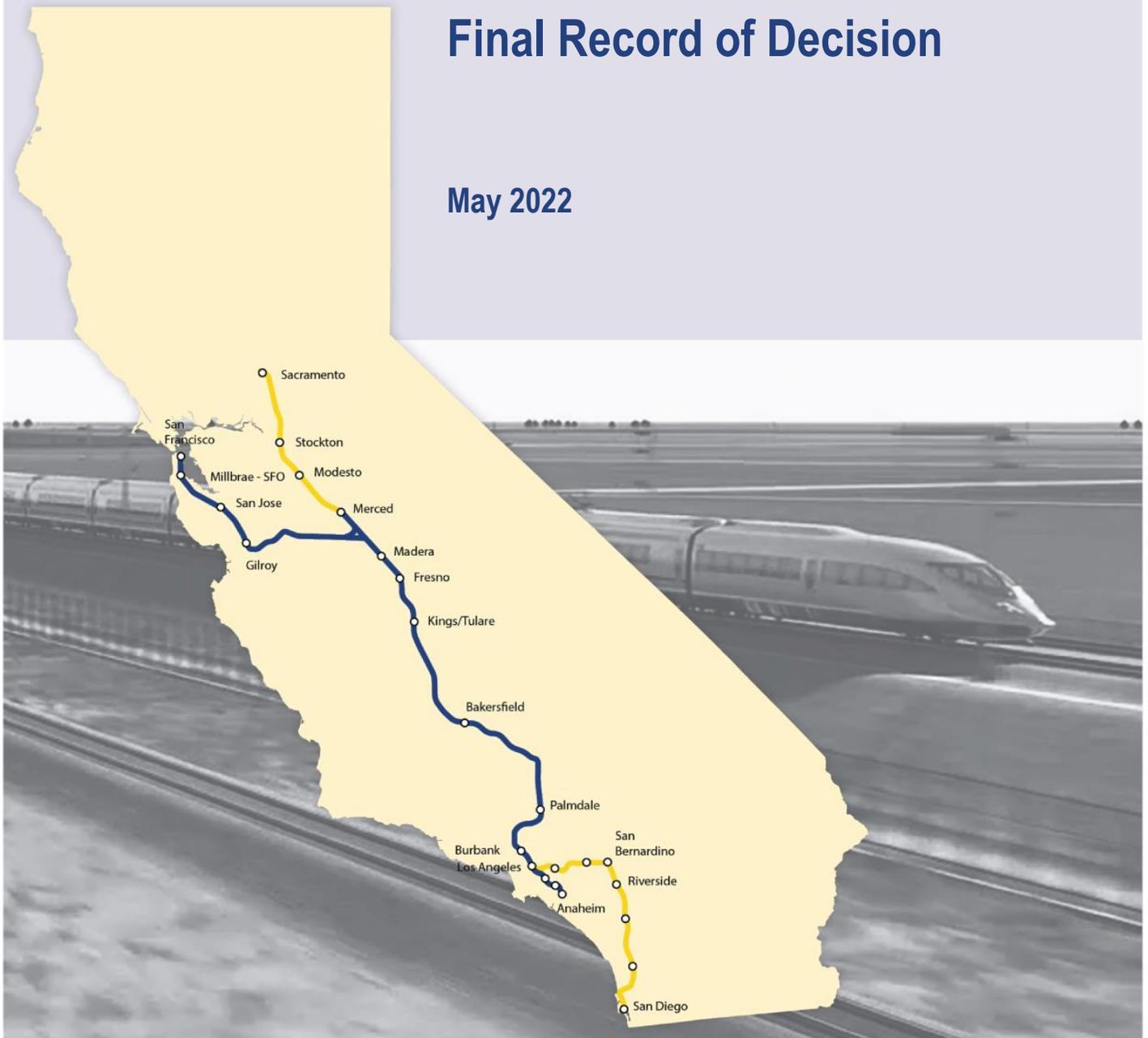


California High-Speed Rail Authority

# San Jose to Merced Project Section

Final Record of Decision

May 2022



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



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## Acronyms and Abbreviations

Acronym	Definition
Authority	California High-Speed Rail Authority
BA	biological assessment
BAAQMD	Bay Area Air Quality Management District
BMP	best management practice
BO	biological opinion
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act
C.F.R.	Code of Federal Regulations
CWA	Clean Water Act
DDV	Diridon design variant
DOT	U.S. Department of Transportation
DPS	distinct population segment
Draft EIR/EIS	<i>San Jose to Merced Project Section Draft Environmental Impact Report/Environmental Impact Statement</i>
EFH	Essential Fish Habitat
EIR	environmental impact report
EIS	environmental impact statement
EIS Documents	Draft EIS, Supplemental Draft EIS, and Final EIS
Fed. Reg.	<i>Federal Register</i>
FESA	federal Endangered Species Act
FHWA	Federal Highway Administration
Final EIR/EIS	<i>San Jose to Merced Project Section Final Environmental Impact Report/Environmental Impact Statement</i>
FRA	Federal Railroad Administration
GEA	Grasslands Ecological Area
HSR	high-speed rail
I-	Interstate
IAMF	impact avoidance and minimization feature
LEDPA	least environmentally damaging practicable alternative
MMEP	Mitigation Monitoring and Enforcement Plan
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
MOWF	maintenance of way facility

Acronym	Definition
MOWS	maintenance of way siding
mph	miles per hour
MT	mainline track
NEPA	National Environmental Policy Act
NEPA/404/408 MOU	<i>Memorandum of Understanding—National Environmental Policy Act (42 U.S.C. 4321 et seq) and Clean Water Act Section 404 (33 U.S.C. 1344) and Rivers and Harbors Act Section 14 (33 U.S.C. 408)—Integration Process for the California High-Speed Train Program</i>
NEPA Assignment MOU	<i>Memorandum of Understanding between the Federal Railroad Administration and the State of California, Acting through its California State Transportation Agency and its California High-Speed Rail Authority, for the State of California's Participation in the Surface Transportation Project Delivery Program Pursuant to 23 U.S.C. 327</i>
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOx	nitrogen oxide
NRHP	National Register of Historic Places
OSHA	Occupational Safety and Health Administration
PAA	Preliminary Alternatives Analysis
PM <sub>2.5</sub>	particulate matter less than or equal to 2.5 microns in diameter
PM <sub>10</sub>	particulate matter less than or equal to 10 microns in diameter
Project	San Jose to Merced Project Section
Reclamation	U.S. Department of the Interior, Bureau of Reclamation
ROD	Record of Decision
RSA	resource study area
SAA	Supplemental Alternatives Analysis
Section 106 PA	<i>First Amended Programmatic Agreement among the Federal Railroad Administration, the Advisory Council on Historic Preservation, the California State Historic Preservation Officer, and the California High-Speed Rail Authority Regarding Compliance with Section 106 of the National Historic Preservation Act as it Pertains to the California High-Speed Train Project</i>
Section 404	Clean Water Act Section 404 (33 U.S.C. § 1344)
Section 408	Rivers and Harbors Act of 1899, Section 14 (33 U.S.C. § 408)
SFBAAB	San Francisco Bay Area Air Basin
SHPO	State Historic Preservation Officer
SJVAB	San Joaquin Valley Air Basin
SJVAPCD	San Joaquin Valley Air Pollution Control District
SR	State Route
STB	Surface Transportation Board

Acronym	Definition
TDV	tunnel design variant
UPRR	Union Pacific Railroad
USACE	U.S. Army Corps of Engineers
U.S.C.	United States Code
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
VERA	Voluntary Emissions Reduction Agreement

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# 1 INTRODUCTION

This document is the California High-Speed Rail Authority’s (Authority) Record of Decision (ROD) under the National Environmental Policy Act (NEPA) for the California High-Speed Rail (HSR) San Jose to Merced Project Section, which is part of the statewide HSR system. The Authority is the federal NEPA lead agency under what is commonly referred to as NEPA Assignment. More specifically, the environmental review, consultation, and other actions required of a federal lead agency by federal environmental laws for this San Jose to Merced Project Section (Project) are being or have been carried out by the State of California pursuant to 23 United States Code (U.S.C.) Section 327 and a Memorandum of Understanding (MOU) effective July 23, 2019, and executed by the Federal Railroad Administration (FRA) and the State of California (NEPA Assignment MOU) (FRA and State of California 2019). The Authority is also the lead agency for state environmental reviews under the California Environmental Quality Act (CEQA).

The San Jose to Merced Project Section geographically overlaps with the previously approved Merced to Fresno Project Section at the Central Valley Wye, where the north/south and east/west legs of the HSR system connect. The San Jose to Merced Project Section comprises three extents, as shown in Figure 1 below: (1) the San Jose to Central Valley Wye Project Extent from Scott Boulevard in Santa Clara to Carlucci Road in Merced County, the western terminus of the Central Valley Wye (Project); (2) the Central Valley Wye, which connects the east-west portion of HSR from the San Francisco Bay Area (Bay Area) to the Central Valley with the north-south portion from Merced to Fresno; and (3) the Ranch Road to Merced Project Extent, which is the northernmost portion of the Merced to Fresno Project Section, from the northern limit of the Central Valley Wye (Ranch Road) to the Merced Station.



HSR = high-speed rail

**Figure 1 San Jose to Merced Project Section Geographic Context**

The Authority approved the Preferred Alternative for the Merced to Fresno Project Section, inclusive of the Ranch Road to Merced Project Extent, in May 2012, following certification of the *Final California High-Speed Train Project Environmental Impact Report/Environmental Impact Statement and Final Section 4(f) Statement and Draft General Conformity Determination—Merced to Fresno Section* (Merced to Fresno Section Final EIR/EIS) (Authority and FRA 2012). The Authority approved the Preferred Alternative for the Central Valley Wye, inclusive of the

Central Valley Wye Project Extent, in September 2020, following the certification of the *Merced to Fresno Section: Central Valley Wye Final Supplemental EIR/EIS* (Authority 2020a).

The Authority has therefore focused the San Jose to Merced Project Section EIR/EIS on the San Jose to Central Valley Wye Project Extent that connects to the already-approved extents at Carlucci Road in Merced County and ends at Scott Boulevard in Santa Clara (the Project). While the northern service limit of the Project will be the San Jose Diridon Station, the engineering design and evaluation includes infrastructure and train operations north to Scott Boulevard to serve the San Jose Diridon Station. The Project is an approximately 90-mile portion of the entire 145-mile-long San Jose to Merced Project Section.

This ROD approves Alternative 4 as described in the *San Jose to Merced Project Section Final Environmental Impact Report/Environmental Impact Statement* (Final EIR/EIS) dated February 25, 2022 (Authority 2022). As set forth in this ROD, the Selected Alternative is Alternative 4, which includes the San Jose Diridon Station as modified by the Diridon design variant (DDV), existing rail corridor upgrades between San Jose and Gilroy, a Downtown Gilroy Station, the South Gilroy maintenance of way facility (MOWF), dedicated HSR infrastructure through the Pacheco Pass as modified by the tunnel design variant (TDV), and dedicated HSR infrastructure continuing across the San Joaquin Valley to connect to the Central Valley Wye, and a maintenance of way siding (MOWS) west of Turner Island Road in the Central Valley, which best serves the purpose and need for this Project and minimizes economic, social, and environmental impacts.

The Authority proposes to construct and operate the Project after receiving the required approvals from the appropriate federal agencies. These agencies include the federal cooperating agencies—the U.S. Army Corps of Engineers (USACE), the U.S. Department of the Interior, Bureau of Reclamation (Reclamation), and the Surface Transportation Board (STB). Other federal agencies with specific review or permitting roles include the U.S. Environmental Protection Agency (USEPA), the U.S. Fish and Wildlife Service (USFWS), the National Marine Fisheries Service (NMFS), and the Advisory Council on Historic Preservation.

To comply with NEPA and CEQA, the Authority issued a joint Draft Environmental Impact Report/Environmental Impact Statement (Draft EIR/EIS) for the Project in April 2020 (Authority 2020b) and a Revised Draft EIR/Supplemental Draft EIS in April 2021 (Authority 2021a) generally limited to new information about certain federal and state candidate species under federal and state Endangered Species Acts. Following public review of the Draft EIR/EIS and the Revised Draft EIR/Supplemental Draft EIS, the Authority considered and responded to public comments, revised the EIR/EIS to address public comments, and published a Final EIR/EIS on February 25, 2022. Consistent with 40 Code of Federal Regulations (C.F.R.) Section 1506.2,<sup>1</sup> the Final EIR/EIS is one document that covers both state and federal environmental requirements. However, because this ROD contains the decision of the Authority under its assigned responsibilities for NEPA, the documents are referred to as the “Draft EIS,” “Supplemental Draft EIS,” and “Final EIS.” In making its decision, the Authority considered the information and analysis contained in the 2020 Draft EIS, the 2021 Supplemental Draft EIS, and the 2022 Final EIS (collectively, “EIS Documents”). The Authority also considered public and agency comments received on the EIS Documents.

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<sup>1</sup> The Council on Environmental Quality (CEQ) issued new regulations, effective September 14, 2020, updating the NEPA implementing procedures at 40 C.F.R. Parts 1500–1508. However, because this Project initiated the NEPA process before September 14, 2020, it is not subject to the new regulations. The Authority is relying on the regulations as they existed prior to September 14, 2020. Therefore, all citations to CEQ regulations in this document refer to the 1978 regulations, pursuant to 40 C.F.R. Section 1506.13 (2020) and the preamble at 85 *Federal Register* (Fed. Reg.) 43340.

Table 1 summarizes major NEPA milestones and completion dates for the EIS Documents.

**Table 1 Summary of Major NEPA Milestones**

Milestone	Date
Notice of Intent Published in <i>Federal Register</i>	March 2009
Public Scoping	March 2009
Public and Agency Meetings <sup>1</sup>	September 2009–September 2013
Public and Agency Meetings <sup>2</sup>	October 2013–February 2016
Letters of Concurrence on Preliminary LEDPA Determination	March 2020
Notice of Availability Published and Issuance of Draft EIS and Section 4(f) Evaluation	April 24, 2020
Public Hearing to Receive Public Comment	May 27, 2020
Public and Agency Meetings <sup>3</sup>	May 2016–September 2021
Issuance of Supplemental Draft EIS	April 23, 2021
National Marine Fisheries Service Biological Opinion issued	June 24, 2021
U.S. Fish and Wildlife Service Biological Opinion Issued	December 22, 2021
Publication of Draft General Conformity Determination	November 26, 2021
Draft Individual Section 4(f) Evaluation of Two Parks in Santa Clara County	January 7, 2022
Notice of Availability and Issuance of Final EIS and Section 4(f) Evaluation	February 25, 2022
Approval of Final General Conformity Determination	March 24, 2022
End of Waiting Period for Final EIS and Section 4(f) Evaluation	March 28, 2022

<sup>1</sup> See Chapter 9, Table 9-2, in the Final EIS for organizational/individual meetings and dates held.

<sup>2</sup> See Chapter 9, Table 9-3, in the Final EIS for organizational/individual meetings and dates held.

<sup>3</sup> See Chapter 9, Table 9-4, in the Final EIS for organizational/individual meetings and dates held.

EIS = environmental impact statement

LEDPA = least environmentally damaging practicable alternative

The San Jose to Merced Project Section will connect to the already-approved portions of the HSR system running the length of the Central Valley between Merced and Palmdale, extending the approved HSR from Santa Clara County to Los Angeles County. This decision document outlines all relevant information used by the Authority as the NEPA lead agency for approval of the Selected Alternative—Alternative 4, with the DDV and TDV, the San Jose Diridon and Downtown Gilroy Stations, the MOWF in the Gilroy area, and an MOWS west of Turner Island Road in the Central Valley. As described further in Section 4.2, Alternatives Carried Forward for Study in the EIS, the Authority considered the following project alternatives: Alternatives 1, 2, 3, and 4, which follow the same general corridor with a few exceptions. Alternatives 1, 2, and 3 are on viaduct through San Jose Diridon Station and cross over State Route (SR) 87 in the San Jose Diridon Station Approach Subsection. While Alternatives 2 and 4 follow the same general alignment in the Monterey Corridor Subsection, Alternative 2 is on embankment and in new, dedicated HSR right-of-way all the way to Gilroy. In the Morgan Hill and Gilroy Subsection, Alternatives 1 and 3 are on viaduct and venture farther east north of San Martin. South of San Martin, Alternative 3 traverses to a more eastern station and MOWF location. All of the project alternatives converge again near Casa de Fruta.

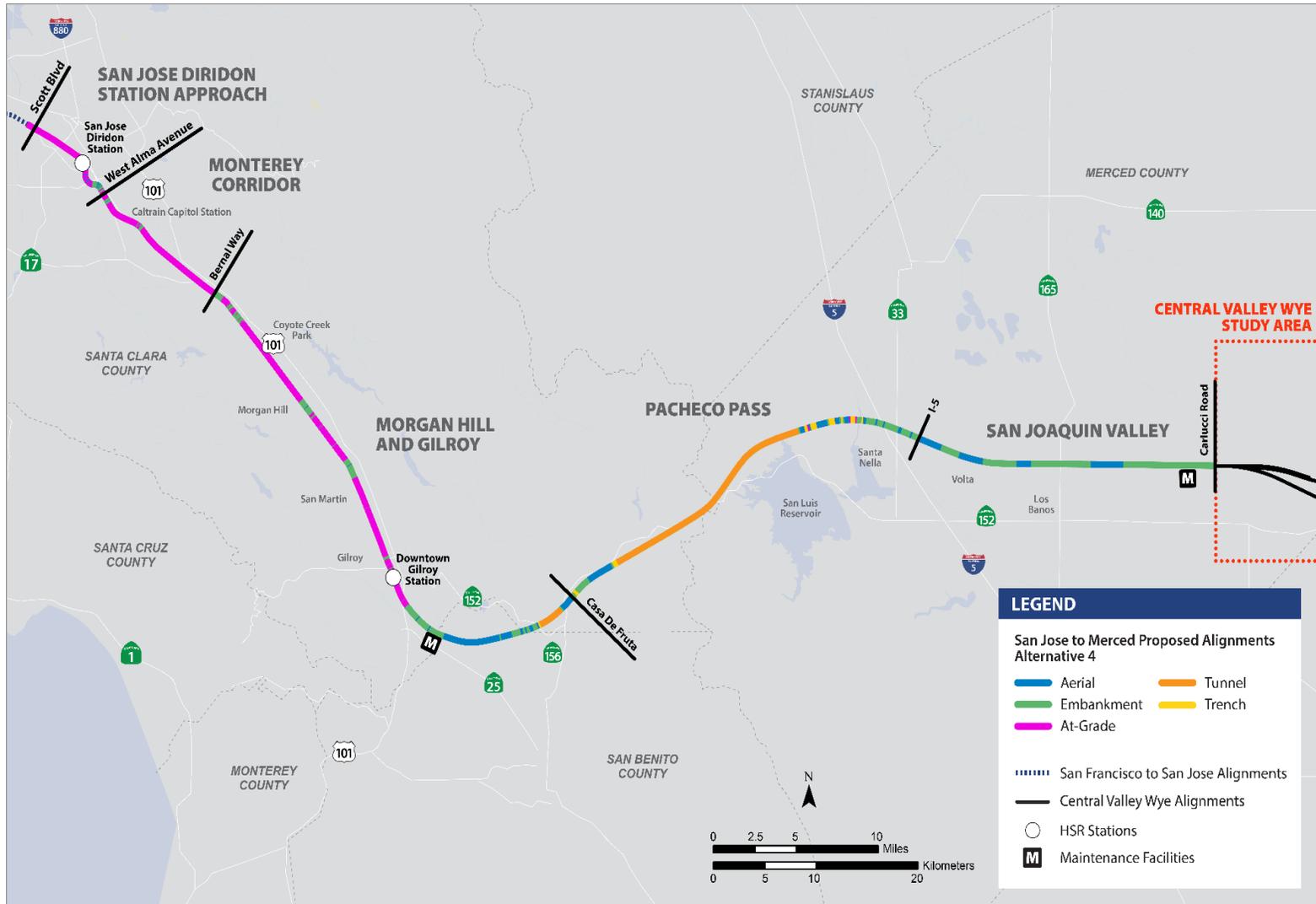
As depicted on Figure 2 and described in further detail in Chapter 2, Alternatives, of the Final EIS, the Selected Alternative spans approximately 90 miles between Santa Clara and Merced County. The alignment of the Selected Alternative begins at Scott Boulevard in Santa Clara and ends at Carlucci Road in Merced County. The Selected Alternative includes at-grade design options for the San Jose Diridon Station Approach Subsection, the Monterey Corridor Subsection, and the Morgan Hill and Gilroy Subsection and tunnel design options in the Pacheco Pass Subsection and the San Joaquin Valley Subsection. The Selected Alternative comprises 15.2 miles on viaduct, 30.3 miles at grade, 25.9 miles on embankment, 2.3 miles in trench, and two tunnels totaling 15.0 miles. The Selected Alternative extends blended electric-powered passenger railroad infrastructure from the southern limit of Caltrain's Peninsula Corridor Electrification Project through Gilroy. South and east of Gilroy, HSR will operate on a dedicated guideway.

In making its decision, the Authority considered the information and analysis contained in the EIS Documents and the associated administrative record and input received from the public, tribes, and other agencies.

The Authority has prepared this ROD in accordance with the NEPA Assignment MOU dated July 23, 2019; the CEQ regulations implementing NEPA (40 C.F.R. §§ 1505.2 and 1506.10), and FRA's Procedures for Considering Environmental Impacts (64 Fed. Reg. 28545, May 26, 1999), as modified by 78 Fed. Reg. 2713 (January 14, 2013).

Specifically, this ROD:

- Provides background on the NEPA process leading to the Final EIS, including a summary of public involvement and agency coordination.
- States and reaffirms the Project's Purpose and Need.
- Summarizes the process that led to the development of the alternatives for study in the Draft EIS, Supplemental Draft EIS, and Final EIS.
- Discusses agency roles and responsibilities.
- Identifies the project alternatives considered in the EIS Documents.
- Identifies Alternative 4, with the DDV and TDV, the San Jose Diridon and Downtown Gilroy Stations, the MOWF south of Gilroy, and an MOWS west of Turner Island Road in the Central Valley, as the Selected Alternative.
- Identifies the Environmentally Preferable Alternative.
- Summarizes environmental benefits and adverse effects.
- Discusses and makes determinations required under other relevant laws and guidance, including:
  - The National Historic Preservation Act of 1966, as amended (NHPA) (54 U.S.C. §§ 306101–307106 et seq.)
  - Section 4(f) of the Department of Transportation Act of 1966 (49 U.S.C. § 303)
  - Section 7 of the Endangered Species Act of 1973 (16 U.S.C. §§ 1531–1544)
  - Section 404 of the Clean Water Act (CWA) (33 U.S.C. §§ 1251–1387)
  - U.S. Presidential Executive Order 12898 (Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, February 11, 1994)
  - U.S. Presidential Executive Order 11988 (Floodplain Management)
  - FRA's General Conformity Determination pursuant to the Clean Air Act (42 U.S.C. §§ 7401–7671q)



HSR = high-speed rail; I- = Interstate.

JULY 2019

Note: The SR 152 (North) to Road 11 Wye Alternative is the Selected Alternative for the Merced to Fresno Section: Central Valley Wye. This figure shows the Wye alignments as they were analyzed in the Merced to Fresno Section: Central Valley Wye Supplemental EIR/EIS (Authority 2020a).

**Figure 2 Selected Alternative for the San Jose to Merced Project Section**

- Summarizes the comments received on the Final EIS and responds to substantive comments that have not been previously addressed.
- Imposes impact avoidance and minimization features (IAMF) and mitigation measures that will be implemented to avoid and minimize environmental harm and sets forth a binding monitoring and enforcement program for all such features and measures.
- Presents the Authority's decision, determinations, and findings on the proposed project and identifies and discusses the factors that were balanced by the Authority in making its decision.
- Summarizes the status of compliance with permitting and other environmental requirements.
- The ROD also includes the following:
  - Appendix A, Final Federal General Conformity Determination, March 24, 2022
  - Appendix B, USFWS Biological Opinion, December 22, 2021
  - Appendix C, Mitigation Monitoring and Enforcement Plan (MMEP)
  - Appendix D, State Historic Preservation Officer (SHPO) Section 106 Concurrence Letter and Memorandum of Agreement (MOA), March 11, 2022
  - Appendix E, NMFS Biological Opinion, June 24, 2021
  - Appendix F, USACE Preliminary LEDPA Concurrence Letter, March 20, 2020, and USEPA Preliminary LEDPA Concurrence Letter, March 18, 2020
  - Appendix G, Section 4(f) Concurrence Letters
  - Appendix H, Comments Received Between the Publication of the Final EIS and the April 28, 2022, Board Meeting
  - Appendix I, Errata for Final EIS
  - Appendix J, Final Individual Section 4(f) Evaluation of Two Parks in Santa Clara County

## 1.1 California HSR System

The Authority is responsible for planning, designing, constructing, and operating the California HSR System. Its state statutory 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.

The California HSR System will provide intercity, high-speed service on more than 800 miles of track throughout California, connecting the major population centers of Sacramento, the San Francisco Bay Area, the southern Central Valley, Los Angeles, the Inland Empire, Orange County, and San Diego, as shown on Figure 3. The Authority and FRA prepared three programmatic (Tier 1) EIR/EIS documents to select preferred alignments and station locations to advance for project-level analysis in Tier 2 EIR/EISs. See Chapter 1, Project Purpose, Need, and Objectives, of the Final EIS for a detailed description of the HSR system and the history of Tier 1 documents. The HSR system will use state-of-the-art, electrically powered, high-speed, steel-wheel-on-steel-rail technology, including contemporary safety, signaling, and automatic train-control systems that will incorporate positive train control infrastructure and be compliant with the requirements of 49 C.F.R. Part 236 Subpart I, with trains capable of operating up to 220 miles per hour (mph) over a fully grade-separated, dedicated guideway alignment.



ARTIC = Anaheim Regional Transportation Intermodal Center; HSR = high-speed rail; SFO = San Francisco.

**Figure 3 Statewide California High-Speed Rail System**

The Authority plans two phases of California HSR System development. The California HSR Program 2020 Business Plan describes in detail how the California HSR System will be implemented and recognizes current budgetary and funding realities. The California HSR System Phase 1, as approved through Tier 1 decisions, has been divided into eight individual project sections for site-specific, Tier 2 analysis. The Authority and the FRA defined HSR project sections such that they will have independent utility or independent significance (i.e., be usable even if later sections of the HSR system are not completed). As of February 2022, Tier 2 environmental reviews have been completed for the following project sections.

- Fresno to Bakersfield (completed April 2012)
- Merced to Fresno (completed May 2012)
- Merced to Fresno: Central Valley Wye (completed September 2020)
- Fresno to Bakersfield: Locally Generated Alternative (Bakersfield Station) (completed November 2019)
- Bakersfield to Palmdale (completed August 2021)
- Burbank to Los Angeles (completed January 2022)

## 1.2 San Jose to Merced Project Section

With the completion of a programmatic review of the California HSR System in 2005, the Authority and the FRA, as joint lead agencies for NEPA, commenced the Tier 2 environmental review process for the Project in late 2008. In 2008, the Authority and FRA selected a Pacheco Pass connection, with corridors and station locations for further examination in Tier 2 environmental reviews. Between San Jose and Merced, the corridor advanced for Tier 2 study was the Pacheco Pass via Henry Miller Road (Union Pacific Railroad [UPRR] Connection) from San Jose to the Central Valley. The station locations advanced for Tier 2 study were a downtown San Jose Diridon Station and a Downtown Gilroy/Caltrain station, with no station between Gilroy and Merced. The Authority and FRA held scoping meetings for the Project in March 2009. Public and agency involvement for the Draft EIS started in 2009 and continued through publication of the Draft EIS, Supplemental Draft EIS, and Final EIS. From 2010 through 2013, the Authority conducted an alternatives analysis for the Project. As a result of litigation, the Authority prepared additional programmatic environmental review for the Bay Area and the Central Valley project sections and again selected the Pacheco Pass connection (Authority 2012a). During the development of the Draft EIS, between 2016 and 2019, input was solicited from the public, stakeholders, and agencies about project alternatives and to consider refinements of the prior alternatives or the addition of new alternatives responsive to their concerns.

As detailed in Chapter 9, Public and Agency Involvement, of the Final EIS, the Authority has held more than 500 meetings, briefings, and conversations to date with community stakeholders, businesses, local agencies, and elected officials to gather, confirm, and understand key community concerns so that these concerns are incorporated both into the development of alternatives and during the environmental process. As detailed in Chapter 5 of the Final EIS and related appendices, the Authority conducted general and specific outreach efforts to potentially affected minority populations and low-income populations and representative public entities between August 2016 and September 2021 throughout the San Jose to Merced Project Section with the objectives of raising awareness about the Project and gathering input regarding project impacts and benefits to inform the identification of the Preferred Alternative and assessment of impacts and mitigation measures in the Draft EIS and Final EIS. The Authority advertised and conducted select meetings in English, Spanish, and Vietnamese, based on request from and needs of the participants and provided the same language accommodation for materials distributed.

At its September 17, 2019, meeting, the Authority Board concurred with Authority staff that Alternative 4 is the Authority's Preferred Alternative for the San Jose to Merced Project Section (Authority 2019a). The Draft EIS identified Alternative 4 as the Preferred Alternative, which the Authority confirmed in the Final EIS. This identification was based on balancing the impacts of the project alternatives on the natural environment and community resources presented in the Draft EIS and Final EIS in the context of CEQA, NEPA, CWA, stakeholder preferences, and capital construction costs. The Authority worked closely with federal, state, and regional agencies to meet regulatory requirements by refining the Selected Alternative to avoid and minimize impacts and, where necessary, to reach agreement on mitigation measures for impacts that cannot be avoided.

The Draft EIS was released on April 24, 2020, for an initial 45-day public comment period that closed on June 8, 2020. On May 15, 2020, the Authority notified USEPA that the review and comment period was being extended to end on June 23, 2020, due to the uncertainty surrounding the COVID-19 pandemic. The USEPA published the revised notice in the *Federal Register* on May 22, 2020. The Authority held a virtual public hearing on May 27, 2020, to receive oral testimony on the Project and the Draft EIS. The traditional in-person format of the public hearing was changed to a virtual public hearing held online and via telephone to comply with the Governor of California's directives and to protect public health during the COVID-19 pandemic. The Draft EIS presented the purpose and need for the Project; a reasonable range of alternatives for rail alignment, station site, and maintenance facilities; the existing setting; alternative effects (both beneficial and adverse) from construction and operation; and project design features and mitigation measures to avoid, reduce, or eliminate adverse environmental effects.

Following public review of the Draft EIS, a Supplemental Draft EIS was circulated in April 2021. The Supplemental Draft EIS was generally limited to new information about certain federal and state candidate species under the federal Endangered Species Act (FESA) and the California Endangered Species Act.

In February 2022, the Authority published the Final EIS.

The Authority received 747 comment submissions on the Draft EIS, 16 comment submissions on the Supplemental Draft EIS, and comment submissions on the Final EIS and Draft ROD. The Authority considered the information presented in the comments received. The Final EIS includes responses to all substantive comments on the EIS Documents. This ROD includes responses to all substantive comments received during the Final EIS waiting period.

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## 2 AGENCY ROLES AND RESPONSIBILITIES

The Authority is the NEPA lead agency, pursuant to the NEPA Assignment MOU. The STB, Reclamation, and the USACE are NEPA cooperating agencies.

Multiple other federal agencies have been involved with and contributed to the environmental review, including the USEPA, USFWS, NMFS, National Park Service, Federal Emergency Management Agency, U.S. Department of Veterans Affairs, and the Advisory Council on Historic Preservation. Additionally, consultation with the Natural Resources Conservation Service was conducted to evaluate conversion of farmland to other uses.

### 2.1 Federal Railroad Administration

The FRA's responsibilities for environmental review, consultation, and other actions required by applicable federal environmental laws, including NEPA, for the proposed Project are being carried out by the Authority, acting on behalf of the State of California pursuant to 23 U.S.C. Section 327 and the NEPA Assignment MOU. Under the MOU, FRA assigned federal environmental review responsibilities for the Project to the State of California. Since July 23, 2019, the Authority has performed as the lead NEPA agency in this program, known as NEPA Assignment.

As required by law and the NEPA Assignment MOU, the FRA has retained responsibility for making air quality conformity determinations under the Clean Air Act (42 U.S.C. § 7506) and government-to-government consultation with Indian tribes (23 C.F.R. § 773.105(b)(4)). FRA issued the final air quality General Conformity Determination on March 24, 2022 (see Appendix A). FRA has carried out its government-to-government responsibilities, as described in the attached Section 106 MOA (see Appendix D).

The NEPA Assignment MOU also requires the Authority to consult with FRA prior to making any proposed constructive use determinations under Section 4(f) of the Department of Transportation Act of 1966 (49 U.S.C. § 303); however, there are no such determinations associated with the Selected Alternative.

Additionally, FRA maintains authority over railroad safety under 49 U.S.C. Section 20103. As such, FRA may exercise certain regulatory authority over the Project. FRA also administers certain grant funds provided to the Authority under the American Recovery and Reinvestment Act of 2009 (Public Law 111-5) and oversees the Authority's compliance with a grant agreement for the HSR system.

### 2.2 Surface Transportation Board

The STB has authority over construction and operation of new rail lines (49 U.S.C. § 10901). As the STB explained in its June 13, 2013, decision authorizing construction of the 65-mile section of the California HSR System between Merced and Fresno (Docket No. FD\_35724\_0), 49 U.S.C. Section 10501(a)(2)(A) gives the STB jurisdiction over transportation by rail carrier in one state, as long as that intrastate transportation is carried out, "as part of the interstate rail network." The STB determined that the California HSR System will be constructed as part of the interstate rail network and therefore concluded that it has jurisdiction over the California HSR System.

The STB has participated as a cooperating agency in the environmental review process for the San Jose to Merced Project Section. Following completion of this process, the STB may adopt the Authority's EIS (or conduct additional review, as appropriate) and issue a separate ROD authorizing the Project.

### 2.3 U.S. Department of the Interior, Bureau of Reclamation

The HSR alignment crosses Reclamation lands and facilities. Reclamation may issue rights of entry permits for pedestrian surveys and ground-disturbing investigations, such as geotechnical investigations, or other information-gathering activities. It may grant temporary construction permits for the relocation of facilities and equipment such as pipes, canals, and pumps. If the facilities are relocated outside of Reclamation's ownership, the Authority will acquire any needed land rights necessary for future operations and maintenance needs and/or relocated Reclamation

features. After construction, the Authority will transfer to Reclamation necessary land rights. Reclamation will grant or transfer land rights as appropriate to the Authority. The Final EIS Appendix 3.6-A, Public Utilities and Energy Facilities, depicts all existing major utilities and energy facilities, including those on Reclamation-managed lands, within the footprint of the San Jose to Merced Project Section project alternatives. Reclamation has participated as a cooperating agency in the environmental review process for the San Jose to Merced Project Section.

## 2.4 U.S. Army Corps of Engineers

USACE is responsible for issuing permits under the CWA Section 404 (33 U.S.C. § 1344) (Section 404) and authorizations under the Rivers and Harbors Act of 1899, Section 14 (33 U.S.C. § 408) (Section 408).

The Authority, FRA, USACE, and USEPA executed an MOU (NEPA/404/408 MOU) in November 2010 (FRA et al. 2010) to ensure coordination between NEPA environmental review and regulatory processes under Section 404 and Section 408. Through the NEPA/404/408 MOU process, the “preliminary least environmentally damaging practicable alternative” is identified pursuant to the Section 404(b)(1) Guidelines.

Under Section 404, the USACE and USEPA regulate the discharge of dredged and fill materials into the waters of the U.S. Project sponsors must obtain a permit from the USACE for discharges of dredged or fill materials into waters of the U.S. Aquatic resources in the vicinity include several types of wetlands as well as other waters (i.e., streams, lakes, and other open water features) as verified by the USACE under a preliminary jurisdictional determination issued on December 5, 2019. Based on the Authority’s analysis of permanent impacts on waters of the U.S. and coordination with the USACE, the Authority expects that an individual Clean Water Act Section 404 permit will be required for the San Jose to Merced Project Section.

The project alternatives that were considered in the EIS Documents incorporated various combinations of a range of design options for each of the five subsections of the Project. In September 2017, the USEPA and the USACE concurred with the decision to carry forward the three project alternatives presented in Checkpoint B Addendum 3 (Authority and FRA 2017). In January 2019, the USACE concurred with and, in February 2019, the USEPA agreed with the decision to carry forward a fourth project alternative presented in Checkpoint B Addendum 4 (Authority 2019c). All four of these project alternatives are evaluated in the Final EIS.

The San Jose to Merced Project Section will require review from the USACE under Section 408 where the subsection will include modifications or alterations of federal flood control facilities to ensure that its usefulness is not impaired. The Selected Alternative will pass through federal flood control projects along Guadalupe River and Llagas Creek near San Martin and east Gilroy and will thus require permission from USACE under Section 14 of the Rivers and Harbors Act (33 U.S.C. § 408) for work proposed at Guadalupe River as well as Llagas Creek near San Martin. Therefore, during the design phase, the Authority will be required to coordinate with the SCVWD, now known as Valley Water, to obtain Section 408 review for the Guadalupe River crossing in San Jose and the Llagas Creek crossing near San Martin. As noted above, USACE has concurred that the overall project purpose is acceptable as the basis for the USACE 404(b)(1) alternatives analysis. Pursuant to Section 404, USACE and USEPA concurred in March 2020 that the Authority’s Selected Alternative is the preliminary LEDPA. USACE also provided a preliminary recommendation that the Authority is advancing appropriate design for the future application for authorization to modify USACE flood control facilities under Section 408.

USACE is required to comply with NEPA and issue its own NEPA decision before it can issue a permit under Section 404 or permission under Section 408. The information contained in the Final EIS will provide information that will facilitate USACE’s consideration and issuance of any necessary permits and approvals. Further, any USACE documents produced using information from the Final EIS can be used to assess proposed alterations/modifications of federal flood risk management facilities and any associated operation and maintenance activities.

## 2.5 U.S. Fish and Wildlife Service and National Marine Fisheries Service

Concurrently with the NEPA process, the Authority initiated consultations under FESA Section 7 (16 U.S.C. § 1536), pursuant to 50 C.F.R. Part 402, and regarding Essential Fish Habitat (EFH) pursuant to 50 C.F.R. Part 600. Section 7 of FESA requires federal agencies to consult with USFWS and/or NMFS, depending on the type of species or habitat affected, to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of threatened or endangered fish, wildlife, or plant species or result in the destruction or adverse modification of designated critical habitat for any such species. Impacts associated with threatened and endangered species and habitat are addressed through a consultation process with USFWS and/or NMFS that is outlined under Section 7 of FESA and the implementing regulations. The Magnuson-Stevens Fisheries and Conservation Management Act (16 U.S.C. § 1801 et seq.) requires federal agencies to consult with NMFS on activities that may adversely affect EFH for species that are managed under federal fishery management plans in U.S. waters. Impacts associated with EFH are addressed through a coordination process with NMFS that may be combined with FESA Section 7 consultation.

If an action may affect a threatened or endangered species, under Section 7 a study that describes the effects, known as a biological assessment (BA), is generally required to be submitted to the appropriate agency with jurisdiction over the resource (USFWS and/or NMFS). After the appropriate agency has accepted the BA, the agency will render a biological opinion (BO). A BO is the agency's opinion as to whether a project is likely to jeopardize the continued existence of a FESA-listed species or result in the destruction or adverse modification of a species' critical habitat.

Because the Project may affect threatened or endangered species, the Authority prepared a BA for the Project and consulted with the USFWS and NMFS, as required. The Authority submitted the BA with a request to initiate Section 7 consultation to USFWS and NMFS in June 2020. The BA evaluates the potential adverse effects of the Project on species listed as endangered or threatened, as well as effects on designated critical habitat. NMFS issued its BO on the Project on June 24, 2021, concluding that the Project is not likely to jeopardize the continued existence of the federally listed threatened Central California Coast steelhead (*Oncorhynchus mykiss*) distinct population segment (DPS) or South Central California Coast steelhead (*O. mykiss*) DPS or destroy or adversely modify their critical habitat. NMFS also reviewed the proposed action for its effects on the federally listed threatened California Central Valley steelhead (*O. mykiss*) DPS and concurred with the Authority's conclusion that the Project is not likely to adversely affect the California Central Valley steelhead DPS. The Section 7 consultation with NMFS also included consultation on adverse effects to Essential Fish Habitat pursuant to the amended Magnuson-Stevens Act. USFWS issued a BO on December 22, 2021. Appendix B of this ROD contains the USFWS BO, and Appendix E contains the NFMS BO.

## 2.6 Advisory Council on Historic Preservation

The Advisory Council on Historic Preservation is an independent federal agency that promotes the preservation, enhancement, and productive use of our nation's historic resources and advises the President and Congress on national historic preservation policy. Established by the National Historic Preservation Act in 1966, the Advisory Council on Historic Preservation (ACHP) has the legal responsibility to encourage federal agencies to factor historic preservation into federal project requirements (50 C.F.R. § 1502.25). The ACHP is a signatory to the Authority's Section 106 Programmatic Agreement.

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### 3 PURPOSE AND NEED

#### 3.1 Purpose of the High-Speed Rail System

As established in the 2005 Statewide Program EIR/EIS for HSR (Authority and FRA 2005), the purpose of the California HSR System is to provide a reliable high-speed electric-powered train system that links the major metropolitan areas of California, delivering predictable and consistent travel times. A further objective is to provide an interface with commercial airports, mass transit, and the highway network and to 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.

#### 3.2 Purpose of the San Jose to Merced Project Section

The purpose of this Project is to implement the San Jose to Merced Project Section of the California HSR System: to provide the public with electric-powered HSR service that provides predictable and consistent travel times between major urban centers and connectivity to airports, mass transit systems, and the highway network in the south San Francisco Bay Area and Central Valley and to connect the northern and southern portions of the statewide HSR system.

The purpose and need for the San Jose to Merced Project Section was developed through a process established by the Authority, FRA, USACE, and USEPA pursuant to a November 2010 MOU that was intended to facilitate the integration of NEPA, Section 404 of the CWA, and Section 14 of the Rivers and Harbor Act (NEPA/404/408 MOU). The parties reached agreement on the purpose and need in August 2011.

#### 3.3 Statewide and Regional Need for the High-Speed Rail System in the San Jose to Merced Project Section

The approximately 145-mile-long San Jose to Merced Project Section is an essential component of the statewide HSR system. The San Jose to Merced Project Section will provide access to a new transportation mode, contribute to increased mobility throughout California, and connect the Bay Area to the rest of the statewide HSR system via four counties: Santa Clara, San Benito, Merced, and Madera, as illustrated on Figure 1-3 of the Final EIS. As major population and economic centers for California, the South Bay and Central Valley regions contribute significantly to the statewide need for a new intercity transportation service that will connect San Francisco with the Central Valley and Los Angeles.

The capacity of California's intercity transportation system, including the southern Bay Area and Central Valley systems, is insufficient to meet existing and future travel demand. The current and projected future system congestion will continue to result in deteriorating air quality, reduced reliability, increased travel times, more highway accidents, and increasing greenhouse gas emissions. The system has not kept pace with the tremendous increase in population, economic activity, and tourism in the state, including in the Bay Area and Central Valley.

The interstate highway system, commercial airports, and the conventional passenger rail system serving the intercity travel market are operating at or near capacity and will require large public investments in 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 may be impractical or may be constrained by physical, regulatory, environmental, political, and other factors.

The need for improvements to intercity travel in California, including intercity travel between the Bay Area and the Central Valley, relates to the following issues:

- Future growth in demand for intercity travel, including the growth in demand in the Bay Area and Central Valley regions
- Capacity constraints that will result in increasing congestion and travel delays, including those in the South Bay and Central Valley regions

- Unreliability of travel stemming from congestion and delays, weather conditions, accidents, and other factors that affect the quality of life and economic well-being of residents, businesses, and tourists in California, including in the South Bay and Central Valley regions
- Reduced mobility as a result of increasing demand on limited modal connections among major airports, transit systems, and passenger rail in the state, including in the South Bay and Central Valley regions
- Poor and deteriorating air quality and pressure on natural resources and agricultural lands due to expansion of highways and airports, as well as continued urban development, including in the Bay Area and Central Valley
- Legislative mandates to moderate the effects of transportation on climate change, including required reductions in greenhouse gas emissions caused by vehicles powered by the combustion of carbon-based fuels

As major population and economic centers, the southern San Francisco Bay Area and Central Valley regions contribute significantly to the statewide need for a new intercity transportation service that will connect these regions to each other and to other major population and economic centers of the state. The following sections provide additional information about the factors contributing to the need for the San Jose to Merced Project Section.

## 4 ALTERNATIVES CONSIDERED

This section summarizes the alternatives analysis process and the project alternatives evaluated in the EIS Documents and describes the Selected and Environmentally Preferable Alternatives.

### 4.1 Alternatives Analysis Process and Alternatives Considered but Eliminated from Detailed Study

At the conclusion of the 2005 Statewide Program EIR/EIS (Authority and FRA 2005), the Authority and FRA identified selected preferred corridors for most of the statewide system to be studied in more detail in Tier 2 EIR/EISs. At the time, the Authority deferred selection of preferred corridors for Bay Area to Central Valley to a second Tier 1 EIR/EIS process.

The Authority and FRA undertook an extensive, public screening process to identify and refine alternatives for study in the EIS. The initial project-level alternatives were presented in the *San Jose to Merced Preliminary Alternatives Analysis (PAA) Report* (Authority and FRA 2010). After the 2010 PAA report, the Authority prepared two Supplemental Alternatives Analysis (SAA) reports in May and July 2011 (Authority and FRA 2011a, 2011b), which presented a refined range of alternatives addressing multiple criteria and emphasizing the project objective of maximizing the use of existing transportation corridors and available right-of-way. Following the 2011 SAA reports, the Authority continued to refine the alternatives by responding to stakeholder, agency, and public comments; performing additional engineering and environmental review; and maintaining consistency with the Authority's design objectives. In 2013, the Authority and FRA developed a Checkpoint B Summary Report (Authority and FRA 2013), largely drawn from the work completed for the PAA and SAA reports between June 2010 and July 2011, for review by the USACE and USEPA. The USACE and USEPA concurred in August and September 2014, respectively, with the alternatives recommended for inclusion in the Draft EIS. Following the completion of the Checkpoint B analysis in 2013, work on the San Jose to Merced Project Section was suspended.

In late 2015, the Authority reinitiated work on the Project. The additional analysis began with, and built upon, the range of alternatives that had been documented in the *Checkpoint B Summary Report* (Authority and FRA 2013) for the San Jose to Merced Project Section. The 2016 Business Plan (Authority 2016) included updated ridership forecasts and operational planning undertaken since the 2012 Business Plan (Authority 2012b). As such, the Authority identified certain new alternatives (such as a viaduct alternative between San Jose and Gilroy and blended operation north of San Jose Diridon Station) and also reconsidered the formerly dismissed at-grade alignment for the San Jose Diridon Station Approach Subsection. With Project reinitiation, the Authority and FRA reached out to the public, stakeholders, and agencies to solicit their input and concerns about project alternatives and to consider refinements of the prior alternatives or the addition of new alternatives responsive to those concerns. The reconsideration of alternatives in 2016 and 2017 used a two-phase screening process to evaluate the direct and relative performance of conceptual alternatives. The Authority and FRA (2017) developed a *Checkpoint B Summary Report Addendum 3* to narrow the range of alternatives to three of the end-to-end project alternatives evaluated in the Draft EIS.

In light of operational planning undertaken since the 2016 Business Plan, the Authority reconsidered the formerly dismissed at-grade alignment for the San Jose Diridon Station Approach Subsection and extending blended service proposed for the San Francisco to San Jose Project Section from San Jose to Gilroy as part of the 2018 Business Plan (Authority 2018). The Authority and FRA developed a *Checkpoint B Summary Report Addendum 4* (Authority 2019c) to review the preliminary effects of this alternative and assess whether to evaluate a new alternative in the Draft EIS. The alternatives analysis process is further summarized in Chapter 2 and Appendix 2-I of the Final EIS.

Potential alternatives considered over the course of project development either failed to adequately meet the project purpose and need/project objectives, failed to offer a substantial environmental advantage over other alternatives studied, and/or were deemed not to be feasible

from a cost, technical, or engineering perspective. These potential alternatives were eliminated from analysis in the EIS Documents.

## 4.2 Alternatives Carried Forward for Study in the EIS

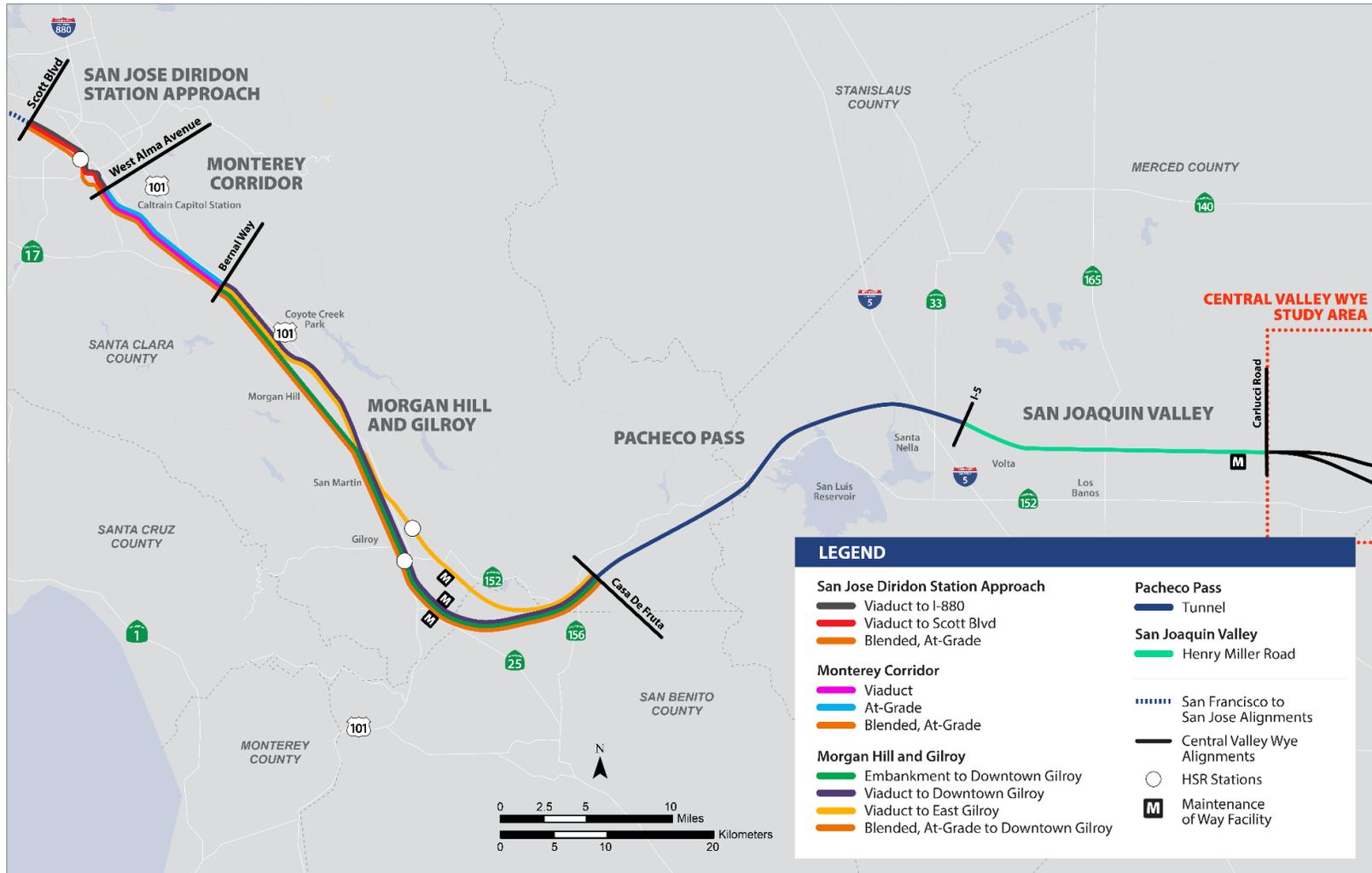
As a result of a comprehensive alternative analysis process, the EIS evaluated four alignment alternatives and two design options that could be used with any alternative: Alternatives 1, 2, 3, and 4; the DDV design option; and the TDV design option. To more clearly describe the location of environmental resources and project impacts, all four project alternatives are divided into five geographic subsections. Figure 4 and Table 2 show the design options of each project alternative by subsection. The DDV is illustrated on Figure 5.

**Table 2 Design Options by Subsection**

Subsection/Design Options	Alternative 1	Alternative 2	Alternative 3	Alternative 4
<b>San Jose Diridon Station Approach</b>				
Viaduct to Scott Blvd	–	X	X	–
Viaduct to I-880	X	–	–	–
Blended, At-Grade	–	–	–	X
<b>Monterey Corridor</b>				
Viaduct	X	–	X	–
At-Grade	–	X	–	–
Blended, At-Grade	–	–	–	X
<b>Morgan Hill and Gilroy</b>				
Embankment to downtown Gilroy	–	X	–	–
Viaduct to downtown Gilroy	X	–	–	–
Viaduct to east Gilroy	–	–	X	–
Blended, At-Grade to downtown Gilroy	–	–	–	X
<b>Pacheco Pass</b>				
Tunnel	X	X	X	X
<b>San Joaquin Valley</b>				
Henry Miller Rd	X	X	X	X

Source: Authority 2019d

I = Interstate; X = present; – = absent



Source: Authority 2019d

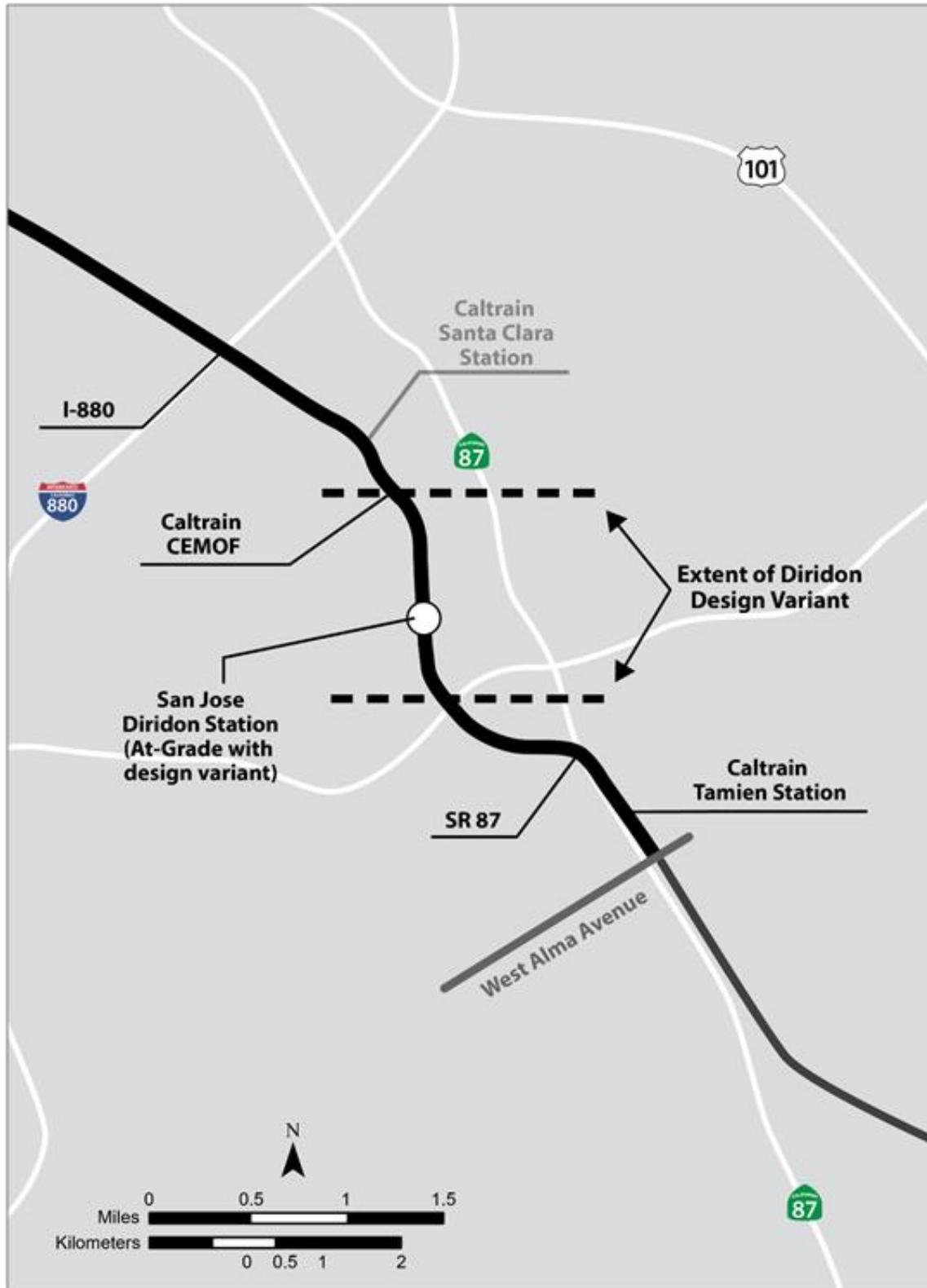
HSR = high-speed rail; I- = Interstate

Note: The design options for each subsection are described in Chapter 2 of the Final EIS.

Note: The SR 152 (North) to Road 11 Wye Alternative is the Selected Alternative for the Merced to Fresno Section: Central Valley Wye. This figure shows the Wye alignments as they were analyzed in the Merced to Fresno Section: Central Valley Wye Supplemental EIR/EIS (Authority 2020a).

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Figure 4 San Jose to Merced Project Section Alternatives Considered in the EIS



CEMOF = Centralized Equipment Maintenance and Operation Facility; I- = Interstate; SR = State Route

**Figure 5 Extent of Diridon Design Variant**

The Project is an approximately 90-mile portion of the 145-mile-long San Jose to Merced Project Section. It comprises mostly dedicated HSR system infrastructure, HSR station locations at San Jose Diridon and Gilroy, an MOWF in the Gilroy area, and an MOWS west of Turner Island Road in the Central Valley. HSR stations at San Jose Diridon and Gilroy will support transit-oriented development, provide an interface with regional and local mass transit services, and provide connectivity to the South Bay and Central Valley highway network.<sup>2</sup> The Project begins at Scott Boulevard in Santa Clara. The HSR infrastructure and operations transition from the blended system between San Francisco and Santa Clara to a fully dedicated system north of the San Jose Diridon Station, either at Scott Boulevard in Santa Clara (Alternatives 2 and 3) or near Interstate (I-) 880 (Alternative 1); or, in the case of Alternative 4, the blended system extends to downtown Gilroy. The Project continues south and east from Gilroy, continuing east through the Pacheco Pass to the Central Valley, to end at Carlucci Road, the western limit of the Central Valley Wye. As shown in Figure 4, the Project comprises the following five subsections:

- San Jose Diridon Station Approach—Extends approximately 6 miles from north of San Jose Diridon Station at Scott Boulevard in Santa Clara to West Alma Avenue in San Jose. This subsection includes San Jose Diridon Station.
- Monterey Corridor—Extends approximately 9 miles from West Alma Avenue to Bernal Way in the community of South San Jose. This subsection is entirely within the city of San Jose.
- Morgan Hill and Gilroy—Extends approximately 30 miles from Bernal Way in the community of South San Jose to Casa de Fruta Parkway/SR 152 in the community of Casa de Fruta in Santa Clara County.
- Pacheco Pass—Extends approximately 25 miles from Casa de Fruta Parkway/SR 152 to east of I-5 in unincorporated Merced County.
- San Joaquin Valley—Extends approximately 20 miles from I-5 to Carlucci Road in unincorporated Merced County.

The four end-to-end project alternatives illustrated in Figure 4 share many common elements. Because all four project alternatives follow the same general corridor, they address many of the same concerns regarding local infrastructure. All four project alternatives are identical in the Pacheco Pass and San Joaquin Valley Subsections; Alternatives 2 and 3 use the same design options in the San Jose Diridon Station Approach Subsection; Alternatives 1 and 3 use the same design options in the Monterey Corridor Subsection; and all four project alternatives use different design options in the Morgan Hill and Gilroy Subsection. The No Project Alternative (synonymous with the No Action Alternative) was also analyzed in the EIS Documents. The project alternatives analyzed in the EIS are the alternatives that the Authority identified as reasonable and feasible and capable of meeting the Project's purpose and need. All project alternatives include a station in San Jose. A second station will be constructed in either downtown Gilroy or east Gilroy, depending upon the project alternative selected.

The following sections describe the four project alternatives, two design options, two design variants, stations, and the maintenance facilities evaluated in the EIS Documents. All of these project alternatives and options are described in detail in Chapter 2 of the Final EIS.

#### 4.2.1 Alternative 1

As discussed in Chapter 2, Alternatives, of the Final EIS, Alternative 1 would begin at Scott Boulevard in blended service with Caltrain at grade. Beginning at I-880 on the southbound approach to West Hedding Street, Caltrain tracks would be realigned to accommodate the HSR tracks. Dedicated HSR tracks would diverge from the Caltrain Mainline Track (MT) 2 and MT3 and continue south along the north side of the existing Caltrain corridor, crossing under West Hedding Street. Southeast of West Hedding Street, the dedicated HSR tracks would transition from a two-track at-grade configuration to retained fill and finally to a two-track aerial profile. The

<sup>2</sup> *South Bay* refers to Santa Clara County.

HSR alignment would rise on embankment to an approximately 70-foot-high aerial structure. Continuing on an aerial structure, the alignment would diverge from the Caltrain right-of-way south of the San Jose Diridon Station HSR platforms by turning sharply east at the Park Avenue overcrossing. The HSR aerial structure would cross over Los Gatos Creek and San Carlos Street, then over Royal Avenue and the intersection of Bird Avenue and Auzerais Avenue, then over the I-280/SR 87 interchange. Continuing south along the east side of SR 87, the HSR aerial structure would cross over West Virginia Street and the Guadalupe River Trail, then over the Caltrain rail bridge, the Guadalupe River, and Willow Street. The HSR aerial structure would continue south over the Caltrain Tamien Station on an alignment between Tamien Station and the SR 87 freeway, transitioning to the Monterey Corridor Subsection at West Alma Avenue.

Alternative 1 would continue predominantly on viaduct in the median of Monterey Road for 9 miles within San Jose city limits and remain on viaduct via the Morgan Hill Bypass to downtown Gilroy approximately 30 miles, from Bernal Way in South San Jose to Casa de Fruta. This alternative is distinguished by an alignment around downtown Morgan Hill and a low viaduct approach to an aerial Downtown Gilroy Station. Alternative 1 would include an MOWF south of Gilroy on the east side of the alignment. The alignment would continue predominantly on viaduct and embankment across the Soap Lake floodplain before entering a 1-mile tunnel (Tunnel 1) west of Casa de Fruta.

From Casa de Fruta, the alignment would generally follow the existing SR 152 corridor east for approximately 17 miles, then diverge north around the Cottonwood Creek ravine of the San Luis Reservoir for approximately 8 miles before transitioning to the San Joaquin Valley Subsection near I-5 in Merced County.

The alignment and guideway in the Pacheco Pass Subsection would be the same for all four project alternatives, entailing a 13.5-mile tunnel through Pacheco Pass to avoid any encroachment into the San Luis Reservoir or surficial encroachment into the Cottonwood Creek Wildlife Area.

The alignment would continue around the northern arm of the San Luis Reservoir and viaducts over the California Aqueduct, Delta-Mendota Canal, and I-5. East of the I-5 overcrossing, the guideway would be predominantly on embankment along the south side of Henry Miller Road to Carlucci Road, traveling on several mile-plus-long sections of viaduct over major watercourses, the UPRR alignment, and Ingomar Grade Road. The guideway would also be on viaduct through several sections of the Grasslands Ecological Area (GEA) to allow for wildlife movement. Wildlife crossings are also provided via culverts where the guideway is on embankment in this subsection. Several local roadways—Delta Road, Turner Island Road, and Carlucci Road—would be relocated on bridges over the HSR embankment. An MOWS would be located near Turner Island Road.

Overall, the HSR guideway under this alternative would comprise two tunnels totaling 15.0 miles, 45.4 miles of viaduct, 21.9 miles of embankment, 2.3 miles in trench, and 4.3 miles at grade in an excavated hillside cut. Figure 2-53 of the Final EIS illustrates the primary design features of Alternative 1.

#### **4.2.2 Alternative 2**

As discussed in Chapter 2, Alternatives, of the Final EIS, Alternative 2 would begin at Scott Boulevard at grade in blended service with Caltrain. Approximately 300 feet south of Scott Boulevard, the HSR tracks would separate from the Caltrain tracks and begin ascending to embankment and then to the 50-foot-tall, dedicated viaduct at Main Street. Alternative 2 would use a longer viaduct than Alternative 1, ascending to aerial structure near Scott Boulevard rather than ascending to aerial structure south of I-880. A result of the longer viaduct is that blended service with Caltrain would occur north of Scott Boulevard. The long viaduct under Alternative 2 would have a wider footprint than the short viaduct to I-880 under Alternative 1, requiring more curve straightening of the Caltrain tracks north of I-880. South of Santa Clara Station, the three relocated UPRR tracks would cross under the HSR viaduct so that all Caltrain and UPRR tracks

would be west of the HSR viaduct. The viaduct would then ascend to approximately 68 feet to cross over I-880.

Between West Alma Avenue and the northern base of Communications Hill, Alternative 2 would be the same as Alternative 1, but it would begin the viaduct transition to the Monterey Road/UPRR corridor approximately 400 feet north of the transition under Alternative 1. The alignment would be generally at grade through the Monterey Corridor Subsection. On the approach to Monterey Road, the aerial structure would cross over the UPRR tracks and the Caltrain Capitol Station. Continuing south, the alignment would descend into a trench beneath a widened Capitol Expressway bridge before ascending to grade at Skyway Drive. Branham Lane and Roeder Road/Chynoweth Avenue would be lowered to be separated from the HSR and existing railroad crossings. The alignment would continue south at grade under SR 85/West Valley Freeway, with modifications to the existing highway bridge to allow HSR to pass underneath. Under Alternative 2, one left turn lane would be removed south of Senter Street and one left turn lane would be removed south of Roeder Road where Monterey Road would be depressed and grade-separated from adjacent properties. Alternative 2 differs from Alternative 1 by shifting all Monterey Road travel lanes and median east of their current locations.

From the southern limit of the Monterey Corridor Subsection, Alternative 2 would be at grade on retained fill between the UPRR right-of-way and Monterey Road in South San Jose. Alternative 2 would require construction of new roadway grade separations to maintain east-west connectivity across Monterey Road. South along the UPRR alignment through Morgan Hill, the alignment would cross over Monterey Road on a clear-span bridge and then on embankment along the east side of the UPRR alignment, crossing over Main, East/West Dunne, San Pedro, and Tennant Avenues on short bridges over the roadways, which would be depressed to maintain east-west connections. The existing bridge at Butterfield Boulevard would be extended to cross over the realigned Railroad Avenue and at-grade HSR alignment, and the Butterfield canal would be relocated to the east to accommodate the HSR alignment adjacent to the UPRR alignment.

Continuing south, the HSR alignment would ascend onto embankment, and West Little Llagas Creek would flow through a new culvert. Monterey Road and the UPRR alignment would be realigned westward between East Middle Avenue and Roosevelt Avenue. HSR would cross over San Martin Avenue and Oak Street, which would be below grade. HSR would continue south at grade adjacent to the east side of the UPRR alignment, while numerous roads would be raised onto bridges, realigned, or depressed to accommodate HSR and the UPRR alignment.

Continuing south into Gilroy, the alignment would shift east for the approach to the Downtown Gilroy Station. HSR and the UPRR alignment would be on embankment (approximately 15 to 25 feet high) and cross over several roads on bridges before arriving at the Downtown Gilroy Station on embankment (approximately 16 feet high). The HSR alignment would continue on embankment south from the Downtown Gilroy Station and descend into a trench under Luchessa Avenue and U.S. Highway 101. Alternative 2 would include an MOWF south of Gilroy on the east side of the alignment. The remainder of this subsection—to Casa de Fruta—would be the same as under Alternative 1. As described in Alternative 1, an MOWS would be located near Turner Island Road.

Overall, this alternative would comprise 20.9 miles on viaduct, 8.5 miles at grade, 41.0 miles on embankment, two tunnels totaling 15.0 miles, and 3.2 miles in trench. Figure 2-59 of the Final EIS illustrates Alternative 2.

### 4.2.3 Alternative 3

As discussed in Chapter 2, Alternatives, of the Final EIS, Alternative 3 was designed to minimize the project footprint through the use of viaduct and by going around downtown Morgan Hill, much like Alternative 1. Alternative 3 would bypass downtown Gilroy to an East Gilroy Station, further minimizing interface with the UPRR corridor in comparison to Alternative 1. Like Alternative 2, Alternative 3 would use the viaduct to Scott Boulevard design option, requiring less disruption of UPRR track than the shorter viaduct to I-880 option. Alternative 3 would incorporate the same alignment and profile as Alternative 1 in the Monterey Corridor, Pacheco Pass, and San Joaquin

Valley Subsections, and the same alignment and profile as Alternative 2 in the San Jose Diridon Station Approach Subsection.

The primary difference between Alternative 3 and Alternative 1 is in the Morgan Hill and Gilroy Subsection. From Bernal Way in South San Jose, the alignment through Morgan Hill and San Martin would be the same as described for Alternative 1. South of the Monterey Corridor Subsection, Alternative 3 would diverge east from Alternative 1 north of Gilroy, near the intersection of Monterey Road and Church Avenue. Beginning at Church Avenue, a new freight track would diverge off the UPRR mainline to provide a freight connection to the MOWF. The aerial alignment would cross over Denio Avenue and Buena Vista Avenue on viaduct before descending onto embankment. On the north end of the East Gilroy Station site, the alignment would cross beneath Las Animas Avenue; on the south end of the station site, Leavesley Road would be raised on bridges over the HSR embankment. The alignment would cross Llagas Creek on a low viaduct, and Levee Road would be realigned north of Llagas Creek. Continuing south, the alignment would ascend to approximately 25 feet above grade on embankment approaching the East Gilroy MOWF site on the south side of the more eastern alignment. SR 152 would be grade-separated and realigned, crossing over the MOWF on a bridge. Both Frazier Lake Road and Holsclaw Road would connect to the grade-separated SR 152. Continuing on a 40-foot-high embankment and then on viaduct, the alignment would cross the Pajaro River, Millers Canal, Lake Road, Pacheco Creek, Lovers Lane, San Felipe Road, and SR 152 before entering the west portal of Tunnel 1. The Alternative 3 alignment would converge a short distance west of Tunnel 1 with the alignments of the other project alternatives. The alignment and guideway in the Pacheco Pass and San Joaquin Valley Subsections would be the same under all four project alternatives. As described in Alternative 1, an MOWS would be located near Turner Island Road.

Overall, this alternative would comprise 43.2 miles on viaduct, 1.8 miles at grade, 24.9 miles on embankment, 2.4 miles in trench, and two tunnels totaling 15.0 miles.

#### 4.2.4 Alternative 4

As discussed in Chapter 2, Alternatives, of the Final EIS, development of Alternative 4 was intended to extend blended electric-powered passenger railroad infrastructure from the southern limit of Caltrain's Peninsula Corridor Electrification Project through Gilroy. Additionally, Alternative 4 was intended to modernize and electrify the rail corridor, which encompasses the addition of tracks, rebuilding infrastructure, and electrifying the corridor as described below and in Section 2.6.2.7, Alternative 4 of the Final EIS. The alternative is distinguished from the other three project alternatives by a blended, at-grade alignment that will operate on two electrified passenger tracks and one conventional freight track predominantly within the existing Caltrain and UPRR rights-of-way to Gilroy. As a result, it includes numerous at-grade crossings that will require four-quadrant gates and other modifications between Santa Clara and Gilroy.

Alternative 4 will begin at Scott Boulevard in blended service with Caltrain on an at-grade profile following Caltrain MT2 and MT3 south along the east side of the existing Caltrain corridor. The existing Lafayette Street pedestrian overpass will remain in place, as will the De La Cruz Boulevard and West Hedding Street roadway overpasses. New UPRR track east of Caltrain MT1 will start just south of Emory Street to maintain freight movement capacity north of San Jose Diridon Station. The existing Santa Clara Station will remain, and the existing College Park Caltrain Station will be reconstructed. A new bridge will be built over Taylor Street for the UPRR alignment to tie into the Lenzen Wye.

The blended at-grade alignment will continue along MT2 and MT3 to enter new dedicated HSR platforms at grade at the center of San Jose Diridon Station (Final EIS Figure 2-66).

Continuing south, the blended at-grade three-track alignment will remain in the Caltrain right-of-way through the Gardner neighborhood. The existing underpass at Park Avenue and the existing overpass at San Carlos Street will remain in place. Four-quadrant gates with channelization will be built at Auzeais Avenue and West Virginia Street. A new bridge for the blended HSR/MT3 track over I-280 will be constructed. The existing underpasses at Bird Avenue and Delmas Avenue will be reconstructed, as will the rail bridge overpasses. New standalone rail bridges over

Prevost Street, SR 87, the Guadalupe River, and Willow Street will be built for MT3. MT1 and MT2 will remain on the existing structures. The existing Tamien Caltrain Station will remain in place.

From West Alma Avenue the alignment will extend southeast to Bernal Way (Final EIR/EIS Figure 2-65) and will be in blended service with Caltrain on an at-grade profile within the Caltrain and UPRR right-of-way. The Michael Yard will be reconfigured to a double-ended facility and relocated to the east side of the corridor. A new standalone bridge over West Alma Avenue will be constructed for MT3 and a maintenance track, with MT1 and MT2 remaining on the existing structure. A new bridge over Almaden Road will be constructed for MT2 and MT3, while MT1 will remain on the existing structure. Capitol Caltrain Station and Blossom Hill Caltrain Station will be reconstructed. Four-quadrant barrier gates with channelization will be built at Skyway Drive, Branham Lane, and Chynoweth Avenue.

From Bernal Way in South San Jose, the alignment will extend through Morgan Hill and San Martin to the Downtown Gilroy Station, then curve generally east across the Pajaro River floodplain and through a portion of northern San Benito County before entering Tunnel 1 at the base of the Diablo Range. In this subsection, three private road crossings will be eliminated and alternate access will be provided to those properties. The existing Bailey Avenue overpass will remain in place. The Monterey Road underpass will be reconstructed to accommodate the future widening of Monterey Road to four lanes. The Morgan Hill Caltrain Station will be reconstructed with two new side platforms built outside MT2 and MT3. The platform will be reached by a new pedestrian underpass built at the north end of the platform. The existing Butterfield Boulevard overpass will remain in place. Upper Llagas Creek bridge will be reconstructed.

The San Martin Caltrain Station will be reconstructed—the existing platform will be removed, and a new center platform will be built between MT2 and MT3. The platform will be reached by a new pedestrian overpass constructed at the south end of the platform. The existing bridge at Miller Slough will be replaced with a triple-cell box.

The Downtown Gilroy Station approach will be at grade with dedicated HSR tracks to the west of the UPRR alignment between Old Gilroy Street/7th Street and 9th Street (Final EIS Figure 2-68). A new HSR station will be built south of the existing Caltrain station. The Alternative 4 MOWF will be similar to the facility described in Alternative 1. South and east of Gilroy, HSR will operate on a dedicated guideway similar to that of Alternatives 1 and 2 into Tunnel 1 and then through the Pacheco Pass and San Joaquin Valley Subsections, which are the same for all four project alternatives. As described in Alternative 1, an MOWS will be located near Turner Island Road.

Overall, this alternative will comprise 15.2 miles on viaduct, 30.3 miles at grade, 25.9 miles on embankment, 2.3 miles in trench, and two tunnels with a combined length of 15.0 miles.

#### 4.2.5 Diridon and Tunnel Design Variants

The Authority developed two design variants intended to optimize train speed: the DDV and the TDV. As shown on Figure 4, the DDV will be located north and south of San Jose Diridon Station and at the station platforms and, if adopted, will apply only to the Selected Alternative, Alternative 4. The TDV will be located at the two tunnels east of Gilroy and through the Pacheco Pass and applies to all four project alternatives.

The DDV will allow for higher speeds in the approaches and through San Jose Diridon Station than the preliminary design for the Selected Alternative will provide. The preliminary design is based on the Peninsula Corridor Electrification Project track geometry and restricts speeds approaching and through the station to 15 mph. The DDV will reduce the curvature in the alignment to the north of the station between Julian Street and Santa Clara Street and from the south of the station to San Carlos Street. The design variant will also modify the preliminary design for the Selected Alternative of the ends of the platforms, providing for increased speeds of 40 mph, comparable to the design speeds provided by Alternatives 1, 2, and 3.

