughout the Palmdale to Burbank region would result in impacts on Section 4(f) and 6(f) resources. These impacts would occur mainly in developed areas including Palmdale and Burbank. Because of land-use restrictions in the ANF including SGMNM, no major development would occur within ANF including SGMNM.
- Environmental Justice**—Jurisdictions in the region would evaluate the potential environmental and human health effects of future projects that would potentially have disproportionately high and adverse impacts on environmental justice populations.

Environmental Justice

Environmental justice evaluations entail identifying and addressing the potential for disproportionately high and adverse effects on minority and/or low-income populations.

S.8 Palmdale to Burbank Project Section Alternatives Evaluation

The following sections provide an overview of the impacts of the Refined SR14, SR14A, E1, E1A, E2, and E2A Build Alternatives, including both adverse impacts and benefits common to the Build Alternatives. If adverse impacts are substantial, then proposed mitigation is described. A comparison of the capital and operating costs is also presented. As shown previously, Table S-1 provides a high-level comparison of key design features associated with each of the Build Alternatives.

S.8.1 Palmdale to Burbank Project Section Benefits

The California HSR System would help to accommodate anticipated population and employment growth and associated travel needs in California by providing millions of people the option to travel by train rather than by automobile or airline. According to the California Department of Finance, between 2015 and 2040, California's population is expected to increase by 21 percent, or 8 million residents—from approximately 39 million to 47 million (CDOF 2016); in the same time frame, employment in California is also expected to increase by 15 percent, or 3 million employees—from approximately 18 million to 21 million (BLS 2016). Between 2015 and 2040, the population of Los Angeles County is expected to increase by 15 percent or nearly 1.5 million residents—from approximately 10 million to more than 11 million; in the same time frame, employment in Los Angeles County is expected to increase by 11 percent or 0.5 million employees—from approximately 4.7 million to 5.2 million (SCAG 2016). California's growing population, coupled with robust economic growth and tourism forecasts, will generate increased demand for intercity travel.

The California HSR System would provide a safe, clean, efficient transit system to accommodate this population and employment growth. An estimated 5,600 riders are anticipated to board through stations within the Palmdale to Burbank Project Section daily (Authority 2019b). The all-electric HSR train would be powered completely by 100 percent renewable energy. As such, the California HSR System would serve as a climate-change mitigation strategy to reduce California's greenhouse gas emissions by converting future automobile and aviation trips to HSR trips. Reductions in automobile VMT and aviation travel would result in a reduction of greenhouse gas emissions because the high-speed trains would be powered by renewable energy. Although the California HSR System would increase electricity consumption, the California HSR System would reduce vehicle and air travel miles with corresponding reductions in fuel consumption and air emissions, for a net reduction in emissions from transportation. Along with addressing the capacity constraints of automobile and airline travel, the California HSR System would improve air quality, reduce congestion, and improve transportation safety and travel time.

The Palmdale to Burbank Project Section would provide an interface with commercial airports, mass transit, and the highway network to relieve capacity constraints of the existing transportation system as increases in intercity travel demand in California occur. The HSR stations in Palmdale and Burbank would provide transit hubs that could support local government plans for high-density transit-oriented development and could attract development away from the edges of urban boundaries. The California HSR System would also improve water quality compared to the No Project Alternative because of decreased VMT, which would reduce non-point-source pollutants from vehicle travel.

The Palmdale to Burbank Project Section would provide benefits at the local, regional, and state levels. At the regional level, benefits would include economic growth, long-term air quality benefits, and traffic congestion reductions. Construction of the California HSR System would generate a total of approximately 35,000 to 37,000 job-years, depending on the selected Build Alternative, and operation and maintenance of the project would result in a total of approximately 5,000 new job-years.⁹ It is anticipated that the regional workforce in Los Angeles County would be able to accommodate this employment demand, so the induced economic activity would benefit the regional economy.

Non-Point-Source Pollutants

Pollution that collects from a wide area and cannot be traced to a single source. Examples include pesticides or fertilizers from farms or developed lands that wash into rivers or percolate through the soil into groundwater.

S.8.2 Comparison of Impacts for the Palmdale to Burbank Project Section Build Alternatives

The Refined SR14 and SR14A Build Alternative alignments would diverge from the E1, E1A, E2, and E2A Build Alternatives near the California Aqueduct, and would turn west and follow the existing SR 14 freeway. The E1, E1A, E2, and E2A Build Alternatives would diverge and continue in a southwesterly direction beneath the ANF including SGMNM where both would continue in a tunnel. The Build Alternative corridors would each follow the same route in the city of Burbank as they approach the Burbank Airport Station.

Table S-4 lists and compares the key NEPA and CEQA impacts of the six Build Alternatives prior to mitigation. Table S-5 lists significant project impacts and proposed mitigation measures for the Build Alternatives and the CEQA level of significance after mitigation; impacts determined to be less than significant prior to mitigation under CEQA are not included. The comparison of the six Build Alternatives in the paragraphs below generally focuses on impacts where each Build Alternative would result in different impacts for the specified resource topics and serves to differentiate the impacts among each of the Build Alternatives.

This impact analysis takes into account project design features (i.e., IAMFs) which are in compliance with regulatory requirements to avoid and reduce environmental impacts prior to application of mitigation measures. As a result, the Authority would comply with these regulations, and therefore, such measures are not summarized here. The Authority will comply with these regulatory requirements and will strive to avoid and minimize impacts as design progresses to final plans and specifications for construction.

⁹ A job-year is 1 year of work for one person; thus, a single new construction job that lasts 5 years would equal 5 job-years, and 10 new construction jobs that last 5 years would equal 50 job years.

Table S-4 Pre-Mitigation Comparison of Key CEQA/NEPA Impacts for the High-Speed Rail Build Alternatives

Impact	Build Alternative					
	Refined SR14	SR14A	E1	E1A	E2	E2A
Transportation						
Construction Impacts						
Number of roadway segments where the LOS would degrade to an unacceptable level during northbound spoils hauling	LOS would degrade to an unacceptable level at 2 roadway segments in the AM peak hour.	LOS would degrade to an unacceptable level at 2 roadway segments in the AM peak hour.	LOS would degrade to an unacceptable level at 4 roadway segments in the AM peak hour.	LOS would degrade to an unacceptable level at 4 roadway segments in the AM peak hour.	LOS would degrade to an unacceptable level at 3 roadway segments in the AM peak hour.	LOS would degrade to an unacceptable level at 3 roadway segments in the AM peak hour.
	LOS would degrade to an unacceptable level at 1 roadway segments in the PM peak hour.	LOS would degrade to an unacceptable level at 2 roadway segments in the PM peak hour.	LOS would degrade to an unacceptable level at 4 roadway segments in the PM peak hour.	LOS would degrade to an unacceptable level at 5 roadway segments in the PM peak hour.	LOS would degrade to an unacceptable level at 4 roadway segments in the PM peak hour.	LOS would degrade to an unacceptable level at 5 roadway segments in the PM peak hour.
Number of roadway segments where the LOS would degrade to an unacceptable level during southbound spoils hauling	LOS would degrade to an unacceptable level at 2 roadway segments in the AM peak hour.	LOS would degrade to an unacceptable level at 2 roadway segments in the AM peak hour.	LOS would degrade to an unacceptable level at 4 roadway segments in the AM peak hour.	LOS would degrade to an unacceptable level at 5 roadway segments in the AM peak hour.	LOS would degrade to an unacceptable level at 2 roadway segments in the AM peak hour.	LOS would degrade to an unacceptable level at 3 roadway segments in the AM peak hour.
	LOS would degrade to an unacceptable level at 2 roadway segments in the PM peak hour.	LOS would degrade to an unacceptable level at 3 roadway segments in the PM peak hour.	LOS would degrade to an unacceptable level at 4 roadway segments in the PM peak hour.	LOS would degrade to an unacceptable level at 5 roadway segments in the PM peak hour.	LOS would degrade to an unacceptable level at 3 roadway segments in the PM peak hour.	LOS would degrade to an unacceptable level at 4 roadway segments in the PM peak hour.

Impact	Build Alternative					
	Refined SR14	SR14A	E1	E1A	E2	E2A
Number of intersections (including new intersections) where the LOS would degrade to an unacceptable level during northbound spoils hauling	LOS would degrade to an unacceptable level at 4 intersections in the AM peak hour. LOS would degrade to an unacceptable level at 5 intersections in the PM peak hour.	LOS would degrade to an unacceptable level at 5 intersections in the AM peak hour. LOS would degrade to an unacceptable level at 7 intersections in the PM peak hour.	LOS would degrade to an unacceptable level at 6 intersections in the AM peak hour. LOS would degrade to an unacceptable level at 7 intersections in the PM peak hour.	LOS would degrade to an unacceptable level at 5 intersections in the AM peak hour. LOS would degrade to an unacceptable level at 7 intersections in the PM peak hour.	LOS would degrade to an unacceptable level at 4 intersections in the AM peak hour. LOS would degrade to an unacceptable level at 3 intersections in the PM peak hour.	LOS would degrade to an unacceptable level at 3 intersections in the AM peak hour. LOS would degrade to an unacceptable level at 3 intersections in the PM peak hour.
Number of intersections (including new intersections) where the LOS would degrade to an unacceptable level during southbound spoils hauling	LOS would degrade to an unacceptable level at 6 intersections in the AM peak hour. LOS would degrade to an unacceptable level at 6 intersections in the PM peak hour.	LOS would degrade to an unacceptable level at 7 intersections in the AM peak hour. LOS would degrade to an unacceptable level at 8 intersections in the PM peak hour.	LOS would degrade to an unacceptable level at 6 intersections in the AM peak hour. LOS would degrade to an unacceptable level at 7 intersections in the PM peak hour.	LOS would degrade to an unacceptable level at 6 intersections in the AM peak hour. LOS would degrade to an unacceptable level at 7 intersections in the PM peak hour.	LOS would degrade to an unacceptable level at 3 intersections in the AM peak hour. LOS would degrade to an unacceptable level at 3 intersections in the PM peak hour.	LOS would degrade to an unacceptable level at 3 intersections in the AM peak hour. LOS would degrade to an unacceptable level at 3 intersections in the PM peak hour.

Impact	Build Alternative					
	Refined SR14	SR14A	E1	E1A	E2	E2A
Number of freeway segments where the LOS would degrade to an unacceptable level during southbound spoils hauling	LOS would degrade to an unacceptable level at 2 freeway segments in the AM peak hour. LOS would degrade to an unacceptable level at 2 freeway segments in the PM peak hour.	LOS would degrade to an unacceptable level at 2 freeway segments in the AM peak hour. LOS would degrade to an unacceptable level at 2 freeway segments in the PM peak hour.	LOS would degrade to an unacceptable level at 1 freeway segment in the AM peak hour. LOS would degrade to an unacceptable level at 2 freeway segments in the PM peak hour.	LOS would degrade to an unacceptable level at 1 freeway segment in the AM peak hour. LOS would degrade to an unacceptable level at 2 freeway segments in the PM peak hour.	LOS would degrade to an unacceptable level at 1 freeway segment in the AM peak hour. LOS would degrade to an unacceptable level at 2 freeway segments in the PM peak hour.	LOS would degrade to an unacceptable level at 1 freeway segment in the AM peak hour. LOS would degrade to an unacceptable level at 2 freeway segments in the PM peak hour.
Number of roadway segments where the LOS would degrade to an unacceptable level during project construction	LOS would degrade to an unacceptable level at 1 roadway segment in the AM peak hour. LOS would degrade to an unacceptable level at 1 roadway segments in the PM peak hour.	LOS would degrade to an unacceptable level at 1 roadway segment in the AM peak hour. LOS would degrade to an unacceptable level at 1 roadway segments in the PM peak hour.	LOS would degrade to an unacceptable level at 1 roadway segment in the AM peak hour. LOS would degrade to an unacceptable level at 1 roadway segments in the PM peak hour.	LOS would degrade to an unacceptable level at 1 roadway segment in the AM peak hour. LOS would degrade to an unacceptable level at 1 roadway segments in the PM peak hour.	LOS would degrade to an unacceptable level at 1 roadway segment in the AM peak hour. LOS would degrade to an unacceptable level at 1 roadway segments in the PM peak hour.	LOS would degrade to an unacceptable level at 1 roadway segment in the AM peak hour. LOS would degrade to an unacceptable level at 1 roadway segments in the PM peak hour.

Impact	Build Alternative					
	Refined SR14	SR14A	E1	E1A	E2	E2A
Number of intersections (including new intersections) where the LOS would degrade to an unacceptable level during project construction	LOS would degrade to an unacceptable level at 3 intersections in the AM peak hour. LOS would degrade to an unacceptable level at 4 intersections in the PM peak hour.	LOS would degrade to an unacceptable level at 3 intersections in the AM peak hour. LOS would degrade to an unacceptable level at 4 intersections in the PM peak hour.	LOS would degrade to an unacceptable level at 1 intersection in the AM peak hour. LOS would degrade to an unacceptable level at 2 intersections in the PM peak hour.	LOS would degrade to an unacceptable level at 1 intersection in the AM peak hour. LOS would degrade to an unacceptable level at 1 intersection in the PM peak hour.	LOS would degrade to an unacceptable level at 1 intersection in the AM peak hour. LOS would degrade to an unacceptable level at 2 intersections in the PM peak hour.	LOS would degrade to an unacceptable level at 1 intersection in the AM peak hour. LOS would degrade to an unacceptable level at 1 intersection in the PM peak hour.
Operations Impacts						
Number of roadway segments where the LOS would degrade to an unacceptable level during 2040 Plus Project conditions	LOS would degrade to an unacceptable level at a total of 8 roadway segments in the AM peak hour (2 additional roadway segments compared to 2040 No Project conditions). LOS would degrade to an unacceptable level at a total of 11 roadway segments in the PM peak hour (6 additional roadway segments compared to 2040 No Project conditions).					
Number of intersections (including new intersections) where the LOS would degrade to an unacceptable level during 2040 Plus Project conditions	LOS would degrade to an unacceptable level at a total of 6 intersections in the AM peak hour (1 additional intersection compared to 2040 No Project conditions). LOS would degrade to an unacceptable level at a total of 12 intersections in the PM peak hour (4 additional intersections compared to 2040 No Project conditions).					
Air Quality and Global Climate Change						
Construction Impacts						
Criteria pollutant emissions during project construction would exceed general conformity <i>de minimis</i> thresholds	The Build Alternatives would exceed general conformity <i>de minimis</i> thresholds. Years during which exceedances would occur for each criteria pollutant and relevant air quality management district are listed below.					
<i>Criteria Pollutant</i>	<i>Air Quality Management District</i>	<i>Exceedance Years</i>	<i>Exceedance Years</i>	<i>Exceedance Years</i>	<i>Exceedance Years</i>	<i>Exceedance Years</i>
Volatile organic compounds	SCAQMD	None	None	None	None	None
	AVAQMD	None	None	None	None	None

Impact		Build Alternative					
		Refined SR14	SR14A	E1	E1A	E2	E2A
Nitrogen oxide	SCAQMD	2021 – 2025	2020 – 2026	2021 – 2026	2021 – 2026	2021 – 2026	2021 – 2026
	AVAQMD	None	None	None	None	None	2023
Carbon monoxide	SCAQMD	2023	2022 – 2023	None	None	None	2022, 2024 – 2025
	AVAQMD	None	None	None	None	None	None
Sulfur dioxide	SCAQMD	None	None	None	None	None	None
	AVAQMD	None	None	None	None	None	None
Particulate matter less than or equal to 10 micrometers	SCAQMD	None	None	None	None	None	None
	AVAQMD	None	None	None	None	None	None
Particulate matter less than or equal to 2.5 micrometers	SCAQMD	None	None	None	None	None	None
	AVAQMD	None	None	None	None	None	None
Criteria pollutant emissions during project construction would exceed CEQA thresholds		The Build Alternatives would exceed CEQA thresholds. Exceedances would occur for each criteria pollutant and relevant air quality management district as listed below (yearly unless otherwise noted).					
<i>Criteria Pollutant</i>	<i>Air Quality Management District</i>	<i>Exceedance Years</i>	<i>Exceedance Years</i>	<i>Exceedance Years</i>	<i>Exceedance Years</i>	<i>Exceedance Years</i>	<i>Exceedance Years</i>
Volatile organic compounds	SCAQMD (daily)	None	None	None	None	None	None
	AVAQMD	None	None	None	None	None	None
Nitrogen oxide	SCAQMD (daily)	2020 – 2025	2020 – 2027	2021 – 2025	2021 – 2025	2021 – 2026, 2028	2021 – 2025
	AVAQMD	None	None	None	None	None	2023
Carbon monoxide	SCAQMD (daily)	2021 – 2023	2020 – 2024	2023	2023	2021 – 2025	2023
	AVAQMD	None	None	None	None	None	None

Impact		Build Alternative					
		Refined SR14	SR14A	E1	E1A	E2	E2A
Sulfur dioxide	SCAQMD (daily)	None	None	None	None	None	None
	AVAQMD	None	None	None	None	None	None
Particulate matter less than or equal to 10 micrometers	SCAQMD (daily)	None	None	None	None	None	None
	AVAQMD	None	None	None	None	None	None
Particulate matter less than or equal to 2.5 micrometers	SCAQMD (daily)	None	None	None	None	None	None
	AVAQMD	None	None	None	None	None	None
Health risks from construction emissions		None of the six Build Alternatives would result in exceedance of applicable thresholds for cancer risk or for chronic and acute noncancer health impacts.					
<i>Increased cancer risk to residential sensitive receptors exceeding thresholds</i>		No	No	No	No	No	No
<i>Increased noncancer health risk (chronic and acute) to residential sensitive receptors exceeding thresholds</i>		No	No	No	No	No	No
Localized construction effects		The Build Alternatives have communities that would experience localized construction emission exceedances, assuming worst-case scenarios for construction activities.					
Total construction GHG emissions (metric tons CO ₂ e)		134,000	171,000	142,000	154,000	140,000	179,000

Impact	Build Alternative					
	Refined SR14	SR14A	E1	E1A	E2	E2A
Noise and Vibration						
Construction Impacts						
Residential communities affected by aboveground construction activities (Figure S-13)	<ul style="list-style-type: none"> Harold / Alpine Agua Dulce 	<ul style="list-style-type: none"> Harold / Alpine Agua Dulce 	<ul style="list-style-type: none"> Harold / Alpine Near Southern California Edison (SCE) Vincent Substation 	<ul style="list-style-type: none"> Harold / Alpine Near SCE Vincent Substation 	<ul style="list-style-type: none"> Harold / Alpine Near SCE Vincent Substation Lake View Terrace Sun Valley 	<ul style="list-style-type: none"> Harold / Alpine Near SCE Vincent Substation Lake View Terrace Sun Valley
Noise-sensitive areas affected by traffic noise from truck trips hauling construction spoils	<ul style="list-style-type: none"> Big Springs Road northwest of Acton for Refined SR14 	<ul style="list-style-type: none"> None for SR14A 	<ul style="list-style-type: none"> Portals: Aliso Canyon Road, Crown Valley Road, and Soledad Canyon Road south of Palmdale Adit: Sand Canyon Road and Placerita Canyon Road in ANF 	<ul style="list-style-type: none"> Portals: Aliso Canyon Road, Crown Valley Road, and Soledad Canyon Road south of Palmdale Adit: Sand Canyon Road and Placerita Canyon Road in ANF 	<ul style="list-style-type: none"> Wheatland Avenue in the Shadow Hills neighborhood Foothill Boulevard in the Lake View Terrace neighborhood Aliso Canyon Road, Crown Valley Road, and Soledad Canyon Road south of Palmdale 	<ul style="list-style-type: none"> Wheatland Avenue in the Shadow Hills neighborhood Foothill Boulevard in the Lake View Terrace neighborhood Aliso Canyon Road, Crown Valley Road, and Soledad Canyon Road south of Palmdale

Impact	Build Alternative					
	Refined SR14	SR14A	E1	E1A	E2	E2A
Operations Impacts						
Operation of the rail corridor would result in moderate and severe noise impacts and significant vibration and ground-borne noise effects.	Noise Effects					
	Moderate: 129	Moderate: 99	Moderate: 143	Moderate: 173	Moderate: 141	Moderate: 168
	Severe: 55	Severe: 19	Severe: 108	Severe: 44	Severe: 164	Severe: 102
	Vibration Effects					
	Residential: 27	Residential: 27	Residential: 20	Residential: 20	Residential: 0	Residential: 0
Institutional: 1	Institutional: 1	Institutional: 1	Institutional: 1	Institutional: 0	Institutional: 0	
Horses may experience startle effects within 50 feet of the alignment at these following locations	Pacific Crest Trail, Vasquez Rocks Natural Area Park	Pacific Crest Trail, Vasquez Rocks Natural Area Park	None	None	Hansen Dam Recreation Area, and Stonehurst Park and Recreation Center	Hansen Dam Recreation Area, and Stonehurst Park and Recreation Center
Electromagnetic Fields and Electromagnetic Interference						
Construction Impacts						
Potentially sensitive receptors within the RSA	2	2	2	2	0	0
Facilities that could operate sensitive equipment within 50 feet of construction equipment	2	2	2	2	0	0
Operations Impacts						
Facilities that could operate sensitive equipment within the RSA	2	2	2	2	0	0
Number of schools within 500 feet of the HSR footprint	3	4	3	3	2	2
Miles of existing track in the RSA that could be affected by EMI generated by project operation	13	14	16	15	12	11
Airports that operate within the RSA	2	2	2	2	2	2

Impact	Build Alternative					
	Refined SR14	SR14A	E1	E1A	E2	E2A
Public Utilities and Energy						
Construction Impacts						
Planned temporary interruption of utility services						
High-risk utility conflicts	291	260	254	219	169	161
Major low-risk utility conflicts	170	150	146	126	109	103
Total construction water demand (acre feet/year)	1,033	1,371	848	1,169	603	945
Total construction solid waste (million cubic yards)	4.04	4.18	3.12	3.11	2.35	2.63
Total construction energy consumption (MMBtu/year)	3.16 million	3.23 million	2.70 million	2.71 million	3.01 million	3.02 million
Biological and Aquatic Resources						
Construction Impacts						
Number of affected special-status plant species	All of the Build Alternatives would affect the same 3 Federal Endangered Species Act (FESA)-listed special-status plant species and 41 non-FESA-listed special-status plant species					
Number of affected special-status plant communities	5	5	4	4	5	5
Number of affected FESA-listed special-status wildlife species	12	12	11	11	11	11
Number of non-FESA-listed special-status wildlife species affected	46	46	43	43	47	47
Acreage of affected wetland waters of the U.S. (temporary and permanent footprint)	8	1	8 – 9 ¹	1 – 3 ¹	15	8
Acreage of affected nonwetland waters of the U.S. (temporary and permanent footprint)	40 – 41 ¹	29 – 30 ¹	33 – 34 ¹	20 – 21 ¹	27 – 28 ¹	14 – 15 ¹

Impact	Build Alternative					
	Refined SR14	SR14A	E1	E1A	E2	E2A
High risk of impacts on state and federally protected aquatic resources, including waters of the U.S., from groundwater depletion in ANF (miles)	3.2	3.2	5.5	5.5	9.9	9.9
Acreage of affected additional waters of the State	6	2	7	2	7	2
Acreage of affected CDFW riparian habitat (temporary and permanent footprint)	47 – 53 ¹	41 – 47 ¹	31 – 36 ¹	25 – 30 ¹	24 – 25 ¹	18 – 20 ¹
Acreage of affected CDFW lakes and streambeds (temporary and permanent footprint)	52 – 53 ¹	32 – 33 ¹	44 – 46 ¹	28 – 30 ¹	53 ¹	38 ¹
High risk of impacts on aquatic resource subject to Section 1600 et. seq. regulation from groundwater depletion in ANF (linear miles)	3.2	3.2	5.5	5.5	9.9	9.9
Risk of Secondary Effects from Tunnel Construction ³	Lowest Risk	Lowest Risk	High Risk	High Risk	Highest Risk	Highest Risk

Hydrology and Water Resources

Construction Impacts

Number of waterbody crossings at grade (fill, embankment, or cut-and-cover tunnel)	48	43	43	42	34	39
Number of viaduct waterbody crossings	12	3	7	3	8	3
Number of tunnel waterbody undercrossings	29	32	43	44	44	40
Acres of construction-period ground disturbance	2,572 – 2,654 ¹	2,355 – 2,437 ¹	2,249 – 2,263 ¹	2,022 – 2,159 ¹	2,093 – 2,094 ¹	1,963 – 1,964 ¹
Acres of permanent footprint	2,436 – 2,510 ¹	2,208 – 2,274 ¹	2,156	1,898 – 2,021 ¹	1,994 – 2,006 ¹	1,835 – 1,847 ¹
Acres of new impervious surfaces	787	752	742	700	650	607

Impact	Build Alternative					
	Refined SR14	SR14A	E1	E1A	E2	E2A
Acres of construction-period ground disturbance within SFHAs	294 – 295	280 – 281 ¹	306	306	422	421
Acres of permanent footprint within floodplains	292 – 293	280 – 281 ¹	306	306	422	421
Number of groundwater basins crossed by construction footprint	4	3	3	1	2	0
Number of groundwater wells within 1 mile of alignment centerline	30	30	24	24	22	22
Miles of tunnel beneath ANF	7.28	7.28	17.86	17.86	17.90	17.90
Width (feet) of gouge, crushed, and sheared rock fault zones	1,180	1,180	860	860	2,820	2,820
Number of Faults	15	15	7	7	20	20
Number of High-Risk Areas within the Tunnel Construction RSA	1	1	2	2	6	6
Number of Moderate Risk Areas within the Tunnel Construction RSA	3	3	4	4	5	5
Miles of Tunnel in Groundwater Pressure above 25 bar	5.6	5.6	10.9	10.9	11.3	11.3
Seeps and springs in ANF within 1 mile of alignment centerline	0	0	1	1	6	6
Streams in the ANF within 1 mile of Build Alternative alignment	11	11	22	22	39	39
Private wells within or near ANF including SGMNM	14	14	38	38	25	25
Production wells within or near ANF including SGMNM	4	4	0	0	3	3
Private structures within or near ANF that could rely on private wells within ANF	333	333	152	152	253	253

Impact	Build Alternative					
	Refined SR14	SR14A	E1	E1A	E2	E2A
Geology, Soils, Seismicity, and Paleontological Resources						
Construction Impacts						
Acres of temporary surface footprint within high subsidence potential zones	1,710	1,635	1,886	1,651	1,886	1,651
Acres of permanent footprint within high-subsidence-potential zones (surface / subsurface)	1,680 / 30	1,613 / 95	1,855 / 16	1,609 / 35	1,854 / 16	1,609 / 35
Acres of temporary and permanent footprint in areas of known karst terrain (surface / subsurface)	302 / 14	209 / 29	0 / 0	0 / 0	0 / 0	0 / 0
Acres of temporary footprint within nonseismic landslide hazard areas (surface / subsurface)	4 / 5	3 / 6	0 / 15	0 / 15	5 / 3	5 / 3
Acres of temporary footprint within seismic landslide hazard areas	147 – 160 ¹	123 – 137 ¹	40 – 49 ¹	40 – 49 ¹	119	90
Acres of temporary footprint within highly erodible soil areas	288 – 299 ¹	282 – 292 ¹	161 – 168 ¹	100 – 104 ¹	223 – 241	156 – 183 ¹
Acres of permanent footprint within highly erodible soils	288 – 299 ¹	274 – 284 ¹	153 – 160 ¹	98 – 102 ¹	215 – 233 ¹	147 – 152 ¹
Acres of temporary and permanent footprint within soil areas that are highly corrosive to steel (surface / subsurface)	447 / 8	464 / 20	447 / 5	436 / 5	447 / 5	399 / 5
Acres of temporary and permanent footprint within soil areas that are highly corrosive to concrete	24	13	24	13	24	13
Acres of temporary footprint within areas of difficult excavation	2,681	2,271	1,879	1,938	1,808	1,869
Acres of temporary surface footprint within liquefaction-prone areas	289 – 296 ¹	218 – 277 ¹	180	151	217	190

Impact	Build Alternative					
	Refined SR14	SR14A	E1	E1A	E2	E2A
Acres of footprint within dam inundation zones (temporary / permanent)	475 – 517 ¹ / 469 – 517 ¹	538 – 590 ¹ / 524 – 571 ¹	480 – 496 ¹ / 480 – 496 ¹	551 – 570 ¹ / 535 – 555 ¹	173 / 260	331 / 320
Tons of construction aggregate required for construction (million tons)	8.1	9.3	8.1	8.7	8.9	8.4
Acres of temporary surface footprint within MRZ-2 zones	602 – 628 ¹	662 – 699 ¹	408 – 423 ¹	419 – 433 ¹	246	247
Acres of permanent footprint within MRZ-2 zones (surface / subsurface)	602 – 628 ¹ / 94 – 96 ¹	651 – 674 ¹ / 95	408 – 423 ¹ / 45	415 – 429 ¹ / 45	246 / 10	247 / 31
Active mining facilities within construction footprint	1	1	0	0	0	0
Closed mining facilities within construction footprint	3	3	1	1	1	1
Inactive oil/gas wells within construction footprint	1	1	1	1	2	2
Linear miles of bored tunnel through paleontologically sensitive geologic units (high / low sensitivity)	8 / 7	10 / 9	5 / 3	6 / 4	5 / 3	6 / 3
Linear miles of surface profile through paleontologically sensitive geologic units (high / low sensitivity)	3 / 12	2 / 12	3 / 10	2 / 10	3 / 9	2 / 9
Acres of surface footprint within paleontologically sensitive geologic units (high / low sensitivity)	493 / 1,976	581 / 1,907	410 / 1,631	387 / 1,608	500 / 1,429	479 / 1,396
Hazardous Materials and Wastes						
Construction Impacts						
Estimated hazardous spoils quantities (million cubic yards)	9	9	3	3	4	4
Number of high-priority PEC ⁴ sites within construction footprint	26	26	24	24	21	20

Impact	Build Alternative					
	Refined SR14	SR14A	E1	E1A	E2	E2A
Number of medium-priority PEC sites within construction footprint	76	82	74	77	38	42
Number of schools within 0.25 mile of construction footprint	18 – 23 ¹	21 – 26 ¹	10	10	6	6
Number of landfills within 0.25 mile of alignment centerline	21 – 25 ¹	25 – 26 ¹	21 – 25 ¹	25 – 26 ¹	16	16
Number of inactive oil/gas facilities	1	1	1	1	1 – 2 ¹	1 – 2 ¹
Operations Impacts						
Number of schools within 0.25 mile of operational footprint	18 – 23 ¹	21 – 26 ¹	10	10	6	6
Safety and Security						
Construction Impacts						
Number of temporary road closures	17	15	17	15	7	5
Number of permanent road closures	9	5	13	12	11	10
Operations Impacts						
Number of airports/airstrips located within RSA	3	3	2	2	1	1
Schools within 2 miles of the Build Alternative footprint	13	14	12	12	7	7

Impact	Build Alternative					
	Refined SR14	SR14A	E1	E1A	E2	E2A
Socioeconomics and Communities						
Construction Impacts						
Residential communities affected by aboveground construction activities	<ul style="list-style-type: none"> ▪ Boulders at the Lake ▪ Harold ▪ Acton (near Vasquez High School) ▪ Agua Dulce (near Big Springs Road) ▪ Sylmar 	<ul style="list-style-type: none"> ▪ Boulders at the Lake ▪ Sylmar 	<ul style="list-style-type: none"> ▪ Boulders at the Lake ▪ Harold ▪ Acton (near Foreston Drive) ▪ Sylmar 	<ul style="list-style-type: none"> ▪ Boulders at the Lake ▪ Acton (near Foreston Drive) ▪ Sylmar 	<ul style="list-style-type: none"> ▪ Boulders at the Lake ▪ Harold ▪ Acton (near Foreston Drive) ▪ Lake View Terrace ▪ Sun Valley 	<ul style="list-style-type: none"> ▪ Boulders at the Lake ▪ Acton (near Foreston Drive) ▪ Lake View Terrace ▪ Sun Valley
Existing residential communities divided by at-grade or above-grade Build Alternative footprint	<ul style="list-style-type: none"> ▪ Harold ▪ Acton (near Vasquez High School) ▪ Agua Dulce (near Big Springs Road) 	<ul style="list-style-type: none"> ▪ Boulders at the Lake 	<ul style="list-style-type: none"> ▪ Harold ▪ Acton (near Foreston Drive) 	<ul style="list-style-type: none"> ▪ Boulders at the Lake ▪ Acton (near Foreston Drive) 	<ul style="list-style-type: none"> ▪ Harold ▪ Acton (near Foreston Drive) ▪ Lake View Terrace 	<ul style="list-style-type: none"> ▪ Boulders at the Lake ▪ Acton (near Foreston Drive) ▪ Lake View Terrace
Total single-family residential units displaced	38 – 41 ¹	8 – 11 ¹	13 – 18 ¹	12 – 17 ¹	38	37
Total multifamily residential units displaced	13	29	11	27	11	27
Communities with insufficient suitable replacement residential housing	Southeast Antelope Valley	None	None	None	Lake View Terrace	Lake View Terrace
Total businesses displaced	161 – 178 ¹	160 – 177 ¹	160 – 177 ¹	162 – 179 ¹	68	70
Communities with insufficient suitable replacement sites for businesses	<ul style="list-style-type: none"> ▪ Pacoima ▪ Sun Valley 	<ul style="list-style-type: none"> ▪ Pacoima ▪ Sun Valley 	<ul style="list-style-type: none"> ▪ Pacoima ▪ Sun Valley 	<ul style="list-style-type: none"> ▪ Pacoima ▪ Sun Valley 	<ul style="list-style-type: none"> ▪ Sun Valley ▪ Shadow Hills 	<ul style="list-style-type: none"> ▪ Sun Valley ▪ Shadow Hills
Cumulative sales tax over construction period	\$95,700,900	\$97,402,700	\$92,291,300	\$93,663,100	\$92,891,800	\$94,264,800

Impact	Build Alternative					
	Refined SR14	SR14A	E1	E1A	E2	E2A
Annual average sales tax during construction	\$11,962,600	\$12,175,300	\$11,536,400	\$11,707,900	\$10,321,300	\$10,473,900

Station Planning, Land Use, and Development

Construction Impacts

Acres of existing land uses subject to temporary land-use impacts

Industrial	<1 – 2 ¹	0 – <1 ¹	<1 – 2 ¹	0 – <1 ¹	0	0
Commercial	0 – <1 ¹	0 – <1 ¹	0 – <1 ¹	0 – <1 ¹	0 – <1 ¹	0 ¹
Residential	22 – 41 ¹	17 – 27 ¹	28 – 63 ¹	48 – 63 ¹	32 – 63 ¹	35 – 64 ¹
Agricultural	8	0	8	3	8	3
Recreational	0	0	0	0	0	0
Public	1 – 2 ¹	0 – <1 ¹	1 – 2	0 – <1 ¹	1	0 – <1 ¹
Institutional	8	8	0	0	0 – <1	0 – <1
Railroads/utilities	1 – 2	0 – <1 ¹	1 – 2	0	1	0
Vacant land	71 – 100 ¹	96 – 118 ¹	27 – 40 ¹	59 – 75 ¹	32 – 47 ¹	46 – 61 ¹

Acres of general plan designated land uses subject to temporary land-use impacts

Industrial	<1 – 12 ¹	0 ¹	<1 – 12 ¹	0	0	0
Commercial	<1	11	0	11	0	11
Medium-high-density residential	0	0	0	0	0	0
Low-density residential	93 – 116	92 – 105 ¹	53	81 – 96	56	65
Agricultural/open space	2 – 13	0 ¹	1	1	<1	<1
Angeles National Forest	6 – 33	6 – 33 ¹	<1 – 27 ¹	<1 – 27 ¹	<1 – 32 ¹	<1 – 32 ¹
Public facility/institutional	11 – 15 ¹	8 – 9 ¹	11 – 15	9 ¹	12	5
Right-of-way	0	0	0	0	0	0
Specific plan	0	0	0	0	0	0

Impact	Build Alternative					
	Refined SR14	SR14A	E1	E1A	E2	E2A
Total permanent surface conversions to transportation land use (acres)	1,614 – 1,667 ¹	1,279 – 1,361 ¹	1,233 – 1,288 ¹	1,077 – 1,127 ¹	1,187 – 1,210 ¹	984 – 996 ¹
<i>Permanent impacts on existing land uses (acres)</i>						
Industrial	142 – 154 ¹	137 – 150 ¹	95 – 107 ¹	92 – 104 ¹	32	30
Commercial	19 – 22 ¹	20 – 23 ¹	19 – 22 ¹	18 – 21 ¹	12 – 13 ¹	11
Agricultural	143 – 153 ¹	65 – 73 ¹	149 – 158 ¹	137 – 143 ¹	184 – 189 ¹	175 – 176 ¹
Residential	13	18	<1	5	<1	5
Recreational	<1	<1	<1	<1	<1	<1
Public	140 – 141 ¹	104	122 – 123 ¹	114	93	85
Institutional	7	7	1	1 – 13 ¹	0 – 1 ¹	0 – 1 ¹
Railroads/utilities	148 – 149 ¹	101	187 – 188 ¹	132	157	103
Vacant land	946 – 974 ¹	827 – 886 ¹	644 – 673 ¹	578 – 595 ¹	691 – 701 ¹	984 – 998 ¹
<i>Permanent impacts on planned land uses (acres)</i>						
Industrial	181 – 196 ¹	183 – 190 ¹	195 – 210 ¹	205 – 212 ¹	133	138
Commercial	41	26	47	21	44	19
Medium-high-density residential	1	3	1	3	1	0 – <1
Low-density residential	825 – 826 ¹	612	632	506	680 – 681 ¹	555
Agricultural/open space	238	170	185	165	164	143
Angeles National Forest	216 – 288 ¹	216 – 288 ¹	95 – 109 ¹	95 – 109 ¹	83 – 102 ¹	83 – 102 ¹
Public facility/institutional	108 – 114 ¹	104 – 105 ¹	135 – 141 ¹	121	79	60
Right-of-way	4	3	0	0	0	0
Specific plan	0	0	0	0	0	0
<i>Permanent specific land-use impacts within Angeles National Forest (acres)</i>						
Back country	0 – 66 ¹	0 – 66 ¹	62 – 76 ¹	62 – 76 ¹	29 – 33 ¹	29 – 33 ¹

Impact	Build Alternative					
	Refined SR14	SR14A	E1	E1A	E2	E2A
Back country (motorized use restricted)	<1	<1	0	0	0	0
Back country (Nonmotorized)	0 – <1	0 – <1	22 – 23 ¹	22 – 23 ¹	22 – 37 ¹	22 – 37 ¹
Developed area interface	216 – 221 ¹	216 – 221 ¹	0 – 10 ¹	0 – 10 ¹	27	27
Agricultural Farmland and Forest Land						
Construction Impacts						
Temporary use of Important Farmland (acres)	None					
Temporary use of Grazing Land (acres)	0 – 36 ¹	10 – 36 ¹	8	8	8	8
Temporary use of Forest Land	Adit Option SR14-A1	Adit Option SR14-A1	Adit Option E1-A1 Adit Option E1-A2	Adit Option E1-A1 Adit Option E1-A2	None	None
Parks, Recreation, and Open Space						
Construction Impacts						
Number of affected parks, recreational areas, and open space resources	6	6	5	6	7	8
Aesthetics and Visual Quality						
Construction Impacts						
Number of key viewpoints with adverse effects to visual quality	6	2	2	2	4	4
Cultural Resources⁵						
Construction Impacts						
Potential adverse effect on archaeological resources (number of phased resources) ⁶	20	12	15	10	14	11
Potential adverse effect on built historical resources (number of resources)	2	2	5	5	5	5

Impact	Build Alternative					
	Refined SR14	SR14A	E1	E1A	E2	E2A
Operations Impacts						
Potential effect on historically significant built-environment resources (number of resources)	1	1	2	2	1	1
Regional Growth						
Construction Impacts						
Direct jobs created during peak year construction (2023)	7,800	7,900	7,900	8,000	7,900	8,000
Direct jobs created as percent of projected construction-industry jobs (2023)	5.4%	5.5%	5.5%	5.6%	5.5%	5.6%
Total direct, indirect, and induced jobs created during construction (2023)	83,400	84,900	80,300	81,600	80,900	82,100
Operations Impacts						
HSR operations and maintenance employment growth (jobs)	500					
HSR increased employment due to improved accessibility (jobs)	4,900					
Total HSR-induced long-term employment growth (jobs)	5,383					
Percent increase over 2040 No Project Alternative employment projections (jobs)	0.1%					
Total HSR-induced population growth	11,693					
Percent increase over 2040 No Project Alternative population projections	0.1%					
Impacts of long-term land-use consumption	The Build Alternatives would generate an additional 0.9 percent housing need beyond the No Project Alternative projections. Growth resulting from the project would be consistent with that already planned for the RSA; therefore, there would be no increased land use consumption due to long-term induced population growth.					