The tunnel design variant consists of alterations to all the alternatives (i.e., as compared to the base preliminary designs in Volume 3) of the tunnel and tunnel approaches in the Morgan Hill and

Gilroy Subsection (Tunnel 1) and the tunnel and tunnel approaches in the Pacheco Pass Subsection (Tunnel 2) to accommodate an operating speed of 220 mph. Figure 6 depicts the extent of the TDV. The Tunnel 1 design variant will be in the same horizontal and vertical location as the preliminary design, but it will have a greater super elevation<sup>3</sup> in the curves providing for increased speeds up to 220 mph in the tunnel and tunnel approaches. The Tunnel 2 design variant will be in the same horizontal location as the preliminary design, and the tunnel will be slightly deeper below the surface. It will also have a greater super elevation in the curves, providing for increased speeds up to 220 mph in the tunnel and tunnel approaches.

### 4.3 Description of the Selected Alternative

The Authority has identified Alternative 4, which includes the San Jose Diridon Station as modified by the DDV, existing rail corridor upgrades between San Jose and Gilroy, a Downtown Gilroy Station, the South Gilroy MOWF, dedicated HSR infrastructure through the Pacheco Pass as modified by the TDV, and dedicated HSR infrastructure continuing across the San Joaquin Valley to connect to the Central Valley Wye, and a MOWS west of Turner Island Road in the Central Valley, as the Selected Alternative. The Selected Alternative extends from Scott Boulevard in Santa Clara and ends at Carlucci Road in Merced County. Figure 2 shows the Selected Alternative. As described above, the Selected Alternative will be comprised of 15.2 miles on viaduct, 30.3 miles at grade, 25.9 miles on embankment, 2.3 miles in trench, and two tunnels totaling 15.0 miles. The Selected Alternative is intended to extend blended electric-powered passenger railroad infrastructure from the southern limit of Caltrain's Peninsula Corridor Electrification Project through Gilroy. South and east of Gilroy, HSR will operate on a dedicated guideway.

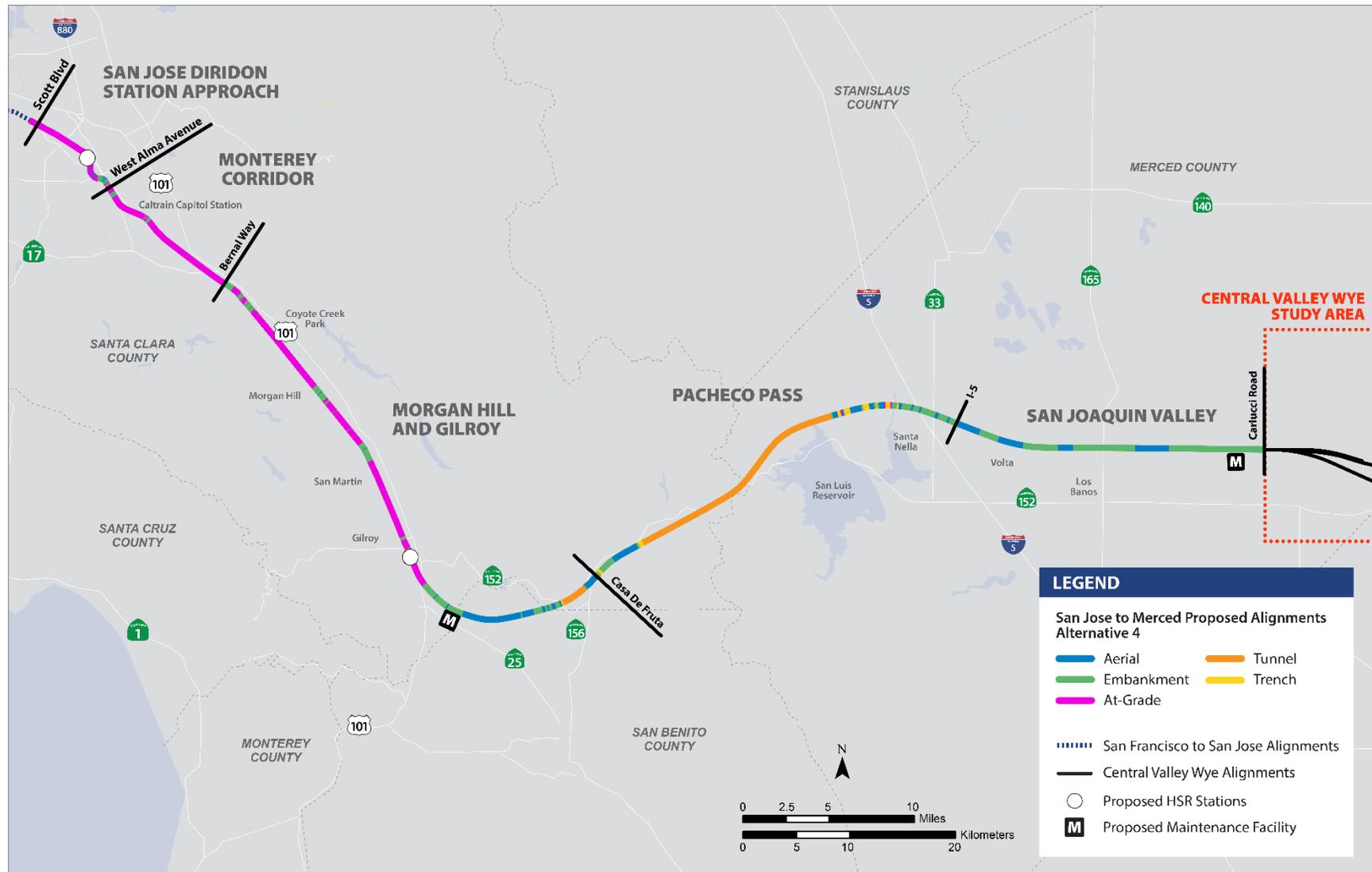
The Selected Alternative will begin at Scott Boulevard in blended service with Caltrain on an at-grade profile following Caltrain MT2 and MT3 south along the east side of the existing Caltrain corridor. The Authority has developed a DDV that will allow for higher speeds in the approaches and through Diridon Station than the preliminary design for Alternative 4 will provide. As originally designed, Alternative 4 was based on the Peninsula Corridor Electrification Project track geometry and restricts speeds approaching and through the station to 15 mph. The DDV will improve the curvature in the alignment described above to the north of the station between Julian Street and Santa Clara Street and from the south end of the station to San Carlos Street. The design variant will also modify the preliminary design of the ends of the platforms, providing for increased speeds of 40 mph, comparable to the design speeds provided by Alternatives 1, 2, and 3.

The existing Lafayette Street pedestrian overpass will remain in place, as will the De La Cruz Boulevard and West Hedding Street roadway overpasses. New UPRR track east of Caltrain MT1 will start just south of Emory Street to maintain freight movement capacity north of San Jose Diridon Station. The existing Santa Clara Station will remain, and the existing College Park Caltrain Station will be reconstructed. A new bridge will be built over Taylor Street for the UPRR alignment to tie into the Lenzen Wye.

The blended at-grade alignment will continue along MT2 and MT3 to enter new dedicated HSR platforms at grade at the center of San Jose Diridon Station (Final EIS Figure 2-66). The DDV will be located north and south of San Jose Diridon Station and at the station platforms and will reduce the curvature in the alignment to the north of the station between Julian Street and Santa Clara Street and from the south of the station to San Carlos Street. Continuing south, the blended at-grade three-track alignment will remain in the Caltrain right-of-way through the Gardner neighborhood. The existing underpass at Park Avenue and the existing overpass at San Carlos

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<sup>3</sup> *Super elevation* is the vertical distance between the height of the inner and outer rails at a curve. Super elevation is used to partially or fully counteract the centrifugal force acting radially outward on a train when it is traveling along the curve.



Source: Authority 2019a

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Figure 6 Alternative 4 Proposed Alignment

Street will remain in place. Four-quadrant gates with channelization will be built at Auzerais Avenue and West Virginia Street. A new bridge for the blended HSR/MT3 track over I-280 will be constructed. The existing underpasses at Bird Avenue and Delmas Avenue will be reconstructed, as will the rail bridge overpasses. New standalone rail bridges over Prevost Street, SR 87, the Guadalupe River, and Willow Street will be built for MT3. MT1 and MT2 will remain on the existing structures. The existing Tamien Caltrain Station will remain in place.

From West Alma Avenue the alignment will extend southeast to Bernal Way (Final EIR/EIS Figure 2-65) and will be in blended service with Caltrain on an at-grade profile within the Caltrain and UPRR right-of-way. The Michael Yard will be reconfigured to a double-ended facility and relocated to the east side of the corridor. A new standalone bridge over West Alma Avenue will be constructed for MT3 and a maintenance track, with MT1 and MT2 remaining on the existing structure. A new bridge over Almaden Road will be constructed for MT2 and MT3, while MT1 will remain on the existing structure. Capitol Caltrain Station and Blossom Hill Caltrain Station will be reconstructed. Four-quadrant barrier gates with channelization will be built at Skyway Drive, Branham Lane, and Chynoweth Avenue.

From Bernal Way in South San Jose, the alignment will extend through Morgan Hill and San Martin to the Downtown Gilroy Station, then curve generally east across the Pajaro River floodplain and through a portion of northern San Benito County before entering Tunnel 1 at the base of the Diablo Range. In this subsection, three private road crossings will be eliminated and alternate access will be provided to those properties. The existing Bailey Avenue overpass will remain in place. The Monterey Road underpass will be reconstructed to accommodate the future widening of Monterey Road to four lanes. The Morgan Hill Caltrain Station will be reconstructed with two new side platforms built outside MT2 and MT3. The platform will be reached by a new pedestrian underpass built at the north end of the platform. The existing Butterfield Boulevard overpass will remain in place. Upper Llagas Creek bridge will be reconstructed. Twelve wildlife crossings or jump-outs will be built in this subsection and wildlife intrusion deterrents will be constructed for at-grade crossings at Blanchard Road, Palm Avenue, Live Oak Avenue, and Bloomfield Avenue.

The Downtown Gilroy Station approach will be at grade with dedicated HSR tracks to the west of the UPRR alignment between Old Gilroy Street/7th Street and 9th Street (Final EIS Figure 2-68). A new HSR station will be built south of the existing Caltrain station. The MOWF south of Gilroy on the east side of the alignment. The alignment will continue predominantly on viaduct and embankment across the Soap Lake floodplain before entering a 1.5-mile tunnel (Tunnel 1) west of Casa de Fruta.

From there, the alignment will generally follow the existing SR 152 corridor east from Casa de Fruta for approximately 17 miles, then diverge north around the Cottonwood Creek ravine of the San Luis Reservoir for approximately 8 miles before transitioning to the San Joaquin Valley Subsection near I-5 in Merced County. The alignment and guideway in the Pacheco Pass Subsection includes a 13.5-mile tunnel (Tunnel 2) through Pacheco Pass to avoid any encroachment into the San Luis Reservoir or surficial encroachment into the Cottonwood Creek Wildlife Area. The TDV consists of alterations of the tunnel and tunnel approaches in the Morgan Hill and Gilroy Subsection (Tunnel 1) and the tunnel and tunnel approaches in the Pacheco Pass Subsection (Tunnel 2). The alignment will continue around the northern arm of the San Luis Reservoir and viaducts over the California Aqueduct, Delta-Mendota Canal, and I-5. East of the I-5 overcrossing, the guideway will be predominantly on embankment along the south side of Henry Miller Road to Carlucci Road, traveling on several mile-plus-long sections of viaduct over major watercourses, the UPRR alignment, and Ingomar Grade Road. Four wildlife crossing culverts will be provided west of the California Aqueduct, with an additional two between the California Aqueduct and the Delta-Mendota Canal and one between the Delta-Mendota Canal and I-5. Three wildlife crossings will be provided between I-5 and Santa Nella Road, and three more between Santa Nella Road and Fahey Road. Viaducts will also function as wildlife movement areas in this subsection. The guideway will also be on viaduct through several sections of the GEA to allow for wildlife movement. Wildlife crossings will also be provided via culverts where the guideway is on embankment in this subsection. Several local roadways—Delta

Road, Turner Island Road, and Carlucci Road—will be relocated on bridges over the HSR embankment. An MOWS will be located near Turner Island Road.

#### 4.4 Environmentally Preferable Alternative

The CEQ NEPA regulations require that the ROD identify all alternatives that were considered, “...specifying the alternative or alternatives which were considered to be environmentally preferable” (40 C.F.R. § 1505.2).

In determining an environmentally preferable alternative, the Authority considered all San Jose to Merced Project Section project alternatives as well as the No Action Alternative. The Authority weighed and balanced the physical environmental effects associated with the project alternatives as well as those associated with the No Action Alternative. The Authority determined that the adverse environmental effects associated with the Selected Alternative were less substantial than the environmental consequences associated with the No Action Alternative in terms of air quality and traffic, and thus identified the Selected Alternative as environmentally preferable. The Authority identified the environmentally preferable alternative by balancing the adverse and beneficial impacts of the project alternatives on the human and natural environment. As discussed in Section 2.4, U.S. Army Corps of Engineers, of this ROD, the USACE and USEPA concurred in March 2020 that the Authority’s Selected Alternative is the preliminary LEDPA, consistent with USACE’s permit program (33 C.F.R. Parts 320–331) and USEPA’s Section 404(b)(1) Guidelines (40 C.F.R. Parts 230–233). Additionally, as identified in Section 8.4.5, Identification of the Preferred Alternative, and Section 8.6, Environmentally Preferable Alternative, of the Final EIS, and in accordance with 40 C.F.R. Section 1505.2, Alternative 4, including the DDV and TDV, the San Jose Diridon and Downtown Gilroy Stations, the MOWF south of Gilroy, and an MOWS west of Turner Island Road in the Central Valley, is the environmentally preferable alternative for the following reasons:

- Alternative 4 will have the lowest overall impacts because it will result in the fewest displacements of residences, businesses, community facilities, and agricultural structures; will result in the least conversion of agricultural farmland to nonagricultural uses (and thus lowest impact on agricultural employment); and will cause the least change in aesthetics and visual quality. Alternative 4 will have the most noise impacts (with noise barrier mitigation only) but the lowest impacts on Monterey Road travel times. While Alternative 4 will potentially have the most impact on emergency vehicle response times, this could be mitigated by the Authority working with local jurisdictions to construct and operate new fire stations and install new responder equipment at existing stations. The other project alternatives would have greater impacts than Alternative 4 in terms of key community resources, with the exception of noise.
- Alternative 4 will result in the lowest impacts on key natural environmental factors of the four project alternatives, such as wetlands and other aquatic habitats providing high-value habitat for a diverse array of species. Alternative 4 is also the project alternative most likely to receive support for permitting by the USACE under the CWA (see Section 8.7, Least Environmentally Damaging Practicable Alternative, of the Final EIS). Alternative 4 will have the lowest impacts of the four project alternatives on high-value aquatic habitats and habitat for special-status plant and wildlife species.
- Alternative 4 will result in the lowest impacts from permanent use of Section 4(f) parks and National Register of Historic Places (NRHP)-listed or -eligible built environment historic resources.
- Alternative 4 is the lowest capital cost project alternative.

Table 8-1 and Section 8.4, Preferred Alternative, in the Final EIS provide a detailed comparison of the various criteria evaluated for the San Jose to Merced Project Section project alternatives.

When compared to Alternatives 1, 2, and 3, Alternative 4, with the DDV and TDV, the San Jose Diridon and Downtown Gilroy Stations, the MOWF south of Gilroy, and an MOWS west of Turner Island Road in the Central Valley, will result in the fewest impacts related to the number of

displacements, biological resources, Section 4(f)/6(f) resources, aesthetics and visual quality, agricultural farmland, and built environment resources. Alternative 4 will have the most alignment in proximity to existing transit corridors, and Alternative 4 is the only alternative that will provide the opportunity to extend electrified Caltrain service to Gilroy.

In accordance with 40 C.F.R. Section 1505.2, the Authority identifies Alternative 4, with the DDV and TDV, the San Jose Diridon and Downtown Gilroy Stations, the MOWF south of Gilroy, and an MOWS west of Turner Island Road in the Central Valley, as the environmentally preferable alternative.

## 5 SUMMARY OF POTENTIAL EFFECTS

Construction and operation of the Selected Alternative has the potential to affect a variety of environmental and social resources. Impacts on these resources could be adverse or beneficial. NEPA impact determination requires consideration of both context and intensity. Chapter 3, Affected Environment, Environmental Consequences, and Mitigation Measures, of the Final EIS includes a full discussion of the potential impacts of the San Jose to Merced Project Section, organized by resource area. To fully understand the potential range of impacts of the Selected Alternative, the Final EIS analyzed all reasonably foreseeable environmental impacts resulting from its construction and operation.

The Selected Alternative will not result in impacts in the following resource areas: electromagnetic fields and electromagnetic interference; public utilities and energy; geology, soils, seismicity, and paleontology; hazardous materials and waste; socioeconomics and communities; and regional growth. Additionally, some resource sections have adverse impacts under NEPA under some of the project alternatives but not for the Selected Alternative: station planning, land use, and development, as well as parks, recreation, and open space. These resources have also been excluded from this decision document. In determining that the Selected Alternative will not result in impacts on these resources, implementation of IAMFs, mitigation measures, and best management practices (BMPs) are presumed and will be required as part of project implementation as described further in Section 6, Mitigation Commitments and Monitoring, of this ROD.

Although adverse impacts on biological resources are resolved with mitigation, this document also includes a discussion of impacts on these resources due to the strong public and agency interest in these issues throughout the process.

Although adverse impacts on hydrology and water resources are resolved with mitigation, this document also includes a discussion of impacts on these resources to support the floodplains determination in Section 9.6.

The following sections summarize the adverse and the beneficial impacts that may occur with construction and operation of the Selected Alternative.

### 5.1 Transportation

As discussed in Section 3.2, Transportation, of the Final EIS, operation of the Selected Alternative will result in increased traffic adjacent to stations in San Jose and Gilroy and increased gate-down time at the at-grade crossings, which will adversely affect intersections in the San Jose Diridon Station Approach, Monterey Corridor, and Morgan Hill and Gilroy Subsections but will have adverse effects at fewer intersections than the other project alternatives. Temporary road closures and realignments will result in increases in travel times, delays, and inconvenience to the traveling public under all four project alternatives, with the Selected Alternative having the least disruption during construction due to fewer proposed modifications of existing roadways than the other project alternatives.

Construction of the Selected Alternative will lead to temporary impacts on major roadways, freeways, and intersections from temporary road closures and relocations during construction. Construction will also result in permanent road closures and realignments that will have permanent impacts on intersection operations. Operation of the Selected Alternative will also result in permanent effects on intersection operations.

Some public parking may require temporary closure during construction, but temporary effects on parking at the San Jose Diridon Station and SAP Center under the Selected Alternative will be smaller than with the other project alternatives. Operation of the Selected Alternative will permanently displace parking at and adjacent to the San Jose Diridon Station, the SAP Center, and the Downtown Gilroy Station, but the Selected Alternative includes construction of replacement parking on a 1:1 basis under TR-IAMF#9, so there will be no permanent reduction of available parking at these locations. The demand for parking for HSR riders in the area surrounding the San Jose Diridon Station can be accommodated through public and private

parking venues and offset through the existing and planned expansion in transit access to the station.

Construction of the Selected Alternative will involve the temporary closure of bus stops, parking areas, transit stations, and roadway travel lanes. Operation of the Selected Alternative will result in continuous permanent impacts on bus services. Construction of the Selected Alternative will also result in temporary impacts on pedestrian and bicycle access from the temporary closure or removal of pedestrian facilities, bicycle lanes, and paths.

Construction of the Selected Alternative would contribute to temporary interference with passenger rail transit. Construction of the Selected Alternative will result in temporary impacts on freight rail operations from temporary closure or relocation of tracks, and disruption and delay will last hours or days. Operation of the Selected Alternative will not result in continuous permanent impacts on freight rail capacity because there will be no limiting of freight service from sharing of tracks in portions of different project alternatives. Freight operation hours will be constrained during operation of the Selected Alternative, which will cause changes in freight operations and inconvenience to operators, but freight operations overall will be maintained.

To minimize potential effects on transportation, the Authority will implement numerous strategies and design features (set forth in IAMFs) to avoid or minimize effects during construction, such as the adoption of a construction transportation plan and contractor requirements to avoid or minimize circulation impacts due to road closures. Project features to address parking impacts include identification of employee parking locations, off-street parking for construction-related vehicles, and replacement for temporary displacement of special event parking at the SAP Center. Project features to address nonmotorized travel impacts include providing and maintaining pedestrian and bicycle accessibility across the HSR corridor, to and from stations, and on station property.

In addition to these IAMFs, the Authority will require numerous mitigation measures that will further minimize and/or compensate for adverse effects of the Selected Alternative. The mitigation measures include installation, modification, and/or optimization of signals; widening and reconfiguring of specific approaches and intersections; restriping to address traffic delay impacts; installation of transit signal priority to address both construction and operational effects on transit delays; and a railway disruption control plan. The Selected Alternative's overall impact on transportation resources in the region and state will be beneficial through substantial reductions in vehicle miles traveled, increased transit connectivity, and reduction in the need to expand freeways and airports.

## 5.2 Air Quality and Greenhouse Gases

As discussed in Section 3.3, Air Quality and Greenhouse Gases, of the Final EIS, annual construction emissions of the Selected Alternative will exceed the General Conformity *de minimis* threshold in the San Joaquin Valley Air Basin (SJVAB) for nitrogen oxide (NO<sub>x</sub>) for all years of construction between 2022 and 2028 even with implementation of IAMFs. NO<sub>x</sub> emissions associated with construction of the Selected Alternative will also exceed the General Conformity *de minimis* threshold in the San Francisco Bay Area Air Basin (SFBAAB) between 2023 and 2025 even with implementation of IAMFs. All other pollutants will be below applicable *de minimis* thresholds. Construction of the Selected Alternative will lead to new violations of the PM<sub>10</sub> and PM<sub>2.5</sub> CAAQS and NAAQS, as well as potentially contribute to existing PM<sub>10</sub> and PM<sub>2.5</sub> violations through exceedances of the SIL. The Selected Alternative will also violate the 1-hour NO<sub>2</sub> NAAQS and CAAQS. Construction of the Selected Alternative will generate GHG emissions. However, these emissions will be temporary and will be offset from the emissions benefit that will occur during the operations period. As a result, the Selected Alternative will not result in global climate change impacts from greenhouse gas emissions.

The Selected Alternative, as well as any of the other project alternatives, will avoid localized impacts from asbestos and lead-based paint exposure. To reduce impacts on the environment, construction of the Selected Alternative will include project features to avoid and minimize impacts on air quality. Specifically, the Selected Alternative will employ measures to reduce

fugitive dust emissions, use renewable diesel fuel in construction diesel equipment and on-road diesel trucks, and reduce criteria exhaust emissions from both on-road construction vehicles and heavy-duty off-road construction equipment. The Selected Alternative will reduce the potential impact of concrete batch plants through siting and control measures. The Authority will require mitigation measures that will further minimize and/or compensate for adverse effects of the Selected Alternative. These mitigation measures include additional on-site emissions controls to reduce fugitive dust and requirements for the use of zero emission and/or near-zero emission vehicles and off-road equipment. The Authority will also offset project construction emissions in the SFBAAB and the SJVAB. The Authority will enter into an agreement with the Bay Area Air Quality Management District (BAAQMD) to reduce NO<sub>x</sub> to the required levels by acquiring emissions offsets. The Authority and the San Joaquin Valley Air Pollution Control District (SJVAPCD) will enter into a Voluntary Emissions Reduction Agreement (VERA) to cover the portion of the Project approved and funded for construction within the SJVAB. Through the VERA, the Authority will fund emission reduction projects that will achieve the necessary emission reductions.

Operation of the Selected Alternative, as well as any of the other project alternatives, will provide statewide and regional air quality benefits. This will result in a permanent net benefit to air quality during operations because it will lower emissions of mobile source air toxics, greenhouse gases, volatile organic compounds, NO<sub>x</sub>, sulfur dioxide, carbon monoxide, PM<sub>10</sub>, and PM<sub>2.5</sub> by diverting trips from travel modes with higher emissions (e.g., commercial air flights and automobile trips) to HSR, which has lower emissions.

### 5.3 Noise and Vibration

As discussed in Section 3.4, Noise and Vibration, of the Final EIS, the Selected Alternative will have similar noise impacts related to construction activities near sensitive receptors at night as the other project alternatives. Construction vibration impacts will also occur during rail corridor construction for the Selected Alternative and the other project alternatives. The Selected Alternative will result in the most vibratory compaction at embankments and at-grade portions of all project alternatives; construction in existing right-of-way will require more nighttime work to minimize service disruptions.

Operation of the Selected Alternative will generate intermittent noise above ambient levels primarily from train passbys throughout the project section and also from horn sounding at at-grade crossings and stations between San Jose and Gilroy. Without mitigation, the elevated noise levels will result in adverse impacts from the exposure of sensitive receptors to severe noise. The other project alternatives would be grade-separated and would have fewer operational noise impacts. Operation of the Selected Alternative will also generate traffic and associated noise at HSR stations as well as additional noise associated with train movements in and out of the MOWF near Gilroy. Operation of all project alternatives will also generate additional noise associated with traction power facilities, and the Selected Alternative will have the greatest number of these impacts prior to mitigation due to the higher level of noise impacts due to train horn sounding. All project alternatives will have limited operations impacts associated with human and livestock startle. Operation of the Selected Alternative will cause intermittent permanent vibration annoyance impacts at sensitive receptors. The Selected Alternative will result in the most vibration impacts prior to mitigation, and Alternative 1 would result in the least.

To avoid or minimize potential noise and vibration effects associated with construction and operation, the Authority will adhere to all applicable state and federal regulations, including Federal Highway Administration (FHWA) and FRA guidelines for noise from transportation sources and the abatement of excessive noise; Occupational Safety and Health Administration (OSHA) regulations that protect workers from hazardous noise exposure; FHWA and OSHA guidelines regarding modeling and mitigating noise from construction sources for both construction workers and sensitive receptors in proximity to construction; and the California Department of Transportation methodology for evaluating construction and traffic noise and for evaluating the effectiveness and feasibility of different sound abatement methods.

Additionally, the Authority has developed project-specific design strategies that will further reduce the potential for adverse effects associated with construction and operation of the Selected Alternative to levels below those that will be achieved through regulatory compliance alone. However, even with implementation of regulatory requirements and these project-specific design strategies, the Selected Alternative will still have the potential to result in adverse impacts. To further reduce project-related construction and operations noise and vibration, the Authority has developed mitigation measures that include sound barriers, building sound insulation, and noise easements; requiring preparation and adherence to a construction noise mitigation and monitoring program; conducting subsequent noise and vibration environmental analysis during final design; ensuring that train vehicle procurement meets pertinent federal noise regulations for locomotives and rail cars; and ensuring stations, MOWFs, and traction power substations are designed to reduce noise. In addition, where local jurisdictions decide to apply to the FRA for establishment of a quiet zone, the Authority will support that effort, which may result in reduction of horn sounding at the at-grade crossings within any established quiet zones.

#### 5.4 Biological and Aquatic Resources

As discussed in Section 3.7, Biological and Aquatic Resources, of the Final EIS, the Selected Alternative will reduce adverse impacts on biological and aquatic resources after IAMFs and mitigation measures are implemented. Although adverse impacts on biological resources are resolved with mitigation, this document includes a discussion of impacts on these resources due to the strong public and agency interest in these issues throughout the process.

The Selected Alternative will have the fewest impacts on most biological and aquatic resources compared to other project alternatives, as summarized below:

- The Selected Alternative will disturb or remove special-status species (plants and wildlife) or their habitats during construction, but it will have the lowest overall impact on special-status species among the project alternatives. Operations impacts on special-status species are expected to be similar among all project alternatives, including the Selected Alternative.
- The Selected Alternative will disturb non-special-status species during construction, including the disturbance or removal of habitats for these common species but will have the lowest overall impact on non-special-status species among the project alternatives. The Selected Alternative will also affect habitat for waterfowl and shorebirds within the GEA; however, the impacts with the GEA are identical among the project alternatives. Operations impacts are primarily associated with wildlife movement and are discussed further below.
- The Selected Alternative will disturb or remove special-status plant communities during construction, but it will have the lowest overall impact on special-status plant communities among the project alternatives. Operations impacts will include the intermittent disturbance or degradation of special-status plant communities during maintenance of the right-of-way; however, operations impacts from the Selected Alternative are expected to be similar to the other project alternatives.
- The Selected Alternative will disturb or remove aquatic resources during construction, but it will have the lowest overall impact on aquatic resources among the project alternatives. Operations impacts will include the intermittent disturbance or degradation of aquatic resources during maintenance of the right-of-way; however, operations impacts from the Selected Alternative are expected to be similar to the other project alternatives.
- The Selected Alternative will result in the removal of protected trees during construction, but it will have the lowest overall impact on protected trees among the project alternatives. Operations impacts on protected trees are not expected.
- The Selected Alternative will affect wildlife movement and wildlife movement corridors during construction. The Selected Alternative will have the least impact because it will be located within the existing UPRR right-of-way in Coyote Valley and will therefore require a smaller project footprint. Outside of the Coyote Valley area and UPRR right-of-way, the Selected Alternative will have identical effects to other project alternatives related to other wildlife

movement corridors, including effects from noise, light, and visual disturbance. Operations impacts will result from intermittent noise, vibration, visual disturbance, lighting, and strike but are expected to be similar among the project alternatives.

- The Selected Alternative will affect conservation areas, but it will have the lowest impact in terms of the number of acres affected and the number of conservation areas affected, among the project alternatives. Operations impacts on conservation areas are expected to be minor, primarily indirect effects on conservation areas adjacent to the right-of-way and are expected to be similar among all project alternatives.
- The Selected Alternative will affect habitat conservation plans, but it will have similar impacts to the other project alternatives. Operations are not expected to result in any conflicts with habitat conservation plans.

To avoid and minimize potential effects on biological resources and aquatic resources during construction and operation of the Selected Alternative, the Authority will implement numerous strategies and design features (termed IAMFs). These IAMFs include incorporation of viaduct wildlife undercrossings into the project design to maintain opportunities for wildlife movement, designated areas for staging, access, and construction; biological monitors; bird-safe design features to prevent bird collision and electrocution, and the establishment of protocols to further avoid or minimize impacts. In addition to these IAMFs, the Authority will implement numerous mitigation measures that will further minimize and/or compensate for adverse effects of the Selected Alternative. These include broad and species-specific mitigation strategies designed to minimize impacts through the establishment of environmentally sensitive areas and nondisturbance zones; installation of wildlife exclusion fencing; installation of dedicated wildlife crossings; installation of innovative noise/visual barriers or structures at important wildlife movement areas, including an opaque guideway enclosure extending for 3.5 miles in the GEA to avoid bird collision and noise/lighting effects on wildlife habitat; and compensating for impacts through habitat restoration, enhancement, and preservation and management of habitat

As a result of extensive coordination and input received from the fish and wildlife agencies and stakeholders, the Authority refined twenty-two mitigation measures and added eleven mitigation measures to further reduce impacts. The refinements and additions adopted as a result of this coordination will greatly benefit species. For instance, the size of protective nest buffers for fully protected raptor species was increased five-fold, additional funnel fencing and lighting restrictions were added to maintain wildlife movement opportunities during construction in the Pacheco Pass, additional measures were adopted for in-water construction in fish habitat, and measures to control operational and intermittent light sources were strengthened. In addition, the Authority restated the program-level commitment to acquire agricultural, open space or conservation easements over 10,000 acres. And to address the regional cumulative condition for wildlife movement, the Authority added a measure to ensure that a dedicated overcrossing is constructed over SR-152, which is currently a substantial source of wildlife mortality and a major contributor to the significant cumulative effect on wildlife movement in the region.

The Authority will also implement the requirements set forth in FESA incidental take statements and CESA incidental take permits to further reduce adverse effects of the Selected Alternative.

## 5.5 Hydrology and Water Resources

As discussed in Section 3.8, Hydrology and Water Resources, of the Final EIS, the Selected Alternative will not have adverse effects on hydrology and water resources. To support the findings in Section 9.6 of this ROD, this section addresses impacts to floodplains from the Selected Alternative. Construction of the Selected Alternative will place new structures and/or modify existing structures within 100-year floodplains regulated by the Federal Emergency Management Agency, which will result in changes to channel geometry and flood flow characteristics and have the potential to result in permanent impacts on floodplain hydraulics. However, with implementation of IAMFs, which will require flood protection measures that minimize effects on 100-year floodplain water surface elevations and coordination with the U.S. Army Corps of Engineers, no permanent effects on designated floodplains from construction will occur. In

addition to having minimal impacts on the hydraulics of the Soap Lake floodplain, the Selected Alternative will have minimal impacts on the hydrology of the Soap Lake floodplain. The project will increase the peak 100-year flow rate by 0.25 percent from the existing condition, and preliminary hydraulic analysis indicates there will be negligible impacts on downstream floodplains and floodways as a result of this minimal increase in peak flow rates. Construction of the Selected Alternative in the Soap Lake floodplain will not have substantial downstream impacts.

The design of the Selected Alternative with IAMFs minimizes impacts to floodplains. As a result, the Authority does not need to implement mitigation measures for floodplain impacts.

## 5.6 Safety and Security

Of the safety and security topics described in Section 3.11 Safety and Security (i.e., emergency services, wildfire hazards, community safety, and security), of the Final EIS, only the area of emergency vehicle response delays have adverse effects after the implementation of IAMFs, mitigation measures, and BMPs. Through effective implementation of roadway improvements, project features will minimize permanent construction impacts on the exposure of motor vehicle drivers, pedestrians, and bicyclists to traffic hazards, and these users will benefit from overpasses and underpasses, local street widening, traffic restrictions, new traffic signals, and intersection improvements that are part of the Project.

Construction of the Selected Alternative, as well as any of the other project alternatives, will result in temporary closures of and modifications to certain roadways during construction, which will result in temporary delay to emergency vehicle response in certain areas, with the Selected Alternative having the least amount of roadway closure during construction. Alternatives 1, 2, and 3 would narrow Monterey Road during construction, which would result in delays to emergency vehicle response. The Selected Alternative will not entail narrowing Monterey Road, but there will be temporary delays caused by temporary detours and closures associated with construction.

To address these impacts, the Authority will, in collaboration with construction contractors and/or local jurisdictions, prepare and implement plans to maintain emergency vehicle access during construction and to establish procedures for implementing temporary road and lane closures. The Authority will coordinate efforts between the construction contractor and local jurisdictions to minimize conflicts and maintain pedestrian, bicycle, and transit access.

Construction of the Selected Alternative, as well as any of the other project alternatives, will result in increased traffic around the San Jose Diridon Station, which will result in emergency vehicle response delays. Operations of the Selected Alternative will result in increased gate-down time at at-grade crossings, which will result in delays to emergency response in certain locations. To reduce this impact, emergency vehicle priority at traffic signals will be installed. Mitigation for the Selected Alternative will also include additional emergency response improvements, such as emergency vehicle bypass lanes, provision of additional equipment to emergency providers, increase in emergency services, and construction of new fire stations, among other options as necessary to address adverse emergency response delays due to implementation of the Selected Alternative. This mitigation will fully mitigate the Selected Alternative's impacts on emergency vehicle response time, if implemented. While the Authority can provide funding for these improvements, it cannot compel the City of San Jose, Santa Clara County, the City of Morgan Hill, or the City of Gilroy to construct and operate the improvements. If local jurisdictions do not implement emergency vehicle response improvements with the Authority funding for construction, proposed site-specific traffic mitigation measures that address peak-hour delays at intersections adjacent or nearby to locations with significant emergency vehicle response time effects due to gate-down time (TR-MM#1e, TR-MM#1t, TR-MM#1u, TR-MM#1w, TR-MM#1x.6, TR-MM#1x.8, TR-MM#1x.9, and TR-MM#1x.10) will help to reduce congestion near at-grade crossings but will not eliminate delays at the at-grade crossings themselves.

## 5.7 Agricultural Farmland

As discussed in Section 3.14, Agricultural Farmland, of the Final EIS, construction of the Selected Alternative will have direct and indirect impacts on Important Farmland. Direct impacts will include the temporary use of Important Farmland during construction, in addition to the permanent conversion of Important Farmland to nonagricultural use.

Indirect impacts on Important Farmland by the Selected Alternative will include permanent creation of remnant parcels of Important Farmland during construction, as well as temporary and permanent disruption of agricultural infrastructure affecting Important Farmland during construction. The Selected Alternative will result in the temporary use of 461 acres of Important Farmland, which is the least impact of the project alternatives.

The Selected Alternative will also result in the permanent conversion of Important Farmland to nonagricultural use caused by direct use of the land. Construction of the Selected Alternative and other project alternatives, including acquisition of land for the construction of the HSR right-of-way, access easement, stations, and maintenance facilities, will require the long-term use of Important Farmland, resulting in direct permanent impacts or the conversion of Important Farmland to a nonagricultural use. Construction of the Selected Alternative will result in permanent conversion of 1,033 acres of Important Farmland, which is the least impact of the project alternatives.

Included in the 1,033 acres of Important Farmland permanently converted to nonagricultural use by construction of the Selected Alternative, 17.8 acres are within agricultural conservation easements. This is more than Alternative 1 and less than Alternatives 2 and 3.

The Selected Alternative will result in indirect permanent conversion of 147 acres of Important Farmland through the creation of remnant parcels. This will have the least impact among the project alternatives proposed. From the standpoint of access and the disruption of agriculture infrastructure, the Selected Alternative will result in the permanent closure of 12 roads and in 3 permanent farm road modifications. This is the least impact among the four project alternatives, because the Selected Alternative will be built where possible within an existing railroad right-of-way.

Construction of the Selected Alternative will have the least temporary disruption of electrical lines and pipelines or canals serving Important Farmland.

During operations, HSR trains will generate wind along the sides and at the rear of the train (known as *wake*); however, the impact from wind will be minimal and will not lead to the indirect permanent conversion of Important Farmland to nonagricultural use. Operations and maintenance activities associated with the electrical transmission facilities will be the same for all project alternatives as under existing conditions. The electrical transmission facilities will not generate any wind and will not lead to the indirect permanent conversion of Important Farmland to nonagricultural use.

The Authority has developed IAMFs to avoid or minimize the Selected Alternative's impacts on Important Farmland (refer to Appendix C). However, even with adherence to these IAMFs, the Selected Alternative will still result in the permanent conversion of Important Farmland to a nonagricultural use. To offset these impacts, the Authority will, through an agreement with the California Department of Conservation, fund the California Farmland Conservancy Program's work to identify suitable agricultural land for mitigation of impacts and to fund the purchase of agricultural conservation easements from willing sellers at a replacement ratio of 1:1 for lands that are directly permanently converted to nonagricultural use by the Project. This agreement provides for the purchase of agricultural conservation easements to preserve Important Farmland in an amount commensurate with the quantity and quality of converted farmlands. Additionally, to mitigate impacts, the Authority will minimize the area of Important Farmland converted near aerial guideways near Casa de Fruta, which will also result in minor localized beneficial effects for wildlife. Also, prior to construction, the Authority will coordinate with property owners to evaluate potential for modified access to remnant parcels, to allow continued use of agricultural lands and

facilities, and to determine drainage facility relocations so that relocations will reduce impacts on continued operations of the drainage facilities. Mitigation to reduce impacts on Important Farmland will benefit the agricultural community by preserving land for agricultural uses.

## 5.8 Aesthetics and Visual Quality

As discussed in Section 3.16, Aesthetics and Visual Quality, of the Final EIS, construction of the Selected Alternative will cause temporary impacts on visual character and quality by introducing construction activities and equipment into the viewsheds of all viewer groups, including worker parking and equipment and materials storage areas. Impacts will be greater where there are sensitive viewers or where larger portions of the Selected Alternative will be visible. Construction will be visible from some locations with scenic vistas, such as from elevated roadways and bridges that cross or parallel the existing rail corridors or from adjacent multilevel buildings, degrading visual quality where sensitive viewers are present.

During construction of the Selected Alternative, construction staging areas, precast yards, tunnel portals, maintenance facilities, station sites, and other HSR buildings would have temporary nighttime lighting for security and safety that would create a new source of light that would adversely affect nighttime views. Operation of the Selected Alternative will result in permanent direct visual impacts from the increase in lighting levels at HSR facilities in rural agricultural settings where existing nighttime light levels are low, including an MOWF south of Gilroy and an MOWS in the San Joaquin Valley. In these locations near HSR facilities, project features will reduce impacts on nighttime light levels through visually sensitive lighting design, but they will not eliminate the presence of nighttime light. Unlike Alternatives 1, 2, and 3, the Selected Alternative will not have adverse effects from nighttime operation of trains because spillover light from passing trains will be similar to existing light from passenger and freight trains. The Selected Alternative will have less train light spillover compared to the other project alternatives because it will run at grade, and the light spillover will be contained by existing vegetation and noise barriers. Also, the Selected Alternative will operate in blended service with Caltrain in urbanized areas, with lights from HSR similar to lights from existing passenger and freight service, resulting in the least impact of the four project alternatives. In other locations, the overall impact from light spillover will be the same under all four project alternatives.

Construction of the Selected Alternative will cause direct permanent impacts on visual character and quality resulting from physical changes of the landscape that alter the existing visual character or that block, screen, obstruct, or interfere with views of scenic resources and important visual landmarks, resulting in degraded visual quality. In general, permanent construction impacts will be greater where the HSR is on viaduct and the scale of the infrastructure dominates the existing landscape. The Selected Alternative will have the lowest operations impact on aesthetics and visual quality because the at-grade alignment will be mostly within the Caltrain right-of-way, both within the San Jose Diridon Station Approach Subsection and the Monterey Corridor Subsection, and it will be at grade mostly within the UPRR right-of-way within the Morgan Hill and Gilroy Subsection.

To avoid or lessen other visual impacts of the Selected Alternative, the Authority has developed IAMFs, which include adherence to the Authority's aesthetic guidelines and review process for non-station structures. The application of station area development principles will help to maximize the performance of the transportation investment, enhance the livability of the communities it serves, create long-term value, and sensitively integrate the Project into the communities along the HSR system corridor. The Authority will encourage context-sensitive designs by working with local governments to enhance the public benefits of HSR station development so that they meet the needs of the local communities.

To further reduce potential adverse visual effects associated with construction of the Selected Alternative, the Authority has developed mitigation measures that will require contractors to minimize and/or screen construction areas and to minimize or avoid nighttime light disturbance. These measures will also require the Authority to engage with local communities to help inform the design of elevated guideways so that they are more visually harmonious with the local context. Landscape treatments and other plantings after construction will also help enhance

visual quality. Mitigation measures also include ensuring the prompt treatment of graffiti on new infrastructure.

## 5.9 Cultural Resources

As discussed in the *San Jose to Merced Project Section 106 Finding of Effect Report* (Authority 2020d) and Section 3.17, Cultural Resources, of the Final EIS, the Selected Alternative will affect pre-contact and historic-era archaeological resources and historic built environment resources and may affect presently unknown or undiscovered cultural resources. Construction of the Selected Alternative will adversely affect the fewest historic built resources (5) compared to Alternatives 1 and 3 (7), and Alternative 2 (11). The Selected Alternative will have an adverse effect on five built environment historic properties, including three that will be demolished (the Madrone Underpass, Live Oak Creamery, and the Cozzi Family Property). Additionally, construction of new HSR station facilities will remove character-defining features and alter historic setting characteristics of the Southern Pacific Depot in San Jose and diminish the agricultural setting of the Negra Ranch.

Mitigation is available to address impacts, including: relocation of an historic property to avoid demolition (CUL-MM#4), preparation and submittal of additional recordation and documentation (CUL-MM#6) should design changes result in expansion of the area of potential effects, preparation of interpretive or educational materials (CUL-MM#7), and station design consistent with the Secretary of the Interior's Standards for the Treatment of Historic Properties (36 C.F.R. Part 68) (CUL-MM#10).

Because of limited access to private lands within the area of potential effects during development of the EIS, all project alternatives have the potential to damage previously unidentified archaeological sites prior to construction or buried sites found during construction. The Selected Alternative has the fewest archaeologically sensitive acres, including land in the existing right-of-way and new acquisition areas.

To avoid or minimize cultural resources impacts, the Authority will incorporate IAMFs, including requirements for additional surveys; training sessions for construction personnel to be able to identify cultural resources; a monitoring plan; a discovery plan; a procedure to be followed if unanticipated discoveries are made during ground-disturbing activities; and plans to protect and to avoid or minimize damage to historic properties. Additionally, the Selected Alternative will incorporate mitigation measures concerning both archaeological resources and built environment resources. Mitigation includes phased identification of archaeological and built environment resources, allowing for the potential discovery of previously unidentified resources once access to all properties within the construction area is secured.

Surveys for such resources will be conducted on all properties that have not been subject to prior surveys before construction begins. Should any resources be identified, the Authority will consult with Section 106 consulting parties and agree upon appropriate mitigation measures, which may include preservation in place, data recovery, or other appropriate steps outlined in the Built Environment Treatment Plan (Authority 2021b) or Archaeological Treatment Plan (Authority 2021c). Archaeological mitigation will set forth protocols and standards to ensure that any unanticipated discoveries are properly evaluated, avoided if possible, and treated and that will halt construction work in the area while such discoveries are evaluated.

## 5.10 Cumulative Impacts

As discussed in Section 3.19, Cumulative Impacts, of the Final EIS, adherence to IAMFs and/or mitigation measures will avoid or minimize most impacts associated with construction and operation of the Selected Alternative. However, when combined with other past, present, and reasonably foreseeable projects, the Selected Alternative, even with adherence to IAMFs and mitigation measures as appropriate, will contribute to cumulative construction and operations impacts in the following resource areas:

- Construction—Transportation, air quality, safety and security, agricultural farmland, aesthetics and visual quality, and cultural resources

- Operations—Noise, safety and security, and parks and recreation resources

Under the Selected Alternative, roadway closures and construction traffic associated with construction of the San Jose Diridon and Gilroy Stations will result in temporary effects on traffic networks, including bus transit. Operation of the Selected Alternative will result in localized increases in traffic levels in the San Jose Diridon and Gilroy Station areas. Operation of the Selected Alternative will also contribute to cumulative intersection delays due to increased gate-down time at existing at-grade crossings in downtown San Jose, along the Monterey Corridor, and in Morgan Hill and Gilroy. Even with the mitigation measures identified in Appendix C, the Selected Alternative will result in a cumulative impact under NEPA.

Construction of the Selected Alternative, in combination with cumulative projects, will increase emissions of carbon monoxide, nitrogen dioxide, PM<sub>2.5</sub>, and PM<sub>10</sub>. Even with mitigation, emissions will not be reduced below thresholds. Therefore, the Selected Alternative, in combination with cumulative projects, will result in a cumulative impact under NEPA.

Operation of the Selected Alternative, in combination with cumulative projects, will result in cumulative noise impacts. Even with the implementation of mitigation measures identified in Appendix C, the Selected Alternative will result in a cumulative impact under NEPA. However, the Authority will also incorporate certain offsetting mitigation measures into the Preferred Alternative, as discussed in Chapter 5 of the Final EIR/EIS. In particular, offsetting mitigation measures GWG-OMM#1 and GWG-OMM#2, related to noise mitigation in the form of sound walls or noise treatments for the Gardner/Willow Glen community south of downtown San Jose, will reduce cumulative noise effects from existing highway traffic; offsetting mitigation measure SC/NSJ-OMM#1, related to noise mitigation in the form of noise treatments for the Santa Clara and North San Jose community, will reduce cumulative noise effects from existing highway traffic; offsetting mitigation measure SJD-OMM#2, related to noise mitigation in the form of noise treatments for the San Jose Diridon community, will reduce cumulative noise effects from existing highway traffic; offsetting mitigation measures WGTA-OMM#3 and WGTA-OMM#4, related to noise mitigation in the form of noise treatments for the Washington/Guadalupe, Tamien, and Alma/Almaden community, will reduce cumulative noise effects from existing highway traffic and existing airplane noise; offsetting mitigation measure SSJ-OMM#3, related to noise mitigation in the form of noise treatments for the South San Jose community, will reduce cumulative noise effects from existing highway traffic; offsetting mitigation measure MH-OMM#3, related to noise mitigation in the form of noise treatments for the Morgan Hill community, will reduce cumulative noise effects from existing highway traffic; and offsetting mitigation measure G-OMM#6, related to noise mitigation in the form of noise treatments for the Gilroy community, will reduce cumulative noise effects from existing highway traffic. Therefore, although the incremental effect of operations for the Preferred Alternative will result in cumulative noise impacts for the corridor as a whole, the contribution of the project to cumulative operational noise impacts in the Gardner/Willow Glen; Santa Clara and North San Jose; San Jose Diridon; Washington/Guadalupe, Tamien, and Alma/Almaden; South San Jose; Morgan Hill; and Gilroy; communities would be reduced through the project's mitigation contribution towards sound walls or noise treatments.

With respect to emergency response and services, the Selected Alternative and other cumulative projects will result in temporary closures of and modifications to certain roadways during construction, which will result in temporary delay to emergency vehicle response in certain areas, with the Selected Alternative having the least amount of roadway closure during construction. Mitigation will provide funding for the City of San Jose, the City of Morgan Hill, and the City of Gilroy to implement emergency vehicle priority at traffic signals along Monterey Road, which will reduce the contribution to emergency vehicle delays during construction.

During operations, the Selected Alternative will also result in increased traffic around the San Jose Diridon Station and the Downtown Gilroy Station, which will result in emergency vehicle response delays. Mitigation will provide funding for the City of San Jose and the City of Gilroy to implement emergency vehicle priority at traffic signals near the stations, which will reduce the contribution to emergency vehicle delays during operation. The Selected Alternative will also

result in increased gate-down time at at-grade crossings, which will result in delays to emergency response in certain locations. Where monitoring identifies or forecasts impacts relative to at-grade crossings, the Authority will develop an Emergency Vehicle Priority Treatment Plan in conjunction with local agencies and will fund the necessary emergency vehicle response improvements that will be implemented by local jurisdictions. These improvements will reduce the Project's contribution to increased emergency response times. If the local jurisdictions are not able to implement all the necessary mitigation, the Selected Alternative in combination with planned and foreseeable projects will result in a cumulative impact under NEPA during operations.

The Selected Alternative, in combination with cumulative projects in the cumulative RSA, will result in a cumulative impact on agricultural farmland because construction will permanently convert large areas of agricultural farmland to nonagricultural uses or indirectly by creating remnant parcels, despite project features. To mitigate this impact, the Authority will fund the California Farmland Conservancy Program's work to identify suitable agricultural land for mitigation of impacts and to fund the purchase of agricultural conservation easements from willing sellers. The Authority will also minimize the area required to operate and maintain the aerial guideway.

Operation of the Selected Alternative, in combination with cumulative projects, will result in cumulative impacts on parks, recreational facilities, open space resources, or school district play areas. Even with adherence to the mitigation measures identified in Appendix C, the operation of the Selected Alternative will result in a cumulative impact under NEPA.

Construction of the Selected Alternative and other project features, combined with other cumulative projects, will result in permanent cumulative aesthetic impacts because the visual quality and setting will be degraded. The Selected Alternative includes aesthetic guidelines and an aesthetic review process to integrate HSR infrastructure into the surrounding landscape and local context. Mitigation will include incorporating aesthetic design preferences into final design, providing vegetation screening adjacent to residential areas, replanting unused portions of land, and screening traction power facilities and radio towers. Nonetheless, the Selected Alternative will result in a cumulative impact under NEPA.

Construction of the Selected Alternative, in combination with cumulative projects, will result in cumulative impacts on built historic resources. Even with the mitigation measures identified in Appendix C, the Selected Alternative will result in a cumulative impact under NEPA.

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## 6 MITIGATION COMMITMENTS AND MONITORING

The Authority will supervise construction and require implementation of mitigation measures for the Selected Alternative. The Authority is responsible for ensuring that these commitments are implemented, and the Authority has a full oversight role for this Project. It is also expected that USACE, the State Water Resources Control Board, and the California Department of Fish and Wildlife will make frequent compliance reviews to ensure that all conditions of their respective permits are satisfied. Consistent with 40 C.F.R. Section 1505.2(c), all practicable means to avoid or minimize environmental harm caused by the Selected Alternative have been identified and incorporated as IAMFs. Further means to reduce and/or compensate for environmental impacts have been identified and included as mitigation measures included in the MMEP (Appendix C). The Authority will monitor the implementation of environmental commitments in the MMEP consistent with the NEPA Assignment MOU and with CEQ regulations and guidance.

The MMEP describes mitigation measures that will avoid, minimize, or compensate for reasonably foreseeable environmental impacts that result from constructing and operating the San Jose to Merced Project Section of the California HSR System. These measures were developed by the Authority, pursuant to its responsibilities under NEPA Assignment, in consultation with appropriate agencies, as well as with input received from the public.

The Selected Alternative also incorporates the IAMFs and BMPs that are identified in the MMEP. The Authority, as part of the Final EIS, identified these measures to avoid and minimize potential project impacts. The Authority will apply these IAMFs and BMPs to avoid impacts in several resource areas. Regulatory requirements (such as hazardous material disposal and various mandatory safety strategies) provide additional assurance that impacts on the environment will not occur or will be minimized to the fullest extent practicable. The applicable regulatory requirements and the IAMFs that are part of the Selected Alternative are described in more detail in the MMEP. The IAMFs are a condition of project approval and must be implemented by the Authority during design, construction, and operation of the Selected Alternative approved by this ROD.

All IAMFs and mitigation measures are included within the MMEP. The Authority is required to comply with all mitigation measures adopted with this ROD. The MMEP, as incorporated into this ROD, is a formal commitment by the Authority to carry out all of the measures identified therein as a condition of project approval. Therefore, in designing, constructing, and operating the Selected Alternative, the Authority is required to adhere to and provide appropriate funding for all IAMFs and mitigation measures in the MMEP.

The Authority will implement an Environmental Management System consisting of strategic planning, policies, and procedures; organizational structure; staffing and responsibilities; milestones; schedule; and resources devoted to achieving the Authority's environmental commitments. The Environmental Management System will also track the implementation of environmental requirements and compliance reports. This system will rely on data from the Authority's contractor, regional consultants, permitting activities, monitoring, inspections, and other compliance activities. This database will be managed by the Authority. Agency partners, including FRA, will receive regular updates from meetings and reports that will demonstrate compliance and progress relevant to their regulatory requirements.

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## 7 SUMMARY OF COMMENTS RECEIVED AFTER RELEASE OF THE FINAL EIS

Following publication of the Final EIS, the Authority received 54 written comment submittals prior to the April 28, 2022, Board meeting. Staff reached out to individual commenters throughout the waiting period and until the Board meeting and provided responses. No issues were identified in the comments that were not previously addressed.

The range and types of comments received by the Authority during the waiting period included concerns and questions on the following topics:

- General opposition to the project
- General support of the project
- Property acquisition process and timing
- Project impacts to specific properties
- Grade crossings
- Wildlife movement
- Environmental Justice community improvements
- Requests for assistance interpreting Volume 3, Preliminary Engineering for Project Design Record
- Requests for copies of the environmental document(s) or supporting technical studies

The public verbal comments provided at the April 27, 2022, Board meeting, covered the following topics:

- Project impacts on the Grasslands Ecological Area and related mitigation
- General support for the project
- Appreciation for environmental justice offsetting mitigation measures
- Readiness of Gilroy Transit Center for the project
- Priorities for infrastructure to support high-speed rail including electrification, crossings, stations, and platforms

At the April 28, 2022, Board meeting the Board received a presentation with information in response to public comments as well as several topics or questions raised by Board members during the April 27, 2022, Board meeting. These topics included the following:

- Emergency vehicle response delay
- Gardner community impacts and mitigation
- Vierra Ranch property displacements and mitigation
- Grasslands Ecological Area impacts, mitigation, and development of a cooperative agreement

Summaries of and responses to all written correspondence received are included in Appendix H, Comments Received Between the Publication of the Final EIR/EIS and the April 28, 2022, Board meeting.

In issuing this ROD, the Authority has considered all comments received following the publication of the Final EIS, the Draft ROD, as well as the comments previously received on the Draft EIS and Revised/Supplemental Draft EIR/EIS.

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## 8 CORRECTIONS TO FINAL EIS

As a part of the Authority's review of the San Jose to Merced Project Section Final EIS, several minor corrections and clarifications were identified. Corrections are identified in Appendix I of this document. The corrections and clarifications are not considered significant new information and do not change the analysis or conclusions of the EIS. These corrections and clarifications address items already covered in the Final EIS. These clarifications do not trigger the need to prepare a supplement, per the CEQ NEPA regulations (40 C.F.R. § 1502.9(c)(1)). The errata described within Appendix I are herewith corrected in the Final EIS and associated technical reports for the San Jose to Merced Project Section of the California HSR System.

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## 9 DECISION

The Authority finds that Alternative 4, with the DDV and TDV, the San Jose Diridon and Downtown Gilroy Stations, the MOWF south of Gilroy, and an MOWS west of Turner Island Road in the Central Valley—with the specific limits extending from Scott Boulevard in Santa Clara to Carlucci Road in Merced County—identified in the Final EIS as the Preferred Alternative is the Selected Alternative. In making this finding, the Authority concludes that, among the alternatives considered, the Selected Alternative best fulfills the purpose and need and objectives for the Project while balancing impacts on the natural and human environment.

In reaching this decision, the Authority considered the physical and operational characteristics and potential environmental consequences associated with all considered San Jose to Merced Project Section alternatives. The Authority, as lead agency, consulted with the cooperating agencies and considered the Draft EIS, Supplemental Draft EIS, and Final EIS, including the analysis of the No Action Alternative, all project alternatives, and all public and agency comments received during the review periods in reaching this decision.

The cooperating agencies may issue their own decision documents, as appropriate, consistent with their statutory and regulatory responsibilities.

### 9.1 Section 106

Section 106 of the NHPA (16 U.S.C. § 470f) requires that any federal agency having direct or indirect jurisdiction over a proposed federal or federally assisted undertaking take into account the effect of the undertaking on any district, site, building, structure, or other object that is listed or eligible for listing on the NRHP. The FRA, SHPO, the Authority, and the Advisory Council on Historic Preservation executed the *Programmatic Agreement among the Federal Railroad Administration, the Advisory Council on Historic Preservation, the California State Historic Preservation Officer, and the California High-Speed Rail Authority Regarding Compliance with Section 106 of the National Historic Preservation Act, As It Pertains to the California High-Speed Train Project* (Section 106 PA) in 2011 (FRA et al. 2011) and extended the Section 106 PA by executing a First Amendment on July 21, 2021 (FRA et al. 2021). The Section 106 PA sets forth numerous requirements intended to ensure appropriate treatment of historic resources during ground-disturbing activities associated with project construction. The Section 106 PA also provides protocols for how and when formal eligibility determinations will be made. Eligibility determinations will be made by the appropriate agency based on information presented in the appropriate, completed state site records forms. Moreover, the Section 106 PA sets forth requirements for tribal monitoring of construction activities to help ensure protection of cultural resources that may be encountered. Adherence to the terms of the Section 106 PA will fulfill all obligations under Section 106.

In accordance with the Section 106 PA, an MOA for the treatment of adverse effects on historic properties in the San Jose to Merced Project Section of the California HSR System was executed by the SHPO and the Authority on March 11, 2022. The following entities were invited to sign the MOA as concurring parties:

- Amah Mutsun Tribal Band
- Amah Mutsun Tribal Band of Mission San Juan Bautista
- Indian Canyon Mutsun Band of Costanoan
- North Valley Yokuts Tribe
- Tamien Nation
- City of San Jose
- City of Gilroy
- San Jose Historical Landmarks Commission
- Santa Clara Valley Transportation Authority

Additionally, the STB is an invited signatory to the MOA. The MOA summarizes the results of the Section 106 process and the treatment measures for both aboveground and below-ground cultural resources.

The assessment of adverse effects required under Section 106 of the NHPA was documented in the *San Jose to Merced Project Section, Section 106 Finding of Effect Report* (Authority 2020d) that was approved by SHPO on March 27, 2020, in a Concurrence Letter (see Appendix D).

## 9.2 Section 4(f)/6(f)

Projects that are undertaken by an operating administration of the U.S. Department of Transportation (DOT) or that may receive federal funding and/or discretionary approvals from such an operating administration must demonstrate compliance with Section 4(f) of the DOT Act of 1966. Section 4(f) protects publicly owned lands that are parks, recreational areas, and wildlife refuges. Section 4(f) also protects historic sites (including archaeological resources) of national, state, or local significance that are on public or private land.

Under the NEPA Assignment MOU, the Authority has been delegated the power to make determinations under Section 4(f). The NEPA Assignment MOU stipulates that the Authority must consult with the FRA prior to making any constructive use determination but otherwise delegates all responsibilities under Section 4(f) to the Authority. As further detailed below, there is no constructive use determination associated with the San Jose to Merced Project Section.

As described in Chapter 4, Final Section 4(f)/6(f) Evaluations, of the Final EIS, Section 4(f) properties were considered throughout the planning and alternatives development and analysis process to avoid and minimize impacts on resources protected by Section 4(f). During this process, the Selected Alternative was designed to avoid direct adverse effects on parks, recreational areas, and historic resources, including Reed Street Dog Park; Los Gatos Creek Trail and Park; Guadalupe River Trail, Reach 6; Sunlite Baking Company; Coyote Creek Trail; Stevens/Fisher House; Barnhart House; Morgan Hill Community and Cultural Center; IOOF Orphanage Home; and Cottonwood Creek Wildlife Area. The Final EIS contains the Authority's evaluation of whether the San Jose to Merced Project Section project alternatives will result in any of the following "uses" of properties protected under Section 4(f):

- Permanent use (which encompasses permanent easements or temporary easements that exceed limits for temporary occupancy),
- Temporary occupancy, and
- Constructive use.

Impacts were then evaluated to see if the criteria for a *de minimis* impact determination were met, and appropriate coordination with officials having jurisdiction over each resource was conducted. There are 84 Section 4(f) properties in the Selected Alternative's RSA for recreational and cultural resources. Of the 84 properties evaluated, 1 park/recreational resource (Fuller Park) was determined to have *de minimis* impacts, 2 parks (Coyote Creek Parkway County Park and Field Sports County Park) were determined to have a temporary occupancy, 1 park (Coyote Creek Parkway County Park) was determined to have a permanent use, 4 historic properties (Southern Pacific Depot [Diridon Station/Hiram Cahill Depot], Cozzi Family Property, Madrone Underpass, and Live Oak Creamery) were determined to have a permanent use, and 1 historic property (San Martin Winery) was determined to have a *de minimis* impact. The remaining properties did not have a Section 4(f) use. The Authority issued its Draft Section 4(f) Evaluation in the Draft EIS. The Authority prepared a draft individual Section 4(f) assessment for Coyote Creek Parkway County Park and Field Sports County Park and provided it to Santa Clara County Parks and Recreation Department on January 7, 2022 for a 45-day review period, which concluded on February 22, 2022. The Authority received comments from Santa Clara County Parks and Recreation Department on February 22, 2022. The Section 4(f) Evaluation was finalized in the Final EIS, and the final individual Section 4(f) assessment for Coyote Creek Parkway County Park and Field Sports County Park is presented as Appendix J to this ROD. The analysis and information in the Section 4(f) Evaluation included with the Final EIS is incorporated herein by reference, as is the analysis in Appendix J.

### 9.2.1 Measures to Minimize Harm/Mitigation

The Authority developed measures to minimize harm to Southern Pacific Depot [Diridon Station/Hiram Cahill Depot], Cozzi Family Property, Madrone Underpass, Live Oak Creamery, Coyote Creek Parkway County Park, and Field Sports County Park resources during project planning to avoid or minimize impacts, as well as mitigation measures to compensate for unavoidable project impacts. Table 4-10 of the Final EIS, which is incorporated herein by reference, lists the measures identified by the Authority to minimize harm, as required by 49 U.S.C. 303(c)(2). The measures identified in Table 4-10 of the Final EIS that are applicable to the Selected Alternative are now incorporated into the Selected Alternative. The Authority is continuing ongoing coordination, as appropriate, with the officials with jurisdiction over the Section 4(f) properties. During the Authority’s consideration of its decision and during final design, the Authority, in consultation with the officials with jurisdiction, may identify and implement additional measures to further reduce potential impacts on the Southern Pacific Depot (Diridon Station/Hiram Cahill Depot), Cozzi Family Property, Madrone Underpass, Live Oak Creamery, Coyote Creek Parkway County Park, and Field Sports County Park.

### 9.2.2 Section 4(f)/6(f) Determination

Section 4(f) requires the selection of an alternative that avoids the use of a Section 4(f) property if that alternative is deemed feasible and prudent and the use does not qualify for a finding of *de minimis* impact. After making a Section 4(f) determination and identifying measures to minimize harm, if there is more than one alternative that results in the use of a Section 4(f) property, the Authority must also compare the alternatives to determine which alternative has the potential to cause the least overall harm in light of the preservationist purpose of the statute.

As described in Chapter 4 of the Final EIS, the Authority has made a *de minimis* determination under 49 U.S.C. 303(d) for Fuller Park. The Director of the City of San Jose Department of Parks, Recreation, and Neighborhood Services, the official with jurisdiction over Fuller Park, concurred in writing with this finding on September 21, 2021 (see Appendix G).

As described in Chapter 4 of the Final EIS and in Appendix J, the Authority has made a determination that the Selected Alternative will result in a temporary occupancy of land that is adverse in terms of the Section 4(f) statute's preservation purpose and a permanent use under Section 4(f) for Coyote Creek Parkway County Park. As noted above, the Authority came to this determination after undertaking an evaluation to conclude that there are no feasible or prudent avoidance alternatives to the Selected Alternative, the Selected Alternative includes all possible planning to minimize harm to these Section 4(f) properties resulting from such use, and the Selected Alternative will cause the least overall harm in light of Section 4(f)'s preservation purpose.

As described in Chapter 4 of the Final EIS and in Appendix J, the Authority has made a determination that there is a temporary occupancy of land that is adverse in terms of the statute's preservation purpose for Field Sports County Park. As noted above, the Authority came to this determination after undertaking an evaluation to conclude that there are no feasible or prudent avoidance alternatives to the Selected Alternative, the Selected Alternative includes all possible planning to minimize harm to these Section 4(f) properties resulting from such use, and the Selected Alternative will cause the least overall harm in light of Section 4(f)'s preservation purpose.

As described in Chapter 4 of the Final EIS and in Appendix J, the Authority has made a determination that the Selected Alternative will result in a permanent use of land that is adverse in terms of the Section 4(f) statute's preservation purpose and a permanent use under Section 4(f) for Coyote Creek Parkway County Park. As noted above, the Authority came to this determination after undertaking an evaluation to conclude that there are no feasible or prudent avoidance alternatives to the Selected Alternative, the Selected Alternative includes all possible planning to minimize harm to these Section 4(f) properties resulting from such use, and the Selected Alternative will cause the least overall harm in light of Section 4(f)'s preservation purpose.

As described in Chapter 4 of the Final EIS, the Authority has made a *de minimis* determination under 49 U.S.C. 303(d) for San Martin Winery. The California SHPO, the official with jurisdiction over San Martin Winery, concurred in writing with the no adverse effect finding on March 27, 2020 (see Appendix G).

As described in Chapter 4 of the Final EIS, the Authority has made a determination that there is a permanent use under Section 4(f) for four historic properties: Southern Pacific Depot (Diridon Station/Hiram Cahill Depot), Cozzi Family Property, Madrone Underpass, and Live Oak Creamery. As described in Chapter 4 of the Final EIS, the Authority came to this determination after undertaking an evaluation to conclude that there are no feasible or prudent avoidance alternatives to the Selected Alternative, the Selected Alternative includes all possible planning to minimize harm to these Section 4(f) properties resulting from such use, and the Selected Alternative will cause the least overall harm in light of Section 4(f)'s preservation purpose.

Among all of the San Jose to Merced Project Section project alternatives, the Selected Alternative will result in the least overall harm to resources protected by Section 4(f) because the Selected Alternative will have an impact on the fewest Section 4(f) resources of all of the project alternatives analyzed in the Draft EIS and Final EIS. Thus, the Selected Alternative will cause the least overall harm to Section 4(f) resources.

There are four Section 6(f) properties within the RSA: Guadalupe River Park, Guadalupe Gardens (part of Guadalupe River Park), San Luis Dinosaur Development (part of San Luis Reservoir State Recreation Area), and the Cottonwood Creek Wildlife Area (NPS 2016). The Selected Alternative will not require permanent or temporary acquisition of land from any of the Section 6(f) properties. In addition, construction activities will not occur within any of the resources. While construction of the tunnel underneath Cottonwood Creek Wildlife Area may result in the lowering of groundwater due to tunnel inflows, Mitigation Measures BIO-MM#9 and HYD-MM#1 will avoid affecting wildlife function. Therefore, no impacts on Section 6(f) resources will occur.

### 9.3 General Conformity Determination

As part of the environmental review of the San Jose to Merced Project Section, the Authority conducted and FRA approved a general conformity evaluation pursuant to 40 C.F.R. Part 93, Subpart B. The Authority conducted the general conformity evaluation following all regulatory criteria and procedures and in coordination with the USEPA, BAAQMD, SJVAPCD, and the California Air Resources Board. As a result of this review, the FRA concluded, because project-generated emissions will either be fully offset (for construction phase) or less than zero (for operational phase), that the Project's emissions can be accommodated in the state implementation plan for the SFBAAB and SJVAB.

The FRA has determined that the Project as designed will conform to the approved state implementation plan based on the following:

- The Authority will commit that construction-phase NO<sub>x</sub> emissions will be offset consistent with the applicable federal regulations by entering into an agreement with BAAQMD and through the Authority's existing commitments in its June 2014 MOU and VERA with the San Joaquin Valley Unified Air Pollution Control District (Authority and SJVAPCD 2014), respectively.
- The Authority will enter into a contractual agreement with BAAQMD and has executed a contractual agreement with SJVAPCD to mitigate the Project's NO<sub>x</sub> emissions by providing funds to BAAQMD and SJVAPCD to fund grants for projects that achieve the necessary emission reductions.
- BAAQMD and SJVAPCD will seek and implement the necessary emission reduction measures, using Authority funds.
- BAAQMD and SJVAPCD will serve as administrators of the emissions reduction projects and verifiers of the successful mitigation effort.

Therefore, the FRA has concluded that the proposed Project, as designed, conforms to the purpose of the approved state implementation plan and is consistent with all applicable general conformity requirements. The Final General Conformity Determination is included with this ROD as Appendix A.

#### 9.4 Section 7 Endangered Species Finding

The proposed action (construction and operation of the Selected Alternative) is in compliance with Section 7 of the ESA. Because the proposed action is likely to affect threatened or endangered species subject to USFWS and NMFS jurisdiction, the Authority prepared a joint BA for the Project and consulted with USFWS and NMFS, as required under Section 7 of the FESA. After evaluating the potential effects of the proposed action, and after additional informal consultation with the USFWS and NMFS, the Authority determined that the San Jose to Merced Project Section may affect, and is likely to adversely affect, the following species:

- Metcalf Canyon jewelflower (endangered)
- Santa Clara Valley dudleya (endangered)
- Bay checkerspot butterfly (threatened)
- Vernal pool fairy shrimp (threatened)
- Vernal pool tadpole shrimp (threatened)
- Valley elderberry longhorn beetle (threatened)
- Steelhead–central California coast DPS (threatened)
- Steelhead–south-central California coast DPS (threatened)
- California red-legged frog (threatened)
- California tiger salamander (threatened)
- Least Bell’s vireo (endangered)

The Authority developed and submitted the BA, which evaluated direct, indirect, and cumulative effects of the Project on federally listed species and their designated critical habitat, to the NMFS and USFWS in early 2020 and requested the initiation of formal Section 7 consultation. The BA was subsequently revised and resubmitted in October 2020 to address NMFS comments. The Authority’s informal and formal Section 7 consultation with USFWS and NMFS has been ongoing and was instrumental in scoping the biological resource analysis for the EIS Documents, as well as for the BA. The Authority held numerous meetings with USFWS and NMFS following submittal of the BA to each agency. The Authority consulted with both agencies regarding effects on listed species, conservation measures, and overall findings in each agency’s BO.

NMFS issued its BO and completed consultation on June 24, 2021 (Appendix E). USFWS issued its BO and completed consultation on December 22, 2021 (Appendix B). In the BOs, USFWS and NMFS concurred with the determinations made by the Authority regarding federally listed species that would not be adversely affected and for species that would be affected, determined that the proposed action is not likely to jeopardize the continued existence of any federally listed species. The BOs each contain an Incidental Take Statement, and, consistent with Section 7 requirements, the BOs also stipulate several reasonable and prudent measures to avoid or minimize potential incidental take of listed species. The Authority will implement the measures identified in the USFWS and NMFS BOs.

The Coyote hydrologic unit (18050003) within the Santa Clara Valley region contributes to the EFH watershed historically utilized by both coho and Chinook salmon. The Authority also consulted with NMFS in accordance with the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. § 1855(b)) for this action. NMFS concluded that the Project will adversely affect the EFH of coho and Chinook salmon in the action area and included EFH Conservation Recommendations in the BO. As required by Section 305(b)(4)(B) of the Magnuson-Stevens Fishery Conservation and Management Act, the Authority provided a detailed response to NMFS regarding its ability to implement the EFH Conservation Recommendations within 30 days of receipt of the BO (Appendix E).

## 9.5 Wetlands Finding

In addition to NEPA and other environmental laws, the federal lead agency is also required to make findings pursuant to U.S. Executive Order 11990, Protection of Wetlands (May 24, 1977), and the DOT Wetlands Order, DOT Order 5660.1A, Preservation of the Nation's Wetlands (August 24, 1978).

Aquatic resources in the vicinity include several types of wetlands as well as other waters (i.e., streams, lakes, and other open water features) as verified by the USACE under a preliminary jurisdictional determination issued on December 5, 2019. The Project will require authorization under Section 404 of the CWA. Construction of the Selected Alternative will have direct and indirect impacts on aquatic resources. Portions of the project extent that cross or abut aquatic resources will result in placement of fill (e.g., for construction of bridge supports), installation of culverts, and associated in-channel work. Construction of track and systems could also alter surface and subsurface hydrology that supplies or drains aquatic features. Additional effects on aquatic resources may result from groundwater reduction during tunnel construction and the associated disruption of hydrologic cycles of surface water resources. Though impacts on waters of the United States may occur as part of the Selected Alternative, in April 2020, the USEPA and the USACE provided letters on the preliminary LEDPA determination by the Authority. Both agencies concurred that Alternative 4 represents the preliminary LEDPA for the San Jose to Merced Project Section. Design requirements and permit conditions will require contractors to avoid impacts on jurisdictional waters wherever feasible. The requirements identified in the MMEP, incorporated as part of this document (Appendix C), will minimize the destruction, loss, or degradation of wetlands and preserve and enhance the natural and beneficial values of wetlands.

To the maximum extent practicable, the Authority will implement pre- and post-construction BMPs for sediment and erosion control. The measures and features included in the MMEP will reduce and offset impacts on wetlands to a level sufficient to achieve no net loss. However, if determined to be necessary by USACE or the State Water Resources Control Board, these measures may be increased through their respective permitting processes, or additional measures may be recommended and reflected in other project permits and authorizations.

Based upon USACE findings and the Authority's evaluation, the Authority determines that the Project is consistent with U.S. Executive Order 11990 and DOT Order 5660.1A.

## 9.6 Floodplains Finding

DOT Order 5620.2 implements U.S. Executive Order 11988, Floodplain Management (May 24, 1977). These orders state that the federal lead agency may not approve an alternative involving a significant encroachment unless the agency can make a finding that the proposed encroachment is the only practicable alternative. The major purposes of U.S. Executive Order 11988 are to avoid federal support for floodplain development; to prevent uneconomic, hazardous, or incompatible use of floodplains; to restore and preserve the natural and beneficial floodplain values; and to be consistent with the standards and criteria of the National Floodplain Insurance Program.

Construction of the Selected Alternative will place new structures and/or modify existing structures within 100-year floodplains regulated by the Federal Emergency Management Agency, which will result in changes to channel geometry and flood flow characteristics and have the potential to result in permanent impacts on floodplain hydraulics. However, with implementation of IAMFs, which will require flood protection measures that minimize effects on 100-year floodplain water surface elevations, no permanent effects on designated floodplains from construction will occur. As indicated in Section 3.8, Hydrology and Water Resources, of the Final EIS, the Authority, as the federal lead agency under the NEPA Assignment MOU, concludes that the Selected Alternative will not result in any substantial adverse impacts on floodplains, will not result in a substantial change in flood risks, and will not substantially affect access to the facilities for maintenance and other activities at either the new bridge located upstream from existing railroad bridges over the Guadalupe River or the reconstructed bridge over Llagas Creek.