Impact	Build Alternative					
	Refined SR14	SR14A	E1	E1A	E2	E2A
Cumulative Impacts						
Construction Impacts						
Adverse Effects	Construction of each Build Alternative would result in cumulative adverse effects pertaining to the following resource topics: Transportation, Air Quality (General Conformity and Localized Construction Effects), Noise, Paleontological Resources, Socioeconomics and Communities (Population and Community Impacts), Aesthetics and Visual Quality, and Cultural Resources.					
Operations Impacts						
Adverse Effects	Operations of each Build Alternative would result in cumulative adverse effects pertaining to noise.					

¹As discussed in Section S.5.3.6, the Build Alternatives would require adits and intermediate windows for construction access to tunneled portions of the alignment. This table includes ranges of quantifiable impacts that would result from the selection of each adit and intermediate window combination.

²A special-status plant species is a plant species that has some form of state or federal protection because it is threatened or rare.

³For further breakdown of impacts on special-status plant and wildlife species from changes in hydrologic conditions due to tunnel construction, refer to Section 3.7, Biological and Aquatic Resources.

⁴The PEC designation applies to specific sites where there is a possibility of existing, past, or potential hazardous materials release into soil, groundwater, or surface water.

⁵Per the Section 106 PA, the recorded archaeological sites in the project area of potential conflict that have not been evaluated for National Register of Historic Places eligibility will be revisited and will undergo phased evaluation.

⁶Phased resources consist of resources that have not been surveyed due to lack of access, either due to physical constraints or where access to resources has not been granted. Numbers in this table have been rounded.

ANF = Angeles National Forest; AVAQMD = Antelope Valley Air Quality Management District; CDFW = California Department of Fish and Wildlife; CEQA = California Environmental Quality Act; CESA = California Endangered Species Act; CO₂e = carbon dioxide equivalent; EMI = electromagnetic interference; FESA = federal Endangered Species Act; GHG = greenhouse gas; HSR = high-speed rail; LOS = level of service; MMBtu = million British thermal units; MRZ = mineral resource zone; PEC = potential environmental concern; RSA = resource study area; SCE = Southern California Edison; Section 106 PA = Section 106 Programmatic Agreement; SFHA = Special Flood Hazard Area; SCAQMD = South Coast Air Quality Management District; SGMNM = San Gabriel Mountains National Monument; VMT = vehicle miles traveled

Table S-5 CEQA Summary of Resources with Significant Impacts and Applicable Mitigation Measures

Impact	Summary of Significant Impact before Mitigation	Mitigation Measure	CEQA Level of Significance after Mitigation
Transportation			
<p>Impact TRA#5: Spoils Hauling Effects on Transit Services.</p>	<p>Construction-period earthwork and tunneling activities for the Build Alternatives would generate substantial spoils material, which would be trucked to various potential disposal sites in the Palmdale to Burbank region. Spoils hauling for all Build Alternatives would significantly affect transit services.</p>	<p>TRA-MM#12: The contractor will develop a Transportation Construction Management Plan to manage circulation for affected modes of travel during the construction period, which will include the following:</p> <ul style="list-style-type: none"> ▪ Schedule a majority of construction-related travel during off-peak hours. ▪ Locate spoils collection areas and access to minimize delays during peak hours. ▪ Where feasible, temporarily restripe roadways to maximize vehicular capacity at locations affected by construction closures. <p>However, there is no guarantee that these measures would adequately reduce impacts on transit services during spoils hauling.</p>	<p>Less than Significant for all six Build Alternatives.</p>
<p>Impact TRA#11: Project Construction Effects on Rail and Transit Services.</p>	<p>Transit operators would require scheduling and route adjustments to accommodate modifications to the transportation network in the proposed HSR station areas.</p>	<p>TRA-MM#9 and TRA-MM#11: <i>Transit Providers</i>— A Transit Coordination Plan will implement revisions to transit routes, stops, and schedules to serve the proposed HSR station areas.</p>	<p>Less than Significant for all six Build Alternatives</p>
<p>Impact TRA#12: Project Construction Effects on Non-Motorized Modes Near the Burbank Airport Station.</p>	<p>Coordination with the cities of Palmdale and Burbank would be required during the HSR station planning and roadway design phase to address impacts on pedestrian and bicyclist access and circulation.</p>	<p>TRA-MM#10 and TRA-MM#11: <i>Nonmotorized Modes</i>— The California HSR System will construct new pedestrian and bicycle facilities to compensate for loss of existing facilities and restore connections affected by modifications to the local roadway network.</p>	<p>Less than Significant for all six Build Alternatives</p>

Impact	Summary of Significant Impact before Mitigation	Mitigation Measure	CEQA Level of Significance after Mitigation
Air Quality and Global Climate Change			
<p>Impact AQ#2: Regional Air Quality Impact during Construction.¹</p>	<p>Construction-period emissions would exceed the applicable SCAQMD and AVAQMD CEQA threshold(s) for all Build Alternatives. While the specific construction year and pollutant-type exceedances vary among the Build Alternatives, there are no deviations large enough that would make one Build Alternative substantially less impactful than another.</p>	<p>AQ-MM#1: The Authority will secure emissions offsets in the SCAQMD to achieve general conformity and/or to result in net emissions below the applicable emission thresholds.</p> <p>AQ-MM#2: The Authority will secure emissions offsets in the AVAQMD to achieve general conformity and/or to result in net emissions below the applicable emission thresholds (E2A Build Alternative only).</p> <p>AQ-MM#3: The Authority will use zero emission or near zero emission technology for 25 percent of all light-duty on-road vehicles. The Authority will have a goal to use zero emission or near zero emission technology for 100 percent of the light-duty on-road vehicles, 25 percent of the heavy-duty on-road vehicles, and a minimum of 10 percent for off-road conduction equipment used for construction.</p>	<p>Significant and Unavoidable for all six Build Alternatives</p>

Impact	Summary of Significant Impact before Mitigation	Mitigation Measure	CEQA Level of Significance after Mitigation
<p>Impact AQ#3: Compliance with Air Quality Plans during Construction.¹</p>	<p>Construction-period emissions would result in the exceedance General Conformity de minimis thresholds of NOx and CO during construction within the SCAQMD and the AVAQMD. These exceedances could conflict with or obstruct implementation of the air quality plans, which have been prepared to attain NAAQS and CAAQS.</p>	<p>AQ-MM#1: The Authority will secure emissions offsets in the SCAQMD to achieve general conformity and/or to result in net emissions below the applicable emission thresholds.</p> <p>AQ-MM#2: The Authority will secure emissions offsets in the AVAQMD to achieve general conformity and/or to result in net emissions below the applicable emission thresholds (E2A Build Alternative only).</p> <p>AQ-MM#3: The Authority will use zero emission or near zero emission technology for 25 percent of all light-duty on-road vehicles. The Authority will have a goal to use zero emission or near zero emission technology for 100 percent of the light-duty on-road vehicles, 25 percent of the heavy-duty on-road vehicles, and a minimum of 10 percent for off-road conduction equipment used for construction.</p>	<p>Significant and Unavoidable for all six Build Alternatives</p>
<p>Impact AQ#5: Localized Construction Effects.¹</p>	<p>Construction activities for the Build Alternatives would cause localized elevated criteria pollutant concentrations. These elevated concentrations would cause or contribute to exceedances of the NAAQS and CAAQS.</p>	<p>AQ-MM#3: The Authority will use zero emission or near zero emission technology for 25 percent of all light-duty on-road vehicles. The Authority will have a goal to use zero emission or near zero emission technology for 100 percent of the light-duty on-road vehicles, 25 percent of the heavy-duty on-road vehicles, and a minimum of 10 percent for off-road conduction equipment used for construction.</p>	<p>Significant and Unavoidable for all six Build Alternatives</p>

Impact	Summary of Significant Impact before Mitigation	Mitigation Measure	CEQA Level of Significance after Mitigation
Noise and Vibration			
Impact N&V#1: Construction Noise Impacts on Sensitive Receivers. ¹	HSR construction activities for the Build Alternatives would expose residences near the HSR construction footprint to construction noise that exceeds recommended threshold criteria.	N&V-MM#1: Prior to starting construction, the contractor will prepare a noise-monitoring program to describe how the contractor will monitor construction noise to verify compliance with applicable noise limits.	Significant and Unavoidable for all six Build Alternatives
Impact N&V#2: Spoils Hauling Route Noise Impacts on Sensitive Receivers. ¹	Trucks on haul routes used for removal of spoils from construction activities for the Refined SR14, E1, E1A, E2, and E2A Build Alternatives would result in noise impacts. No severe construction noise impacts from spoils hauling are anticipated for the SR14A Build Alternative	N&V-MM#1: Prior to starting construction, the contractor will prepare a noise-monitoring program to describe how the contractor will monitor construction noise to verify compliance with applicable noise limits.	Significant and Unavoidable for the Refined SR14, E1, E1A, E2, and E2A Build Alternatives Not applicable to the SR14A Build Alternative
Impact N&V#3: HSR Construction Vibration Impacts on Sensitive Receivers.	HSR construction activities for the Build Alternatives may cause ground-borne vibration levels that would cause annoyance or interference with sensitive equipment.	N&V-MM#2: The contractor will prepare a vibration technical memorandum documenting vibration reduction methods to meet applicable vibration threshold criteria.	Less than Significant for all six Build Alternatives

Impact	Summary of Significant Impact before Mitigation	Mitigation Measure	CEQA Level of Significance after Mitigation
<p>Impact N&V#4: Operational Traffic Noise Impacts on Sensitive Receivers.¹</p>	<p>Noise due to traffic generated by the Palmdale Station during project operations would increase noise levels at nearby residential receivers.</p>	<p>N&V-MM#3: The Authority will implement noise barriers, sound insulation, and noise easements as mitigation for noise impacts in accordance with California HSR System Noise Mitigation Guidelines.</p>	<p>Significant and Unavoidable for all six Build Alternatives</p>
<p>Impact N&V#6: Operational Train Noise Impacts.¹</p>	<p>Operation of the California HSR System for the Build Alternatives would result in moderate and severe noise impacts.</p>	<p>N&V-MM#3, N&V-MM#4, N&V-MM#5, and N&V-MM#6: The Authority will implement measures to reduce operations noise, including:</p> <ul style="list-style-type: none"> ▪ Operation noise mitigation guidelines ▪ Vehicle noise specifications ▪ Special track work at crossovers and turnouts ▪ Additional noise analysis following final design ▪ Noise barriers 	<p>Significant and Unavoidable for all six Build Alternatives</p>

Impact	Summary of Significant Impact before Mitigation	Mitigation Measure	CEQA Level of Significance after Mitigation
<p>Impact N&V#7: Noise Impacts on Wildlife and Domestic Animals.</p>	<p>Wildlife: Wildlife within 50 feet of the HSR trackway at viaduct crossing locations would periodically experience noise levels that exceed the applicable FRA thresholds for wildlife noise exposure.</p> <p>Domestic Animals: Because of the location of equestrian facilities such as stables and riding trails, the Refined SR14, SR14A, E2, and E2A Build Alternatives would result in startle effects on horses. The E1 and E1A Build Alternatives would not result in startle effects on horses because of its distance from equestrian facilities.</p>	<p>N&V-MM#8: The Authority will post signage to warn users of an upcoming train crossing and the approximate time for the crossing at equestrian facilities near the Refined SR14, SR14A, E2, and E2A Build Alternative corridors, reducing noise impacts on domestic animals to less than significant.</p> <p>Wildlife within 50 feet of the Build Alternatives would experience noise impacts. There are no feasible mitigation measures to reduce impacts associated with noise impacts on wildlife at viaduct crossings. Fencing associated with the project would preclude animals from getting within 50 feet of the alignment, so as not to expose them to noise impacts. Additionally, unconfined wildlife would have the ability to avoid ground-borne noise levels by moving away from the track as trains approach, and noise from pass-bys would be short; thus, impacts would be less than significant.</p>	<p>Less than Significant for the Refined SR14, SR14A, E2, and E2A Build Alternatives</p> <p>Not applicable to the E1 and E1A Build Alternatives</p>
<p>Impact N&V#8: Operational Train Vibration Impacts (Refined SR14, SR14A, E1, and E1A Build Alternatives only).</p>	<p>Operation of the California HSR System for the Build Alternatives would result in significant vibration impacts.</p>	<p>N&V-MM#7: The Authority will develop site-specific vibration reduction measures, including stiffening floors in vibration-sensitive buildings, creating buffer zones, and modifying HSR vehicles.</p>	<p>Less than Significant for the Refined SR14, SR14A, E1, and E1A Build Alternatives</p> <p>Not applicable to the E2 and E2A Build Alternatives</p>

Impact	Summary of Significant Impact before Mitigation	Mitigation Measure	CEQA Level of Significance after Mitigation
<p>Impact N&V#9: Noise and Vibration from HSR Stationary Facilities.</p>	<p>Roadway relocations, railway relocations, and operation of California HSR System features (including adits and substations) associated with the Build Alternatives would result in moderate and severe noise impacts.</p>	<p>N&V-MM#3 and N&V-MM#6: The Authority will implement measures to reduce operation noise and vibration, including:</p> <ul style="list-style-type: none"> ▪ Operation noise mitigation guidelines ▪ Additional noise analysis following final design ▪ Noise barriers 	<p>Less than Significant for all six Build Alternatives</p>
Electromagnetic Interference/Electromagnetic Fields			
<p>Impact EMI/EMF#1: Temporary Impacts from Use of Heavy Construction Equipment (Refined SR14, SR14A, E1, and E1A Build Alternatives only).</p>	<p>The Refined SR14, SR14A, E1, and E1A Build Alternatives would require the use of heavy construction equipment capable of generating EMI/EMFs near two facilities (Pacifica Hospital and Serra Medical Group in Sun Valley) that could contain EMI-sensitive equipment. The E2 and E2A Build Alternatives are not located near facilities that could contain EMI-sensitive equipment.</p>	<p>EMI/EMF-MM#1: The Authority will contact relevant entities regarding the impacts of HSR-related EMFs on sensitive equipment before completion of final project design. Where necessary to avoid interference, final design will include suitable design provisions (such as magnetic field shielding walls) to prevent EMI at sensitive equipment.</p>	<p>Less than Significant for the Refined SR14, SR14A, E1, and E1A Build Alternatives Not applicable to the E2 and E2A Build Alternatives</p>
<p>Impact EMI/EMF#3: Temporary Impacts from Operation of Electrical Equipment (Refined SR14, SR14A, E1, and E1A Build Alternatives only).</p>	<p>The Refined SR14, SR14A, E1, and E1A Build Alternatives would require the use of electrical equipment capable of generating EMF near two facilities (Pacifica Hospital and Serra Medical Group in Sun Valley) that could contain EMI-sensitive equipment. The E2 and E2A Build Alternatives would not operate near facilities that could contain EMI-sensitive equipment.</p>	<p>EMI/EMF-MM#1: The Authority will contact relevant entities regarding the impacts of HSR-related EMFs on sensitive equipment before completion of final project design. Where necessary to avoid interference, final design will include suitable design provisions (such as magnetic field shielding walls) to prevent EMI at sensitive equipment.</p>	<p>Less than Significant for the Refined SR14, SR14A, E1, and E1A Build Alternatives Not applicable to the E2 and E2A Build Alternatives</p>

Impact	Summary of Significant Impact before Mitigation	Mitigation Measure	CEQA Level of Significance after Mitigation
<p>Impact EMI/EMF#7: EMI with Sensitive Equipment.</p>	<p>The Refined SR14, SR14A, E1, and E1A Build Alternatives could expose sensitive medical equipment to EMI at two facilities (Pacifica Hospital and Serra Medical Group in Sun Valley) that could contain EMI-sensitive equipment. The E2 and E2A Build Alternatives would not operate near facilities that could contain EMI-sensitive equipment.</p>	<p>EMI/EMF-MM#1: The Authority will contact relevant entities regarding the impacts of HSR-related EMFs on sensitive equipment before completion of final project design. Where necessary to avoid interference, final design will include suitable design provisions (such as magnetic field shielding walls) to prevent EMI at sensitive equipment.</p>	<p>Less than Significant for the Refined SR14, SR14A, E1, and E1A Build Alternatives Not applicable to the E2 and E2A Build Alternatives</p>
<p>Public Utilities and Energy</p>			
<p>Impact PUE#1: Planned Temporary Interruption of Utility Services.</p>	<p>Construction would require the temporary shutdown of utility lines, such as water, sewer, electricity, or gas, to safely move or extend these lines. Additionally, The SR14A, E1A, and E2A Build Alternatives would require the reconfiguration of multiple buildings and equipment at the Acton Water Treatment Plant that would intersect with the alignments. The reconfiguration of facilities at the Acton Water Treatment Plant may require temporarily halting water pumping through the plant.</p>	<p>PUE-MM#2: Prior to the start of construction, the Authority will coordinate with AVEK to facilitate the reconfiguration of the Acton Water Treatment Plant. The Authority will ensure that the Acton Water Treatment Plant would remain operable in conjunction with implementation of the Build Alternatives. The Authority will pay its fair share of the impact fee for reconfiguration of the Acton Water Treatment Plant.</p>	<p>Less than Significant for all six Build Alternatives</p>
<p>Impact PUE#3: Effects from Water Demand during Construction.</p>	<p>Construction activities for all Build Alternatives would use water to increase the water content of soil to optimize compaction for dust control, to prepare concrete, and to re-seed disturbed areas. This would periodically increase demand for water beyond the planned allocation of water supplies to the local water agencies.</p>	<p>PUE-MM#1: The Authority will prepare a water supply analysis for the Preferred Alternative that identifies the detailed water supply needs for HSR construction and operation. Based on the results of the water supply analysis, the Authority will coordinate with the water agencies to determine whether allocations for additional water supply are needed. In the event that additional water supply is needed, the Authority will pay the water agencies its fair share of fees.</p>	<p>Less than Significant for all six Build Alternatives</p>