Design of the Selected Alternative also includes effective measures to avoid or minimize the potential for exposure of HSR passengers and employees to flooding, and new or additional exposure to flooding risks and hazards from the failure of a levee or dam will not occur. Based upon these findings, the Authority determines that the proposed action is consistent with requirements of U.S. Executive Order 11988.

## 9.7 Environmental Justice Finding

U.S. Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (February 16, 1994), and the DOT Order 5610.2C, U.S. Department of Transportation Actions to Address Environmental Justice in Minority Populations and Low-income Populations (May 14, 2021) (USDOT 2021), require that each federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations (“environmental justice communities”).

The San Jose to Merced Project Section project alternatives, including the Selected Alternative, will result in adverse effects on all populations, including low-income populations or minority populations, residing or conducting business at certain locations along the project corridor in Santa Clara, parts of San Jose, Morgan Hill, Gilroy, and the San Joaquin Valley. The Authority has held more than 250 meetings, briefings, and outreach activities to date with community stakeholders, businesses, local agencies, and elected officials in environmental justice communities to gather, confirm, and understand key community concerns so that these concerns are considered both in the development of project alternatives and during the environmental process. As discussed in Chapter 5 of the Final EIS, the Authority has determined that the Selected Alternative will not result in disproportionately high and adverse environmental effects on low-income and/or minority populations, after implementation of mitigation measures, IAMFs, and benefits.

As discussed in Chapter 5 of the Final EIS, the Selected Alternative will include the application of IAMFs and all practicable direct mitigation measures to avoid or eliminate disproportionately high and adverse effects on low-income populations and minority populations (see the MMEP, Appendix C).

The low-income and/or minority populations in the study area would benefit from the transit improvements the San Jose to Merced Project Section would provide, including increased statewide accessibility to jobs, goods, and services; reduced vehicle miles traveled; long-term air quality improvements; reduction in greenhouse gas emissions; public safety benefits realized through new safety and signaling systems; and new employment opportunities during construction and operations. HSR stations can also become a focal point of economic activity as public and private investment seeks to capture the travel benefits of increased intercity accessibility. Localized beneficial effects are anticipated in the area surrounding the San Jose Diridon and Downtown Gilroy Stations, where minority populations and low-income populations are present.

The Authority identified offsetting mitigation measures for the Selected Alternative, which were developed through a 21-month community improvement planning process that included three rounds of community engagement to identify and evaluate potential community improvements with potential to offset residual disproportionately high and adverse project effects. Most of the community improvements evaluated were initially identified by members of the affected communities or by representative entities such as cities or through review of prior community assessments of unmet needs. In determining whether mitigation measures sufficiently offset disproportionate effects on environmental justice communities, the Authority considered input from individuals, organizations, and representatives of minority communities and low-income communities on the value of the offsetting mitigation measures. The Authority is committed to funding the specific identified offsetting mitigation measures identified in the MMEP by working in concert with local implementing partners.

After consideration of direct mitigation, project benefits, offsetting mitigation measures, and the input of environmental justice communities, the Authority has determined that the Selected Alternative will not have disproportionately high and adverse effects on minority populations or low-income populations.

## 10 CONCLUSION

The Authority, as the federal lead agency, and as authorized by the NEPA Assignment MOU, has reached a decision that most closely aligns with the Authority's statutory mission and the responsibilities assigned to it by FRA pursuant to NEPA Assignment, considering economic, environmental, technical, and other factors and based on the information contained within the Final EIS and the project record.

For the San Jose to Merced Project Section, the Authority approves Alternative 4, with the DDV and TDV, the San Jose Diridon and Downtown Gilroy Stations, the MOWF south of Gilroy, and an MOWS west of Turner Island Road in the Central Valley, with the specific limits extending from Scott Boulevard in Santa Clara to Carlucci Road in Merced County. The Authority has selected this alternative because: (1) it best satisfies the Purpose, Need, and Objectives for the proposed action; and (2) it minimizes impacts on the natural and human environment by utilizing an existing transportation corridor where practicable and incorporating mitigation measures. Accordingly, Alternative 4 with the DDV and TDV, the San Jose Diridon and Downtown Gilroy Stations, the MOWF south of Gilroy, and an MOWS west of Turner Island Road in the Central Valley, with the specific limits extending from Scott Boulevard in Santa Clara to Carlucci Road in Merced County, has been selected and approved for project implementation.

Brian P. Kelly

June 1, 2022

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Brian P. Kelly  
Chief Executive Officer  
California High-Speed Rail Authority

Date

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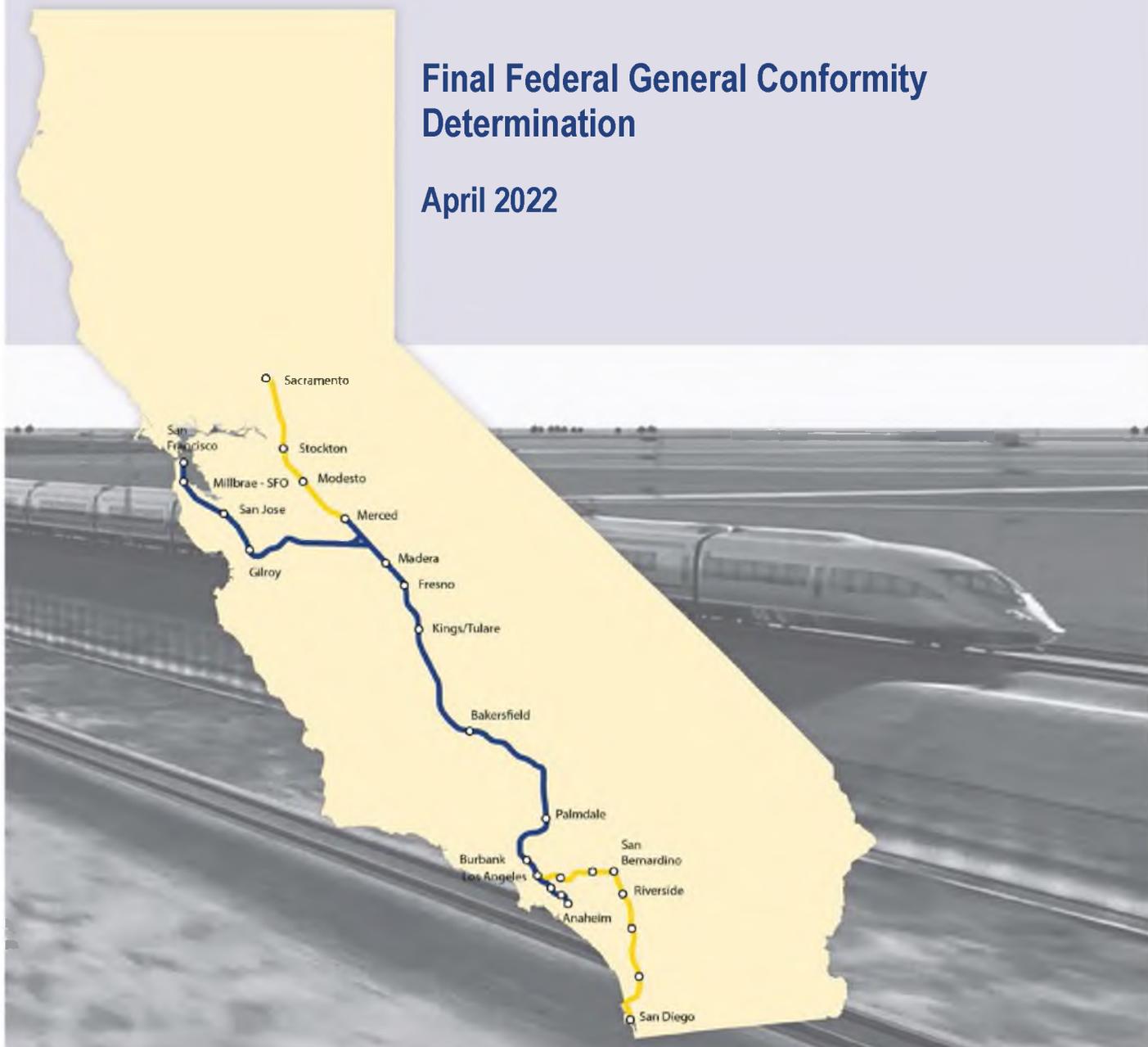
**APPENDIX A: FINAL GENERAL CONFORMITY DETERMINATION,  
MARCH 24, 2022**

California High-Speed Rail Authority

# *San Jose to Merced* *Project Section*

**Final Federal General Conformity  
Determination**

**April 2022**



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

California High-Speed Rail System, San Jose to Merced Section  
Final General Conformity Determination

Prepared by:

U.S. Department of Transportation  
Federal Railroad Administration

This Final General Conformity Determination has been prepared by the Federal Railroad Administration (FRA), pursuant to Section 176(c) of the Federal Clean Air Act, 42 U.S.C. 7506(c)(1), and its implementing regulations (“General Conformity Rule”). Specifically, this Final General Conformity Determination documents FRA’s finding that the California High-Speed Rail System, San Jose to Merced Section will comply with the General Conformity Rule, provided that any construction emissions exceeding *de minimis* levels will be offset through agreements between the California High-Speed Rail Authority and the applicable air districts.

MARLYS A  
OSTERHUES

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Date of Approval

Marlys Osterhues  
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## EXECUTIVE SUMMARY

The California High-Speed Rail (HSR) system, proposed by the California High-Speed Rail Authority (Authority), will provide intercity, high-speed service on more than 800 miles of guideway 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. The San Jose to Central Valley Wye Project Extent (Project)<sup>1</sup>, which is the focus of this General Conformity Determination, is a critical link connecting San Jose to the Central Valley portion of the HSR system at the Central Valley Wye in Merced County, which in turn connects to the portion of the system running north to Merced and south to Fresno and southern California.<sup>2</sup>

The General Conformity Rule, as codified in Title 40 Code of Federal Regulations Part 93, Subpart B, establishes the process by which federal agencies determine conformance of proposed projects that are federally funded or require federal approval with applicable air quality standards. This determination must demonstrate that a project would not cause or contribute to new violations of air quality standards, exacerbate existing violations, or interfere with timely attainment or required interim emissions reductions towards attainment.

FRA prepared a Draft General Conformity Determination, pursuant to 40 C.F.R. part 93, subpart B, which establishes the process for complying with the General Conformity requirements of the Clean Air Act. FRA published a notice in the Federal Register on November 26, 2021 advising the public of the availability of the Draft Conformity Determination for a 30-day review and comment period. The draft Conformity Determination was published at <http://www.regulations.gov>, Docket No. FRA-2021-0100. The comment period of the Draft Conformity Determination closed on December 27, 2021. FRA received two comments expressing support for the project.

This Final General Conformity Determination documents the FRA's finding that the Project complies with the General Conformity Rule and that it conforms to the purposes of the area's approved State Implementation Plan and is consistent with all applicable requirements. The Final General Conformity Determination is available at <http://www.regulations.gov>, Docket No. FRA-2021-0100, and on FRA's website at <https://railroads.dot.gov/environment/environmental-reviews/clean-air-act-california-general-conformity-determinations>. This Final General Conformity Determination is based on the impact avoidance and minimization features and mitigation measures described in Appendix 2-E and Section 3.3.7, respectively, of the San Jose to Merced Project Section Final Environmental Impact Report/Environmental Impact Statement (Authority 2022) and that will be implemented for the Project. This compliance is demonstrated as follows:

- Operations of the Project would result in a reduction of regional emissions of all applicable air pollutants and would not cause a localized exceedance of an air quality standard.
- While emissions generated during construction of the Project would exceed the General Conformity thresholds for nitrogen oxides in the San Francisco Bay Area Air Basin and San Joaquin Valley Air Basin, these emission increases would be offset through a new agreement with BAAQMD and an existing Memorandum of Understanding and Voluntary Emission Reduction Agreement with the San Joaquin Valley Air Pollution Control District, respectively.

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<sup>1</sup> The Project Section has been evaluated in three extents: from San Jose to the western limit of the Central Valley Wye; the Central Valley Wye itself; and from the northern limit of the Central Valley Wye to Merced (i.e., the northern portion of the Merced to Fresno Project Section).

<sup>2</sup> As part of its first phase, the California HSR System is planned as seven distinct sections from San Francisco in the north to Los Angeles and Anaheim in the south.

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Attachment A: Letters of Agreement with BAAQMD

## ACRONYMS AND ABBREVIATIONS

AP-42	USEPA's AP-42 Compilation of Air Pollutant Emission Factors
APCD	air pollution control district
Authority	California High-Speed Rail Authority
BAAQMD	Bay Area Air Quality Management District
Bay Area	San Francisco Bay Area
C.F.R.	Code of Federal Regulations
CAA	Clean Air Act
CalEEMod	California Emissions Estimator Model
CARB	California Air Resources Board
CEQA	California Environmental Quality Act
CO	carbon monoxide
EIR	environmental impact report
EIS	environmental impact statement
EMFAC2017	EMission FACTors 2017
EMMA	Environmental Mitigation Management and Assessment system
FRA	Federal Railroad Administration's
Fresno to Bakersfield Final EIR/EIS	Fresno to Bakersfield Section Final EIR/EIS
g/L	grams per liter
GHG	greenhouse gas
HSIPR	High-Speed Intercity Passenger Rail
HSR	High-Speed Rail
I-	Interstate
IAMF	impact avoidance and minimization feature
MBARD	Monterey Bay Air Resources District
Merced to Fresno Final EIR/EIS	Merced to Fresno Section Final EIR/EIS
MOU	memorandum of understanding
mph	miles per hour
MPO	metropolitan planning organizations
NAAQS	national ambient air quality standards
NCCAB	North Central Coast Air Basin
NEPA	National Environmental Policy Act
NO <sub>2</sub>	nitrogen dioxide
NO <sub>x</sub>	nitrogen oxide
O <sub>3</sub>	ozone
PM	particulate matter

PM <sub>10</sub>	particulate matter less than or equal to 10 microns in diameter
PM <sub>2.5</sub>	particulate matter less than or equal to 2.5 microns in diameter
Project	San Jose to Central Valley Wye Project Extent
Project Section	San Jose to Merced Project Section
ROD	record of decision
RSA	resource study area
SAFE	Safer Affordable Fuel-Efficient
SFBAAB	San Francisco Bay Area Air Basin
SIP	State Implementation Plan
SJVAB	San Joaquin Valley Air Basin
SJVAPCD	San Joaquin Valley Air Pollution Control District
SO <sub>x</sub>	sulfur oxide
SR	State Route
Statewide Program EIR/EIS	Final Program EIR/EIS for the Proposed California High-Speed Train System
tpy	tons per year
U.S.C.	United States Code
USEPA	U.S. Environmental Protection Agency
VERA	Voluntary Emissions Reduction Agreement
VMT	vehicle miles traveled
VOC	volatile organic compound

# 1 INTRODUCTION

This Final General Conformity Determination for the San Jose to Central Valley Wye Section of the California High-Speed Rail (HSR) System (Project) (a portion of the San Jose to Merced Project Section [Project Section]) and was prepared consistent with the implementing regulations of Section 176 of the Clean Air Act (CAA). Section 176(c)(1) of the CAA prohibits federal agencies from engaging in, supporting, or providing financial assistance for licensing, permitting or approving any activities that do not conform to an approved CAA implementation plan. That approved plan may be a federal, state, or tribal implementation plan.

The CAA defines nonattainment areas as geographic regions that have been designated as not meeting one or more of the national ambient air quality standards (NAAQS). The CAA requires that each state prepare a State Implementation Plan (SIP). A maintenance plan must be prepared for each former nonattainment area that subsequently demonstrated compliance with the standards. The SIP is a state's plan for how it will meet the NAAQS by the CAA deadlines established by the CAA.

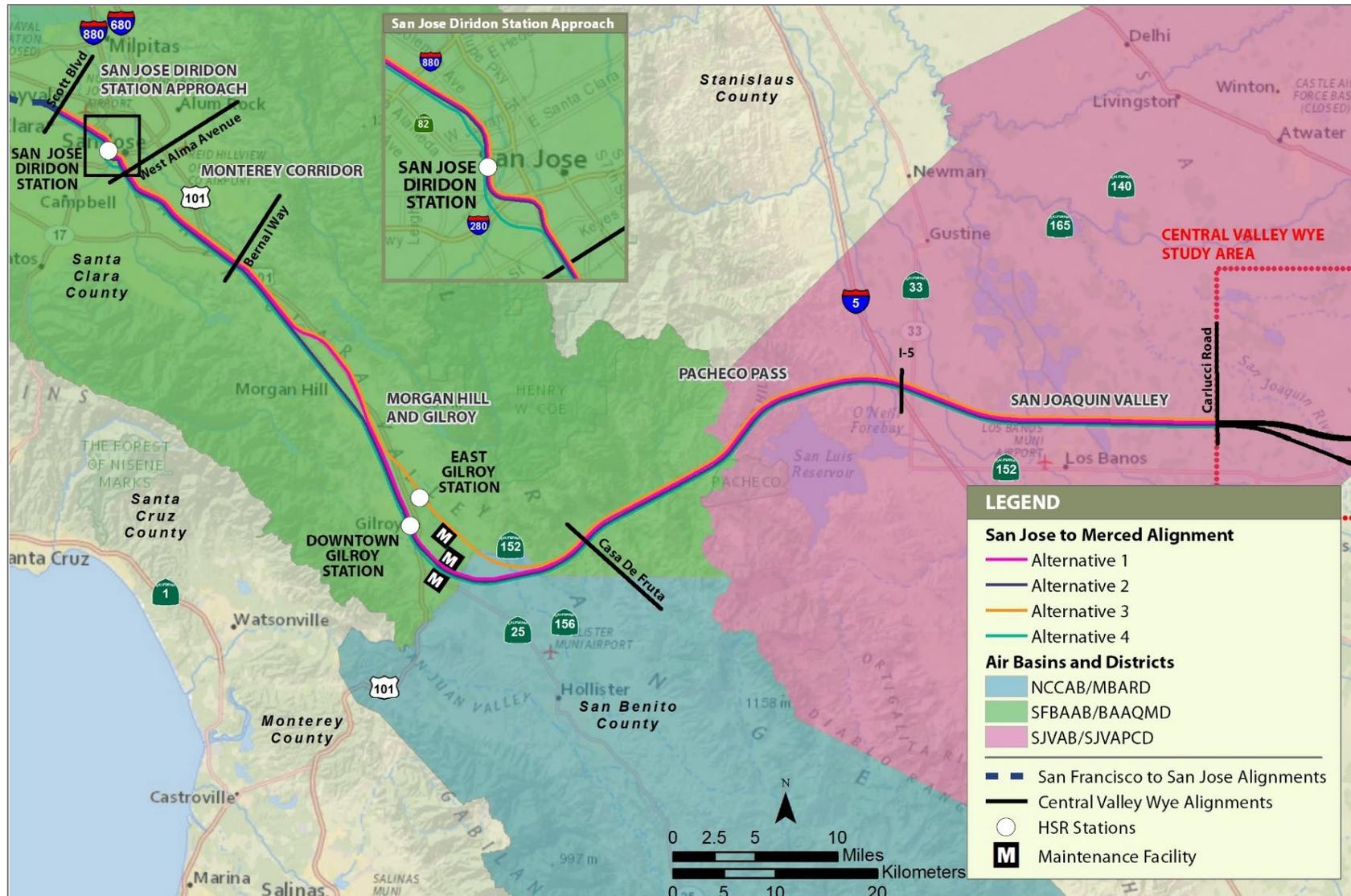
The General Conformity Rule is codified in Title 40 Code of Federal Regulations (C.F.R.). Conformity is defined as “upholding an implementation plan’s purpose of eliminating or reducing the severity and number of violations of the NAAQS and achieving expeditious attainment of such standards.” 40 C.F.R. Part 93 also establishes the process by which federal agencies determine conformity. This determination must demonstrate that the Project would not cause or contribute to new violations of air quality standards, exacerbate existing violations, or interfere with timely attainment or required interim emissions reductions towards attainment. Since the Project is receiving federal funds through grants from the Federal Railroad Administration (FRA), it is an action that may be subject to the General Conformity Rule.

FRA prepared this Final General Conformity Determination after the release of the *San Jose to Merced Final Environmental Impact Report/Environmental Impact Statement (FEIR/FEIS)*, which complies with the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA). Because the analysis used for the EIR/EIS also generated the information necessary for the General Conformity Determination, specific analysis may be incorporated herein by reference.

## 1.1 Regulatory Status of Resource Study Area

In November 1993, the U.S. Environmental Protection Agency (USEPA) two sets of regulations to implement section 176(c) of the CAA. The final transportation conformity regulations were approved on November 24, 1993 to address transportation plans, programs, and projects developed, funded, or approved under title 23 United States Code (U.S.C.) or the Federal Transit Act, 49 U.S.C Section 1601 et seq. (40 C.F.R. § 93 Subpart A). These regulations have been revised several times since they were first issued. While the Transportation Conformity regulations do not apply to the Project, many of the transportation planning documents developed under those regulations are helpful in understanding the regional air quality and planning status of the resource study area (RSA). The final general conformity regulations were approved on November 30, 1993. Because of the federal funding and potential safety and other approvals, the Project is subject to the general conformity regulations. The final general conformity regulations were approved on November 30, 1993. Because of the federal funding and potential safety and other approvals, the Project is subject to the general conformity regulations.

The RSA for the Project is the San Francisco Bay Area Air Basin (SFBAAB) San Joaquin Valley Air Basin (SJVAB), and the North Central Coast Air Basin (NCCAB). Figure 1 shows the Project footprint as it is situated in the three air basins. Planning documents for pollutants for which the RSA is classified as federal nonattainment or maintenance are developed by the Bay Area Air Quality Management District (BAAQMD), Monterey Bay Air Resources District (MBARD), San Joaquin Valley Air Pollution Control District (SJVAPCD), and the California Air Resources Board (CARB) and approved by the USEPA. Table 1 lists the planning documents relevant to the Project’s RSA.



Source: Authority 2019a, CARB 2012

Figure 1 Resource Study Area Air Basins

**Table 1 Planning Documents Relevant to the Resource Study Area**

Plan	Status
<b>San Francisco Bay Area Air Basin</b>	
2001 San Francisco Bay Area Ozone Attainment Plan for the 1-Hour National Ozone Standard	<p>In a March 30, 2001, <i>Federal Register</i> notice (66 Fed. Reg. 17379), the USEPA proposed to make a finding that the Bay Area has not attained the national 1-hour O<sub>3</sub> standard. The USEPA proposed partial approval and partial disapproval of the 1999 Ozone Attainment Plan. On August 28, 2001, the USEPA took final action on its March 2001 notice, triggering a CAA requirement that a new plan be submitted within 1 year of the effective date of the USEPA's final action.</p> <p>The revised 2001 Ozone Attainment Plan included the necessary changes to address the USEPA's disapproval of the prior plan. In addition, to address the requirements triggered by the USEPA's finding of failure to attain, the plan included a new emissions inventory and commitments to adopt and implement additional control measures to attain the standard by 2006, the attainment deadline. It also included additional contingency measures in the event the Bay Area did not attain the standard by 2006.</p>
2017 Clean Air Plan	<p>Although not a federal planning document, the Bay Area 2017 Spare the Air, Cool the Climate (Clean Air Plan) provided a comprehensive plan to improve Bay Area air quality and protect public health. The Clean Air Plan defined a control strategy that the BAAQMD and its partners is implementing to: (1) attain all state and national ambient air quality standards; (2) eliminate disparities among Bay Area communities in cancer health risk from toxic air contaminants; and (3) reduce GHG emissions to protect the climate.</p>
<b>North Central Coast Air Basin</b>	
2005 Report on Attainment of the California Particulate Matter Standards in the Monterey Bay Region	<p>Although not a federal planning document, the plan fulfilled the requirements of Senate Bill 656 to reduce public exposure to PM. The plan outlines readily available, feasible, and cost-effective control measures for PM within the MBARD.</p>
2007 Federal Maintenance Plan for Maintaining the National Ozone Standard in the Monterey Bay Region	<p>This plan presents the strategy for maintaining the NAAQS for O<sub>3</sub> in the NCCAB. The NCCAB attained the 8-hour NAAQS in 2014.</p>
2012–2015 Air Quality Management Plan	<p>Although not a federal planning document, the Air Quality Management Plan is prepared triennially by the MBARD to document the region's continued progress toward meeting the state 8-hour O<sub>3</sub> standard.</p>
<b>San Joaquin Valley Air Basin</b>	
2007 PM <sub>10</sub> Maintenance Plan and Request for Redesignation	<p>On September 25, 2008, the USEPA redesignated the San Joaquin Valley to attainment for the PM<sub>10</sub> NAAQS and approved the 2007 PM<sub>10</sub> Maintenance Plan.</p>
2007 8-Hour Ozone Plan	<p>On May 5, 2010, the USEPA reclassified the 8-hour O<sub>3</sub> nonattainment status of the San Joaquin Valley from "serious" to "extreme." The reclassification required the state to incorporate more stringent requirements, such as lower permitting thresholds, and implement reasonably available control technologies at more sources.</p> <p>The 2007 8-hour Ozone Plan contained a comprehensive and exhaustive list of regulatory and incentive-based measures to reduce emissions of O<sub>3</sub> and PM precursors throughout the San Joaquin Valley. On December 18, 2007, the SJVAPCD Governing Board adopted the plan with an amendment to extend</p>

Plan	Status
	the rule adoption schedule for organic waste operations. On January 8, 2009, the USEPA found that the motor vehicle budgets for 2008, 2020, and 2030 from the 2007 8-hour Ozone Plan were not adequate for transportation conformity purposes. The next plan will address the USEPA's 2008 8-hour O <sub>3</sub> standard of 75 parts per billion.
2013 Plan for the Revoked 1-Hour Ozone Standard	On September 19, 2013, the USEPA approved the San Joaquin Valley's 2013 Plan for the Revoked 1-Hour Ozone Standard. Effective June 15, 2005, the USEPA revoked the federal 1-hour O <sub>3</sub> standard for areas including the SJVAB.
2015 Plan for the 1997 PM <sub>2.5</sub> Standard	On April 30, 2008, the SJVAPCD adopted the 2008 PM <sub>2.5</sub> Plan satisfying all federal implementation requirements for the 1997 federal PM <sub>2.5</sub> standard. Per guidance from the USEPA, the plan addressed the 1997 PM <sub>2.5</sub> standard under Subpart 1 of federal CAA Title 1, Part D (Subpart 1). Subsequently, in 2013, the D.C. Circuit Court ruled that the USEPA erred by solely using CAA Subpart 1 in establishing its PM <sub>2.5</sub> implementation rule, without consideration of the PM-specific provisions in CAA Title 1, Part D, Subpart 4 (Subpart 4). In June 2014, the USEPA classified the SJVAB as a "moderate" nonattainment area under Subpart 4. The USEPA recently reclassified the Valley as "serious" nonattainment effective May 7, 2015. The 2015 PM <sub>2.5</sub> Plan addresses the federal mandates for a "serious" nonattainment area related to the 1997 PM <sub>2.5</sub> standard.
2016 Moderate Area Plan for the 2012 PM <sub>2.5</sub> Standard	The 2016 Moderate Area Plan addresses the federal mandates for areas classified as "moderate" nonattainment for the 2012 PM <sub>2.5</sub> federal annual air quality standard of 12 micrograms per cubic meter
2016 Plan for the 2008 8-Hour Ozone Standard <sup>1</sup>	The District adopted the 2016 Plan for the 2008 8-Hour Ozone Standard in June 2016. This plan satisfies CAA requirements and ensures expeditious attainment of the 75 parts per billion 8-hour O <sub>3</sub> standard.
2018 PM <sub>2.5</sub> Plan	The 2018 PM <sub>2.5</sub> Plan provides a single integrated plan to attain the federal health-based 1997, 2006, and 2012 NAAQS. The plan builds upon comprehensive strategies already in place from previously adopted SJVAPCD attainment plans and measures.

Sources: BAAQMD 2001, 2017; MBUAPCD 2005, 2007, 2017; SJVAPCD 2007a, 2007b, 2013, 2015, 2016a, 2016b, 2018

BAAQMD = Bay Area Air Quality Management District

Bay Area = San Francisco Bay Area

CAA = Clean Air Act

CARB = California Air Resources Board

CO = carbon monoxide

GHG = greenhouse gases

MBARD = Monterey Bay Air Resources District

NAAQS = national ambient air quality standards

NCCAB = North Central Coast Air Basin

O<sub>3</sub> = ozone

PM<sub>10</sub> = particulate matter 10 microns or less in diameter

PM<sub>2.5</sub> = particulate matter 2.5 microns or less in diameter

SFBAAB = San Francisco Bay Area Air Basin

SIP = State Implementation Plan

SJVAB = San Joaquin Valley Air Basin

SJVAPCD = San Joaquin Valley Air Pollution Control District

USEPA = U.S. Environmental Protection Agency

## 1.2 General Conformity Regulations

On November 30, 1993, the USEPA promulgated final General Conformity regulations at 40 C.F.R. Part 93 Subpart B for all federal activities except highways and transit programs covered by Transportation Conformity. The regulations in Subpart B were subsequently amended in March 2010. Because the Project will not be funded or require approval(s) under Title 23 U.S.C. or the Federal Transit Act, 49 U.S.C Section 1601 et seq., the General Conformity requirements are applicable, rather than Transportation Conformity. In general terms, unless a project is exempt under 40 C.F.R. Section 93.153(c) or is not on the agency's presumed-to-conform list pursuant to 40 C.F.R. Section 93.153(f), a General Conformity Determination is required where a federal action in a nonattainment or maintenance area causes an increase in the total of direct

and indirect emissions of the relevant criteria pollutants and precursor pollutants that are equal to or exceed certain *de minimis* rates.

During the applicability analysis, the federal agency determines the following:

- Whether the action will occur in a nonattainment or maintenance area
- Whether one or more of the specific exemptions apply to the action
- Whether the federal agency has included the action on its list of presumed-to-conform actions
- Whether the total direct and indirect emissions are below or above the *de minimis* levels
- Where a facility has an emissions budget approved by the state or tribe as part of the SIP or Tribal Implementation Plan, the federal agency determines that the emissions from the Project are within the budget

The USEPA Guidance states that the applicability analysis can be, but is not required to be, completed concurrently with any analysis required under NEPA. The applicability analysis for this Project is described in Section 8, Applicability Analysis. If after the applicability analysis, the Federal agency concludes it should conduct a conformity determination, it may demonstrate conformity by one or more of several prescribed methods. These methods include:

- Demonstrating that the direct and indirect emissions are specifically identified in the relevant implementation plan
- Obtaining a written statement from the entity responsible for the implementation plan that the total indirect and direct emissions from the action, along with other emissions in the area, will not exceed the total implementation plan emission budget
- Fully offsetting the total direct and indirect emissions by reducing emissions of the same pollutant in the same nonattainment or maintenance area

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## 2 CALIFORNIA HIGH-SPEED RAIL PROJECT

### 2.1 California High-Speed Rail System

The Authority, is responsible for planning, designing, constructing, and operating the HSR system. Its mandate is to develop an HSR system connecting the state's major population centers and coordinate 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.

The HSR system will provide intercity, high-speed service on more than 800 miles of railroad throughout California, connecting the major population centers of Sacramento, the San Francisco Bay Area (Bay Area), the Central Valley, Los Angeles, the Inland Empire, Orange County, and San Diego. It would 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 up to 220 miles per hour (mph) over a grade-separated, dedicated guideway alignment.

The FRA is responsible for oversight and regulation of railroad safety and implementation of the High-Speed Intercity Passenger Rail (HSIPR). As part of the HSIPR Program, the FRA is providing partial funding for the environmental analysis and documentation required under NEPA, CEQA, and other related environmental laws. Pursuant to U.S. Code Title 23 Section 327, under the NEPA Assignment Memorandum of Understanding between the FRA and the State of California, effective July 23, 2019, the Authority is the federal lead agency for environmental reviews for all Authority Phase 1 and Phase 2 California HSR System projects. The FRA performs Clean Air Act Conformity determinations and other federal approvals retained by the FRA under the NEPA Assignment Memorandum of Understanding.

In April 2012 and May 2014, respectively, the FRA and the Authority published the *Merced to Fresno Section Final EIR/EIS* (Merced to Fresno Final EIR/EIS) (Authority and FRA 2012) and *Fresno to Bakersfield Section Final EIR/EIS* (Fresno to Bakersfield Final EIR/EIS) (Authority and FRA 2014). The FRA issued the Record of Decision (ROD) for the Fresno to Bakersfield Project in June 2014. Both projects are within the SJVAB, and a General Conformity Determination was prepared as part of the environmental processes to comply with the CAA. The Merced to Fresno and Fresno to Bakersfield General Conformity Determinations include the Authority's commitment to offset all emissions to net zero through a Voluntary Emissions Reduction Agreement (VERA) between the Authority and the SJVAPCD. Although the San Jose to Merced Project Section of the HSR system is independent of the other HSR system project sections for purposes of NEPA and CEQA analysis, certain construction activities may occur concurrently with construction activities for other project sections within the SFBAAB and SJVAB. Therefore, estimates of cumulative emissions, where available, have been presented in Section 13, Estimated Emission Rates and Comparison to *de minimis* Thresholds—Cumulative Analysis, of this document. These future emissions estimates have been included in this document in the interest of full disclosure of future construction emissions that may occur in the SFBAAB and SJVAB from other sections of the HSR system; each of these sections would undergo separate conformity determinations later.

### 2.2 California High-Speed Rail System—San Jose to Central Valley Wye Project Extent

The Project will provide HSR service between San Jose Diridon Station in downtown San Jose, with a Gilroy station in either downtown Gilroy or east Gilroy, and a station in downtown Merced. It will connect San Jose to the Central Valley portion of the HSR system at the Central Valley Wye in Merced County, which in turn would connect to the portion of the system running north to Merced and south to Fresno and southern California.

The Project is designed to allow trains to and from the Bay Area to transition smoothly from north-south to east-west travel with a minimum reduction in speed to achieve the Proposition 1A travel time requirement. Proposition 1A requires that the HSR system be designed to achieve a nonstop

service travel time of 2 hours and 10 minutes between San Jose and Los Angeles Union Station.<sup>3</sup> The Project follows existing transportation corridors to the extent feasible, as directed by Proposition 1A.<sup>4</sup>

The Project corridor is between Scott Boulevard and Carlucci Road and constitutes approximately 91 miles of the approximately 145-mile-long Project Section, which includes dedicated HSR track and systems, and station locations at San Jose Diridon and Gilroy; an MOWF in the Gilroy area, and an MOWS near Turner Island Road in the Central Valley. HSR stations at San Jose Diridon and Gilroy would support transit-oriented development, provide an interface with regional and local mass transit services, and provide connectivity to the South Bay and Central Valley highway network.<sup>5</sup> The Project begins at Scott Boulevard in Santa Clara. The HSR infrastructure and operations transition from the blended system between San Francisco and Santa Clara to a fully dedicated system north of the San Jose Diridon Station, either at Scott Boulevard in Santa Clara or near I-880; or, in the case of Alternative 4, the blended system extends to downtown Gilroy. The Project continues south and east from Gilroy, continuing east through the Pacheco Pass to the Central Valley to its end at Carlucci Road, the western limit of the Central Valley Wye.

The Project comprises the following five subsections:

- **San Jose Diridon Station Approach**—Extends approximately 6 miles from north of the San Jose Diridon Station at I-880 in San Jose or Scott Boulevard in Santa Clara to West Alma Avenue in San Jose. This subsection includes San Jose Diridon Station and overlaps the southern portion of the San Francisco to San Jose Project Section.
- **Monterey Corridor**—Extends approximately 9 miles from West Alma Avenue to Bernal Way in the community of South San Jose. This subsection is entirely within the city of San Jose.
- **Morgan Hill and Gilroy**—Extends 30–32 miles from Bernal Way in the community of South San Jose to Casa de Fruta Parkway/State Route (SR) 152 in the community of Casa de Fruta in Santa Clara County.
- **Pacheco Pass**—Extends approximately 25 miles from Casa de Fruta Parkway/SR 152 to I-5 in Merced County.
- **San Joaquin Valley**—Extends approximately 18 miles from I-5 to Carlucci Road in unincorporated Merced County.

The Authority has developed four end-to-end alternatives for the Project: Alternative 1, Alternative 2, Alternative 3, and Alternative 4. Each alternative consists of a variety of alignment and station options. It is estimated that construction of the Project would take approximately 7 years, with initiation of construction in 2022 and completion in 2028.

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<sup>3</sup> Proposition 1A requires that the HSR system be designed to achieve a nonstop service travel time of 2 hours and 40 minutes between San Francisco and Los Angeles Union Station, including a 30-minute ride between San Francisco and San Jose (§ 2704.09(b)(4)).

<sup>4</sup> Proposition 1A requires that the HSR system be designed to operate on an alignment that follows existing transportation and utility corridors to the extent feasible (§ 2704.09(g)).

<sup>5</sup> *South Bay* refers to Santa Clara County.

### 3 AIR QUALITY CONDITIONS IN THE RESOURCE STUDY AREA

#### 3.1 Meteorology and Climate

Air quality is affected by the rate and location of pollutant emissions and by meteorological conditions that influence movement and dispersal of pollutants in the atmosphere. Atmospheric conditions, such as wind speed, wind direction, and air temperature gradients, along with local topography, provide the link between air pollutant emissions and local air quality levels.

Elevation and topography can affect localized air quality. The Project extent crosses the SFBAAB, NCCAB, and SJVAB. Within the SFBAAB, temperatures in the Santa Clara Valley are warm on summer days and cool on summer nights, and winter temperatures are mild. Winds in the valley are greatly influenced by the terrain, resulting in a prevailing flow that roughly parallels the valley's northwest-southeast axis. Within the NCCAB, the semi-permanent high-pressure cell in the eastern Pacific, known as the Pacific High, is the basic controlling factor in the climate. The generally northwest-southeast orientation of mountainous ridges tends to restrict and channel the summer onshore air currents. In the fall and winter, the surface winds become weak, which can lead to pollutant transport from the SFBAAB and SJVAPCD into the NCAAB. Within the SJVAB, summer temperatures often exceed 100 degrees Fahrenheit, and the surrounding mountain ranges restrict air movement through and out of the valley. Air pollutants often tend to collect, leading to higher concentrations of emitted pollutants.

#### 3.2 Ambient Air Quality in the Resource Study Area

The CARB maintains ambient air monitoring stations for criteria pollutants throughout California. There are three monitoring stations in the vicinity of the HSR alignment alternatives in Santa Clara County, and one relevant monitoring station in both San Benito and Merced Counties. These stations provide representative ambient criteria pollutant concentrations. The addresses and distances of the stations to the HSR alignment are summarized below.

- San Jose—Jackson Street (156B Jackson Street, San Jose, CA 95110): Approximately 1 mile northeast.
- San Martin—Murphy Avenue (13030 Murphy Ave., San Martin, CA 95046): Approximately 0.25 mile east.
- Gilroy—9th Street (9th and Princeville, Gilroy, CA 95020): Approximately 0.5 mile west.
- Hollister—Fairview Road (1979 Fairview Rd., Hollister, CA 95023): Approximately 9 miles south.
- Merced—S. Coffee Avenue (385 S. Coffee Avenue, Merced, CA 95340): Approximately 18 miles northeast.

Table 2 summarizes the results of ambient monitoring at these stations for the most recent 3 years of available data. Some stations only monitor ozone (O<sub>3</sub>), whereas others monitor carbon monoxide (CO), nitrogen dioxide (NO<sub>2</sub>), and particulate matter less than or equal to 10 microns in diameter (PM<sub>10</sub>) and PM less than or equal to 2.5 microns in diameter (PM<sub>2.5</sub>).

Between 2016 and 2018, monitored CO, sulfur dioxide (SO<sub>2</sub>) NO<sub>2</sub> concentrations did not exceed any federal or state standards at any of the stations that reported monitoring data for these pollutants. However, the state and federal standards for O<sub>3</sub>, PM<sub>10</sub>, and PM<sub>2.5</sub> were exceeded at one or more stations that reported monitoring data for these pollutants. Using violations of the ambient air quality standards as a proxy for air quality, O<sub>3</sub> and PM conditions tend to be poorest in the vicinity of the eastern portion of the Project in Merced County, with air quality improving westward toward the SFBAAB.

#### 3.3 Resource Study Area Emissions

The CARB maintains an annual emission inventory for each county and air basin in the state. The inventories for Santa Clara, San Benito, and Merced Counties consist of data submitted to CARB

by the local air districts plus estimates for certain source categories, which are provided by CARB staff.

The most recent published inventory data for Santa Clara, San Benito, and Merced Counties is summarized in Table 3. Based on the 2012 air pollutant inventory data, except for San Benito County, mobile source emissions represent most of the volatile organic compounds (VOC), NO<sub>x</sub>, and CO emissions. In San Benito County, area sources represent most VOC emissions, and mobile source emissions represent the majority of NO<sub>x</sub> and CO. Area sources represent the majority of PM<sub>10</sub> and PM<sub>2.5</sub> emissions in all three counties.

**Table 2 Ambient Criteria Pollutant Concentration Data at Air Quality Monitoring Stations along the Project Extent**

Pollutant and Standards	San Jose—Jackson Street			San Martin—Murphy Avenue			Gilroy—9th Street			Hollister—Fairview Road			Merced—S. Coffee Avenue														
	2016	2017	2018	2016	2017	2018	2016	2017	2018	2016	2017	2018	2016	2017	2018												
<b>Ozone (O<sub>3</sub>)<sup>a</sup></b>																											
Maximum 1-hour concentration (ppm)	0.087	0.121	0.078	0.096	0.096	0.092	0.079	0.096	0.097	0.073	0.078	0.077	0.097	0.093	0.104												
Maximum 8-hour concentration (ppm)	0.066	0.098	0.061	0.071	0.086	0.080	0.070	0.084	0.065	0.060	0.072	0.063	0.086	0.084	0.082												
Number of days standard exceeded <sup>1</sup>																											
CAAQS 1-hour (>0.09 ppm)	0	3	0	1	1	0	0	1	1	0	0	0	2	0	4												
NAAQS 8-hour (>0.070 ppm)	0	4	0	1	3	1	0	1	0	0	1	0	28	16	21												
CAAQS 8-hour (>0.070 ppm)	0	4	0	1	3	1	0	1	0	0	1	0	29	17	23												
<b>Carbon Monoxide (CO)<sup>b</sup></b>																											
Maximum 8-hour concentration (ppm)	1.4	1.8	2.1	Station does not monitor CO			Station does not monitor CO			Station does not monitor CO			Station does not monitor CO														
Maximum 1-hour concentration (ppm)	1.9	2.1	2.5																								
Number of days standard exceeded <sup>1</sup>																											
NAAQS 8-hour (≥9 ppm)	0	0	0																								
CAAQS 8-hour (≥9.0 ppm)	0	0	0																								
NAAQS 1-hour (≥35 ppm)	0	0	0																								
CAAQS 1-hour (≥20 ppm)	0	0	0																								
<b>Nitrogen Dioxide (NO<sub>2</sub>)<sup>a</sup></b>																											
National maximum 1-hour concentration (ppm)	51.1	67.5	86.1	Station does not monitor NO <sub>2</sub>			Station does not monitor NO <sub>2</sub>			Station does not monitor NO <sub>2</sub>			35.4	38.9	45.8												
State maximum 1-hour concentration (ppm)	51	67	86										35	38	45												
State annual average concentration (ppm)	11	N/A	12										6	7	7												
Number of days standard exceeded																											
NAAQS 1-hour (98th Percentile>0.100 ppm)	0	0	0										0	0	0												
CAAQS 1-hour (0.18 ppm)	0	0	0										0	0	0												
Annual standard exceeded?																											
NAAQS annual (>0.053 ppm)	No	No	No	No	No	No																					
CAAQS annual (>0.030 ppm)	No	No	No	No	No	No																					
<b>Particulate Matter (PM<sub>10</sub>)<sup>2, a</sup></b>																											
National <sup>3</sup> maximum 24-hour concentration (mg/m <sup>3</sup> )	40.0	69.4	155.8	Station does not monitor PM <sub>10</sub>			Station does not monitor PM <sub>10</sub>			44.3	80.9	95.9	Station does not monitor PM <sub>10</sub>														
National <sup>3</sup> second-highest 24-hour concentration (mg/m <sup>3</sup> )	35.2	67.3	115.4							43.2	74.7	84.1															
State <sup>4</sup> maximum 24-hour concentration (mg/m <sup>3</sup> )	41.0	69.8	121.8							N/A	N/A	N/A															
State <sup>4</sup> second-highest 24-hour concentration (mg/m <sup>3</sup> )	37.5	67.6	118.5							N/A	N/A	N/A															
National annual average concentration (mg/m <sup>3</sup> )	17.5	20.7	23.0							16.5	19.6	20.4															
State annual average concentration (mg/m <sup>3</sup> ) <sup>5</sup>	18.3	21.3	23.1							N/A	N/A	N/A															

Pollutant and Standards	San Jose—Jackson Street			San Martin—Murphy Avenue			Gilroy—9th Street			Hollister—Fairview Road			Merced—S. Coffee Avenue				
	2016	2017	2018	2016	2017	2018	2016	2017	2018	2016	2017	2018	2016	2017	2018		
Number of days standard exceeded <sup>1</sup>																	
NAAQS 24-hour (>150 mg/m <sup>3</sup> ) <sup>6</sup>	0	0	3							0	0	0					
CAAQS 24-hour (>50 mg/m <sup>3</sup> ) <sup>6</sup>	0	19	12							N/A	N/A	N/A					
Annual standard exceeded?																	
CAAQS annual (>20 mg/m <sup>3</sup> )	No	Yes	Yes							N/A	N/A	N/A					
<b>Particulate Matter (PM<sub>2.5</sub>)<sup>a</sup></b>																	
National <sup>3</sup> maximum 24-hour concentration (mg/m <sup>3</sup> )	22.6	49.7	133.9	Station does not monitor PM <sub>2.5</sub>			16.0	48.4	97.5	20.4	42.0	52.7	43.0	69.3	88.2		
National <sup>3</sup> second-highest 24-hour concentration (mg/m <sup>3</sup> )	21.8	46.5	130.5		15.8	40.7	84.0	17.2	34.3	49.4	43.0	60.6	81.7				
State <sup>4</sup> maximum 24-hour concentration (mg/m <sup>3</sup> )	22.7	49.7	133.9		16.0	48.4	97.5	20.4	42.0	52.7	43.0	69.3	88.2				
State <sup>4</sup> second-highest 24-hour concentration (mg/m <sup>3</sup> )	21.8	46.5	130.5		15.3	40.7	84.0	17.2	34.3	49.4	43.0	60.6	81.7				
National annual average concentration (mg/m <sup>3</sup> )	8.3	9.5	12.7		5.6	5.4	7.7	4.3	5.0	7.1	11.9	13.2	15.1				
State annual average concentration (mg/m <sup>3</sup> ) <sup>5</sup>	8.4	N/A	12.9		N/A	N/A	7.9	N/A	5.1	7.2	11.9	13.2	15.1				
Number of days standard exceeded <sup>1</sup>																	
NAAQS 24-hour (>35 mg/m <sup>3</sup> )	0	6	16					0	2	13	0	1	11	5	19	21	
Annual standard exceeded?																	
NAAQS annual (>12.0 mg/m <sup>3</sup> )	No	No	Yes					No	No	No	No	No	No	No	Yes	Yes	
CAAQS annual (>12 mg/m <sup>3</sup> )	No	No	Yes				No	No	No	No	No	No	No	Yes	Yes		
<b>Sulfur Dioxide (SO<sub>2</sub>)</b>																	
Maximum 1-hour concentration (ppm)	0.0018	0.0036	0.0069	Station does not monitor SO <sub>2</sub>			Station does not monitor SO <sub>2</sub>			Station does not monitor SO <sub>2</sub>			Station does not monitor SO <sub>2</sub>				
Number of days standard exceeded <sup>1</sup>																	
NAAQS 1-hour (>0.0075 ppm)	0	0	0														
CAAQS 1-hour (>0.25 ppb)	0	0	0														

Sources: <sup>a</sup> CARB 2020<sup>b</sup> USEPA 2020

<sup>1</sup> An exceedance of a standard is not necessarily a violation because of the regulatory definition of a violation.

<sup>2</sup> National statistics are based on standard conditions data. In addition, national statistics are based on samplers using federal reference or equivalent methods.

<sup>3</sup> State statistics are based on local conditions data, except in the South Coast Air Basin, for which statistics are based on standard conditions data. In addition, state statistics are based on California-approved samplers.

<sup>4</sup> Measurements usually are collected every 6 days.

<sup>5</sup> State criteria for ensuring that data are sufficiently complete for calculating valid annual averages are more stringent than national criteria.

<sup>6</sup> Mathematical estimate of how many days' concentrations would have been measured as higher than the level of the standard had each day been monitored. Values have been rounded.

CAAQS = California ambient air quality standards

mg/m<sup>3</sup> = milligrams per cubic meter

NAAQS = national ambient air quality standards

ppm = parts per million

> = greater than

N/A = not applicable or there was insufficient or no data available to determine the value

**Table 3 Estimated Annual Average Emissions for Santa Clara, San Benito, and Merced Counties (2012 data published in 2017) (tons per day)**

Source Category	Santa Clara County						San Benito County						Merced County					
	VOC	CO	NO <sub>x</sub>	SO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	VOC	CO	NO <sub>x</sub>	SO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	VOC	CO	NO <sub>x</sub>	SO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
<b>Stationary Sources</b>																		
Fuel Combustion	1	7	10	3	1	1	<1	<1	1	0	<1	<1	<1	2	2	<1	<1	<1
Waste Disposal	1	<1	<1	<1	<1	<1	<1	0	0	0	0	0	2	<1	<1	<1	0	0
Cleaning and Surface Coatings	7	0	0	0	0	0	<1	0	0	0	<1	<1	1	0	0	0	<1	<1
Petroleum Production & Marketing	2	0	0	0	0	0	<1	0	0	0	0	0	<1	0	0	0	0	0
Industrial Processes	2	<1	1	<1	1	1	<1	<1	<1	0	1	<1	2	<1	<1	<1	1	<1
<b>Area-Wide Sources</b>																		
Solvent Evaporation	15	0	0	0	0	0	1	0	0	0	0	0	4	0	0	0	0	0
Miscellaneous Processes	2	15	3	<1	14	4	1	2	<1	<1	6	1	18	5	1	<1	26	5
<b>Mobile Sources</b>																		
On-Road Motor Vehicles	17	133	34	<1	3	1	1	8	5	0	<1	<1	4	30	18	<1	1	1
Other Mobile Sources	9	81	12	<1	1	1	<1	3	1	0	<1	<1	2	12	8	<1	<1	<1
<b>Grand Total (all sources)</b>	<b>55</b>	<b>238</b>	<b>61</b>	<b>3</b>	<b>20</b>	<b>7</b>	<b>4</b>	<b>13</b>	<b>6</b>	<b>0</b>	<b>8</b>	<b>1</b>	<b>32</b>	<b>48</b>	<b>29</b>	<b>&lt;1</b>	<b>29</b>	<b>6</b>

Source: CARB 2017

CO = carbon monoxide

 NO<sub>x</sub> = nitrogen oxide

 PM<sub>2.5</sub> = particulate matter smaller than or equal to 2.5 microns in diameter

 PM<sub>10</sub> = particulate matter smaller than or equal to 10 microns in diameter

VOC = volatile organic compounds

 SO<sub>x</sub> = sulfur oxide

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## 4 RELATIONSHIP TO NEPA

The *San Jose to Merced Section Final EIR/EIS* identifies potential environmental impacts of the Project, both adverse and beneficial, identifies appropriate measures to mitigate adverse impacts, and identifies the agencies' preferred alternative. The EIR/EIS was prepared to comply with both NEPA and CEQA.

The General Conformity regulations establish certain procedural requirements that must be followed when preparing a General Conformity evaluation and are similar, but not identical, to those for conducting an air quality impact analysis under NEPA regulations. NEPA requires that the air quality impacts of the Project's implementation be analyzed and disclosed. For purposes of NEPA, the air quality impacts of the Project were determined by identifying the Project's associated incremental emissions and air pollutant concentrations and comparing them, respectively, to emissions thresholds and to the CAAQS and NAAQS. The air quality impacts of the Project under future Plus Project conditions were also compared in the Final EIR/EIS to the future No Project conditions for NEPA purposes, and they were compared to existing conditions. The General Conformity Determination process and proposed general findings are discussed in Sections 3.3.4.4, 3.3.6.1, and 3.3.8 of the EIR/EIS.

To appropriately document the identification and offset, where necessary, of the emissions resulting from the Project, the FRA is issuing this Final General Conformity Determination. The Authority has entered into a memorandum of understanding (MOU) with the SJVAPCD that establishes the framework for fully mitigating to net-zero construction emissions of NO<sub>x</sub>, volatile organic compounds (VOC), PM<sub>10</sub>, and PM<sub>2.5</sub>. For the SFBAAB and in coordination with the BAAQMD, the Authority will commit to purchase of additional offsets to net all criteria pollutant emissions to levels that are below the General Conformity de minimis level for each calendar year that exceedances occur. Refer to Section 11.2, Compliance with Conformity Requirements, for details on the Authority's commitments.

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## 5 PROJECT FEATURES TO REDUCE EMISSIONS

To reduce impacts on the environment, the construction of the Project will include Project features to avoid and minimize impacts on air quality. These Project features will be included in the Mitigation Monitoring and Enforcement Program, which would be issued concurrently with the Final EIR/EIS and ROD for the Project and are enforceable commitments undertaken by the Authority. Construction of the Project is anticipated to occur through contract. The Authority will include all Project features in the construction contract, which would create binding and enforceable commitments to implement.

The Authority would be responsible for implementing and overseeing a mitigation monitoring program so the contractor meets all air quality design features.

Project design features as part of the Project include the following:

### ***AQ-IAMF#1: Fugitive Dust Emissions***

During construction, the Contractor shall employ the following measures to minimize and control fugitive dust emissions. The Contractor shall prepare a fugitive dust control plan for each distinct construction segment. At a minimum, the plan shall describe how each measure will be employed and identify an individual responsible for ensuring implementation. At a minimum, the plan shall address the following components unless alternative measures are approved by the applicable air quality management district.

- Cover all vehicle loads transported on public roads to limit visible dust emissions, and maintain at least 6 inches of freeboard space from the top of the container or truck bed.
- Clean all trucks and equipment before exiting the construction site using an appropriate cleaning station that does not allow runoff to leave the site or mud to be carried on tires off the site.
- Water exposed surfaces and unpaved roads at a minimum three times daily with adequate volume to result in wetting the top 1 inch of soil while avoiding overland flow. Rain events may sufficiently wet the top 1 inch of soil to alleviate the need to manually apply water.
- Limit vehicle travel speed on unpaved roads to 15 miles per hour (mph).
- Suspend any dust-generating activities when average wind speed exceeds 25 mph.
- Stabilize all disturbed areas, including storage piles that are not being used on a daily basis for construction purposes, by using water, a chemical stabilizer/suppressant, or hydro mulch or by covering with a tarp or other suitable cover or vegetative ground cover. In areas adjacent to organic farms, the Authority will use nonchemical means of dust suppression.
- Stabilize all on-site unpaved roads and off-site unpaved access roads using water or a chemical stabilizer/suppressant. In areas adjacent to organic farms, the Authority will use nonchemical means of dust suppression.
- Apply water to or presoak all areas where land clearing, grubbing, scraping, excavation, land leveling, grading, cut-and-fill, and demolition activities are carried out.
- For buildings up to six stories tall, wet all exterior surfaces of buildings during demolition.
- Limit or expeditiously remove the accumulation of mud or dirt from adjacent public streets at a minimum of once daily, using a vacuum type sweeper.
- After the addition of materials to or the removal of materials from the surface or outdoor storage piles, apply sufficient water or a chemical stabilizer/suppressant.

**AQ-IAMF#2: Selection of Coatings**

During construction, the contractor will use:

- Low-volatile organic compound (VOC) paint that contains less than 10 percent of VOC contents (VOC, 10%).
- Super-compliant or Clean Air paint that has a lower VOC content than that required by Bay Area Air Quality Management District Regulation 8, Rule 3, Monterey Bay Unified Air Pollution Control District Rule 426, and San Joaquin Valley Unified Air Pollution Control District Rule 4601, when available. If not available, the contractor will document the lack of availability, recommend alternative measure(s) to comply with Regulation 8, Rule 3, Rule 426, and Rule 4601 or disclose absence of measure(s) for full compliance, and obtain concurrence from the Authority.

**AQ-IAMF#3: Renewable Diesel**

During construction, the Contractor will use renewable diesel fuel to minimize and control exhaust emissions from all heavy-duty diesel-fueled construction diesel equipment and on-road diesel trucks. Renewable diesel must meet the most recent ASTM D975 specification for Ultra Low Sulfur Diesel and have a carbon intensity no greater than 50% of diesel with the lowest carbon intensity among petroleum fuels sold in California. The Contractor will provide the Authority with monthly and annual reports, through the Environmental Mitigation Management and Application (EMMA) system, of renewable diesel purchase records and equipment and vehicle fuel consumption. Exemptions to use traditional diesel can be made where renewable diesel is not available from suppliers within 200 miles of the project site. The construction contract must identify the quantity of traditional diesel purchased and fully document the availability and price of renewable diesel to meet project demand.

**AQ-IAMF#4: Reduce Criteria Exhaust Emissions from Construction Equipment**

Prior to issuance of construction contracts, the Authority will incorporate the following construction equipment exhaust emissions requirements into the contract specifications:

- All heavy-duty off-road construction diesel equipment used during the construction phase will meet Tier 4 engine requirements.
- A copy of each unit's certified tier specification and any required CARB or air pollution control district operating permit will be made available to the Authority at the time of mobilization of each piece of equipment.
- The contractor will keep a written record (supported by equipment-hour meters where available) of equipment usage during project construction for each piece of equipment.
- The contractor will provide the Authority with monthly reports of equipment operating hours (through the Environmental Mitigation Management and Assessment [EMMA] system) and annual reports documenting compliance.

**AQ-IAMF#5: Reduce Criteria Exhaust Emissions from On-Road Construction Equipment**

Prior to issuance of construction contracts, the Authority will incorporate the following material-hauling truck fleet mix requirements into the contract specifications:

- All diesel on-road trucks used to haul construction materials, including fill, ballast, rail ties, and steel, shall use a model year 2010 or newer engine.
- The contractor will provide documentation to the Authority of efforts to secure such a fleet mix.
- The contractor will keep a written record of equipment usage during Project construction for each piece of equipment and provide the Authority with monthly reports of vehicle miles traveled (VMT) (through EMMA) and annual reports documenting compliance.

***AQ-IAMF#6: Reduce the Potential Impact of Concrete Batch Plants***

Prior to construction of any concrete batch plant, the contractor will provide the Authority with a technical memorandum documenting consistency with the Authority's concrete batch plant siting criteria and utilization of typical control measures. Concrete batch plants will be sited at least 1,000 feet from sensitive receptors, including places such as daycare centers, hospitals, senior care facilities, residences, parks, and other areas where people may congregate. The concrete batch plant will implement typical control measures to reduce fugitive dust such as water sprays, enclosures, hoods, curtains, shrouds, movable and telescoping chutes, central dust collection systems, and other suitable technology, to reduce emissions to be equivalent to the USEPA AP-42 controlled emission factors for concrete batch plants. The contractor will provide to the Authority documentation that each batch plant meets this standard during operation.

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## 6 REGULATORY PROCEDURES

The General Conformity regulations establish certain procedural requirements that must be followed when preparing a General Conformity evaluation. The procedures required for the General Conformity evaluation are similar, but not identical, to those for conducting an air quality impact analysis pursuant to NEPA. The draft General Conformity Determination was released for public and agency review pursuant to 40 C.F.R. Section 93.156, and this Final General Conformity Determination is being published concurrently with the ROD for the Project.

The Authority identified the appropriate emission estimation techniques and planning assumptions in close consultation with the state entities charged with regulating air pollution in the SFBAAB, NCCAB, and SJVAB.

### 6.1 Use of Latest Planning Assumptions

The General Conformity regulations require the use of the latest planning assumptions for the area encompassing the Project, derived from the estimates of population, employment, travel, and congestion most recently approved by the area’s metropolitan planning organizations (MPO)C.F.R. § 93.159(a)).

The emission estimation techniques, which were slightly different from those used in establishing the applicable SIP emissions budgets, have been approved by the BAAQMD, MBARD, and SJVAPCD. The traffic data used in the air quality analysis are based on the level of ridership as presented in *Connecting and Transforming California, 2016 Business Plan* (2016 Business Plan) (Authority 2016).<sup>6</sup> Further, the traffic data are consistent with the most recent estimates made by the MPOs for traffic volume growth rates, including forecast changes in VMT and vehicle hours traveled. The MPO developed these estimates from their traffic assignment models based on current and future population, employment, and travel and congestion information. These assumptions are consistent with those in the current conformity determinations for the regional transportation plans and transportation improvement programs.

### 6.2 Use of Latest Emission Estimation Techniques

The General Conformity regulations require the use of the latest and most accurate emission estimation techniques available, unless such techniques are inappropriate (40 C.F.R. § 93.159(b)). Emissions from construction activities were calculated using a combination of emission factors and methodologies from the California Emissions Estimator Model (CalEEMod2, the CARB’s EMFAC2017 model, and the USEPA’s AP-42 Compilation of Air Pollutant Emission Factors (AP-42) based on Project-specific construction data (e.g., schedule, equipment, truck volumes) provided by the Project design team (Scholz pers. comm.). CalEEMod provides the latest emission factors for construction off-road equipment. It accounts for lower fleet population and growth factors because of the economic recession and updated load factors based on feedback from engine manufacturers. The use of emission rates from CalEEMod reflects the recommendation of the CARB to capture the latest off-road construction assumptions. CalEEMod default load factors (the ratio of average equipment horsepower utilized to maximum equipment horsepower) and useful life parameters were used for emission estimates. CalEEMod default load factors (the ratio of average equipment horsepower utilized to maximum equipment horsepower) and useful life parameters were used for emission estimates.

Construction exhaust emissions from equipment; fugitive dust emissions from earthmoving activities; and emissions from worker trips, deliveries, and material hauling were calculated and

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<sup>6</sup> As described in Volume 2, Appendix 3.3-C, Changes to Project Benefits Based on 2018 Business Plan of the EIR/EIS, the Authority Board adopted the 2018 Business Plan on May 15, 2018. The 2018 Business Plan assumes an opening year of 2033 for Phase 1 and presents different ridership forecasts for 2029 and 2040 than were assumed in this EIR/EIS. Under the 2018 Business Plan ridership forecasts, the HSR project would achieve the same benefits described in this section, but they would occur at different times and may be less than those presented in Section 3.3.6, Environmental Consequences. Nonetheless, HSR would ultimately afford a more energy-efficient choice for personal travel that would help alleviate highway congestion, provide greater capacity for goods movement, and reduce criteria pollutant and GHG emissions.

compiled in a spreadsheet tool specific to the Project for each year of construction. Mobile source emission burdens from worker trips and truck trips were calculated using VMT estimates and appropriate emission factors from EMFAC2017. Fugitive dust from re-entrained road dust was calculated using emission factors from USEPA's AP-42, Sections 13.2.1 and 13.2.2. Refer to Chapter 9, Construction Activities Considered, for further detail on the emissions estimation techniques.

### 6.3 Major Construction-Phase Activities

Project-specific data, including construction equipment lists and the construction schedule, were used for the analysis. Calculations were performed for each year of construction for the Project using default emission factors, as described further in Section 9, Construction Activities Considered.

Major activities were grouped into the following categories:

- Viaduct
- Embankment
- At grade
- Trench
- Tunnel
- Cut and fill

Construction activities associated with each component included demolition, excavation, utilities, roadwork, concrete forming, and other rail work. Each of these activities was considered to evaluate the regional and localized air quality effects during the construction phase. Analysts also quantified emissions from reconductoring approximately 11.1 miles of the existing single-circuit Spring to Llagas and Green Valley to Llagas 115-kilovolt power lines. Refer to Section 9, Construction Activities Considered, for further detail on the construction schedule.

### 6.4 Emission Scenarios

The General Conformity regulations require that the evaluation reflect certain emission scenarios (40 C.F.R. § 93.159(d)). Specifically, these scenarios generally include the evaluation of direct and indirect emissions from the Project for the following years: (1) for nonattainment areas, the attainment year specified in the SIP, or if the SIP does not specify an attainment year, the latest attainment year possible under the CAA, and for maintenance areas, the farthest year for which emissions are projected in the approved maintenance plan; (2) the year during which the total of direct and indirect emissions for the Project are projected to be the greatest on an annual basis; and (3) any year for which the applicable SIP specifies an emissions budget. Both the operational and construction phases of the Project must be analyzed, and the following applies to the Project:

- Emissions generated during the operational phase of the Project would meet the emission requirements for the years associated with Items 1 and 3 because the emissions generated during the operational phase would be less than those emitted in the No Project scenario. In addition, microscale analyses conducted for the EIR/EIS demonstrate that the operational phase of the Project would not cause or exacerbate a violation of the NAAQS for all applicable pollutants (see Final EIR/EIS, Section 3.3.6.1).
- Emissions generated during the Project's construction phase, which would include the year with the greatest amount of total direct and indirect emissions (2025, as identified in Item 2), may be subject to General Conformity regulations because they would increase regional emission rates and, as such, have the potential to cause or exacerbate an exceedance of the NAAQS. Therefore, analyses were conducted to estimate the amounts of emissions that would be generated during the construction phase (for comparison with the General Conformity applicability rates) and the potential impacts of these emissions on local air quality levels. Emissions generated at the construction sites (e.g., tailpipe emissions from the on-site heavy-duty diesel equipment and fugitive dust emissions generated by vehicles traveling within the construction sites) and on the area's roadways by vehicles traveling to and from

these sites (by vehicles transporting materials and the workers traveling to and from work) were considered.

- Air quality dispersion modeling would be required for this conformity analysis to estimate the Project's localized impacts on PM concentrations if the annual emissions of the pollutants generated during construction were to exceed the General Conformity *de minimis* thresholds.

Annual emissions were estimated for each year of the Project's construction period. These emissions, which are the maximum values for the Project, are described in more detail in Section 10, Estimated Emission Rates and Comparison to *de minimis* Thresholds, of this report.

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## 7 APPLICABILITY ANALYSIS

The first step in a General Conformity evaluation is an analysis of whether the requirements apply to a proposed federal action in a nonattainment or a maintenance area. Unless exempted by the regulations or otherwise presumed to conform, a Federal action requires a General Conformity Determination for each pollutant where the total of direct and indirect emissions caused by the Project would equal or exceed an annual *de minimis* emission rate.

### 7.1 Attainment Status of Resource Study Area

The USEPA designates each county (or portions of counties) within California as attainment, maintenance, or nonattainment based on the area's ability to maintain ambient air concentrations below the air quality standards. Areas are designated as attainment if ambient air concentrations of a criteria pollutant are below the ambient standards. Areas are designated as nonattainment if ambient air concentrations are above the ambient standards. Areas previously designated as nonattainment that subsequently demonstrated compliance with the standards are designated as maintenance. Table 4 summarizes the attainment status of the SFBAAB, NCCAB, and SJVAB with regard to the NAAQS and CAAQS.

**Table 4 Federal Attainment Status of the SFBAAB, NCCAB, and SJVAB**

Pollutant	SFBAAB	NCCAB	SJVAB
O <sub>3</sub>	Marginal Nonattainment	Attainment	Extreme Nonattainment
PM <sub>10</sub>	Attainment	Attainment	Serious Maintenance
PM <sub>2.5</sub>	Moderate Nonattainment	Attainment	Serious/Moderate Nonattainment <sup>1</sup>
CO	Attainment	Attainment	Attainment
NO <sub>2</sub>	Attainment	Attainment	Attainment
SO <sub>2</sub>	Attainment	Attainment	Attainment

Source: USEPA 2018

CO = carbon monoxide

NCCAB = North Central Coast Air Basin

NO<sub>2</sub> = nitrogen dioxide

O<sub>3</sub> = ozone

PM<sub>2.5</sub> = particulate matter smaller than or equal to 2.5 microns in diameter

PM<sub>10</sub> = particulate matter smaller than or equal to 10 microns in diameter

SFBAAB = San Francisco Bay Area Air Basin

SJVAB = San Joaquin Valley Air Basin

SO<sub>2</sub> = sulfur dioxide

<sup>1</sup> The SJVAB is serious nonattainment for the 2006 PM<sub>2.5</sub> standard and moderate nonattainment for the 2012 PM<sub>2.5</sub> standard.

Under federal designations, the RSA is currently designated as extreme and marginal nonattainment for 8-hour O<sub>3</sub><sup>7</sup> in the SJVAB and SFBAAB, respectively; moderate/serious nonattainment for PM<sub>2.5</sub> in the SFBAAB and SJVAB; and maintenance for PM<sub>10</sub> in the SJVAB. As such, the FRA is required to demonstrate project-level compliance with the General Conformity Rule for NO<sub>x</sub> and VOCs (O<sub>3</sub> precursors), PM<sub>2.5</sub>, PM<sub>10</sub>, and SO<sub>2</sub> (PM<sub>2.5</sub> precursor<sup>8</sup>), if Project-related emissions of these pollutants in the SFBAAB or SJVAB would exceed the General Conformity *de minimis* thresholds.

<sup>7</sup> It should be noted that because O<sub>3</sub> is a secondary pollutant (i.e., it is not emitted directly into the atmosphere, but is formed in the atmosphere from the photochemical reactions of VOCs and NO<sub>x</sub> in the presence of sunlight), its *de minimis* threshold is based on primary emissions of its precursor pollutants, NO<sub>x</sub> and VOCs. If the net emissions of either NO<sub>x</sub> or VOCs exceeds the *de minimis* applicability thresholds (USEPA 1994), the Project is subject to a general conformity evaluation for O<sub>3</sub>.

<sup>8</sup> Ammonia is also a precursor to PM<sub>2.5</sub>. However, neither construction nor operation of the Project would result in material emissions of ammonia.

As shown in Table 4, the portion of the RSA in the NCCAB is in attainment for all criteria pollutants. As outlined in Section III.A of the General Conformity Rule, “only actions which cause emissions in designated nonattainment and maintenance areas are subject to the regulations.” As such, a General Conformity analysis is not required for the portion of the Project within the NCCAB. There are no applicable *de minimis* thresholds, and no further discussion of Project activities in the NCCAB is provided in this General Conformity Determination.

## 7.2 Exemptions from General Conformity Requirements

As noted previously, the General Conformity requirements apply to a federal action if the net Project emissions equal or exceed certain *de minimis* emission rates. The only exceptions to this applicability criterion are if the activity is on the federal agency’s presumed-to-conform list (40 C.F.R. § 93.153(f)), meets the narrow exemption for federal actions in response to an emergency or disaster (40 C.F.R. § 93.153(e)), or is one of the following topical exemptions:

- Actions that would result in no emissions increase or an increase in emissions that is clearly below the *de minimis* levels (40 C.F.R. § 93.153(c)(2)). Examples include administrative actions and routine maintenance and repair.
- Actions where the emissions are not reasonably foreseeable (40 C.F.R. § 93.153(c)(3))
- Actions which implement a decision to conduct or carry out a conforming program (40 C.F.R. § 93.153 (c)(4))
- Actions which include major new or modified sources requiring a permit under the New Source Review program (40 C.F.R. § 93.153(d)(1))
- Actions in response to emergencies or natural disasters (40 C.F.R. § 93.153(d)(2))
- Actions which include air quality research not harming the environment (40 C.F.R. § 93.153(d)(3))
- Actions which include modifications to existing sources to enable compliance with applicable environmental requirements (40 C.F.R. § 93.153(d)(4))
- Actions which include emissions from remedial measures carried out under the Comprehensive Environmental Response, Compensation and Liability Act that comply with other applicable requirements (40 C.F.R. § 93.153(d)(5)).

However, the Project does not meet any of the exemption categories described above. In addition, the FRA has not established a presumed-to-conform list of activities at the time of this evaluation, and the Project does not meet the requirements of 40 C.F.R. Section 93.153(e).

## 7.3 Applicability for Project

After determining that the Project is not otherwise exempt, the applicability of the General Conformity requirements to the Project is evaluated by comparing the total of direct and indirect emissions for the calendar year of greatest emissions to the General Conformity *de minimis* thresholds. Where the total of direct and indirect emissions attributable to the Project is found to be below the *de minimis* emission rates for a pollutant, that pollutant is excluded from General Conformity requirements, and no further analysis is required. However, when the emissions of an applicable pollutant are at or above a *de minimis* threshold, that pollutant must undergo a General Conformity evaluation.

## 7.4 De Minimis Emission Rates

The General Conformity requirements would apply to the Project for each pollutant for which the total of direct and indirect emissions caused by the Project equal or exceed the *de minimis* emission rates shown in Table 5. These emission rates are expressed in units of tons per year (tpy) for the Project in each air basin for the calendar year. The applicable threshold levels for the pollutants for which General Conformity is required in the RSA are shown in Table 5.

**Table 5 De Minimis Rates for Determining Applicability of General Conformity Requirements to Federal Actions**

Air Basin	Annual Air Pollutant Emissions in Tons per Year					
	VOC	NO <sub>x</sub>	CO	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>2</sub>
San Francisco Bay Area Air Basin <sup>1</sup>	100	100	None	None	100	100
San Joaquin Valley Air Basin <sup>2</sup>	10	10	None	100	70	70
North Central Coast Air Basin <sup>3</sup>	None	None	None	None	None	None

Source: 40 C.F.R. Section 93.153

CO = carbon monoxide

NO<sub>x</sub> = oxides of nitrogen

O<sub>3</sub> = ozone

PM<sub>2.5</sub> = particulate matter 2.5 microns in diameter or less

PM<sub>10</sub> = particulate matter 10 microns in diameter or less

VOC = volatile organic compounds

SO<sub>2</sub> = sulfur dioxide

<sup>1</sup> The General Conformity *de minimis* thresholds for criteria pollutants are based on the federal attainment status of the RSA in the SFBAAB. The RSA is considered a marginal nonattainment area for the O<sub>3</sub> NAAQS and a moderate nonattainment area for the PM<sub>2.5</sub> NAAQS. Although the RSA is in attainment for SO<sub>2</sub>, because SO<sub>2</sub> is a precursor for PM<sub>2.5</sub>, the PM<sub>2.5</sub> General Conformity *de minimis* thresholds are used.

<sup>2</sup> The General Conformity *de minimis* thresholds for criteria pollutants are based on the federal attainment status of the RSA in the SJVAB. The RSA is considered an extreme nonattainment area for the O<sub>3</sub> NAAQS, a serious/moderate nonattainment area for the PM<sub>2.5</sub> NAAQS, and a serious maintenance area for the PM<sub>10</sub> NAAQS. Although the RSA is in attainment for SO<sub>2</sub>, because SO<sub>2</sub> is a precursor for PM<sub>2.5</sub>, the PM<sub>2.5</sub> General Conformity *de minimis* thresholds are used. For PM<sub>2.5</sub> and SO<sub>2</sub>, the *de minimis* threshold for projects located in serious nonattainment areas are used because this threshold is lower than the 100 tons per year threshold for projects exclusively in moderate nonattainment areas.

<sup>3</sup> The NCCAB is in attainment for all criteria pollutants (see Table 4).

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## 8 CONSTRUCTION ACTIVITIES CONSIDERED

As shown in Section 3.3.6.1 of the Final EIR/EIS, the results of the regional analyses conducted for the Project demonstrate that emissions generated during the operational phase would be less than those emitted in the No Project and existing conditions scenarios and that the microscale analyses demonstrate that the Project would not cause or exacerbate a violation of the NAAQS for these pollutants. As such, no further analysis of the operational period emissions is necessary for this General Conformity Determination. This section focuses on the emissions generated from the construction period emissions for the Project.

The analysis conducted for the EIR/EIS to estimate potential air quality impacts caused by on-site (e.g., demolition activities, construction equipment operations, and truck movements) and off-site (e.g., motor vehicle traffic effects because of truck trips) construction-phase activities included the following:

- Estimation of emissions generated by the construction activities (e.g., deconstruction, concrete and steel construction), including fugitive dust emissions and emissions released from diesel-powered equipment and trucks based on the hours of operation of each piece of equipment<sup>9</sup>
- Identification of heavily traveled truck routes to estimate the cumulative effects of on-site construction activity emissions and off-site traffic emissions
- An on-site dispersion modeling analysis of the major construction areas
- An off-site dispersion modeling analysis of the roadway intersections and interchanges adjacent to the construction areas, using traffic data that include construction-related vehicles and background traffic
- A comparison of the on-site and off-site modeling results to the applicable NAAQS for the applicable pollutants

Emission rates for these activities were estimated based on the following:

- The number of hours per day and duration of each construction activity
- The number and type of construction equipment to be used
- HP and utilization rates (hours per day) for each piece of equipment
- The quantities of construction/demolition material produced and removed from each site
- The number of truck trips needed to remove construction and demolition material and to bring the supply materials to each site

The following is a discussion of the construction analysis methodology. A full list of assumptions can be found in the EIR/EIS, Appendix C to the *San Jose to Merced Project Section Air Quality and Greenhouse Gases Technical Report* (Authority and FRA 2019).