Impact	Summary of Significant Impact before Mitigation	Mitigation Measure	CEQA Level of Significance after Mitigation
Biological Resources and Wetlands			
<p>Impact BIO#1: Project Construction Effects on Habitat for Special-Status Individuals and Communities.</p> <p>Impact BIO#2: Project Construction Effects on Special-Status Amphibian Habitat.</p> <p>Impact BIO#3: Project Construction Effects on Special-Status Bird Habitat.</p> <p>Impact BIO#4: Project Construction Effects on Special-Status Fish Habitat</p> <p>Impact BIO#5: Project Construction Effects on Special-Status Invertebrate Habitat.</p> <p>Impact BIO#6: Project Construction would Affect Special-Status Mammal Habitat.</p> <p>Impact BIO#7: Project Construction Effects on Special-Status Reptile Habitat</p> <p>Impact BIO#14: Project Operation Effects on Habitat for Special-Status Species Individuals and Communities.</p>	<p>Construction of the Build Alternatives would permanently convert special-status species habitat within the construction footprint into HSR infrastructure. Vehicles and personnel would directly and indirectly affect special-status species and habitat.</p> <p>Operation and maintenance activities for the Build Alternatives would be unlikely to affect special-status species or habitat because these activities would occur where natural habitat was removed during construction. However, impacts would include mortality, injury, or harassment caused by increased human activity related to the maintenance of California HSR System equipment and facilities, by exposure to accidental spills, including contaminants or pollutants, and noise from train operations.</p> <p>Groundwater seepage into long tunnels would affect habitat reliant on surface water resources, including springs, seeps, and streams.</p>	<p>BIO-MM#1, BIO-MM#2, BIO-MM#3, BIO-MM#4, BIO-MM#5, BIO-MM#6, BIO-MM#7, BIO-MM#8, BIO-MM#14, BIO-MM#15, BIO-MM#16, BIO-MM#17, BIO-MM#18, BIO-MM#20, BIO-MM#21, BIO-MM#25, BIO-MM#26, BIO-MM#27, BIO-MM#28, BIO-MM#29, BIO-MM#32, BIO-MM#33, BIO-MM#34, BIO-MM#36, BIO-MM#38, BIO-MM#39, BIO-MM#43, BIO-MM#44, BIO-MM#46, BIO-MM#47, BIO-MM#50, BIO-MM#52, BIO-MM#53, BIO-MM#54, BIO-MM#55, BIO-MM#56, BIO-MM#58, BIO-MM#60, BIO-MM#61, BIO-MM#62, BIO-MM#63, BIO-MM#65, BIO-MM#66, BIO-MM#67, BIO-MM#68, BIO-MM#69, BIO-MM#70, BIO-MM#71, BIO-MM#72, BIO-MM#73, BIO-MM#74, BIO-MM#76, BIO-MM#78, BIO-MM#79, BIO-MM#80, BIO-MM#81, BIO-MM#82, BIO-MM#84, BIO-MM#85, BIO-MM#86, BIO-MM#87, BIO-MM#88, BIO-MM#89, BIO-MM#90, BIO-MM#91, BIO-MM#92, BIO-MM#93, BIO-MM#94, BIO-MM#95, BIO-MM#96, BIO-MM#97, BIO-MM#98, BIO-MM#99, BIO-MM#100, and BIO-MM#101: The Authority will implement measures to reduce impacts on special-status plant species, wildlife species, and plant communities, including:</p> <ul style="list-style-type: none"> ▪ Pre-construction surveys to determine the presence of special-status plants and wildlife within the construction footprint ▪ Construction site monitoring, deterrence, and relocation to protect 	<p>Less than Significant for all six Build Alternatives (Impact BIO#1 through Impact BIO#7, and Impact BIO#14)</p>

Impact	Summary of Significant Impact before Mitigation	Mitigation Measure	CEQA Level of Significance after Mitigation
		<p>special-status wildlife within and immediately adjacent to the construction footprint</p> <ul style="list-style-type: none"> ▪ Aquatic resource protection, nondisturbance zones, seasonal work restrictions, erosion-control measures, and construction monitoring ▪ Habitat revegetation, grading, exotic plant removal, and long-term monitoring and maintenance within areas disturbed by construction activities ▪ Compensatory habitat mitigation consisting of off-site habitat acquisition, restoration, or enhancement; purchase of mitigation credits; or payment into a land bank fund ▪ Development of an AMMP, which will involve ongoing monitoring and reporting activities to provide for the detection and remediation of both foreseeable and unforeseeable hydrogeological impacts 	

Impact	Summary of Significant Impact before Mitigation	Mitigation Measure	CEQA Level of Significance after Mitigation
<p>Impact BIO#8: Project Construction Effects on State and Federally Protected Aquatic Resources.</p> <p>Impact BIO#9: Project Construction Effects on Fish and Wildlife Resources Protected by Fish and Game Code Section 1600 et seq.</p>	<p>Construction of the Build Alternatives would affect aquatic resources. Direct impacts on functions and values of wetlands and waters caused by construction would include a decrease in the benefits the wetlands and waters could have on surface water quality, flood attenuation, and groundwater recharge, as well as a decrease in the quality of nesting/foraging and overall habitat available for wildlife. Erosion, siltation, chemical spills or leaks, and runoff into natural and constructed water features would degrade water quality.</p> <p>Operation and maintenance activities for the Build Alternatives would increase erosion, sedimentation, or contamination of aquatic areas adjacent to the HSR corridor.</p>	<p>BIO-MM#4, BIO-MM#5, BIO-MM#6, BIO-MM#32, BIO-MM#33, BIO-MM#34, BIO-MM#39, BIO-MM#46, BIO-MM#47, BIO-MM#50, BIO-MM#53, BIO-MM#55, BIO-MM#56, BIO-MM#58, BIO-MM#62 and BIO-MM#93: The Authority will implement measures to reduce aquatic resources impacts, including:</p> <ul style="list-style-type: none"> ▪ Revegetation, grading, exotic plant removal, and long-term monitoring and maintenance within aquatic resources disturbed by temporary construction activities ▪ Vernal pool work restrictions (e.g., seasonal avoidance), protection (e.g., exclusion fencing), and construction monitoring ▪ Compensatory aquatic resources mitigation consisting of off-site acquisition, restoration, or enhancement; purchase of mitigation credits; or payment into a land bank fund 	<p>Less than Significant for all six Build Alternatives (Impact BIO#8 and Impact BIO#9)</p>
<p>Impact BIO#10: Project Construction Effects on Federally Designated Critical Habitat.</p>	<p>The Refined SR14, SR14A, E2, and E2A Build Alternatives would affect critical habitat for federally endangered species.</p> <p>The E1 and E1A Build Alternatives would not affect critical habitat.</p>	<p>BIO-MM#6, BIO-MM#47, BIO-MM#50, and BIO-MM#53: Application of species-specific mitigation measures will reduce impacts on species with critical habitat within the Refined SR14, SR14A, E2, and E2A Build Alternatives disturbance areas.</p>	<p>Less than Significant for the Refined SR14, SR14A, E2, and E2A Build Alternatives</p> <p>Not applicable to the E1 and E1A Build Alternatives.</p>

Impact	Summary of Significant Impact before Mitigation	Mitigation Measure	CEQA Level of Significance after Mitigation
<p>Impact BIO#11: Project Construction Effects on Significant Ecological Areas.</p>	<p>Construction and operation of the Build Alternatives would affect significant ecological areas.</p>	<p>BIO-MM#6, BIO-MM#47, BIO-MM#50, and BIO-MM#53: Application of species-specific mitigation measures will reduce impacts on species with critical habitat within the Build Alternative disturbance areas.</p>	<p>Less than Significant for all six Build Alternatives</p>
<p>Impact BIO#12: Project Construction Effects on Protected Trees. Impact BIO#19: Project Operation would Affect Protected Trees.</p>	<p>Construction and operation of the Build Alternatives would affect trees protected under county and local plans and ordinances.</p>	<p>BIO-MM#6, BIO-MM#35, BIO-MM#50, BIO-MM#55, BIO-MM#56, and BIO-MM#58: Application of species-specific mitigation measures will reduce impacts on protected trees within the Build Alternative disturbance areas.</p>	<p>Less than Significant for all six Build Alternatives (Impact BIO#12 and Impact BIO#19)</p>
<p>Impact BIO#13: Project Effects on Wildlife Movement Corridors.</p>	<p>Project construction activities and the presence of permanent HSR footprint associated with all Build Alternatives would affect wildlife movement and habitat connectivity.</p>	<p>BIO-MM#6, BIO-MM#36, BIO-MM#37, BIO-MM#58, BIO-MM#60, BIO-MM#64, BIO-MM#77, BIO-MM#78, and BIO-MM#83: Application of-specific mitigation measures will reduce impacts on wildlife movement corridors within the Build Alternative disturbance areas.</p>	<p>Less than Significant for all six Build Alternatives</p>
<p>Hydrology and Water Resources</p>			
<p>Impact HWR#2: Construction Activities Required for the Build Alternatives.</p>	<p>Construction-related chemicals and soils exposed through ground-disturbing activities like grubbing, vegetation removal, and grading could temporarily affect surface water quality during the construction period. Excavation, trenching, tunneling, and dewatering activities would potentially increase the risk of groundwater contamination for all Build Alternatives in areas where construction over groundwater aquifers is proposed.</p>	<p>HWR-MM#1: Areas of likely groundwater contamination would require controls for the isolation, treatment, and disposal of contamination. Mitigation will also involve either creation of new groundwater recharge areas or coordination with the LADWP to modify operations at the Hansen flood control dam.</p>	<p>Less than Significant for all six Build Alternatives</p>

Impact	Summary of Significant Impact before Mitigation	Mitigation Measure	CEQA Level of Significance after Mitigation
<p>Impact HWR#3: Changes in Flood Risks Associated with Temporary Construction Activities and Permanent Structures Required for the Build Alternatives.</p>	<p>Construction of the Build Alternatives would require surface disturbance within flood hazard areas, which may affect the carrying capacity of the floodway.</p>	<p>HWR-MM#2: The Authority will implement the following measures to reduce flood hazards:</p> <ul style="list-style-type: none"> ▪ Restore floodplains disturbed by construction activities by grading to pre-construction topography and revegetation ▪ Avoid placement of facilities in the floodplain or raise the ground with fill above the base flood elevation. ▪ Use construction methods and facilities to minimize potential encroachments onto surface water resources. 	<p>Less than Significant for all six Build Alternatives</p>
<p>Impact HWR#4: Changes in Groundwater Recharge Associated with Temporary Construction Activities and Permanent Structures Required for the Build Alternatives (Refined SR14, SR14A, E1, and E1A Build Alternatives only).</p>	<p>The Refined SR14, SR14A, E1, and E1A Build Alternatives would cross the Hansen Spreading Grounds; new impervious surfaces within the spreading ground would potentially interfere substantially with groundwater recharge within the San Fernando Groundwater Basin.</p>	<p>HWR-MM#3: New groundwater recharge areas would be constructed, discharges would be increased from Hansen Dam, or a third option for maintaining groundwater recharge rates would be coordinated with local authorities.</p>	<p>Less than Significant for all six Build Alternatives</p>
<p>Impact HWR#5: Changes in Hydrogeologic Conditions Associated with Tunnel Construction Beneath the ANF which May Affect Surface and Subsurface Water Resources.</p>	<p>Long tunnel construction associated with all Build Alternatives has the potential to temporarily affect hydrogeology resources in ANF including SGMNM. Long-term groundwater seepage into tunnel structures would potentially reduce the viability of surface waters, springs, seeps, and wells.</p>	<p>HWR-MM#4: The Authority will develop an AMMP, which would involve ongoing monitoring and reporting activities to detect and remediate, in a timely manner, both foreseeable and unforeseeable hydrogeological impacts that may arise in the future on USFS lands. The AMMP will generate information and data sufficient to identify unanticipated hydrogeological impacts that may arise during the construction and operation of the HSR, if any, and will trigger actions to avoid, minimize, and/or offset such impacts</p>	<p>Less than Significant for all six Build Alternatives</p>

Impact	Summary of Significant Impact before Mitigation	Mitigation Measure	CEQA Level of Significance after Mitigation
Geology, Soils, Seismicity, and Paleontology			
<p>Impact GSSP#4: Construction Could Expose Erodible Soils During Construction.</p>	<p>The Boulevard Mine and CalMat Mine disposal sites would be regraded to a new base elevation (expected to remain below surrounding grade) and managed as open pits. Exposed soils at would be subject to standard engineering guidelines and applicable regulations to minimize exposure to erosive forces, but, depending on the end use of this mine site, long-term soil loss would potentially occur for all Build Alternatives.</p>	<p>GEO-MM#1: The contractor and/or Authority will develop a restoration plan or temporary soil stabilization plan (interim reclamation plan) for spoil disposal sites. This plan will establish that these locations are not left with exposed soils that would be vulnerable to wind and water erosion.</p>	<p>Less than Significant for all six Build Alternatives</p>
<p>Impact GSSP#10: Inundation Related to Seismically Induced Dam Failure Could Endanger People or Structures During Construction.</p>	<p>Construction of the Build Alternatives would not cause or accelerate the potential for dam inundation. However, the Build Alternatives would be located within several dam inundation areas. Dam failures would potentially result in significant damage to structures and equipment or result in injuries or death.</p>	<p>GEO-MM#2 Prior to commencing construction activities, the construction contractor will develop an evacuation plan to address accident conditions and inundation hazards in dam inundation zones.</p>	<p>Less than Significant for all six Build Alternatives</p>
<p>Impact GSSP#13: Mine Conditions Could Pose Hazards During Construction.</p>	<p>Construction workers would face entrapment risks at the Vulcan Mine, Boulevard Mine, and CalMat Mine disposal sites. This impact would be identical for all Build Alternatives.</p>	<p>GEO-MM#2 Prior to commencing construction activities, the construction contractor will develop an evacuation plan to address accident conditions and entrapment risks at the Vulcan Mine, Boulevard Mine, and CalMat Mine disposal sites.</p>	<p>Less than Significant for all six Build Alternatives</p>

Impact	Summary of Significant Impact before Mitigation	Mitigation Measure	CEQA Level of Significance after Mitigation
<p>Impact GSSP#15: Surface Excavation and Subsurface Tunneling Could Destroy Unique Paleontological Resources.¹</p>	<p>Several geologic units within the construction footprints of the Build Alternatives have the potential to yield paleontological resources. Bored tunnel construction would likely destroy paleontological resources encountered beneath the ground surface because typical paleontological resource protection techniques (such as visual surveying and monitoring) are not feasible during bored tunnel construction.</p>	<p>There are no feasible mitigation measures to reduce impacts on subsurface paleontological resources.</p>	<p>Significant and Unavoidable for all six Build Alternatives</p>
<p>Hazardous Materials and Wastes</p>			
<p>Impact HMW#3: Potential for Handling Hazardous Materials or Waste within 0.25 Mile of an Educational Facility during Construction.</p> <p>Impact HMW#8: Potential for Handling Hazardous Materials or Waste Within 0.25 mile of an Educational Facility during Operations.</p>	<p>Construction and operation activities for all Build Alternatives would entail handling of hazardous materials or waste near educational facilities.</p>	<p>HMW-MM#1: The contractor will prepare a memorandum for the Authority’s approval regarding construction Best Management Practices (BMPs) for hazardous materials throughout construction, including a plan to avoid the use of extremely hazardous materials within 0.25 mile of a school.</p> <p>An operations plan will be created by the Authority and coordinated with the educational facilities to document compliance.</p>	<p>Less than Significant for all six Build Alternatives (Impact HMW#3 and Impact HMW#8)</p>

Impact	Summary of Significant Impact before Mitigation	Mitigation Measure	CEQA Level of Significance after Mitigation
Safety and Security			
<p>Impact S&S#3: Permanent Interference with Emergency Response.</p> <p>Impact S&S#4: Interference with Emergency Response from Train Accidents and Increased Activity at Stations and Facilities.</p>	<p>Operation of the Build Alternatives would potentially interfere with emergency response within the HSR stations and rights-of-way because of limited access to HSR facilities.</p>	<p>S&S-MM#1: The Authority will monitor the response of local fire, rescue, and other emergency service providers to incidents at HSR stations. The Authority will enter a cost-sharing agreement with these providers to fund the Authority's fair share of emergency service needs created by the project.</p> <p>The project will also minimize interference with emergency response by including design provisions and procedures for emergency service access to HSR facilities.</p>	<p>Less than Significant for all six Build Alternatives (Impact S&S#3 and Impact S&S#4)</p>
Socioeconomics and Communities			
<p>Impact SOCIO#2: Permanent Disruption to Community Cohesion or Division of Established Communities from Construction.</p>	<p>Construction of the Build Alternatives would physically and visually divide established communities.</p>	<p>SO-MM#2: The Authority will engage in special outreach to affected homeowners, residents, landowners, business owners, community organizations, and local officials, as well as require the Authority's evaluation of the community's modified access, in order to enable the Authority to maintain community cohesion and avoid physical deterioration.</p>	<p>Less than Significant for all six Build Alternatives</p>

Impact	Summary of Significant Impact before Mitigation	Mitigation Measure	CEQA Level of Significance after Mitigation
<p>Impact SOCIO#3: Permanent Displacement of Community Facilities from Construction (E2 and E2A Build Alternatives only).</p>	<p>Construction of the E2 and E2A Build Alternatives would displace a community facility: the Los Angeles County Department of Public Social Services in Sun Valley, which could necessitate the construction of a new facility if suitable replacement facilities are unavailable.</p> <p>The Refined SR14, SR14A, E1, and E1A Build Alternatives would not result in the displacement of community facilities.</p>	<p>SO-MM#3: The Authority will consult with the appropriate parties before the acquisition phase of the project to assess potential opportunities to reconfigure facilities and buildings and/or relocate affected community facilities, as necessary, to minimize the disruption of facility activities and services, and to provide for relocation that allows the community currently being served to continue to use these services.</p>	<p>Less than Significant for the E2 and E2A Build Alternatives</p> <p>Not applicable to the Refined SR14, SR14A, E1, and E1A Build Alternatives</p>
<p>Impact SOCIO#14: Permanent Effects on Agricultural Operations from Project Operations.</p>	<p>Impacts on Important Farmland from the Refined SR14 and SR14A Build Alternatives would be limited to the construction of an electrical utility corridor across an approximately 9-acre vineyard east of the Sierra Highway/SR 14 interchange for a traction power facility.</p>	<p>AG-MM#1: The Authority will design and build electrical utility corridors to avoid placing structures on agricultural lands. This will entail coordination with the farm owners to ensure that electrical utilities are placed on poles with powerlines that span agricultural land uses, within the identified project footprint, so that no agricultural land would be converted to a nonagricultural use either directly or indirectly. Utility easements would not affect existing agricultural operations and activities.</p>	<p>Less than Significant for the Refined SR14, SR14A Build Alternatives</p> <p>Not applicable to the, E1, E1A, E2, and E2A Build Alternatives</p>

Impact	Summary of Significant Impact before Mitigation	Mitigation Measure	CEQA Level of Significance after Mitigation
Land Use and Planning			
<p>Impact LU#3: Permanent Alterations to Existing and Planned Land Uses from Construction of the Build Alternatives.</p>	<p>HSR construction staging areas and project infrastructure associated with all Build Alternatives would convert land to transportation use.</p>	<p>LU-MM#1, SO-MM#1, SO-MM#2, SO-MM#3, N&V-MM#1, TR-MM#1, TR-MM#2, TR-MM#3, TR-MM#4, TR-MM#5, TR-MM#6, TR-MM#7, and TR-MM#8: The Authority will implement the following measures to reduce land-use impacts:</p> <ul style="list-style-type: none"> ▪ Assist station cities with implementation of station-area plans ▪ Assist with residential and community facility relocations ▪ Implement local improvements and community workshops to minimize division of communities ▪ Minimize visual disruption at temporary construction areas 	<p>Less than Significant for all six Build Alternatives</p>
Agricultural Farmland and Forest Land			
<p>Impact AG#2: Permanent Conversion of Agricultural Land to Nonagricultural Land (Refined SR14 and SR14A Build Alternatives only).</p>	<p>The Refined SR14 and SR14A Build Alternatives would require an electrical utility corridor that would traverse a parcel of Important Farmland, an approximately 9-acre vineyard east of where the Refined SR14 Build Alternative crosses Sierra Highway. The E1, E1A, E2, and E2A Build Alternatives would not impact parcels of Important Farmland.</p>	<p>AG-MM#1: The Authority shall design and build utility corridors to avoid placing structures on agricultural lands. This entails electrical utilities being placed on poles that span agricultural land uses, within the identified Build Alternative footprint, so that no agricultural land would be converted to a nonagricultural use.</p>	<p>Less than Significant for the Refined SR14 and SR14A Build Alternatives No impact for the E1, E1A, E2, and E2A Build Alternatives</p>

Impact	Summary of Significant Impact before Mitigation	Mitigation Measure	CEQA Level of Significance after Mitigation
Parks, Recreation, and Open Space			
<p>Impact PK#1: Acquisition of Parks, Recreation, and Open Space Resources.</p>	<p>Construction and operation of the Build Alternatives would require temporary construction easements and permanent acquisition of park, recreational, and open space resources. Such acquisitions reduce the capacity of a park or recreational resource to provide the features and attributes that are important to the surrounding communities.</p>	<p>PR-MM#6, PR-MM#7, and PR-MM#9: The Authority will restore and return land used for temporary construction areas to the property owners. The Authority will offset permanent parks, recreational area, and open space acquisitions through consultation with the property owner to negotiate resource compensation, replacement, or enhancement consistent with applicable state and federal laws.</p>	<p>Less than Significant for all six Build Alternatives</p>
<p>Impact PK#2: Construction-Related Access, Noise, Vibration, Air Quality, and Visual Changes to Parks, Recreation, and Open Space Resources.</p>	<p>Construction of the Build Alternatives would create access, noise, vibration, air quality, and visual changes that would affect parks, recreational areas, and open space resources.</p>	<p>PR-MM#1, PR-MM#2, PR-MM#3, PR-MM#4, and PR-MM#5: The Authority will implement the following measures to reduce construction-period disruption of parks, recreational areas, and open space resources:</p> <ul style="list-style-type: none"> ▪ Provide routes to park and trail facilities within or near the construction footprint ▪ Maintain access to park facilities during construction ▪ Follow standard safety procedures to protect traffic ▪ Temporarily or permanently replace recreation areas within the construction footprint ▪ Develop a construction staging and management plan to minimize noise, dust, traffic, and visual disruptions 	<p>Less than Significant for all six Build Alternatives</p>

Impact	Summary of Significant Impact before Mitigation	Mitigation Measure	CEQA Level of Significance after Mitigation
<p>Impact PK#3: Changes to Park, Recreation, and Open Space Resource Character.</p>	<p>Operation of the Build Alternatives would result in noise/vibration increases and changes in visual quality, which would potentially affect the enjoyment of passive recreational activities in open-space areas.</p>	<p>PR-MM#8: The Authority will consult with property owners regarding compensation for, or replacement or enhancement of, the access driveways or parking areas at the recreation resource to maintain accessibility to park facilities or to provide alternative access.</p>	<p>Less than Significant for all six Build Alternatives</p>
<p>Impact PK#4: Increased or Decreased Use of Parks, Recreation, and Open Space Resources (E1, E1A, E2, and E2A Build Alternatives only).</p>	<p>Increased connectivity resulting from operation of the Build Alternatives would increase or decrease the use of existing parks and recreational facilities.</p>	<p>PR-MM#8: The Authority will consult with the property owner regarding the specific conditions of the changes to access and compensation for, or replacement or enhancement of, access facilities at the recreation resource to maintain accessibility to park facilities or to provide alternative access.</p>	<p>Less than Significant for the E1, E1A, E2, and E2A Build Alternatives Not applicable to the Refined SR14 and SR14A Build Alternatives</p>
<p>Aesthetics and Visual Quality</p>			
<p>Impact AVQ#1: Temporary Construction Impacts on Existing Visual Quality.</p>	<p>Construction activities for the Build Alternatives, including earth preparation (which includes excavation and embankment activities), rail bed construction, materials storage, and equipment movement, would cause substantial visual disturbance in the relatively rural areas between Palmdale and Burbank.</p>	<p>AVQ-MM#1: The contractor will prepare a technical memorandum identifying how the project would minimize construction-related visual/aesthetic disruption through measures such as relegating and regrading areas disturbed during construction.</p>	<p>Less than Significant for all six Build Alternatives</p>
<p>Impact AVQ#2: Temporary Construction Impacts from Light and Glare.</p>	<p>Lighting associated with nighttime construction for the Build Alternatives would intermittently affect nighttime views.</p>	<p>AVQ-MM#2: Nighttime construction lighting will be shielded and directed downward in a manner to minimize light falling outside of the construction site boundaries. Shielding nighttime construction lighting will minimize the light and glare within developed areas at night.</p>	<p>Less than Significant for all six Build Alternatives</p>

Impact	Summary of Significant Impact before Mitigation	Mitigation Measure	CEQA Level of Significance after Mitigation
<p>Impact AVQ#3: Temporary Construction Impacts on Scenic Vistas and Drives.</p>	<p>Construction activities would temporarily decrease scenic views along Sierra Highway (near Una Lake), Soledad Canyon Road, Aliso Canyon Road and Little Tujunga Canyon Road, and SR 14 highway scenic drive. The Build Alternatives would also be visible from the Lamont Odett Vista Point.</p>	<p>AVQ-MM#1: The contractor will prepare a technical memorandum identifying how the project would minimize construction-related visual/aesthetic disruption through measures such as relegating and regrading areas disturbed during construction.</p>	<p>Less than Significant for all six Build Alternatives</p>
<p>Impact AVQ#4: Permanent construction impacts on existing visual quality.¹</p>	<p>Construction of the Build Alternatives would result in permanent changes to the landscape, which would change the visual quality. HSR-related structures, including the Burbank Airport Station, elevated guideways, and ancillary facilities would block views, cast shadows, and add built features to the landscape for each of the Build Alternatives.</p>	<p>AVQ-MM#3, AVQ-MM#4, AVQ-MM#5, and AVQ-MM#6: The Authority will implement the following measures to reduce permanent effects on visual quality from construction of the project:</p> <ul style="list-style-type: none"> ▪ Utilize aesthetic preferences approved by local jurisdictions for non-station structures. ▪ Incorporate vegetation screening along at-grade and elevated guideways next to residential areas. ▪ Plant vegetation within land acquired for the project that is not used for the HSR or related supporting infrastructure. ▪ Screen traction power supply stations and radio communication towers for the project from public view with landscaping, solid walls or fencing. 	<p>Significant and Unavoidable for all six Build Alternatives</p>

Impact	Summary of Significant Impact before Mitigation	Mitigation Measure	CEQA Level of Significance after Mitigation
Cultural Resources			
<p>Impact CUL#1: Effects on Known Archaeological Resources Caused by Construction Activities.</p>	<p>Ground disturbance associated with construction of the Build Alternatives would result in direct impacts on known archaeological resources in the archaeological APE.</p>	<p>CUL-MM#1, CUL-MM#3, and CUL-MM#4: The Authority will implement the following measures to reduce construction effects on known and unknown archaeological resources:</p> <ul style="list-style-type: none"> ▪ Consult MOA signatories, concurring parties, and tribal consulting parties to determine the preferred treatment and appropriate mitigation measures ▪ Develop meaningful mitigation measures for effects on as-yet-unknown Native American archaeological resources that cannot be avoided. ▪ Halt construction activities and require compliance with applicable regulations should there be an unanticipated archaeological discovery. ▪ Adhere to BMPs at identified archaeological sites. ▪ Establish and maintain resource buffer zones surrounding vulnerable sites during construction activities. 	<p>Less than Significant for all six Build Alternatives</p>

Impact	Summary of Significant Impact before Mitigation	Mitigation Measure	CEQA Level of Significance after Mitigation
<p>Impact CUL#2: Effects on Unknown Archaeological Resources Caused by Construction Activities.</p>	<p>Ground disturbance associated with construction of the Build Alternatives has the potential to affect unknown archaeological resources encountered during project construction.</p>	<p>CUL-MM#1, CUL-MM#2, and CUL-MM#3: The Authority will implement the following measures to reduce effects on human remains discovered during construction activities:</p> <ul style="list-style-type: none"> ▪ Consult MOA signatories, concurring parties, and tribal consulting parties to determine the preferred treatment and appropriate mitigation measures. ▪ Halt construction activities and require compliance with applicable regulations should there be an unanticipated archaeological discovery. <p>Contact the relevant county coroner to determine whether an investigation regarding cause of death would be required.</p>	<p>Less than Significant for all six Build Alternatives</p>
<p>Impact CUL#3: Effects on Human Remains Discovered during Construction Activities.</p>	<p>Ground-disturbing construction activities for the Build Alternatives would have the potential to disturb human remains, including those interred outside of formal cemeteries.</p>	<p>CUL-MM#1, CUL-MM#2, and CUL-MM#3: The Authority will implement the following measures to reduce effects on human remains discovered during construction activities:</p> <ul style="list-style-type: none"> ▪ Consult MOA signatories, concurring parties, and tribal consulting parties to determine the preferred treatment and appropriate mitigation measures. ▪ Halt construction activities and require compliance with applicable regulations should there be an unanticipated archaeological discovery. ▪ Contact the relevant county coroner to determine whether an investigation regarding cause of death would be required. 	<p>Less than Significant for all six Build Alternatives</p>

Impact	Summary of Significant Impact before Mitigation	Mitigation Measure	CEQA Level of Significance after Mitigation
<p>Impact CUL#4: Effects on Historic Built Resources Caused by Construction Activities (E1, E1A, E2, and E2A Build Alternatives only).</p>	<p>The Refined SR14 and SR14A Build Alternatives would not result in significant impacts on historical built resources.</p> <p>The E1, E1A, E2, and E2A Build Alternatives would result in indirect impacts on historical built resources in the built historical APE. Implementation of the E1, E1A, E2, and E2A Build Alternatives would introduce “visual elements that diminish the integrity of a property’s” setting and feeling.</p>	<p>CUL-MM#5 and CUL-MM#6: The Authority will implement the following measure for the E1, E1A, E2, and E2A Build Alternatives to reduce effects on built historical resources during construction activities:</p> <ul style="list-style-type: none"> ▪ Consultation with SHPO to develop protection measures to preserve the visual integrity of the Blum Ranch viewshed. ▪ Coverage of roadway with geofabric prior to laying asphalt. Asphalt will be removed following construction of the project. 	<p>Significant and Unavoidable for E1, E1A, E2, and E2A Build Alternatives</p> <p>Not applicable to the Refined SR14 and SR14A Build Alternatives</p>
Cumulative Impacts			
<p>Cumulative Localized Construction Effects (Air Quality)¹</p>	<p>Construction activities for the Build Alternatives would cause localized elevated criteria pollutant concentrations. These elevated concentrations would cause or contribute to exceedances of the NAAQS and CAAQS.</p>	<p>No additional mitigation to address the cumulative impact.</p>	<p>Significant and Unavoidable for all six Build Alternatives</p>
<p>Cumulative Noise Impacts¹</p>	<p>Construction of the Build Alternatives, in conjunction with other past, present, and reasonably foreseeable projects, would result in noise effects that would last for the duration of construction activities.</p> <p>The Build Alternatives, in combination with cumulative projects, could cause exceedance of noise thresholds to sensitive receptors during operation.</p>	<p>No additional mitigation to address the cumulative impact.</p>	<p>Significant and Unavoidable for all six Build Alternatives</p>

Impact	Summary of Significant Impact before Mitigation	Mitigation Measure	CEQA Level of Significance after Mitigation
Cumulative Paleontological Resource Impacts ¹	Construction of the Build Alternatives, in combination with past, present, and reasonably foreseeable future development would result in significant cumulative impacts on paleontological resources.	No additional mitigation to address the cumulative impact.	Significant and Unavoidable for all six Build Alternatives
Cumulative Population and Community Impacts ¹	The Build Alternatives, along with other planned projects, could permanently divide established communities and could permanently displace residences or businesses, necessitating construction of replacement housing or facilities.	No additional mitigation to address the cumulative impact.	Significant and Unavoidable for all six Build Alternatives
Cumulative Aesthetic and Visual Quality Impacts ¹	Construction of the Build Alternatives, along with reasonably foreseeable future projects, could degrade visual and aesthetic resources, which represents a significant cumulative impact.	No additional mitigation to address the cumulative impact.	Significant and Unavoidable for all six Build Alternatives

¹ Indicates an impact that would be significant and unavoidable at the project level and during cumulative conditions.

AMMP = Adaptive Monitoring and Management Plan; ANF = Angeles National Forest; APE = Area of Potential Effects; Authority = California High-Speed Rail Authority; AVAQMD = Antelope Valley Air Quality Management District; BMP = best management practices; CAAQS = California Ambient Air Quality Standards; CDFW = California Department of Fish and Wildlife; CEQA = California Environmental Quality Act; EMF = electromagnetic field; EMI = electromagnetic interference; FRA = Federal Railroad Administration; HSR = high-speed rail; LADWP = Los Angeles Department of Water and Power; MOA = Memorandum of Agreement; NAAQS = National Ambient Air Quality Standards; SCAQMD = South Coast Air Quality Management District; SGMNM = San Gabriel Mountains National Monument; SHPO = State Historic Preservation Officer

S.8.2.1 Refined SR14 and SR14A Build Alternatives

The SR14A Build Alternative alignment is the longest of the six Build Alternatives (38 miles), followed by the Refined SR14 Build Alternative alignment (37 miles). Additionally, both the Refined SR14 and SR14A Build Alternatives would have the shortest length of tunnel beneath the ANF including the SGMNM. The Refined SR14 and SR14A Build Alternatives would also have the shortest construction duration.

- Transportation**—Northbound and southbound spoils hauling associated with the Refined SR14 and SR14A Build Alternatives would result in fewer roadway segment impacts where the LOS would degrade to unacceptable levels compared to the E1, E1A, E2, and E2A Build Alternatives. However, southbound spoils hauling associated with the Refined SR14 and SR14A Build Alternatives would degrade LOS at two freeway segments to unacceptable levels during the AM peak hour; the E1, E1A, E2, and E2A Build Alternatives would only degrade LOS at 1 freeway segment to an unacceptable level in the AM peak hour (southbound spoils hauling associated with each of the six Build Alternatives would degrade LOS at 2 freeway segments during the PM peak hour). Construction of the Refined SR14 and SR14A Build Alternatives would degrade LOS to unacceptable levels at more intersections (3 intersections in the AM peak hour and 4 intersections in the PM peak hour) compared to the E1, E1A, E2, and E2A Build Alternatives (each of which would degrade LOS at 1 intersection in the AM peak hour and 1 to 2 intersections in the PM peak hour).
- Air Quality**—Construction of the Refined SR14 and SR14A Build Alternatives would exceed SCAQMD general conformity *de minimis* thresholds for CO (in 2023, and 2022-2023, respectively). Only the E2A Build Alternative would also exceed this threshold for CO during construction (2022, 2024-2025). The SR14A Build Alternative would exceed SCAQMD daily CEQA thresholds for NOx for a greater span of years than each of the other Build Alternatives (2020-2027). Operation of all six Build Alternatives would have a beneficial effect and would reduce statewide emissions of all pollutants when compared to existing and future No Project baselines, under all ridership scenarios.
- Noise and Vibration**—Construction of the Refined SR14 Build Alternative would result in noise impacts in the communities of Harold/Alpine and Agua Dulce (Figure S-13). The Refined SR14 and SR14A Build Alternatives are the only Build Alternatives that would result in construction noise impacts in Agua Dulce. Spoils hauling during construction of SR14A Build Alternative would not result in any noise impacts, while the Refined SR14 Build Alternative would limit impacts to Big Springs Road northwest of Acton. Operation of the SR14A Build Alternative would cause the fewest moderate noise impacts on residences, but the Refined SR14 and SR14A Build Alternatives would result in the most vibration effects on residences. However, unlike the other Build Alternatives, the Refined SR14 Build Alternative would have noise impacts on the Pacific Crest Trail and Vasquez Rocks Natural Area Park. SR14A would avoid these noise impacts by being built in a tunnel through this area. Like the E2 and E2A Build Alternatives, the Refined SR14 and SR14A Build Alternatives would result in noise impacts on domestic animals and wildlife. In contrast, the E1 and E1A Build Alternatives would only result in noise impacts on wildlife.

Sensitive Receivers

Land uses where increased annoyances caused by noise and vibration could occur are classified as sensitive receivers. Examples of sensitive receivers include residences, hospitals, and schools.