### 8.1 Models and Methods for Emissions Modeling

Construction of the Project would generate emissions of VOC, NO<sub>x</sub>, CO, sulfur oxide (SO<sub>x</sub>) PM<sub>10</sub>, and PM<sub>2.5</sub>. Emissions would originate from off-road equipment exhaust, employee and haul truck vehicle exhaust (on-road vehicles) site grading and earth movement, concrete batching, demolition, paving, architectural coating, and helicopters (for reconductoring work). These emissions would be temporary (i.e., limited to the construction period) and would cease when construction activities are complete.

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<sup>9</sup> It is possible changes in VMT, speeds, or idle times resulting from traffic detours during construction could result in additional emissions. However, it is unknown to what extent motorists will change their driving patterns as a result of traffic detours and impediments, and, as such, it would be speculative to quantify the impact of temporary roadway restrictions on criteria pollutant emissions.

Combustion exhaust, fugitive dust (PM<sub>10</sub> and PM<sub>2.5</sub>), and fugitive off-gassing (VOCs) were estimated using a combination of emission factors and methodologies from CalEEMod, version 2016.3.2; the CARB's EMFAC2017 model, and the USEPA's AP-42 Compilation of Air Pollutant Emission Factors based on Project-specific construction data (e.g., schedule, equipment, truck volumes) provided by the Project design team (Scholz pers. comm.).

- **Off-road equipment**—Emission factors for off-road construction equipment (e.g., loaders, graders, bulldozers) were obtained from the CalEEMod (version 2016.3.2) User's Guide appendix, which provides values per unit of activity (in grams per horsepower-hour) by calendar year (Trinity Consultants 2016). Analysts estimated criteria pollutants by multiplying the CalEEMod emission factors by the equipment inventory provided by the Project engineering team (Scholz pers. comm.).
- **On-road vehicles**—On-road vehicles (e.g., pickup trucks, flatbed trucks) would be required for material and equipment hauling, on-site crew and material movement, and employee commuting. The analysis estimated exhaust emissions from on-road vehicles using the EMFAC2017 emissions model and activity data (miles traveled per day) provided by the Project engineering team (Scholz pers. comm.). Emission factors for haul trucks are based on aggregated-speed emission rates for EMFAC's T7 Single vehicle category. Factors for on-site dump, water, boom, and concrete trucks were based on 5 mph emission rates for the T6 Heavy category. Factors for employee commute vehicles were based on a weighted average for all vehicle speeds for EMFAC's light-duty automobile/light-duty truck vehicle categories. CARB's (2019) Safer Affordable Fuel-Efficient [SAFE] Vehicles Rule adjustment factors were applied to the emission factors for gasoline-powered vehicles. Fugitive re-entrained road dust emissions were estimated using the USEPA's *Compilation of Air Pollutant Emission Factors* (AP-42), Sections 13.2.1 and 13.2.2 (USEPA 2006, 2011).
- **Site grading and earth movement**—Fugitive dust emissions from earth movement (e.g., site grading, bulldozing, and truck loading) were quantified using emission factors from CalEEMod and USEPA (1998) AP-42 cut-and-fill material were provided by the Project engineering team (Scholz pers. comm.).
- **Concrete batching**—Fugitive dust emissions from concrete batching at the three new temporary batch plants were quantified using emission factors from BAAQMD's (2016) Permit Handbook and USEPA's AP-42. Daily and annual batch quantities (cubic yards) were provided by the Project engineering team (Scholz pers. comm.).
- **Demolition**—Fugitive dust emissions from building demolition were based on the anticipated amount of square feet to be demolished and calculation method from the CalEEMod User's Guide (Trinity Consultants 2016).
- **Paving**—Fugitive VOC emissions associated with paving were calculated using activity data (e.g., square feet paved) provided by the Project engineer and the CalEEMod default emission factor of 2.62 pounds of VOC per acre paved (Scholz pers. comm.).
- **Architectural coating**—Fugitive VOC emissions associated with architectural coatings of the stations were calculated using activity data (e.g., square feet coated) provided by the Project engineering team and methods contained in the CalEEMod User's Guide (Scholz pers. comm.). Emissions calculations assume a VOC content of 150 grams per liter (g/L), consistent with BAAQMD's Regulation 8, Rule 3, Section 301.
- **Helicopters**—Helicopters would be required for the re-conductoring work. Exhaust emissions were calculated using emission factors and assumptions derived from a review of guidance manuals published by USEPA (1978) *The Climate Registry* (2018).

## 8.2 Ballast and Subballast Hauling

Ballast and subballast materials could be transported from multiple quarry locations throughout Northern California and the Central Valley. Analysts estimated emissions from ballast and subballast material hauling by trucks and locomotives based on the travel distances and

transportation method (by rail or by truck) from the locations where ballast materials would be available. Analysts used heavy-duty truck emission factors (T7 Single) from EMFAC2017 to estimate emissions from haul trucks and rail emission factors from the USEPA (2009) to estimate the locomotive emissions. to estimate the locomotive emissions.

Analysts identified up to 11 potential quarries that could provide ballast material. All quarries are within the SFBAAB, MBARD, and SJVAPCD, with the furthest quarry located 37 rail miles and 89 highway miles from the Project footprint. Ballast and subballast quantities for the Project were provided by the Project engineering team and distributed equally among the identified quarries (Scholz pers. comm.). Scenario 1 assumed ballast and subballast would be hauled to the Project footprint using a combination of trucks and locomotives, and Scenario 2 assumed ballast and subballast would be hauled to the Project footprint using only trucks.

### 8.3 Annual Emissions Estimates

As discussed in Section 7.3, Major Construction-Phase Activities, up to six construction activities (viaduct, embankment, at grade, trench, tunnel, and large cut and fill) would be constructed, depending on the subsection and alternative. The analysis assumes that each component would be constructed over multiple phases between 2022 and 2028.<sup>10</sup>

### 8.4 Emissions by Air Basin

Activities occurring within the SFBAAB and SJVAB were quantified and analyzed separately to compare emissions to appropriate *de minimis* thresholds. Emissions generated by construction of subsections that would occur exclusively within one air basin (e.g., San Jose Diridon Station Approach in the SFBAAB) were wholly assigned to that air basin. Emissions estimates for alternatives that span more than one air district were apportioned based on the location of construction activity. For example, construction of the Pacheco Pass Subsection would occur in both the SFBAAB and SJVAB. Accordingly, the emissions estimates were apportioned to the SFBAAB and SJVAB based on the number of rail miles constructed within each air basin. Table 6 summarizes the location of each subsection and the air basin scaling factors used in the analysis, as appropriate. All reconductoring work would occur in the SFBAAB.

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<sup>10</sup> Construction is expected to take place later than the dates assumed in the air quality analysis. The construction emissions estimates are therefore conservative, as future emissions rates will be lower due to the implementation of cleaner and newer equipment.

**Table 6 Track Miles and Construction Scaling Factors by Air Basin**

Subsection	Alternative 1		Alternative 2		Alternative 3		Alternative 4	
	SFBAAB	SJVAB	SFBAAB	SJVAB	SFBAAB	SJVAB	SFBAAB	SJVAB
<b>Constructed Rail Miles</b>								
San Jose Diridon Station Approach	3	0	3	0	3	0	3	0
Monterey Corridor	4	0	4	0	4	0	4	0
Morgan Hill and Gilroy	14	0	14	0	13	0	14	0
Pacheco Pass	5	7	5	7	5	7	5	7
San Joaquin Valley	0	9	0	9	0	9	0	9
<b>Emission Scaling Factors</b>								
San Jose Diridon Station Approach	100%	0%	100%	0%	100%	0%	100%	0%
Monterey Corridor	100%	0%	100%	0%	100%	0%	100%	0%
Morgan Hill and Gilroy	85% <sup>1</sup>	0%	85% <sup>1</sup>	0%	87% <sup>1</sup>	0%	85% <sup>1</sup>	0%
Pacheco Pass	43%	57%	43%	57%	43%	57%	43%	57%
San Joaquin Valley	0%	100%	0%	100%	0%	100%	0%	100%

Sources: Authority 2017; CARB 2012

SFBAAB = San Francisco Bay Area Air Basin

SJVAB = San Joaquin Valley Air Basin

<sup>1</sup> The remaining 13–15 percent of track miles would be constructed in the NCCAB. However, as discussed in Section 8.1, Attainment Status of Resource Study Area, the portion of the RSA in the NCAAB is in attainment for all criteria pollutants. As such, a general conformity analysis is not required, and no further discussion of Project activities in the NCCAB is provided in this General Conformity Determination.

## 8.5 Project Design Features

The Authority has developed IAMFs to reduce air quality effects. Because IAMFs are included as part of the Project design, they are not considered mitigation, and are included as part of the Project construction emissions estimate. Specifically, the following emissions benefits achieved by AQ-IAMF#1 through AQ-IAMF#6 were assumed in the modeling. Specifically, the following emissions benefits achieved by AQ-IAMF#1 through AQ-IAMF#6 were assumed in the modeling.

- Fugitive dust reductions from earthmoving best management practices (AQ-IAMF#1) (Countess Environmental 2006).
  - PM from ground disturbance (i.e., scraping and grading activities), 75 percent (BAAQMD 2017a)
  - PM from unpaved vehicle travel (i.e., re-entrained road dust), 75 percent<sup>11</sup>
  - PM from demolition, 36 percent (Countess Environmental 2006)
- VOC reductions (93 percent) from application of architectural coatings (AQ-IAMF#2).<sup>12</sup>
- Criteria pollutant and greenhouse gas (GHG) Lovegrove and Tadross 2017))
  - CO, 10 percent (Tier 2 tunneling equipment)
  - NO<sub>x</sub>, 10 percent (Tier 2 tunneling equipment)
  - PM, 30 percent (all engines)
- Criteria pollutant and GHG reductions from use of Tier 4 off-road engines (AQ-IAMF#4). Emissions reductions vary by pollutant and equipment type. Emissions were modeled using Tier 4 emission rates from CalEEMod.
- Criteria pollutant and GHG reductions from use of model year 2010 or newer on-road engines in heavy-duty, diesel powered trucks (AQ-IAMF#5). Emissions reductions vary by pollutant, analysis year, and air basin. Emissions were modeled using emission rates for model year 2010 or newer engines derived from the CARB's EMFAC2017 model. The emissions rates for model year 2010 and newer engines reflect implementation of EPA's December 2000 Control of Air Pollution from New Motor Vehicles: Heavy-Duty Engine and Vehicle Standards and Highway Diesel Fuel Sulfur Control Requirements.
- Fugitive dust reductions from implementation of typical control measures at new concrete batch plants, such as water sprays, enclosures, and hoods (AQ-IAMF#6). Emissions were modeled using USEPA AP-42 controlled emission factors for concrete batch plants

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<sup>11</sup> Among other controls, this IAMF requires watering unpaved roads three times daily and limiting vehicle speeds. The 75 percent efficacy is based on a 55 percent reduction for watering and a 44 percent reduction for vehicle speed limits (1 - (.55\*.44)) = 0.75% (Countess Environmental 2006).

<sup>12</sup> Assumes an uncontrolled VOC content of 150 g/L per BAAQMD Regulation 8, Rule 3, Section 301 and a controlled VOC content of 10 g/L per AQ-IAMF#2.

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## 9 ESTIMATED EMISSION RATES AND COMPARISON TO *DE MINIMIS* THRESHOLDS

Total annual estimated emissions generated within the SFBAAB and SJVAB during the construction period, as presented in the EIR/EIS, are provided in Tables 7 and 8. These values are the peak on-site emissions during each analysis year, plus maximum annual off-site emissions. The modeling accounts for implementation of AQ-IAMF#1 through AQ-IAMF#6 and reflects the impact of the SAFE Vehicle Rule (CARB 2019Emissions for each Project alternative, including the Preferred Alternative 4, are presented and analyzed in this General Conformity Determination.

As shown in the tables, annual construction emissions of all Project alternatives would exceed the General Conformity *de minimis* threshold in the SJVAB for NO<sub>x</sub> for all years of construction between 2022 and 2028. NO<sub>x</sub> emissions would also exceed the General Conformity *de minimis* threshold in the SFBAAB in 2024 under Alternatives 1 and 3, and between 2023 and 2025 under Alternatives 2 and 4. All other pollutants would be below applicable *de minimis* thresholds.

**Table 7 San Jose to Central Valley Wye Annual Construction Emissions in the SFBAAB (tons per year)<sup>1</sup>**

Alternative/Year <sup>2</sup>	VOC	NO <sub>x</sub>	CO	SO <sub>2</sub> <sup>3</sup>	PM <sub>10</sub>	PM <sub>2.5</sub>
<b>Alternative 1</b>						
2022	4	50	145	<1	28	6
2023	6	79	200	1	46	10
2024	7	<b><u>106</u></b> *	245	1	66	15
2025	6	85	205	1	49	11
2026	3	37	89	<1	18	4
2027	2	35	53	<1	12	3
2028	1	11	28	<1	3	1
<b>Alternative 2</b>						
2022	6	76	192	1	41	10
2023	7	<b><u>118</u></b> *	255	1	67	16
2024	9	<b><u>155</u></b> *	304	1	93	21
2025	7	<b><u>112</u></b> *	241	1	63	15
2026	4	56	125	<1	29	7
2027	3	69	76	<1	29	6
2028	1	14	38	<1	5	1
<b>Alternative 3</b>						
2022	5	51	173	<1	27	6
2023	7	89	244	1	50	11
2024	8	<b><u>114</u></b> *	293	1	69	15
2025	7	85	233	1	47	11
2026	3	41	116	<1	19	4
2027	2	41	54	<1	15	3
2028	1	12	30	<1	4	1
<b>Alternative 4</b>						
2022	5	77	177	1	47	11
2023	7	<b><u>113</u></b> *	222	1	70	17
2024	8	<b><u>156</u></b> *	272	1	95	23
2025	7	<b><u>139</u></b> *	241	1	79	19
2026	3	62	109	<1	34	8
2027	3	84	70	<1	37	7
2028	1	13	29	<1	5	1
<i>De minimis threshold</i>	100	100	-	100	-	100

Sources: Trinity Consultants 2016; USEPA 1998, 2006, 2009, 2011; BAAQMD 2016; The Climate Registry 2018; Scholz pers. comm. Exceedances of the *de minimis* thresholds are shown in **bolded underline with an asterisk (\*)**.

CO = carbon monoxide  
 NO<sub>x</sub> = oxides of nitrogen  
 PG&E = Pacific Gas and Electric Company  
 PM<sub>2.5</sub> = particulate matter 2.5 microns in diameter or less  
 PM<sub>10</sub> = particulate matter 10 microns in diameter or less  
 SFBAAB = San Francisco Bay Area Air Basin  
 SO<sub>2</sub> = sulfur dioxide  
 VOC = volatile organic compound

<sup>1</sup> Emissions results include implementation of air quality IAMFs, as described in Section 6.  
<sup>2</sup> Construction is expected to take place later than the dates assumed in the air quality analysis. The construction emissions estimates are therefore conservative, as future emissions rates will be lower due to the implementation of cleaner and newer equipment.  
<sup>3</sup> Although the RSA is in attainment for SO<sub>2</sub>, because SO<sub>2</sub> is a precursor for PM<sub>2.5</sub>, the PM<sub>2.5</sub> General Conformity *de minimis* thresholds are used.

**Table 8 San Jose to Central Valley Wye Annual Construction Emissions in the SJVAB (tons per year)<sup>1</sup>**

Alternative/Year <sup>2</sup>	VOC	NO <sub>x</sub>	CO	SO <sub>2</sub> <sup>3</sup>	PM <sub>10</sub>	PM <sub>2.5</sub>
<b>Alternatives 1, 2, 3, or 4<sup>5</sup></b>						
2022	6	<b><u>42</u>*</b>	218	1	18	5
2023	6	<b><u>55</u>*</b>	226	1	24	6
2024	6	<b><u>56</u>*</b>	220	1	23	5
2025	6	<b><u>54</u>*</b>	209	1	21	5
2026	4	<b><u>45</u>*</b>	131	<1	17	4
2027	2	<b><u>50</u>*</b>	49	<1	17	3
2028	1	<b><u>10</u>*</b>	22	<1	2	1
<i>De minimis threshold</i>	10	10	-	70	100	70

Sources: Trinity Consultants 2016; USEPA 1998, 2006, 2009, 2011; BAAQMD 2016; The Climate Registry 2018; Scholz pers. comm.  
 Exceedances of the *de minimis* thresholds are shown in **bolded underline with an asterisk (\*)**.

CO = carbon monoxide  
 NO<sub>x</sub> = oxides of nitrogen  
 PM<sub>2.5</sub> = particulate matter 2.5 microns in diameter or less  
 PM<sub>10</sub> = particulate matter 10 microns in diameter or less  
 SJVAB = San Joaquin Valley Air Basin  
 SO<sub>2</sub> = sulfur dioxide  
 VOC = volatile organic compound

<sup>1</sup> Emissions results include implementation of air quality IAMFs, as described in Section 6.  
<sup>2</sup> Construction is expected to take place later than the dates assumed in the air quality analysis. The construction emissions estimates are therefore conservative, as future emissions rates will be lower due to the implementation of cleaner and newer equipment.  
<sup>3</sup> Although the RSA is in attainment for SO<sub>2</sub>, because SO<sub>2</sub> is a precursor for PM<sub>2.5</sub>, the PM<sub>2.5</sub> General Conformity *de minimis* thresholds are used.  
<sup>4</sup> Construction activities and associated emissions are the same among the four alternatives in the SJVAB.

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## 10 REGIONAL EFFECTS

As shown in Section 3.3.6.1 of the Final EIR/EIS, the total regional emissions for all applicable pollutants are lower during the operations phase of the Project than under No Project conditions (and would therefore not exceed the *de minimis* emission thresholds). As such, only emissions generated during the construction phase were compared to the conformity threshold levels to determine conformity compliance. As shown in Tables 7 and 8, construction-phase emissions, compared to the General Conformity applicability rates, are as follows:

- Annual estimated NO<sub>x</sub> emissions in the SJVAB are greater than the applicability rate of 10 tpy for all years of construction between 2022 and 2028 for all Project alternatives with implementation of IAMFs.
- Annual estimated NO<sub>x</sub> emissions in the SFBAAB are greater than the applicability rate of 100 tpy in 2024 under Alternatives 1 and 3 and for all years of construction between 2023 and 2025 under Alternatives 2 and 4 with implementation of IAMFs.
- Annual estimated VOC, CO, SO<sub>2</sub>, PM<sub>10</sub>, and PM<sub>2.5</sub> emissions are less than the applicability rates in the SFBAAB and SJVAB with implementation of IAMFs.

Therefore, a General Conformity Determination is required for the Project for NO<sub>x</sub> for the years during construction when the emissions would exceed the *de minimis* thresholds in the SFBAAB and SJVAB and do not meet any of the exceptions cited in 40 C.F.R. Section 93.154(c).

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## 11 GENERAL CONFORMITY EVALUATION

For federal actions subject to a General Conformity evaluation, the regulations delineate several ways an agency can demonstrate conformity (40 C.F.R. § 93.158). This section summarizes the findings that were used to make the determination for the Project.

### 11.1 Conformity Requirements of Project

Based on the results shown in Tables 7 and 8, conformity determinations are required for construction-phase emissions for NO<sub>x</sub> because annual estimated emissions are greater than the applicability rates of 100 tpy in the SFBAAB and 10 tpy in the SJVAB.

### 11.2 Compliance with Conformity Requirements

NO<sub>x</sub> (a precursor to O<sub>3</sub>) emissions caused by the construction of the Project would not result in an increase in regional NO<sub>x</sub> emissions in the SFBAAB or SJVAB because exceedances would be mitigated by offsets. This would be achieved by additional on-site controls and offsetting remaining NO<sub>x</sub> emissions generated by the construction of the Project in a manner consistent with the General Conformity regulations.

The requirements for offsets (as described below) would be implemented as part of the Project and will be included in the mitigation measures in the Final EIR/EIS. Any required offsets are anticipated to be accomplished by entering into an agreement with BAAQMD and project-level VERA with the SJVAPCD. The requirement for the VERA (as described below) would be implemented as part of the project and will be included in the mitigation measures in the Final EIR/EIS:

#### **AQ-MM#1: Implement Additional On-Site Emissions Controls to Reduce Fugitive Dust**

During construction, the contractor shall employ the following measures to minimize and control fugitive dust emissions:

- Where feasible, install wind breaks (e.g., dust curtains, plastic tarps, solid fencing) on the average dominant windward side(s) of station construction areas. For purposes of implementation, chain-link fencing with added landscape mesh fabric adequately qualifies as solid fencing.
- Post a publicly visible sign with the telephone number and person to contact at the Authority regarding dust complaints. This person shall respond and take corrective action within 48 hours. The phone number for the local air district shall also be visible to ensure compliance with applicable regulations.

#### **AQ-MM#2: Construction Emissions Reductions – Requirements for use of Zero Emission (ZE) and/or Near Zero Emission (NZE) Vehicles and off-road equipment**

This mitigation measure will reduce the impact of construction emissions from Project

This mitigation measure will reduce the impact of construction emissions from project-related on-road vehicles and off-road equipment.

The Authority and all project construction contractors shall require that a minimum of 25 percent, with a goal of 100 percent, of all light-duty on-road vehicles (e.g., passenger cars, light-duty trucks) associated with the project (e.g., on-site vehicles, contractor vehicles) use ZE or NZE technology.

The Authority and all project construction contractors shall have the goal that a minimum of 25 percent of all heavy-duty on-road vehicles (e.g., for hauling, material delivery and soil import/export) associated with the project use ZE or NZE technology.

The Authority and all project construction contractors shall have the goal that a minimum of 10 percent of off-road construction equipment use ZE or NZE vehicles.

If local or state regulations mandate a faster transition to using ZE and/or NZE vehicles at the time of construction, the more stringent regulations will be applied. For example, Executive Order (EO) N-79-20, issued by California Governor Newsom September 23, 2020, currently states the following:

- Light duty and passenger car sales be 100 percent ZE vehicles by 2035
- Full transition to ZE short haul/drayage trucks by 2035
- Full transition to ZE heavy-duty long-haul trucks, where feasible, by 2045
- Full transition to ZE off-road equipment by 2035, where feasible.

The project will have a goal of surpassing the requirements of these or other future regulations as a mitigation measure.

### **AQ-MM#3: Offset Project Construction Emissions in the San Francisco Bay Area Air Basin**

Prior to issuance of construction contracts, the Authority will conduct an air quality analysis that evaluates the conditions that exist at that time. If the analysis determines that there will be exceedances of the VOC or NO<sub>x</sub> thresholds, even after the application of the mitigation in AQ-MM#2, the Authority will enter into an agreement with BAAQMD to reduce VOC and NO<sub>x</sub> to the required levels by acquiring offsets. The required levels in the SFBAAB are as follows:

1. For emissions in excess of the General Conformity *de minimis* thresholds (NO<sub>x</sub>): net zero.
2. For emissions not in excess of *de minimis* thresholds but above the BAAQMD's daily emission thresholds (VOC and NO<sub>x</sub>): below the appropriate CEQA threshold levels.

The mitigation offset fee amount will be determined at the time of mitigation to fund one or more emissions reduction projects within the SFBAAB. The offset fee will be determined by the Authority and BAAQMD based on the type of projects that present appropriate emission reduction opportunities. These funds may be spent to reduce either VOC or NO<sub>x</sub> emissions ("O<sub>3</sub> precursors"). Documentation of payment will be provided to the Authority or its designated representative.

The agreement will include details regarding the annual calculation of required offsets the Authority must achieve, funds to be paid, administrative fee, and the timing of the emissions reductions projects. Acceptance of this fee by BAAQMD will serve as an acknowledgment and commitment by BAAQMD to: (1) implement an emissions reduction project(s) within a timeframe to be determined based on the type of project(s) selected after receipt of the mitigation fee designed to achieve the emission reduction objectives; and (2) provide documentation to the Authority or its designated representative describing the project(s) funded by the mitigation fee, including the amount of emissions reduced (tons per year) in the SFBAAB from the emissions reduction project(s). To qualify under this mitigation measure, the specific emissions reduction project(s) must result in emission reductions in the SFBAAB that are real, surplus, quantifiable, enforceable, and will not otherwise be achieved through compliance with existing regulatory requirements or any other legal requirement. Pursuant to 40 C.F.R. Section 93.163(a), the necessary reductions must be achieved (contracted and delivered) by the applicable year in question. Funding will need to be received by BAAQMD prior to contracting with participants and should allow enough time to receive and process applications to fund and implement off-site reduction projects prior to commencement of project activities being reduced. This will roughly equate to 1 year prior to the required mitigation; additional lead time may be necessary depending on the level of off-site emission reductions required for a specific year.

This mitigation measure will be effective in offsetting emissions generated during project construction through the funding of emission-reduction projects. It is BAAQMD's experience that emissions offsets are feasible mitigation that effectively achieves actual emission reductions (Kirk 2018).

The implementation of this mitigation measure will not be expected to affect air quality in the BAAQMD because purchasing emissions offsets will not result in any physical change to the environment, and therefore will not result in other secondary environmental impacts. In addition to

VOC and NO<sub>x</sub>, the implementation of emission-reduction projects could result in reductions of other criteria pollutants and/or GHGs. However, this will be a secondary effect of this mitigation measure and is not a required outcome to mitigate any impacts of the project.

#### **AQ-MM#4: Offset Project Construction Emissions in the San Joaquin Valley Air Basin**

On June 19, 2014, the SJVAPCD and the Authority entered an MOU that establishes the framework for fully mitigating to net-zero construction emissions of NO<sub>x</sub>, VOC, PM<sub>10</sub>, and PM<sub>2.5</sub> from the entire HSR project within the SJVAB (Authority and SJVUAPCD 2014). Emissions generated by construction of the portion of the project within the SJVAB are subject to this MOU and, therefore, must be offset to net zero. Pursuant to the MOU, the Authority and the SJVAPCD will enter into a Voluntary Emissions Reduction Agreement (VERA) to cover the portion of the project approved and funded for construction within the SJVAB. The project-level VERA must be executed prior to commencement of construction and the mitigation fees and offsets delivered and achieved according to the requirements of the VERA and MOU.

This mitigation measure will be effective in offsetting emissions generated during construction of the project through the funding of emission-reduction projects. It is SJVAPCD's experience that implementation of a VERA is feasible mitigation that effectively achieves actual emission reductions. Based on the performance of current incentive programs and reasonably foreseeable future growth, the SJVAPCD has confirmed that enough emissions reduction credits will be available to offset emissions generated by the project for all years in excess of the SJVAPCD's thresholds and the General Conformity *de minimis* threshold (Authority and SJVUAPCD 2014).

The implementation of this mitigation measure will not be expected to affect air quality in the SJVAPCD because purchasing emissions offsets will not result in any physical change to the environment, and therefore will not result in other secondary environmental impacts. In addition to NO<sub>x</sub> and PM<sub>10</sub>, the implementation of emission-reduction projects could result in reductions of other criteria pollutants, GHGs, or both. However, this will be a secondary effect of this mitigation measure and is not a required outcome to mitigate any impacts of the project.

### **11.3 Consistency with Requirements and Milestones in Applicable SIP**

The General Conformity regulations state that notwithstanding the other requirements of the rule, a federal action may not be determined to conform unless the total of direct and indirect emissions from the federal action is in compliance or consistent with all relevant requirements and milestones in the applicable SIP (40 C.F.R. § 93.158(c)). This includes, but is not limited to, such issues as reasonable further progress schedules, assumptions specified in the attainment or maintenance demonstration, prohibitions, numerical emission limits, and work practice standards. This section briefly addresses how the construction emissions for the Project were assessed for SIP consistency for this evaluation.

#### **11.3.1 Applicable Requirements from U.S. Environmental Protection Agency**

The USEPA promulgates requirements to support the goals of the CAA with respect to the NAAQS. Typically, these requirements take the form of rules regulating emissions from significant new sources, including emission standards for major stationary point sources and classes of mobile sources, as well as permitting requirements for new major stationary point sources. Since states have the primary responsibility for implementation and enforcement of requirements under the CAA and can impose stricter limitations than the USEPA, the USEPA requirements often serve as guidance to the states in formulating their air quality management strategies.

#### **11.3.2 Applicable Requirements from California Air Resources Board**

In California, to support the attainment and maintenance of the NAAQS, the CARB is primarily responsible for regulating emissions from mobile sources. In fact, the USEPA has delegated authority to the CARB to establish emission standards for on-road and some non-road vehicles separate from the USEPA vehicle emission standards, although the CARB is preempted by the CAA from regulating emissions from many non-road mobile sources, including marine craft. Emission standards for preempted equipment can only be set by the USEPA.

### 11.3.3 Applicable Requirements from Bay Area Air Quality Management District and San Joaquin Valley Air Pollution Control District

To support the attainment and maintenance of the NAAQS in the SFBAAB and SJVAB, the BAAQMD and SJVAPCD have primarily been responsible for regulating emissions from stationary sources. As noted above, the BAAQMD and SJVAPCD develop and update their air quality management plans regularly to support the California SIP. While the plans contain rules and regulations geared to attain and maintain the NAAQS, these rules and regulations also have the much more difficult goal of attaining and maintaining the CAAQS.

### 11.3.4 Consistency with Applicable Requirements for the California High-Speed Rail Authority

The Authority already complies with, and will continue to comply with, a myriad of rules and regulations implemented and enforced by federal, state, regional, and local agencies to protect and enhance ambient air quality in the SFBAAB and SJVAB.

In particular, because of the long persistence of challenges to attain the ambient air quality standards in the SFBAAB and SJVAB, the rules and regulations promulgated by the CARB, BAAQMD, and SJVAPCD are among the most stringent in the U.S.

The Authority will continue to comply with all existing applicable air quality regulatory requirements for activities over which it has direct control and would meet in a timely manner all regulatory requirements that become applicable in the future.

These are appropriate USEPA, CARB, BAAQMD, and SJVAPCD rules which are standard practices and best management practices for construction in the BAAQMD and SJVAPCD, including control of emissions and exhaust:

- **BAAQMD Regulation 2, Rule 2 (New Source Review)**—This rule contains requirements for Best Available Control Technology and emission offsets.
- **BAAQMD Regulation 2, Rule 5 (New Source Review of Toxic Air Contaminates)**—This rule outlines guidance for evaluating TAC emissions and their potential health risks.
- **BAAQMD Regulation 6, Rule 1 (Particulate Matter)**—This rule restricts emissions of PM darker than No. 1 on the Ringlemann Chart to less than 3 minutes in any 1 hour.
- **BAAQMD Regulation 6, Rule 6 (Prohibition of Trackout)**—This rule limits the quantity of PM in the atmosphere through control of trackout of solid materials onto paved public roads outside the boundaries of Large Bulk Material Sites, Large Construction Sites, and Large Disturbed Surface sites including landfills.
- **BAAQMD Regulation 7 (Odorous Substances)**—This regulation establishes general odor limitations on odorous substances and specific emission limitations on certain odorous compounds.
- **BAAQMD Regulation 8, Rule 3 (Architectural Coatings)**—This rule limits the quantity of VOC in architectural coatings.
- **BAAQMD Regulation 9, Rule 6 (Nitrogen Oxides Emission from Natural Gas-Fired Boilers and Water Heaters)**—This rule limits emissions of NO<sub>x</sub> generated by natural gas-fired boilers.
- **BAAQMD Regulation 9, Rule 8 (Stationary Internal Combustion Engines)**—This rule limits emissions of NO<sub>x</sub> and CO from stationary internal combustion engines of more than 50 horsepower.
- **BAAQMD Regulation 11, Rule 2 (Asbestos Demolition, Renovation, and Manufacturing)**—This rule controls emissions of asbestos to the atmosphere during demolition, renovation, milling, and manufacturing and establishes appropriate waste disposal procedures.

- **SJVAPCD Rule 2010 (Permits Required)**—This rule requires any person constructing, altering, replacing or operating any source operation which emits, may emit, or may reduce emissions to obtain an Authority to Construct or a Permit to Operate.
- **SJVAPCD Rule 2201 (New and Modified Stationary Source Review)**—This rule requires that sources not increase emissions above the specified thresholds.
- **SJVAPCD Rule 2280 (Portable Equipment Registration)**—This rule requires portable equipment used at project sites for less than 6 consecutive months be registered with the SJVAPCD.
- **SJVAPCD Rule 4002 (National Emission Standards for Hazardous Air Pollutants)**—This rule incorporates by reference the National Emission Standards for Hazardous Air Pollutants from Part 61, Chapter I, Subchapter C, Title 40, Code of Federal Regulations (CFR) and the National Emission Standards for Hazardous Air Pollutants for Source Categories from Part 63, Chapter I, Subchapter C, Title 40, Code of Federal Regulations (CFR).
- **SJVAPCD Rule 4102 (Nuisance)**—This rule prohibits discharge from any source whatsoever such quantities of air contaminants or other materials which cause injury, detriment, nuisance or annoyance to any considerable number of persons or to the public or which endanger the comfort, repose, health or safety of any such person or the public or which cause or have a natural tendency to cause injury or damage to business or property.
- **SJVAPCD Rule 4201 and Rule 4202 (Particulate Matter Concentration and Emission Rates)**—These rules provide PM emission limits for sources operating within the district.
- **SJVAPCD Rule 4301 (Fuel-Burning Equipment)**—This rule limits the emissions from fuel-burning equipment whose primary purpose is to produce heat or power by indirect heat transfer.
- **SJVAPCD Rule 4601 (Architectural Coatings)**—This rule limits VOC emissions from architectural coatings.
- **SJVAPCD Rule 4641 (Cutback, Slow Cure, and Emulsified Asphalt, Paving, and Maintenance Operations)**—This rule limits VOC emissions by restricting the application and manufacturing of certain types of asphalt for paving and maintenance operations.
- **SJVAPCD Rule 8011 (General Requirements—Fugitive Dust Emission Sources)**—This rule outlines requirements for implementation of control measures for fugitive dust emission sources.
- **SJVAPCD Rule 9510 (Indirect Source Review)**—This rule outlines mitigation requirements for construction and operations emissions that exceed certain thresholds. The rule applies to any transportation project in which construction emissions equal or exceed 2 tons of NO<sub>x</sub> or PM<sub>10</sub> per year. Projects subject to Rule 9510 must submit an Air Impact Assessment application to the SJVAPCD prior to construction.
- **BAAQMD and SJVAPCD CEQA Guidelines**—The BAAQMD and SJVAPCD prepared their *Air Quality Guidelines* and *Guide for Assessing and Mitigating Air Quality Impacts* (GAMAQI), respectively, to assist lead agencies and project applicants in evaluating the potential air quality impacts of projects in the SFBAAB and SJVAB (BAAQMD 2017b; SJVAPCD 2015). The Air Quality Guidelines and GAMAQI provide BAAQMD- and SJVAPCD-recommended procedures for evaluating potential air quality impacts during the CEQA environmental review process. The documents provide guidance on evaluating short-term (construction) and long-term (operational) air emissions. The Air Quality Guidelines and GAMAQI used in this evaluation contain guidance on the following:
  - Criteria and thresholds for determining whether a project may have a significant adverse air quality impact
  - Specific procedures and modeling protocols for quantifying and analyzing air quality impacts

- Methods to mitigate air quality impacts
- Information for use in air quality assessments and environmental documents that will be updated more frequently, such as air quality data, regulatory setting, climate, and topography
- USEPA Rule 40 C.F.R. Part 89, Control of Emissions from New and In-Use Nonroad Compression-Ignition Engines: requires stringent emission standards for mobile nonroad diesel engines of almost all types using a tiered phase-in of standards
- CARB Rule 13 California Code of Regulations Section 1956.8, California Exhaust Emission Standards and Test Procedures for 1985 and Subsequent Model Heavy-Duty Diesel Engines and Vehicles: requires significant reductions in emissions of NO<sub>x</sub>, PM, and nonmethane organic compounds using exhaust treatment on heavy-duty diesel engines manufactured in model year 2007 and later years.

## 12 ESTIMATED EMISSION RATES AND COMPARISON TO *DE MINIMIS* THRESHOLDS—CUMULATIVE ANALYSIS

The RSA for cumulative air quality impacts is the SFBAAB and SJVAB. While these are separate projects for purposes of planning the HSR system, construction of the Project would overlap with the construction period for the following other HSR sections<sup>13</sup>:

- San Francisco to San Jose, construction in the SFBAAB between 2022 and 2025
- Merced to Fresno, construction in the SJVAB in 2022
- Central Valley Wye, construction in the SJVAB in 2022 and material hauling in the SFBAAB in 2022
- Fresno to Bakersfield, construction in the SJVAB between 2022 and 2023
- Bakersfield to Palmdale, construction in the SJVAB between 2022 and 2025

Overlapping construction activities could add to cumulative air quality impacts within the SFBAAB and SJVAB. For purposes of full disclosure of the potential impacts, the cumulative emissions that could result from potential concurrent construction activities are presented in Tables 9 and 10. As the analysis demonstrates, concurrent construction could result in exceedances of the NO<sub>x</sub> General Conformity *de minimis* threshold in the SFBAAB and VOC and NO<sub>x</sub> General Conformity *de minimis* thresholds in the SJVAB. As previously discussed, the Authority has already entered into an MOU with the SJVAPCD that will offset all emissions of VOC, NO<sub>x</sub>, and PM generated in the SJVAB by construction of the High Speed Rail Project to net zero. Pursuant to AQ-MM#-3, the Authority will enter into an agreement with BAAQMD to offset VOC and NO<sub>x</sub> emissions from construction of the Project in excess of the federal *de minimis* thresholds to net zero, if there will be exceedances of the VOC or NO<sub>x</sub> thresholds as determined by an analysis to be conducted prior to the issuance of construction contracts.

The Merced to Sacramento Project would also generate emissions in the SJVAB. However, this section would not be completed until Phase 2, which is after the mandated Los Angeles to San Francisco line. It is likely construction activities would therefore take place after this Project is completed (i.e., after 2028).

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<sup>13</sup> The analysis assumed that Project construction would take place from 2022 to 2028, and that construction of other HSR project sections would occur according to the schedules presented in their respective environmental documents.

**Table 9 Overlapping HSR System Construction Emissions in the SFBAAB (tons per year)**

Year <sup>1</sup>	VOC	NO <sub>x</sub>	CO	SO <sub>2</sub> <sup>2</sup>	PM <sub>10</sub>	PM <sub>2.5</sub>
<b>2022</b>						
JM <sup>3,4</sup>	6	77	192	1	47	11
FJ <sup>3,5</sup>	5	99	136	1	134	30
CVY	1	31	9	<1	1	1
<i>Total</i>	11	<b><u>207</u></b> <sup>*</sup>	337	1	182	43
<b>2023</b>						
JM <sup>3,4</sup>	7	<b><u>118</u></b> <sup>*</sup>	255	1	70	17
FJ <sup>3,5</sup>	4	91	117	<1	117	27
CVY	0	0	0	0	0	0
<i>Total</i>	10	<b><u>209</u></b> <sup>*</sup>	372	1	187	44
<b>2024</b>						
JM <sup>3,4</sup>	9	<b><u>156</u></b> <sup>*</sup>	304	1	95	23
FJ <sup>3,5</sup>	3	80	105	<1	106	24
CVY	0	0	0	0	0	0
<i>Total</i>	12	<b><u>237</u></b> <sup>*</sup>	409	1	202	46
<b>2025</b>						
JM <sup>3,4</sup>	7	<b><u>139</u></b> <sup>*</sup>	241	1	79	19
FJ <sup>3,5</sup>	4	96	132	<1	102	23
CVY	0	0	0	0	0	0
<i>Total</i>	12	<b><u>235</u></b> <sup>*</sup>	372	1	181	42
De minimis threshold	100	100	-	100	-	100

Source: See Table 7 in Section 10.0; Authority and FRA 2017a

Exceedances of the *de minimis* thresholds are shown in **bolded underline with an asterisk (\*)**.

CO = carbon monoxide

CVY = Central Valley Wye

FJ = San Francisco to San Jose

IAMF = impact avoidance and minimization feature

JM = San Jose to Merced

NO<sub>x</sub> = oxides of nitrogen

PM<sub>2.5</sub> = particulate matter 2.5 microns in diameter or less

PM<sub>10</sub> = particulate matter 10 microns in diameter or less

RSA = resource study area

SO<sub>2</sub> = sulfur dioxide

VOC = volatile organic compound

<sup>1</sup> The analysis assumed that Project construction would take place from 2022 to 2028, and that construction of other HSR project sections would occur according to the schedules presented in their respective environmental documents.

<sup>2</sup> Although the RSA is in attainment for SO<sub>2</sub>, because SO<sub>2</sub> is a precursor for PM<sub>2.5</sub>, the PM<sub>2.5</sub> General Conformity *de minimis* thresholds are used.

<sup>3</sup> Emissions results include implementation of air quality IAMFs, as described in Section 6.

<sup>4</sup> Presents the highest emissions estimate that would occur under any of the four alternatives.

<sup>5</sup> Presents emissions under Alternative B, which is the alternative with the greatest emissions in the SFBAAB.

**Table 10 Overlapping HSR System Construction Emissions in the SJVAB (tons per year)**

Year <sup>1</sup>	VOC	NO <sub>x</sub>	CO	SO <sub>2</sub> <sup>2</sup>	PM <sub>10</sub>	PM <sub>2.5</sub>
<b>2022</b>						
JM <sup>3,4</sup>	6	<b><u>42</u></b> *	218	1	18	5
B-P <sup>5</sup>	<b><u>11</u></b> *	<b><u>103</u></b> *	87	1	10	5
F-B <sup>5</sup>	<1	1	1	<1	<1	<1
M-F <sup>5</sup>	5	4	3	<1	9	2
CVY <sup>5</sup>	2	<b><u>44</u></b>	20	<1	2	2
<i>Total</i> <sup>6</sup>	<b><u>25</u></b> *	<b><u>194</u></b> *	330	2	39	13
<b>2023</b>						
JM <sup>3,4</sup>	6	<b><u>55</u></b> *	226	1	24	6
B-P <sup>5</sup>	8	<b><u>70</u></b> *	66	1	9	4
F-B <sup>5</sup>	<1	<1	<1	<1	<1	<1
M-F <sup>5</sup>	0	0	0	0	0	0
CVY <sup>5</sup>	0	0	0	0	0	0
<i>Total</i> <sup>6</sup>	<b><u>14</u></b> *	<b><u>125</u></b> *	292	2	33	10
<b>2024</b>						
JM <sup>3,4</sup>	6	<b><u>56</u></b> *	220	1	23	5
B-P <sup>5</sup>	6	<b><u>50</u></b> *	50	1	6	3
F-B <sup>5</sup>	0	0	0	0	0	0
M-F <sup>5</sup>	0	0	0	0	0	0
CVY <sup>5</sup>	0	0	0	0	0	0
<i>Total</i> <sup>6</sup>	<b><u>12</u></b> *	<b><u>106</u></b> *	270	2	29	8
<b>2025</b>						
JM <sup>3,4</sup>	6	<b><u>54</u></b> *	209	1	21	5
B-P <sup>5</sup>	2	<b><u>10</u></b> *	11	1	1	1
F-B <sup>5</sup>	0	0	0	0	0	0
M-F <sup>5</sup>	0	0	0	0	0	0
CVY <sup>5</sup>	0	0	0	0	0	0
<i>Total</i> <sup>6</sup>	8	<b><u>64</u></b> *	220	2	22	6
De minimis threshold	10	10	-	70	100	70

Source: See Table 8 in Section 10; Authority and FRA 2012, Authority and FRA 2017a, Authority and FRA 2014b, Authority and FRA 2017b  
Exceedances of the *de minimis* thresholds are shown in **bolded underline with an asterisk (\*)**.

B-P = Bakersfield to Palmdale

CO = carbon monoxide

CVY = Central Valley Wye

F-B = Fresno to Bakersfield

IAMF = impact avoidance and minimization feature

JM = San Jose to Merced

M-F = Merced to Fresno

NO<sub>x</sub> = oxides of nitrogen

PM<sub>2.5</sub> = particulate matter 2.5 microns in diameter or less

PM<sub>10</sub> = particulate matter 10 microns in diameter or less

RSA = resource study area

SO<sub>2</sub> = sulfur dioxide

VOC = volatile organic compound

<sup>1</sup> The analysis assumed that Project construction would take place from 2022 to 2028, and that construction of other HSR project sections would occur according to the schedules presented in their respective environmental documents.

<sup>2</sup> Although the RSA is in attainment for SO<sub>2</sub>, because SO<sub>2</sub> is a precursor for PM<sub>2.5</sub>, the PM<sub>2.5</sub> General Conformity *de minimis* thresholds are used.

<sup>3</sup> Emissions results include implementation of air quality IAMFs, as described in Section 6.

<sup>4</sup> Refer to Table 8 in Section 10.

<sup>5</sup> The highest annual emissions for each pollutant among the analyzed alternatives is presented.

<sup>6</sup> Totals may not add due to rounding.

### 13 REPORTING AND PUBLIC COMMENTS

To support a decision concerning the Project, the FRA issued a draft General Conformity Determination for a 30-day public and agency review as required by 40 C.F.R. §§ 93.155 and 93.156. In developing the analysis underlying this general conformity determination, the Authority has consulted extensively with the BAAQMD and SJVAPCD on a variety of technical and modeling issues. The Authority has also consulted with the USEPA and CARB on the overall approach to demonstrating general conformity.

The FRA provided copies of the draft General Conformity Determination to the appropriate regional offices of the USEPA, CARB, BAAQMD, and SJVAPCD for a 30-day review. FRA published a notice in the Federal Register on November 26, 2021 advising the public of the availability of the Draft Conformity Determination for a 30-day review and comment period. This draft conformity determination was made available on FRA's docket at <https://www.regulations.gov/>, Docket FRA-2021-0100. The comment period of the Draft Conformity Determination closed on December 27, 2021.

Two comments were received on the draft General Conformity Determination. These comments were supportive of the project and did not include any comments on the content of the draft General Conformity Determination. Consequently, no changes are necessary for this Final General Conformity Determination.

The FRA will provide copies of this Final General Conformity Determination to the appropriate regional offices of USEPA, CARB, BAAQMD, and SJVAPCD. The Final General Conformity Determination is available at the FRA website (<https://railroads.dot.gov/environment/environmental-reviews/clean-air-act-california-general-conformity-determinations>) and on FRA's docket at <https://www.regulations.gov/>, Docket FRA-2021-0100.

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## 14 FINDINGS AND CONCLUSIONS

FRA conducted a General Conformity evaluation consistent with 40 C.F.R. Part 93 Subpart B. The General Conformity regulations apply at this time to this Project because the Project is in an area that is designated as either nonattainment or maintenance for the 8-hour O<sub>3</sub>, 24-hour PM<sub>2.5</sub>, and 24-hour PM<sub>10</sub> standards. The FRA conducted the General Conformity evaluation consistent with all regulatory criteria and procedures and following the Authority's coordination with the USEPA, BAAQMD, SJVAPCD, and CARB. As a result of this review, the FRA concluded, because Project-generated emissions would either be fully offset (for construction phase) or less than zero (for operational phase), that the Project's emissions can be accommodated in the SIP for the SFBAAB and SJVAB. The FRA has determined that the Project as designed would conform to the approved SIP based on the following:

- The Authority would commit that construction-phase NO<sub>x</sub> emissions would be offset consistent with the applicable federal regulations by entering into an agreement with BAAQMD and through the Authority's existing commitments in its June 2014 MOU and VERA with the SJVAPCD, respectively.
- The Authority, BAAQMD, and SJVAPCD would enter into a contractual agreement to mitigate the Project's NO<sub>x</sub> emissions by providing funds to BAAQMD's and SJVAPCD's to fund grants for projects that achieve the necessary emission reductions.
- BAAQMD and SJVAPCD would seek and implement the necessary emission reduction measures, using Authority funds.
- BAAQMD and SJVAPCD would serve as administrators of the emissions reduction projects and verifiers of the successful mitigation effort.

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## ATTACHMENT A: LETTERS OF AGREEMENT WITH BAAQMD



**BAY AREA  
AIR QUALITY  
MANAGEMENT  
DISTRICT**

**ALAMEDA COUNTY**

John J. Bauters  
(Vice Chair)  
Pauline Russo Cutter  
David Haubert  
Nate Miley

**CONTRA COSTA COUNTY**

John Gioia  
David Hudson  
Karen Mitchoff  
(Chair)  
Mark Ross

**MARIN COUNTY**

Katie Rice

**NAPA COUNTY**

Brad Wagenknecht

**SAN FRANCISCO COUNTY**

Tyrone Jue  
(SF Mayor's Appointee)  
Myrna Melgar  
Shamann Walton

**SAN MATEO COUNTY**

David J. Canepa  
Carole Groom  
Davina Hurt  
(Secretary)

**SANTA CLARA COUNTY**

Margaret Abe-Koga  
Cindy Chavez  
Rich Constantine  
Rob Rennie

**SOLANO COUNTY**

Erin Hannigan  
Lori Wilson

**SONOMA COUNTY**

Teresa Barrett  
Lynda Hopkins

Jack P. Broadbent  
EXECUTIVE OFFICER/APCO

Connect with the  
Bay Area Air District:



March 11, 2022

Brian Kelly  
Chief Executive Officer  
California High Speed Rail Authority  
770 L Street, Suite 620,  
Sacramento, CA 95814

Re: Intent to offset future emissions during construction of San Francisco to San Jose and San Jose to Merced Sections of the California High-Speed Rail System for purposes of Federal Clean Air Act General Conformity

Dear Mr. Kelly,

### **Purpose**

The purpose of this letter is to document that the Bay Area Air Quality Management District (Air District) and the Bay Area Clean Air Foundation (Foundation) intend to work with the California High Speed Rail Authority (Authority) on off-site emission reduction measures to support General Conformity for the San Francisco to San Jose and San Jose to Merced Project Sections of the California High-Speed Rail (HSR) System.

### **Projects**

The California HSR System will provide intercity, high-speed service on more than 800 miles of guideway throughout California, connecting the major population centers of Sacramento, the San Francisco Bay Area, the southern Central Valley, Los Angeles, the Inland Empire, Orange County, and San Diego. The San Francisco to San Jose (FJ) and San Jose to Merced Project (JM) Sections ("Projects" or "Actions") are critical links connecting the Bay Area to the Central Valley project sections.

### **General Conformity Rule**

The General Conformity Rule, as codified in Title 40 Code of Federal Regulations Part 93, Subpart B, establishes the process by which federal agencies determine conformance of proposed projects that are federally funded or require federal approval with applicable air quality standards. This determination must demonstrate that a proposed action would not cause or contribute to new violations of air quality standards, exacerbate existing violations, or interfere with timely attainment or required interim emissions reductions towards attainment. The Authority, as the proponent of the Actions, is receiving federal grant funds through the Federal Railroad Administration's (FRA) High-Speed Intercity Passenger Rail program. The Actions may also receive FRA safety approvals. Because of the federal

funding and potential safety approvals, the Actions are subject to the General Conformity Rule; and because construction-phase emissions (without mitigation) would exceed General Conformity *de minimis* thresholds, the Actions are not exempt and must demonstrate how the projects intend to achieve conformity.

### **General Conformity Determinations**

It is the Air District's understanding that the draft General Conformity Determinations for the Actions document FRA's findings that the Actions comply with the General Conformity Rule, conform to the purposes of the State Implementation Plan, and are consistent with all applicable requirements. FRA will issue the draft General Conformity Determination for the San Francisco to San Jose Project Section for public review and comment and has issued the draft General Conformity Determination for the San Jose to Merced Project Section for public review. Neither Air District nor the Bay Area Clean Air Foundation have reviewed or commented on the draft Conformity Determinations.

The draft General Conformity Determinations are based on the Impact Avoidance and Minimization Measures (IAMF) and Mitigation Measures (MM) that are described in Appendix 2-E and Section 3.3.7 of the Final EIR/EISs for both Actions and that will be implemented for the Actions. This compliance is demonstrated as follows:

- The operation of the Action would result in a reduction of regional emissions of all applicable air pollutants and would not cause a localized exceedance of an air quality standard; and
- Whereas emissions generated during the construction of the Actions would exceed General Conformity *de minimis* thresholds for one pollutant, these emission increases would be offset through off-site emissions reductions projects funded by the Authority and administered by Air District's support organization, the Bay Area Clean Air Foundation, a public charity.

Based on the Authority's current emissions analysis, construction emissions exceed General Conformity *de minimis* thresholds for nitrogen oxides (NO<sub>x</sub>) in the San Francisco Bay Area Air Basin. The Authority has advised that these exceedances are based on current construction schedule and equipment estimates and based on the available information to date. The methodology used by the Authority in creating these estimates is similar to what was used for estimating the emissions for the EIR/EISs for the Authority's Merced to Fresno and Fresno to Bakersfield Project Sections. After seven years of construction in the Central Valley, the Authority reports that the estimates in those EIR/EISs are conservative and actual emissions from construction are currently lower than EIR/EIS estimates by 50 to 70 percent.

### **Impact Avoidance and Minimization Features**

The Authority has incorporated the following IAMFs into the Projects:

- **AQ-IAMF#1: Fugitive Dust Emissions:** The contractor will employ several control measures to minimize and control fugitive dust emissions and prepare a fugitive dust control plan for each distinct construction segment.
- **AQ-IAMF#2: Selection of Coatings:** The contractor will use lower VOC content paint than that required by Air District Regulation 8, Rule 3, when available.
- **AQ-IAMF#3: Renewable Diesel:** The contractor will use renewable diesel fuel to minimize and control exhaust emissions from all heavy-duty diesel-fueled construction diesel equipment and on-road diesel trucks.
- **AQ-IAMF#4: Reduce Criteria Exhaust Emissions from Construction Equipment:** All heavy-duty off-road construction diesel equipment used during the construction phase will meet Tier 4 engine requirements.
- **AQ-IAMF#5: Reduce Criteria Exhaust Emissions from On-Road Construction Equipment:** All diesel on-road trucks used to haul construction materials will be model year 2010 or newer.<sup>1</sup>
- **AQ-IAMF#6: Reduce the Potential Impact of Concrete Batch Plants:** The contractor will prepare a technical memorandum documenting the concrete batch plant siting criteria, including locating the plant at least 1,000 feet from sensitive receptors, and utilization of typical control measures.

## Mitigation Measures

The Authority has committed to the following mitigation measure in its Northern California environmental documentation and has committed in its environmental documentation to incorporating this measure into its future Northern California construction contracts.

### ***AQ-MM#2<sup>2</sup>- Construction Emissions Reductions—Requirements for Use of Zero Emission and/or Near Zero Emission Vehicles and Off-Road Equipment***

This mitigation measure will reduce the impact of construction emissions from project-related on-road vehicles and off-road equipment.

The Authority and all project construction contractors will require that a minimum of 25 percent, with a goal of 100 percent, of all light-duty on-road vehicles (e.g., passenger cars, light-duty trucks) associated with the project (e.g., on-site vehicles, contractor vehicles) use zero emission (ZE) or near-zero emission (NZE) technology.

The Authority and all project construction contractors will have the goal that a minimum of 25 percent of all heavy-duty on-road vehicles (e.g., for hauling, material delivery and soil import/export) associated with the construction activities for the San

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<sup>1</sup> IAMFs listed are from the San Jose to Merced Project Section. AQ-IAMF#5 in San Francisco to San Jose Project Section is slightly different and reads as follows: All on road trucks will consist of an average fleet mix of equipment year 2010 or newer, but no less than the average fleet mix for the current calendar year as set forth in the CARB's EMFAC 2014 database.

<sup>2</sup> This mitigation measure number is specific to the San Jose to Merced Project Section Final EIR/EIS. This same measure is AQ-MM#1 in the San Francisco to San Jose Project Section Final EIR/EIS.

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Francisco to San Jose and San Jose to Merced Sections of the HSR System use ZE or NZE technology.

The Authority and all project construction contractors will have the goal that a minimum of 10 percent of off-road construction equipment use ZE or NZE vehicles.

If local or state regulations mandate a faster transition to using ZE and/or NZE vehicles at the time of construction, the more stringent regulations will be applied. For example, Executive Order (EO) N-79-20, issued by California Governor Newsom September 23, 2020, currently states the following:

- Light duty and passenger car sales be 100 percent ZE vehicles by 2035
- Full transition to ZE short haul/drayage trucks by 2035
- Full transition to ZE heavy-duty long-haul trucks, where feasible, by 2045
- Full transition to ZE off-road equipment by 2035, where feasible.

The project will have a goal of surpassing the requirements of these or other future regulations as a mitigation measure.

It is the Air District's understanding that the Authority already mandates that all such equipment meet the highest emission standard codified by the U.S. Environmental Protection Agency (EPA) —Tier 4 and that the Authority intends for its implementation strategy to go further, mandating through contractual measures that by 2030, 10 percent of off-road equipment be ZEV at start of construction, and sets the goal of 100 percent ZEV for such equipment by 2035.

### **Future Emissions Estimates**

It is the Air District's understanding that since funding has not been fully secured for the Projects, construction emissions would be recalculated after funding is secured, prior to the implementation of any off-site emissions reduction programs and prior to construction activities commencing. As such, the Authority reports that the following steps will be followed to demonstrate conformity:

- Once construction funding is secured for the project section, a revised construction schedule will be developed.
- Based on the new schedule, a construction plan will be developed and analyzed to determine the emissions generated by construction.
- At the time of analysis, the IAMFs and MMs will be revisited and may be updated to include technologies and methodologies that were not considered in the earlier analysis. This review and implementation of updated measures will aid the projects in reducing the generation of emissions due to construction. The Air District strongly recommends that these additional measures include the following:

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- All on-road heavy-duty trucks traveling to the construction site shall have engines that are no more than seven years old (i.e., in 2022, engines must be 2015 model year or newer).
  - All off-road equipment shall use the highest tier engines available when zero-emissions equipment is not available (e.g. Tier 4 construction, rail, marine equipment). In place of Tier 4 engines, off-road equipment can incorporate retrofits such that emission reductions achieved equal or exceed that of a Tier 4 engine.
  - All off-road equipment with a power rating below 19 kilowatts (e.g., plate compactors, pressure washers) shall be battery powered.
  - Diesel generators, including any designated for back-up, shall not be used at the project sites during construction unless absolutely necessary. If necessary, generators shall have Best Available Control Technology (BACT) that meets CARB's Tier 4 emission standards or meets the most stringent in-use standard, whichever has the least emissions.
- Once emission estimates are calculated using the IAMF and MMs, the Authority will confirm whether the estimates are still above the applicable General Conformity *de minimis* thresholds.
  - All affected air districts will be notified of the emission levels and consulted to offset emissions for those years/pollutants that exceed General Conformity *de minimis* thresholds. Alternatively, the air districts could include these emissions in the applicable State Implementation Plan.
  - The emission accounting program the Authority uses to track emissions for the segments currently being constructed will be utilized to actively quantify the construction emissions generated by the project.

## Conclusion

The Air District and the Bay Area Clean Air Foundation acknowledge the following:

- The Authority will ensure that the lowest level of construction emissions are generated through the use of IAMFs outlined in this document and rolling review of best available technologies.
- The Authority will exhaust all on-site opportunities to reduce emissions during the construction phase, including from vehicles traveling to and from the project site, before seeking off-site NOx mitigation.

As such, by signing below the Air District and the Bay Area Clean Air Foundation commit to the following:

- The Air District will work with the Authority to mitigate all NOx emissions exceeding General Conformity *de minimis* thresholds to zero as required by General Conformity, through an off-site emissions reductions program. Funds from the Authority for mitigation offsets will be administered by Air District's Bay Area Clean Air Foundation for the award of grants to Bay Area businesses, public agencies, and

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residents who will implement projects that reduce emissions of NO<sub>x</sub>, reactive organic gases, and particulate matter. The Bay Area Clean Air Foundation intends to enter into a contractual agreement with the Authority to implement this program, with the Authority providing funds for off-site emissions reductions projects that achieve the necessary emissions reductions. Current off-site emissions reductions programs work to cost-effectively reduce emissions from primarily mobile source projects. Project types may include, but are not limited to:

- Grants to replace dirty diesel off-road equipment, e.g., tractors and agricultural equipment, marine, lawn and garden;
  - Grants to replace older, high-polluting trucks and buses; and
  - Grants to owners to scrap older, high-polluting vehicles.
- The Bay Area Clean Air Foundation requires adequate lead time to achieve emissions reductions, and understands that the Authority will commit to working with the Foundation well in advance of construction years during which emissions reductions may be necessary (no less than three years, for construction years estimated to require emissions reductions of 100 tons/year or more).
  - The Bay Area Clean Air Foundation will seek and implement the necessary emission reduction measures to the extent possible, using Authority funds; and
  - The Bay Area Clean Air Foundation will serve in the role of administrator of the emissions reduction projects and verifier of the successful mitigation effort.

Thank you for your continuing partnership with Air District and the Foundation to protect air quality, the climate and public health in the Bay Area.

Sincerely,



Jack P. Broadbent  
Executive Officer/APCO Bay Area Air Quality Management District  
President, Bay Area Clean Air Foundation

cc: Director Margaret Abe-Koga  
Director David J. Canepa  
Chair Cindy Chavez  
Director Rich Constantine  
Director Carole Groom  
Director Davina Hurt  
Director Tyrone Jue  
Director Rob Rennie  
Director Shamann Walton

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**MEMORANDUM OF UNDERSTANDING**

This Memorandum of Understanding ("MOU") is entered into by the California High-Speed Rail Authority ("Authority") and the San Joaquin Valley Unified Air Pollution Control District ("District"). Authority and District are collectively referred to herein as the "Parties" with each being a "Party".

**RECITALS**

**WHEREAS**, District is an air pollution control district formed by the counties of Fresno, Kings, Madera, Merced, San Joaquin, Stanislaus and Tulare, and the Valley portion of Kern, pursuant to California Health and Safety Code section 40150, et seq.; and

**WHEREAS**, District is responsible for developing and implementing air quality control measures within the District Boundaries as depicted in Exhibit A ("District Boundaries" or "San Joaquin Valley Air Basin") attached hereto and incorporated herein, including air quality control measures for stationary sources, transportation sources, and indirect sources; and

**WHEREAS**, despite the best efforts of District, air quality within District Boundaries remains impaired such that the San Joaquin Valley Air Basin is not in attainment of federal Clean Air Act standards for ozone and its precursors NOx and VOCs (extreme nonattainment) and PM2.5 and is in Attainment/Maintenance status for PM1 O(NOx, **VOE**, PM1 Oand PM2.5 collectively, "Criteria Pollutants"); and

**WHEREAS**, emissions of Criteria Pollutants from the Authority's planned high-speed rail construction within District Boundaries would exacerbate that non-attainment status and could threaten that Attainment/Maintenance status; and

**WHEREAS**, the San Joaquin Valley Air Basin is unique meteorologically in that it is surrounded on three sides by mountain ranges, including to the west which significantly limits the ability of ocean weather patterns and winds to refresh air in the basin; and

1           **WHEREAS**, the Authority, in partnership with the Federal Railroad  
2 Administration ("FRA"), is developing a high-speed train system ("HST System"), which  
3 includes construction of guide-way segments, and ancillary facilities such as a Heavy  
4 Maintenance Facility, stations, and overpasses for California pursuant to the California  
5 High-Speed Rail Act (Public Utilities Code section 18500 *et seq.*) ("Rail Act") and the  
6 Safe, Reliable High-Speed Passenger Train Bond Act for the 21st Century (codified at  
7 Streets and Highways Code section 2704 *et seq.*) ("Bond Act") that would serve the  
8 San Francisco Bay Area, Sacramento, Central Valley, Los Angeles and San Diego  
9 through various station-to-station segments ("Segments") (as depicted in Exhibit B);  
10 and

11           **WHEREAS**, the HST System includes segments or portions thereof that will be  
12 constructed, if and when funding can be secured, within the boundaries of the San  
13 Joaquin Valley ("SJV") including the following: Merced to San Jose (portion), Merced to  
14 Fresno (all), Fresno to Bakersfield (all), Bakersfield to Palmdale (portion), and  
15 Sacramento to Merced (portion), collectively referred to as "HST SJV District Portion";  
16 and

17           **WHEREAS**, the Authority completed Program-level Environmental Impact  
18 Statements/Reports ("EIS/EIR") in 2005, 2008, 2010 and 2012 pursuant to the National  
19 Environmental Policy Act ("NEPA") and California Environmental Quality Act ("CEQA")  
20 evaluating impacts of the HST System, and selecting preferred route corridors; and

21           **WHEREAS**, a project level Final EIS/EIR ("MF FEIR") for the Merced to Fresno  
22 Segment ("MF Segment") was approved and certified via Resolution 12-19 ("MF FEIR  
23 Resolution") and the MF Segment approved and CEQA findings made via Resolution  
24 12-20 ("MF Segment Resolution") by the Authority's Board of Directors in May 2012  
25 and FRA's associated Record of Decision ("ROD") issued on September 2012; and

26           **WHEREAS**, construction of a portion of the MF Segment (from approximately  
27 Madera to downtown Fresno) is anticipated to commence in 2014 with connections to  
28 the San Francisco Bay Area and Los Angeles Basin expected after year 2028; and

1           **WHEREAS**, the Authority found in the MF FEIR and MF FEIR Resolution that  
2 construction of the MF Segment would cause significant air quality impacts from  
3 construction emissions of Criteria Pollutants because the San Joaquin Valley Air Basin  
4 is in non-attainment for Criteria Pollutants; and

5           **WHEREAS**, the Authority has included in the MF Segment Resolution, and in  
6 the Draft EIR/EIS for the Fresno-Bakersfield Segment (and anticipates so including in  
7 the draft environmental documents for other Segments of the HST SJV District Portion)  
8 various requirements and mitigation measures to reduce significant construction  
9 emissions associated with the HST SJV District Portion (such as using the cleanest  
10 construction and hauling fleet as reasonably practicable, as detailed in MF FEIR AQ-  
11 MM#1 and #2); and

12           **WHEREAS**, nevertheless, Criteria Pollutant(s) emitted during HST construction  
13 within the District Boundaries would still exacerbate and/or threaten the existing non-  
14 attainment and maintenance status for Criteria Pollutants within the District Boundaries;  
15 and

16           **WHEREAS**, during the public process leading up to the MF FEIR, the District  
17 recommended in writing that the Authority enter into a Voluntary Emission Reduction  
18 Agreement ("VERA") with the District as an additional mitigation measure (because of  
19 the emissions offsets VERA implementation would achieve) for construction emission  
20 impacts the MF FEIR concluded would occur in the MF Segment; and

21           **WHEREAS**, the MF Segment Resolution committed the Authority to entering  
22 into a VERA with the District for the MF Segment as a mitigation measure to  
23 accomplish net-zero MF Segment construction emissions of Criteria Pollutants  
24 because of the San Joaquin Air Basin's difficult air quality challenge (*i.e.*, its non-  
25 attainment status), which VERA now has been drafted for the funded Madera-to-  
26 Fresno portion of the MF Segment and is near ready for execution ("Madera-to-Fresno  
27 VERA"); and

28

1           **WHEREAS**, the Authority understands that any significant HST construction  
2 emissions air quality impacts from Criteria Pollutants within the District Boundaries  
3 could be mitigated through various measures, including emissions offsets to net zero  
4 through entry into VERAs, which approach would address the District's view that any  
5 net HST construction emissions of Criteria Pollutants within the District Boundaries are  
6 impacts that must be fully mitigated; and

7           **WHEREAS**, the District has developed Incentive Programs around several core  
8 principles, including cost-effectiveness, integrity, effective program administration,  
9 excellent customer service, the efficient use of District resources, fiscal transparency  
10 and public accountability; and

11           **WHEREAS**, the District's Incentive Programs involve the District using monies  
12 (such as grant funds and project-proponent-provided monies via a VERA) to fund  
13 (usually on a percentage basis) the purchase and use by third parties of newer  
14 equipment that emits fewer Criteria Pollutants to replace older, less-clean-burning  
15 equipment (such as farm tractors), which the District administers through Individual  
16 Incentive Program Funding Agreements ("IIPFAs"); and

17           **WHEREAS**, the District's IIPFAs require the user of the new equipment to use  
18 the new equipment for a minimum number of hours (based on the user's historical use  
19 of the replaced equipment) over a specified number of years, and require permanent  
20 destruction of the replaced equipment; and

21           **WHEREAS**, the IIPFAs, because of their requirements, result in reductions of  
22 Criteria Pollutants that get assigned to the project proponent providing the funding to  
23 offset emissions by that project proponent ("Criteria Pollutant VERA Offsets"); and

24           **WHEREAS**, the Criteria Pollutant VERA Offsets, because of the requirements of  
25 and protections in the IIPFAs, are secured and certified to the Authority by the District  
26 ("Secured Criteria Pollutant VERA Offsets") upon execution of each IIPFA; and

27           **WHEREAS**, the District's Incentive Programs are regularly audited by  
28 independent outside agencies including professional accountancy corporations on

1 behalf of the federal government, the California Air Resources Board ("ARB"), the  
2 California Department of Finance and the California Bureau of State Audits; and

3 **WHEREAS**, the District has determined that with appropriate funding from  
4 Authority, the District can source, secure and certify Criteria Pollutant VERA Offsets as  
5 necessary for construction of the HST SJV District Portion.

6 **AGREEMENT**

7 **NOW THEREFORE**, the Authority and the District hereby agree as follows:

8 1. **Offset of Construction Emissions of Criteria Pollutants**

9 (i) The Authority shall fully offset all HST SJV District Portion-related HST  
10 construction emissions from Criteria Pollutants by achieving surplus, quantifiable and  
11 enforceable emissions reductions of Criteria Pollutants.

12 (ii) For the purpose of this MOU, "fully offset" or "net zero" means that the  
13 total amount of all Criteria Pollutants emission reductions secured by the offset  
14 reduction measures is equal to, or greater than, the total amount of actual Criteria  
15 Pollutant HST construction emissions within the HST SJV District Portion, minus the  
16 projected emissions of Criteria Pollutants that would have occurred in the locations of  
17 the HST District Portion construction in the absence of HST construction as may be  
18 feasible and technically calculable for specific facilities HST might replace (as individual  
19 VERAs may include). "Surplus" emission reductions are reductions that are not  
20 otherwise required by existing laws or regulations.

21 (iii) In order to fully offset such construction-related air emissions from the  
22 HST SJV District Portion, upon each Segment in the HST SJV District Portion having  
23 been approved for construction by the Authority and any applicable state or federal  
24 entity, having secured funding for construction, and having approved or certified  
25 associated environmental review reports and/or statements as required by applicable  
26 law ("Certified Environmental Document"), the Authority and District shall enter into a  
27 VERA substantially in the form of the Madera-to-Fresno VERA to cover the portion of  
28 the Segment approved and funded for construction within District Boundaries prior to

1 the commencement of construction of said portion. Notwithstanding the above, nothing  
2 in this MOU shall prevent the Authority from commencing any construction if, despite  
3 the Authority's best efforts, timely entry into the associated VERA did not occur; in such  
4 event, the Parties shall work cooperatively to accomplish entry into the VERA in time  
5 for emissions offsets to occur in a timely manner to satisfy applicable law such as  
6 contemporaneous offset timing requirements established by the U.S. Environmental  
7 Protection Agency for general conformity.

## 8 2. VERA Implementation

9 (i) Upon entering into a VERA, the Authority shall provide the District with a  
10 meaningful amount of Air Quality Mitigation Funds (as a deposit) as may be specified in  
11 each VERA, which the District shall place in a District trust or escrow account until  
12 committed in an executed and Authority-approved IIPFA. Such Funds are intended to  
13 fund equipment replacement and/or retrofit to achieve Criteria Pollutant VERA Offsets  
14 and to fund the District's administrative expenses to implement the VERA, as may be  
15 specified in each VERA. The Authority acknowledges that the District will require  
16 availability of a meaningful amount of such Funds prior to soliciting and negotiating  
17 IIPFAs to accomplish Criteria Pollutant VERA Offsets on the Authority's behalf as part  
18 of any individual VERA. The District acknowledges that construction of the HST SJV  
19 District Portion is not fully funded, and future funding sources and availability can affect  
20 how individual VERAs get funded and the provisions and terms in such VERAs. The  
21 total estimated amount of Air Quality Mitigation Funds necessary for each VERA are  
22 based on (a) the total tonnage of Criteria Pollutants estimated to be emitted during the  
23 HST construction covered by each VERA, as estimated within a Certified  
24 Environmental Document or some subsequent estimate based on more then-up-to-  
25 date construction information and (b) District's cost per ton per the then-applicable rate  
26 contained in District Rule 9510 as set forth in each VERA.

27 (ii) Upon receipt of a meaningful amount of such Funds as relates to an  
28 individual VERA and upon the Authority's written notice to proceed from its Contract

1 Manager to the District based on relative certainty of a likely construction start date for  
2 the HST construction covered by the relevant VERA, the District will commence  
3 negotiating and executing (after Authority limited review and approval) and funding  
4 (from the Funds in trusUescrow) IIPFAs to achieve Secured Criteria Pollutant VERA  
5 Offsets on behalf of the Authority in a timely manner to satisfy applicable law or  
6 general conformity regulations requiring emission reductions to be achieved  
7 contemporaneous to the actual emissions to be offset. The Authority will continue to  
8 fund the trusUescrow account, and District will continue to negotiate and execute  
9 additional IIPFAs to create additional Secured Criteria Pollutant VERA Offsets until  
10 sufficient Secured Criteria Pollutant VERA Offsets have been funded to accomplish full  
11 offset to net zero for that VERA.

12 (iii) Upon execution of each IIPFA, District shall issue to the Authority a Secured  
13 Criteria Pollutant VERA Offsets Receipt, by which the District ensures to the Authority  
14 that such associated offsets listed in the Receipt have been secured with no further  
15 involvement or funding by the Authority.

16 (iv) Through periodic reporting to each other, the Authority will monitor the actual  
17 emissions resulting from construction and the District will monitor and match such  
18 actual emissions to the total offsets stated in Secured Criteria Pollutant VERA Offsets  
19 Receipts issued to date. The District shall certify in writing to the Authority when the  
20 total Secured Criteria Pollutant VERA Offsets listed in all Receipts issued fully offset  
21 the actual construction emissions of Criteria Pollutant(s) from the HST Segment portion  
22 covered by the associated VERA.

### 23 **3. Refunds**

24 When total offsets stated in Secured Criteria Pollutant VERA Offsets Receipts  
25 equal or exceed total actual construction emissions of Criteria Pollutants for the HST  
26 construction covered in a VERA, the District shall, upon Authority written request,  
27 refund the Authority any remaining Air Quality Mitigation Funds which are not  
28

1 encumbered through IIPFAs. The District shall have a reasonable period of time to  
2 refund the unencumbered Air Quality Mitigation Funds.

3 **4. Transfer of Segment Excess Emission Reductions**

4 If total offsets stated in Secured Criteria Pollutant VERA Offsets Receipts  
5 exceed total construction emissions of Criteria Pollutants for the HST construction  
6 covered in a VERA, the Authority shall be credited with such excess emission ("VERA  
7 Excess Emission Reduction" or "Excess"). Such VERA Excess Emission Reductions  
8 shall be transferred to any other then-existing or future Authority-District VERA. If there  
9 is no existing VERA and likely will not be a future VERA in time for the Authority to get  
10 value for the Excess, the Authority may transfer the Excess to a third-party developer.

11 **5. District Rule 9510-Indirect Source Review**

12 Authority acknowledges that it is required to comply with all applicable laws that  
13 may be in effect as the HST SJV District Portion is implemented, such as the District's  
14 current Rule 9510 (including its requirement to submit an Air Impact Assessment  
15 Application). The Authority acknowledges that it is subject to all applicable provisions  
16 of District Rule 9510 that are in effect at the time of submitting an Air Impact  
17 Assessment Application, but the District anticipates that Criteria Pollutant Offsets to be  
18 accomplished through VERAs as contemplated by this MOU will satisfy the emissions  
19 reductions requirements of current Rule 9510.

20 **6. Term of MOU**

21 This MOU shall be effective upon the date it is signed. The Parties acknowledge  
22 that construction of the HST SJV District Portion could span one or more decades. The  
23 Parties agree to work cooperatively together over that time period to evaluate any  
24 amendments necessary to this MOU to reflect any relevant circumstances that may  
25 change, including but not limited to changing state and federal law requirements  
26 related to air quality, changes (positive or negative) in the Clean Air Act attainment  
27 status of the San Joaquin Air Basin for Criteria Pollutants or other pollutants, changing  
28 and evolving HST funding, and changing state and federal law requirements related to

1 the HST System. This MOU shall be terminated by its terms when total offsets stated in  
2 Secured Criteria Pollutant VERA Offsets Receipts equal or exceed total actual  
3 construction emissions of Criteria Pollutants for the HST SJV District Portion.