PRELIMINARY DRAFT/SUBJECT TO CHANGE - HSR ALIGNMENT IS NOT DETERMINED
 Source: Authority, 2020; National Geographic, 2020

May 1, 2021

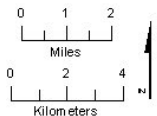
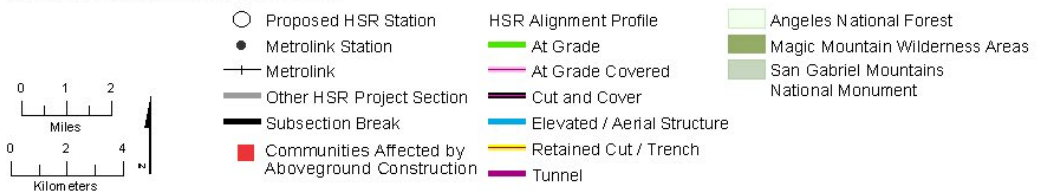


Figure S-13 Communities Affected by Aboveground Construction

- Electromagnetic Fields and Electromagnetic Interference**—Construction of the Refined SR14 and SR14A Build Alternatives would result in EMI at facilities that could operate sensitive equipment: Serra Medical Group and Pacifica Hospital. The E2 and E2A Build Alternatives would avoid this impact. The Refined SR14 and SR14A Build Alternatives would encounter existing railroad track that could be affected by EMI (13 miles and 14 miles of railroad track, respectively), less than the E1 and E1A Build Alternatives (16 miles and 15 miles respectively), but more than the E2 and E2A Build Alternatives (12 miles and 11 miles, respectively).
- Public Utilities and Energy**—The Refined SR14 and SR14A would result in more high-risk and major low-risk utility conflicts during construction (461 total utility conflicts and 410 total utility conflicts, respectively), compared to the E1 and E1A Build Alternatives (400 and 345, respectively) and the E2 and E2A Build Alternatives (278 and 264, respectively). Construction of the SR14A Build Alternative would require the greatest total water demand of each of the six Build Alternatives. The SR14A Build Alternative would also consume the most energy and would generate the most solid waste during construction of each of the Build Alternatives. The Refined SR14 Build Alternative would consume more energy during construction and generate more solid waste than the E1, E1A, E2, and E2A Build Alternatives.
- Biological and Aquatic Resources**—In general, the Refined SR14 and SR14A Build Alternatives would result in the most biological and aquatic resource impacts. The Refined SR14 and SR14A Build Alternatives would affect the most listed wildlife species and the most acreage of wildlife habitat. All six Build Alternatives would affect the same special-status plant species, but the Refined SR14 and SR14A Build Alternatives would affect the largest plant habitat area. Where the Refined SR14 and SR14A Build Alternatives cross the Santa Clara River in Soledad Canyon, the unarmored threespine stickleback is known to be present (a California Department of Fish and Wildlife fully protected¹⁰ fish species). Bridge design in this area would require special provisions to avoid impacts on this species. The Refined SR14 and SR14A trackway and ancillary facilities would also affect waters of the U.S., which provide habitat for several special-status species. Changes in groundwater contribution to surface-water resources resulting from tunneling activities beneath the ANF could adversely affect aquatic habitat, altering the amount and quality of aquatic habitats for associated biological resources. The Refined SR14 and SR14A Build Alternatives would have the least risk for potential impacts on habitat for plant species and communities from tunneling under the ANF.
- Hydrology and Water Resources**—Between Palmdale and Burbank, the Refined SR14 Build Alternative would require 48 surface water crossings at grade (including crossings on fill, on embankment, or in cut-and-cover tunnels) and 12 viaduct crossings; the SR14A Build Alternative would require 43 surface water crossings at grade and three such crossings over viaduct. The Refined SR14 Build Alternative alignment would cross Una Lake on embankment at grade, and would require substantial fill of this waterbody, which would reduce in size; the SR14A Build Alternative would avoid Una Lake, pursuing a more easterly course approximately 300 feet east of Una Lake. South of Una Lake, the Refined SR14 Build Alternative would pass beneath the California Aqueduct and then continue on a series of viaducts across tributaries of the Santa Clara River until crossing the channel of the Santa Clara River in Soledad Canyon before entering a long tunnel under ANF; the SR14A Build Alternative alignment would traverse a more easterly route and cross over the California Aqueduct, and would also cross the channel of the Santa Clara River in Soledad Canyon before entering a tunnel under the ANF. The Refined SR14 and SR14A Build Alternative alignments would continue through the ANF in areas with no known or mapped seeps or springs within the Moderate Risk Areas and High Risk Areas evaluated, which indicates that the Refined SR14 and SR14A Build Alternatives, when compared to the other Build

10 California Department of Fish and Wildlife fully protected species may not be taken (e.g., harassed, harmed, wounded, killed, captured, or collected), and no permits may be issued for their take except for collecting these species for necessary scientific research and relocation of the bird species for the protection of livestock.

Alternatives, may have the fewest impacts on hydrogeological resources within the ANF including SGMNM. Additionally, the Refined SR14 and SR14A Build Alternative tunnels would encounter the shortest distances through high-risk groundwater pressures compared to the E1, E1A, E2, or E2A Build Alternatives, reducing the chance for seepage into HSR tunnels that could affect local hydrogeology. The Refined SR14 and SR14A Build Alternatives would encounter the fewest streams within the ANF including SGMNM compared to the E1, E1A, E2, or E2A Build Alternatives. Compared to the E2 and E2A Build Alternatives, the Refined SR14 and SR14A Build Alternatives would encounter less total width of faults within the ANF including SGMNM that could result in seepage into tunnels. However, this width would be wider than the width of fault zones encountered by the E1 and E1A Build Alternatives. South of the ANF, the Refined SR14 and SR14A Build Alternative alignments would cross the Hansen Spreading Grounds and channel, which are owned and maintained by the Los Angeles County Flood Control District for the purposes of conveying stormwater to local rivers and groundwater reservoirs. Construction of the Refined SR14 and SR14A Build Alternatives would cause the most ground disturbance of the Build Alternatives, which could result in erosion and water quality degradation. The SR14A Build Alternative would entail the least construction-period ground disturbance within special flood hazard areas. The Refined SR14 and SR14A Build Alternatives would negatively affect the groundwater recharge function of the Hansen Spreading Grounds. The Refined SR14 and SR14A Build Alternatives footprint also encompasses the most active groundwater wells within 1 mile of the alignment centerline.

- **Geology, Soils, Seismicity, and Paleontological Resources**—The Refined SR14 and SR14A Build Alternatives would require the longest crossing of the San Gabriel Fault Zone, which poses major geotechnical challenges. The Refined SR14 and SR14A Build Alternatives also propose the most surface disturbance and subsurface tunneling through geologic units with a high likelihood to yield paleontological resources. With regard to mineral resources, the Refined SR14 and SR14A Build Alternatives would result in the greatest restriction of access to regionally significant mineral resources.
- **Hazardous Materials and Wastes**—The Refined SR14 and SR14A Build Alternatives would generate contaminated spoils by excavating contaminated soils associated with PEC sites near the Vulcan Mine site and Hansen Spreading Grounds in the San Fernando Valley; the E1 and E1A Build Alternatives would generate contaminated spoils similar to the Refined SR14 and SR14A Build Alternatives; and the E2 and E2A Build Alternatives would generate contaminated spoils south of the Big Tujunga Wash crossing and at the CalMat Mine disposal site. The Refined SR14 and SR14A Build Alternatives would generate the most potentially contaminated spoils (approximately 9 million cubic yards [mcy]) compared to the E1 and E1A Build Alternatives (approximately 3 mcy) and the E2 and E2A Build Alternatives (approximately 4 mcy). The Refined SR14 and SR14A Build Alternatives could result in the handling of hazardous materials within 0.25 mile of more education facilities than each of the other Build Alternatives (18 to 23 education facilities and 21 to 26 education facilities, respectively, depending on the adit option chosen).
- **Safety and Security**—The Refined SR14 and SR14A Build Alternatives would result in fewer permanent road closures from construction (9 road closures and 5 road closures, respectively) compared to the E1 and E1A Build Alternatives (13 road closures and 12 road closures, respectively) and E2 and E2A Build Alternatives (11 road closures and 10 road closures, respectively). These closures would have similar potential to create traffic hazards for each Build Alternative; the grade separations implemented as part of project design would minimize traffic hazards. The Refined SR14 and SR14A Build Alternatives' vicinity includes the most airports and airstrips of the six Build Alternatives. Each Build Alternative vicinity includes the Hollywood Burbank Airport. In addition, the Refined SR14 and SR14A Build Alternatives' vicinity includes Agua Dulce Airpark and Whiteman Airport.
- **Socioeconomics and Communities**—As discussed in Section S.5.3.6, the Build Alternatives would require adits and intermediate windows for construction access to tunneled portions of the alignment. Thus, ranges of quantifiable impacts that would result

from the selection of each adit and intermediate window option combination are discussed here. The Refined SR14 Build Alternative would displace the most existing single-family residential units (38 to 41), while the SR14A Build Alternative would displace the fewest existing single-family residential units (8 to 11). The SR14A Build Alternative would displace the most existing multifamily residential units (29) as compared to the E1 and E1A Build Alternatives (13 to 18 and 12 to 17 single-family residential units, and 11 and 27 multifamily residential units, respectively) and the E2 and E2A Build Alternatives (38 and 37 single-family residential units, 11 and 27 multifamily residential units, respectively). The Refined SR14 and SR14A Build Alternatives would result in higher cumulative sales taxes and annual average sales taxes during the construction period.

- **Agricultural Farmland and Forest Land**—The Refined SR14 and SR14A Build Alternatives would require an electrical utility corridor across an approximately 9-acre parcel of Important Farmland east of where the Refined SR14 and SR14A Build Alternatives cross the Sierra Highway. If electrical towers were placed within this parcel of Important Farmland, 1 acre of this land would be converted to nonagricultural use. Power lines extending from adit facilities associated with the Refined SR14 and SR14A Build Alternatives could encounter forest land in areas managed by the USFS. Adherence to the USFS Special Use Authorization includes several provisions including those that would require the Authority to avoid, or else be liable for, damaging or contaminating the surrounding environment; provisions would adequately avoid, minimize, or compensate for the permanent loss of forest land or conversion of forest land to nonforest use that could result from construction of permanent adit facilities within the ANF.
- **Parks, Recreation, and Open Space**—The Refined SR14 Build Alternative infrastructure would be located near 21 parks, recreation, and open space resources; the SR14A Build Alternative would be located near 22 parks, recreation, and open space resources. This is a larger number than are near other Build Alternatives, and in the case of the Refined SR14 Build Alternative includes facilities in direct conflict with a 400-foot segment of the Pacific Crest Trail. To preserve access during both the construction and operation periods for the Refined SR14 Build Alternative, the trail would be realigned. Given the large number of park resources within the Refined SR14 and SR14A Build Alternatives' RSA (including the Pacific Crest Trail for the Refined SR14 Build Alternative), the Refined SR14 and SR14A Build Alternatives would have the greatest potential for indirect effects on parks, recreational areas, and open space resources (i.e., construction-period access restrictions, new noise and vibration sources, air quality degradation during construction, visual changes, and permanent changes to park character).
- **Aesthetics and Visual Quality**—Construction and operation of the Refined SR14 and SR14A Build Alternatives would affect visual quality in scenic areas between Palmdale and Burbank. Large-scale overcrossing structures associated with the Refined SR14 Build Alternative would obstruct views of various waterways and other natural scenic resources, such as the Pacific Crest Trail and near the community of Agua Dulce.
- **Cultural Resources**—With implementation of IAMFs and mitigation measures, construction and operation of the Refined SR14 and SR14A Build Alternatives would result in less than significant impacts on archaeological and built historic resources. Based on the number of historic properties within the archaeological and built historic RSAs and the extent of construction and operations impacts, the SR14A Build Alternative would have the least potential for direct and indirect effects on cultural resources.
- **Regional Growth**—Because the Build Alternatives are similar in length and would use the same Burbank Airport Station site, regional growth effects of the six Build Alternatives would not differ with regard to operations effects. However, effects would differ slightly with regard to construction jobs. The Refined SR14 and SR14A Build Alternatives would create the highest number of total construction job-years (83,400 and 84,900 total job-years during construction, respectively).

- **Cumulative Impacts**—The Refined SR14 and SR14A Build Alternatives would not substantially differ from the E1, E1A, E2, and E2A Build Alternatives regarding the contribution of significant cumulative effects. The Palmdale to Burbank Project Section in combination with other past, present, and reasonably foreseeable future actions or projects (cumulative projects), listed in Appendix 3.19-A of this Draft EIR/EIS, would result in the following significant cumulative construction-period impacts under CEQA: transportation, air quality (General Conformity and localized construction effects), noise, paleontological resources, socioeconomics and communities (population and community impacts), and aesthetics and visual quality. In addition, the Palmdale to Burbank Project Section in combination with other cumulative projects would result in cumulative noise impacts during long-term operation of the HSR Build Alternative.

S.8.2.2 E1 and E1A Build Alternatives

Both the E1 and E1A Build Alternative alignments would be slightly shorter in length (35 miles each) than the Refined SR14 Build Alternative (37 miles) and SR14A Build Alternative alignments (38 miles), but longer than the E2 and E2A Build Alternative alignments (31 miles each). Total construction time for the E1 and E1A Build Alternatives (8.5 years each) would be longer than that for the Refined SR14 and SR14A Build Alternatives (8.3 years each), but shorter than that for the E2 and E2A Build Alternatives (9.3 years each).

- **Transportation**—Northbound and southbound spoils hauling associated with the E1 and E1A Build Alternatives would result in more roadway segment impacts where the LOS would degrade to unacceptable levels compared to the Refined SR14, SR14A, and E2 Build Alternatives. Southbound spoils hauling associated with the E1 and E1A Build Alternatives would degrade LOS at 1 freeway segment to unacceptable levels during the AM peak hour, identical to the E2 and E2A Build Alternatives and fewer than the Refined SR14 and SR14A Build Alternatives (each of which would degrade LOS at 2 freeway segments to an unacceptable level in the AM peak hour). Southbound spoils hauling associated with each of the six Build Alternatives would degrade LOS at 2 freeway segments during the PM peak hour. Construction of the E1 and E1A Build Alternatives would degrade LOS to unacceptable levels at fewer intersections (1 intersection in the AM peak hour for both and 2 intersections for the E1 Build Alternative and 1 intersection for the E1A Build Alternative in the PM peak hour) compared to the Refined SR14 and SR14A Build Alternatives (each of which would degrade LOS at 3 intersections in the AM peak hour and 4 intersections in the PM peak hour), but the same number of intersections as the E2 and E2A Build Alternatives.
- **Air Quality**—Construction of the E1 and E1A Build Alternatives would not result in exceedances in SCAQMD general conformity *de minimis* thresholds for CO; the Refined SR14, SR14A, and E2A Build Alternatives would exceed this threshold during construction. The E1 and E1A Build Alternative would exceed SCAQMD daily CEQA thresholds for CO for a lesser timespan than each of the other Build Alternatives (2023 only). Operation of all six Build Alternatives would have a beneficial effect and would reduce statewide emissions of all pollutants when compared to existing and future No Project baselines, under all ridership scenarios.
- **Noise and Vibration**—Construction of the E1 and E1A Build Alternatives would result in noise impacts in the communities of Harold/Alpine, and a community located near the Southern California Edison Vincent Substation between Palmdale and Acton (Figure S-13). Traffic noise from spoils hauling associated with construction of the E1 and E1A Build Alternatives would affect noise-sensitive uses surrounding portal and adit sites along Aliso Canyon Road, Soledad Canyon Road, Crown Valley Road south of Palmdale, Sand Canyon Road, and Placerita Canyon Road. The E1A Build Alternative would have the most moderate operational noise impacts of the six Build Alternatives. Unlike the Refined SR14, SR14A, E2, and E2A Build Alternatives, the E1 and E1A Build Alternatives would not result in noise impacts on domestic animals. The E1 and E1A Build Alternatives would, however, result in noise impacts on wildlife.

- Electromagnetic Fields and Electromagnetic Interference**—Construction of the E1 and E1A Build Alternatives would result in EMI at facilities that could operate sensitive equipment: Serra Medical Group and Pacifica Hospital. The E2 and E2A Build Alternatives would avoid this impact. The Refined E1 and E1A Build Alternatives would encounter more existing railroad track that could be affected by EMI (16 miles and 15 miles of railroad track, respectively) than the Refined SR14 and SR14A Build Alternatives (13 miles and 14 miles respectively) and the E2 and E2A Build Alternatives (12 miles and 11 miles, respectively).
- Public Utilities and Energy**—The E1 and E1A would result in fewer high-risk and major low-risk utility conflicts during construction (400 total utility conflicts and 345 total utility conflicts, respectively) compared to the Refined SR14 and SR14A Build Alternatives (461 and 410, respectively) but more than the E2 and E2A Build Alternatives (278 and 264, respectively). Construction of the SR14A Build Alternative would require the greatest total water demand of each of the six Build Alternatives. The SR14A Build Alternative would also consume the most energy and would generate the most solid waste during construction of each of the Build Alternatives. The Refined SR14 Build Alternative would consume more energy during construction and generate more solid waste than the E1, E1A, E2, and E2A Build Alternatives.
- Biological and Aquatic Resources**—The E1 and E1A Build Alternatives would affect the fewest acres of special-status plant species habitat and the fewest non-federal Endangered Species Act (FESA)-listed special-status wildlife species. With regard to aquatic resources, the E1A Build Alternative would affect the fewest acres of waters of the U.S. The E1A Build Alternative would also affect the fewest acres of lakes and streambeds subject to California Fish and Game Code Section 1600 et. seq. Changes in groundwater contribution to surface-water resources resulting from tunneling activities could adversely affect aquatic habitat, altering the amount and quality of aquatic habitats for associated biological resources. The E1 and E1A Build Alternatives would have the most potential to adversely impact special-status amphibian and reptile habitat from tunneling under the ANF.
- Hydrology and Water Resources**—Between Palmdale and Burbank, the E1 Build Alternative would entail 43 surface water crossings at grade (including crossings on fill, on embankment, or in cut-and-cover tunnels) and seven viaduct crossings; the E1A Build Alternative would entail 42 water crossings at grade and three viaduct crossings. As with the Refined SR14 Build Alternative, the E1 Build Alternative would cross Una Lake on embankment at grade; in contrast, the E1A Build Alternative would avoid Una Lake, pursuing a more easterly course approximately 300 feet east of Una Lake. The E1 Build Alternative would cross the California Aqueduct on fill or embankment and tributaries of the Santa Clara River south of Palmdale on a viaduct; the E1A Build Alternative would take a more easterly route along this portion of the alignment and would also cross over the California Aqueduct and tributaries of the Santa Clara River. South of Aliso Canyon, the E1 and E1A Build Alternatives would avoid most surface waters between the Antelope Valley and the San Fernando Valley by tunneling under the ANF including SGMNM. The E1 and E1A Build Alternative alignments would cross the ANF through areas where there are known and mapped seeps and springs, which indicate the potential for hydrogeological impacts during construction. The E1 and E1A Build Alternative tunnels would traverse a longer distance than the Refined SR14 and SR14A Build Alternative tunnels in areas of high groundwater pressure, increasing the chance of hydrogeological impacts resulting from seepage into tunnels. The E1 and E1A Build Alternatives would encounter more streams within the ANF including SGMNM compared to the Refined SR14 and SR14A Build Alternatives but would encounter fewer than the E2 and E2A Build Alternatives. The E1 and E1A Build Alternative alignments would traverse the least width of faults within the ANF including SGMNM with the potential to increase seepage into tunnels. South of the ANF, the E1 and E1A Build Alternative alignments would cross the Hansen Spreading Grounds and channel. The E1 and E1A Build Alternatives would permanently reduce the size of groundwater recharge ponds in the Hansen Spreading Grounds. Construction of the E1 and E1A Build Alternatives would result in fewer acres of construction-period ground disturbance than the Refined SR14 and

SR14A Build Alternatives but would disturb more acres than would the E2 and E2A Build Alternatives. The E1 and E1A Build Alternatives would result in more acres of construction-period ground disturbance within special flood hazard areas than would the Refined SR14 and SR14A Build Alternatives, but fewer than would the E2 and E2A Build Alternatives.

- **Geology, Soils, Seismicity, and Paleontological Resources**—The E1 and E1A Build Alternatives would require fewer permanent structures within hazardous and potentially hazardous fault zones than the Refined SR14 and SR14A Build Alternatives. However, the E1 and E1A Build Alternatives would experience greater risks from these fault zones than the E2 and E2A Build Alternatives. The E1 and E1A Build Alternatives would result in the smallest impact on regionally significant mineral resources when compared to the Refined SR14, SR14A, E2, and E2A Build Alternatives.
- **Hazardous Materials and Wastes**—The E1 and E1A Build Alternatives would generate contaminated spoils by excavating contaminated soils associated with PEC sites near the Vulcan Mine site and Hansen Spreading Grounds in the San Fernando Valley; the Refined SR14 and SR14A Build Alternatives would generate contaminated spoils similar to the E1 and E1A Build Alternatives; and the E2 and E2A Build Alternatives would generate contaminated spoils south of the Big Tujunga Wash crossing and at the CalMat Mine disposal site. The E1 and E1A Build Alternatives would generate the least potentially contaminated spoils (approximately 3 mcy) compared to the Refined SR14 and SR14A Build Alternatives (approximately 9 mcy) and the E2 and E2A Build Alternatives (approximately 4 mcy). The E1 and E1A Build Alternatives could result in the handling of hazardous materials within 0.25 mile of 10 education facilities each, fewer than the Refined SR14 and SR14A Build Alternatives (18 to 21 and 23 to 26 educational facilities respectively, depending on the adit option chosen) but more than the E2 and E2A Build Alternatives (6 education facilities each).
- **Safety and Security**—The E1 and E1A Build Alternatives would result in more permanent road closures from construction (13 road closures and 12 road closures, respectively) compared to the Refined SR14 and SR14A Build Alternatives (9 road closures and 5 road closures, respectively) and E2 and E2A Build Alternatives (11 road closures and 10 road closures, respectively). These closures would have similar potential to create traffic hazards for each Build Alternative; the grade separations implemented as part of project design would minimize traffic hazards. Each Build Alternative vicinity includes the Hollywood Burbank Airport. In addition, the E1 and E1A Build Alternatives' vicinity includes Whiteman Airport.
- **Socioeconomics and Communities**—As discussed in Section S.5.3.6, the Build Alternatives would require adits and intermediate windows for construction access to tunneled portions of the alignment. Thus, ranges of quantifiable impacts that would result from the selection of each adit and intermediate window option combination are discussed here. The E1 and E1A Build Alternatives would displace fewer single-family residential units (13 to 18 and 12 to 17, respectively) compared to the number displaced by the Refined SR14 (38 to 41) or E2 and E2A Build Alternatives (38 and 37, respectively), but more than the SR14A Build Alternative (8 to 11). The E1 and E1A Build Alternatives would displace 11 multifamily residential units and 27 multifamily units, respectively, lower than the number displaced by the Refined SR14 and SR14A Build Alternatives (13 and 29, respectively) and similar to the E2 and E2A Build Alternatives (11 and 27, respectively). The E1 and E1A Build Alternatives would displace 160 to 177 businesses and 162 to 179 businesses, respectively, more than would be displaced by the E2 and E2A Build Alternatives (68 and 70, respectively) and approximately the same number of businesses as would be displaced by the Refined SR14 and SR14A Build Alternatives (161 to 178 and 160 to 177, respectively).
- **Agricultural Farmland and Forest Land**—The E1 and E1A Build Alternatives would not result in permanent conversions of Important Farmland. Power lines extending from adit facilities associated with the E1 and E1A Build Alternatives would encounter forest land. Adherence to the USFS Special Use Authorization includes several provisions including those that would require the Authority to avoid, or else be liable for, damaging or contaminating the surrounding environment; provisions would adequately avoid, minimize, or

compensate for the permanent loss of forest land or conversion of forest land to nonforest use that could result from construction of permanent adit facilities within the ANF.

- **Parks, Recreation, and Open Space**—The E1 Build Alternative infrastructure would be located near 17 parks, recreation, and open space resources; the E1A Build Alternative would be located near 18 parks, recreation, and open space resources. Direct and indirect impacts on parks, recreational areas, and open space resources would be less than significant.
- **Aesthetics and Visual Quality**—The E1 and E1A Build Alternatives would be built largely below grade and would thus result in the fewest permanent construction impacts and least visual impacts on their surroundings.
- **Cultural Resources**—Construction of the E1 and E1A Build Alternatives would result in significant and unavoidable visual impacts on two historical built resources: Blum Ranch and Blum Ranch Farmhouse. Construction of the E1 and E1A Build Alternatives would result in less than significant impacts on archaeological resources, and operations impacts on historical built resources could be brought to a less than significant level.
- **Regional Growth**—Because the Build Alternatives are similar in length and would use the same Burbank Airport Station site, regional growth effects of the six Build Alternatives would not differ with regard to operations effects. However, effects would differ slightly with regard to construction jobs. The E1 Build Alternatives would create the fewest number of total construction job-years (80,300 total job-years during construction); The E1A Build Alternative would create fewer total construction job-years (81,600 total job-years during construction) than the Refined SR14, SR14A and E2A Build Alternatives.
- **Cumulative Impacts**— The E1 and E1A Build Alternatives would not substantially differ from the Refined SR14, SR14A, E2, and E2A Build Alternatives regarding the contribution of significant cumulative effects. The Palmdale to Burbank Project Section in combination with other past, present, and reasonably foreseeable probable future actions or projects (cumulative projects), listed in Appendix 3.19-A of this Draft EIR/EIS, would result in the following significant cumulative construction-period impacts under CEQA: transportation, air quality (General Conformity and localized construction effects), noise, paleontological resources, socioeconomics and communities (population and community impacts), and aesthetics and visual quality. In addition, the Palmdale to Burbank Project Section in combination with other cumulative projects would result in cumulative noise impacts during long-term operation of the HSR Build Alternative.

S.8.2.3 E2 and E2A Build Alternatives

The E2 and E2A Build Alternatives would have the shortest total length, but the longest construction duration of the six Build Alternatives.

- **Transportation**—Northbound and southbound spoils hauling associated with the E2 and E2A Build Alternatives would result in fewer roadway segment impacts where the LOS would degrade to unacceptable levels compared to the E1 and E1A Build Alternatives, but more roadway segment impacts than the Refined SR14 and SR14A Build Alternatives. Northbound and southbound spoils hauling associated with the E2 and E2A Build Alternatives would degrade LOS to unacceptable levels at fewer intersections compared to the Refined SR14, SR14A, E1, and E1A Build Alternatives. Southbound spoils hauling associated with the E2 and E2A Build Alternatives would degrade LOS at 1 freeway segment to unacceptable levels during the AM peak hour, identical to the E1 and E1A Build Alternatives and fewer than the Refined SR14 and SR14A Build Alternatives (each of which would degrade LOS at 2 freeway segments to an unacceptable level in the AM peak hour). Construction of the E2 and E2A Build Alternatives would degrade LOS to unacceptable levels at fewer intersections (1 intersection in the AM peak hour and 2 intersections for the E2 Build Alternative and 1 intersection for the E2A Build Alternative in the PM peak hour) compared to the Refined SR14 and SR14A Build Alternatives (each of which would degrade LOS at 3 intersections in

the AM peak hour and 4 intersections in the PM peak hour), but the same number of intersections as the E1 and E1A Build Alternatives.

- **Air Quality**—The E2A Build Alternative is the only Build Alternative that would exceed AVAQMD general conformity *de minimis* thresholds for NO_x (in 2023) and AVAQMD CEQA thresholds for NO_x (in 2023). Like the Refined SR14 and SR14A Build Alternatives, the E2A Build Alternative would also exceed SCAQMD general conformity *de minimis* thresholds for CO during construction (in 2022 and 2024 – 2025). Operation of all six Build Alternatives would have a beneficial effect and would reduce statewide emissions of all pollutants when compared to existing and future No Project baselines, under all ridership scenarios.
- **Noise and Vibration**—Of the six Build Alternatives, the E2 and E2A Build Alternatives would cause construction noise and vibration impacts in the most residential communities (Figure S-13). Noise impacts from spoils hauling associated with the E2 and E2A Build Alternative alignments would occur along Wheatland Avenue in the Shadow Hills neighborhood, along Foothill Boulevard in the Lake View Terrace neighborhood, and along Aliso Canyon Road, Crown Valley Road, and Soledad Canyon Road south of Palmdale. Operation of the E2 and E2A Build Alternatives would also result in operational noise impacts on the most sensitive receivers. Unlike the other Build Alternatives, operations of the E2 and E2A Build Alternatives would not result in ground-borne vibration impacts on residential sensitive receptors. Like the Refined SR14 and SR14A Build Alternatives, the E2 and E2A Build Alternatives would result in noise impacts on domestic animals and wildlife. In contrast, the E1 and E1A Build Alternatives would only result in noise impacts on wildlife.
- **Electromagnetic Fields and Electromagnetic Interference**—Unlike the Refined SR14, SR14A, E1, and E1A Build Alternatives, construction of the E2 and E2A Build Alternatives would not result in EMI at facilities that could operate sensitive equipment and would avoid EMI to potentially sensitive receptors within the RSA. The E2 and E2A Build Alternatives would encounter the shortest length existing railroad track that could be affected by EMI (12 miles and 11 miles of railroad track, respectively) compared to the Refined SR14 and SR14A Build Alternatives (13 miles and 14 miles respectively) and the E1 and E1A Build Alternatives (16 miles and 15 miles, respectively).
- **Public Utilities and Energy**—The E2 and E2A would result in fewer high-risk and major low-risk utility conflicts during construction (278 total utility conflicts and 264 total utility conflicts, respectively), compared to the Refined SR14 and SR14A Build Alternatives (461 and 410, respectively) and the E1 and E1A Build Alternatives (400 and 345, respectively). Construction of the E2 Build Alternative would require the least total water demand and would generate the least amount of solid waste of each of the six Build Alternatives. The SR14A Build Alternative would also consume the most energy and would generate the most solid waste during construction of each of the Build Alternatives. The E2 and E2A Build Alternatives would consume more energy during construction than the E1 and E1A Build Alternatives, but less than the Refined SR14 and SR14A Build Alternatives.
- **Biological and Aquatic Resources**—The E2 and E2A Build Alternatives would affect more special-status plant species habitat than the E1 and E1A Build Alternatives, but less than the Refined SR14 and SR14A Build Alternatives. Of the six Build Alternatives, the E2A Build Alternative would affect the fewest acres of listed special-status wildlife habitat. The E2 Build Alternative would affect the most acreage of wetland waters of the U.S., although the E2A Build Alternative would affect the fewest acres of nonwetland waters of the U.S. The E2 Build Alternative would affect Una Lake, which provides habitat for several special-status species. Changes in groundwater contribution to surface-water resources resulting from tunneling activities could adversely affect aquatic habitat, altering the amount and quality of aquatic habitats for associated biological resources. The E2 and E2A Build Alternatives are the only alternatives with the potential to impact special-status bird and fish habitat from tunneling under the ANF.
- **Hydrology and Water Resources**—The E2 Build Alternative would entail 34 surface water crossings at grade (including crossings on fill, on embankment, or in cut-and-cover tunnels) and

eight viaduct crossings; the E2A Build Alternative would entail 39 surface water crossings at grade and three viaduct crossings. The E2 Build Alternative would cross Una Lake on embankment at grade; in contrast, the E2A Build Alternative would avoid Una Lake, pursuing a more easterly course approximately 300 feet east of Una Lake. The E2 and E2A Build Alternative alignments would cross the California Aqueduct on fill or embankment and would also cross tributaries of the Santa Clara River south of Palmdale; the E2A Build Alternative would take a more easterly route along this portion of alignment and would also cross over the California Aqueduct and tributaries of the Santa Clara River. South of Aliso Canyon, the E2 and E2A Build Alternatives would avoid most surface waters between the Antelope Valley and the San Fernando Valley by tunneling under ANF including SGMNM. The E2 and E2A Build Alternative alignments would cross Big Tujunga Wash (on viaduct) south of ANF. The E2 and E2A Build Alternative alignments would cross the ANF through areas where there are the most known and mapped seeps and springs, which indicate the potential for hydrogeological impacts during construction. The E2 and E2A Build Alternative tunnels would traverse the longest distance in areas of high groundwater pressure compared to the paths of the Refined SR14, SR14A, E1, and E1A Build Alternatives, so the E2 and E2A Build Alternatives have a greater risk of impacts on hydrogeology. The E2 and E2A Build Alternatives would also be located within 1 mile of more streams within the ANF and would encounter the greatest total width of faults with the potential to increase seepage into tunnels. The E2 and E2A Build Alternatives would involve the most construction-period ground disturbance and permanent footprint within special flood hazard areas but would have the fewest groundwater wells within 1 mile of the alignment centerline.

- **Geology, Soils, Seismicity, and Paleontological Resources**—The E2 and E2A Build Alternatives would involve the least permanent footprint within dam inundation zones and would require the largest amount of construction aggregate for construction. The E2 and E2A Build Alternatives would result in similar impacts on paleontological resources as the E1 and E1A Build Alternatives but would result in the fewest impacts on regionally significant mineral resources when compared to the Refined SR14, SR14A, E1, and E1A Build Alternatives.
- **Hazardous Materials and Wastes**—The E2 and E2A Build Alternatives would generate contaminated spoils by excavating contaminated soils associated with PEC sites south of the Big Tujunga Wash crossing and at the CalMat Mine disposal site; the Refined SR14, SR14A, E1, and E1A Build Alternatives would generate contaminated spoils near the Vulcan Mine site and Hansen Spreading Grounds in the San Fernando Valley. The E2 and E2A Build Alternatives would generate less potentially contaminated spoils (approximately 4 mcy) compared to the Refined SR14 and SR14A Build Alternatives (approximately 9 mcy) but more than the E1 and E1A Build Alternatives (approximately 3 mcy). The E2 and E2A Build Alternatives could result in the handling of hazardous materials within 0.25 mile of 6 education facilities, fewer than the Refined SR14 and SR14A Build Alternatives (18 to 23 education facilities and 21 to 26 education facilities respectively, depending on the adit option chosen) and the E1 and E1A Build Alternatives (10 educational facilities, each).
- **Safety and Security**—The Refined E2 and E2A Build Alternatives would result in more permanent road closures from construction (11 road closures and 10 road closures, respectively) compared to the Refined SR14 and SR14A Build Alternatives (9 road closures and 5 road closures, respectively) but fewer than the E1 and E1A Build Alternatives (13 road closures and 12 road closures, respectively). These closures would have similar potential to create traffic hazards for each Build Alternative; the grade separations implemented as part of project design would minimize traffic hazards. The E2 and E2A Build Alternatives' vicinity includes the fewest airports and airstrips of the six Build Alternatives, only including the Hollywood Burbank Airport.
- **Socioeconomics and Communities**—As discussed in Section S.5.3.6, the Build Alternatives would require adits and intermediate windows for construction access to tunneled portions of the alignment. Thus, ranges of quantifiable impacts that would result from the selection of each adit and intermediate window option combination are discussed here. The E2 and E2A Build Alternatives would displace 38 and 37 single-family residential

units, respectively, which is a larger number than the E1, E1A, and SR14A Build Alternatives (13 to 18; 12 to 17; and 8 to 11 single-family residential units, respectively), but a smaller number than the Refined SR14 Build Alternative would displace (38 to 41). The E2 and E2A Build Alternatives would displace 11 multifamily residential units and 27 multifamily units, respectively; the E2 Build Alternative would displace fewer multifamily residential units than the Refined SR14 and SR14A Build Alternatives (13 and 29, respectively) and a similar number of multifamily units to the E1 and E1A Build Alternatives (11 and 27, respectively). The E2 and E2A Build Alternatives would require the fewest business displacements (68 and 70 businesses, respectively) compared to the number of business displacements under the E1 (160 to 177) and the E1A (162 to 179) or the Refined SR14 (161 to 178) and the SR14A (160 to 177) Build Alternatives.

- **Agricultural Farmland and Forest Land**—The E2 and E2A Build Alternatives would not result in permanent conversions of Important Farmland or forest land resources.
- **Parks, Recreation, and Open Space**—The E2 Build Alternative infrastructure would be located near 13 parks, recreation, and open space resources; the E2A Build Alternative would be located near 14 parks, recreation, and open space resources. These are fewer than would be near the alignments for the other four Build Alternatives. However, the direct and indirect impacts on the Hansen Dam Open Space under the E2 and E2A Build Alternatives would represent the largest impacts on parks, recreational areas, and open space resources of the six Build Alternatives.
- **Aesthetics and Visual Quality**—The E2 and E2A Build Alternatives would adversely affect visual quality in scenic areas between Palmdale and Burbank. Although the E2 and E2A Build Alternatives would largely be built underground, project infrastructure would contrast with the natural harmony of some views near the tunnel portals, such as near Lake View Terrace and Big Tujunga Wash.
- **Cultural Resources**—Like the E1 and E1A Build Alternatives, construction of the E2 and E2A Build Alternatives would result in significant and unavoidable visual impacts on two historical built resources: Blum Ranch and Blum Ranch Farmhouse. Construction of the E2 and E2A Build Alternatives would result in less than significant impacts on archeological resources, and operations impacts on historical built resources could be brought to a less than significant level.
- **Regional Growth**—Because the Build Alternatives are similar in length and would use the same Burbank Airport Station site, regional growth effects of the six Build Alternatives would not differ with regard to operations effects. However, effects would differ slightly with regard to construction jobs. The E2 and E2A Build Alternatives would create a lower number of total construction job-years (80,900 and 82,100 total job-years during construction, respectively) compared to the Refined SR14 and SR14A Build Alternatives (83,400 and 84,900 total job-years during construction, respectively).
- **Cumulative Impacts**—The E2 and E2A Build Alternatives would not substantially differ from the Refined SR14, SR14A, E1, and E1A Build Alternatives regarding the contribution of significant cumulative effects. The Palmdale to Burbank Project Section in combination with other past, present, and reasonably foreseeable probable future actions or projects (cumulative projects), listed in Appendix 3.19-A of this Draft EIR/EIS, would result in the following significant cumulative construction-period impacts under CEQA: transportation, air quality (General Conformity and localized construction effects), noise, paleontological resources, socioeconomics and communities (population and community impacts), and aesthetics and visual quality. In addition, the Palmdale to Burbank Project Section in combination with other cumulative projects would result in cumulative noise impacts during long-term operation of the HSR Build Alternative.

S.8.3 Comparison of HSR Stations

As described in Section S.5.6, the Palmdale to Burbank Project Section proposes one station site: the Burbank Airport Station adjacent to the Hollywood Burbank Airport in Burbank. This station site would be identical for all six Build Alternatives. Thus, impacts resulting from the station do not influence the selection of the Preferred Alternative. The impacts of this station are included in Table S-4 and Table S-5.

S.8.4 Preferred Alternative

The Authority has identified the SR14A Build Alternative as the Preferred Alternative for the Palmdale to Burbank Project Section, with the Burbank Airport Station. The Authority identified the Preferred Alternative by balancing the adverse and beneficial impacts of the project on the human and natural environment. The Authority weighed a variety of issues, including natural resource and community impacts, the input of the communities along the route, the views of federal and state resource agencies, project costs, constructability, and other differentiators to identify what the Authority believes is the best Build Alternative to achieve the project’s Purpose and Need.

S.8.5 Capital and Operating Costs

Table S-6 provides cost estimates in 2018 dollars for each of the six Build Alternatives. The cost estimates include the total labor and materials necessary to construct the Palmdale to Burbank Project Section, including stations, utility relocations, electrical infrastructure and substations, and modifications to roadways required to accommodate grade-separated guideways. Additionally, the cost estimates do not include acquiring vehicles as those are part of the California HSR System costs and are not associated with construction of individual project sections.