4 7. **Exhibits.** The Exhibits to this MOU are fully incorporated and are a part  
5 of this MOU, and are:

- 6 A. District Boundaries Map
- 7 B. HST System and Segment Map

8 8. **Miscellaneous.** The Recitals set forth above are hereby incorporated into  
9 the terms of this MOU. Counterpart and facsimile/computer image signatures shall be  
10 treated as originals. Notices under this MOU shall be given in writing to the persons  
11 and addresses listed in the then-most-current VERA. This MOU contains all  
12 understandings between the Parties as to the matters covered herein and incorporates,  
13 integrates and supersedes any different or other oral or written understandings  
14 between the Parties as to the matters covered herein. This MOU was prepared equally  
15 by both Parties.

16 IN WITNESS WHEREOF, the Authority and District have executed this MOU  
17 and agree that it shall be effective as of the date first written above.

18 **AUTHORITY**

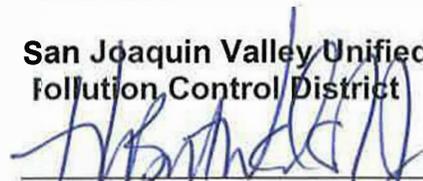
19 **High Speed Rail Authority**

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21 \_\_\_\_\_  
22 Jeff Morales  
23 Chief Executive Officer

**DISTRICT**

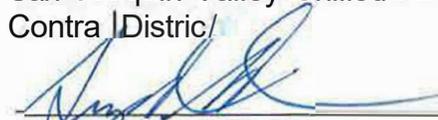
24 **San Joaquin Valley Unified Air  
25 Pollution Control District**

26 

27 \_\_\_\_\_  
28 Hub Walsh  
Governing Board Chair

**Recommended for approval:**

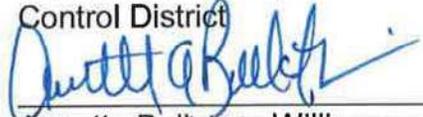
San Joaquin Valley Unified Air Pollution  
Control District



Seve Cadredin  
Executive Director/APCO

**Approved as to legal form:**

San Joaquin Valley Unified Air Pollution  
Control District



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Annette Ballatore-Williamson  
~~Interim~~ District Counsel

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**EXHIBIT A: District Boundaries/San Joaquin Valley Air Basin**

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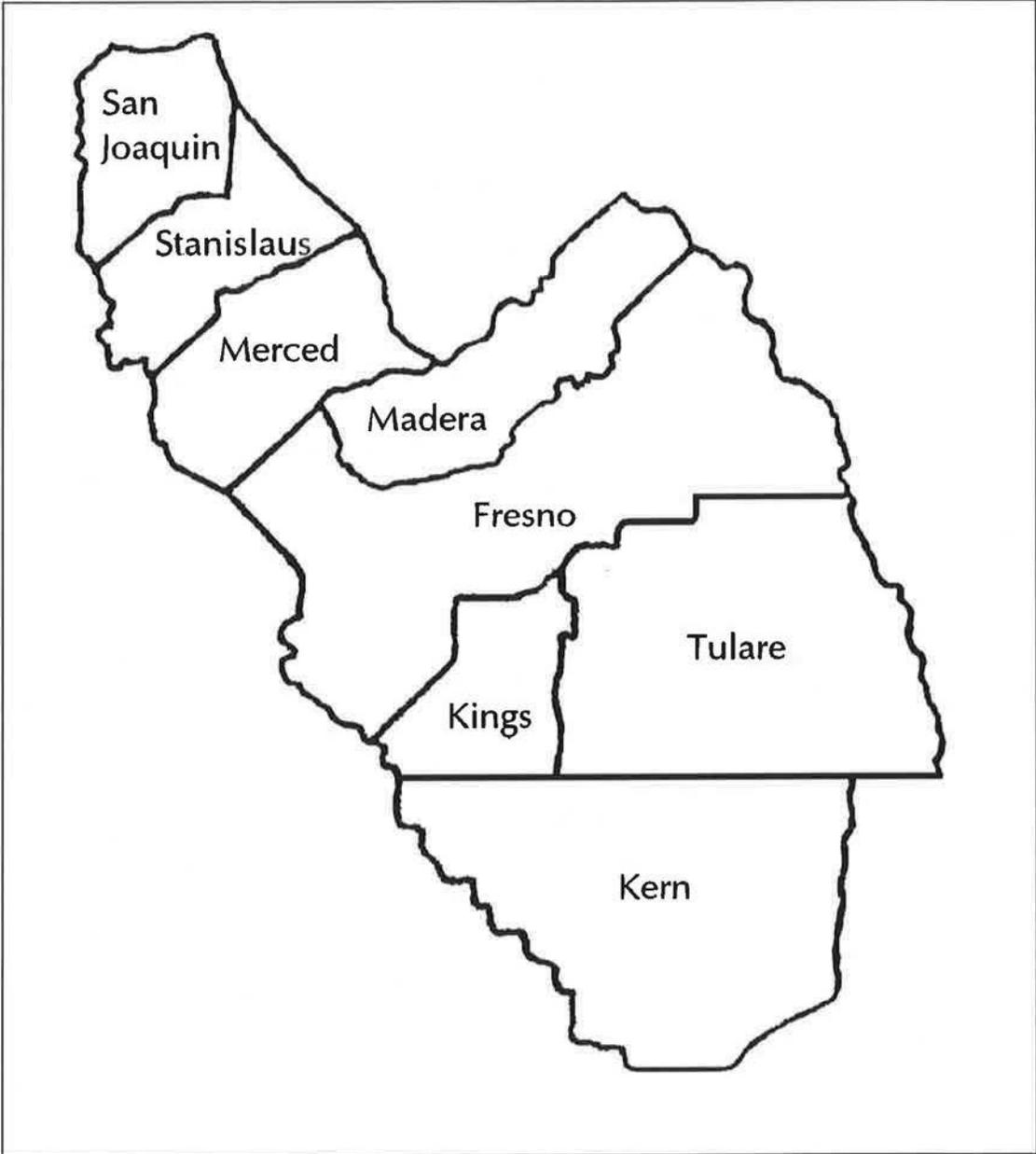


EXHIBIT B: Segments/Corridors of the HST System

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## **APPENDIX B: USFWS BIOLOGICAL OPINION, DECEMBER 22, 2021**





# United States Department of the Interior

FISH AND WILDLIFE SERVICE  
Sacramento Fish and Wildlife Office  
2800 Cottage Way, Suite W-2605  
Sacramento, California 95825-1846  
SFWO\_mail@fws.gov



December 22, 2021

Serge Stanich  
Director of Environmental Services  
California High-Speed Rail Authority  
770 L Street, Suite 620  
Sacramento, California 95814  
Serge.Stanich@hsr.ca.gov

Subject: Formal Consultation on the California High-Speed Rail System: San Jose to Merced Project Section

Dear Serge Stanich:

This letter is in response to the California High-Speed Rail Authority's (Authority) request for initiation of formal consultation with the U.S. Fish and Wildlife Service (Service) on the San Jose to Merced Project Section of the California High-Speed Rail (HSR) System (project) in Santa Clara, San Benito, and Merced counties, California. This letter is sent to the Authority in its role as the federal lead agency for the San Jose to Merced Project Section under the National Environmental Policy Act (NEPA) and other federal laws. Pursuant to 23 United States Code (U.S.C.) 327, under the NEPA Assignment Memorandum of Understanding (MOU) between the Federal Railroad Administration (FRA) and the State of California, effective July 23, 2019, the Authority is the federal lead agency for environmental reviews and approvals for all Authority Phase 1 and Phase 2 projects. Under the MOU, the Authority has been assigned FRA's Endangered Species Act (Act) Section 7 (16 U.S.C. 1536) responsibilities for consultations (formal and informal) with respect to HSR and other projects described in subpart 3.3 of the MOU.

At issue are the project's effects on the following federally listed species and critical habitats:

Species federally listed as endangered:

- San Joaquin kit fox (*Vulpes macrotis mutica*) (kit fox)
- California condor (*Gymnogyps californianus*) (condor)
- least Bell's vireo (*Vireo bellii pusillus*) (vireo)
- blunt-nosed leopard lizard (*Gambelia silus*) (lizard)
- Coyote ceanothus (*Ceanothus ferrisiae*)
- Metcalf Canyon jewelflower (*Streptanthus albidus ssp. albidus*) (jewelflower)

- Santa Clara Valley dudleya (*Dudleya setchellii*) (dudleya)
- Tiburon paintbrush (*Castilleja affinis* ssp. *neglecta*)
- vernal pool tadpole shrimp (*Lepidurus packardii*) (tadpole shrimp)

Species federally listed as threatened:

- giant garter snake (*Thamnophis gigas*)
- California red-legged frog (*Rana draytonii*) (frog) and its designated critical habitat
- Central California Distinct Population Segment of California tiger salamander (*Ambystoma californiense*) (salamander) and its designated critical habitat
- Bay checkerspot butterfly (*Euphydryas editha bayensis*) (butterfly) and its designated critical habitat
- valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) (beetle)
- vernal pool fairy shrimp (*Branchinecta lynchi*) (fairy shrimp)

Critical habitat has been designated for the condor, vireo, beetle, tadpole shrimp, and fairy shrimp. Because no designated or proposed critical habitat for these species occurs in the action area, it is not considered in this biological opinion.

This response is provided under the authority of the Act of 1973, as amended (16 U.S.C. 1531 et seq.), and in accordance with the implementing regulation pertaining to interagency corporation (50 Code of Federal Regulations [CFR] 402).

The federal action on which we are consulting is the construction, operation, and maintenance of the Authority's San Jose to Merced Project Section of the HSR. Pursuant to 50 CFR 402.12(j), you submitted a biological assessment (BA) and a BA supplement for our review and requested concurrence with the findings presented therein. These findings conclude the project may affect and is likely to adversely affect the following federally listed species: the vireo, the frog, the salamander, the butterfly, the beetle, the tadpole shrimp, the fairy shrimp, the jewelflower, and the dudleya.

In considering your request, we based our evaluation on the following:

- 1) Extensive coordination between the Service and the Authority (and the FRA prior to the MOU, as described above) from April 2015 to October 2021 regarding the project, conservation measures, and framework for evaluating the effects on federally listed species
- 2) The June 24, 2020, letter from the Authority to the Service requesting initiation of formal consultation
- 3) The *San Jose to Merced Project Section Biological Assessment*, dated June 2020, and supplemental information provided November 2021
- 4) Correspondence between the Authority and the Service
- 5) Other information available to the Service

The Authority determined that the project, as proposed, may affect but is not likely to adversely affect the kit fox, the lizard, giant garter snake, Coyote ceanothus, and Tiburon paintbrush. The

Service concurs with this determination as the effects will be discountable for the following reasons:

- 1) The species have not been documented in the action area within the last 10 years and are not expected to occur in the action area,
- 2) Conservation measures as provided below under Description of the Project, including CM-GEN-07: Prepare WEAP Training Materials and Conduct Construction Period WEAP Training and CM-PLT-01: Conduct Pre-Construction Surveys for Listed Plants and Implement Avoidance and Minimization Measures will be implemented and will avoid adverse effects should the species unexpectedly occur within the action area,
- 3) The conservation measure below specific to the kit fox,
- 4) The small amount of suitable habitat in the action area.

#### Conservation Measures Specific to San Joaquin Kit Fox

#### **CM-SJKF-01: Conduct Pre-Construction Surveys for San Joaquin Kit Fox and Implement Exclusion Areas around Potential Dens**

Within 30 days prior to the start of any ground-disturbing activity in each work area<sup>1</sup> from the Pajaro River in San Benito and Santa Clara Counties east along the entire alignment excluding areas directly above the tunneled alignment, the Designated Biologist will conduct pre-construction surveys in suitable habitat for kit fox in the work area plus a 500-foot buffer (where access permitted). If no potential dens or sign of kit fox are observed, no further measures will be required. The surveys will be phased with project buildout and the start of activities at each work area.

Potential dens will be monitored for a minimum of five consecutive nights with a trail camera and tracking medium to evaluate den status and determine the presence/absence of kit fox. A potential den includes all natural earthen dens/burrows with entrances/tunnels 3.5 inches in diameter or larger, but for which there are no historical records or current evidence of use. If there is a risk that cameras may be stolen or vandalized, then at that site, monitoring may be conducted using tracking medium only with prior concurrence from the Service. All potential kit fox dens will be mapped and photo documented and described in the survey report. The Project Biologist will submit a survey findings report prior to start of ground-disturbing activities to the Authority to document compliance with this measure. Once dens are monitored and shown to be unoccupied, they will be collapsed the next day following the fifth consecutive night of species absence. Should a survey result in positive identification of the kit fox or should kit fox be encountered during construction, the Designated Biologist will require all activities that could adversely affect individuals to stop and the Service will be notified within 24 hours to determine if reinitiation of Section 7 consultation is warranted. Any such cessation of activities will be limited to the area necessary to protect the species pending further direction from the Service.

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<sup>1</sup> For the purposes of this biological opinion, the *work area* is defined as the portion of the project footprint that is currently under active construction.

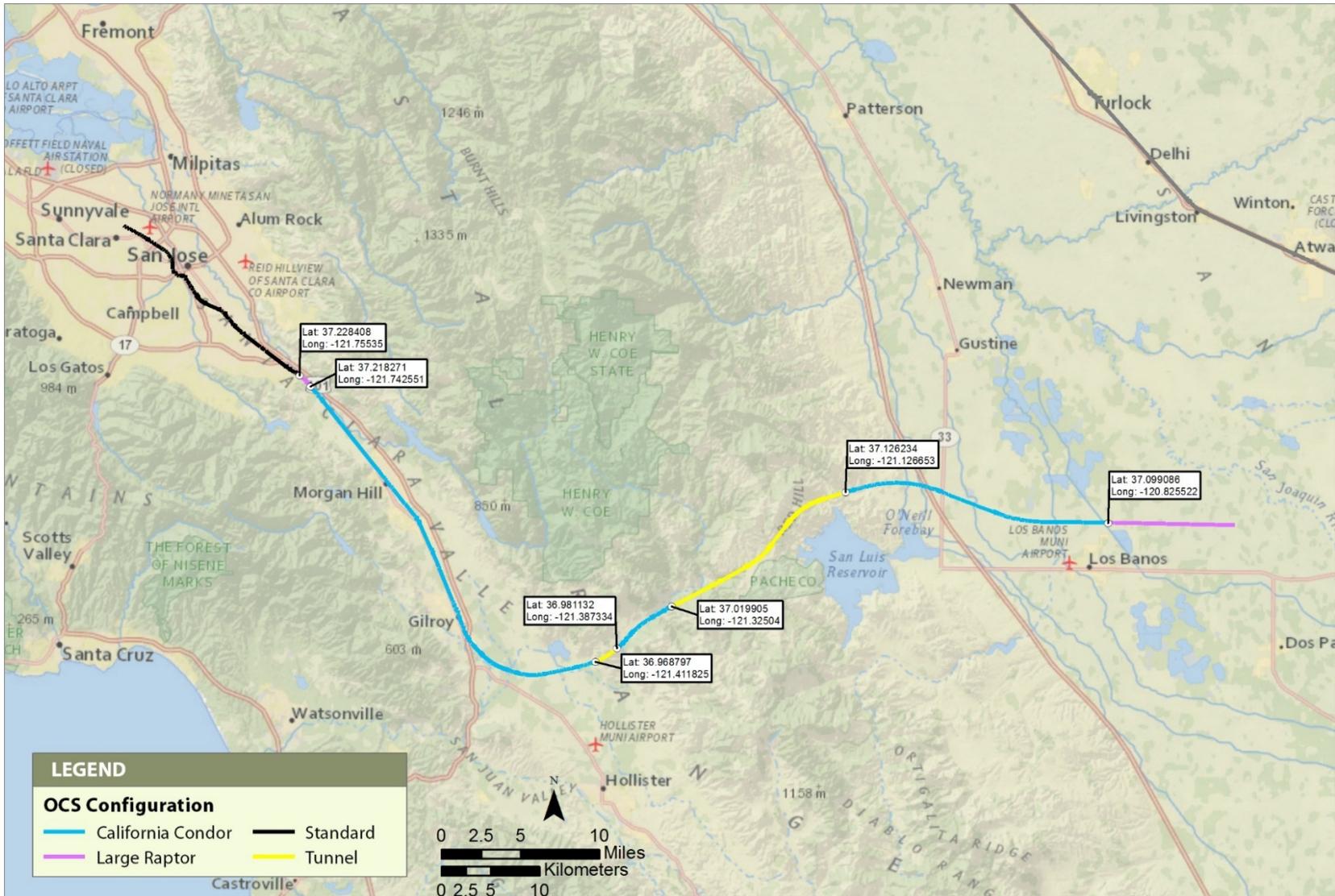
The Authority determined that the project, as proposed, may affect but is not likely to adversely affect the condor. The Service concurs with this determination as the effects will be discountable for the following reasons:

- 1) Implementation of species-specific conservation measures, as provided below (CM-CACO-01 through CM-CACO-07), will avoid adverse effects,
- 2) Implementation of general conservation measures, as described under the Description of the Project, including CM-GEN-20: Design the Project to Be Bird Safe, which states that the project, including the catenary system, masts, and other structures such as fencing, electric lines, communication towers and facilities, will be designed to be bird and raptor-safe (i.e., avoid electrocution and strike) in accordance with applicable Avian Power Line Interaction Committee (APLIC) recommendations in *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006* (APLIC 2006) and *Reducing Avian Collisions with Power Lines: State of the Art in 2012* (APLIC 2012),
- 3) The Authority's commitment to designing the project's overhead catenary system to provide a minimum safe distance between the conductors of 83 horizontal inches and 52 vertical inches to avoid condor electrocution between the latitude and longitude positions indicated on the map below (Figure 1),
- 4) No nesting habitat for the condor occurs within the action area.

#### **CM-CACO-04: Implement Avoidance Measures for California Condor**

During any ground-disturbing activities in the range of condor, the Project Biologist will implement the following avoidance measures:

- Construction materials in work areas, including items that could pose a risk of entanglement, such as ropes and cables, will be properly stored and secured when not in use.
- Litter, small artificial items (screws, washers, nuts, bolts, etc.), and all food waste will be stored in self-closing, sealable containers with lids that latch to prevent entry by wind, common ravens, and mammals. All trash receptacles will be inspected and collected regularly; the contents disposed of from work areas on a daily basis to prevent spillage and maintain sanitary conditions. The receptacles will be removed from the work area when construction or operations and maintenance (O&M) activities are complete.
- All fuels, fluids, and components with hazardous materials or wastes will be handled in accordance with applicable regulations. These materials will be kept in segregated, secured and/or secondary containment facilities as necessary. Any spills of liquid substances that could harm wildlife will be immediately addressed.



.Figure 1. Overhead Catenary System Bird-Safe Configuration Locations

- The project will avoid the exposure of wildlife to antifreeze containing ethylene glycol by keeping parked vehicles/equipment free of leaks, particularly antifreeze, and immediately cleaning up any spills or discharges that arise from leaks.
- Polychemical lines will not be used or stored on site to preclude wildlife, especially condor, from obtaining and ingesting pieces of polychemical lines.

#### **CM-CACO-05: Implement Helicopter Avoidance Measures for California Condor**

In the event helicopters are needed, the Project Biologist will coordinate with the Service, as appropriate, prior to helicopter use that could affect condor, to establish that no known individuals are in the work area. If condors are present, helicopter use will be avoided until the birds have left the area. If condors are observed in helicopter work areas, further helicopter use will be avoided until the Designated Biologist or Biological Monitor has determined that the condors have left the area. The Designated Biologist and Biological Monitors will have radio contact with the project foreman, who will be in radio contact with the helicopter pilot. The biologist will provide real-time information updates to the project foreman and helicopter pilot to avoid conflicts with condors.

#### **CM-CACO-06: Stop Work and Implement Hazing Methods for California Condor**

If a condor(s) lands or is observed in or near a work area, the Designated Biologist or Biological Monitor will assess the construction activities occurring and determine whether there is a potential hazard to the condor. Activities determined to be a potential hazard will be stopped until the condor has abandoned the area. After 15 minutes, if a condor has not left of its own volition, the Designated Biologist or Biological Monitor, or other Service-approved personnel, will implement Service-approved hazing methods in accordance with the Service Recovery Program's *Guidance on Hazing California Condors* (Service 2014a).

If the condor does not leave the area within 30 minutes of the initiation of hazing, the Designated Biologist or Biological Monitor will notify the Project Biologist. The Project Biologist will coordinate with the Authority and the Service to determine the appropriate actions.

#### **CM-CACO-07: Implement Removal of Carrion That May Attract California Condor**

Dead and injured wildlife found in the right-of-way and tracks will be removed during construction and O&M when the train is in operation. During O&M within condor range, automated security monitoring and track inspections will be used to detect fence failures and/or the presence of carrion in the right-of-way.

Term and Condition #5 of the biological opinion will help ensure that the above measures and determinations remain accurate and supported prior to construction of the project.

The remainder of this document provides our biological opinion on the effects of the project on the vireo, the frog and its critical habitat, the salamander and its critical habitat, the butterfly and its critical habitat, the beetle, the tadpole shrimp, the fairy shrimp, the jewelflower, and the dudleya.

## Consultation History

April to December 2015	The Authority initiated informal consultation with the Service; coordinated meetings with the Service; provided maps of the proposed alignments and species models to the Service; requested a list of species for consideration for the BA.
January to December 2016	The Authority coordinated with the Service regarding species information, modeling, and mitigation.
January 2017 to May 2020	The Authority coordinated with the Service regarding species information, modeling, mitigation, and effects analysis.
June 24, 2020	The Authority submitted documents initiating formal consultation with the Service, including providing the <i>San Jose to Merced Project Section Biological Assessment (BA)</i> for review.
June 24 to October 26, 2020	The Authority and the Service held meetings and conferences to discuss the need for additional information.
October 26, 2020	The Service requested additional information from the Authority.
October 26, 2020 to August 2021	The Authority and the Service held workshops and reviewed Service comments on the BA.
August 25, 2021	The Authority requested formal consultation with the Service for the project and submitted supplemental information to the BA.

## BIOLOGICAL OPINION

### Description of the Project

#### *Project Overview*

The State of California proposes to build a HSR system to connect the major population centers of the San Francisco Bay Area with the Los Angeles metropolitan region. The HSR system is envisioned as an electrically powered, high-speed, steel-wheel-on-steel-rail technology with state-of-the-art safety, signaling, and automated train-control systems. The trains will be capable of operating at speeds of up to 220 miles per hour (mph) over a fully grade-separated, dedicated track alignment.

The project is the construction, operation, and maintenance of the approximately 90-mile portion of the San Jose to Merced Project Section between Scott Boulevard in Santa Clara County and Carlucci Road in Merced County (Figure 2). The project consists of the Authority's Preferred Alternative, Alternative 4, as identified in the *San Jose to Merced Project Section Draft Environmental Impact Report (EIR)/Environmental Impact Statement (EIS)* (Authority 2020) and includes electrical interconnection and network upgrades to existing infrastructure where required to meet the projected power demands of the HSR system.



**Figure 2. San Jose to Merced Project Section Geographic Context**

Development of the project is intended to extend blended electric-powered passenger railroad infrastructure from the southern limit of the Caltrain Peninsula Corridor Electrification Project through Gilroy. South and east of Gilroy, HSR will operate on a dedicated guideway. The objectives of this approach are to minimize property displacements and natural resource impacts, retain local community development patterns, improve the operational efficiency and safety of the existing railroad corridor, and accelerate delivery of electrified passenger rail services in the increasingly congested southern Santa Clara Valley corridor.

The 90-mile project includes a blended, at-grade alignment that will operate on two electrified passenger tracks and (for a short portion of the alignment) one conventional freight track predominantly within the existing Caltrain and Union Pacific Railroad (UPRR) rights-of-way. The maximum train speed of 110 mph in the blended guideway will be enabled by continuous 8-foot chain-link, access-restriction fencing; four-quadrant gates, roadway lane channels, and railroad trespass deterrents at all public road grade crossings; and fully integrated communications and controls for train operations, grade crossings, and roadway traffic. Caltrain stations will be reconstructed to enable directional running as part of blended operations.

Overall, the project will be comprised of 15.2 miles on viaduct, 30.3 miles at grade, 25.9 miles on embankment, 2.3 miles in trench, and two tunnels with a combined length of 15.0 miles (Figure 3). The project comprises five subsections that are shown in Table 1 and illustrated on Figure 3.

**Table 1. San Jose to Central Valley Wye Project Subsections**

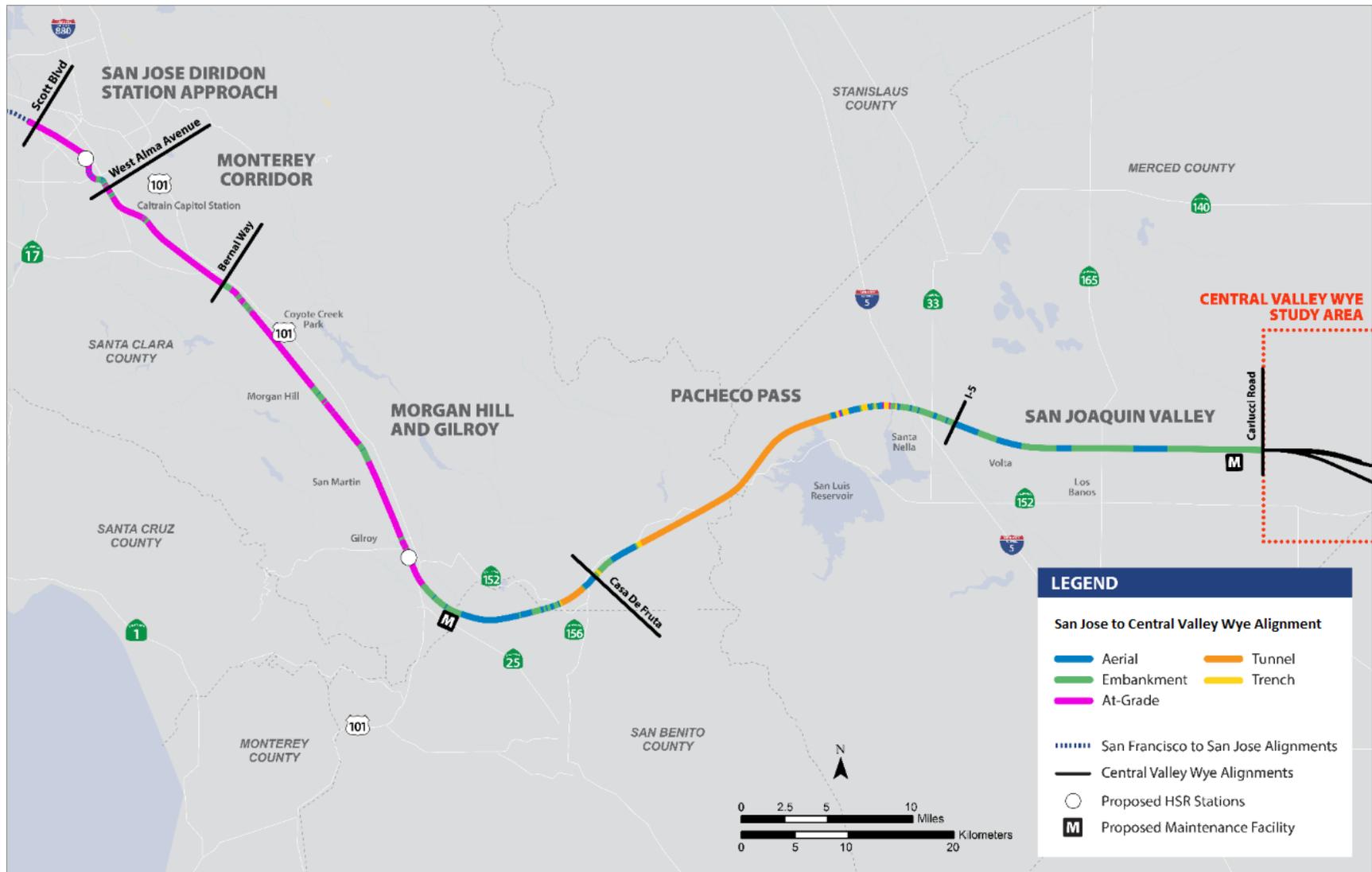
Subsection	Start	End
San Jose Diridon Station Approach (overlaps southern portion of San Francisco to San Jose Project Section)	Scott Boulevard (city of Santa Clara)	West Alma Avenue (city of San Jose)
Monterey Corridor	West Alma Avenue (city of San Jose)	Bernal Way/Kittery Court (community of South San Jose, city of San Jose)
Morgan Hill and Gilroy (includes Gilroy Station)	Bernal Way (community of South San Jose, City of San Jose)	Casa de Fruta Parkway (community of Casa de Fruta, Santa Clara County)
Pacheco Pass	Casa de Fruta Parkway (community of Casa de Fruta, Santa Clara County)	Interstate 5/Santa Nella Boulevard (community of Santa Nella, Merced County)
San Joaquin Valley	Interstate 5/Santa Nella Boulevard (community of Santa Nella, Merced County)	Carlucci Road (unincorporated Merced County)

Source: Authority 2019

### *Project Footprint*

The project footprint extends to the physical limits of the construction activities associated with the action and includes all areas that will be permanently or temporarily affected by the action. The project footprint includes all components and rights of way (ROW) needed to construct, operate, and maintain all permanent HSR features between the Project Section's logical termini. The estimated project footprint (i.e., combined permanent and temporary disturbance areas) for the action is expected to be no greater than approximately 4,004 acres.

The project footprint primarily consists of rail ROW that would include both a northbound and a southbound track in a corridor ranging from 60 feet wide, where elevated on a viaduct, to several hundred feet wide, where on embankment or in cut. Additional ROW would be required to accommodate associated facilities and improvements, such as maintenance facilities and equipment storage areas, permanent access roads, traction power substations (TPSS), switching and paralleling stations, train signaling and communication facilities, grade separations (overheads and underpasses), intrusion protection barriers, and wildlife crossing structures. The project footprint also includes areas for utility relocations, roadway relocations, electrical power connections, and construction activities (e.g., laydown, storage, and similar areas). The project footprint consists of the limits of cut and fill, plus all access roads and areas required for operating, storing, and refueling construction equipment.



Source: Authority 2019

JUNE 2019

Figure 3. San Jose to Central Valley Wye Alignment by Profile Type

Due to the Design/Build nature of the project, design refinements will occur as construction progresses, which may result in shifts in the project footprint into adjacent habitat. In addition, acquisition of ROW will provide access for surveys and updated habitat mapping. The HSR system, project footprint, and modeled habitat acreages included in the text below are based on the best available information at this time. Regardless of the final project footprint, project impacts will be similar geographically as well as in general nature and magnitude.

The following sections describe the project infrastructure.

#### San Jose Diridon Station Approach Subsection

The project will begin at Scott Boulevard in blended service with Caltrain on an at-grade profile following Caltrain Main Track (MT) 2 and MT3 south along the east side of the existing Caltrain corridor. The existing Lafayette Street pedestrian overpass will remain in place, as will the De La Cruz Boulevard and West Hedding Street roadway overpasses. New UPRR track will start just south of Emory Street to maintain freight movement capacity north of San Jose Diridon Station. The new UPRR track will be east of Caltrain MT1. The existing Santa Clara Station will remain. The existing College Park Caltrain Station will be reconstructed just north of Emory Street on the west side of the Caltrain Corridor on the existing siding track to eliminate the existing holdout rule at the station. A portion of both legs of the UPRR Warm Springs Subdivision Lenzen Wye will undergo minor track adjustments, and a new bridge will be built over Taylor Street for UPRR to tie into the Lenzen Wye.

The blended at-grade alignment will continue along MT2 and MT3 to enter new dedicated HSR platforms at grade at the center of San Jose Diridon Station. HSR platforms will be extended south to provide 1,385-foot and 1,465-foot platforms and will be raised to provide level boarding with the HSR trains. The existing Santa Clara Street underpass will remain, but the track in the throat and yard will require modification. There will be no need for modifications to the (Santa Clara) Valley Transportation Authority (VTA) light rail.

Continuing south, the blended at-grade three-track alignment will remain in the Caltrain right-of-way through the Gardner neighborhood. The existing underpass at Park Avenue and the existing overpass at San Carlos Street will remain in place. Four-quadrant gates with channelization will be built at Auzerais Avenue and West Virginia Street. A new bridge for the blended HSR/MT3 track over Interstate (I-) 280 will be constructed. The existing underpasses at Bird Avenue and Delmas Avenue will be reconstructed, as will the rail bridge overpasses. New standalone rail bridges over Prevost Street, State Route (SR) 87, the Guadalupe River, and Willow Street will be built for MT3. MT1 and MT2 will remain on the existing structures. The existing Tamien Caltrain Station will remain in place.

#### Monterey Corridor Subsection

The Monterey Corridor Subsection will be approximately 9 miles long and entirely within the San Jose city limits. From the San Jose Diridon Station Approach at West Alma Avenue, just south of the Caltrain Tamien Station, the alignment will extend primarily southeast to Bernal Way. This subsection will be in blended service with Caltrain on an at-grade profile within the Caltrain and UPRR right-of-way. HSR and Caltrain will operate on the electrified MT2 and MT3 tracks, while UPRR will operate on

a nonelectrified MT1. The two existing tracks will be shifted to accommodate the third track. The existing Tamien Caltrain Station will remain in place with two new electrified turnback tracks constructed south of the station to facilitate turning trains outside the station platform areas. The Michael Yard will be reconfigured to a double-ended facility to accommodate storage of Altamont Corridor Express trains and relocated to the east side of the corridor. A new standalone bridge over West Alma Avenue will be constructed for MT3 and a maintenance track, with MT1 and 2 remaining on the existing structure. A new bridge over Almaden Road will be constructed for MT2 and MT3, while MT1 will remain on the existing structures. The bike path at Almaden Expressway will be realigned to the west in a culvert under the roadway. The existing pedestrian overpass at Communications Hill will remain in place. Capitol Caltrain Station will be reconstructed with a new center platform between MT2 and MT3. The platform will be reached by a new pedestrian overpass built at the north end of the platform. The existing Capitol Expressway overpass will remain in place. Four-quadrant barrier gates with channelization will be built at Skyway Drive, Branhan Lane, and Chynoweth Avenue. The existing Blossom Hill Road overpass and adjacent pedestrian overpass will remain in place. The Blossom Hill Caltrain Station will be reconstructed; the existing pedestrian overpass and platform will be removed and a new center platform constructed between MT2 and MT3. The platform will be reached by a new pedestrian overpass built at the south end of the platform. Great Oaks Parkway will be realigned for approximately 1,350 feet to accommodate the widened rail corridor. SR 85 and Bernal Road overpasses will remain in place.

#### Morgan Hill and Gilroy Subsection

The Morgan Hill and Gilroy Subsection will be approximately 32 miles long, continuing south from the Monterey Corridor Subsection. From Bernal Way in South San Jose, the alignment will extend through Morgan Hill and San Martin to the Downtown Gilroy Station, then curve generally east across the Pajaro River floodplain and through a portion of northern San Benito County before entering Tunnel 1 at the base of the Diablo Range. The alignment will exit the tunnel at Casa de Fruta Parkway/SR 152 in unincorporated eastern Santa Clara County, where it will transition to the Pacheco Pass Subsection. This subsection will be blended service with Caltrain on an at-grade profile within the Caltrain and UPRR right-of-way with an at-grade Downtown Gilroy Station. Past the Downtown Gilroy Station and south of the U.S. Highway (US) 101 overpass, HSR will enter the fully grade-separated, dedicated track needed to operate HSR trains at speeds faster than 125 mph.

Beginning at the southern limit of the Monterey Corridor Subsection, the alignment will continue in blended service with Caltrain on an at-grade profile in the existing UPRR right-of-way. HSR and Caltrain will operate on the electrified MT2 and MT3 tracks, while UPRR will operate on MT1. A UPRR siding track will be provided between Blanchard Road and Bailey Avenue. Four-quadrant barrier gates will be installed at all existing public road crossings. Intrusion deterrents will be installed at all at-grade crossings. Three private roads crossing will be eliminated, and alternate access provided to those properties. The existing Bailey Avenue overpass will remain in place. The Monterey Road underpass will be reconstructed to accommodate the future widening of Monterey Road to four lanes. The Morgan Hill Caltrain Station will be reconstructed with two new side platforms built outside MT2 and MT3. The platform will be reached by a new pedestrian underpass constructed at the north end of the platform. The existing

Butterfield Boulevard overpass will remain in place. Upper Llagas Creek bridge will be reconstructed.

The San Martin Caltrain Station will be reconstructed—the existing platform will be removed and a new center platform will be built between MT2 and MT3. The platform will be reached by a new pedestrian overpass constructed at the south end of the platform. The existing bridge at Miller Slough will be replaced with a triple-cell box. Blended service will end just south of the Downtown Gilroy Station, where Caltrain will have access to turn back and stabling tracks relocated from the station area to south of 10<sup>th</sup> Street on the west side of the UPRR right-of-way. The Gilroy Caltrain Station will be reconstructed—the existing Caltrain platform will be shifted south and served by a southbound station track. A northbound Caltrain side platform will be provided to the east of a northbound station track. Two side platforms will be provided for HSR on the outside of the MT2 and MT3 tracks. The platforms will be reached by a new pedestrian overpass constructed over the center of the platforms. HSR will continue south under the US 101 overpass, which will remain in place. Past the Industry spur, HSR will ascend onto embankment and then a bridge over the UPRR. Two bridges will be constructed, one for MT2 and MT3 and a separate one for the maintenance of way facility (MOWF) lead track. The UPRR Hollister branch line will be realigned to the west to accommodate HSR bridging over the UPRR tracks at a single location. HSR MT2 and MT3 will descend from the embankment before crossing over Bloomfield Avenue on a new structure. Four-quadrant barrier gates and intrusion deterrents will be installed at Bloomfield Avenue for the MOWF lead track and UPRR service track. HSR will continue past the MOWF and transition to a new viaduct structure to cross over the Pajaro River.

The HSR alignment south and east of Gilroy will cross an agricultural area in Santa Clara and San Benito Counties that is part of the upper Pajaro River (UPR) floodplain, historically referred to as Soap Lake. The HSR guideway will be on viaduct over the major watercourses to provide a floodplain crossing that is neutral to the hydrology and hydraulics of the floodplain and to accommodate wildlife movement. Because of the Calaveras fault crossing at this location, Tequisquita Slough will be partially filled by approximately 800 feet of HSR embankment. The embankment area will include cross-culverts and 1.3 acres of adjacent floodwater detention basins; in addition, an extended viaduct over Pacheco Creek will serve to maintain floodplain capacity and function. HSR will be on embankment between Pacheco Creek and Lovers Lane, returning to viaduct at Lovers Lane. After Lovers Lane, the alignment will continue in a combination of embankment and viaduct until reaching the west portal for Tunnel 1 on the east side of SR 152. After exiting the 1.4-mile Tunnel 1 on the west side of SR 152, the alignment will cross over SR 152 and the southern portion of the Pacheco Creek Valley on an aerial structure south of Casa de Fruta. The alignment will transition onto embankment just beyond Southside Way at the western transition to the Pacheco Pass Subsection.

#### Pacheco Pass Subsection

The Pacheco Pass Subsection will be approximately 25 miles long. The alignment will generally follow the existing SR 152 corridor east from Casa de Fruta for approximately 17 miles, then diverge north around the Cottonwood Creek ravine of the San Luis Reservoir for approximately 8 miles before transitioning to the San Joaquin Valley Subsection near I-5 in Merced County. Tunnel is the only design option in this subsection.

From the eastern limit of the Morgan Hill and Gilroy Subsection, the guideway will transition from aerial structure to embankment along the southern boundary of Casa de Fruta. This stretch of embankment will be on fill or in excavated hillside cuts to accommodate a level HSR guideway profile over varied surface elevations and to control unstable slopes known for vulnerability to landslip (i.e., areas subject to the downward falling or sliding of a mass of soil, detritus, or rock on or from a steep slope). The alignment will ascend to viaduct over Pacheco Creek along the south side of SR 152 and remain on viaduct to the Tunnel 2 west portal. This portal will include a staging area for tunnel construction and a permanent area for traction and facility power with access provided by a service road from SR 152. Tunnel 2 will extend approximately 13.5 miles northeast. Access to the Tunnel 2 east portal for HSR construction, operations, and maintenance will be on McCabe Road north of Romero Ranch. Continuing east, the HSR guideway will be predominantly on a combination of embankment and aerial structures, with viaducts over Romero Creek and the California Aqueduct. Romero Road will be realigned at its intersection with I-5. East of I-5, the alignment will cross over SR 33/Santa Nella Road and the Central California Irrigation District (CCID) Outside Canal before transitioning to the San Joaquin Valley Subsection at Fahey Road.

#### San Joaquin Valley Subsection

The San Joaquin Valley Subsection will be approximately 18 miles long, from east of I-5 (at Fahey Road) to the intersection of Henry Miller Road and Carlucci Road in Merced County, where the alignment will connect to the Central Valley Wye. The single design option in this subsection is Henry Miller Road—a combination of viaduct and embankment.

South of Fahey Road, the guideway will continue east and cross over three irrigation ditches, Cherokee Road, the CCID Main Canal, two additional irrigation ditches, and adjacent farmland on viaduct. Continuing east, the alignment will be on embankment (including four proposed culvert crossings for irrigation ditches) before ascending on an approximately 1.4-mile-long viaduct over the San Luis Wasteway, the UPRR West Side branch line, and Ingomar Grade Road.

The alignment will descend to embankment west of Volta Road while turning southeast before crossing to the south side of Henry Miller Road. Henry Miller Road will be realigned to pass over the HSR alignment on a bridge. The HSR embankment between the Volta Road overcrossing and Los Banos Creek will cross over two proposed culverts to maintain irrigation canals. The alignment will then ascend to cross over Los Banos Creek and Badger Flat Road on a 1.35-mile-long viaduct before descending onto embankment.

The alignment will continue east for 3.6 miles on embankment over several combined wildlife crossing/drainage culverts and drainage culverts, including an irrigation ditch at Wilson Road, an irrigation ditch at Johnson Road, two irrigation ditches at Nantes Avenue, the Santa Fe Canal, the San Luis Canal, the San Luis Drain, and the Porter-Blake Bypass. A road will be constructed between Badger Flat Road and Nantes Avenue. SR 165/Merced Springs Road will be raised to cross over the HSR alignment and Henry Miller Road on a bridge. East of SR 165 and the Santa Fe Grade, the alignment will ascend to an approximately 1.8-mile viaduct south of the Los Baños State Wildlife Area across Mud Slough to maintain wildlife movement within the Grasslands Ecological Area (GEA). Baker Road, Midway Road, and Hereford/Salt Slough will be closed south of

Henry Miller Road. Box Car Road will become a cul-de-sac with a new road to the east. Hutchins Road will be abandoned. The alignment will continue on embankment to the eastern limit of the subsection and the project. Culvert crossings will be provided for the San Pedro Canal, Boundary Drain, Longe Tree Canal, Devon Drain, West Delta Drain, West Delta Canal, Dambrosia Ditch, Delta Canal and seepage drain, East Delta Canal, Poso Drain, Belmont Drain, Delta Canal #1, West San Juan Drain, San Juan #1, and several other irrigation ditches and drains in the section of viaduct over the GEA. Several local roadways—Delta Road, Turner Island Road, and Carlucci Road—will be elevated over the HSR guideway, maintaining access to adjacent properties. The alignment will transition to the Central Valley Wye at Carlucci Road.

A typical train will be 9 to 11 feet wide and approximately 660 feet long and will seat up to 1,000 passengers. The power will be distributed to each train car via the overhead contact system (OCS) through a pair of pantographs that extend like antennae above the train. Each trainset will have a train control system that could be independently monitored with override control, while also communicating with the systemwide Operations Control Center. Phase 1 HSR service is expected to need up to 78 trainsets in 2040, depending on the HSR fares charged and ridership levels (Authority and FRA 2017). Vehicle lighting will comply with applicable rail safety, security, and operational requirements.

The fully grade-separated, dedicated track infrastructure needed to operate HSR trains at speeds greater than 125 mph has more stringent alignment requirements than infrastructure for conventional trains. The project will use multiple track support types, or profiles: low, near-the-ground tracks will be at grade; higher tracks will be elevated on structure (viaduct) or on embankment; and below-grade tracks will be in open cut, retained cut, trench, or tunnel. Types of bridges that might be built include full channel spans, large box culverts, and, for wider river crossings, limited piers below the ordinary high-water mark of the established channel. Two tunnels will be constructed: one in the Morgan Hill to Gilroy Subsection and one in the Pacheco Pass Subsection. Flood lighting or night lighting will not be installed along the HSR guideway for track operations or maintenance, except for specific sited facilities such as maintenance and systems sites. Lighting will be used with closed-circuit televisions (CCTVs). In spaces where lighting will be inappropriate due to environmental impacts, infrared receptors with infrared cameras or other appropriate technologies may be used. Temporary, portable lighting will be used at all locations when maintenance work is being undertaken to ensure sufficient light levels to undertake the works safely.

Traction power switching and paralleling stations work together to balance the electrical load between tracks and to switch power off or on to either track in the event of an emergency. Traction power switching stations will be required at approximately 15-mile intervals, midway between the TPSSs. Each traction power switching station will encompass approximately 14,400 square feet (160 by 90 feet). Traction power paralleling stations will be required at approximately 5-mile intervals between the traction power switching stations and the TPSSs. Each traction power paralleling station will encompass approximately 9,600 square feet (120 by 80 feet), and each will include an approximately 450-square-foot (18 by 25 feet) control room.

During normal system operations, the local utility will provide power service through the TPSSs. Should the flow of power be interrupted, the system will automatically switch to

a backup power source through use of an emergency standby generator, an uninterruptible power supply, or a direct current battery system. Permanent emergency standby generators for the project will be located at passenger stations and at terminal layup or storage and maintenance facilities.

A computer-based, enhanced automatic train control (ATC) system will control the trains. The enhanced ATC system will comply with the FRA-mandated positive train control (PTC) requirements, including safe separation of trains, over-speed prevention, and work zone protection. This system will use a wireless-based communications network that will include a fiber optical backbone and communications towers at intervals of approximately 1.5 to 3 miles, depending on the terrain and selected radio frequency. Signaling and train control elements within the right-of-way will include components and microprocessor components, cabling to the field hardware and track, signals, and switch machines on the track. Communications radio towers in these facilities will use a 6- to 8-foot-diameter 100-foot-tall pole. The communications facilities will be sited in the vicinity of track switches and will be grouped with other traction power, maintenance, station, and similar HSR facilities where possible. Where communications towers cannot be co-located with TPSSs or other HSR facilities, the communications facilities will be sited near the HSR corridor in a fenced area approximately 20 by 15 feet. ATC and standalone radio sites will not be staffed. Permanent safety lighting will incorporate motion sensors, height limits, shielding, and downward-facing orientation while still meeting safety, security, and operational criteria. Fencing around signaling and train control facilities may be screened. Lighting will be used with CCTVs. In spaces where lighting is inappropriate due to environmental impacts, infrared receptors with infrared cameras or other appropriate technologies may be used.

As previously described, each TPSS will have two 115/50-kV or 230/50-kV single-phase transformers. These transformers will interconnect the TPSS to two breaker-and-a-half bays<sup>5</sup> constructed at a new utility switching station or within the fence line of an existing facility via a short section of 230-kV transmission or 115-kV power lines (tie-line). Per Authority requirements, the proposed interconnection points will need redundant transmission (i.e., double-circuit electrical lines) from the point of interconnection, with each interconnection connected only to two phases of the transmission source. A new utility switching station will encompass approximately 35,200 square feet (160 by 220 feet) and include an approximately 975-square-foot (15 by 65 feet) control building, 525-square-foot (15 by 35 feet) battery building and, if required, a retention basin. The utility switching station could be screened from view with perimeter walls or fences. Communication facilities (i.e., redundant [two underground or one underground and one overhead on existing power structures] fiber optic lines) will also be required to support the electrical interconnections connecting TPSSs to new utility switching stations or to existing facilities, typically within tie-line/utility corridors.

The project includes the following components:

- Alignment and ancillary features
  - Approximately 90 miles of railway consisting of 15.2 miles on viaduct, 30.3 miles at grade, 25.9 miles on embankment, 2.3 miles in trench, and two tunnels with a combined length of 15.0 miles
  - Approximately 15.2 miles of dual HSR track

- Approximately 29 at-grade road crossings
- Associated railway support structures (e.g., TPSSs, switching/paralleling stations, MOWFs)
- Electrical interconnections
  - Two 115/50 kV or 230/50 kV single-phase transformers for each TPSS
  - New 115 kV or 230 kV switching station or reconfiguration of existing facility within fence line
- Network upgrades
  - Reconductor two 115 kV power lines
  - Collocation of new power lines with existing 230 kV transmission lines

### *Heavy Maintenance Facilities*

Three sites for the MOWF are under consideration. The East Gilroy MOWF will be located west of the HSR mainline, south of the community of Old Gilroy, extending from north of Pacheco Pass Highway (SR 152) to north of Bloomfield Avenue. The South Gilroy MOWF will be located in one of two locations—between Carnadero Avenue and Bloomfield Avenue on the east side of the HSR alignment or south of Bloomfield Avenue on the west side of the HSR alignment.

A maintenance of way siding (MOWS) is proposed near Turner Island Road near the eastern limit of the project. The MOWS will be about 0.5 mile long, encompassing about 4 acres. The facility will be constructed near Henry Miller Road to avoid the GEA and other sensitive habitat.

### *Stations*

Two stations will be constructed for the project in San Jose and Gilroy. The San Jose Diridon Station will be constructed at the existing Caltrain station. A second station—in the Morgan Hill and Gilroy Subsection—will be constructed in either downtown Gilroy or east Gilroy, depending upon the alternative selected. Conceptual station plans at both stations provide space for a multitude of services, including local and regional transit connectivity, pick-up and drop-off facilities, parking, station buildings for ticketing and support services, and passenger waiting and access area for HSR. Station planning will incorporate pedestrian and bicyclist connectivity; improved station area roadways for facilitating connectivity; expanded sidewalks, pathways, and plazas; rider pick-up and drop-off areas; and automobile parking.

### *Project Roadway Modifications*

State highway and local roadway modifications include:

- **State highway underpasses**—Where the HSR alignment is proposed to cross over state highway facilities in various locations on aerial structures, the possibility of encroachment into the California Department of Transportation (Caltrans) right-of-way will depend upon the placement of the HSR aerial structure columns. Temporary closure of the Caltrans right-of-way may be necessary for placement of precast aerial structure sections, during which time traffic will be detoured onto local streets.
- **Roadway overcrossings**—Where the HSR alignment is at grade and runs parallel to state facilities, access will be severed where an at-grade leg of an intersection crosses

the HSR alignment. Accordingly, road overcrossings will be necessary for maintaining function of the state highway and local road systems. Intersecting roads will be realigned horizontally and adjusted vertically to cross over the state highway. The possibility of encroachment into the Caltrans right-of-way will depend upon the placement of the overcrossing columns. The design intent of these crossings is to maintain the existing intersection and traffic patterns during construction. However, when conforming to the existing roads, some short-term closures may be required, and local traffic will utilize one of the other overcrossings or intersections in the vicinity.

- **Eliminating leg of intersections**—The elimination of one leg of an existing at-grade intersection with a state highway was deemed necessary where the road was in close proximity to other accessible, proposed overcrossings or where the existing average annual daily traffic was not high enough to warrant its own overcrossing. In these circumstances, the access will be severed along the leg of the intersection that the HSR track traverses. There will be no impacts on the Caltrans right-of-way as no structures are required. Local traffic will utilize one of the other overcrossings in the vicinity.
- **Ramp modifications**—Ramp modifications will be necessary where the HSR track is on an aerial structure, and the proposed columns directly interfere with the existing alignments of roadways or off-ramps. These ramps will be modified to avoid the proposed columns and accommodate any other roadway realignments that result from the aerial structure columns. Although the modifications will be slight, additional right-of-way may be required for the realigned off-ramps. Roadway traffic will likely use existing facilities while the realigned ramps are being constructed.

#### *Project Construction Footprint*

The project will require the acquisition of residential, commercial, industrial, and agricultural properties to obtain adequate right-of-way for construction and operations. In the San Joaquin Valley Subsection, the alignment will traverse a portion of the GEA, requiring acquisition of land under conservation easement.

#### *Pre-Construction Activities*

During final design, the Authority will conduct several pre-construction activities to optimize construction staging and management. These activities include the following:

- Conducting geotechnical investigations to define precise geologic, groundwater, and seismic conditions along the alignment. The results of this work will guide final design and construction methods for foundations, underground structures, tunnels, stations, grade crossings, aerial structures, systems, and substations.
- Identifying construction laydown and staging areas used for mobilizing personnel, stockpiling materials, and storing equipment for building HSR or related improvements. In some cases, these areas will also be used to assemble or prefabricate components of guideway or wayside facilities before transport to installation locations. Precasting yards will be identified for the casting, storage, and preparation of precast concrete segments; temporary spoil storage; workshops, and the temporary storage of delivered construction materials. Field offices and temporary jobsite trailers will also be located at the staging areas. Construction laydown areas are part of the project footprint that is evaluated for potential environmental impacts;

however, actual use of the designated laydown areas will be at the discretion of the design-build contractor. That is, some of the laydown areas included in the engineering drawings may not be fully disturbed or disturbed at all. After completing construction, the staging, laydown, and precasting areas will be restored to pre-construction condition.

- Initiating site preparation and demolition, such as clearing, grubbing, and grading, followed by the mobilization of equipment and materials. Demolition will require strict controls to ensure that adjacent buildings, infrastructure, natural or community resources are not damaged or otherwise affected by the demolition efforts.
- Relocating utilities prior to construction. The Authority will work with the utility companies to relocate or protect in place high-risk utilities, such as overhead tension wires, pressurized transmission mains, oil lines, fiber optical conduits or cables, and communications lines or facilities prior to construction.
- Implementing temporary, long-term, and permanent road closures to reroute or detour traffic away from construction activities. Handrails, fences, and walkways will be provided for the safety of pedestrians and bicyclists.
- Locating temporary batch plants to produce Portland Cement Concrete or asphaltic concrete needed for roads, bridges, aerial structures, retaining walls, and other large structures. The facilities generally consist of silos containing fly ash, lime, and cement; heated tanks of liquid asphalt; sand and gravel material storage areas; mixing equipment; aboveground storage tanks; and designated areas for sand and gravel truck unloading, concrete truck loading, and concrete truck washout. The Authority will implement procedures for reducing air emissions, mitigating noise impacts, and controlling the discharge of potential pollutants into storm drains or watercourses from the use of equipment, materials, and waste products.
- Conducting other studies and investigations, as needed, such as surveys of local business, farms or dairies, and wildlife refuges to identify usage, delivery, shipping patterns, and critical times of the day or year for business, planting, harvesting activities, or recreational activities. This information will help develop construction requirements and worksite traffic control plans, and identify potential alternative routes as well as necessary cultural resource investigations, historic property surveys, and wildlife surveys.

### *Major Construction Activities*

Major types of construction activities for the project include earthwork; bridge, aerial structure, and roadway crossings; railroad systems; and station construction, as briefly described in the following subsections.

#### Earthwork

Earthwork is a general term applied to the movement or removal of soils by mechanical equipment (excavation) and the placement and compaction of soils by mechanical equipment (embankment). Earthwork will be conducted using conventional earthmoving methods and heavy construction equipment, such as dozers, wheel loaders, scrapers, articulated trucks, rear dump trucks, or wagons. The type of equipment used will depend on the hauling distance, with trucks or wagons used for longer distances.

The HSR system seeks to balance the volume of soils needed for excavation and embankment and minimize the input of materials from quarries and disposal of materials outside of the right-of-way. This earthwork balance assumes that excavated soils will be suitable for use as embankment fill (Draft Biological Assessment, Appendix 2-C [Authority 2021]). The Authority is conducting geotechnical investigations within the HSR alignment to assess the geotechnical properties of existing soils, evaluate opportunities for soil re-use and determine improvements to make existing soils suitable for HSR re-use.

The project will require greater quantities of embankment than excavation, requiring approximately an additional 2.3 million 900,000 cubic yards of material, respectively. While fill material is likely to be acquired locally, ballast and subballast materials may be imported from off-site quarries. To minimize material transport, the preliminary engineering design has identified construction staging sites that will store excavated materials close to where they will be placed, minimizing repetitive handling of materials.

The project will require earthwork construction of 53 to 59 miles of embankment or trench construction. The high amount of earthwork is predominantly due to the embankment and at-grade profile through the Morgan Hill and Gilroy Subsection.

#### Bridge, Aerial Structure, and Roadway Crossing Construction

As is done for existing HSR systems around the world, the majority of the elevated guideways will be designed and built using single box segmental girder construction. Where needed, other structural types and construction methods will be considered. This section provides an overview of the construction methods required for foundations, substructures, and superstructures of bridges, aerial structures, and roadway crossings.

**Foundations.** A typical aerial structure foundation pile cap is supported by an average of four large-diameter (5 to 9 feet) bored piles. Depth of piles depends on the geotechnical conditions at each pile site. Pile construction can be achieved by using rotary drilling rigs, and either bentonite slurry or temporary casings may be used to stabilize pile shaft excavation. The estimated pile production rate is 4 days per pile installation. Additional available pile installation methods include bored piles, rotary drilling cast-in-place (CIP) piles, driven piles, and a combination of pile jetting and driving.

Following completion of the piles, pile caps can be constructed using conventional methods supported by structural steel: either precast and pre-stressed piles or cast-in-drilled hole piles. For pile caps constructed near existing structures such as railways, bridges, and underground drainage culverts, temporary sheet piling (i.e., temporary walls) can be used to minimize disturbances to adjacent structures. Sheet piling installation and extraction will likely be achieved using hydraulic sheet piling machines.

**Substructure.** Typical aerial structures of up to 90 feet will be constructed using CIP bent caps and columns supported by structural steel and installed upon pile caps. A self-climbing formwork system may be used to construct piers and portal beams more than 90 feet high. The self-climbing formwork system is equipped with a winched lifting device, which is raised up along the column by hydraulic means with a structural frame mounted on top of the previous pour. In general, a 3-day cycle for each 12-foot pour height can be achieved. The final size and spacing of the piers depend on the type of superstructure and spans they are supporting.

**Superstructure.** The selection of superstructure type will consider the loadings, stresses, and deflections encountered during the various intermediate construction stages, including changes in static scheme, sequence of tendon installation, maturity of concrete at loading, and load effects from erection equipment. Accordingly, the final design will depend on the selected means and methods of construction, such as full-span precast, span-by-span, balanced cantilever segmental precast, and CIP construction on falsework. These superstructure construction methods are described in full detail in the *San Jose to Merced Project Section Constructability Assessment Report* (Draft Biological Assessment, Appendix 2-C [Authority 2021]) and are summarized as follows:

- **Full-span precast construction**—Box girders will be precast and pre-stressed in advance as a full span and stored in a precasting yard. The 110-foot precast segments, weighing around 900 tons, will be transported along the previously constructed aerial guideway using a special gantry system.
- **Span-by-span precast segmental construction**—Shorter box girder segments will be precast and pre-stressed and stored in a precasting yard. These segments, limited to 12-foot segments weighing less than 70 tons, will likely be individually transported to the construction site by ground transportation. Once the gantry system is in place, construction will involve hoisting the segments from the ground and installing and tensioning the prestressing tendons to create the box girder.
- **Balanced cantilever segmental construction**—In locations where construction will occur over existing facilities that prevent equipment and temporary supports on the ground, balanced cantilever segmental construction may be used. Under this construction method, box girder segments (12-foot segments weighing less than 70 tons) that are either precast or CIP will be placed in a symmetrical fashion around a bent column. The segments will be anchored at the ends by cantilever tendons located in the deck slab, with midspan tendons balancing the weight between two cantilevers. Precast segments will be precast off-site, transported to the construction site, and installed incrementally onto a portion of the existing cantilever using ground cranes, hoisting devices, or a self-launching gantry. Segments can also be CIP and installed two at a time, one at each end of the balanced cantilever. Segments generated by CIP are generally longer than those in precast construction since they do not need to be transported to the construction site.
- **CIP Construction on Falsework**—The method involves creating a suspended formwork with either a launching girder or gantry system. Once the formwork is in position and reinforcements and prestressing are placed, concrete is poured and the prestressing is stressed. The formwork is then removed and moved to the next segment.
- Construction of road crossings and bridges will be similar to the approach described above for aerial structures. The superstructure will likely be constructed using precast, prestressed, concrete girders and CIP deck. Approaches to bridges will be earthwork embankments, mechanically stabilized earth wall, or other retaining structures.
- Crossings of existing railroads, roads, and the HSR will be constructed on the line of the existing road or offline at some locations. When constructed online, the existing road will be closed or temporarily diverted. When constructed offline, the existing road will be maintained in use until the new crossing is completed. Single tracking of

VTA service will be necessary during construction of the SR 87 bridge. The following project features are necessary for VTA to modify operations during construction: a new crossover with two powered switches south of Tamien Station, provision of power to six existing switches, and installation of track signals at these new and existing powered switches. Where HSR will cross over existing railroads, the Authority will coordinate with the rail operators to avoid operational impacts during construction. Where new roadway undercrossings of existing railroads are required, a temporary shoofly track will be constructed to maintain railroad operations during undercrossing construction.

### Tunnels

Tunnels will be used where the HSR system passes through a hill or mountain where the vertical profile is too deep to use an open cut to pass through the topography. The project will require the construction of two tunnels—Tunnel 1 in the Morgan Hill and Gilroy Subsection and Tunnel 2 in the Pacheco Pass Subsection. This is similar to what is anticipated for these project tunnels. These tunnels will be twin-bore, single-track tunnels, with lengths of approximately 1.6 and 13.5 miles, respectively, and a minimum internal diameter of 29.5 feet. Localized enlargements, or niches, may be required at intervals to accommodate equipment such as OCS tensioning devices, traction power paralleling stations, ventilation fans, communication equipment, signaling equipment, and drainage systems. Cross passages, placed no more than 800 feet apart, will be required between adjacent tunnels to provide emergency exits. The Authority will acquire exclusive underground property approximately 132 feet wide and 62 feet high to accommodate both tunnels and all support elements.

Preparation for and construction of these tunnels will occur over a 6-year period and will generally proceed as follows:

Construction of access roads to the future tunnel portal sites: a new access road will be constructed on the west side of SR 152 from Walnut Avenue to the east portal of Tunnel 1, and a new road and bridge across Pacheco Creek will be constructed to the west portal of Tunnel 2. McCabe Road will be improved to provide access to the east portal of Tunnel 2.

Construction of power system: overhead power lines will be installed to the construction staging areas, and portable diesel generators will be installed to provide backup power supply.

Preparation of tunnel portals: a large, level area will be constructed at each tunnel portal including installation of retaining walls to minimize grading and slope modification. At the portals for Tunnel 2, this construction will likely include hillside slope reduction or application of drainage techniques, as well as ongoing monitoring and maintenance, to reduce the potential for landslides. Tunnel portals will initially be used to store precast materials and equipment, assemble and maintain equipment, stockpile tunnel spoils, and conduct ongoing monitoring and measuring of safety and ventilation systems. Portals will also be designed to accommodate housing trailers, ventilation buildings, communications

equipment, power facilities, water and sewage, lighting and fencing, and clear areas for parking and storage.<sup>2</sup>

Manufacturing and transport of precast tunnel support materials: manufacturing of precast materials, such as the tunnel lining segments will occur off-site and be transported to the tunnel portals.

Tunnel excavation will likely be conducted using a combination of tunnel boring machines (TBMs) and conventional tunneling methods at either end of the tunnel portals. The type of machine used will be determined by the Authority's design-build contractor, based on the tunnel length, the particular geology of the project, the amount of groundwater present and its condition, and other factors. A detailed discussion of tunnel construction methods is available in the *San Jose to Merced Project Section: Conceptual Tunnel Design and Constructability Considerations – Pacheco Pass* (Authority 2017) and is summarized below:

- **Conventional tunneling methods**—The primary conventional tunneling method anticipated to be used is a roadheader, consisting of a boom-mounted cutting head, a loading device usually involving a conveyor, and a crawler traveling track to move the machine forward into the rock face. Drill-and-blast techniques and the use of hydraulic excavators could also be required. For conventional tunneling methods, the estimated power demand is 3,000 kVA to operate two roadheaders, two drill jumbos, and ancillary equipment, with 1,000 kVA emergency power supply.
- **TBMs**—TBMs are shielded or open-type machines consisting of a rotating cutting wheel, called a cutterhead, followed by a main bearing, a thrust system and trailing support mechanisms. Support mechanisms can include conveyors or other systems for muck removal, control rooms, electrical systems, dust removal, ventilation and mechanisms for transport of pre-cast segments. These machines excavate rock with disc cutters mounted in the cutterhead, and then transfer the excavated rock through openings in the cutterhead to a belt conveyor for removal from the tunnel. Following TBM excavation, a tunnel lining is built with steel ribs and lagging or precast concrete segments. The shield is then pushed forward with hydraulic jacks that thrust against the installed lining and the back of the tunnel shield. For TBM excavation, the estimated power demand for a single construction staging area of a twin-bore tunnel is 7,500 kVA to power two TBMs, trailing gear, and continuous conveyors, ventilation fans, lights, pumps, shop equipment, change house, yard lighting, and office trailers, as well as 4,000 kVA for an emergency power supply.
- **Transport of tunnel spoils**—Tunnel excavation will generate large volumes of soil and rock materials (an estimated 0.5 million cubic yards from Tunnel 1 and 4.3 million cubic yards from Tunnel 2). Tunnel spoils will be temporarily stockpiled at the tunnel portal and, depending on geotechnical properties, distributed along the alignment and reused for embankment fill or nonstructural fill. Depending on the rate of excavation completed, the transport of tunnel spoils could require approximately 160 three-axle dump truck trips per day at each tunnel portal (Draft Biological Assessment, Appendix 2-C [Authority 2021]).

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<sup>2</sup> Reinforced structures may be necessary for permanent support at tunnel portals. Permanent structures will be designed for the most unfavorable load combinations. Depending on the various conditions, including slope stability, static earth pressures, and seismic loading, slope stability mitigation measures may be required.

### Railroad Systems Construction

The HSR system will include trackwork, traction power electrification, signaling, and communications. After completion of earthwork and structures, trackwork is the first rail system to be constructed, and it must be in place at least locally to start traction power electrification and railroad signaling installation. Trackwork construction generally requires the welding of transportable lengths of steel running onto longer lengths (approximately 0.25 mile), which are placed in position on crossties or track slabs and field-welded into continuous lengths.

Tie and ballast, and slab track construction will be used. Tie and ballast construction, which will be used for at-grade and minor structures, typically uses crossties and ballast that are distributed along the track bed by truck or tractor. In sensitive areas, such as where the HSR is parallel to or near streams, rivers, or wetlands, and in areas of limited accessibility, this operation may be accomplished by using the constructed rail line for material delivery. For major civil structures, slab track construction will be used. Slab track construction is a nonballasted track form using precast supports to which the track is directly fixed.

Traction power electrification equipment to be installed includes TPSSs, traction power switching and paralleling stations, and the OCS. Traction power facility equipment and houses are typically fabricated and tested in a factory, then delivered by tractor-trailer to a prepared site adjacent to the alignment. Substations are assumed to be located every 30 miles along the alignment. Traction power switching stations are located every 15 miles and traction power paralleling stations every 5 miles along the alignment. The OCS is assembled in place over each track and includes poles, brackets, insulators, conductors, and other hardware.

Signaling equipment to be installed includes wayside cabinets and bungalows, communications radio towers, wayside signals (at track interlockings), switch machines, insulated joints, impedance bonds, and connecting cables. The equipment will support automatic train protection; enhanced automatic train protection; and PTC to maintain train separation, routing at interlocking, and speed.

### Station Construction

Because the HSR stations in San Jose and downtown Gilroy will be co-located with existing Caltrain stations, existing train operations will be maintained during HSR station construction/modification. The San Jose Diridon Station and downtown Gilroy station will be reconstructed to accommodate the HSR system and the east Gilroy station will be a new station. HSR stations require significant coordination and planning to accommodate safe and convenient access to existing businesses and residences, to complement transit-oriented and station-supportive development, and to accommodate traffic control during construction periods. The typical construction sequence at station areas will be as follows:

- **Demolition and Site Preparation**—The Authority will be required to construct detour roadways, new station entrances, construction fences and barriers, and other elements to replace the removal from service of existing facilities on the worksite. The Authority will be required to perform street improvement work, site clearing and earthwork, drainage work, and utility relocations. Additionally, electrical substations and maintenance facilities are assumed to be newly constructed structures. For platform improvements or additional platform construction, the Authority may be required to realign existing track.

- **Structural Shell and Mechanical/Electrical Rough-Ins**—For these activities, the Authority will construct foundations and erect the structural frame for the new station, enclose the new building, construct new platforms, and connect the structure to site utilities. Additionally, the Authority will rough-in electrical and mechanical systems and install specialty items such as elevators, escalators, and ticketing equipment.
- **Finishes and Tenant Improvements**—The Authority will install electrical and mechanical equipment, communications and security equipment, finishes, and signage. Additionally, the Authority may install other tenant improvements if requested.

**San Jose Diridon Station.** The project will primarily involve installing new turnouts and modifying the configuration of San Jose Diridon Station to build two high-level, 1,400-foot platforms for HSR, retain two platforms for commuter and conventional intercity trains, provide passenger services and train operations support in new structures north and south of the existing station building, build new overhead concourses for passenger access to train platforms, and relocate the existing bus station in three stages to accommodate progressive growth in HSR services:

- San Francisco to Gilroy Early Service in 2027 will require all passenger platform improvements, HSR passenger and operations support in a building south of the existing station house, and an overhead concourse from the south HSR station building with ramps to the two HSR platforms. Access to existing subway ramps will be retained for HSR passenger egress.
- Valley-to-Valley Service in 2029 will require ramps from the south overhead concourse to the Caltrain platforms.
- Phase 1 Service in 2033 will require development of another HSR building north of the existing station house, relocation of the existing bus station at that location, a second overhead pedestrian concourse from the north HSR station building with ramps to all train platforms, and closure of all platform ramps down to the subway.

**Downtown Gilroy Station.** A Downtown Gilroy Station will be constructed. A pedestrian undercrossing will connect the new station entrances on either side of the track, and Caltrain service will not be interrupted for construction of the undercrossing. Track realignment work will, however, temporarily relocate the existing Caltrain platform. During work on the Caltrain and UPRR facilities, temporary tracks and platforms will be located at the future HSR platform locations as a shoofly.

The existing station platforms will be repurposed for longer HSR platforms with tracks on the inside and two shorter platforms on the outside for Caltrain, Amtrak, and Transportation Agency for Monterey County. A new overhead concourse will provide passenger access to all platforms.

**Other Stations Affected by HSR Construction.** Construction of the project will also affect the following existing Caltrain stations: Santa Clara Station, College Park Station, Capitol Station, Tamien Station, Blossom Hill Station, Morgan Hill Station, and San Martin Station. Construction work at these stations will be coordinated with the affected transit service providers to maintain access to and operation of existing facilities or provide temporary facilities to support continued operation during construction. Construction could entail shifting the position of the platforms or access, changing

platform types, providing grade-separated pedestrian access to platforms, maintaining parking capacity, and other methods to maintain operations.

#### *Construction Utility Requirements and Waste Disposal*

Contractors will need to use water for construction activities such as dust control during demolition of surface and subsurface features, excavation, soil compaction, landscape restoration, concrete work, general cleanup, hygiene, and drinking. If no available water sources exist near the site, then contractors will use tanker trucks, storage tanks, and/or water towers to provide water to the site. Contractors will temporarily store excavated materials produced by construction activities within the construction footprint. Wherever possible, they will return excavated soil to its original location to be used as backfill and dispose waste materials associated with construction, including soils unsuitable for backfill, in landfills permitted to take these types of materials.

#### *Construction Materials and Equipment*

Materials required for construction include steel rails, building materials for the maintenance facilities, control buildings, and power supply facilities, as well as concrete, reinforcing steel, ballast, cement, aggregates, specialized train system components, fuel, and water. Materials will be delivered and stored at the San Jose to Merced Project Section project site for use. Various construction types of equipment will be used and staged at the site, including but not limited to cranes, pile drivers, dump trucks, bulldozers, and bucket loaders.

#### *Construction Timeline*

Construction will likely proceed concurrently along the entire project alignment. When the project is funded, construction will occur over multiple phases over approximately 6 years. Construction will occur 5 days a week with 8-hour days (250 days per year), except for construction of the Pacheco Pass tunnels, which will occur 7 days a week, 24 hours per day. Trackwork within the existing railway will be predominantly performed at night and on weekends between San Jose and Gilroy, requiring short-term roadway closures and establishment of roadway detours while roadway approach grading and paving is performed and new crossing panels are set.

In addition to the standard construction period, 2 years of additional construction will be required after the initial Phase I start-up to reconnector the existing Spring to Llagas and Green Valley to Llagas existing power lines. This work will be completed within an approximately 24-month timeframe.

#### *Operations and Maintenance*

##### HSR Service

The conceptual HSR service plan for Phase 1 describes service from Anaheim/Los Angeles through the Central Valley from Bakersfield to Merced and northwest into the Bay Area, terminating in San Francisco. Subsequent stages of the HSR system include a southern extension from Los Angeles to San Diego via the Inland Empire and an extension from Merced north to Sacramento.

Train service will run in diverse patterns between various terminals. Three basic service types are envisioned:

- Express trains will serve major stations only, providing fast travel times between Los Angeles and San Francisco during the morning and afternoon peak.
- Limited-stop trains will skip selected stops along a route to provide faster service between stations.
- All-stop trains will focus on regional service.

The majority of trains will provide limited-stop services and offer a relatively fast run time along with connectivity among various intermediate stations. Numerous limited-stop patterns will be provided to achieve a balanced level of service at the intermediate stations. The service plan envisions at least four limited-stop trains per hour in each direction, all day long, on the main route between San Francisco and Los Angeles. Each intermediate station in the Bay Area, the Central Valley between Fresno and Bakersfield, Palmdale in the high desert, and Sylmar and Burbank in the San Fernando Valley will be served by at least two limited-stop trains every hour—offering at least two reasonably fast trains an hour to San Francisco and Los Angeles. Selected limited-stop trains will be extended south of Los Angeles as appropriate to serve projected demand.

The service plan provides direct train service between most station pairs at least once per hour. Certain routes may not always be served directly, and some passengers will need to transfer from one train to another at an intermediate station, such as Los Angeles Union Station, to reach their final destination. Generally, the Phase 1 conceptual operations and service plans offer a wide spectrum of direct-service options and minimize the need for passengers to transfer.

In 2029, the assumed first year of HSR operation, two trains per hour will operate during peak travel times and one train per hour off-peak travel times between San Francisco and Bakersfield. When Phase 1 operations occur, this biological opinion assumes the following service:

- Two peak trains per hour from San Francisco and Los Angeles (one in off-peak)
- Two peak trains per hour from San Francisco and Anaheim (one in off-peak)
- Two peak trains per hour from San Jose and Los Angeles
- One peak train per hour from Merced and Los Angeles
- One train per hour (peak and off-peak) from Merced and Anaheim

Total daily operations for the San Jose to Merced Project Section of the HSR system are shown in Table 2.

**Table 2. Total Daily Operations—San Jose to Merced Project Section**

Service Description	2029	2040
<b>Nonrevenue Trains</b>		
Between MOWF and Gilroy	0	0
Between MOWF and San Jose	0	0
Between MOWF and Merced	0	0
<b>Revenue Trains</b>		
Trains per peak hour (max, one-way)	2	7
Trains per off-peak hour (max, one-way)	1	4
Trains per peak period per day (max)	24	80
Trains per off-peak period per day (max)	24	96
Number of daytime operations: 7 am–10 pm (max)	40	148
Number of nighttime operations: 10 pm–7 am (max)	8	28
<b>Total Trains by Segment</b>		
Trains per peak hour (max, one-way)	2	7
Trains per off-peak hour (max, one-way)	1	4
Trains per peak period per day (max)	24	80
Trains per off-peak period per day (max)	24	96
Number of daytime operations: 7 am–10 pm (max)	40	148
Number of nighttime operations: 10 pm–7 am (max)	8	28
<b>Total Trains All Segments</b>		
Trains per peak period per day (max)	24	80
Trains per off-peak period per day (max)	24	96
Number of daytime operations: 7 am–10 pm (max)	40	148
Number of nighttime operations: 10 pm–7 am (max)	8	28
Total Daily Operations	48	176

MOWF = maintenance-of-way facility

### Maintenance Activities

The Authority will regularly perform maintenance along the track and railroad right-of-way as well as on the power systems, train control, signaling, communications, and other vital systems required for the safe operation of the HSR system. Maintenance methods are expected to be similar to those of existing European and Asian HSR systems, adapted to the specifics of the California HSR. However, the FRA will specify standards of maintenance, inspection, and other items in a set of regulations (i.e., Rule of Particular Applicability) to be issued in the next several years, and the overseas practices may be amended in ways not currently foreseen. The brief descriptions of maintenance activities provided below are thus based on best professional judgment about future practices in California.

**Track and Right of Way.** The track at any point will be inspected several times each week using measurement and recording equipment aboard special measuring trains. These trains are of similar design to the regular trains but will operate at a lower speed.

They will run between midnight and 5 a.m. and will usually pass over any given section of track once in the night.

Most adjustments to the track and routine maintenance will be accomplished in a single night at any specific location with crews and material brought by work trains along the line. When rail resurfacing (i.e., rail grinding) is needed, perhaps several times a year, specialized equipment will pass over the track sections at 5–10 mph.

Approximately every 4–5 years, ballasted track will require tamping. This more intensive maintenance of the track uses a train with a succession of specialized cars to raise, straighten, and tamp the track, using vibrating “arms” to move and position the ballast under the ties. The train will typically cover a 1-mile-long section of track in the course of one night’s maintenance. Slab track, the track support type anticipated at elevated sections, will not require this activity. No major track components are expected to require replacement through 2040.

Other maintenance of the right-of-way, aerial structures, culverts, drains, and bridge sections of the alignment will include culvert and drain cleaning, vegetation control (e.g., mowing, disking, or herbicide application), litter removal, rodent control, and inspection that will typically occur monthly to several times a year.

**Power.** The OCS along the right-of-way will be inspected nightly, with repairs being made when needed; these will typically be accomplished during a single night maintenance period. Other inspections will be made monthly. Many of the functions and status of substations and smaller facilities outside the trackway will be remotely monitored. However, visits will be made to repair or replace minor items and will also be scheduled several times a month to check the general site. No major component replacement for the OCS or the substations is expected through 2040.

**Structures.** Visual inspections of the structures along the right-of-way and testing of fire/life safety systems and equipment in or on structures will occur monthly, while inspections of all structures for structural integrity will be conducted at least annually. Steel structures will require painting every several years. Repair and replacement of lighting and communication components of tunnels and buildings will be performed on a routine basis. No major component replacement or reconstruction of any structures is expected through 2040.

**Signaling, Train Control, and Communications.** Inspection and maintenance of signaling and train control components will be guided by FRA regulations and standards to be adopted by the Authority. Typically, physical in-field inspection and testing of the system will be conducted four times a year using hand-operated tools and equipment. Communication components will be routinely inspected and maintained, usually at night, although daytime work may be undertaken if the work area is clear of the trackway. No major component replacement of these systems is expected through 2040.

**Stations.** Each station will be inspected and cleaned daily. Inspections of the structures, including the platforms, will be conducted annually. Inspections of other major systems, such as escalators, the heating and ventilation system, ticket-vending machines, and CCTV, will be performed according to manufacturer recommendations. Major station components are not expected to require replacement through 2040.

**Perimeter Fencing and Intrusion Protection.** Fencing and intrusion protection systems will be remotely monitored, as well as periodically inspected. Maintenance will take place as needed; however, fencing and intrusion protection systems are not expected to require replacement before 2040.

### *Compensatory Habitat*

The Authority will provide compensatory habitat mitigation that seeks to increase the amount of protected habitat for federally listed species; preserve and enhance important wildlife movement corridors; and consolidate and expand existing protected habitat.

The Authority will secure conservation easements and develop long-term management plans for compensatory mitigation sites. The list of potential compensatory mitigation sites has not been finalized and is subject to augmentation with Service approval. The final compensatory mitigation sites will be selected based on their relatively high conservation value (e.g., proximity to other protected habitats or conserved areas such as core habitat areas or linkages connecting core habitat patches); location within important wildlife movement corridors, recovery areas, or designated critical habitat; presence of listed species and/or suitable habitat (i.e., high species richness/high biodiversity sites); mitigation habitat overlap among species; and ability to satisfy the requirements of the Service and other permitting agencies. The permanent protection of the compensatory mitigation sites will also support goals identified for the jewelflower, the dudleya, the tadpole shrimp, the fairy shrimp, the beetle, the butterfly, the frog, the salamander, and the vireo in the recovery plans for these species by protecting habitat (Service 1998a, 1998b, 2002, 2005a, 2017a, 2019a).

For all proposed mitigation sites, long-term management plans, conservation easements, and funding analyses for the long-term endowments will be submitted to the Service for review and approval before the plans are finalized and implemented. The Authority may also purchase habitat compensation credits at a Service-approved mitigation site or conservation bank in addition to securing compensatory sites.

To avoid a temporal loss of habitat and reduce project effects on listed species, the Authority's proposed mitigation strategy includes securing compensatory mitigation prior to the start of construction. Compensatory mitigation will be secured in phases in accordance with the progress of construction of the San Jose to Merced Project Section. As such, the Authority's proposed mitigation strategy will ensure that the compensatory mitigation will be secured before or concurrent with the commencement of construction for each Construction Package (CP). In the event that it is not possible to secure all of the compensatory mitigation for each CP in advance, it will be completed no later than 18 months after the initiation of ground disturbance of each CP.

All areas of habitat loss for federally listed species will be documented in compliance reporting. This documentation will include geographic information system (GIS) data layers, associated metadata, and photo documentation of areas of habitat loss for each species. For each species, a cumulative acreage of habitat loss will be presented in a table.

### *Reporting*

The Authority will submit monthly and annual reports to the Service documenting compliance with the conservation measures and this biological opinion. The reports will

include summaries of the habitat assessment and species-specific pre-activity surveys and findings, observations and incidental take of threatened or endangered species, compliance with conservation measures successfully implemented, noncompliance events and corrections or adjustments to meet compliance, an accounting of the cumulative total number of acres of species suitable habitat that has been disturbed (with associated GIS layers, associated metadata, and photo documentation), and the type and number of acres for which compensatory mitigation has been secured.

### *Conservation Measures*

The Authority has proposed the following measures to minimize effects on federally listed species. The measures below are considered part of the project evaluated by the Service in this biological opinion.

The results of the habitat suitability modeling, described below, will be used as a guide during species' habitat assessment surveys. However, Designated Biologists (described below) will consider all areas in and adjacent to the project footprint when determining where surveys are warranted. Habitat assessment, protocol-level surveys when available, and pre-construction surveys will be phased with project buildout and the start of activities at each work area.

### General Conservation Measures

#### **CM-GEN-01: Establish Qualified Biologists and Biological Monitors**

At least 15 days prior to the onset of activities, the Authority will submit, for review and approval by the Service, the name(s), contact information, and relevant qualifications and experience of Project Biologists and Designated Biologists who will conduct activities specified in the following measures. The roles of biologists will be as follows:

- **Project Biologists.** For each section or construction package, the Authority will identify a Project Biologist(s). For their section or construction package, the Project Biologist(s) will be responsible for implementation of the conservation measures, oversee the scheduling and work of Designated Biologists and Biological Monitors, and develop compliance reporting.
- **Designated Biologists.** Designated Biologists will be responsible for directly overseeing and reporting the implementation of general and species-specific conservation measures. Designated Biologists may be Service-approved on a species-specific basis, in which case Designated Biologists will only be authorized to conduct surveys and implement other measures for the covered species for which they have been approved. The Designated Biologists will have support from Biological Monitors. Designated Biologists will submit memoranda and reports to the Authority to document compliance with conservation measures.
- **Biological Monitors.** Biological Monitors will report directly to a Designated Biologist for implementation of species measures or directly to the Project Biologist for implementation of general measures. Biological Monitors will be selected by the Authority based on their documented experience with and understanding of the ecology of the species included in this opinion. Biological Monitors will be responsible for conducting Worker Environmental Awareness Program (WEAP) training, implementing general conservation measures, conducting compliance monitoring, and reporting their compliance monitoring activities. Biological Monitors

also may assist Designated Biologists in implementing species-specific conservation measures under the direct, on-site, supervision of the Designated Biologist.

### **CM-GEN-02: Conduct Monitoring of Construction Activities**

The Designated Biologist or Biological Monitor will be present in the work area to verify compliance with avoidance and minimization measures, including during ground- or vegetation-disturbing activities in or adjacent to Environmentally Sensitive Areas (ESA), wildlife exclusion fencing (WEF), and construction exclusion fencing (exclusion fencing).

### **CM-GEN-03: Prepare and Implement a Biological Resources Management Plan**

Prior to construction activities, the Project Biologist will prepare the Biological Resources Management Plan (BRMP). The goal of the BRMP will be to provide the Project Biologist, Designated Biologists, and Biological Monitors with an organized reference and reporting tool to verify that the mitigation measures and terms and conditions are implemented and reported in a timely manner. The BRMP will include terms and conditions from applicable permits and agreements and make provisions for monitoring assignments, scheduling, and responsibility designations. These will include all conservation measures and repair, mitigation, and compensatory actions included in the biological opinion. These measures and conditions will be tracked through final design, implementation, and post-construction phases. For all measures, terms, and conditions, requirements and planned mechanisms for documenting and reporting compliance will be identified. The BRMP will also identify the individual responsible for post-construction compliance reporting. All project environmental plans, such as the Restoration and Revegetation Plan (RRP) and Weed Control Plan (WCP), will be included as appendices to the BRMP. The BRMP will contain, but not be limited to, the following information:

- A master schedule that shows construction of the project, pre-construction surveys, and establishment of buffers and exclusions zones to protect sensitive biological resources
- Specific measures for the protection of special-status species
- Identification (on construction plans) of the locations and quantity of habitats to be avoided or removed, along with the locations where habitats are to be restored
- Identification of agency-approved Project Biologist(s), Designated Biologists, and Biological Monitor(s), including those responsible for notification and report of injury or mortality of federally- or state-listed species
- Measures to preserve topsoil and control erosion
- Design and locations of protective fencing around ESA and the construction staging areas
- Locations of trees to be protected as wildlife habitat (roosting sites) and locations for planting replacement trees
- Specification of the purpose, type, frequency, and extent of chemical use for insect and disease control operations as part of vegetative maintenance in sensitive habitat areas

- Specific measures for the protection of riparian areas. These measures may include erosion and siltation control measures, protective fencing guidelines, dust control measures, grading techniques, work area limits, and biological monitoring requirements
- Provisions for biological monitoring during ground-disturbing activities to confirm compliance and success of protective measures will: (1) identify specific locations of wildlife habitat and sensitive species to be monitored; (2) identify the frequency of monitoring and the monitoring methods (for each habitat and sensitive species to be monitored); (3) list required qualifications of Biological Monitor(s); (4) identify the reporting requirements; and (5) provide an accounting of impacts on special-status species habitat compared to pre-construction impact estimates
- Notification and reporting requirements in the event of an accidental death or injury to a federally listed species during project activities or failure to meet conservation measures included in the biological opinion

The BRMP will be submitted to the Authority for review and approval prior to any ground-disturbing activity.

#### **CM-GEN-04: Prepare and Implement a Restoration and Revegetation Plan**

Prior to any ground-disturbing activity, the Project Biologist will prepare a RRP to address temporary impacts resulting from ground-disturbing activities in areas that potentially support special-status species, wetlands, and other aquatic resources. Restoration activities may include but are not limited to: grading landform contours to approximate pre-disturbance conditions, re-vegetating disturbed areas with native plant species, and using certified weed-free straw and mulch. The Authority will implement the RRP in all temporarily disturbed areas outside of the permanent right-of-way that potentially support special-status species, wetlands, and/or other aquatic resources.

Consistent with Section 1415 of the Fixing America's Surface Transportation Act, restoration activities will provide habitat for native pollinators by planting native forbs and grasses. The Project Biologist will obtain a locally sourced native seed mix. The restoration success criteria will include limits on nonnative invasive species, as defined by the California Invasive Plant Council, to an increase no greater than 10 percent compared to the pre-disturbance condition, or to a level determined through a comparison with an appropriate reference site consisting of similar natural communities and management regimes. The RRP will be submitted to the Authority for review and approval.

#### **CM-GEN-05: Prepare and Implement a Weed Control Plan**

Prior to any ground-disturbing activity during the construction phase, the Project Biologist will develop a WCP.

The purpose of the WCP is to establish approaches to minimize and avoid the spread of invasive weeds during ground-disturbing activities during construction and O&M. The WCP will include, at a minimum, the following:

- A requirement to delineate ESAs in the field prior to weed control activities
- A schedule for weed surveys to be conducted in coordination with the BRMP

- Success criteria for invasive weed control will be linked to the BRMP standards for on-site work during ground-disturbing activities. In particular, the criteria will establish limits on the introduction and spread of invasive species, as defined by the California Invasive Plant Council, to less than or equal to the pre-disturbance conditions in the area temporarily affected by ground-disturbing activities. If invasive species cover is found to exceed pre-disturbance conditions by greater than 10 percent or is 10 percent greater than levels at a similar, nearby reference site, a control effort will be implemented. If the target, or other success criteria identified in the WCP, has not been met by the end of the WCP monitoring and implementation period, the Authority will continue the monitoring and control efforts, and remedial actions will be identified and implemented until the success criteria are met.
- Provisions to ensure consistency between the WCP and the RRP, including verification that the RRP includes measures to minimize the risk of the spread and/or establishment of invasive species and reflects the same revegetation performance standards as the WCP
- Identification of weed control treatments, including permitted herbicides and manual and mechanical removal methods
- Restrictions on herbicide use to avoid primary or secondary poisoning of special-status plant species and butterfly host plants and to require application by certified applicators in accordance with the compound label and other restrictions mandated by the U.S. Environmental Protection Agency, and requirements of the California Department of Pesticide Regulation, and County agricultural Commissioner.
- Timeframes for weed control treatment for each plant species
- Identification of fire prevention measures
- All vehicles and equipment will arrive at project sites free of plant and soil material within or near serpentine habitat

#### **CM-GEN-06: Facilitate Regulatory Agency Access**

Throughout the construction period, the Authority or its designee will allow access by the Service or other resource agency staff to the project site. Because of safety concerns, all visitors will check in with the Authority's resident engineer prior to entering the project footprint. If agency personnel visit the project footprint, the Project Biologist will prepare a memorandum within three business days after the visit documenting the issues raised during the field meeting. The Project Biologist will report any issues regarding regulatory compliance raised by agency personnel to the Authority.

#### **CM-GEN-07: Prepare WEAP Training Materials and Conduct Construction Period WEAP Training**

Prior to any ground-disturbing activity, the Project Biologist will prepare a WEAP to train construction crews to recognize and identify sensitive biological resources that may be encountered in the vicinity of the project footprint. The WEAP training materials will be submitted to the Authority for review and approval. A video of the WEAP training prepared and presented by the Project Biologist and approved by the Authority may be used if the Designated Biologist or Biological Monitor is not available to present the training in person.

At a minimum, WEAP training materials will include the following information: key provisions of the Act, the California Endangered Species Act, the Bald and Golden Eagle Protection Act, the Migratory Bird Treaty Act, California Fish and Game Code 1600, Porter-Cologne Water Quality Control Act, and the Clean Water Act; the consequences and penalties for violation or noncompliance with these laws and regulations and project authorizations; identification and characteristics of special-status plants, special-status wildlife, jurisdictional waters, and special-status plant communities and explanations about their ecological value; hazardous substance spill prevention and containment measures; the contact person and procedures in the event of the discovery of a dead or injured wildlife species; and review of avoidance, minimization, and mitigation measures.

The Designated Biologist or Biological Monitor will present WEAP training to all construction personnel prior to working in the project footprint. As part of the WEAP training, construction timing in relation to species' habitat and life-stage requirements will be detailed and discussed on project maps, which will show areas of planned minimization and avoidance measures. Crews will be informed during the WEAP training that, except when necessary as determined in consultation with the Designated Biologist or Biological Monitor, travel in the project footprint is restricted to established roadbeds, which include all pre-existing and project-constructed unimproved and improved roads. Training materials will include a fact-sheet handout or wallet-sized card conveying this information to be distributed to all participants in WEAP training sessions and will be provided in other languages as necessary to accommodate non-English speaking workers. All construction staff will attend WEAP training prior to beginning work on-site and will attend the WEAP training on an annual basis thereafter.

Upon completion of the WEAP training, each construction crew training attendee will sign a form stating that they attended the training, understood the information presented, and agreed to comply with the requirements set out in the WEAP training. The Project Biologist will submit the signed WEAP training forms to the Authority monthly, and annually the Authority will certify that WEAP training had been provided to all construction personnel. Each month, the Project Biologist will provide updates relevant to the training to construction personnel during the daily safety (tailgate) meeting.

#### **CM-GEN-08: Conduct Operation and Maintenance Period WEAP**

Prior to initiating O&M activities, O&M personnel will attend a WEAP training session arranged by the Authority. At a minimum, O&M WEAP training materials will include the following information: key provisions of the Act, the California Endangered Species Act, the Bald and Golden Eagle Protection Act, the Migratory Bird Treaty Act, Porter-Cologne Water Quality Control Act, and the Clean Water Act; the consequences and penalties for violation or noncompliance with these laws and regulations and project authorizations; identification and characteristics of special-status plants, special-status wildlife, jurisdictional waters, and special-status plant communities and explanations about their ecological value; hazardous substance spill prevention and containment measures; and the contact person in the event of the discovery of a dead or injured wildlife species. The training will include an overview of provisions of the BRMP, annual vegetation and management plan, WCP, and security fencing, ESAs, and WEF maintenance plans pertinent to O&M activities. A fact sheet prepared by the Authority environmental compliance staff will be prepared for distribution to the O&M employees. The training will be provided by the Authority's environmental compliance staff. The training sessions will be provided to employees prior to their involvement in any O&M

activity and will be repeated for all O&M employees on an annual basis. Upon completion of the WEAP training, O&M employees will, in writing, verify their attendance at the training sessions and confirm their willingness to comply with the requirements set out in those sessions.

#### **CM-GEN-09: Establish Monofilament Restrictions**

Prior to any ground-disturbing activity, the Biological Monitor will verify that plastic monofilament netting (erosion control matting) or similar material is not being used as part of erosion control materials. Non-monofilament substitutes including coconut coir matting, tackified hydroseeding compounds, rice straw wattles, and reusable erosion, sediment, and wildlife control systems that have been approved by the regulatory agencies (e.g., ERTEC Environmental Systems products) may be used.

#### **CM-GEN-10: Avoid Animal Entrapment**

At the beginning and end of each workday all excavated, steep-walled holes or trenches that are more than 8 inches deep with sidewalls steeper than a 1:1 (45 degree) slope will be inspected for trapped animals and, at the close of each day, will be covered with plywood or similar materials or provided a minimum of one escape ramp constructed of fill earth per 10 feet of trenching. Before such holes or trenches are filled, they will be thoroughly inspected for trapped wildlife by the Biological Monitor(s).

All construction pipe, culverts, or similar structures with a diameter of 3 inches or greater that are stored overnight in the project footprint will be covered and elevated at least one foot above ground. Pipes or similar structures, regardless of diameter, will be covered such that avian entrapment is avoided. All pipes, culverts, and similar structures will be inspected for wildlife before such material is moved, buried, or capped.

#### **CM-GEN-11: Delineate Equipment Staging Areas and Traffic Routes**

Prior to any ground-disturbing activity, the Designated Biologist and Biological Monitor(s) will establish staging areas for construction equipment in areas that minimize effects on sensitive biological resources, including habitat for special-status species, seasonal wetlands, and wildlife movement corridors. Staging areas (including any temporary material storage areas) will be in areas that will be occupied by permanent facilities, where practicable. Equipment staging areas will be identified on final project construction plans. The Designated Biologist and Biological Monitor(s) will flag and mark access routes to ensure that vehicle traffic in the project footprint is restricted to established roads, work areas, and other designated areas.

#### **CM-GEN-12: Dispose of Construction Spoils and Waste**

The contractor will dispose of waste materials associated with construction, including soil materials unsuitable for reuse, in local landfills are permitted to take these types of materials, and in conformance with state and federal laws.

#### **CM-GEN-13: Establish Environmentally Sensitive Areas and Non-Disturbance Zones**

Prior to any ground-disturbing activity in a work area, the Project Biologist will use flagging to mark ESAs that support special-status species or aquatic resources and are subject to seasonal restrictions or other avoidance and minimization measures. The Project Biologist will also direct the installation of WEF to prevent special-status wildlife species from entering work areas. The WEF will have exit doors to allow animals that

may be inside an enclosed area to leave the area. The Project Biologist will also direct the installation of construction exclusionary fencing (exclusionary fencing) at the boundary of the work area, as appropriate, to avoid and minimize impacts on special-status species or aquatic resources outside of the work area during the construction period. The ESAs, WEF, and exclusionary fencing will be fine mesh material (e.g., Animex Fencing or similar) and delineated by the Designated Biologist based on the results of habitat mapping or modeling and any pre-construction surveys, and in coordination with the Authority. The ESA, WEF, and exclusionary fencing locations will be identified and depicted on an exclusion fencing exhibit. The purpose of the ESAs and WEF will be explained at WEAP training and the locations of the ESA and WEF areas will be noted during worker tailgate sessions.

Fencing installation will be monitored by a Designated Biologist or Biological Monitor to ensure that federally listed species are not injured or killed during installation. Temporary fencing will be installed in areas of construction that are beyond the perimeter of the right-of-way or in areas where construction staging will occur. After installation of the temporary fencing, the work area will be surveyed by a Designated Biologist(s) to confirm the absence of federally-listed wildlife. The ESA, WEF, and exclusionary fencing will be regularly inspected and maintained by the Designated Biologist or Biological Monitors to ensure its integrity and that wildlife are not trapped.

#### **CM-GEN-14: Install Aprons or Barriers within Security Fencing**

Prior to final construction design the Project Biologist will review the fencing plans along any portion of the permanent right-of-way adjacent to natural habitats and confirm that the permanent security fencing will be enhanced with a barrier (e.g., fine mesh fencing) that extends at least 12 inches below ground and 12 inches above ground to prevent special-status reptiles, amphibians, and mammals from moving through or underneath the fencing and gaining access to areas in the right-of-way. At the 12-inch depth of the below grade portion of the apron, it will extend or be bent at an approximately 90-degree angle and oriented outward from the right-of-way a minimum of 12-inches, to prevent fossorial wildlife from digging or tunneling below the security fence. A climber barrier (e.g., rigid curved or bent overhang) will be installed at the top of the apron to prevent wildlife from climbing over the apron. The Project Biologist may coordinate with the Service prior to completion of the fencing design.

The Project Biologist will ensure that the selected apron material and climber barrier will not have the potential to cause harm, injury, entanglement, or entrapment to wildlife species. The Authority will provide for yearly inspection and repair of the fencing.

Prior to construction and operation, the Project Biologist will field inspect the fencing along any portion of the permanent right-of-way that is adjacent to natural habitats and confirm that the fencing has been appropriately installed. Both the fencing plan review and field inspection will be documented in memorandums from the Project Biologist and provided to the Authority.

#### **CM-GEN-15: Design and Maintain Wildlife Crossings to Facilitate Wildlife Movement**

The Authority will design and maintain all wildlife crossings created specifically for terrestrial species consistent with the guidelines and recommendations in the Wildlife Corridor Assessment (WCA) unless different dimensions are specified in authorizations

issued under the Act. To the extent feasible, all wildlife crossings created specifically for terrestrial species will include the following features and design considerations:

- Native earthen bottom
- Ledges or tunnels will be incorporated into the design to facilitate safe passage of small mammals
- Unobstructed entrances (e.g., no riprap, energy dissipaters, grates), although vegetative cover, adjacent to and near the entrances of crossings, is permissible
- Openness and a clear line of sight from end to end
- Cover materials within the crossing such as rock or brush piles where smaller animals can take cover
- Year-round absence of water for a portion of the width of the crossing (i.e., no flowing water)
- Where water is likely to be present within a crossing as a result of a high groundwater table or proximity to an existing floodplain, wildlife crossing design will include features to minimize water entry into the crossing (e.g., impermeable groundwater barriers, berms) and to maximize drainage and drying time (e.g., slopes, sump pumps, permeable soils)
- Where hydrologic flow-balancing features (culverts) provide wildlife connectivity, "shelves" will be constructed to allow small and medium animals to pass through the structure when it is flooded
- Slight grade at approaches to prevent flooding
- Hydrologic designs (ledges, cross slopes, water detention features, infiltration features, water proofing, or other features) to maintain crossing functionality (a dry crossing path) up to and including 100-year storm events for 95 percent of the year (347 days)
- Limited open space between crossing and cover/habitat
- Separation from human use areas (e.g., trails, multiuse undercrossings)
- Avoidance of artificial light at approaches to wildlife crossings
- Wildlife undercrossings, hydrologic flow balancing features, culverts, and bridges, as well as the entry and exit areas to these features, will be inspected annually for obstructions such as debris, overgrown vegetation, garbage, or other material that was not included in the original design or will reduce the intended function
- All needed maintenance, repairs, and clearing of wildlife movement structures will be performed within 6 months of inspection.

The Authority will incorporate features to accommodate wildlife movement into the design of bridges and culverts that are replaced or modified as part of project construction, wherever feasible. Project Biologist review of final construction design for consistency with placement and dimensions of wildlife crossings will be verified in a memorandum provided to the Authority.

**CM-GEN-16: Work Stoppage**

During construction activities, the Designated Biologists and general Biological Monitors will have stop work authority to protect any federally listed wildlife species in the project footprint. This work stoppage will be coordinated with the Authority or its designee. The Contractor will suspend vegetation- or ground-disturbing activities in the work area(s) where the potential construction activity could result in injury or mortality of listed species; work may continue in other areas. The Contractor will continue the suspension until the individual leaves voluntarily or is moved to an approved release area using Service-approved handling techniques and methods, or as required by the Service.

**CM-GEN-17: Enforce Construction Speed Limits**

A speed limit of 15 mph will be enforced during project construction for all vehicles operating on unimproved access roads and in temporary and permanent work areas in the limit of direct effect.

**CM-GEN-18: Implement Avoidance of Nighttime Light Disturbance**

Prior to construction requiring nighttime lighting, the Contractor will prepare a Lighting Plan verifying how the Contractor will shield nighttime construction lighting and direct it downward in such a manner to minimize the light that falls outside the construction site boundaries. The Lighting Plan will be submitted to the Authority for review and approval prior to any work requiring nighttime lighting. The Lighting Plan will describe the type of lighting that will be used, maximum level of lumens to be emitted, and a schematic showing where lighting equipment will be stationed and which cardinal direction(s) the lighting equipment will face.

Permanent or temporary, fixed, exterior lighting, including motion triggered security lighting that casts light beyond the project footprint between sunset and sunrise, will not be used.

**CM-GEN-19: Implement Water or Dust Palliative Measures**

Water or dust palliatives will be applied to the construction right-of-way, dirt roads, trenches, spoil piles, and other areas where ground disturbance takes place to minimize dust emissions and topsoil erosion. Dust palliatives will be nontoxic to wildlife and plants. For construction in suitable habitat for listed species, the Biological Monitor will patrol areas of disturbance to ensure that water does not puddle for long periods and attract listed species or other wildlife to the project site. Operational ponding will be avoided through careful grading and hydrologic design. Water tanks will be covered with secure lids. Leaking hoses, tanks, or other sources of inadvertent pooling will be repaired immediately or moved offsite.

**CM-GEN-20: Design the Project to Be Bird Safe**

Prior to final construction design, the Authority, in consultation with the Project Biologist, will ensure that the catenary system, masts, and other structures such as fencing, electric lines, communication towers and facilities are designed to be bird and raptor-safe in accordance with the applicable recommendations presented in *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006* (APLIC 2006) and *Reducing Avian Collisions with Power Lines: State of the Art in 2012* (APLIC 2012).

Applicable APLIC recommendations include, but are not limited to:

- Ensuring sufficient spacing of phase conductors to prevent bird electrocution
- Configuring lines to reduce vertical spread of lines and/or decreasing the span length if such options are feasible
- Marking lines and fences (e.g., Bird Flight Diverter for fencing and lines) to increase the visibility of lines and reduce the potential for collision. Where fencing is necessary, using bird compatible design standards to increase visibility of fences to prevent collision and entanglement
- Installing perch guards to discourage avian presence on and near project facilities
- Minimizing the use of guy wires. Where the use of guywires is unavoidable, demarcating guywires using the best available methods to minimize avian strikes (e.g. line markers)
- Structures will be monopole or dual-pole design versus lattice tower design to minimize perching and nesting opportunities. Communication towers will conform to *Recommended Best Practices for Communication Tower Design, Siting, Construction, Operation, Maintenance, and Decommissioning* (Service 2018)
- Reusing or co-locating new transmission facilities and other ancillary facilities with existing facilities and disturbed areas to minimize habitat impacts and avoid collision risks
- Use of facility lighting that does not attract birds or their prey to project sites. These include using non-steady burning lights (red, dual red and white strobe, strobe-like flashing lights) to meet Federal Aviation Administration requirements, using motion or heat sensors and switches to reduce the time when lights are illuminated, using appropriate shielding to reduce horizontal or skyward illumination, and avoiding the use of high-intensity lights (e.g., sodium vapor, quartz, and halogen). Lighting will not be installed under viaduct and bridge structures in riparian habitat areas
- Ensuring poles do not have openings that could entrap birds; including sealing or capping all openings in poles or providing for escape routes (e.g., openings accommodating escape for various species)
- Designing aerial structures (e.g., viaducts and bridges) and tunnel portals to discourage birds and bats from roosting in expansion joints or other crevices
- Insulated wire or tree wire will be used for all electrical conduits to increase visibility of wires and minimize potential for collision

Additional bird operational actions will be required for dry lakes and playas, Audubon Important Bird Areas, and documented avian movement corridors. These measures include:

- Avoid, to the extent feasible, siting transmission lines across canyons or on ridgelines to prevent bird and raptor collisions
- Install bird flight diverters on all facilities spanning or within 1,000 feet of stream and wash channels, canals, ponds, and any other natural or artificial body of water

Fencing or other type of flight diverter will be installed on all viaduct structures to encourage birds and raptors to fly over the HSR and avoid flying directly in the path of on-coming trains.

#### **CM-GEN-21: Prohibit Pets in Work Areas**

No pets will be allowed on site during construction or O&M.

#### **CM-GEN-22: Prepare Post-Construction Compliance Report**

A post-construction compliance report will be submitted to the Service upon completion of each construction package, as defined by the design-build contracts. The post-construction compliance report will provide the following information:

- Dates of project groundbreaking and completion
- Pertinent information concerning the success of the project in meeting compensation and other conservation measures
- Known project effects on listed species
- Observed incidences of injury or mortality of any listed species
- Other pertinent information

#### **CM-GEN-23: Notification of Dead, Injured, or Sick Wildlife**

The Authority will notify the Service within 24 hours if dead, injured, or sick listed species are observed.

#### Conservation Measures Specific to Federally Listed Plants

#### **CM-PLT-01: Conduct Pre-Construction Surveys for Listed Plants and Implement Avoidance and Minimization Measures**

Prior to ground- or vegetation-disturbing activities, the Designated Biologist will conduct surveys for listed plants' suitable habitat. The Designated Biologist(s) will conduct protocol-level surveys for federally listed plant species prior to any ground- or vegetation-disturbing activities in suitable habitat for federally listed plant species during the appropriate bloom period for each species. Habitat assessment and protocol-level surveys will be phased with project build-out and the start of activities at each work area.

The surveys will be consistent with *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities* (CDFW 2018) and *Guidelines for Conducting and Report Botanical Inventories for Federally Listed, Proposed and Candidate Plants* (Service 2000). The Designated Biologist will flag and record in GIS the locations of any observed federally listed plant species. Prior to surveys and if a reference population exists, reference populations for target survey species will be visited to confirm bloom conditions and ensure target species have flowers or other discernible features necessary to identify plants.

If federally listed plants are observed during plant surveys, ESA fencing will be installed to protect the population or individuals, plus a 100-foot buffer (where access is permitted). In areas where construction occurs in modeled habitat that is occupied by serpentine-dependent federally listed plants, Section 3 (Construction Work) of the *Best Management Practices (BMP) for Preventing Phytophthora Introduction and Spread: Trail Work, Construction, Soil Import* (Swiecki and Bernhardt 2018) will be implemented.

If plants cannot be avoided, they will be documented prior to impacts. Documentation will include density and percent cover of the affected species; key habitat characteristics, including soil type, associated species, hydrology, and topography; and photo documentation of pre-construction conditions.

Prior to any vegetation- or ground-disturbing activity within temporary work areas, the Designated Biologist will stockpile and segregate the top 4 inches of topsoil from locations in the work area where federally listed plant species were observed during surveys. The topsoil will be stored on site and redistributed onto the temporary work area after construction completion.

#### Conservation Measures Specific to Bay Checkerspot Butterfly

##### **CM-BCB-01: Minimize Direct Impacts on Bay Checkerspot Butterfly Host Plants**

Prior to construction, the Designated Biologist will survey for Bay checkerspot larval host plants—dwarf plantain, purple owl’s-clover, and paintbrush—within suitable habitat. If host plants are found within the project footprint, construction personnel will avoid them to the extent feasible. Where avoidance is not feasible, ground disturbance will take place during the adult flight season (March 1–April 30).

#### Conservation Measures Specific to Valley Elderberry Longhorn Beetle

##### **CM-VELB-01: Conduct Pre-Construction Surveys for Valley Elderberry Longhorn Beetle**

Prior to vegetation- or ground-disturbing activities within the species’ range and in suitable habitat, an agency-approved Designated Biologist will search the work area for elderberry bushes with stems greater than 1 inch in diameter at ground level.

##### **CM-VELB-02: Develop Construction Setback and Erect Signage**

Within the species’ range and in suitable habitat, a no-activity buffer zone will be established around elderberry shrubs whose retention is feasible. A 165-foot (or wider) buffer will be established and maintained around elderberry plants containing stems measuring 1 inch or greater in diameter at ground level (Service 2017b).

The agency-approved Designated Biologist will erect signage every 50 feet along the edge of the 165-foot buffer area with the following information: *“This area is habitat of the valley elderberry longhorn beetle, a federally threatened species, and must not be disturbed. This species is protected by the Endangered Species Act of 1973, as amended. Violators are subject to prosecution, fines, and imprisonment.”* The signs will be installed prior to the start of construction, must be clearly readable from a distance of 20 feet, and must be maintained by the Authority throughout the duration of construction activities.

#### Conservation Measures Specific to Vernal Pool Fairy Shrimp and Vernal Pool Tadpole Shrimp

##### **CM-VPS-01: Conduct Pre-Construction Surveys for Vernal Pool Species**

Prior to vegetation- or ground-disturbing activities within the species’ range, an agency-approved Designated Biologist will search for suitable seasonal wetland, vernal pool, and atypical wetland habitat (e.g., ditches, tire ruts) within the work area and a 250-foot buffer. Where suitable wetland habitat is identified, the Designated Biologist will visit these areas after the first rain event of the season to determine whether seasonal wetlands

and vernal pools have been inundated. A seasonal wetland, vernal pool, or other potentially suitable habitat (e.g., ditches, tire ruts) will be considered inundated when it holds more than 3 centimeters of standing water 24 hours after a rain event. Within 10 days after the pools have been inundated, the Designated Biologist will conduct surveys consistent with the *Survey Guidelines for the Listed Large Brachiopods* (Service 2017c). If surveys are not performed, the wetland habitat will be considered occupied. The Designated Biologist will submit a report to the Authority within 30 days of completing the work.

### **CM-VPS-02: Implement Seasonal Vernal Pool Work Restriction**

Initial ground-disturbing activities that will not overlap with occupied or assumed occupied vernal pool crustacean habitat but that will occur within 250 feet of occupied or assumed occupied habitat will be restricted to the dry season (June 2 to October 14) or when the habitat is dry (i.e., lacks flowing or standing water). If construction activities must occur within 250 feet of suitable habitat during the October 15–June 1 period, erosion control materials will be installed to reduce sedimentation into vernal pools and other suitable habitat.

### **CM-VPS-03: Establish and Monitor Vernal Pool Exclusion Zones**

Non-disturbance exclusion zones will be erected to minimize water quality and hydrologic impacts on the occupied or assumed occupied vernal pool crustacean habitat. The Designated Biologist will erect exclusion fencing 250 feet from the edge of occupied or assumed occupied seasonal wetland or vernal pool habitat, where accessible. The Biological Monitor(s) will monitor and maintain the vernal pool exclusion zones as directed by the Designated Biologist.

### Conservation Measures Specific to California Red-Legged Frog

#### **CM-CRLF-01: Conduct Pre-Construction Surveys for California Red-Legged Frog and Implement Avoidance Measures**

Where suitable habitat has been identified within the project work area and prior to ground-disturbing activities, a Designated Biologist will conduct a pre-construction survey of potential breeding and suitable upland habitat to evaluate the presence or absence of the frog, or presence will be assumed.

Surveys for the frog will be conducted within suitable habitat as described below.

- Surveys will occur no earlier than 24 hours prior to ground-disturbing activities in the work area.
- The Designated Biologist will conduct a pre-construction survey of suitable breeding habitat following the *Revised Guidance on Site Assessments and Field Surveys for The California Red-legged Frog* (Service 2005b) or other more recent guidelines, if available.
- The Designated Biologist will investigate all potential areas that could be used by frogs for feeding, breeding, sheltering, movement, and other essential behaviors.
- Found individuals will be moved a short distance by the Designated Biologist to undisturbed suitable habitat beyond the work area no more

than 300 feet from the nearest suitable aquatic habitat to the greatest extent feasible while still in the action area. Preferred locations are those nearest and most similar to the habitat where the animal was found and could include mammal burrows, dense vegetation, mud cracks, and leaf litter.

- Any survey, construction, operations, or maintenance activity that occurs within ponds or other aquatic habitat for the frog will implement the measures from *The Declining Amphibian Task Force Fieldwork Code of Practice* (DAPTF 1998) for preventing the introduction and spread of amphibian diseases.

### **CM-CRLF-02: Install, Monitor, and Maintain Exclusion Barriers**

If occupied or assumed occupied habitat occurs adjacent to the work area, exclusion barriers (e.g., silt fences) will be installed, monitored, and maintained under direction of the Designated Biologist between the adjacent, suitable habitat and the work area, as described below.

- Exclusion barriers will be installed prior to initial ground-disturbing activities around the work area, or between the work area and occupied or assumed occupied habitat, as necessary to exclude individuals from entering.
- Exclusion fencing will be trenched into the soil at least 4 inches in depth, with the soil compacted against both sides of the fence for its entire length to prevent individuals from passing under the fence.
- Barriers will be installed with turnarounds at any access openings needed in the fencing to redirect frogs away from gaps in the fencing.
- Exclusion fencing will be monitored and maintained by the Authority until all construction activities are completed.
- Outside the breeding season (April 1 to October 31), barriers will be inspected by the Designated Biologist or Biological Monitor at least twice weekly on nonconsecutive days.
- During the breeding season (November 1 to March 31), barriers will be inspected daily.

If exclusion fencing between occupied or assumed occupied habitat and the work area is not possible (e.g., no property access) or warranted given the activity extent or duration (e.g., temporary activities that only take a couple of weeks to complete), the following measures will be implemented.

- The Designated Biologist or Biological Monitor will be on site during all activities that occur within suitable habitat of frogs.
- Prior to any ground-disturbing activity during the dry season (June 1–October 15), the Designated Biologist will conduct a pre-construction survey of suitable habitat within the work area and a 100-foot buffer, where access is available. After pre-construction surveys are complete, daily surveys are not needed during the dry season.

- During the wet season (October 16–May 31), to the maximum extent practicable, no construction activities will occur during rain events or within 24 hours following a rain event.
- During the wet season (October 16–May 31), the Designated Biologist or Biological Monitor will inspect the work area and all equipment/materials for the presence of frogs following or during a rain event.
- If a frog is found during any season, the animal will be allowed to move away from the project site of its own volition or, if the animal is in danger, moved by the Designated Biologist.

### **CM-CRLF-03: Dewatering Aquatic Breeding Habitat**

If a suitable aquatic breeding feature that is occupied or assumed occupied needs to be dewatered by pumping, the following measures will be followed.

- The intakes will be completely screened with wire mesh not larger than 5 millimeters.
- Water will be released or pumped downstream at an appropriate rate to maintain downstream flows during construction.
- If the aquatic feature is not within the project work area, any barriers to flow will be removed in a manner that will allow flow to resume with the least disturbance to the substrate upon completion of construction activities.
- Any construction, operations, or maintenance activity that occurs within ponds or other aquatic habitat for the frog will implement the measures from *The Declining Amphibian Task Force Fieldwork Code of Practice* (DAPTF 1998) for preventing the introduction and spread of amphibian diseases

### Conservation Measures Specific to California Tiger Salamander

#### **CM-CTS-01: Conduct Pre-Construction Surveys for California Tiger Salamander and Implement Avoidance Measures**

Where suitable habitat has been identified within the project work area, prior to ground-disturbing activities, a Designated Biologist will conduct a pre-construction survey of potential breeding and suitable upland habitat to evaluate the presence or absence of salamanders, or presence will be assumed. Surveys will be conducted no more than 30 days before the start of ground-disturbing activities in a work area. Within upland habitat, all mammal burrows will be hand excavated by a Designated Biologist. If possible, each burrow excavation will be conducted by slowly removing the burrow (including any side tunnels) or structures using hand tools (e.g., shovel, digging bar, garden trowel, masonry trowel, etc.). If hand tools cannot be used safely due to soil compaction, structural material present, and/or burrow depth extending greater than two feet from the surface, mechanical methods may be used. Mechanical methods will include either hand power tools or a backhoe and/or hand tools (e.g., shovel, garden trowel, masonry trowel, etc.). Cloth, cylinder, capped pipe, or similar material that would protect the integrity of the burrow will be pushed into the burrow approximately 12 to 16 inches to plug the burrow and prevent animals from exiting during excavation (i.e., to prevent injury or mortality). All burrows (including side burrows) will be excavated to their endpoints and the excavation will then be backfilled, brought back to grade, and compacted using the same equipment that was used for excavation. If any salamanders are found during excavation

or above ground within the work area, the Designated Biologist will relocate the individual(s). Found individuals will be moved a short distance by the Designated Biologist to undisturbed suitable habitat beyond the extent of the construction site no more than 300 feet from the capture location while still in the action area. Preferred locations are those nearest and most similar to the habitat where the animal was found and could include mammal burrows, dense vegetation, mud cracks, and leaf litter. Any survey, construction, operations, or maintenance activity that occurs within ponds or other aquatic habitat for salamander will implement the measures from *The Declining Amphibian Task Force Fieldwork Code of Practice* (DAPTF 1998) for preventing the introduction and spread of amphibian diseases.

### **CM-CTS-02: Install, Monitor, and Maintain Exclusion Barriers**

If occupied or assumed occupied habitat occurs adjacent to a work area, exclusion barriers will be installed, monitored, and maintained along the perimeter of the work area to exclude individuals from entering the work area, as described below.

- The Authority, as directed by a Designated Biologist, will install exclusion barriers (e.g., silt fences) along the perimeter of the project footprint or between the project footprint and the adjacent, suitable habitat.
- Exclusion barriers will be installed prior to initial ground-disturbing activities around the work area, or between the work area and occupied or assumed occupied habitat, as necessary to exclude individuals from entering.
- Exclusion fencing must be trenched into the soil at least 4 inches in depth, with the soil compacted against both sides of the fence for its entire length to prevent salamanders from passing under the fence.
- Barriers will be installed with turnarounds at any access openings needed in the fencing to redirect salamanders away from openings.
- Exclusion fencing will be monitored and maintained by the Authority throughout the salamander's entire active period (November to June) or until all construction activities are completed, whichever occurs first.
- Barriers must be inspected by a Designated Biologist or Biological Monitor at least twice weekly on nonconsecutive days outside the breeding season.
- Barriers will be inspected daily following any rain event and during the active period (November to June).

If exclusion fencing between occupied or assumed occupied habitat and the work area is not possible work will be restricted to the dry season between July and October.

### **CM-CTS-03: Dewatering Aquatic Breeding Habitat**

If a suitable aquatic breeding feature that is occupied or assumed occupied needs to be dewatered by pumping, the following measures will be followed.

- The intakes will be completely screened with wire mesh not larger than 5 millimeters.
- Water will be released or pumped downstream at an appropriate rate to maintain downstream flows during construction.

- If the aquatic feature is not within the project work area, any barriers to flow will be removed in a manner that will allow flow to resume with the least disturbance to the substrate upon completion of construction activities.
- Any construction, operations, or maintenance activity that occurs within ponds or other aquatic habitat for the salamander will implement the measures from *The Declining Amphibian Task Force Fieldwork Code of Practice* (DAPTF 1998) for preventing the introduction and spread of amphibian diseases.

#### Conservation Measures Specific to Least Bell's Vireo

##### **CM-LBVI-01: Conduct Pre-Construction Surveys and Implement Avoidance Measures for Least Bell's Vireo**

No more than 30 days prior to any ground- or vegetation-disturbing activity, the Designated Biologist will make an initial site visit to determine if suitable habitat for the vireo exists in the work area, plus a 500-foot buffer (where access is permitted).

Where suitable habitat is present, the Designated Biologist will conduct surveys prior to ground- or vegetation-disturbing activities, adhering to guidance in *Least Bell's Vireo Survey Guidelines* (Service 2001).

Habitat assessment and species surveys will be phased with project build-out and the start of activities at each work area. Following the surveys, the Designated Biologist(s) will conduct bimonthly surveys (every 2 weeks) during construction activities that occur within 500 feet of suitable habitat during the nesting season for the vireo as required by the survey guidelines. If construction activities are subsequently halted or delayed by more than 2 weeks (14 days) during the nesting season for the vireo, the Designated Biologist(s) will repeat surveys 5 days prior to the reinitiation of construction activities. Upon reinitiation of construction activities, the Designated Biologist will conduct the bimonthly surveys. A survey report will be transmitted to the Authority prior to the initiation of ground- or vegetation-disturbing activities at the survey site.

If a vireo bird or nest is detected within 500 feet of construction or maintenance activities, the Designated Biologist will establish a 300-foot no-work buffer (where access is permitted) around the individual or nest to the extent practicable. The Designated Biologist may adjust the size of the no-work buffer in coordination with the Authority and Service. The Designated Biologist or Biological Monitor will have the authority to halt work if vireo individuals exhibit distress and/or abnormal nesting behavior.

The no-work buffer will remain in place until the Designated Biologist has determined that the individual(s) has left the area or the nest has failed or the young have fledged and are no longer reliant upon the nest site. The Designated Biologist will adjust the no-work buffer size and/or location to ensure that adults and young are not adversely affected by construction.

For construction activities involving the use of a helicopter, the nest buffer for federally listed nesting birds will be 500 feet horizontal and 300 feet vertical. Buffers will be measured from the location of the nest, regardless of where the nest is located.

## Action Area

The action area is defined in 50 CFR § 402.02, as “all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action.” The action area includes the project footprint and the lands surrounding it. The project footprint includes the rail alignment as well as associated project structures such as roadway improvements, overcrossings, related ancillary facilities, and other permanent project elements, such as tunnel portals. The project footprint includes 4,004 acres, 138 acres of which are mapped as developed. The area affected by disturbance from noise, vibration, dust, and lighting during project construction and operation extends 1,000 feet from both sides of the project footprint. Therefore, the total action area that will be evaluated for potential effect from the San Jose to Merced Project Section of the HSR system under this biological opinion is 32,901 acres.

## Analytical Framework for the Jeopardy Determination

Section 7(a)(2) of the Act requires that federal agencies ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of listed species. “Jeopardize the continued existence of” means to engage in an action that reasonably will be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species (50 CFR § 402.02).

The jeopardy analysis in this biological opinion considers the effects of the proposed federal action, and any cumulative effects, on the rangewide survival and recovery of the listed species. It relies on four components: (1) the *Status of the Species*, which describes the current rangewide condition of the species, the factors responsible for that condition, and its survival and recovery needs; (2) the *Environmental Baseline*, which analyzes the current condition of the species in the action area without the consequences to the listed species caused by the project, the factors responsible for that condition, and the relationship of the action area to the survival and recovery of the species; (3) the *Effects of the Action*, which determines all consequences to listed species that are caused by the proposed federal action; and (4) the *Cumulative Effects*, which evaluates the effects of future, non-federal activities in the action area on the species. The *Effects of the Action* and *Cumulative Effects* are added to the *Environmental Baseline* and in light of the status of the species, the Service formulates its opinion as to whether the project is likely to jeopardize the continued existence of the listed species.

## Analytical Framework for the Adverse Modification Determination

Section 7(a)(2) of the Act requires that federal agencies ensure that any action they authorize, fund, or carry out is not likely to destroy or to adversely modify designated critical habitat. A final rule revising the regulatory definition of “destruction or adverse modification” (DAM) was published on August 27, 2019 (84 Fed. Reg. 44976). The final rule became effective on October 28, 2019. The revised definition states:

“*Destruction or adverse modification* means a direct or indirect alteration that appreciably diminishes the value of critical habitat as a whole for the conservation of a listed species.”

The DAM analysis in this biological opinion relies on four components: (1) the *Status of Critical Habitat*, which describes the current rangewide condition of the critical habitat in terms of the key components (i.e., essential habitat features, primary constituent elements, or physical and biological features) that provide for the conservation of the listed species, the factors responsible for that condition, and the intended value of the critical habitat overall for the conservation/recovery of the listed species; (2) the *Environmental Baseline*, which analyzes the current condition of the critical habitat in the action area without the consequences to designated critical habitat caused by the project, the factors responsible for that condition, and the value of the critical habitat in the action area for the conservation/recovery of the listed species; (3) the *Effects of the Action*, which determines all consequences to designated critical habitat that are caused by the proposed federal action on the key components of critical habitat that provide for the conservation of the listed species, and how those impacts are likely to influence the conservation value of the affected critical habitat; and (4) *Cumulative Effects*, which evaluate the effects of future non-federal activities that are reasonably certain to occur in the action area on the key components of critical habitat that provide for the conservation of the listed species and how those impacts are likely to influence the conservation value of the affected critical habitat. The *Effects of the Action* and *Cumulative Effects* are added to the *Environmental Baseline* and in light of the status of critical habitat, the Service formulates its opinion as to whether the action is likely to destroy or adversely modify designated critical habitat. The Service's opinion evaluates whether the action is likely to impair or preclude the capacity of critical habitat in the action area to serve its intended conservation function to an extent that appreciably diminishes the rangewide value of critical habitat for the conservation of the listed species. The key to making that finding is understanding the value (i.e., the role) of the critical habitat in the action area for the conservation/recovery of the listed species based on the *Environmental Baseline* analysis.

### **Status of the Species**

#### *Metcalf Canyon Jewelflower*

Please refer to the *Streptanthus albidus* ssp. *albidus* (*Metcalf Canyon Jewelflower*) *5-Year Review: Summary and Evaluation* (Service 2013) for the most recent comprehensive assessment of the species' range-wide status. No change in the species' listing status was recommended in the 5-year review. Threats evaluated during that review have continued to act on the species since the 2013 5-year review was finalized. While there continues to be loss of habitat throughout its range, to date no project has proposed a level of effect for which the Service has issued a biological opinion of jeopardy for the jewelflower.

#### *Santa Clara Valley Dudleya*

Please refer to the *5-Year Review Santa Clara Valley Dudleya* (*Dudleya setchellii*) (Service 2021) for the most recent comprehensive assessment of the species' range-wide status. No change in the species' listing status was recommended in the 5-year review. Threats evaluated during that review have continued to act on the species since the 2021 5-year review was finalized. While there continues to be loss of habitat throughout its range, to date no project has proposed a level of effect for which the Service has issued a biological opinion of jeopardy for the dudleya.

*Bay Checkerspot Butterfly*

Please refer to the *Bay Checkerspot Butterfly* (*Euphydryas editha bayensis*) *5-Year Review: Summary and Evaluation* (Service 2009) for the most recent comprehensive assessment of the range-wide status of the butterfly, which found that because of continued population declines and habitat loss, the butterfly is at greater risk of extinction now than at the time of listing and may warrant reclassification to endangered status. Threats evaluated during that review have continued to act on the species since the 2009 5-year review was finalized. While there has been continued loss of habitat, to date no project has proposed a level of effect for which the Service has issued a biological opinion of jeopardy for the butterfly.

*Valley Elderberry Longhorn Beetle*

Please refer to the *Revised Recovery Plan for Valley Elderberry Longhorn Beetle* (Service 2019a) for the current status of the species. For the most recent comprehensive assessment of the range-wide status of the beetle, please refer to the *Withdrawal of the Proposed Rule To Remove the Valley Elderberry Longhorn Beetle From the Federal List of Endangered and Threatened Wildlife* (Service 2014b). Threats evaluated during that review have continued to act on the species since the 2014 withdrawal was finalized. While there continues to be loss of beetle habitat throughout its range, to date no project has proposed a level of effect for which the Service has issued a biological opinion of jeopardy for the beetle.

*Vernal Pool Fairy Shrimp*

Please refer to the *Vernal Pool Fairy Shrimp* (*Branchinecta lynchi*) *5-year Review: Summary and Evaluation* (Service 2007a) for the most recent comprehensive assessment of the species' range-wide status. No change in the species' listing status was recommended in this 5-year review. Threats evaluated during that review and discussed in the final document have continued to act on the species since the 5-year review was published, with loss of habitat being the most significant effect. To date no project has proposed a level of effects for which the Service has issued a biological opinion of jeopardy for the species.

*Vernal Pool Tadpole Shrimp*

Please refer to the *Vernal Pool Tadpole Shrimp* (*Lepidurus packardii*) *5-year Review: Summary and Evaluation* (Service 2007b) for the most recent comprehensive assessment of the species' range-wide status. No change in the species' listing status was recommended in this 5-year review. Threats evaluated during that review and discussed in the final document have continued to act on the species since the 5-year review was published, with loss of habitat being the most significant effect. To date no project has proposed a level of effects for which the Service has issued a biological opinion of jeopardy for the species.

*California Red-Legged Frog*

Please refer to the *Recovery Plan for the California Red-Legged Frog* (*Rana draytonii*) (Service 2002) for the current status of the species. Threats evaluated during that review and discussed in the recovery plan have continued to act on the species since the review

was published, with loss of habitat being the most significant effect. To date no project has proposed a level of effects for which the Service has issued a biological opinion of jeopardy for the species.

#### *California Tiger Salamander*

Please refer to the *California Tiger Salamander Central California Distinct Population Segment (Ambystoma californiense) 5-year Review: Summary and Evaluation* (Service 2014c) for the current status of the species. No change in the species' listing status was recommended in the 5-year review. Threats evaluated during that review and discussed in the final document have continued to act on the species since the review was published, with loss of habitat being the most significant effect. To date no project has proposed a level of effects for which the Service has issued a biological opinion of jeopardy for the species.

#### *Least Bell's Vireo*

Please refer to the *Least Bell's Vireo (Vireo bellii pusillus) 5-Year Review: Summary and Evaluation* (Service 2006) for the current status of the species. The 5-year review recommended that the species be downlisted to threatened. Threats evaluated during that review have continued to act on the species since the review was published. To date, no project has proposed a level of effect for which the Service has issued a biological opinion of jeopardy for the species.

### **Status of Critical Habitat**

#### *Bay Checkerspot Butterfly Critical Habitat*

Fifteen units of critical habitat for the butterfly were designated by the Service in 2008 (73 Fed. Reg. 50406). The designated critical habitat includes four units in San Mateo County that comprise 1,692 acres and nine units in Santa Clara County that comprise 16,601 acres.

#### *California Red-Legged Frog Critical Habitat*

Critical habitat for the frog was designated in March 2001 (66 Fed. Reg. 14626) and revised in April 2006 (71 Fed. Reg. 19244) and in March 2010 (75 Fed. Reg. 12816). Approximately 1,636,609 acres in 27 California counties fall within the boundaries of the final revised critical habitat designation.

#### *California Tiger Salamander Critical Habitat*

Critical habitat for the salamander was designated in August 2005 (70 Fed. Reg. 49380). The designation includes nearly 200,000 acres across 31 critical habitat units designated in 19 counties.

### **Environmental Baseline**

Environmental baseline refers to the condition of the listed species or its designated critical habitat in the action area, without the consequences to the listed species or designated critical habitat caused by the project. The environmental baseline includes the

past and present impacts of all federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation in process. The consequences to listed species or designated critical habitat from ongoing agency activities or existing agency facilities that are not within the agency's discretion to modify are part of the environmental baseline.

The action area encompasses three U.S. Department of Agriculture Ecoregion sections, the Great Valley, Central Valley Coast Ranges, and Central California Coast. From the I-5 freeway east at or below an elevation of 200 feet above mean sea level (FAMSL) is the Great Valley ecoregion, which is characterized by a low-elevation fluvial plain formed on nonmarine sedimentary rocks with low hills. The cover type is primarily irrigated agriculture with small areas of natural cover types that include annual grasslands, western hardwoods, and wet grasslands or vernal pools. The Great Valley includes the Delta-Mendota Canal and California Aqueduct. The Central Valley Coast Ranges ecoregion approximately begins west of the I-5 freeway at elevations higher than 200 FAMSL, reaching elevations up to 2,200 FAMSL, and ends west at the descent into the Santa Clara Valley back to 200 FAMSL. The landscape of this ecoregion is low-elevation parallel ranges with steep slopes. Rock formations are marine and nonmarine sedimentary origins. Vegetation is western hardwoods, annual grasslands, and chaparral-mountain shrub cover types, and many species are drought-deciduous. The Central Valley Coast Ranges includes the O'Neill Forebay, San Luis Reservoir, Pacheco State Park, and Henry W. Coe State Park. The Santa Clara Valley and into San Jose is the Central California Coast ecoregion; terrain is low to moderate elevation with parallel ranges and valleys. The bedrock is sedimentary, granitic, and ultramafic formations. Vegetation is a mixture of western hardwoods, chaparral-mountain shrub, and annual grasslands cover types, with many of the species adapted to fire. The Central California Coast ecoregion includes San Felipe Lake, Coyote Lake County Park, and Santa Teresa County Park. The climate for all three ecoregions is Mediterranean-like, with mild, wet winters and hot, dry summers with brief periods of drought (USDA 2007).

### *Species*

The Authority used species habitat suitability modeling initially to delineate potentially suitable habitat (hereinafter referred to as *modeled habitat*) and to estimate potential species distribution in the action area along the alignment. It can be reasonably assumed that not all modeled habitat will be occupied. The modeling effort used rule-based models for the the jewelflower, the dudleya, the butterfly, the beetle, the tadpole shrimp, the fairy shrimp, the frog, the salamander, and the vireo.

Rule-based models identified potentially suitable habitat based on scientific literature and species expert input related to the physical and biological habitat parameters associated with species occurrence. *Suitable habitat* is defined as any land cover type that is known to provide the resources and conditions necessary for survival and reproduction of a listed species (Hall et al. 1997). The precision of the species models is greatest in the project corridor, where detailed vegetation mapping was conducted for the permanent and temporary project impact footprints and within 500 feet of the permanent and temporary project impact footprints, using high resolution aerial photography and field reconnaissance surveys where access was available.

The results of the species habitat suitability modeling were applied to the following:

**Impact estimates:** The species habitat suitability models were overlain with the project footprint to determine the total area of potential impact to each species' modeled habitat.

**Developing avoidance and minimization measures and determining habitat offsets:**

Species habitat suitability models provided information for the development and application of species-specific conservation measures and for the determination of the amount of compensatory mitigation that may be required for impacts to each species' habitat.

Metcalf Canyon Jewelflower

The action area contains 938 acres of modeled habitat for the jewelflower in the Monterey Corridor and Morgan Hill and Gilroy project subsections. Approximately 15 acres of modeled habitat for the jewelflower are in the project's temporary disturbance footprint, and approximately 12 acres are in the permanent disturbance footprint.

In the action area, suitable habitat and known occurrences of the jewelflower are in Coyote Valley. There are three California Natural Diversity Database (CNDDDB) jewelflower occurrences located within the action area (CDFW 2019). These occurrences are in Metcalf Canyon, near Dana Rock Park, and Communication Hill, in the City of San Jose.

Santa Clara Valley Dudleya

The action area contains 788 acres of modeled habitat for the dudleya in the Monterey Corridor and Morgan Hill and Gilroy project subsections. Approximately 13 acres of modeled habitat for the dudleya are in the project's temporary disturbance footprint, and approximately 11 acres are in the permanent disturbance footprint. There are seven dudleya occurrences within the action area (CDFW 2019). Some of these occurrences are in Metcalf Canyon, Tulare Hill, and Coyote Ridge.

Bay Checkerspot Butterfly

The action area contains 792 acres of modeled habitat for the butterfly in the Monterey Corridor and Morgan Hill and Gilroy project subsections. Approximately 15 acres of modeled habitat for the butterfly are in the project's temporary disturbance footprint, and approximately 11 acres are in the permanent disturbance footprint and include locations at Communication Hill, Tulare Hill, and Coyote Ridge.

Suitable habitat is mapped where serpentine soils are present outside of the developed portions of the south San Francisco Bay Area in the action area. Communication Hill is not known to be occupied. The butterfly occurs most densely along the east and west sides of Coyote Valley in areas designated as critical habitat and the surrounding vicinity. The action area intersects four CNDDDB occurrences of the butterfly. The largest occurrence (occurrence #17), located on Coyote Ridge in the project footprint, spans more than 5,000 acres and has been documented as containing hundreds of thousands to millions of butterfly larvae (CDFW 2019).

The butterfly population on Tulare Hill is a satellite population<sup>3</sup>; 10 or fewer individuals were observed in annual surveys between 2004 and 2007 (Service 2009) until

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<sup>3</sup> Smaller habitat patches capable of developing robust Bay checkerspot populations in years of favorable weather when the habitat is in good condition.

reintroduction efforts in 2013 boosted population numbers to 124 adults in 2014, 270 adults in 2015, and 270 adults in 2016. However, in 2017 the number of adults observed on Tulare Hill dropped to just six adults (CDFW 2019).

Tulare Hill is a steppingstone between Coyote Ridge and Santa Teresa County Park (i.e., land that facilitates movement between blocks of core habitat) (Service 1998a, 2009). Coyote Ridge contains high-quality serpentine bunchgrass grassland for the butterfly and is known to be occupied.

#### Valley Elderberry Longhorn Beetle

The action area contains 26 acres of modeled habitat for the beetle in the San Joaquin Valley project subsection. Approximately 2 acres of modeled habitat are in the project's permanent disturbance footprint.

Suitable habitat for the beetle overlaps the action area between the Santa Clara–Merced County boundary and the eastern terminus of the action area. Suitable habitat is most densely mapped in the action area in the vicinity of San Luis Reservoir and O'Neill Forebay. Suitable habitat for the beetle indicates the presence of riparian vegetation; however, a comprehensive survey of beetle and elderberry shrubs has not been conducted in the action area. There is limited riparian habitat that could support elderberry shrubs within the action area. There are no CNDDDB occurrences of the beetle in the action area.

#### Vernal Pool Fairy Shrimp

The action area contains 70 acres of modeled habitat for the fairy shrimp in the Pacheco Pass and San Joaquin Valley project subsections. Approximately 3.7 acres of modeled habitat for the fairy shrimp are in the project's permanent disturbance footprint.

Fairy shrimp are known to occur within the Central Coast, San Joaquin Valley, and Southern Sierra Valley vernal pool regions (Service 2005a, 2007a; CDFW 2019). A comprehensive survey of vernal pools or habitat for fairy shrimp has not been conducted in the action area.

The project overlaps with three mapped vernal pools: one on Romero Ranch, north of SR 152; one on the east side of US 165 south of Henry Miller Road; and one along the south side of Henry Miller Road between US 165 and Santa Fe Grade. Based on a review of aerial photography, the habitat adjacent to US 165 is on farmland that has been disked or graded, which may preclude the presence of vernal pool crustaceans. While suitable vernal pool habitat overlaps with the action area, and the action area is within the species' ranges, no CNDDDB occurrences of the fairy shrimp overlap with the action area (CDFW 2019).

#### Vernal Pool Tadpole Shrimp

The action area contains 9 acres of modeled habitat for the tadpole shrimp in the San Joaquin Valley project subsection. Approximately 0.5 acre of modeled habitat for the tadpole shrimp are in the project's permanent disturbance footprint.

In the action area, tadpole shrimp are known to occur within the San Joaquin Valley and Southern Sierra Valley vernal pool regions (Service 2005a; CDFW 2019). Within the San Joaquin Valley vernal pool region, tadpole shrimp are known to occur within the GEA core area (Service 2005a; CDFW 2019), which overlaps with the action area. The project overlaps with two mapped vernal pools: one on the east side of US 165 south of Henry Miller Road and one along the south side of Henry Miller Road between US 165 and Santa Fe Grade. Based on a review of aerial photography, the habitat adjacent to US 165

is on farmland that has been disked or graded, which may preclude the presence of vernal pool crustaceans.

There are no CNDDDB occurrences of tadpole shrimp that overlap with the action area; however, there is one occurrence of tadpole shrimp immediately adjacent to the action area at Santa Fe Grade in Los Banos (CDFW 2019). A comprehensive survey of vernal pools or habitat for tadpole shrimp has not been conducted in the action area.

#### California Red-Legged Frog

The action area contains 4,079 acres of modeled habitat for the frog in the Monterey Corridor, Morgan Hill and Gilroy, Pacheco Pass, and San Joaquin Valley project subsections. Approximately 32 acres of modeled habitat for the frog are in the project's temporary disturbance footprint, and approximately 270 acres are in the permanent disturbance footprint.

Suitable aquatic habitat includes streams, deep pools, backwaters within streams and creeks, ponds, marshes, sag ponds, dune ponds, and lagoons with components of submergent or emergent vegetation (Thomson et al. 2016), and terrestrial aestivation or refuge habitat includes moist leaf litter, dense understory, or in small mammal burrows for refuge and foraging (Jennings and Hayes 1994).

The action area overlaps suitable habitat in rural areas (i.e., excludes the heavily developed cities that constitute the south San Francisco Bay area) from the northern end of the action area in San Jose to O'Neill Forebay in eastern Pacheco Pass. Most of the overlap is concentrated along Pacheco Pass. The habitat in this area is primarily mapped as coastal oak woodland interspersed with annual grassland and a network of interconnected streams. Artificial stock ponds also dot the area. Mapped suitable habitat between Pacheco Lake and the Santa Clara County–Merced County line is primarily located along the steep SR 152 transportation corridor and is likely to be made up of small patches of denuded or ruderal habitat and culverted, steeply graded streams. Habitat along the transportation corridor is unlikely to be occupied. Habitat east and west of Pacheco Lake and the county line is up to 0.5 and 1.5 miles away from SR 152, respectively, and is expected to contain higher quality habitat (i.e., intact habitat blocks subject to less disturbance).

There are 12 CNDDDB occurrences of the frog in the action area located at Coyote Valley at Monterey Road, South of Gilroy just west of US 101 (western edge of the Soap Lake complex), and Eastern Pacheco Pass near SR 152 (western edge of San Luis Reservoir) (CDFW 2019).

#### California Tiger Salamander

The action area contains 10,870 acres of modeled habitat for the salamander in the Monterey Corridor, Morgan Hill and Gilroy, Pacheco Pass, and San Joaquin Valley project subsections. Approximately 68 acres of modeled habitat for the salamander are in the project's temporary disturbance footprint, and approximately 1,460 acres are in the permanent disturbance footprint.

Suitable habitat (aquatic breeding sites consist of seasonal ponds, such as vernal pools or other semipermanent calm waters; terrestrial aestivation or refuge sites in lowland grasslands, oak savannah, and mixed woodland habitats with underground retreats in California ground squirrel [*Spermophilus beechyii*] or Botta's pocket gopher [*Thomomys*

*bottae*] burrows) has been mapped within the action area, and there are documented occurrences within the action area.

Suitable habitat is located throughout the natural, undeveloped portions of the action area. There are nine extant occurrences of salamander in the action area (CDFW 2019). There is one location along the alignment that is within the assumed dispersal distance (1.3 miles) of breeding habitat, and it is in this location where there may be movement across the project footprint. It is along Monterey Road in Coyote Valley just south of the Monterey Road and Bailey Avenue interchange. On the east side of the rail in this location, the salamander occurrence is approximately 0.3–0.4 mile from the rail alignment at the Coyote Creek Golf Course. Another cluster of salamander presumed extant occurrences is on the west side of the rail alignment, almost directly west of the Coyote Creek Golf Course, in the foothills of the Santa Cruz Mountains. This occurrence is more than a mile away from the rail alignment.

#### Least Bell's Vireo

The action area contains 478 acres of modeled habitat for the vireo in the Morgan Hill and Gilroy and Pacheco Pass project subsections. Approximately 6 acres of modeled habitat for the vireo are in the project's temporary disturbance footprint, and approximately 67 acres are in the permanent disturbance footprint.

Suitable habitat for breeding and foraging (riparian habitat with a developed canopy layer and dense shrubs (Franzreb 1989; Kus 2002; Service 2006) has been mapped within the action area, and there is one documented occurrence within the action area.

Modeled breeding habitat for the vireo overlaps the action area in Santa Clara County and includes riparian habitat in Coyote Creek, Llagas Creek, Uvas Creek, Pajaro River, and north of Hollister within Pacheco Creek.

There is a historical occurrence of the vireo that overlaps the action area; a portion of this occurrence is within the project footprint. The CNDDDB maps this occurrence as an approximately 3-mile reach of Llagas Creek between SR 152 and the Pajaro River in Santa Clara County near Gilroy. Individuals were detected in June 1997 and May 2001; because specific occurrence location was not provided, the entire reach was mapped in the CNDDDB (CDFW 2019).

#### *Stressors*

Common stressors in the action area to most or all the species include:

- Disturbance to habitat from urbanization, energy development (oil, gas, wind, and solar), grazing, and agriculture
- Impacts from introduction of non-native invasive species (plants and insects)
- Herbicide and pesticide use
- Off-highway vehicle use
- Small population size
- Predation (for wildlife species, including nest brood parasitism for avian species)
- Climate change (including impacts from regional drought and fire)
- Inadequacy of existing regulatory mechanisms

- The presence of roads, routes, trails, railroads, and utility corridors in suitable habitat.
- Vehicle-caused mortality

### *Critical Habitat*

#### Bay Checkerspot Butterfly Critical Habitat

There are 16,600 acres of butterfly critical habitat total, 1,120 acres of which overlap with the action area. The action area intersects four critical habitat units (6, 10, 12, and 13) between the cities of San Jose and San Martin on either side of US 101. Critical habitat unit 6, Tulare Hill, overlaps with 92 acres of the action area and is located within the permanent impact area of the project footprint. The other three intersected critical habitat units, Hale, San Martin, and Kirby, overlap with 198, 191, and 639 acres of the action area, respectively, and are located within the temporary impact area of the project footprint.

#### California Red-Legged Frog Critical Habitat

The final revised critical habitat designation consists of approximately 1,636,609 acres of critical habitat in 27 California counties. The action area overlaps with 4,674 acres of critical habitat unit STC-2 in the Diablo Range section of the project between Gilroy and San Luis Reservoir, where the alignment travels east toward the Central Valley.

#### California Tiger Salamander Critical Habitat

Critical habitat for salamander consists of almost 200,000 acres across 31 critical habitat units designated in 19 counties within four regions. The action area overlaps 267 acres of East Bay Region Units 10A and 10B, and 2,066 acres of San Felipe Unit 12 in Santa Clara and San Benito Counties.

### **Effects of the Action**

Effects of the action are all consequences to listed species or critical habitat that are caused by the project, including the consequences of other activities that are caused by the project. A consequence is caused by the project if it will not occur but for the project and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action.

The project will result in the temporary and permanent loss of suitable habitat for the jewelflower, dudleya, butterfly, beetle, tadpole shrimp, fairy shrimp, frog, salamander, and vireo. Temporary habitat loss is any ground disturbance that can be restored to pre-disturbance conditions within 1 year. Permanent habitat loss includes ground disturbance that will last more than 1 year or any habitat conversion from suitable to non-suitable.

Table 3 shows maximum habitat loss for the nine federally listed species addressed in this biological opinion and the total compensation for each species. Adverse effects or impacts on species habitat are expressed as the maximum estimated acreage of suitable habitat affected by construction and operations of the project. The calculation of maximum habitat loss for species associated with vernal pools includes the entirety of the feature (i.e., the acreage of indirect bisected effects). Because habitat models were developed to conservatively estimate habitat suitability and the presence of federally

**Table 3. Maximum Temporary and Permanent Loss of Suitable Habitat in the Action Area and Compensatory Mitigation**

<b>Species</b>	<b>Modeled Habitat That Overlaps with the Footprint</b>	<b>Modeled Habitat Loss Where the Species Is Reasonably Certain to Occur (acres)</b>	<b>Compensatory Habitat (acres)</b>
<b>Plants</b>			
Metcalf Canyon jewelflower	27	27	81
Santa Clara Valley dudleya	24	24	72
<b>Bay checkerspot butterfly</b>			
Suitable habitat	26	26	78
<b>Valley elderberry longhorn beetle</b>			
Potentially suitable habitat	160	2	6
<b>Vernal pool fairy shrimp</b>			
Potentially suitable habitat, San Joaquin Valley Recovery Unit	0.5	0.5	1.5
Potentially suitable habitat, Central Coast Recovery Unit	3.2	3.2	9.6
Vernal pool fairy shrimp, TOTAL	3.7	3.7	11.1
<b>Vernal pool tadpole shrimp</b>			
Potentially suitable habitat, San Joaquin Valley Recovery Unit	0.5	0.5	1.5
<b>California red-legged frog</b>			
Potentially suitable aquatic breeding habitat	127	32	96
Potentially suitable upland refugia and foraging habitat	2,385	1,871	3,742
California red-legged frog, TOTAL	2,512	1,903	3,838

Species	Modeled Habitat That Overlaps with the Footprint	Modeled Habitat Loss Where the Species Is Reasonably Certain to Occur (acres)	Compensatory Habitat (acres)
<b>California tiger salamander</b>			
Potentially suitable aquatic breeding habitat	93	57	171
Potentially suitable upland refugia and foraging habitat	2,876	1,471	2,942
California tiger salamander, TOTAL	2,969	1,528	3,113
<b>Least Bell's vireo</b>			
Potentially suitable habitat	77	73	146

listed species is assumed in the absence of surveys, this analysis likely overestimates the magnitude of effects on occupied habitat.

#### *Metcalf Canyon Jewelflower and Santa Clara Valley Dudleya*

The project is anticipated to affect the jewelflower and dudleya where suitable habitat is identified in the action area. The jewelflower and dudleya are reasonably certain to occur on all modeled habitat in the project footprint, which is 27 acres and 24 acres, respectively (Table 3).

Affected habitat corresponds to areas where populations are known to or could occur, and required soil substrates and textures, vegetation communities, and/or elevation exist and where adverse effects on the jewelflower and dudleya are likely to occur if individuals are present. Effects on these species from construction and O&M activities could occur outside the project footprint but are not likely to be adverse.

Permanent loss of suitable habitat will occur at the base of Communication Hill along the existing railway and at the base of Tulare Hill along Monterey Road. Temporary habitat loss will result from establishment of staging areas for electrical reconductoring and infrastructure work, entailing temporary ground disturbance and vegetation removal. Temporary impact areas are located along Coyote Ridge in San Jose, along Llagas Road in Morgan Hill, on private property surrounding the CordeValle Golf Club in San Martin, and in the Soap Lake Region.

There is potential for individuals or seeds to be negatively impacted as a result of project construction, salvage, and relocation. Impacts could occur from the following:

- Removal and mortality during grubbing and clearing and establishment of staging areas and temporary construction easements in or near serpentine rock outcrops and serpentine grassland habitat
- Crushing by vehicles or equipment or burial during excavation

- Digging, transporting, and planting associated with salvage and relocation
- Dust generated from construction activities limiting gas exchange and photosynthesis.

O&M activities (e.g., vehicle access, grading, clearing, excavation, herbicide application) could cause reduced survival of special-status plants inside and adjacent to the project footprint, as well as to individuals that recolonize any remaining suitable serpentine habitat in and adjacent to the project footprint. Chemical runoff from trucks or equipment during construction, operations, and maintenance activities could leach into soils and reduce the vigor of or kill the jewelflower and dudleya. Use of herbicides for weed abatement during operations or maintenance could affect either species outside the right-of-way if they are applied near occupied habitat (e.g., drift effect).