Table S-6 Estimated Capital Costs of the High-Speed Rail Alternatives Palmdale to Burbank (2018\$ millions)

Authority Cost Category	Refined SR14 Build Alternative	SR14A Build Alternative	E1 Build Alternative	E1A Build Alternative	E2 Build Alternative	E2A Build Alternative
10 Track structures and track	\$12,723	\$13,568	\$13,267	\$13,867	\$13,526	\$14,086
20 Stations, terminal, intermodal ^{1,2}	\$556	\$560	\$573	\$532	\$661	\$624
30 Support facilities: yards, shops, administration buildings ³	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
40 Sitework, right-of-way, land, existing improvements	\$4,946	\$5,472	\$4,459	\$4,607	\$4,074	\$4,139
50 Communications and signaling	\$175	\$189	\$173	\$182	\$164	\$159
60 Electric traction	\$249	\$256	\$237	\$238	\$213	\$214

Authority Cost Category	Refined SR14 Build Alternative	SR14A Build Alternative	E1 Build Alternative	E1A Build Alternative	E2 Build Alternative	E2A Build Alternative
70 Vehicles	Considered a systemwide cost and not included as part of the Build Alternatives within individual project sections.					
80 Professional services	\$2,950	\$3,169	\$2,985	\$3,110	\$3,036	\$3,138
90 Unallocated contingency ⁴	\$801	\$861	\$803	\$834	\$799	\$824
100 Finance charges	Estimate to be developed prior to project construction.					
Total⁵	\$22,400	\$24,075	\$22,497	\$23,370	\$22,473	\$23,184

Source: Appendix 6-B, Preliminary Engineering for Project Definition Record Set Capital Cost Estimate Report

¹ The Palmdale to Burbank Project Section spans from the city of Palmdale near the vicinity of Spruce Court just west of Sierra Highway in the north, to Burbank in the south. Station costs overlap. The Palmdale Station and Maintenance Facility were fully evaluated as part of the Bakersfield to Palmdale Project Section, and are also included in the Bakersfield to Palmdale Project Section costs. The Burbank Station costs are also included in the Burbank to Los Angeles Project Section costs.

² Roadway modifications and accesses to the alignment are accounted for under station cost estimates. The SR14A, E1A, and E2A Build Alternatives would require significantly less roadway modifications due to more tunneling and through avoidance of the Pearblossom interchange, resulting in lower station construction cost estimates compared to the Refined SR14, E1, and E2 Build Alternatives.

³ The Palmdale to Burbank Project Section cost information does not include support facilities.

⁴ All cost categories include unallocated contingencies. Category SCC 90 consists of only unallocated monies.

⁵ Totals may not sum due to rounding

Authority = California High-Speed Rail Authority

The operations and maintenance costs in 2015 dollars as apportioned to the Palmdale to Burbank Project Section are shown in Table S-7 and are based on Phase 1 of the California HSR System, total cost per route mile.¹¹ The costs associated with operations and maintenance are apportioned on the basis of trainset miles¹² operated in the Palmdale to Burbank Project Section. The costs associated with maintenance of infrastructure are apportioned as a ratio of 40 route miles to 520 Phase 1 total route miles. For more information on the operations and maintenance cost model used for cost forecasting, please refer to Appendix 6-A and Appendix 6-B of this Draft EIR/EIS.

Table S-7 Annual Operation and Maintenance Costs Apportioned to the Palmdale to Burbank Project Section (2015\$ millions)

Operations and Maintenance Activity	2040 Medium Ridership Scenario	2040 High Ridership Scenario
Train operations	\$22	\$24
Dispatching	\$3	\$3
Maintenance of equipment	\$11	\$12
Maintenance of infrastructure	\$10	\$11
Station and train cleaning	\$6	\$6
Commercial costs and functions	\$7	\$8
General and administrative	\$4	\$5
Insurance	\$4	\$4
Unallocated contingency	\$3	\$3
Total¹	\$70	\$76

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

¹Totals may not sum due to rounding.

EIR/EIS = Environmental Impact Report/Environmental Impact Statement

S.9 Section 4(f) and Section 6(f)

S.9.1 Section 4(f)

Under Section 4(f) of the U.S. Department of Transportation Act (codified at 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 is a finding of *de minimis* impact, or if there are no prudent or feasible alternatives to such use, and the project includes all possible planning to minimize harm to such properties. Properties protected under Section 4(f) are publicly owned lands of a park, recreation area, or wildlife and waterfowl refuge or land of 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 Refined SR14, SR14A, E1, E1A, E2, and E2A Build Alternatives would result in the use of Section 4(f) resources; however, findings of a *de minimis* impact are proposed. None of the Build Alternatives would result in a use of a Section 4(f) resource. Table S-8 summarizes preliminary Section 4(f) use determinations and applicable standardized or property-specific conditions or treatments proposed for each of the six Build Alternatives.

¹¹ Route mile is defined as the distance traveled over tracks between two points.

¹² A trainset mile is the movement of a train 1 mile.

Table S-8 Summary of Preliminary Section 4(f) Use Determinations

Resource	Preliminary Section 4(f) Use Determination ¹					
	Refined SR14	SR14A	E1	E1A	E2	E2A
Parks and Recreation Resources						
Palmdale Hills Trail (Proposed Extension)	<i>de minimis</i>	<i>de minimis</i>	<i>de minimis</i>	<i>de minimis</i>	<i>de minimis</i>	<i>de minimis</i>
Acton Community Trail (Proposed Extension)	No use	No use	<i>de minimis</i>	<i>de minimis</i>	<i>de minimis</i>	<i>de minimis</i>
Littlerock Trail (Proposed Extension)	<i>de minimis</i>	<i>de minimis</i>	<i>de minimis</i>	<i>de minimis</i>	<i>de minimis</i>	<i>de minimis</i>
Vasquez Loop Trail (Proposed Extension)	<i>de minimis</i>	<i>de minimis</i>	<i>de minimis</i>	<i>de minimis</i>	<i>de minimis</i>	<i>de minimis</i>
Pacific Crest Trail	No use	<i>de minimis</i>	No use	No use	No use	No use
San Gabriel Mountains National Monument	No use	No use	<i>de minimis</i>	<i>de minimis</i>	<i>de minimis</i>	<i>de minimis</i>
Angeles National Forest	No use	No use	No use	No use	<i>de minimis</i>	<i>de minimis</i>
Rim of the Valley Trail (Proposed Extension)	No use	No use	No use	No use	No use	No use
Hansen Dam Open Space Area	No use	No use	No use	No use	<i>de minimis</i>	<i>de minimis</i>
Historic Resources						
Palmdale Ditch	No use	No use	<i>de minimis</i>	<i>de minimis</i>	<i>de minimis</i>	<i>de minimis</i>
East Branch of the California Aqueduct	<i>de minimis</i>	<i>de minimis</i>	<i>de minimis</i>	<i>de minimis</i>	<i>de minimis</i>	<i>de minimis</i>
Site 19-003890 (Vasquez Rocks Archaeological District)	<i>de minimis</i>	<i>de minimis</i>	No use	No use	No use	No use
Blum Ranch	No use	No use	No use	No use	No use	No use
Blum Ranch Farmhouse	No use	No use	No use	No use	No use	No use

Resource	Preliminary Section 4(f) Use Determination ¹					
	Refined SR14	SR14A	E1	E1A	E2	E2A
Pink Motel and Café	No use	No use	No use	No use	No use	No use
Eagle and Last Chance Mine Road	No use	No use	<i>de minimis</i>	<i>de minimis</i>	<i>de minimis</i>	<i>de minimis</i>

Source: Authority, 2019a

¹ A Section 4(f) use may be constituted as a permanent use,¹³ temporary occupancy,¹⁴ or a constructive use.¹⁵ A finding of *de minimis* impact is proposed for several Section 4(f) resources. Section 4(f) uses are defined in detail in Chapter 4, Section 4(f) and 6(f) Evaluations. Authority = California High-Speed Rail Authority

S.9.2 Section 6(f)

Section 6(f) properties are recreation resources funded by the Land and Water Conservation Fund Act (54 U.S.C. 200305(f)). Parklands acquired or developed with Land and Water Conservation Fund Act 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.” No Section 6(f)-protected property was identified as part of this environmental review. Therefore, there would be no Section 6(f) impacts associated with the six Build Alternatives.

S.10 Environmental Justice

Environmental justice can be defined as the fair treatment and meaningful involvement of all people, regardless of race, color, national origin, or income. For a proposed transportation project, this means involvement from the early stages of transportation planning and decision-making through construction, operations, and maintenance. The decision-making process must evaluate, to the extent practicable and permitted by law, the potential disproportionately high and adverse human health and environmental impacts of their programs, policies, and activities on minority and/or low-income populations. A disproportionately high and adverse effect on minority populations and low-income populations is generally defined as an effect that:

- Would be predominantly borne by minority populations or low-income populations, or
- Would be suffered by minority populations and low-income populations and would be appreciably more severe or greater in magnitude than the adverse effect suffered by the non-low-income and non-minority populations in the affected area and the reference community.

The following laws and regulations govern environmental justice-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 USEO 12898
- Improving Access to Services for Persons with Limited English Proficiency (Presidential Executive Order 13166)

¹³ When a Section 4(f) property is permanently incorporated into a proposed transportation facility.

¹⁴ When a Section 4(f) property, in whole or in part, is required for construction-related activities but not permanently incorporated into a transportation facility.

¹⁵ When a transportation project does not permanently incorporate the property of a protected resource, but the proximity of the project results in impacts (e.g., noise, vibration, visual, access, and ecological) after incorporation of mitigation that are so severe that the protected activities, features, or attributes that qualify the resource for protection under Section 4(f) are substantially impaired.

- 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 (CEQ 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.)
- California Government Code Section 65040.12(e)
- California Global Warming Solutions Act of 2006: Greenhouse Gas Reduction Fund (Assembly Bill 32, Chapter 488, Statutes of 2006)

Addressing environmental justice issues involves procedural and technical considerations. Procedural considerations include reaching out to ensure that minority and/or low-income populations and other traditionally underserved populations are effectively engaged in public involvement processes. As discussed further in Chapter 9, Public and Agency Involvement, the Authority has been conducting outreach for the Palmdale to Burbank Project Section since 2014. Additional outreach events specifically aimed toward environmental justice communities began in 2019 and are ongoing (refer to Appendix 5-A for the complete Environmental Justice Outreach Plan, including discussion of procedural considerations). 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 origin, age, sex, or disability and commitment to provide language assistance to individuals with limited English proficiency.

The presence of environmental justice populations is more prevalent in Los Angeles County than in the state as a whole. As such, the proposed alignments of the Palmdale to Burbank Project Section Build Alternatives would result in impacts on environmental justice populations. Although the six Build Alternatives for the Palmdale to Burbank Project Section were designed to avoid impacts on these populations, avoiding these impacts entirely was not feasible. The Authority has preliminarily concluded that the Palmdale to Burbank Project Section would result in disproportionately high and adverse effects on minority and/or low-income populations associated with socioeconomics (business displacements and community cohesion). However, the Authority has also found that long-term operation of the Build Alternatives would result in beneficial effects on California populations, including low-income and minority populations. These beneficial effects include sales tax gains, regional employment increases, better regional transportation, transportation safety (because of new grade-separated crossings), and regional air quality benefits.

The Authority has preliminarily concluded that, when project benefits and impacts are considered as a whole, all six Build Alternatives would result in disproportionately high and adverse effects on EJ populations related to socioeconomics (business displacements and community cohesion). (refer to Chapter 5, Environmental Justice, for further discussion of impacts on these populations). The Authority's environmental justice determination in this Draft EIR/EIS is preliminary and is subject to change based on comments received during the public comment period on this document and additional community engagement meetings. In accordance with U.S. Department of Transportation Order 5610.2C, if disproportionately high and adverse effects are identified, the action would only be carried out if the Authority determines that "further mitigation measures or alternatives that would avoid or reduce the disproportionately high and adverse effect are not practicable." This determination will be addressed in the Final EIR/EIS.

S.11 Areas of Controversy

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

- Impacts on corridor communities (including noise, visual quality impacts, loss of community character and cohesion, and right-of-way acquisition) from at-grade and elevated alignments (particularly for the Refined SR14 Build Alternative) in the San Fernando Valley
- Impacts on forest land in the ANF including SGMNM
- Impacts on groundwater and hydrogeology in the ANF including SGMNM
- Seismic/geological considerations
- Noise impacts on domestic animals and wildlife
- Impacts disproportionately borne by environmental justice populations
- Impacts on special-status plants and wildlife
- Impacts on Una Lake

S.12 Environmental Process

The Authority is circulating this 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 in the study area, and on the Authority's website. The following discussion outlines the next steps in the environmental process

S.12.1 Identification of Preferred Alternative

After considering public and agency comments, the Authority identified the SR14A Build Alternative (Figure S-7) as its preferred Build Alternative on August 20, 2020. The Preferred Alternative represents the most advantageous Build Alternative based on the analysis provided in this Draft EIR/EIS in the context of purpose and need, project objectives, NEPA and CEQA, local and regional land use plans, natural resource and community impacts, the input of the communities along the route, project costs, and constructability.

A portion of each of the six Build Alternatives evaluated in this Draft EIR/EIS cross under the ANF, including the SGMNM. Minimizing the potential for adverse effects on the natural resources in the ANF including SGMNM, particularly potential effects on groundwater and surface water, was key in evaluating and determining a Preferred Alternative. In addition, the six Build Alternatives include long deep bored tunnels under the ANF, including the SGMNM. Constructability issues such as rock quality and potential effects associated with squeezing ground, in-situ stresses, and groundwater pressures on the tunnel lining system, were key factors in evaluating and identifying a Preferred Alternative for the Palmdale to Burbank Project Section.

The Preferred Alternative also integrates the Authority's evaluation under Section 4(f) of the Department of Transportation Act (U.S.C. Title 49, § 303) (Section 4(f)), which provides special protection to publicly owned public parks; recreational areas of national, state, or local significance; wildlife or waterfowl refuges; and lands of a historic site of national, state, or local significance. As described in Chapter 4, Draft Section 4(f) and 6(f) Evaluations, Section 4(f) properties can only be used by federally funded transportation projects if there is no feasible and prudent Build Alternative, and planning has been undertaken to minimize harm to 4(f) property used by the project. For more information on the Authority's evaluation under Section 4(f), see Chapter 4, Draft Section 4(f) and Section 6(f) Evaluations.

S.12.2 Next Steps in the Environmental Process

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.12.2.1 Public and Agency Comment

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 for the comment period. The comment period will include a public hearing. Information about the schedule for the public hearing is available on the Authority's website at www.hsr.ca.gov. The document also is available at the Authority offices and on the Authority's website. After considering public and agency comments, the Authority will prepare a Palmdale to Burbank Project Section Final EIR/EIS that will include responses to comments.

S.12.2.2 California High-Speed Rail Authority Decision-Making

The Authority will prepare the Palmdale to Burbank Project Section Final EIR/EIS, which will include responses to comments on this Draft EIR/EIS. The Authority Board of Directors will consider whether to certify the Final EIR/EIS for compliance with CEQA and approve the project pursuant to CEQA. The Authority Board of Directors will also consider whether to approve a Record of Decision selecting the Preferred Alternative and directing the Chief Executive Officer to issue it as a final ROD pursuant to the NEPA Assignment Memorandum of Understanding.¹⁶

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 to Build Alternatives have been required or incorporated into the project that avoid or substantially lessen the significant environmental effect as identified in the Final EIR/EIS.
- Changes or Build 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 Build Alternatives identified in the Final EIR/EIS.

If the Authority proceeds with project approval, it will file a NOD 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/EIS 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 NOD.

The ROD would describe the project and Build Alternatives considered, describe the Preferred Alternative, and identify the environmentally preferable alternative, make environmental findings and determinations with regard to air quality conformity, FESA, Section 106, Section 4(f), and environmental justice, and identify required mitigation measures.

S.12.2.3 Federal Railroad Administration Decision-Making

Pursuant to the NEPA Assignment Memorandum of Understanding¹⁷, the FRA retains responsibility for certain critical activities, including making project-level Clean Air Act conformity determinations and conducting formal government-to-government tribal consultations.

¹⁶ Memorandum of Understanding for the National Environmental Policy Act Assignment (FRA and State of California 2019).

¹⁷ Memorandum of Understanding for the National Environmental Policy Act Assignment (FRA and State of California 2019)

The Authority expects that, upon completion of the environmental process for the Palmdale to Burbank Project Section, the Authority—acting in lieu of FRA pursuant to assignment of FRA’s responsibilities—would issue a combined Final EIS and ROD in compliance with NEPA. The ROD would describe the project and Build Alternatives considered, describe the Preferred Alternative, and identify the environmentally preferable alternative; make environmental findings and determinations with regard to air quality conformity, FESA, Section 106, Section 4(f), and environmental justice; and identify required mitigation measures. No project-related construction may begin until the Authority’s final decision has been issued and 30 days have passed since the issuance of the ROD, and necessary federal, state, and local permits have been obtained.

S.12.2.4 United States Army Corps of Engineers Decision-Making

The USACE would review the Build Alternatives and identify a Least Environmentally Damaging Practicable Alternative for the Palmdale to Burbank Project Section. The Authority would also apply for a permit under Section 404 of the Clean Water Act, as the Build Alternatives would require discharges into waters of the U.S. This permit would include conditions to avoid and minimize impacts from discharges on waters of the U.S. Additionally, permissions under Section 14 of the Rivers and Harbors Act (33 U.S.C. 408) would be required for effects on flood control facilities and floodplains.

The USACE intends to use the Final EIR/EIS to integrate procedural requirements of NEPA and its permitting responsibilities (including the United States Environmental Protection Agency’s Section 404(b)(1) Guidelines) to provide a single document that streamlines and enables informed decision-making, including, but not limited to, adoption of the EIS, issuance of necessary RODs, Section 404 permit decisions, and Section 408 permission (as applicable), as well as support the USACE’s final Least Environmentally Damaging Practicable Alternative determination and public interest review determination. This single document can be used for alteration/modification of completed federal flood risk management facilities and associated operations and maintenance, and real estate permissions or instruments (as applicable).

S.12.2.5 United States Forest Service Decision-Making

The Authority would apply for a Special Use Authorization from USFS, which would include conditions to avoid or minimize impacts on forest land or management of forest resources within the ANF including SGMNM. A Special Use Authorization would be required because HSR tunnels and other facilities would be constructed within the ANF including within SGMNM boundaries.

S.12.2.6 Surface Transportation Board Decision-Making

Upon completion of the environmental process and issuance of a ROD by the Authority, the Surface Transportation Board will issue a final decision on whether to approve the Palmdale to Burbank Project Section (the final decision also serves as the Surface Transportation Board’s ROD under NEPA). In making its final decision, the Surface Transportation Board will consider the transportation merits, environmental record, and recommendations from the Surface Transportation Board’s Office of Environmental Analysis on the Preferred Alternative and mitigation measures. No project-related construction may begin until the Surface Transportation Board’s final decision has been issued and has become effective.

S.12.2.7 Bureau of Land Management Decision-Making

The Authority would apply for a grant of right-of-way for Bureau of Land Management properties crossed by the Preferred Alternative.

S.13 Project Implementation

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

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