Construction could introduce nonnative plant species that could permanently degrade serpentine grassland habitat. Although serpentine grasslands are typically more resistant to invasion by nonnative species than many other land cover types, nonnative species have potential to eventually degrade serpentine grasslands. For example, barbed goatgrass (*Aegilops triuncialis*) is an invasive grass that has been documented on Coyote Ridge and is the subject of focused management and monitoring by the Santa Clara Valley Open Space Authority (SCVOSA) (McGraw 2015). The introduction or spread of nonnative plants will increase competition for resources (i.e., sun, water, and soil nutrients), negatively affecting flowering success, pollination, seeding, and germination of native plants. The introduction of nonnative plant species may also significantly alter habitat heterogeneity by outcompeting native plants, thereby further facilitating successful invasion of nonnatives. Successful invasion of nonnative plant species could result in permanent degradation of suitable habitat for the jewelflower and the dudleya and negatively affect the fitness of populations that occur within the action area.

Construction could introduce nonnative diseases that could kill jewelflower and dudleya individuals and degrade serpentine grassland habitat. Specifically, introduction of exotic *Phytophthora* species can result in root disease and plant mortality. The *Phytophthora* genus is a group of water molds that can lead to root rot, stem cankers, and blights of fruit and leaves in the host plant. When introduced into native ecosystems, various exotic *Phytophthora* species have proven to be serious to devastating pathogens (Swiecki and Bernhardt 2018). However, the effect of *Phytophthora* species on the jewelflower and the dudleya is currently unknown.

To avoid and minimize effects on these species from the project, the Authority has proposed general and species-specific conservation measures, including pre-construction surveys, establishment of ESAs and non-disturbance zones, and salvage and relocation plans. Suitable habitat for these species that is temporarily disturbed will be restored to pre-disturbance conditions following construction. Compensatory mitigation for the jewelflower and dudleya will also be implemented to offset impacts on suitable habitat.

### *Bay Checkerspot Butterfly*

The project is anticipated to affect the butterfly where suitable habitat is identified in the action area. Butterflies are reasonably certain to occur on all 26 acres of modeled habitat in the project footprint. This habitat corresponds to locations on Communication Hill, Tulare Hill along Monterey Road, and on Coyote Ridge, where serpentine soils may be present and could support the species' larval host plants (*Plantago*) and where adverse effects are likely to occur if butterflies are present. Changes in butterfly behavior from construction and O&M activities could occur outside the project footprint but are not likely to result in adverse effects.

Temporary impact areas are located along Coyote Ridge in San Jose, at Chesbro Reservoir County Park in Morgan Hill, and on private property surrounding the CordeValle Golf Club in

**Table 4. Impacts to Butterfly Critical Habitat**

Unit Number: Name	Total Acres	Impacted Acres	% Remaining
Unit 6: Tulare Hill	348	3	99.14%
Unit 10: Hale	205	5	97.56%
Unit 12: San Martin	189	2	98.94%
Unit 13: Kirby	2,204	13	99.41%
All Butterfly Critical Habitat	18,293	23	99.87%

San Martin. Effects to habitat include staging and temporary construction easements, which could temporarily remove vegetation reducing potential food, perching or egg laying opportunities which could result in reduced individual fitness.

There is potential for individuals to be injured or killed as a result of project construction. Injury and mortality could result from the following:

- Crushing of host plants supporting egg masses and larvae
- Collisions with or crushing of adults feeding on nectar plants by vehicles or equipment operating during the adult flight season (March to April)
- Disturbance and displacement of individuals from noise, vibration, and air turbulence.

The butterfly is considered to be relatively sedentary, although the upper dispersal limit is unknown. This species has only been recorded migrating up to 3.5 miles, but a multiyear study by McKechnie et al. observed that only 1.7 percent of males and 4.8 percent of females moved a distance of approximately 1,600 feet (Service 2009). The project will be sited on the Coyote Valley floor where substantial risk of mortality from vehicle and train strike already exist (US 101, Monterey Road, and Caltrain) for individuals migrating east to west across the alignment, from Coyote Ridge (the core population) to suitable habitat west of US 101 on Tulare Hill or at Santa Teresa County Park. Train operation will increase the risk of vehicle-related mortality in the area, as some individuals could be struck by a passing train.

Train maintenance vehicles or staff could crush adults, larvae, or eggs during inspections, emergency repairs, or vegetation management activities. Use of herbicides for weed abatement during operations or maintenance activities could affect butterfly host plants outside the right-of-way if applied near populations (e.g., drift effect). Chemical runoff from trucks or equipment along the rights-of-way for access roads could leach into soils and reduce the vigor of or kill host plants.

Construction could introduce nonnative invasive plant species that could permanently degrade serpentine grassland habitat. Although serpentine grasslands are typically more resistant to invasion by nonnative species than many other land cover types, nonnative species eventually degrade serpentine grasslands. For example, barbed goatgrass (*Aegilops triuncialis*) is an invasive grass that has been documented on Coyote Ridge and is the subject of focused management and monitoring by the SCVOSA (McGraw 2015: page 68).

To avoid and minimize adverse effects on the butterfly from the project, the Authority has proposed general and species-specific conservation measures including but not limited to pre-

construction surveys, Biological Monitors, establishment of ESAs, and water and dust palliative measures. Suitable habitat for the butterfly that is temporarily disturbed will be restored to pre-disturbance conditions following construction, to the extent feasible. Compensatory mitigation for the butterfly will be implemented for permanent impacts on suitable habitat containing host plants (*Plantago*) on serpentine grassland where butterflies are assumed to be present. Injury and mortality to eggs, larvae, pupae, and adults that occur in suitable habitat impacted by the project where the butterfly is assumed to be present are likely unavoidable due to the cryptic nature of this species during the egg, larvae, and pupae stages and the inability to block the insect from flying into the work area.

#### Bay Checkerspot Butterfly Critical Habitat

The project overlaps with 23 acres of butterfly critical habitat and 4 Units; Tulare Hill (Unit 6) with 3 acres of impacts, Hale (Unit 10) with 5 acres of impacts, San Martin (Unit 12) with 2 acres of impacts, and Kirby (Unit 13) with 13 acres of impacts (Table 4). The permanent project footprint overlaps with 3 acres of critical habitat, which are all in the Tulare Hill Unit. The temporary project footprint overlaps with 20 acres in the Hale, San Martin, and Kirby Units. The following describes each of the butterfly primary constituent elements (PCE) as defined in the critical habitat final rule (73 Fed. Reg. 50406–50452).

- **PCE #1**—Annual or perennial grasslands with little to no overstory that provide north-south and east-west slopes with a tilt of more than 7 degrees for larval host plant survival during periods of atypical weather (for example, drought). The project will temporarily diminish 20 acres and permanently remove 3 acres of the amount of PCE #1 available to the butterfly.
- **PCE #2**—The presence of the primary larval host plant, dwarf plantain (*Plantago erecta*), and at least one of the secondary host plants, purple owl's-clover (*Castilleja densiflora*) or exserted paintbrush (*Castilleja exserta*), are required for reproduction, feeding, and larval development.
- **PCE #3**—The presence of adult nectar sources for feeding such as desert parsley (*Lomatium* spp), California goldfields (*Lasthenia californica*), tidy-tips (*Layia platyglossa*), sea muilla (*Muilla maritima*), scytheleaf onion (*Allium falcifolium*), false babystars (*Linanthus androsaceus*), and intermediate fiddleneck (*Amsinckia intermedia*).

The temporary disturbance of 20 acres of critical habitat will temporarily diminish the amount of PCE #2 and PCE #3 available to the butterfly.

- **PCE #4**—Soils derived from serpentinite ultramafic rock (Montara, Climara, Henneke, Hentine, and Obispo soil series) or similar soils (Inks, Candlestock, Los Gatos, Fagan, and Barnabe soil series) that provide areas with fewer aggressive, nonnative plant species for larval host plants and adult nectar plants survival and reproduction.
- **PCE #5**—The presence of stable holes and cracks in the soil, and surface rock outcrops that provide shelter for the larval stage of the butterfly during summer diapause. Implementation of the general conservation measures will reduce adverse effects on the butterfly during construction, operations, and maintenance of the project. The Authority will compensate for habitat loss through protection, enhancement, and management of additional habitat, some of which will be within existing critical habitat units. Permanent protection of these lands will help maintain the geographic distribution of the species and contribute to its recovery.

After project impacts, 99.9 percent of all butterfly critical habitat will remain; this extent of habitat loss is not expected to adversely affect the function of the Tulare Hill, Hale, San Martin, and Kirby critical habitat units or butterfly critical habitat throughout the species' range.

#### *Valley Elderberry Longhorn Beetle*

Of the 160 acres of modeled habitat in the project footprint, beetles are reasonably certain to occur in approximately 2 acres of modeled habitat that will be permanently lost due to construction of the project. Permanent habitat loss will occur due to the conversion and disturbance of valley foothill riparian habitat within the project footprint. This habitat corresponds to riparian areas located along Henry Miller Road in Merced County where adverse effects are likely to occur if beetles are present. The remaining 158 acres of modeled habitat are grassland patches on the sides of roads, farm edges, and on levees where the species is not reasonably certain to occur due to the infrequency of elderberry bushes in these habitat types and the lack of known occurrence in the region. Changes in beetle behavior from construction and O&M activities could occur outside the project footprint but are not likely to result in adverse effects.

Construction could indirectly injure or kill the beetle host plant, the elderberry bush, as a result of altered site hydrology (e.g., altered flow and inundation patterns, changes in groundwater availability and water quality) from the installation of impermeable surfaces (e.g., concrete).

Temporary disturbance to riparian areas is expected from staging and temporary construction easements, which could remove host plants.

All temporary impacts to riparian vegetation will be restored in each work area to avoid and minimize indirect habitat degradation (i.e., erosion resulting from ground disturbance, spread of invasive plant species) and the temporal loss of suitable habitat for the beetle.

There is potential for individuals to be injured or killed as a result of project construction. Injury and mortality could occur from the following:

- Construction vehicles or equipment crushing or striking beetles
- Removal or pruning of occupied elderberry shrubs
- Removal or disturbance of valley foothill riparian habitat containing elderberry shrubs
- Removal or disturbance of annual grassland, coastal oak woodland, perennial grassland, or valley oak woodland containing elderberry shrubs within 200 feet of riverine or river, lacustrine habitat
- Disturbance and displacement of individuals may result from noise, vibration, and air turbulence.

Injury or mortality to the beetle could occur during O&M activities, but this is expected to be infrequent given these activities will take place within the developed rail footprint. Because immature beetles are confined to their host plants and adult beetles are generally found close to host plants (Service 2019a), train strike on riparian-dwelling beetles is not expected. However, periodic bridge maintenance activities may require workers and equipment to enter riparian corridors to inspect or work on bridges, and elderberry shrubs occupied by the species may be removed or pruned during such activities.

Construction could introduce invasive plant species that could permanently degrade valley foothill riparian and other suitable habitat. Nonnative invasive plant species may have significant indirect impacts on the beetle by affecting elderberry shrub vigor and recruitment (Talley et al.

2006). Nonnative grasses may also impair elderberry germination or establishment or elevate fire risk (Talley et al. 2006).

To avoid and minimize adverse effects on the beetle from the project, the Authority has proposed general and beetle-specific conservation measures, including but not limited to pre-construction surveys, Biological Monitors, establishment of ESAs, and water and dust palliative measures. Compensatory mitigation for the beetle will be implemented for permanent impacts on suitable habitat containing the elderberry host plant in riparian areas where the beetle has potential to occur. Injury and mortality to eggs, larvae, and pupae by the project are likely unavoidable due to the cryptic nature of this species and its biology (e.g., eggs, larvae, and pupae stages occur inside the stem of the bush with no outward evidence of presence).

#### *Vernal Pool Fairy Shrimp and Vernal Pool Tadpole Shrimp*

The fairy shrimp and the tadpole shrimp are reasonably certain to occur on all 3.7 and 0.5 acres, respectively, of modeled habitat in the project footprint. Fairy shrimp and tadpole shrimp habitat corresponds to vernal pool and seasonal wetland land cover types within the San Joaquin Valley, along Henry Miller Road. Additional habitat for the fairy shrimp is found on Romero Ranch in eastern Pacheco Pass.

There is potential for individuals to be injured or killed as a result of project construction. Injury and mortality could occur from the following:

- Construction vehicles and equipment crushing individuals or cysts in occupied pools
- Construction activities resulting in the degradation or destruction of aquatic features containing adults or cysts
- Construction activities resulting in altered hydrology of occupied pools so that individuals can no longer complete their life cycle (i.e., drying of pools leading to desiccation and mortality of dormant cysts).

Operation of the train will not affect the tadpole shrimp or fairy shrimp. Train maintenance activities have potential to injure or kill individuals and damage suitable habitat. O&M effects include further habitat degradation from ground disturbance, clearing, or grubbing. These activities could cause erosion and sedimentation that directly affect the hydrology of adjacent vernal pool habitat. Maintenance vehicles or staff could crush individuals during inspections, emergency repairs, or vegetation management activities.

Use of herbicides for weed abatement during operations or maintenance could alter vernal pool vegetation through alterations to water chemistry or shade cover resulting in mortality or increased predation. Chemical runoff from trucks or equipment along the rights-of-way for access roads could leach into pools adjacent to the project and harm or kill individuals. The introduction of nonnative plant species could potentially affect vernal pool hydrology and result in long-term degradation of both vernal pool and upland plant communities.

To avoid and minimize adverse effects on the tadpole shrimp and fairy shrimp from the project, the Authority has proposed general and species-specific conservation measures including but not limited to pre-construction surveys, Biological Monitors, establishment of exclusion zones, and water and dust palliative measures. Compensatory mitigation will be implemented for permanent impacts on suitable vernal pool habitat where individuals are assumed to be present. Injury and mortality to individuals are likely unavoidable due to the size and nature of the species.

### *California Red-Legged Frog*

Of the 2,512 acres of modeled habitat in the project footprint, frogs are reasonably certain to occur in approximately 1,903 acres. This habitat corresponds to areas of aquatic and upland land cover types within 1 mile of suitable aquatic habitat (including Coyote Valley, Soap Lake, and Pacheco Pass) where the species is likely to occur and where adverse effects are anticipated to occur. Frogs are not expected to be present on the remaining 609 acres of modeled habitat due to distance from suitable aquatic habitat, fragmentation by roads and other infrastructure, and development density. Changes in frog behavior from construction and O&M activities could occur outside the project footprint but are not likely to result in adverse effects.

There is potential for individuals to be injured or killed as a result of project construction and relocation. Injury and mortality could occur from the following:

- Construction-related ground disturbance (e.g., grading, earth-moving, vibration, excavation, exclusion fencing) and vehicle and equipment operation that could crush, entomb, or physically disturb individual frogs
- Construction activities resulting in the degradation, destruction, or dewatering of an aquatic feature containing frog adults, juveniles, or eggs
- Dispersing frogs becoming entrapped in construction materials or in excavation(s)
- Disturbance and displacement of individuals from noise and vibration.
- Capturing, transporting, and releasing individuals found within the construction site.

Train O&M activities have the potential to injure or kill frogs. Trains can strike an individual that has entered the railway. Maintenance vehicles or staff could crush a frog during inspections, emergency repairs, or vegetation management activities.

The use of chemicals and hazardous substances during construction (e.g., oils, gasoline) may cause frog mortality if individuals enter aquatic habitat that has been contaminated by accidental spills or other vehicle and equipment leaks. The introduction of nonnative plant species to upland habitat could reduce frog dispersal because dense herbaceous vegetation could impede movement.

Amphibian pathogens and parasites can be carried between habitats on the hands, footwear, or equipment of fieldworkers, spreading such pathogens or parasites to novel localities containing species that have had little or no prior contact with them. Construction could introduce nonnative diseases that could kill frogs. One example is chytridiomycosis, an infectious disease that affects amphibians worldwide. It is caused by the chytrid fungus (*Batrachochytrium dendrobatidis*), a fungus capable of causing sporadic deaths in some amphibian populations and 100 percent mortality in others.

The WCA identified two locations along the alignment as having potential to affect frog movement: (1) Monterey Road in Coyote Valley just south of the Monterey Road and Bailey Avenue interchange and (2) SR 152. These are the only two locations along the alignment that are within the assumed dispersal distance (2.0 miles) of presumed extant frog populations where the alignment is at-grade and fenced, therefore posing a potential barrier to movement.

The likelihood that individuals currently move across Monterey Road is low. Coyote Creek and Monterey Road currently provide a considerable barrier to east-west movement in this location. In addition, the occurrence polygons on the west side of the alignment are farther apart than the known dispersal distance (2.0 miles). Nonetheless, project design includes four wildlife undercrossings. These undercrossings are expected to maintain the potential for individuals to

move east and west across the alignment, even though the probability of individuals doing so is considered very low.

To minimize and avoid the effects of the project on the frog, the Authority has proposed general and frog-specific conservation measures, including pre-construction surveys, daily surveys, exclusion fencing, and Biological Monitors. Security fencing will be designed to exclude the species from accessing the right-of-way to avoid injury and mortality of individuals from vehicle or train strikes. Suitable habitat for the frog that is temporarily disturbed will be restored to pre-disturbance conditions following construction, and large continuous swaths of habitat will remain intact adjacent to the project. Compensatory mitigation for the frog will also be implemented for permanent impacts on suitable habitat. Habitat fragmentation and substantial obstruction of movement will be minimized with implementation of wildlife crossing structures proposed throughout the alignment and will provide frogs with movement and dispersal corridors, though it may increase the potential for the species to encounter predators that may also be utilizing the wildlife crossings.

#### California Red-legged Frog Critical Habitat

The project overlaps with 924 acres of the Wilson Peak critical habitat unit (Unit STC-2), 919 acres of which are from permanent activities and 5 of which are from temporary activities (i.e., activities that last less than one year)(Table 5). The frog PCEs as defined in the critical habitat final rule are as follows (75 Fed. Reg. 12816–12959) and all 4 PCEs are within the Wilson Peak critical habitat unit:

- **PCE #1**—Standing bodies of fresh water (with salinities less than 4.5 ppt), including natural and human-made (e.g., stock) ponds, slow-moving streams or pools within streams, and other ephemeral or permanent water bodies that typically become inundated during winter rains and hold water for a minimum of 20 weeks in all but the driest of years
- **PCE #2**—Freshwater pond and stream habitats, as described under PCE #1, that may not hold water long enough for the species to complete its aquatic life cycle but that provide for shelter, foraging, predator avoidance, and aquatic dispersal of juvenile and adult frogs
- **PCE #3**—Upland areas adjacent to or surrounding breeding and nonbreeding aquatic and riparian habitat up to a distance of 1 mile (1.6 kilometers) in most cases (i.e., depending on surrounding landscape and dispersal barriers), including various vegetation types such as grassland, woodland, forest, wetland, or riparian areas that provide shelter, forage, and predator avoidance for the frog.
- **PCE #4**—Accessible upland or riparian habitat within and between occupied or previously occupied sites that are located within 1 mile (1.6 kilometers) of each other and that support movement between such sites

**Table 5. Impacts to Frog Critical Habitat**

Unit Number: Name	Total Acres	Impacted Acres	% Remaining
STC-2: Wilson Peak	204,718	924	99.55%
All Frog Critical Habitat	1,636,609	924	99.94%

Implementation of the general conservation measures will reduce adverse effects on the frog during construction, operations, and maintenance of the project. The Authority will compensate for habitat loss through protection, enhancement, and management of additional habitat, some of which will be within existing critical habitat units. Permanent protection of these lands will help maintain the geographic distribution of the species and contribute to its recovery.

After project impacts, 99.9 percent of all frog critical habitat will remain; this extent of habitat loss is not expected to adversely affect the function of Wilson Peak critical habitat unit and its PCEs.

### *California Tiger Salamander*

Of the 2,969 acres of modeled habitat in the project footprint, salamanders are reasonably certain to occur in 1,528 acres. This habitat corresponds to areas of aquatic and upland land cover types within 1.3 miles of suitable aquatic habitat (including Coyote Valley, Soap Lake, and Pacheco Pass) where the species is likely to occur and where adverse effects are anticipated to occur. Salamanders are not expected to be present on the remaining 1,441 acres of modeled habitat due to distance from suitable aquatic habitat, fragmentation by roads and other infrastructure, and development. Changes in salamander behavior from construction and O&M activities could occur outside the project footprint but are not likely to result in adverse effects.

The project footprint overlaps suitable habitat along the entire alignment, except for the heavily developed cities that constitute the South Bay area. Suitable habitat near existing transportation corridors is likely to be made up of small patches of denuded or ruderal habitat that is separated from larger patches of higher quality habitat by roads, houses, and agricultural development. These areas are unlikely to be occupied.

The greatest potential for the loss of occupied habitat occurs where natural portions of the action area are closest to the project footprint or, in the case of Coyote Valley, where a population may be persisting on a golf course.

Temporary impact areas are distributed along the entire alignment, although most temporary impacts on aquatic breeding and foraging habitat are located east of San Luis Reservoir.

There is potential for individuals to be injured or killed as a result of project construction, burrow inspection/excavation, and relocation. Injury and mortality could occur from the following:

- Construction-related ground disturbance (e.g., grading, earth-moving, excavation, exclusion fencing) that could kill or injure salamanders.
- Construction vehicles crushing individuals or collapsing occupied aestivation refugia in upland habitat.
- Construction activities resulting in the degradation, destruction, or dewatering of an aquatic feature containing salamander adults, juveniles, or eggs.
- Dispersing salamanders becoming entrapped in construction materials or in excavation(s).
- Disturbance and displacement from noise and vibration.
- Capturing, transporting, and releasing individuals found within the construction site.

Train O&M activities have potential to injure or kill salamanders. Trains can strike an individual that has entered the railway. Maintenance vehicles or staff could crush a salamander during inspections, emergency repairs, or vegetation management activities. The use of chemicals and

hazardous substances (e.g., oils, gasoline) during construction may cause salamander mortality if individuals enter aquatic habitat that has been contaminated by accidental spills or other vehicle and equipment leaks. The introduction of nonnative plant species to upland habitat could reduce salamander dispersal to nonbreeding sites (i.e., burrows) because dense herbaceous vegetation could impede movement.

To minimize and avoid effects of the project on the salamander, the Authority has proposed general and species-specific conservation measures, including pre-construction surveys, daily surveys, exclusion fencing, and Biological Monitors. Security fencing will be designed to exclude the species from accessing the right-of-way to avoid injury and mortality of individuals from vehicle or train strikes. Suitable habitat for the salamander that is temporarily disturbed will be restored to pre-disturbance conditions following construction, and large continuous swaths of habitat will remain intact adjacent to the project. Compensatory mitigation for the salamander will also be implemented for permanent impacts on suitable habitat. Habitat fragmentation and substantial obstruction of movement will be minimized with the wildlife crossing structures that are proposed as part of the project.

#### California Tiger Salamander Critical Habitat

The project overlaps with 279 acres of the East Bay Geographic Region of critical habitat for salamander, 5 acres of which are in Lion's Peak Unit (East Bay Units 10A and 10B) and 274 acres of which are in San Felipe Unit (East Bay Unit 12)(Table 6). The permanent project footprint overlaps with 274 acres of critical habitat, all of which are in the San Felipe Unit. The temporary project footprint overlaps with 5 acres, 4 acres of which are in the Lion's Peak Unit and 1 acre of which are in the San Felipe Unit. The following describes each of the salamander PCEs as defined in the critical habitat final rule (70 Fed. Reg. 49380–49458).

- **PCE #1**—Standing bodies of fresh water (including natural and human-made (e.g., stock) ponds, vernal pools, and other ephemeral or permanent water bodies, which typically support inundation during winter rains and hold water for a minimum of 12 weeks in a year of average rainfall.
- **PCE #2**—Upland habitats adjacent and accessible to and from breeding ponds that contain small mammal burrows or other underground habitat that salamanders depend upon for food, shelter, and protection from the elements and predation. The project will diminish the amount of PCE #2 available to the salamander. The extent to which small mammal burrows or other underground habitat are present is unknown, but this analysis assumes burrows are present in these areas.
- **PCE #3**—Accessible upland dispersal habitat between occupied locations that allows for movement between such sites. The project will adversely affect PCE #3 if the dispersal habitat were diminished to the extent that salamanders could not move between occupied locations or if the project creates movement barriers between occupied locations. The project is not known to disrupt movement between occupied habitat patches within critical habitat.

Implementation of the general conservation measures will reduce adverse effects on the salamander during construction, operations, and maintenance of the project. The Authority will compensate for habitat loss through protection, enhancement, and management of additional habitat, some of which will be within existing critical habitat units. Permanent protection of these lands will help maintain the geographic distribution of the species and contribute to its recovery.

**Table 6. Impacts to Salamander Critical Habitat**

Unit Number: Name	Total Acres	Impacted Acres	% Remaining
East Bay Region Unit 10A and 10B: Lion's Peak Unit	892	5	99.44%
East Bay Region Unit 12: San Felipe Unit	6,642	274	95.87%
All Salamander Critical Habitat	199,109	279	99.86%

After project impacts, 99.8 percent of all salamander critical habitat will remain; this extent of habitat loss is not expected to adversely affect the function of the Lion's Peak and San Felipe critical habitat units or salamander critical habitat throughout the species' range.

#### *Least Bell's Vireo*

The project is anticipated to affect the vireo where suitable habitat is identified in the action area. The population density within the project area is unknown but is anticipated to be low as the species may have only just begun to recolonize areas formally used as breeding habitat within its historic range. Of the 77 acres of modeled habitat in the project footprint, vireos are reasonably certain to occur in approximately 73 acres in the project footprint. This habitat corresponds to areas of suitable riparian habitat in the species' historical range where expanding vireo populations are beginning to recolonize and where adverse effects are likely to occur if vireo are present. Vireos are not expected to be present on the remaining 4 acres of modeled habitat due to small patch size, location, fragmentation by roads and other infrastructure, and development. Changes in vireo behavior from construction and O&M activities could result outside the project footprint but are not likely to result in adverse effects.

There is potential for vireo individuals to be injured or killed as a result of project construction.

Train operations could injure or kill individuals. Injury and mortality could result from the following:

- Injury or death could result from train strike or electrical strike if vireo individuals perch on the alignment and are struck by the train or collide with the electrical line when flying away.
- Vireo individuals could fall into tubular steel OCS poles and become injured or trapped.
- Mortality or injury may result from collisions with vehicles or equipment.
- Disturbance and displacement of individuals may result from noise, vibration, and air turbulence.

Direct effects on the vireo during maintenance activities will likely be minor and sporadic because the HSR will operate on bridges or viaducts that are elevated above riparian corridors. However, periodic bridge maintenance activities may require workers and equipment to enter riparian corridors to inspect or work on bridges, and riparian vegetation occupied by the species may be removed or pruned during such activities.

Chemicals and hazardous substances used during construction (e.g., oils, gasoline) may cause vireo mortality if individuals enter habitat or water collection areas that have been contaminated by accidental spills or other vehicle and equipment leaks, ingest prey that has been contaminated, or bring contaminated plant or other material to the nest.

Ground disturbance and vegetation removal in riparian habitat will create areas of bare soil susceptible to colonization by nonnative invasive plant species such as giant reed, tamarisk, and

perennial pepperweed. Dense stands of these species will degrade riparian habitat for vireos and other riparian birds by outcompeting willows and other native plants that provide nest sites.

There is evidence that migrating birds avoid noisy areas during migration (McClure et al. 2013). Small populations are generally more vulnerable to adverse effects, because the loss of even a few animals may reduce genetic diversity in the population and may impede the potential for individuals to find mates and successfully reproduce.

To minimize or avoid effects of the project on the vireo, the Authority has proposed general and vireo-specific conservation measures including pre-construction nesting bird surveys, Biological Monitors, establishment of ESAs and nondisturbance zones, and bird safe project design. Suitable habitat for the vireo will be restored to pre-disturbance conditions following construction. Compensatory mitigation for the vireo will also be implemented for permanent impacts on suitable habitat.

### *Compensatory Habitat*

The Authority is proposing to provide compensatory habitat as part of the project. This compensatory habitat mitigation is intended to offset the effect on the species of the project's anticipated incidental take, resulting from the permanent and temporary loss, modification, and/or degradation of habitat described above. The compensatory habitat proposed will be in the form of placing conservation easements with long-term management plans on compensatory mitigation sites and the purchase of habitat compensation credits at a Service-approved mitigation site or conservation bank.

The amount of suitable habitat for each species that will be provided as compensatory habitat is as follows:

- Metcalf Canyon jewelflower—81 acres
- Santa Clara Valley dudleya—72 acres
- Bay checkerspot butterfly—78 acres
- Valley elderberry longhorn beetle—6 acres
- Vernal pool fairy shrimp—11.1 acres
- Vernal pool tadpole shrimp—1.5 acres
- California red-legged frog—3,838 acres
- California tiger salamander—3,113 acres
- Least Bell's vireo—146 acres

The Authority will provide compensatory mitigation for impacts on suitable habitat for each species per the above acreages. However, upon design finalization of each CP and completion of the pre-construction habitat assessment surveys, the amount of compensatory mitigation may be adjusted based on revised estimated impacts on species' suitable habitat, if needed, for each work area.

This component of the action will have the effect of protecting and managing lands for the species' conservation in perpetuity. The compensatory lands will provide suitable habitat for breeding, feeding, or sheltering commensurate with or better than habitat lost as a result of the project. Providing this compensatory habitat mitigation will offset the loss of habitat and may contribute to other recovery efforts for the species.

## Cumulative Effects

Cumulative effects include the effects of future state, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future federal actions that are unrelated to the project are not considered in this section because they require separate consultation pursuant to Section 7 of the Act.

The Service does not have specific information regarding future non-federal actions within the project action area. However, increased agriculture, urbanization, and human development is reasonably likely to result in increased loss of habitat and a reduction in available food and water resources to support these species.

## Conclusion

After reviewing the current status of the dudleya, jewelflower, butterfly, beetle, tadpole shrimp, fairy shrimp, frog, salamander, and vireo; the environmental baseline for the action area; the effects of the project; and the cumulative effects, it is the Service's biological opinion that the construction of the San Jose to Merced Project Section, as proposed, is not likely to jeopardize the continued existence of these species. The Service reached this conclusion because the project-related effects on the species, when added to the environmental baseline and analyzed in consideration of all potential cumulative effects, will not result in precluding recovery or appreciably reducing the likelihood of survival of these species based on the following:

- 1) The Conservation Measures are designed to avoid or minimize and offset adverse impacts on these species and their suitable habitat.
- 2) Project activities that will result in temporary and permanent impacts on suitable habitat only occur on a small percentage of such habitat within the action area and throughout the full range of these species, and, as such, will be unlikely to reduce landscape-scale habitat functionality.
- 3) Protection of habitats within the compensatory mitigation sites will preserve and restore suitable habitat in the same recovery areas (as applicable) affected by constructing and operating the project.

After reviewing the current status of designated critical habitat for the butterfly, frog, and salamander; the environmental baseline for the action area; the effects of the San Jose to Merced Project Section; and the cumulative effects, it is the Service's biological opinion that the San Jose to Merced Project Section, as proposed, is not likely to destroy or adversely modify designated critical habitat. The Service reached this conclusion because the project-related effects to the designated critical habitat, when added to the environmental baseline and analyzed in consideration of all potential cumulative effects, will not rise to the level of precluding the function of the butterfly, frog, and salamander's critical habitat to serve its intended conservation role for the species based on the following:

- 1) The Conservation Measures are designed to avoid or minimize and offset adverse impacts on these species and their suitable habitat.
- 2) Project activities that will result in temporary and permanent impacts on suitable habitat only occur on a small percentage of such critical habitat within the action area and throughout the full range of these species, and, as such, will be unlikely to reduce landscape-scale habitat functionality.

- 3) Protection of habitats within the compensatory mitigation sites will preserve and restore suitable habitat in the same recovery areas (as applicable) affected by constructing and operating the project.

The effects to the butterfly, frog, and salamander are small and discrete, relative to the entire area designation, and are not expected to appreciably diminish the value of the critical habitat or prevent it from sustaining its role in the conservation of the butterfly, frog, and salamander.

### **INCIDENTAL TAKE STATEMENT**

Section 9 of the Act and federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harass is defined by Service regulations at 50 CFR 17.3 as an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering. Harm is defined by the same regulations as an act which actually kills or injures wildlife. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavior patterns, including breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The measures described below are non-discretionary, and must be undertaken by the Authority for the exemption in section 7(o)(2) to apply. The Authority has a continuing duty to regulate the activity covered by this incidental take statement. If the Authority (1) fails to assume and implement the terms and conditions or (2) fails to adhere to the terms and conditions of the incidental take statement, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the Authority must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement [50 CFR §402.14(i)(3)].

Sections 7(b)(4) and 7(o)(2) of the Act generally do not apply to listed plant species. However, limited protection of listed plants from take is provided to the extent that the Act prohibits the removal and reduction to possession of federally listed endangered plants or the malicious damage of such plants on areas under federal jurisdiction, or the destruction of endangered plants on non-federal areas in violation of State law or regulation or in the course of any violation of a State criminal trespass law.

#### **Amount or Extent of Take**

##### *Bay Checkerspot Butterfly and Valley Elderberry Longhorn Beetle*

The Service anticipates that incidental take of the butterfly and beetle will be difficult to detect due to their life history and ecology. The butterfly inhabits host plants (dwarf plantain or owl's clover) and spends most of its lifespan in the egg or pupa stage, making them difficult to detect. The beetle has short lifespans, with adult males typically living 4 to 5 days, and adult females

living up to 3 weeks. This short adult lifespan coupled with larval development occurring exclusively within the stems of the host elderberry plant make this species difficult to detect. Therefore, the amount of habitat for these species that will be impacted as a result of the project will be used as a surrogate for quantifying take. The Service anticipates that all butterflies within 26 acres of suitable habitat and all beetles within the 2 acres of suitable habitat that will be disturbed by the project could be subject to incidental take in the form of injury, mortality, harm, or harassment.

#### *Vernal Pool Fairy Shrimp and Vernal Pool Tadpole Shrimp*

The Service anticipates that incidental take of fairy shrimp and tadpole shrimp will be difficult to detect due to their life history and ecology and because the number of individuals within the project action area is unknown. Fairy shrimp are less than 2.5 centimeters in length and cysts become embedded in the dried bottom mud of vernal pools at the end of their lifecycle making them difficult to detect. Tadpole shrimp are less than 3.3 inches in length and also produce cysts that lie buried in the soil until the next winter rains trigger the eggs to hatch. It is difficult to know how many cysts are in the soil of any wetland feature, or how many individuals or eggs will occupy any wetland feature later in time. Therefore, the amount of habitat for these species that will be impacted as a result of the project will be used as a surrogate for quantifying take. The Service anticipates that all fairy shrimp within the 3.7 acres of suitable habitat and all tadpole shrimp within the 0.5 acre of suitable habitat that will be disturbed by the project could be subject to incidental take in the form of injury, mortality, harm, or harassment.

#### *California Red-legged Frog and California Tiger Salamander*

The Service anticipates that incidental take of the frog and the salamander will be difficult to detect due to its life history and ecology. Specifically, the frog and the salamander can be difficult to locate due to their cryptic appearance and finding a dead or injured individual is unlikely due to their relatively small size. Losses of the frog and the salamander may be difficult to quantify due to seasonal fluctuations in their numbers, random environmental events, changes in their habitat, or additional environmental disturbances. Therefore, the amount of habitat for these species that will be impacted as a result of the project will be used as a surrogate for quantifying take. The Service anticipates that all frogs within 1,903 acres of suitable habitat and all salamanders within the 1,528 acres of suitable habitat that will be disturbed by the project could be subjected to incidental take in the form of injury, mortality, capture, harm, or harassment.

#### *Least Bell's Vireo*

The Service anticipates that incidental take of vireo will be difficult to detect due to its life history and ecology which includes seasonal fluctuations in populations and an unknown anticipated recolonization rate. Therefore, the amount of habitat for these species that will be impacted as a result of the project will be used as a surrogate for quantifying take. The Service anticipates that all vireo individuals within the 73 acres of suitable habitat that will be disturbed by the project could be subject to incidental take in the form of injury, mortality, harm, or harassment.

Upon implementation of the Reasonable and Prudent Measures, these levels of incidental take associated with the San Jose to Merced Project Section in the form of harm, harassment, capture, injury, and death of the frog and the salamander and harm, harassment, injury, and death of the

butterfly, the beetle, fairy shrimp, tadpole shrimp, and the vireo caused by habitat loss, construction activities, and O&M activities will become exempt from the prohibitions described in section 9 of the Act.

### **Effect of the Take**

In the accompanying biological opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to the butterfly, the beetle, fairy shrimp, tadpole shrimp, the frog, the salamander, and the vireo.

### **Reasonable and Prudent Measures**

All necessary and appropriate measures to avoid or minimize effects on the vireo, the frog, the salamander, the butterfly, the beetle, fairy shrimp, and tadpole shrimp resulting from implementation of the San Jose to Merced Project Section have been incorporated into the project's conservation measures. Therefore, the Service believes the following reasonable and prudent measure is necessary and appropriate to minimize incidental take of the vireo, the frog, the salamander, the butterfly, the beetle, fairy shrimp, and tadpole shrimp:

- 1) All conservation measures, as described here in the Project Description section of this biological opinion, shall be fully implemented and adhered to. Further, this reasonable and prudent measure shall be supplemented by the terms and conditions below.

### **Terms and Conditions**

In order to be exempt from the prohibitions of section 9 of the Act, the Authority must ensure compliance with the following terms and conditions, which implement the reasonable and prudent measure described above. These terms and conditions are nondiscretionary.

- 1) The Authority will include full implementation and adherence to the conservation measures as a condition of any permit or contract issued for the project.
- 2) The Authority will require that all personnel associated with this project are made aware of the conservation measures and the responsibility to implement them fully.
- 3) For those components of the action that will result in habitat degradation or modification whereby incidental take in the form of harm is anticipated, the Authority will provide a precise accounting of the total acreage of habitat impacted to the Service on a monthly and annual basis as described in the reporting section of the project description.
- 4) In order to monitor whether the amount or extent of incidental take anticipated from implementation of the project is approached or exceeded, the Authority will adhere to the reporting requirements described in the project description. The Authority and Service will coordinate annually at a minimum to discuss the project and determine if any adjustments need to be made to the annual limit, the description of covered actions, or any other portion of the project.
- 5) Because it is likely that the Authority will not begin construction on the project for a number of years, the Authority will confer with the Service no less than 1 year before the start of project construction to assess any changes to the project, the species baseline in the action area, and potential changes to the effects from the project on listed species. This process will ensure that the assessment of impacts and proposed avoidance and

minimization measures within this opinion are still accurate and reflect existing conditions on the ground.

### **Salvage and Disposition of Individuals:**

Injured listed species must be cared for by a licensed veterinarian or other qualified person(s), such as the Service-approved biologist. Dead individuals must be sealed in a resealable plastic bag containing a paper with the date and time when the animal was found, the location where it was found, and the name of the person who found it, and the bag containing the specimen frozen in a freezer located in a secure site, until instructions are received from the Service regarding the disposition of the dead specimen. The Service contact person is the San Joaquin Valley Division Supervisor at the Sacramento Fish and Wildlife Office at (916) 414-6544.

### **CONSERVATION RECOMMENDATIONS**

Section 7(a)(1) of the Act directs federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a project on listed species or critical habitat, to help implement recovery plans, or to develop information. The Service recommends the following actions:

- 1) The Authority should continue to work with the Service to assist us in meeting the goals of the *Draft Recovery Plan for the Least Bell's Vireo* (Service 1998b), *Recovery Plan for the California Red-legged Frog (*Rana aurora draytonii*)* (Service 2002), *Recovery Plan for the Central California Distinct Population Segment of the California Tiger Salamander (*Ambystoma californiense*)* (Service 2017a), *Recovery Plan for Serpentine Soil Species of the San Francisco Bay Area* (Service 1998a), *Revised Recovery Plan for Valley Elderberry Longhorn Beetle (*Desmocerus californicus dimorphus*)* (Service 2019a), and *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon* (Service 2005a).

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

### **REINITIATION—CLOSING STATEMENT**

This concludes formal consultation on the California High-Speed Rail System: San Jose to Merced Project Section. As provided in 50 CFR §402.16(a), reinitiation of consultation is required and shall be requested by the federal agency or by the Service where discretionary federal involvement or control over the action has been retained or is authorized by law, and:

- 1) If the amount or extent of taking specified in the incidental take statement is exceeded;
- 2) If new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered;
- 3) If the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in the biological opinion; or written concurrence, or

- 4) If a new species is listed or critical habitat designated that may be affected by the identified action.

If you have any questions regarding this biological opinion, please contact Maggie Sepulveda, Senior Fish and Wildlife Biologist, at [margaret\\_sepulveda@fws.gov](mailto:margaret_sepulveda@fws.gov) or (916) 414-6512 or Patricia Cole, Supervisor, San Joaquin Valley Division, at [patricia\\_cole@fws.gov](mailto:patricia_cole@fws.gov) or (916) 414-6544, or the letterhead address.

Sincerely,

Michael Fris  
Field Supervisor

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## **APPENDIX C: FINAL MITIGATION MONITORING AND ENFORCEMENT PLAN**

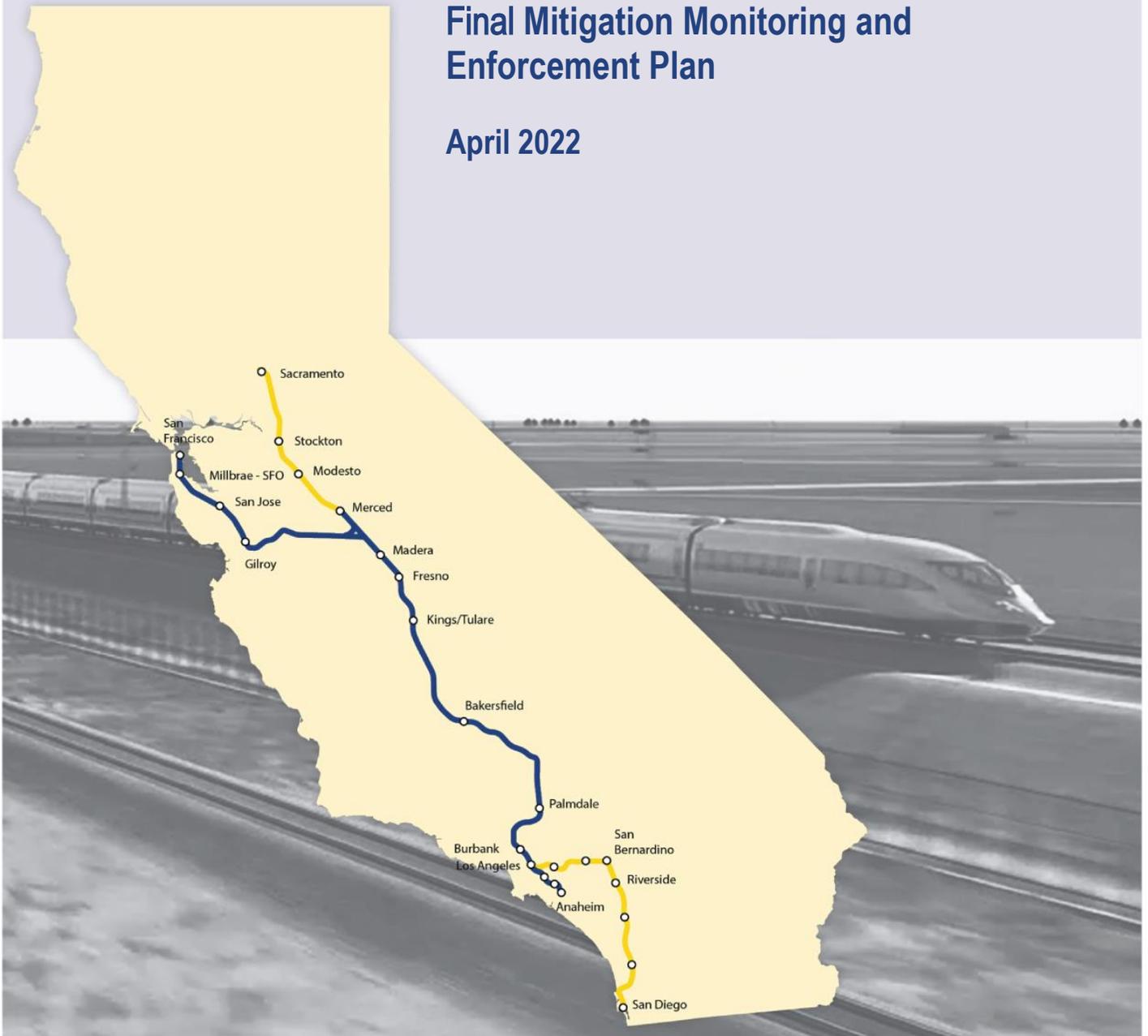


California High-Speed Rail Authority

# San Jose to Merced Project Section

Final Mitigation Monitoring and  
Enforcement Plan

April 2022



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

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**California High-Speed Rail Project  
San Jose to Merced Project Section**



**FINAL MITIGATION MONITORING AND  
ENFORCEMENT PLAN**

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# 1 INTRODUCTION

In February 2022, the California High-Speed Rail Authority (Authority), as the state lead agency and as the federal lead agency pursuant to the National Environmental Policy Act (NEPA) Assignment Memorandum of Understanding (MOU) (July 23, 2019), issued a Final Environmental Impact Report (EIR)/Environmental Impact Statement (EIS) for the San Jose to Merced Project Section of the California High-Speed Rail (HSR) Project.<sup>1</sup> The Final EIR/EIS satisfies the requirements of the California Environmental Quality Act (CEQA) and NEPA and is the basis for the Authority's decision. In its decision, the Authority selected the Preferred Alternative (Alternative 4 including a San Jose Diridon Station, a Downtown Gilroy Station, and a South Gilroy Maintenance-of-Way facility).

This Mitigation Monitoring and Enforcement Plan (MMEP)<sup>2</sup> has been prepared for the Preferred Alternative.

Table 1 of the MMEP describes mitigation measures from the Final EIR/EIS that will mitigate the adverse environmental impacts of the Preferred Alternative. These measures were developed by the Authority in consultation with appropriate agencies, as well as input from the public, to meet the requirements of CEQA and NEPA. The mitigation measures in Table 1 are conditions of approval that the Authority is required to comply with as it implements the Preferred Alternative.

The Preferred Alternative incorporates impact avoidance and minimization features (IAMFs) including best management practices (BMPs) identified in the Final EIR/EIS and described in detail in the technical reports that support the environmental document. As a result of applying these IAMFs, the Preferred Alternative will avoid potential adverse environmental impacts in several resource areas, including electromagnetic fields/electromagnetic interference (EMF/EMI); public utilities and energy; geology, soils, seismicity, and paleontology; station planning, land use, and development; and regional growth. In addition, the regulatory requirements, including permitting and coordination with regulatory agencies, for many project-related activities provide additional assurance that potential adverse environmental impacts will not occur. Three cooperating agencies are part of the NEPA review process: the U.S. Army Corps of Engineers; the U.S. Department of the Interior, Bureau of Reclamation; and the Surface Transportation Board. The following responsible agencies are included as part of the CEQA process:

- California Department of Fish and Wildlife
- California Department of Transportation
- California Department of Water Resources
- California Office of Historic Preservation
- California Public Utilities Commission
- California State Lands Commission
- Peninsula Corridor Joint Powers Board (Caltrain)
- Pajaro River Watershed Flood Prevention Authority
- Regional Water Quality Control Boards
- State Water Resources Control Board
- Santa Clara Valley Water District
- Central Valley Flood Protection Board
- Bay Area Air Quality Management District
- Monterey Bay Unified Air Pollution Control District
- San Joaquin Valley Unified Air Pollution Control District.

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<sup>1</sup> California High-Speed Rail Authority (Authority). 2022. *San Jose to Merced Project Section Final Environmental Impact Report/Environmental Impact Statement*. Sacramento, CA. <https://hsr.ca.gov/programs/environmental-planning/project-section-environmental-documents-tier-2/san-jose-to-merced-project-section-draft-environmental-impact-report-environmental-impact-statement/>.

<sup>2</sup> The MMEP is consistent with CEQA requirements for mitigation monitoring as set forth in Sections 15097 and 15091, subdivision (d) of the CEQA Guidelines (Title 14 California Code of Regulations, Division 6, Chapter 3). Where mitigation is for NEPA purposes only or CEQA purposes only, it is identified accordingly.

Like the mitigation measures listed in Table 1, the project IAMFs and compliance with regulatory requirements are a condition of approval and must be implemented by the Authority during design, construction, and operation of the Preferred Alternative. The IAMFs that are part of the Preferred Alternative are listed in Table 2 and described in Appendix 2-E, Project Impact Avoidance and Minimization Features, in Volume 2 of the Final EIR/EIS.

Key legal requirements the Preferred Alternative is subject to are described for the following resource areas in more detail in the corresponding sections of Chapter 3 of the Final EIR/EIS.

- Transportation – Section 3.2.2
- Air Quality and Greenhouse Gases – Section 3.3.2
- Noise and Vibration – Section 3.4.2
- Electromagnetic Fields and Electromagnetic Interference – Section 3.5.2
- Public Utilities and Energy – Section 3.6.2
- Biological and Aquatic Resources – Section 3.7.2
- Hydrology and Water Resources – Section 3.8.4.2
- Geology, Soils, Seismicity, and Paleontological Resources – Section 3.9.2
- Hazardous Materials and Waste – Section 3.10.2
- Safety and Security – Section 3.11.2
- Socioeconomics and Communities – Section 3.12.2
- Station Planning, Land Use, and Development – Section 3.13.2
- Agricultural Farmland – Section 3.14.2
- Parks, Recreation, and Open Space – Section 3.15.2
- Aesthetics and Visual Quality – Section 3.16.2
- Cultural Resources – Section 3.17.2
- Regional Growth – Section 3.18.2
- Cumulative Impacts – Section 3.19.2

The MMEP adheres to the Council on Environmental Quality's (CEQ) regulations (40 Code of Federal Regulations [C.F.R.] § 1505<sup>3</sup>) and Federal Railroad Administration *Procedures for Considering Environmental Impacts* (64 *Federal Register* [Fed. Reg.] 28545, May 26, 1999) and was prepared based on the CEQ finalized guidance entitled *Appropriate Use of Mitigation and Monitoring and Clarifying the Appropriate Use of Mitigated Findings of No Significant Impact* (CEQ January 14, 2011). The CEQ guidance assists NEPA lead agencies to develop mitigation programs that provide effective documentation, implementation, and monitoring of mitigation commitments.

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<sup>3</sup> The CEQ issued new regulations on July 14, 2020, effective September 14, 2020, updating the NEPA implementing procedures at 40 C.F.R. Part 1500. However, this project initiated the NEPA process before the effective date and is not subject to the new regulations, relying on the 1978 regulations as 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. Section 1506.13 (2020) and the preamble at 85 Fed. Reg. 43340.

## 2 MITIGATION MONITORING AND ENFORCEMENT PLAN

The environmental effects of the Preferred Alternative will result in impacts considered significant under CEQA and in effects considered adverse under NEPA. Mitigation measures that will reduce or eliminate potential adverse environmental impacts are described in Chapter 3 of Volume 1 of the Final EIR/EIS. The specific provisions contained in this MMEP are presented as tables and include mitigation measures identified in the Final EIR/EIS, organized by environmental issue and topical areas addressed in the Final EIR/EIS. In collaboration with the appropriate agencies, the Authority may refine the means by which it will implement a mitigation measure, as long as the alternative means will be equally or more effective. This MMEP describes implementation and monitoring procedural guidance, responsibilities, and timing for each mitigation measure identified in the Final EIR/EIS. Components include:

- **Impact Number and Impact Text:** Provides the impact number and description of the impact requiring mitigation as identified in the Final EIR/EIS.
- **Mitigation Measure(s):** Provides the mitigation measure and monitoring requirements as identified in the Final EIR/EIS.
- **Phase:** Provides the phase during which the mitigation measure will be implemented (pre-construction, during construction, post-construction, or during operation).
- **Implementation Action/Text/Mechanism:** Identifies the actions required to implement the measures, including any required agreements and/or conditions.
- **Reporting Schedule:** Identifies the stage of the project and the frequency that reporting is to occur, if reporting is required.
- **Implementing Party/Monitoring/Reporting Party:** Except as noted, identifies the entity that will be responsible for directly implementing the mitigation measures, monitoring, and reporting. Implementation can be the responsibility of the Authority or its Contractor. Monitoring will generally be the responsibility of the Contractor, with oversight provided by the Authority during construction. Long-term mitigation monitoring responsibilities will be the responsibility of the Authority.

### 2.1 Roles and Responsibilities

As the lead agency and proponent of this Project, the Authority will implement the mitigation measures through its own actions, those of its Contractors, and actions taken in cooperation with other agencies and entities. The Authority is ultimately accountable for the overall administration of the MMEP and for assisting relevant individuals and parties in their oversight and reporting responsibilities. The responsibilities of mitigation implementation, monitoring, and reporting will be extended to several entities as discussed above; however, the Authority will bear the primary responsibility for verifying that the mitigation measures are implemented. The Authority defines the mitigation measures required for the Project. When project work is undertaken by the Authority's contractor, the Contractor shall implement the mitigation measures that are pertinent to its scope of work. The Contractor shall monitor construction activities to ensure that the mitigation measures are being properly implemented and accurately report its activity and results to the Authority. The Authority will periodically check the Contractor's activity, reports, and effectiveness of mitigation activities.

- **Authority**—While the Authority retains responsibility for the implementation and reporting on mitigation measures and IAMFs as specified in this MMEP, activities may be carried out by an Authority representative or an Authority-approved contractor. Authority responsibilities may also include certain measures outside of the scope of the Contractor such as future studies or operations-phase implementation. In addition, oversight of implementation and reporting may be provided by Authority contractor or representatives as lead agency representatives to facilitate regulatory oversight agency coordination and compliance during implementation and reporting.

- **Contractor**—The Contractor(s) (or the environmental team provided by the Contractor) will be responsible for implementing or monitoring mitigation measures and IAMFs as specified in this MMEP.
- **Mitigation Manager**—The Contractor’s representative responsible for overseeing their environmental team’s implementation and reporting of environmental commitments will be responsible for reporting the status of each mitigation measure to the Authority in accordance with this MMEP.
- **Biological Monitor(s)**—The Contractor-provided Biological Monitor(s) will be approved by and report directly to the Contractor’s Biologist. The Biological Monitor(s) will be present on site within a reasonable monitoring distance during all ground-disturbing activities that have the potential to affect biological resources as directed by the Project Biologist and will be the principal agent(s) in the direct implementation of the MMEP and compliance assurance.
- **Cultural Resources Compliance Manager/Principal Investigator**—This position must be an Archaeologist who meets relevant Secretary of the Interior qualifications for an archaeologist. The Cultural Resources Compliance Manager/Principal Investigator is responsible for implementing mitigation measures in compliance with the terms and conditions outlined in the MMEP and treatment plans and coordinating the status of archaeological mitigation with the Authority in accordance with this MMEP, the Authority’s Programmatic Agreement with the California State Historic Preservation Officer, and the San Jose to Merced Memorandum of Agreement.
- **Cultural Resources Monitor(s)**—The Contractor-provided Cultural Resources Monitor(s) will be approved by and report directly to the Cultural Resources Compliance Manager/Principal Investigator. This/these Monitor(s) will be present on site within a reasonable monitoring distance during ground-disturbing activities in areas indicated as culturally sensitive and will be the principal agent(s) in the direct implementation of the MMEP and compliance assurance as directed by the Cultural Resources Compliance Manager/Principal Investigator.
- **Paleontological Resources Specialist**—The Contractor-provided Paleontological Resources Specialist is responsible for implementing mitigation measures in compliance with the terms and conditions outlined in the MMEP, including preparation of the Paleontological Resources Management Plan and approval and direction of the Paleontological Resource Monitor(s).
- **Paleontological Resources Monitor(s)**—The Contractor-provided Paleontological Resources Monitor(s) will be approved by and report directly to the Paleontological Resources Specialist. The Paleontological Resources Monitor(s) will be present on site within a reasonable monitoring distance during ground-disturbing activities in areas indicated as resource sensitive and will be the principal agent(s) in the direct implementation of the MMEP and compliance assurance as directed by the Paleontological Resources Specialist.

### **3 ENVIRONMENTAL MITIGATION MANAGEMENT AND ASSESSMENT (EMMA) SYSTEM**

The Authority will implement an Environmental Mitigation Management and Assessment (EMMA) system consisting of strategic planning, policies, and procedures, organizational structure, staffing and responsibilities, milestones, schedule, and resources devoted to achieving the Authority's environmental commitments. The EMMA will also include a component that tracks the implementation of mitigation measures (as well as environmental commitments, BMPs, and IAMFs) and can produce reports on compliance. Authority staff will receive periodic reports on compliance and may request additional reports as necessary to ensure that the MMEP is fully implemented. This system will rely on data provided by the Contractor, its consultants, and others to produce status reports regarding construction status, permitting activities, monitoring, inspections, and other compliance activities.

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**Table 1. San Jose to Merced Project Section: Mitigation Monitoring and Enforcement Plan**

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
<b>Transportation</b>										
TR-MM#1c	Optimize Signal Coordination on West Santa Clara Street from Stockton Street to Autumn Street in San Jose (NEPA Effect Only)	Prior to HSR operations, the Contractor will modify the signal and optimize the signal timings and coordination for the traffic signals on West Santa Clara Street from Stockton Street to Autumn Street. This improvement includes the intersections of West Santa Clara Street with Stockton Street, Cahill Street, Montgomery Street, and Autumn Street. The Contractor will prepare all materials necessary for the approval of the City of San Jose for the implementation of the modification.	Design/ construction	Contract requirements; compliance reporting	As needed	Authority/ Contractor	Authority	Final design and prior to construction	Condition of construction contract	Impact TR#7: Continuous Permanent Delay/Congestion Consequences on Intersection Operations
TR-MM#1e	Monterey Road/Chynoweth Avenue–Roeder Road—Widen and Reconfigure (NEPA Effect Only)	Prior to HSR operations, the Contractor will widen and reconfigure the Monterey Road/Chynoweth Avenue–Roeder Road intersection. The specific improvements are limited to: widening the northbound Monterey Road approach to add an additional left turn pocket and a right turn pocket, modify the eastbound Chynoweth Avenue approach to provide one shared through-right and one left turn only lane and widen the westbound Roeder Road approach to provide for an additional left turn pocket. This will require acquisition of additional right-of-way from the northeast and southeast corners of the intersection. These parcels are currently occupied by gas pumps associated with two gas stations. The acquisition will result in displacement of some of the gas pumps, but the pumps could be relocated on the same property, and the business is not likely to be completely displaced.	Design/ construction	Contract requirements; compliance reporting	As needed	Authority/ Contractor	Authority	Final design and prior to construction	Condition of construction contract	Impact TR#7: Continuous Permanent Delay/Congestion Consequences on Intersection Operations Impact S&S#4: Continuous Permanent Impacts on Emergency Access and Response Times
TR-MM#1q	Monterey Road/Tilton Avenue—Various Improvements (NEPA Effect Only)	This measure will include reconfiguring the Monterey Road/Tilton Avenue intersection as follows: <ul style="list-style-type: none"> <li>The mitigation is the interconnection of the Monterey Road/Tilton Avenue intersection with the Monterey Road/Burnett Avenue intersection, which will be accomplished within the roadway right-of-way.</li> </ul>	Design/ construction	Contract requirements; compliance reporting	As needed	Authority/ Contractor	Authority	Final design and prior to construction	Condition of construction contract	Impact TR#7: Continuous Permanent Delay/Congestion Consequences on Intersection Operations
TR-MM#1t	Monterey Road/San Martin Avenue—Restripe Southbound Approach (NEPA Effect Only)	Prior to HSR operations, the Contractor will restripe the southbound Monterey Road approach to San Martin Avenue to provide additional capacity for the southbound left turn lane. This improvement will require the removal of the adjacent northbound left turn lane on Monterey Road into Burbank Avenue. This improvement will not require right-of way acquisition. The Contractor will prepare all materials necessary for the approval of Santa Clara County for the implementation of the modification.  This mitigation measure will improve the operation at this intersection by providing additional vehicle capacity but will not avoid an adverse effect. Implementing TR-MM#1t will result in reduced vehicle capacity at an adjacent intersection (Monterey Road/Burbank Avenue).	Design/ construction	Contract requirements; compliance reporting	As needed	Authority/ Contractor	Authority	Final design and prior to construction	Condition of construction contract	Impact TR#7: Continuous Permanent Delay/Congestion Consequences on Intersection Operations Impact S&S#4: Continuous Permanent Impacts on Emergency Access and Response Times

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
TR-MM #1u	Monterey Road/IOOF Avenue—Widen and Reconfigure Southbound Approach (NEPA Effect Only)	Prior to HSR operations, the Contractor will widen the southbound approach of Monterey Road to IOOF Avenue to provide an additional southbound left turn pocket.	Design/ construction	Contract requirements; compliance reporting	As needed	Authority/ Contractor	Authority	Final design and prior to construction	Condition of construction contract	Impact TR#7: Continuous Permanent Delay/Congestion Consequences on Intersection Operations Impact S&S#4: Continuous Permanent Impacts on Emergency Access and Response Times
TR-MM#1w	Chestnut Street/Luchessa Street—Reconfigure Southbound Approach (NEPA Effect Only)	Prior to HSR operations, the Contractor will restripe the southbound approach of Chestnut Street to Luchessa Street to provide a southbound right turn pocket. This improvement will not require right-of-way acquisition.	Design/ construction	Contract requirements; compliance reporting	As needed	Authority/ Contractor	Authority	Final design and prior to construction	Condition of construction contract	Impact TR#7: Continuous Permanent Delay/Congestion Consequences on Intersection Operations Impact S&S#4: Continuous Permanent Impacts on Emergency Access and Response Times
TR-MM#1x	Install Traffic Signals at Various Locations (NEPA Effect Only)	<p>Prior to HSR operations, the Contractor will install traffic signals at the following locations:</p> <ul style="list-style-type: none"> <li>▪ TR-MM#1x.1: Cahill Street/Stover-Crandall Street</li> <li>▪ TR-MM#1x.2: Montgomery Street/Stover-Crandall Street</li> <li>▪ TR-MM#1x.3: Cahill Street/West San Fernando Street</li> <li>▪ TR-MM#1x.6: East Main Avenue/Depot Street</li> <li>▪ TR-MM#1x.9: School Access/IOOF Avenue</li> <li>▪ TR-MM#1x.10: SR 25/Bloomfield.</li> </ul> <p>The Contractor will prepare all materials necessary for the approval of the City of San Jose, the City of Morgan Hill, the City of Gilroy, and Caltrans (as applicable) for the implementation of this improvement.</p>	Design/ construction	Contract requirements; compliance reporting	As needed	Authority/ Contractor	Authority	Final design and prior to construction	Condition of construction contract	Impact TR#4: Permanent Delay/Congestion Consequences on Intersections from Permanent Road Changes (for TR-MM#1x.10) Impact TR#7: Continuous Permanent Delay/Congestion Consequences on Intersection Operations (for all other mitigation measures listed in Mitigation Text column) Impact S&S#4: Continuous Permanent Impacts on Emergency Access and Response Times (for TR-MM#x.6, x.8, x.9, and x.10)
TR-MM#2	Install Transit Signal Priority	<p>Prior to construction, the Contractor will install bus transit signal priority at all traffic signals in the following locations:</p> <ul style="list-style-type: none"> <li>▪ San Jose Diridon Station Area                             <ul style="list-style-type: none"> <li>– Cahill Street between West Santa Clara Street and Park Avenue</li> <li>– Montgomery Street between West Santa Clara Street and Park Avenue</li> <li>– Autumn Street between West Santa Clara Street and Park Avenue</li> </ul> </li> <li>▪ Gilroy Station Area</li> </ul> <p>Prior to operations, the Contractor will install bus transit signal priority at all traffic signals in the following locations:</p> <ul style="list-style-type: none"> <li>▪ San Jose Diridon Station Area                             <ul style="list-style-type: none"> <li>– Cahill Street between West Santa Clara Street and Park Avenue</li> <li>– Montgomery Street between West Santa Clara Street and Park Avenue</li> <li>– Autumn Street between West Santa Clara Street and Park Avenue</li> </ul> </li> <li>▪ Monterey Road from Capitol Expressway and Blossom Hill Road</li> <li>▪ Gilroy Station Area</li> <li>▪ Monterey Road between 7th Street and 10th Street</li> </ul>	Pre-construction  Pre-operation	Design  Design	Prior to commencement of construction  Prior to commencement of operation	Authority/ Contractor  Authority/ Contractor	Authority/ Contractor	Improvements to address traffic delay impacts	Condition of construction contract	Impact TR#10: Temporary Impacts on Bus Transit Impact TR#12: Permanent Impacts on Bus Transit Impact TR#13: Continuous Permanent Impacts on Bus Services

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<ul style="list-style-type: none"> <li>Alexander Street between 7th Street and 10th Street</li> </ul> <p>The Contractor will prepare all materials necessary for the jurisdictional approvals for the implementation of this improvement.</p>								
TR-MM#3	Railway Disruption Control Plan	<p>Prior to construction, the Contractor will prepare a railway disruption control plan for Authority approval. During construction, the Contractor will implement the plan. The goal of the railway disruption control plan will be to minimize the overall duration of disruption of passenger and freight operations and maintain reasonable LOS, while allowing for an expeditious completion of construction. The construction Contractor will coordinate with passenger rail providers (Caltrain, ACE, Capitol Corridor, TAMC, and Amtrak) and with UPRR in advance and during any potential disruption to passenger or freight operations or passenger or UPRR facilities. The construction Contractor will maintain passenger rail and UPRR's emergency access throughout construction.</p> <p>The Authority will require the construction Contractor, in cooperation with Caltrain, to implement the following coordination and consultation requirements:</p> <ul style="list-style-type: none"> <li>The Contractor will establish a freight stakeholder committee to provide an information and feedback forum prior to and during construction with a minimum of quarterly coordination meetings during construction, which will include representatives from the Authority, Caltrain, UPRR, and freight operators and shippers.</li> <li>The Contractor will consult with Caltrain, UPRR, and freight operators and shippers during preparation of the railway disruption control plan, including provision of a draft plan for freight stakeholder comment prior to completion. Where the plan concerns the Caltrain right-of-way and facilities, Caltrain will approve the plan. The Authority will review and approve the final plan only after Caltrain approval relative to Caltrain right-of-way and facilities.</li> <li>As part of the railway disruption control plan, the Contractor will prepare a track closure contingency plan for every proposed track closure describing the duration of closure and the alternative arrangements to facilitate freight operations, including approval of freight operations during daytime during weekdays (if feasible and approved by Caltrain).</li> <li>The Contractor will notify Caltrain, UPRR, and freight operators and users of any planned mainline track closures or limitations of access to other rail facilities (spur tracks, rail yards, and maintenance facilities) at least 3 months prior to the closure or limitation of access.</li> </ul> <p>The Authority will make efforts to contain and minimize disruption to freight and tenant passenger services during project construction, while allowing for expeditious</p>	Pre-construction	Design	Prior to commencement of construction	Authority/ Contractor	Contractor	Develop and implement railway disruption control plan	Condition of construction contract	<p>Impact TR#11: Temporary Impacts on Passenger Rail Operations</p> <p>Impact TR#20: Temporary Impacts on Freight Rail Operations</p>

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<p>completion of construction. Measures that will be implemented throughout the course of project construction will include, but will not be limited to, the following:</p> <ul style="list-style-type: none"> <li>▪ Limit number of simultaneous track closures within each subsection, with closure timeframe limited as much as feasible for each closure, unless bypass tracks or alternative routes are available.</li> <li>▪ Provide safety measures for freight and passenger rail operation through construction zones.</li> <li>▪ Require Contractors to coordinate with rail dispatch to minimize disruption of rail service in the corridor.</li> <li>▪ Where feasible, limit closure of any tracks for construction activities to periods when train service is less frequent (e.g., weekends, or midday and late evening periods on weekdays).</li> <li>▪ Where one open track cannot be maintained for passenger or freight use, limit multitrack closures to one location at a time, as much as feasible.</li> <li>▪ Where multitrack closures result in temporary suspension of passenger rail service, work with local and regional transit providers to facilitate alternative transit service around the closure area (e.g., increased bus and shuttle service).</li> <li>▪ Where multitrack closures result in temporary suspension of freight rail service, work with UPRR and freight operators and users to schedule alternative freight service timing to minimize disruption to freight customers.</li> <li>▪ Provide advance notice to local and regional transit providers to support advance notice to transit riders of any temporary disruption in passenger rail service.</li> </ul> <p>The Authority will provide a bus bridge from the College Park Station to the Santa Clara Station and San Jose Diridon Station to maintain passenger access to Caltrain service during the 1 to 2 years that the station will be closed because of track work.</p>								
<b>Air Quality and Greenhouse Gases</b>										
AQ-MM#1	Implement Additional On-Site Emissions Controls to Reduce Fugitive Dust	<p>During construction, the Contractor shall employ the following measures to minimize and control fugitive dust emissions:</p> <ul style="list-style-type: none"> <li>▪ Where feasible, install wind breaks (e.g., dust curtains, plastic tarps, solid fencing) on the average dominant windward side(s) of station construction areas. For purposes of implementation, chain-link fencing with added landscape mesh fabric adequately qualifies as solid fencing.</li> <li>▪ Post a publicly visible sign with the telephone number and person to contact at the Authority regarding dust complaints. This person shall respond and take corrective action within 48 hours. The phone number for the local air district shall also be visible to ensure</li> </ul>	Construction	Contract requirements; compliance report	As needed	Authority/ Contractor	Authority	Daily record keeping and report as needed.	Condition of construction contract	<p>Impact AQ#1: Temporary Direct and Indirect Impacts on Air Quality within the SFBAAB</p> <p>Impact AQ#3: Temporary Direct and Indirect Impacts on Air Quality within the SJVAB</p> <p>Impact AQ#4: Temporary Direct Impacts on Implementation of an Applicable Air Quality Plan</p> <p>Impact AQ#5: Temporary Direct Impacts on Localized Air Quality—Criteria Pollutants</p>

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		compliance with applicable regulations.								
AQ-MM#2	Construction Emissions Reductions – Requirements for use of Zero Emission (ZE) and/or Near Zero Emission (NZE) Vehicles and off-road equipment	<p>This mitigation measure will reduce the impact of construction emissions from project related on-road vehicles and off-road equipment. All remaining emissions after implementation of this measure will be offset with emission credits required under Mitigation Measures AQ-MM#3 and AQ-MM#4.</p> <p>The Authority and all project construction contractors shall require that a minimum of 25%, with a goal of 100%, of all light-duty on-road vehicles (e.g., passenger cars, light-duty trucks) associated with the project (e.g., on-site vehicles, contractor vehicles) use zero emission (ZE) or near-zero emission (NZE) technology.</p> <p>The Authority and all project construction contractors shall have the goal that a minimum of 25% of all heavy-duty on-road vehicles (e.g., for hauling, material delivery and soil import/export) associated with the project use ZE or NZE technology.</p> <p>The Authority and all project construction contractors shall have the goal that a minimum of 10% of off-road construction equipment use ZE or NZE vehicles.</p> <p>If local or state regulations mandate a faster transition to using ZE and/or NZE vehicles at the time of construction, the more stringent regulations will be applied. For example, Executive Order (EO) N-79-20, issued by California Governor Newsom September 23, 2020, currently states the following:</p> <ul style="list-style-type: none"> <li>▪ Light duty and passenger car sales be 100% ZE V by 2035</li> <li>▪ Full transition to ZEV short haul/drayage trucks by 2035</li> <li>▪ Full transition to ZEV heavy-duty long-haul trucks, where feasible, by 2045</li> <li>▪ Full transition to ZE off-road equipment by 2035, where feasible</li> </ul> <p>The project will have a goal of surpassing the requirements of these or other future regulations as a mitigation measure.</p>	Pre-construction	Contract requirements; compliance reporting	Monthly and annually	Authority/ Contractor	Authority	Daily record keeping and monthly/annual reporting	A copy of each unit's certified tier specification and any required CARB or air pollution control district operating permit will be made available by the Authority at the time of mobilization of each piece of equipment	<p>Impact AQ#1: Temporary Direct and Indirect Impacts on Air Quality within the SFBAAB</p> <p>Impact AQ#3: Temporary Direct and Indirect Impacts on Air Quality within the SJVAB</p> <p>Impact AQ#4: Temporary Direct Impacts on Implementation of an Applicable Air Quality Plan</p> <p>Impact AQ#5: Temporary Direct Impacts on Localized Air Quality—Criteria Pollutants</p>
AQ-MM#3	Offset Project Construction Emissions in the San Francisco Bay Area Air Basin	<p>Prior to issuance of construction contracts, the Authority will conduct an air quality analysis that evaluates the conditions that exist at that time. If the analysis determines that there will be exceedances of the VOC or NO<sub>x</sub> thresholds, even after the application of the mitigation in AQ-MM#2, the Authority will enter into an agreement with the BAAQMD, to reduce VOC and NO<sub>x</sub> to the required levels by acquiring offsets. The required levels in the SFBAAB are as follows:</p> <ol style="list-style-type: none"> <li>1. For emissions in excess of the General Conformity de</li> </ol>	Pre-construction	Reporting; funding	Weekly	Authority/ Contractor	Authority/ Contractor	Offset project construction criteria air pollutant emissions through funding	Authority to coordinate offset fees with BAAQMD per Contractor reports	<p>Impact AQ#1: Temporary Direct and Indirect Impacts on Air Quality within the SFBAAB</p> <p>Impact AQ#4: Temporary Direct Impacts on Implementation of an Applicable Air Quality Plan</p>

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<p><i>de minimis</i> thresholds (NO<sub>x</sub>): net zero.<sup>4</sup></p> <p>2. For emissions not in excess of <i>de minimis</i> thresholds but above the BAAQMD's daily emission thresholds (VOC and NO<sub>x</sub>): below the appropriate CEQA threshold levels.</p> <p>The mitigation offset fee amount will be determined at the time of mitigation to fund one or more emissions reduction projects within the SFBAAB. The offset fee will be determined by the Authority and the BAAQMD based on the type of projects that present appropriate emission reduction opportunities. These funds may be spent to reduce either VOC or NO<sub>x</sub> emissions ("O<sub>3</sub> precursors"). Documentation of payment will be provided to the Authority or its designated representative.</p> <p>The agreement will include details regarding the annual calculation of required offsets the Authority must achieve, funds to be paid, administrative fee, and the timing of the emissions reductions projects. Acceptance of this fee by BAAQMD will serve as an acknowledgment and commitment by BAAQMD to: (1) implement an emissions reduction project(s) within a timeframe to be determined based on the type of project(s) selected after receipt of the mitigation fee designed to achieve the emission reduction objectives; and (2) provide documentation to the Authority or its designated representative describing the project(s) funded by the mitigation fee, including the amount of emissions reduced (tons per year) in the SFBAAB from the emissions reduction project(s). To qualify under this mitigation measure, the specific emissions reduction project(s) must result in emission reductions in the SFBAAB that are real, surplus, quantifiable, enforceable, and will not otherwise be achieved through compliance with existing regulatory requirements or any other legal requirement. Pursuant to 40 C.F.R. Section 93.163(a), the reductions necessary for GCD must be achieved (contracted and delivered) by the applicable year in question. Funding will need to be received by BAAQMD prior to contracting with offset participants and should allow enough time to receive and process applications to fund and implement offsite reduction projects prior to commencement of project activities being reduced. This will roughly equate to 1 year prior to the required mitigation; additional lead time may be necessary depending on the level of offsite emission reductions required for a specific year.</p>								
AQ-MM#4	Offset Project Construction Emissions	On June 19, 2014, the SJVAPCD and the Authority entered an MOU that establishes the framework for fully	Pre-construction	Reporting; funding	Prior to construction	Authority/ Contractor	Authority/ Contractor	Offset project construction	Pursuant to the MOU, the Authority	Impact AQ#3: Temporary Direct and Indirect Impacts on Air Quality within the

<sup>4</sup> The project will implement measures and best practices to minimize emissions from project construction. After implementation of these measures, emission levels that still exceed thresholds will be offset to the extent necessary to satisfy General Conformity.

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
	in the San Joaquin Valley Air Basin	mitigating to net-zero construction emissions of NOx, VOC, PM <sub>10</sub> , and PM <sub>2.5</sub> from the entire HSR project within the SJVAB (Authority and SJVAPCD 2014). Emissions generated by construction of the portion of the project within the SJVAB are subject to this MOU and, therefore, must be offset to net zero. Pursuant to the MOU, the Authority and the SJVAPCD will enter into a Voluntary Emissions Reduction Agreement (VERA) to cover the portion of the project approved and funded for construction within the SJVAB. The project-level VERA must be executed prior to commencement of construction and the mitigation fees and offsets delivered and achieved according to the requirements of the VERA and MOU.						criteria air pollutant emissions through funding	shall enter into a VERA (or modify the existing VERA) with the SJVAPCD to cover the portion of the project approved and funded for construction within the SJVAB	SJVAB Impact AQ#4: Temporary Direct Impacts on Implementation of an Applicable Air Quality Plan

**Noise and Vibration**

NV-MM#1	Construction Noise Mitigation Measures	<p>Prior to construction (any ground-disturbing activities), the Contractor will prepare a noise-monitoring program for Authority approval. The noise-monitoring program will describe how during construction the Contractor will monitor construction noise to reduce noise levels to the noise limits (an 8-hour L<sub>eq</sub> of 80 dBA during the day and 70 dBA at night for residential land use, 85 dBA for both day and night for commercial land use, and 90 dBA for both day and night for industrial land use) where a noise-sensitive receptor is present and wherever feasible. The Contractor will be given the flexibility to reduce noise in the most efficient and cost-effective manner. This can be done by prohibiting certain noise-generating activities during nighttime hours or providing additional noise control measures to meet required noise limits. In addition, the noise-monitoring program will describe the actions required of the Contractor to meet required noise limits. These actions will include the following nighttime and daytime noise control mitigation measures, as necessary:</p> <ul style="list-style-type: none"> <li>▪ Install a temporary construction site noise barrier near a noise source.</li> <li>▪ Avoid nighttime construction in residential neighborhoods.</li> <li>▪ Locate stationary construction equipment as far as possible from noise-sensitive sites.</li> <li>▪ Reroute construction truck traffic along roadways that will cause the least disturbance to residents.</li> <li>▪ During nighttime work, use smart backup alarms, which automatically adjust the alarm level based on the background noise level, or switch off backup alarms and replace with spotters.</li> <li>▪ Use low-noise-emission equipment.</li> <li>▪ Implement noise-deadening measures for truck loading and operations.</li> <li>▪ Monitor and maintain equipment to meet noise limits.</li> <li>▪ Line or cover storage bins, conveyors, and chutes with sound-deadening material.</li> <li>▪ Use acoustic enclosures, shields, or shrouds for</li> </ul>	Pre-construction/ construction	Design/ reporting	Prior to construction/ weekly monitoring	Authority/ Contractor	Authority/Contractor	Placement of noise barriers and construction equipment to mitigate construction noise, operational noise mitigation measures, and weekly monitoring construction noise	Contract requirements and specifications	Impact NV#1: Temporary Exposure of Sensitive Receptors to Construction Noise Impact PK#1: Temporary Changes from Noise, Vibration, and Construction Emissions on Use and User Experience of Parks, Recreational Facilities, and Open Space Resources
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Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<p>equipment and facilities.</p> <ul style="list-style-type: none"> <li>Use high-grade engine exhaust silencers and engine-casing sound insulation.</li> <li>Prohibit aboveground jackhammering and impact pile driving during nighttime hours.</li> <li>Minimize the use of generators to power equipment.</li> <li>Limit use of public address systems.</li> <li>Grade surface irregularities on construction sites.</li> <li>Use movable noise barriers at the source of the construction activity.</li> <li>Limit or avoid certain noisy activities during nighttime hours.</li> <li>To mitigate noise related to pile driving, use an auger to install the piles instead of a pile driver to reduce noise levels substantially. If pile driving is necessary, limit the time of day that the activity can occur.</li> </ul> <p>The Authority will establish and maintain in operation until completion of construction a toll-free "hotline" regarding the project construction activities. The Authority will arrange for all incoming messages to be logged (with summaries of the contents of each message) and for a designated representative of the Authority to respond to hotline messages within 24 hours (excluding weekends and holidays). The Authority will make a reasonable good-faith effort to address all concerns and answer all questions, and will include on the log its responses to all callers. The Authority will make a log of the incoming messages and the Authority's responsive actions publicly available via request on its website.</p> <p>The Contractor will provide the Authority with an annual report by January 31 of the following year documenting how it implemented the noise monitoring program.</p>								
NV-MM#2	Construction Vibration Mitigation Measures	<p>Prior to construction involving impact pile driving within 50 feet of any building, the Contractor will provide the Authority with a vibration technical memorandum documenting how project pile driving criteria will be met. Upon approval of the technical memorandum by the Authority, and where a vibration-sensitive receptor is present, the contractor will comply with the vibration reduction Methods described in that memorandum. Potential construction vibration building damage is only anticipated from impact pile driving at very close distances to buildings. If pile driving occurs more than 50 feet from buildings, or if alternative methods such as push piling or auger piling are used, damage from construction vibration is not expected to occur. When a construction scenario has been established, the Contractor will conduct pre-construction surveys at locations within 50 feet of pile driving to document the existing condition of buildings in case damage is reported during or after construction. The Contractor will arrange for the repair of damaged buildings or will pay compensation to the property owner.</p>	Pre-construction/ construction/ post-construction	Reporting (technical memorandum)	Pre-construction surveys to establish baseline/weekly monitoring during construction/post-construction repairs, as needed	Authority/ Contractor	Authority/ Contractor	Pre-construction surveys to establish baseline/ weekly monitoring during construction/post-construction repairs, as needed	Contract requirements and specifications	<p>Impact NV#9: Temporary Exposure of Sensitive Receptors and Buildings to Construction Vibration</p> <p>Impact PK#1: Temporary Changes from Noise, Vibration, and Construction Emissions on Use and User Experience of Parks, Recreational Facilities, and Open Space Resources</p>

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
NV-MM#3	Implement Proposed California High-Speed Rail Project Noise Mitigation Guidelines	<p>Various options exist to address any potentially severe noise effects from HSR operations. The Authority has developed Noise and Vibration Mitigation Guidelines for the statewide HSR system that sets forth three categories of mitigation measures to reduce or offset severe noise impacts from HSR operations: noise barriers, sound insulation, and noise easements. The guidelines also set forth an implementation approach that considers multiple factors for determining the reasonableness of noise barriers as mitigation for severe noise impacts, including structural and seismic safety, cost, number of affected receptors, and effectiveness. Noise barrier mitigation will be designed to reduce the exterior noise level from HSR operations from severe to moderate, according to the provisions of the FRA guidance manual (FRA 2012): High-Speed Ground Transportation Noise and Vibration Impact Assessment, DOT/FRA/ORD-12/15. U.S. Department of Transportation, Office of Railroad Policy and Development. September 2012.</p> <p>The Noise and Vibration Mitigation Guidelines, included as Volume 2, Appendix 3.4-B, describe the following mitigation measures and approach:</p> <ul style="list-style-type: none"> <li>▪ <b>Noise Barriers</b>—Prior to operation of the HSR, the Authority will install noise barriers where they can achieve between 5 and 15 dB of exterior noise reduction, depending on their height and location relative to the tracks. The primary requirements for an effective noise barrier are that the barrier must (1) be high enough and long enough to break the line-of-sight between the sound source and the receiver, (2) be of an impervious material with a minimum surface density of four pounds per square foot, and (3) not have any gaps or holes between the panels or at the bottom. Because many materials meet these requirements, aesthetics, durability, cost, and maintenance considerations usually determine the selection of materials for noise barriers. Depending on the situation, noise barriers can become visually intrusive. Typically, the noise barrier style is selected with input from the local jurisdiction to reduce the visual effect of barriers on adjacent lands uses (Authority 2014). For example, noise barriers could be solid or transparent, and made of various colors, materials, and surface treatments. Transparent materials will not be used in noise barriers located in Audubon Important Bird Areas or where noise barriers are being used to</li> </ul>	Pre-construction/ construction/ post-construction	Design	Prior to final design/prior to operation/ monthly reporting during operation	Authority/ Contractor	Authority/ Contractor	Implement noise barriers as needed or acquire easements on properties severely affected by noise	Contract requirements and specifications; California HSR Project noise and vibration mitigation guidelines	<p>Impact NV#2: Intermittent Permanent Exposure of Sensitive Receptors to Noise from Train Operations</p> <p>Impact NV#5: Intermittent Permanent Human Annoyance from Onset of Passing HSR Trains</p> <p>Impact NV#6: Permanent Exposure of Sensitive Receptors to Vehicular Traffic Noise Increases</p> <p>Impact NV#8: Permanent Exposure of Sensitive Receptors to Traction Power Facility Noise</p> <p>Impact PK#7: Permanent Changes from Noise and Vibration on Parks, Recreation, and Open Space Resource Character and Use</p> <p>Impact PK#15: Permanent Changes from Noise and Vibration on School District Play Area Character and Use</p>

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<p>attenuate bird startle effects.</p> <p>Pursuant to the Noise and Vibration Mitigation Guidelines, recommended noise barriers must meet the following criteria to be considered a reasonable and feasible mitigation measure:</p> <ul style="list-style-type: none"> <li>– Achieve a minimum of 5 dB of noise reduction, which is then defined as a benefited receptor.</li> <li>– The minimum number of receptors should be at least 10.</li> <li>– The length should be at least 800 feet.</li> <li>– Must be cost-effective, defined as mitigation not exceeding \$95,000 per benefited receptor.</li> </ul> <p>The maximum noise barrier height will be 14 feet for at-grade sections. Berm and berm/wall combinations are the preferred types of noise barriers where space and other environmental constraints permit. On aerial structures, the maximum noise barrier height will also be 14 feet, but barrier material will be limited by engineering weight restrictions for barriers on the structure. All noise barriers will be designed to be as low as possible to achieve a substantial noise reduction.</p> <p>Noise barriers on both aerial structures and at-grade structures will consist of solid, semitransparent, or transparent materials, as defined in <i>Aesthetic Options for Non-Station Structures</i> (Authority 2014). Volume 2, Appendix 3.4-B, Noise and Mitigation Guidelines, provides additional details.</p> <ul style="list-style-type: none"> <li>▪ <b>Install Building Sound Insulation</b>—If noise barriers are not proposed for receptors with severe impacts, or if proposed noise barriers do not reduce exterior sound levels to below a severe impact level, the Authority will consider providing sound insulation as a potential additional mitigation measure on a case-by-case basis. Sound insulation of residences and institutional buildings to improve outdoor-to-indoor noise reduction is a mitigation measure that can be considered when the use of noise barriers is not feasible in providing a reasonable level (5 to 7 dBA) of noise reduction. Although this approach has no effect on noise in exterior areas, it may be the best choice for sites where noise barriers are not feasible or desirable and for buildings where indoor sensitivity is of most concern. Substantial improvements in building sound insulation (on the order of 5 to 10 dBA) can often be achieved by adding an extra layer of glazing to windows, by sealing holes in exterior surfaces that act as sound leaks, and by providing forced ventilation and air conditioning so that windows do not need to be opened.</li> <li>▪ <b>Noise Easements</b>—If a substantial noise reduction cannot be completed through installation of noise barriers or installing sound insulation, the Authority will consider acquiring a noise easement on properties with</li> </ul>								

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		a severe impact on a case-by-case basis. An agreement between the Authority and the property owner can be established wherein the property owner releases the right to petition the Authority regarding the noise level and subsequent disruptions. This will take the form of an easement that will encompass the property boundaries to the right-of-way of the rail line. The Authority will consider this mitigation measure only in isolated cases where other mitigation is ineffective or infeasible.								
NV-MM#4	Support Potential Implementation of Quiet Zones by Local Jurisdictions	Trains sound warning horns when approaching at-grade crossings because it is required by the FRA as a safety precaution (49 C.F.R. Parts 222 and 229). FRA does allow for the possibility of establishing horn-free Quiet Zones, which will eliminate the requirement for all trains to routinely sound their warning horns when approaching at-grade highway/rail crossings. Establishing Quiet Zones can only be legally undertaken by local jurisdictions; HSR cannot legally establish or require a Quiet Zone. However, HSR will assist local communities with this process through the installation of four-quad gates and channelization at all at-grade crossings that presently lack them, which will help cities to implement Quiet Zones, should they choose to do so. The Authority or its Contractor will assist with the preparation of technical analysis and provide input for the Quiet Zone application, which the local communities could then use as part of their application to FRA. Establishing Quiet Zones will eliminate train warning horns for all trains approaching at-grade highway and rail crossings under normal, nonemergency situations.	Post-construction	Design	As needed	Authority/ Contractor	Authority/ Contractor	Ongoing management of horn use within Quiet Zones.	Contract requirements and specifications	Impact NV#2: Intermittent Permanent Exposure of Sensitive Receptors to Noise from Train Operations Impact PK#7: Permanent Changes from Noise and Vibration on Parks, Recreation, and Open Space Resource Character and Use Impact PK#15: Permanent Changes from Noise and Vibration on School District Play Area Character and Use
NV-MM#5	Vehicle Noise Specification	During HSR vehicle technology procurement, the Authority will require bidders to meet the federal regulations (40 C.F.R. §§201.12/201.13) at the time of procurement for locomotives (currently a 90-dB-level standard) operating at speeds faster than 45 mph.	Post-construction	HSR vehicle purchasing	HSR operation	Authority	Authority	HSR vehicle noise specification	Contract requirements and specifications	Impact NV#2: Intermittent Permanent Exposure of Sensitive Receptors to Noise from Train Operations
NV-MM#6	Special Trackwork at Crossovers, Turnouts, and Insulated Joints	Prior to construction, the Contractor will provide the Authority with an HSR operations noise technical report for review and approval. The report will address minimization or elimination of rail gaps at crossovers and turnouts. Because the impacts of HSR wheels over rail gaps at turnouts increases HSR noise by approximately 6 dB over typical operations, turnouts can be a major source of noise impact. If the turnouts cannot be moved from sensitive areas, the noise technical report will recommend the use of special types of trackwork that eliminate the gap. The Authority will require the project design to follow the recommendations in the approved noise impact report.	Pre-construction	Design	Prior to construction	Authority/ Contractor	Authority/ Contractor	Provide operation noise technical report to determine if special trackwork is required	Submit assessment and if required, supplemental environmental documentation	Impact NV#2: Intermittent Permanent Exposure of Sensitive Receptors to Noise from Train Operations
NV-MM#7	Additional Noise Analysis during Final Design	Prior to construction, the contractor will provide the Authority with an HSR operations noise technical report for review and approval. If final design or final vehicle	Pre-construction	Design	Prior to Construction/ final vehicle	Authority/vehicle contractor	Authority/vehicle contractor	Reassessment of noise and vibration impacts	Submit assessment and if required, supplemental	Impact NV#2: Intermittent Permanent Exposure of Sensitive Receptors to Noise from Train Operations

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		specifications result in changes to the assumptions underlying the noise technical report, the Authority will prepare necessary environmental documentation, as required by CEQA and NEPA, to reassess noise impacts and mitigation.			specification			and recommended mitigation following final design	environmental documentation	Impact NV#5: Intermittent Permanent Human Annoyance from Onset of Passing HSR Trains Impact NV#6: Permanent Exposure of Sensitive Receptors to Vehicular Traffic Noise Increases Impact NV#8: Permanent Exposure of Sensitive Receptors to Traction Power Facility Noise
NV-MM#8	Project Vibration Mitigation Measures	Mitigation for operations vibration impacts can take place at the source, at the sensitive receptor, or along the propagation path from the source to the sensitive receptor. Table 3.4-22 in the Final EIR/EIS lists the mitigation procedures and their locations.	Pre-construction/post-construction	Design	As needed	Authority/ Contractor	Authority/ Contractor and Vehicle Contractor	Design/ construction/ ongoing management to address vibration impacts.	Contract requirements and specifications; noise and vibration mitigation guidelines (Volume 2, Appendix 3.4-B)	Impact NV#10: Intermittent Permanent Exposure of Sensitive Receptors to Vibration from Operations Impact PK#7: Permanent Changes from Noise and Vibration on Parks, Recreation, and Open Space Resource Character and Use
<b>Biological and Aquatic Resources</b>										
BIO-MM#P1	Provide Compensatory Mitigation for Impacts onto the Grasslands Ecological Area	<p>To fulfill a program-level commitment set out in the <i>Bay Area to Central Valley High-Speed Train Final Program EIR/EIS</i> (2008) to preserve habitat and open space values and offset impacts to wetlands, sensitive plant and wildlife species, and other biological resources in and around the Grasslands Ecological Area and other areas along the alignment, the Authority or entities acting on behalf of the Authority will acquire agricultural, conservation or open space easements on 10,000 acres of land generally located within or adjacent to the GEA.</p> <p>The Authority will provide this compensatory mitigation by initially implementing the requirements identified in BIO-MM#s 12, 16, 20, 22, 24, 28, 31, 33, 35, 40, 42, 47, 50, 55, 57, 58, 61, 63, 72, 74, 78, 79a, 79b, 84a, 84b, and 85. To the extent the compensatory mitigation for biological and aquatic resources required under the project-level mitigation measures results in less than 10,000 acres protected under easements, or by other means, on lands generally located within or adjacent to the GEA, the Authority will acquire agricultural, conservation, or open space easements to ensure a total of 10,000 acres of compensatory mitigation as follows:</p> <p>The easements will be acquired from willing sellers, and to the extent feasible, will be located generally within or adjacent to the GEA, with a focus on areas around Los Banos and Volta. To the extent it is not feasible to acquire easements on 10,000 acres in the vicinity of the GEA, easements will be acquired in other areas of the San Jose to Merced Project Section, including in the Diablo Range area located between South Santa Clara Valley and San Joaquin Valley and in and around the Central Valley Wye portion of the project section. The eventual locations of easements will be coordinated with USFWS, CDFW, and the Grassland Water District. Acquisition of easements will</p>	Pre-construction/post-construction	Design/ final design/ surveying/ compensatory mitigation/ reporting	Monthly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Authority to provide compensatory mitigation	Condition of construction contract/condition of regulatory permits	<p>Impact BIO#1: Permanent Conversion or Degradation of Habitat for Special-Status Plant Species</p> <p>Impact BIO#2a: Permanent Conversion or Degradation of Habitat for and Mortality of Bay Checkerspot Butterfly</p> <p>Impact BIO#3: Permanent Conversion or Degradation of Habitat for and Mortality of Vernal Pool Crustaceans</p> <p>Impact BIO#4: Removal or Pruning of Elderberry Plants Potentially Supporting Valley Elderberry Longhorn Beetle</p> <p>Impact BIO#5: Permanent Conversion or Degradation of Habitat for and Mortality of Crotch Bumble Bee</p> <p>Impact BIO#6: Permanent Conversion of Habitat for and Direct Mortality of Steelhead and Pacific Lamprey, and Permanent Conversion of Essential Fish Habitat for Pacific Coast Salmon</p> <p>Impact BIO#7: Permanent Conversion or Degradation of Habitat for and Direct Mortality of California Tiger Salamander</p> <p>Impact BIO#8: Permanent Conversion or Degradation of Habitat for and Direct Mortality of California Red-Legged Frog</p> <p>Impact BIO#9: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Foothill Yellow-Legged Frog</p> <p>Impact BIO#12: Permanent Conversion or Degradation of Habitat for and Direct</p>

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		be completed within 5 years of the start of operations for the project section, to the extent feasible.								Mortality of Blunt-Nosed Leopard Lizard Impact BIO#14: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Giant Garter Snake Impact BIO#17: Permanent Conversion or Degradation of Habitat for and Direct Mortality or Disturbance of Burrowing Owl Impact BIO#18: Permanent Conversion or Degradation of Habitat for and Direct Mortality or Disturbance of Golden Eagle and Bald Eagle Impact BIO#21: Permanent Conversion or Degradation of Habitat for and Direct Mortality or Disturbance of Swainson's Hawks Impact BIO#24: Permanent Conversion or Degradation of Habitat for and Direct Mortality or Disturbance of Tricolored Blackbird and Yellow-Headed Blackbird Impact BIO#25: Permanent Conversion or Degradation of Habitat for and Disturbance of Sandhill Crane Impact BIO#26b: Loss of Denning and Dispersal Habitat for and Direct Mortality or Disturbance of San Joaquin Kit Fox Impact BIO#27: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Fresno Kangaroo Rat Impact BIO#35: Permanent Conversion or Degradation of Special-Status Plant Communities Impact BIO#37: Permanent Conversion or Degradation of Aquatic Resources Considered Jurisdictional under Section 404 of the Federal Clean Water Act or Regulated by the State Impact BIO#38: Permanent Conversion or Degradation of Resources Regulated under California Fish and Game Code Section 1600 et seq. Impact BIO#43: Permanent Impacts on Wildlife Movement Impact BIO#51: Permanent Conversion or Degradation of Conservation Areas Impact BIO#53: Conflict with Santa Clara Valley Habitat Plan
BIO-MM#1	Prepare and Implement a Restoration and Revegetation Plan	Prior to any ground-disturbing activity, the Project Biologist will prepare a restoration and revegetation plan (RRP) to address temporary impacts resulting from ground-	Pre-construction/ construction/ post-construction	Surveying/ monitoring/ reporting	In accordance with agency permit	Authority/ Contractor/ Project Botanist	Authority/ Contractor/ Project Botanist	Prepare and implement RRP/ report findings	Condition of construction contract/condition of	Impact BIO#1: Permanent Conversion or Degradation of Habitat for Special-Status Plant Species

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<p>disturbing activities within areas that potentially support special-status species, wetlands, and/or other aquatic resources. Restoration activities may include, but not be limited to: grading landform contours to approximate pre-disturbance conditions, stockpiling and spreading topsoil, removing invasive plant species (including host plants for butterflies), revegetating disturbed areas with native plant species, and using certified weed-free straw and mulch. The Authority will implement the RRP in all temporarily disturbed areas outside of the permanent right-of-way that potentially support special-status species, wetlands, and/or other aquatic resources.</p> <p>Consistent with Section 1415 of the Fixing America's Surface Transportation Act (FAST Act) restoration activities will provide habitat for native pollinators through plantings of native forbs and grasses. The Project Biologist will obtain a locally sourced native seed mix. The restoration success criteria will include limits on invasive species, as defined by the California Invasive Plant Council, to an increase no greater than 10% compared to the pre-disturbance condition, or to a level determined through a comparison with an appropriate reference site consisting of similar natural communities and management regimes. The RRP will outline at a minimum:</p> <ul style="list-style-type: none"> <li>▪ Procedures for documenting pre-construction conditions for restoration purposes.</li> <li>▪ Sources of plant materials and methods of propagation.</li> <li>▪ Specification of parameters for maintenance and monitoring of re-established habitats, including weed control measures, frequency of field checks, and monitoring reports for temporary disturbance areas.</li> <li>▪ Specification of success criteria for re-established plant communities.</li> <li>▪ Specification of the remedial measures to be taken if success criteria are not met.</li> <li>▪ Methods and requirements for monitoring restoration/replacement efforts, which may involve a combination of qualitative and/or quantitative data gathering.</li> <li>▪ Maintenance, monitoring, and reporting schedules, including an annual report due to the Authority by January 31 of the following year.</li> </ul> <p>The RRP will be submitted to the Authority and regulatory agencies, as defined in the conditions of regulatory authorizations, for review and approval.</p>			requirements				regulatory permits	<p>Impact BIO#2: Permanent Conversion or Degradation of Habitat for and Mortality of Bay Checkerspot Butterfly</p> <p>Impact BIO#3: Permanent Conversion or Degradation of Habitat for and Mortality of Vernal Pool Crustaceans</p> <p>Impact BIO#4: Removal or Pruning of Elderberry Plants Potentially Supporting Valley Elderberry Longhorn Beetle</p> <p>Impact BIO#5: Permanent Conversion or Degradation of Habitat for and Mortality of Crotch Bumble Bee</p> <p>Impact BIO#6: Permanent Conversion of Habitat for and Direct Mortality of Steelhead and Pacific Lamprey, and Permanent Conversion of Essential Fish Habitat for Pacific Coast Salmon</p> <p>Impact BIO#7: Permanent Conversion or Degradation of Habitat for and Direct Mortality of California Tiger Salamander</p> <p>Impact BIO#8: Permanent Conversion or Degradation of Habitat for and Direct Mortality of California Red-Legged Frog</p> <p>Impact BIO#9: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Foothill Yellow-Legged Frog</p> <p>Impact BIO#10: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Western Spadefoot</p> <p>Impact BIO#11: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Western Pond Turtle</p> <p>Impact BIO#12: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Blunt-Nosed Leopard Lizard</p> <p>Impact BIO#13: Permanent Conversion or Degradation of Habitat for and Direct Mortality of San Joaquin Coachwhip, Northern California Legless Lizard, and Coast Horned Lizard</p> <p>Impact BIO#14: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Giant Garter Snake</p> <p>Impact BIO#15: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Short-Eared Owl and Grasshopper Sparrow</p> <p>Impact BIO#16: Permanent Conversion or Degradation of Habitat for Mountain Plover and Disturbance of Western</p>

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
										Snowy Plover (Interior Population) Impact BIO#17: Permanent Conversion or Degradation of Habitat for and Direct Mortality or Disturbance of Burrowing Owl Impact BIO#23: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Least Bell's Vireo, Yellow Warbler, and Yellow-Breasted Chat Impact BIO#24: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Tricolored Blackbird and Yellow-Headed Blackbird Impact BIO#25: Permanent Conversion or Degradation of Habitat for and Disturbance of Sandhill Crane Impact BIO#26: Loss of Denning and Dispersal Habitat for and Direct Mortality or Disturbance of San Joaquin Kit Fox Impact BIO#27: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Fresno Kangaroo Rat Impact BIO#28: Permanent Conversion or Degradation of Habitat for and Direct Mortality of American Badger Impact BIO#29: Permanent Conversion or Degradation of Habitat for and Direct Mortality of San Francisco Dusky-Footed Woodrat and Ringtail Impact BIO#34: Removal or Degradation of Habitat for and Disturbance of Waterfowl and Shorebirds Impact BIO#35: Permanent Conversion or Degradation of Special-Status Plant Communities Impact BIO#37: Permanent Conversion or Degradation of Aquatic Resources Considered waters of the U.S. or waters of the State Impact BIO#38: Permanent Conversion or Degradation of Resources Regulated under California Fish and Game Code Section 1600 et seq. Impact HYD#4: Temporary Impacts on Surface Water Quality during Construction
BIO-MM#2	Prepare and Implement a Weed Control Plan	Prior to any ground-disturbing activity during the construction phase, the Project Biologist will develop a weed control plan (WCP), subject to review and approval by the Authority. The purpose of the WCP is to establish approaches to minimize and avoid the spread of invasive weeds during ground-disturbing activities during	Design/pre-construction	Prepare plan/reporting	Monthly	Authority/Contractor	Authority	Monthly reporting	Condition of construction contract	Impact BIO#1: Permanent Conversion or Degradation of Habitat for Special-Status Plant Species Impact BIO#2: Permanent Conversion or Degradation of Habitat for and Mortality of

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<p>construction and O&amp;M.</p> <p>The WCP will include, at a minimum, the following:</p> <ul style="list-style-type: none"> <li>▪ A requirement to delineate environmentally sensitive areas (ESA) in the field prior to weed control activities.</li> <li>▪ A schedule for weed surveys to be conducted in coordination with the BRMP.</li> <li>▪ Success criteria for invasive weed control. The success criteria will be linked to the BRMP standards for on-site work during ground-disturbing activities. In particular, the criteria will establish limits on the introduction and spread of invasive species, as defined by the California Invasive Plant Council, to less than or equal to the pre-disturbance conditions in the area temporarily affected by ground-disturbing activities. If invasive species cover is found to exceed pre-disturbance conditions by greater than 10% or is 10% greater than levels at a similar, nearby reference site, a control effort will be implemented. If the target, or other success criteria identified in the WCP, has not been met by the end of the WCP monitoring and implementation period, the Authority will continue the monitoring and control efforts, and remedial actions will be identified and implemented until the success criteria are met.</li> <li>▪ Provisions for consistency between the WCP and the RRP, including verification that the RRP includes measures to minimize the risk of the spread and/or establishment of invasive species and reflects the same revegetation performance standards as the WCP.</li> <li>▪ Identification of weed control treatments, including permitted herbicides and manual and mechanical removal methods.</li> <li>▪ Timeframes for weed control treatment for each plant species.</li> <li>▪ Identification of fire prevention measures.</li> </ul>								<p>Bay Checkerspot Butterfly</p> <p>Impact BIO#3: Permanent Conversion or Degradation of Habitat for and Mortality of Vernal Pool Crustaceans</p> <p>Impact BIO#4: Removal or Pruning of Elderberry Plants Potentially Supporting Valley Elderberry Longhorn Beetle</p> <p>Impact BIO#5: Permanent Conversion or Degradation of Habitat for and Mortality of Crotch Bumble Bee</p> <p>Impact BIO#7: Permanent Conversion or Degradation of Habitat for and Direct Mortality of California Tiger Salamander</p> <p>Impact BIO#8: Permanent Conversion or Degradation of Habitat for and Direct Mortality of California Red-Legged Frog</p> <p>Impact BIO#9: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Foothill Yellow-Legged Frog</p> <p>Impact BIO#10: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Western Spadefoot</p> <p>Impact BIO#11: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Western Pond Turtle</p> <p>Impact BIO#12: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Blunt-Nosed Leopard Lizard</p> <p>Impact BIO#13: Permanent Conversion or Degradation of Habitat for and Direct Mortality of San Joaquin Coachwhip, Northern California Legless Lizard, and Coast Horned Lizard</p> <p>Impact BIO#14: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Giant Garter Snake</p> <p>Impact BIO#15: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Short-Eared Owl and Grasshopper Sparrow</p> <p>Impact BIO#16: Permanent Conversion or Degradation of Habitat for Mountain Plover and Disturbance of Western Snowy Plover (Interior Population)</p> <p>Impact BIO#17: Permanent Conversion or Degradation of Habitat for and Direct Mortality or Disturbance of Burrowing Owl</p> <p>Impact BIO#23: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Least Bell's Vireo, Yellow</p>

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
										Warbler, and Yellow-Breasted Chat Impact BIO#24: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Tricolored Blackbird and Yellow-Headed Blackbird Impact BIO#25: Permanent Conversion or Degradation of Habitat for and Disturbance of Sandhill Crane Impact BIO#26: Loss of Denning and Dispersal Habitat for and Direct Mortality or Disturbance of San Joaquin Kit Fox Impact BIO#27: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Fresno Kangaroo Rat Impact BIO#28: Permanent Conversion or Degradation of Habitat for and Direct Mortality of American Badger Impact BIO#29: Permanent Conversion or Degradation of Habitat for and Direct Mortality of San Francisco Dusky-Footed Woodrat and Ringtail Impact BIO#34: Removal or Degradation of Habitat for and Disturbance of Waterfowl and Shorebirds Impact BIO#35: Permanent Conversion or Degradation of Special-Status Plant Communities Impact BIO#37: Permanent Conversion or Degradation of Aquatic Resources Considered waters of the U.S. or waters of the State Impact BIO#38: Permanent Conversion or Degradation of Resources Regulated under California Fish and Game Code Section 1600 et seq.
BIO-MM#3	Establish Environmentally Sensitive Areas and Nondisturbance Zones	Prior to any ground-disturbing activity in a work area, the Project Biologist will use flagging to mark ESAs that support special-status species or aquatic resources and are subject to seasonal restrictions or other avoidance and minimization measures. ESAs will be located around the perimeter of the special-status species or aquatic resources within the work area so that they are avoided during construction. The Project Biologist will also direct the installation of wildlife exclusion fencing (WEF) by the Contractor to prevent special-status wildlife species from entering work areas. The WEF will be installed below grade (e.g., 6–10 inches below grade) and will have exit doors to allow animals that may be inside an enclosed area to leave the area. The Project Biologist will delineate the ESAs and WEF based on the results of habitat	Pre-construction/ construction	Identify and establish ESAs, WEF, and construction exclusionary fencing	In accordance with reporting schedule established by agency permit requirements	Authority/ Contractor	Authority	In accordance with reporting schedule established by agency permit requirements	Condition of construction contract	Impact BIO#1: Permanent Conversion or Degradation of Habitat for Special-Status Plant Species Impact BIO#2: Permanent Conversion or Degradation of Habitat for and Mortality of Bay Checkerspot Butterfly Impact BIO#3: Permanent Conversion or Degradation of Habitat for and Mortality of Vernal Pool Crustaceans Impact BIO#4: Removal or Pruning of Elderberry Plants Potentially Supporting Valley Elderberry Longhorn Beetle Impact BIO#5: Permanent Conversion or Degradation of Habitat for and Mortality of

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<p>mapping or modeling and any pre-construction surveys, and in coordination with the Authority. The Project Biologist will also direct the installation of construction exclusionary fencing (exclusionary fencing) at the boundary of the work area, as appropriate, to exclude special-status species or aquatic resources from the work area during the construction period. The Project Biologist will regularly inspect and maintain the ESA, WEF, and exclusionary fencing. ESA, WEF, and exclusionary fencing.</p> <p>The ESA, WEF, and exclusionary fencing locations will be identified and depicted on an exclusion fencing exhibit. The purpose of the ESAs and WEF will be explained at WEAP training and the locations of the ESA and WEF areas will be noted during worker tailgate sessions.</p>								<p>Crotch Bumble Bee</p> <p>Impact BIO#6: Permanent Conversion of Habitat for and Direct Mortality of Steelhead and Pacific Lamprey, and Permanent Conversion of Essential Fish Habitat for Pacific Coast Salmon</p> <p>Impact BIO#7: Permanent Conversion or Degradation of Habitat for and Direct Mortality of California Tiger Salamander</p> <p>Impact BIO#8: Permanent Conversion or Degradation of Habitat for and Direct Mortality of California Red-Legged Frog</p> <p>Impact BIO#9: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Foothill Yellow-Legged Frog</p> <p>Impact BIO#10: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Western Spadefoot</p> <p>Impact BIO#11: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Western Pond Turtle</p> <p>Impact BIO#12: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Blunt-Nosed Leopard Lizard</p> <p>Impact BIO#13: Permanent Conversion or Degradation of Habitat for and Direct Mortality of San Joaquin Coachwhip, Northern California Legless Lizard, and Coast Horned Lizard</p> <p>Impact BIO#14: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Giant Garter Snake</p> <p>Impact BIO#15: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Short-Eared Owl and Grasshopper Sparrow</p> <p>Impact BIO#16: Permanent Conversion or Degradation of Habitat for Mountain Plover and Disturbance of Western Snowy Plover (Interior Population)</p> <p>Impact BIO#17: Permanent Conversion or Degradation of Habitat for and Direct Mortality or Disturbance of Burrowing Owl</p> <p>Impact BIO#18: Permanent Conversion or Degradation of Habitat for and Disturbance of Golden Eagle and Bald Eagle</p> <p>Impact BIO#20: Permanent Conversion or Degradation of Habitat for and Disturbance of Special-Status Raptors</p>

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
										(American Peregrine Falcon, Northern Harrier, White-Tailed Kite) and Other Raptors Impact BIO#21: Permanent Conversion or Degradation of Habitat for and Disturbance of Swainson's Hawks Impact BIO#22: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Purple Martin, Olive-Sided Flycatcher, and Loggerhead Shrike Impact BIO#23: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Least Bell's Vireo, Yellow Warbler, and Yellow-Breasted Chat Impact BIO#24: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Tricolored Blackbird and Yellow-Headed Blackbird Impact BIO#25: Permanent Conversion or Degradation of Habitat for and Disturbance of Sandhill Crane Impact BIO#26: Loss of Denning and Dispersal Habitat for and Direct Mortality or Disturbance of San Joaquin Kit Fox Impact BIO#27: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Fresno Kangaroo Rat Impact BIO#28: Permanent Conversion or Degradation of Habitat for and Direct Mortality of American Badger Impact BIO#29: Permanent Conversion or Degradation of Habitat for and Direct Mortality of San Francisco Dusky-Footed Woodrat and Ringtail Impact BIO#30: Loss of Roost Sites for and Direct Mortality or Disturbance of Special-Status Bats Impact BIO#34: Removal or Degradation of Habitat for and Disturbance of Waterfowl and Shorebirds Impact BIO#35: Permanent Conversion or Degradation of Special-Status Plant Communities Impact BIO#37: Permanent Conversion or Degradation of Aquatic Resources Considered waters of the U.S. or waters of the State Impact BIO#38: Permanent Conversion or Degradation of Resources Regulated under California Fish and Game Code

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
										Section 1600 et seq. Impact BIO#42: Temporary Disruption of Wildlife Movement Impact HYD#4: Temporary Impacts on Surface Water Quality during Construction
BIO-MM#4	Conduct Monitoring of Construction Activities	During any initial ground-disturbing activity, the Project Biologist will be present in the work area to verify compliance with avoidance and minimization measures, to establish ESAs, and to direct the installation of WEF and construction exclusion fencing by the Contractor.	Construction	Compliance report	Monthly or at other appropriate interval	Authority/ Contractor	Authority	In accordance with reporting schedule established by agency permit requirements	Condition of construction contract	Impact BIO#1: Permanent Conversion or Degradation of Habitat for Special-Status Plant Species Impact BIO#2: Permanent Conversion or Degradation of Habitat for and Mortality of Bay Checkerspot Butterfly Impact BIO#3: Permanent Conversion or Degradation of Habitat for and Mortality of Vernal Pool Crustaceans Impact BIO#4: Removal or Pruning of Elderberry Plants Potentially Supporting Valley Elderberry Longhorn Beetle Impact BIO#5: Permanent Conversion or Degradation of Habitat for and Mortality of Crotch Bumble Bee Impact BIO#6: Permanent Conversion of Habitat for and Direct Mortality of Steelhead and Pacific Lamprey, and Permanent Conversion of Essential Fish Habitat for Pacific Coast Salmon Impact BIO#7: Permanent Conversion or Degradation of Habitat for and Direct Mortality of California Tiger Salamander Impact BIO#8: Permanent Conversion or Degradation of Habitat for and Direct Mortality of California Red-Legged Frog Impact BIO#9: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Foothill Yellow-Legged Frog Impact BIO#10: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Western Spadefoot Impact BIO#11: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Western Pond Turtle Impact BIO#12: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Blunt-Nosed Leopard Lizard Impact BIO#13: Permanent Conversion or Degradation of Habitat for and Direct Mortality of San Joaquin Coachwhip, Northern California Legless Lizard, and Coast Horned Lizard Impact BIO#14: Permanent Conversion or

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
										Degradation of Habitat for and Direct Mortality of Giant Garter Snake Impact BIO#15: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Short-Eared Owl and Grasshopper Sparrow Impact BIO#16: Permanent Conversion or Degradation of Habitat for Mountain Plover and Disturbance of Western Snowy Plover (Interior Population) Impact BIO#17: Permanent Conversion or Degradation of Habitat for and Direct Mortality or Disturbance of Burrowing Owl Impact BIO#18: Permanent Conversion or Degradation of Habitat for and Disturbance of Golden Eagle and Bald Eagle Impact BIO#20: Permanent Conversion or Degradation of Habitat for and Disturbance of Special-Status Raptors (American Peregrine Falcon, Northern Harrier, White-Tailed Kite) and Other Raptors Impact BIO#21: Permanent Conversion or Degradation of Habitat for and Disturbance of Swainson's Hawks Impact BIO#22: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Purple Martin, Olive-Sided Flycatcher, and Loggerhead Shrike Impact BIO#23: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Least Bell's Vireo, Yellow Warbler, and Yellow-Breasted Chat Impact BIO#24: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Tricolored Blackbird and Yellow-Headed Blackbird Impact BIO#25: Permanent Conversion or Degradation of Habitat for and Disturbance of Sandhill Crane Impact BIO#26: Loss of Denning and Dispersal Habitat for and Direct Mortality or Disturbance of San Joaquin Kit Fox Impact BIO#27: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Fresno Kangaroo Rat Impact BIO#28: Permanent Conversion or Degradation of Habitat for and Direct Mortality of American Badger

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
										Impact BIO#29: Permanent Conversion or Degradation of Habitat for and Direct Mortality of San Francisco Dusky-Footed Woodrat and Ringtail Impact BIO#30: Loss of Roost Sites for and Direct Mortality or Disturbance of Special-Status Bats Impact BIO#34: Removal or Degradation of Habitat for and Disturbance of Waterfowl and Shorebirds Impact BIO#35: Permanent Conversion or Degradation of Special-Status Plant Communities Impact BIO#37: Permanent Conversion or Degradation of Aquatic Resources Considered waters of the U.S. or waters of the State Impact BIO#38: Permanent Conversion or Degradation of Resources Regulated under California Fish and Game Code Section 1600 et seq. Impact HYD#4: Temporary Impacts on Surface Water Quality during Construction
BIO-MM#5	Limit Vehicle Traffic and Construction Site Speeds	Prior to any ground-disturbing activities, the Project Biologist will check that appropriate measures have been instituted to restrict project vehicle traffic within the project footprint to established roads, construction areas, and other permissible areas. The Project Biologist will establish vehicle speed limits of no more than 15 mph for unimproved access roads and for temporary and permanent construction areas within the project footprint. The Project Biologist will also direct that access routes be flagged and marked and that measures be adopted to prevent off-road vehicle traffic.	Pre-construction	Compliance reporting	Monthly	Authority/ Contractor	Authority	Monthly reporting	Condition of construction contract	Impact BIO#1: Permanent Conversion or Degradation of Habitat for Special-Status Plant Species Impact BIO#2: Permanent Conversion or Degradation of Habitat for and Mortality of Bay Checkerspot Butterfly Impact BIO#3: Permanent Conversion or Degradation of Habitat for and Mortality of Vernal Pool Crustaceans Impact BIO#4: Removal or Pruning of Elderberry Plants Potentially Supporting Valley Elderberry Longhorn Beetle Impact BIO#5: Permanent Conversion or Degradation of Habitat for and Mortality of Crotch Bumble Bee Impact BIO#7: Permanent Conversion or Degradation of Habitat for and Direct Mortality of California Tiger Salamander Impact BIO#8: Permanent Conversion or Degradation of Habitat for and Direct Mortality of California Red-Legged Frog Impact BIO#9: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Foothill Yellow-Legged Frog Impact BIO#10: Permanent Conversion or Degradation of Habitat for and Direct

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
										Mortality of Western Spadefoot Impact BIO#11: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Western Pond Turtle Impact BIO#12: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Blunt-Nosed Leopard Lizard Impact BIO#13: Permanent Conversion or Degradation of Habitat for and Direct Mortality of San Joaquin Coachwhip, Northern California Legless Lizard, and Coast Horned Lizard Impact BIO#14: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Giant Garter Snake Impact BIO#15: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Short-Eared Owl and Grasshopper Sparrow Impact BIO#16: Permanent Conversion or Degradation of Habitat for Mountain Plover and Disturbance of Western Snowy Plover (Interior Population) Impact BIO#17: Permanent Conversion or Degradation of Habitat for and Direct Mortality or Disturbance of Burrowing Owl Impact BIO#18: Permanent Conversion or Degradation of Habitat for and Disturbance of Golden Eagle and Bald Eagle Impact BIO#19: Injury or Disturbance of California Condor Impact BIO#20: Permanent Conversion or Degradation of Habitat for and Disturbance of Special-Status Raptors (American Peregrine Falcon, Northern Harrier, White-Tailed Kite) and Other Raptors Impact BIO#21: Permanent Conversion or Degradation of Habitat for and Disturbance of Swainson's Hawks Impact BIO#22: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Purple Martin, Olive-Sided Flycatcher, and Loggerhead Shrike Impact BIO#23: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Least Bell's Vireo, Yellow Warbler, and Yellow-Breasted Chat Impact BIO#24: Permanent Conversion or

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
										Degradation of Habitat for and Direct Mortality of Tricolored Blackbird and Yellow-Headed Blackbird Impact BIO#25: Permanent Conversion or Degradation of Habitat for and Disturbance of Sandhill Crane Impact BIO#26: Loss of Denning and Dispersal Habitat for and Direct Mortality or Disturbance of San Joaquin Kit Fox Impact BIO#27: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Fresno Kangaroo Rat Impact BIO#28: Permanent Conversion or Degradation of Habitat for and Direct Mortality of American Badger Impact BIO#29: Permanent Conversion or Degradation of Habitat for and Direct Mortality of San Francisco Dusky-Footed Woodrat and Ringtail Impact BIO#30: Loss of Roost Sites for and Direct Mortality or Disturbance of Special-Status Bats Impact BIO#34: Removal or Degradation of Habitat for and Disturbance of Waterfowl and Shorebirds Impact BIO#35: Permanent Conversion or Degradation of Special-Status Plant Communities Impact BIO#37: Permanent Conversion or Degradation of Aquatic Resources Considered waters of the U.S. or waters of the State Impact BIO#38: Permanent Conversion or Degradation of Resources Regulated under California Fish and Game Code Section 1600 et seq.
BIO-MM#6	Establish and Implement a Compliance Reporting Program	The Project Biologist will prepare monthly and annual reports documenting compliance with all IAMFs, mitigation measures, and requirements set forth in regulatory agency authorizations. The Authority will review and approve all compliance reports prior to submittal to the regulatory agencies. Reports will be prepared in compliance with the content requirements outlined in the regulatory agency authorizations.  Pre-activity survey reports will be submitted within 15 days of completing the surveys and will include: <ul style="list-style-type: none"> <li>▪ Location(s) of where pre-activity surveys were completed, including latitude and longitude, Assessor Parcel Number, and HST parcel number.</li> <li>▪ Written description of the surveyed area. A figure of</li> </ul>	Construction	Compliance report	Monthly and annual or at other appropriate intervals	Authority/ Contractor	Authority	In accordance with reporting schedule established by agency permit requirements	Condition of construction contract	Impact BIO#1: Permanent Conversion or Degradation of Habitat for Special-Status Plant Species Impact BIO#2: Permanent Conversion or Degradation of Habitat for and Mortality of Bay Checkerspot Butterfly Impact BIO#3: Permanent Conversion or Degradation of Habitat for and Mortality of Vernal Pool Crustaceans Impact BIO#4: Removal or Pruning of Elderberry Plants Potentially Supporting Valley Elderberry Longhorn Beetle Impact BIO#5: Permanent Conversion or

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		<p>each surveyed location will be provided that depicts the surveyed area and survey buffers over an aerial image.</p> <ul style="list-style-type: none"> <li>▪ Date, time, and weather conditions observed at each location.</li> <li>▪ Personnel who conducted the pre-activity surveys.</li> <li>▪ Verification of the accuracy of the Authority's habitat mapping at each location, provided in writing and on a figure.</li> <li>▪ Observations made during the survey, including the type and locations (written and GIS) of any sensitive resources detected.</li> <li>▪ Identification of relevant measures from the BRMP to be implemented as a result of the survey observations.</li> </ul> <p>Daily compliance reports will be submitted to the Authority via the Environmental Mitigation Management and Assessment system (EMMA) within 24 hours of each monitoring day. Noncompliance events will be reported to the Authority the day of the occurrence. Daily compliance reports will include:</p> <ul style="list-style-type: none"> <li>• Date, time, and weather conditions observed at each location where monitoring occurred.</li> <li>• Personnel who conducted compliance monitoring.</li> <li>• Project activities monitored, including construction equipment in use.</li> <li>• Compliance conditions implemented successfully.</li> <li>• Noncompliance events observed.</li> </ul> <p>Daily compliance reports will also be included in the monthly compliance reports, which will be submitted to the Authority by the 10th of each month and will include:</p> <ul style="list-style-type: none"> <li>▪ Summary of construction activities and locations during the reporting month, including any noncompliance events and their resolution, work stoppages, and take of threatened or endangered species.</li> <li>▪ Summary of anticipated project activities and work areas for the upcoming month.</li> <li>▪ Tracking of impacts on suitable habitats for each threatened and endangered species identified in USFWS and CDFW authorizations, including: <ul style="list-style-type: none"> <li>– An accounting of the number of acres of habitats for which the Authority provides compensatory mitigation that has been disturbed during the reporting month, and</li> <li>– An accounting of the cumulative total number of acres of threatened and endangered species habitat that has been disturbed during the project period.</li> </ul> </li> <li>▪ Up-to-date GIS layers, associated metadata, and photodocumentation used to track acreages disturbed.</li> <li>▪ Copies of all pre-activity survey reports, daily</li> </ul>								<p>Degradation of Habitat for and Mortality of Crotch Bumble Bee</p> <p>Impact BIO#6: Permanent Conversion of Habitat for and Direct Mortality of Steelhead and Pacific Lamprey, and Permanent Conversion of Essential Fish Habitat for Pacific Coast Salmon</p> <p>Impact BIO#7: Permanent Conversion or Degradation of Habitat for and Direct Mortality of California Tiger Salamander</p> <p>Impact BIO#8: Permanent Conversion or Degradation of Habitat for and Direct Mortality of California Red-Legged Frog</p> <p>Impact BIO#9: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Foothill Yellow-Legged Frog</p> <p>Impact BIO#10: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Western Spadefoot</p> <p>Impact BIO#11: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Western Pond Turtle</p> <p>Impact BIO#12: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Blunt-Nosed Leopard Lizard</p> <p>Impact BIO#13: Permanent Conversion or Degradation of Habitat for and Direct Mortality of San Joaquin Coachwhip, Northern California Legless Lizard, and Coast Horned Lizard</p> <p>Impact BIO#14: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Giant Garter Snake</p> <p>Impact BIO#15: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Short-Eared Owl and Grasshopper Sparrow</p> <p>Impact BIO#16: Permanent Conversion or Degradation of Habitat for Mountain Plover and Disturbance of Western Snowy Plover (Interior Population)</p> <p>Impact BIO#17: Permanent Conversion or Degradation of Habitat for and Direct Mortality or Disturbance of Burrowing Owl</p> <p>Impact BIO#18: Permanent Conversion or Degradation of Habitat for and Disturbance of Golden Eagle and Bald Eagle</p> <p>Impact BIO#19: Injury or Disturbance of California Condor</p>

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		<p>compliance reports, and noncompliance/work stoppage reports for the reporting month.</p> <p>Annual reports will be submitted to the Authority by the 20th of January and will include:</p> <ul style="list-style-type: none"> <li>▪ Summary of all monthly compliance reports for the reporting year.</li> <li>▪ A general description of the status of the project, including projected completion dates.</li> <li>▪ All available information about project-related incidental take of threatened and endangered species.</li> <li>▪ Information about other project impacts on the threatened and endangered species.</li> <li>▪ A summary of findings from pre-construction surveys (e.g., number of times a threatened or endangered species or a den, burrow, or nest was encountered, location, if avoidance was achieved, if not, what other measures were implemented).</li> <li>▪ Written description of disturbances to threatened and endangered species habitat within work areas, both for the preceding 12 months and in total since issuance of regulatory authorizations by USFWS and CDFW, and updated maps of all land disturbances and updated maps of identified habitat features suitable for threatened and endangered species within the project area.</li> </ul> <p>In addition to the compliance reporting requirements outlined above, the following items will be provided for compliance documentation purposes:</p> <ul style="list-style-type: none"> <li>▪ If agency personnel visit the project footprint in accordance with BIO-IAMF#2, the Project Biologist will prepare a memorandum within 1 day of the visit that memorializes the issues raised during the field meeting. This memorandum will be submitted to the Authority via EMMA. Any issues regarding regulatory compliance raised by agency personnel will be reported to the Authority and the Contractor.</li> <li>▪ Compliance reporting will be submitted to the Authority via EMMA in accordance with the report schedule. The Project Biologist will prepare and submit compliance reports that document the following: <ul style="list-style-type: none"> <li>– Implementation and performance of the RRP described in BIO-MM#1</li> <li>– Summary of progress made regarding the implementation of the WCP described in BIO-MM#2</li> <li>– Compliance with BIO-MM#3</li> <li>– Compliance with BIO-IAMF#6</li> <li>– Compliance with BIO-IAMF#7</li> <li>– Compliance with BIO-IAMF#8</li> <li>– Compliance with BIO-IAMF#10</li> <li>– Compliance with BIO-MM#5</li> <li>– Compliance with BIO-IAMF#12</li> </ul> </li> </ul>								<p>Impact BIO#20: Permanent Conversion or Degradation of Habitat for and Disturbance of Special-Status Raptors (American Peregrine Falcon, Northern Harrier, White-Tailed Kite) and Other Raptors</p> <p>Impact BIO#21: Permanent Conversion or Degradation of Habitat for and Disturbance of Swainson's Hawks</p> <p>Impact BIO#22: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Purple Martin, Olive-Sided Flycatcher, and Loggerhead Shrike</p> <p>Impact BIO#23: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Least Bell's Vireo, Yellow Warbler, and Yellow-Breasted Chat</p> <p>Impact BIO#24: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Tricolored Blackbird and Yellow-Headed Blackbird</p> <p>Impact BIO#25: Permanent Conversion or Degradation of Habitat for and Disturbance of Sandhill Crane</p> <p>Impact BIO#26: Loss of Denning and Dispersal Habitat for and Direct Mortality or Disturbance of San Joaquin Kit Fox</p> <p>Impact BIO#27: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Fresno Kangaroo Rat</p> <p>Impact BIO#28: Permanent Conversion or Degradation of Habitat for and Direct Mortality of American Badger</p> <p>Impact BIO#29: Permanent Conversion or Degradation of Habitat for and Direct Mortality of San Francisco Dusky-Footed Woodrat and Ringtail</p> <p>Impact BIO#30: Loss of Roost Sites for and Direct Mortality or Disturbance of Special-Status Bats</p> <p>Impact BIO#34: Removal or Degradation of Habitat for and Disturbance of Waterfowl and Shorebirds</p> <p>Impact BIO#35: Permanent Conversion or Degradation of Special-Status Plant Communities</p> <p>Impact BIO#37: Permanent Conversion or Degradation of Aquatic Resources Considered Waters of the U.S. or Waters of the State</p>

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		<ul style="list-style-type: none"> <li>- Compliance with BIO-IAMF#9</li> <li>- BMP field manual implementation and any recommended changes to construction site housekeeping practices outlined in BIO-IAMF#11</li> <li>▪ Work stoppages and measures taken under BIO-MM#13 will be documented in a memorandum prepared by the Project Biologist and submitted to the Authority within 2 business days of the work stoppage.</li> </ul>								Impact BIO#38: Permanent Conversion or Degradation of Resources Regulated under California Fish and Game Code Section 1600 et seq.
BIO-MM#7	Conduct Botanical Surveys for Special-Status Plant Species and Special-Status Plant Communities	Prior to any ground-disturbing activity, the Project Biologist will conduct protocol-level surveys for special-status plant species and special-status plant communities within each work area consistent with <i>Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities</i> (CDFW 2018c) and <i>Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Plants</i> (USFWS 2000) in all potentially suitable habitats. The Project Biologist will flag and record in GIS the locations of any observed special-status plant species and special-status plant communities and establish a 50-foot buffer from the perimeter of the occupied habitat or the specific habitat type required by the special-status plant species (if the specific habitat types extend beyond the occupied habitat). If a smaller buffer is necessary due to other project constraints, the Authority will develop and implement a site-specific exclusion plan, in consultation with USFWS and CDFW.	Pre-construction	Surveying/ monitoring/ reporting	Report findings at least 30 days prior to ground disturbance	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Conduct protocol-level surveys for special-status plant species Report findings at least 30 days prior to ground disturbance	Condition of construction contract following requirements established by regulatory compliance permits	Impact BIO#1: Permanent Conversion or Degradation of Habitat for Special-Status Plant Species  Impact BIO#35: Permanent Conversion or Degradation of Special-Status Plant Communities
BIO-MM#8	Prepare and Implement Plan for Salvage, Relocation, and/or Propagation of Special-Status Plant Species	Where relocation or propagation of special-status plant species is required by authorizations issued under FESA and/or CESA, the Project Biologist will collect seeds and plant materials and stockpile and segregate the top 4 inches of topsoil from locations within the work area prior to any ground-disturbing activities where special-status plant species were observed during surveys conducted under BIO-MM#1. Special-status plant species are those listed as threatened, endangered, or candidate under FESA; threatened, endangered, or candidate for listing under CESA; state-designated "Rare" species; and CRPR 1B and 2 species that were observed during surveys for use on off-site locations. Restoration locations will be chosen based on the <i>Policy on Mitigation Guidelines Regarding Impacts to Rare, Threatened, and Endangered Plants</i> (CNPS 1998). Suitable sites that may receive salvaged material include Authority mitigation sites, refuges, reserves, federal or state lands, and public/private mitigation banks.  The Project Biologist will prepare a plant species salvage plan to address monitoring, salvage, relocation and/or seed banking of special-status plant species. The plan will include provisions that address the techniques, locations, and procedures required for the collection, storage, and relocation of seed or plant material; collection, stockpiling,	Pre-construction/ construction/ post-construction	Surveying/ monitoring/ reporting	In accordance with agency permit requirements	Authority/ Contractor/ Project Botanist/ Mitigation Manager	Authority/ Contractor/ Project Botanist/ Mitigation Manager	Prepare and implement monitoring, salvage, relocation, and propagation of special-status plant species/ report findings	Condition of construction contract	Impact BIO#1: Permanent Conversion or Degradation of Habitat for Special-Status Plant Species

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		and redistribution of topsoil and associated seed. The plan will also include requirements related to success criteria, such as the plant survival and percent absolute cover of invasive species rated as “high” by the California Invasive Plant Council to be equal to or less than documented baseline conditions as well as maintenance, monitoring, implementation, adaptive management, and annual reporting. The plan will reflect conditions required under regulatory authorizations issued for federal or state-listed species. The Project Biologist will submit the plan to the Authority for review and approval.								
BIO-MM#9	Prepare and Implement a Groundwater Adaptive Management and Monitoring Plan	<p>To avoid, minimize and mitigate for potential impacts on wetlands, creeks, ponds, springs, riparian vegetation, special-status plant and wildlife species and protected trees as a result of hydrogeologic changes due to tunnel construction, the Authority will prepare and implement a groundwater adaptive management and monitoring plan (GAMMP) prior to, during, and after tunnel construction to implement the requirements described under HYD-MM#1 and as described below concerning biological resources. Prior to construction, the GAMMP will be submitted to the USFWS, CDFW, and Regional Water Quality Control Board (RWQCB) for review (and approval where applicable).</p> <p>The purpose of the GAMMP relative to biological resources is to monitor groundwater-dependent biological resources within the tunnel groundwater study area to detect and remediate adverse effects on habitat function in a timely manner. Implementation of the GAMMP will provide information and data to identify hydrological, hydrogeological, and biological effects that may arise during HSR construction, if any, and trigger actions to offset any such impacts.</p> <p>The GAMMP will include the following components, at a minimum, to avoid or minimize and address impacts on habitat for special-status species, aquatic resources, and protected trees:</p> <ul style="list-style-type: none"> <li>▪ <b>Baseline inventory</b>—As allowed by private property owners, the Authority will establish baseline hydrologic conditions within the groundwater resource study area (approximately 1.1 miles north and south of the tunnel alignment) through baseline data collection. Baseline surveys will characterize potential aquatic resources, including but not limited to mapping of wetland and riparian vegetation; hydroperiod (the duration of inundation); flow rates; area of feature; pond depth; the potential for special-status plant and animal species (e.g., California tiger salamander, California red-legged frog, foothill yellow-legged frog, western pond turtle, least Bell’s vireo, tricolored blackbird, and yellow-headed blackbird) and steelhead to occur; and potential groundwater dependent protected trees (e.g., oaks).</li> </ul>	Design/ pre-construction/ construction/ post-construction	Reporting and monitoring/ design  Prepare and implement plan/ report compliance	Follow reporting requirements as established by regulatory compliance permits	Authority/ Contractor	Authority/ Contractor	Follow reporting requirements as established by regulatory compliance permits	Reporting contract requirements/ specifications	<p>Impact BIO#1: Permanent Conversion or Degradation of Habitat for Special-Status Plant Species</p> <p>Impact BIO#6: Permanent Conversion of Habitat for and Direct Mortality of Steelhead and Pacific Lamprey, and Permanent Conversion of Essential Fish Habitat for Pacific Coast Salmon</p> <p>Impact BIO#7: Permanent Conversion or Degradation of Habitat for and Direct Mortality of California Tiger Salamander</p> <p>Impact BIO#8: Permanent Conversion or Degradation of Habitat for and Direct Mortality of California Red-Legged Frog</p> <p>Impact BIO#9: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Foothill Yellow-Legged Frog</p> <p>Impact BIO#10: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Western Spadefoot</p> <p>Impact BIO#11: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Western Pond Turtle</p> <p>Impact BIO#23: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Least Bell’s Vireo, Yellow Warbler, and Yellow-Breasted Chat</p> <p>Impact BIO#24: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Tricolored Blackbird and Yellow-Headed Blackbird</p> <p>Impact BIO#35: Permanent Conversion or Degradation of Special-Status Plant Communities</p> <p>Impact BIO#37: Permanent Conversion or Degradation of Aquatic Resources Considered waters of the U.S. or waters of the State</p> <p>Impact BIO#38: Permanent Conversion or</p>

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		<ul style="list-style-type: none"> <li>▪ <b>Groundwater modeling</b>—The Authority will model groundwater hydrologic conditions and potential tunnel infiltration to further identify specific areas of probable effect on the water table, facilitate selection of appropriate monitoring locations, and prepare for the potential need to provide supplemental water infrastructure in advance of tunneling.</li> <li>▪ <b>Pre-tunneling supplemental water infrastructure provision</b>—To maintain baseline water supply, the Authority will install water storage tanks or water lines in advance of tunneling on or near properties with wetlands, creeks, ponds, and springs subject to landowner approval. Water infrastructure may also be provided for upland protected trees susceptible to groundwater lowering in areas of predicted groundwater effects, but direct watering of protected trees may be utilized instead.</li> <li>▪ <b>Construction monitoring</b>—The Authority will designate monitoring locations and methodologies for monitoring water levels, vegetation cover, special-status species habitat, and protected trees most likely to be affected by tunnel construction as indicated by hydrologic modeling. The Authority will monitor representative locations during periods when effects are most likely to occur. If effects (e.g., lowering water levels resulting in reduced habitat) are observed, the Authority will implement contingency plans that expand monitoring beyond the representative locations and increase monitoring frequency to capture the extent of potential effects on groundwater-dependent biological resources.</li> <li>▪ <b>Supplemental water</b>—The Authority will prepare contingency plans to provide supplemental water as necessary to support riparian/aquatic vegetation, wildlife breeding cycles, aquatic wildlife, or protected tree health within the area of predicted effects determined through modeling or monitoring to be potentially affected by groundwater lowering. Seasonal variation as documented during the preconstruction baseline monitoring will be considered in establishing the amount of supplemental water. For all features, supplemental water will provide minimum flows and periods of inundation to match baseline conditions. The periods of supplemental water, in general, will likely be in periods of baseflow, which occurs in late spring, summer, and early fall outside of rain periods. For breeding habitats, the Authority will, at a minimum, supplement breeding habitat where necessary to maintain adequate depths for completion of the reproduction cycle (defined as the time by which juveniles are viable and mobile such that they can feasibly leave the breeding location). However, where breeding habitat is perennial or long-seasonal, then supplemental water will be provided as necessary to</li> </ul>								<p>Degradation of Resources Regulated under California Fish and Game Code Section 1600 et seq.</p> <p>Impact BIO#40: Removal or Mortality of Trees Protected under Municipal Tree Ordinances</p> <p>Impact BIO#51: Permanent Conversion or Degradation of Conservation Areas</p>

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		<p>maintain the entire wetted period as determined through baseline monitoring. For nonbreeding movement and foraging habitat in creeks and streams, water will be provided to maintain seasonal flow similar to baseline conditions. Water will be provided as needed to sustain habitat conditions up to the point of baseline conditions until the qualified biologist determines it is appropriate to cease its provision. If supplemental water is provided from wells, the effects on water supply and habitat features will be managed to avoid and minimize potential disruption by the selection of well location, depth, flow rate, and the use of alternative supplies. Plans for supplemental water will also consider best practices related to supplemental water near oak trees. For example, oaks will be irrigated only outside their root zone (i.e., beyond the dripline to a distance that is half the distance between the trunk and the dripline).</p> <ul style="list-style-type: none"> <li>▪ <b>Contingency plan for supplemental water in areas outside of predicted area of effect</b>—The Authority will establish contingency procedures to provide supplemental water to wetlands, creeks, ponds, and springs to support riparian/aquatic vegetation, wildlife breeding cycles, and aquatic wildlife as well as supplemental water to protected trees outside the area of predicted effects, if warranted by monitoring.</li> <li>▪ <b>Temporary relocation</b>—The Authority will relocate aquatic species (e.g., California tiger salamander, California red-legged frog, foothill yellow-legged frog, western pond turtle) where unavoidable drying of aquatic breeding habitat will occur before salamanders and frogs have been able to metamorphose and maintaining the habitat with supplemental water is not feasible. The Authority will relocate these species, as allowed by USFWS and CDFW. If holding facilities are used, the Authority will return affected wildlife to affected aquatic areas after recovery of baseline hydrologic conditions.</li> <li>▪ <b>Post-construction monitoring</b>—After construction, the Authority will monitor water levels and aquatic resource conditions of affected features twice annually (spring and summer) and affected protected trees for at least 5 years or as determined through consultation with USFWS and CDFW. As long as groundwater levels are demonstrated to be recovering, monitoring will continue until baseline conditions return or 5 years, whichever is longer. In the event that supplementary water is not successful at restoring aquatic resources and/or protected trees to baseline conditions in the post-construction period and off-site compensation is triggered, then monitoring may be waived for certain features if it is determined that there is no further utility for monitoring the specific feature. Once the Authority determines that conditions have returned to baseline</li> </ul>								

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		<p>conditions, monitoring will no longer be required.</p> <ul style="list-style-type: none"> <li>▪ <b>Post-construction riparian or wetland restoration</b>—The Authority will restore any lost riparian or wetland vegetation that is not recovering on its own within 1 year of construction and is determined to be the result of tunnel construction through comparison to baseline conditions. Subject to landowner approval, such restoration will occur on site or at a suitable location nearby if not feasible on site. The Authority will implement restoration of riparian or wetland restoration, as applicable, as defined in Mitigation Measures BIO-MM#71 and BIO-MM#73.</li> <li>▪ <b>Post-construction compensation</b>—If the Authority determines through direct monitoring or data interpretation that substantial disruption (i.e., loss of 0.5 acre or greater) to habitat supporting special-status species has likely occurred during or after construction and that habitat restoration efforts did not achieve success criteria or that restoration was determined unfeasible, the Authority will compensate for this loss of habitat. In addition, if affected protected trees demonstrate substantial impairment to health or mortality after 5 years of monitoring, the Authority will compensate for affected protected trees with replacement on at least a 1:1 basis. The Authority will implement the compensation of suitable habitat, as applicable, as defined in Mitigation Measures BIO-MM#10, BIO-MM#12, BIO-MM#28, BIO-MM#31, BIO-MM#33, BIO-MM#35, BIO-MM#57, BIO-MM#72, BIO-MM#74 and BIO-MM#75.</li> </ul>								
BIO-MM#10	Prepare and Implement a Habitat Mitigation Plan for Species and Species Habitat	<p>The Authority will prepare an HMP that sets out the compensatory mitigation that will be provided to offset permanent and temporary impacts on federal and state-listed species and their habitat, fish and wildlife resources regulated under Section 1600 et seq. of the Cal. Fish and Game Code, and special-status species. Mitigation implemented under this measure will be consistent with and will be credited towards the 10,000-acre mitigation commitment in BIO-MM#P1 to preserve habitat and open space values and offset impacts on wetlands, sensitive plant and wildlife species, and other biological resources in and around the GEA and other areas along the alignment, and will help advance mitigation commitments at the program level, including mitigation intended to address impacts in the GEA.</p> <p>Mitigation for temporary effects will be located on site and in-kind whenever feasible, and mitigation for permanent effects will be in-kind and located as close to the location of impact as feasible, especially where those impacts occur in natural areas, near areas known or likely to support wildlife movement, or near wildlife crossings that will be constructed as part of the rail (to contribute to the long-term function of the crossing). The Authority could</p>	Pre-construction/ construction/ post-construction	Design/ final design/ surveying/ compensatory mitigation/ reporting	In accordance with reporting schedule established by agency permit requirements	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Prepare and implement HMP for temporary and permanent impacts on biological resources/ report findings/ compliance memos	Condition of construction contract/condition of regulatory permits	<p>Impact BIO#1: Permanent Conversion or Degradation of Habitat for Special-Status Plant Species</p> <p>Impact BIO#2: Permanent Conversion or Degradation of Habitat for and Mortality of Bay Checkerspot Butterfly</p> <p>Impact BIO#3: Permanent Conversion or Degradation of Habitat for and Mortality of Vernal Pool Crustaceans</p> <p>Impact BIO#4: Removal or Pruning of Elderberry Plants Potentially Supporting Valley Elderberry Longhorn Beetle</p> <p>Impact BIO#6: Permanent Conversion of Habitat for and Direct Mortality of Steelhead and Pacific Lamprey, and Permanent Conversion of Essential Fish Habitat for Pacific Coast Salmon</p> <p>Impact BIO#7: Permanent Conversion or Degradation of Habitat for and Direct Mortality of California Tiger Salamander</p> <p>Impact BIO#8: Permanent Conversion or</p>

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		<p>also mitigate in other locations farther from the location of the impact, if the mitigation sites are more appropriate or higher quality than those closer to the location of the impact.</p> <p>The HMP will include the following:</p> <ul style="list-style-type: none"> <li>▪ A description of the species and habitat types for which compensatory mitigation is being provided.</li> <li>▪ A description of the methods used to identify and evaluate mitigation options. Mitigation options will include one or more of the following:                             <ul style="list-style-type: none"> <li>– Purchase of mitigation credits from an agency-approved mitigation bank.</li> <li>– Protection of habitat through acquisition of fee-title or conservation easement and funding for long-term management of the habitat. Title to lands acquired in fee will be transferred to the most suitable landowner/manager in the region, which will be determined in coordination with conservation agencies and organizations, including CDFW. Conservation easements will be held by an entity approved in writing by the applicable regulatory agency. In circumstances where the Authority protects habitat through a conservation easement, the terms of the conservation easement will be subject to approval of the applicable regulatory agencies, and the conservation easement will identify applicable regulatory agencies as third-party beneficiaries with a right of access to the easement areas.</li> <li>– Payment to an existing in-lieu fee program.</li> </ul> </li> <li>▪ A summary of coordination with local conservation agencies and organizations to ensure that the mitigation options promote and do not conflict with the conservation goals in the region.</li> <li>▪ A summary of the estimated direct permanent and temporary impacts on species and species habitat.</li> <li>▪ A description of the process that will be used to confirm impacts. Actual impacts on species and habitat could differ from estimates. Should this occur, adjustments will be made to the compensatory mitigation that will be provided. Adjustments to impact estimates and compensatory mitigation will occur in the following circumstances:                             <ul style="list-style-type: none"> <li>– Impacts on species (typically measured as habitat loss) are reduced or increased as a result of changes in project design</li> <li>– Pre-construction site assessments indicate that habitat features are absent (e.g., because of errors in land cover mapping or land cover conversion)</li> </ul> </li> </ul>								<p>Degradation of Habitat for and Direct Mortality of California Red-Legged Frog</p> <p>Impact BIO#9: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Foothill Yellow-Legged Frog</p> <p>Impact BIO#12: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Blunt-Nosed Leopard Lizard</p> <p>Impact BIO#14: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Giant Garter Snake</p> <p>Impact BIO#17: Permanent Conversion or Degradation of Habitat for and Direct Mortality or Disturbance of Burrowing Owl</p> <p>Impact BIO#21: Permanent Conversion or Degradation of Habitat for and Disturbance of Swainson's Hawks</p> <p>Impact BIO#24: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Tricolored Blackbird and Yellow-Headed Blackbird</p> <p>Impact BIO#25: Permanent Conversion or Degradation of Habitat for and Disturbance of Sandhill Crane</p> <p>Impact BIO#26: Loss of Denning and Dispersal Habitat for and Direct Mortality or Disturbance of San Joaquin Kit Fox</p> <p>Impact BIO#27: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Fresno Kangaroo Rat</p> <p>Impact BIO#34: Removal or Degradation of Habitat for and Disturbance of Waterfowl and Shorebirds</p> <p>Impact BIO#51: Permanent Conversion or Degradation of Conservation Areas</p> <p>Impact BIO#53: Conflict with Santa Clara Valley Habitat Plan</p>

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		<ul style="list-style-type: none"> <li>- The habitat is determined to be unoccupied based on negative species surveys</li> <li>- Impacts initially categorized as permanent qualify as temporary impacts</li> <li>▪ Adjustments to compensatory mitigation requirements through this process will not result in a reduction of the commitment in BIO-MM#P1 to ensure acquisition of agricultural, conservation, or open space easements on a total of 10,000 acres of land.</li> <li>▪ An overview of the strategy for mitigating effects on species. The overview will indicate the ratios set forth in the specific species and habitat compensatory mitigation measures and the total amount of habitat that will be protected pursuant to those ratios (noting that if a permitting agency requires a higher ratio than this document, the future permit condition ratio will apply in implementation). The overview will also set out the process for ensuring implementation of BIO-MM#P1 (the program-level commitment to acquire easements on 10,000 acres of land generally located within or adjacent to the GEA after accounting for compensatory mitigation achieved through project-level mitigation measures).</li> <li>▪ A description of habitat restoration or enhancement projects, if any, as provided by the habitat restoration mitigation measure, that will contribute to compensatory mitigation commitments.</li> <li>▪ A description of the success criteria that will be used to evaluate the performance of habitat restoration or enhancement projects, and a description of the types of monitoring that will be used to verify that such criteria have been met.</li> <li>▪ A description of the management actions that will be used to maintain the habitat on the mitigation sites, and the funding mechanisms for long-term management.</li> <li>▪ A description of adaptive management approaches, if applicable, that will be used in the management of species habitat.</li> <li>▪ A description of financial assurances that will be provided to demonstrate that the funding to implement mitigation is assured.</li> </ul>								
BIO-MM#11	Implement Measures to Minimize Impacts during Off-Site Habitat Restoration, or Enhancement, or Creation on Mitigation Sites	<p>Prior to ground-disturbing activities associated with habitat restoration, enhancement, and/or creation actions at a mitigation site, the Authority will conduct a site assessment of the work area to identify biological and aquatic resources, including plant communities, land cover types, and the distribution of special-status plants and wildlife.</p> <p>Based on the results of the site assessment, the Authority will obtain any necessary regulatory authorizations prior to conducting habitat restoration, enhancement and/or creation activities, including authorization under the FESA</p>	Pre-construction/ construction/ post-construction	Design/ final design/ surveying/ compensatory mitigation/ reporting	Yearly or as established by regulatory compliance permits	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Implement measure to avoid and minimize impacts during off-site habitat restoration, enhancement, and creation/ report findings	Condition of construction contract/condition of regulatory permits	Impact BIO#1: Permanent Conversion or Degradation of Habitat for Special-Status Plant Species  Impact BIO#4: Removal or Pruning of Elderberry Plants Potentially Supporting Valley Elderberry Longhorn Beetle

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<p>or CESA, Cal. Fish and Game Code Section 1600 et seq., the CWA, and the Porter-Cologne Act.</p> <p>Restoration, enhancement, and/or creation of aquatic resources may result in the permanent conversion of grassland to wetland or riparian habitat. While such activities will be beneficial for vernal pool, riparian, and aquatic-breeding species, they will result in a small but measurable loss of upland habitat for other species (e.g., foraging habitat for tricolored blackbird, non-breeding habitat for California tiger salamander and California red-legged frog). Permanent impacts on grassland habitat from aquatic resource restoration, enhancement, and creation will be mitigated at a minimum ratio of 1:1 (acres preserved, enhanced, or restored: acres affected).</p>								
BIO-MM#12	Provide Compensatory Mitigation for Impacts on Listed Plant Species	<p>The Authority will provide compensatory mitigation for direct impacts on federally and state-listed plant species based on the number of acres of occupied plant habitat directly affected. Such mitigation will include the following measures:</p> <ul style="list-style-type: none"> <li>Compensatory mitigation will be provided at a 1:1 ratio to offset direct impacts on occupied federally listed plant species habitat, unless a higher ratio is required pursuant to regulatory authorizations issued under FESA.</li> <li>Compensatory mitigation will be provided at a 1:1 ratio to offset direct impacts on occupied state-listed plant species habitat, unless a higher ratio is required pursuant to regulatory authorizations issued under CESA.</li> </ul> <p>Compensatory mitigation will be provided using one or more of the methods described in BIO-MM#10.</p>	Pre-construction/ construction/ post-construction	Design/ final design/ mitigation	Yearly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Prepare and implement CMP for temporary and permanent impacts on special-status species and their habitat	Condition of construction contract/condition of regulatory permits	<p>Impact BIO#1: Permanent Conversion or Degradation of Habitat for Special-Status Plant Species</p> <p>Impact BIO#5: Permanent Conversion or Degradation of Habitat for and Mortality of Crotch Bumble Bee</p>
BIO-MM#13	Implement Work Stoppage	<p>In the event that any special-status wildlife species is found in a work area, the Project Biologist will have the authority to halt work to prevent the death or injury to the species. Any such work stoppage will be limited to the area necessary to protect the species and work may be resumed once the Project Biologist determines that the individuals of the species have moved out of harm's way or the Project Biologist has relocated them out of the work area in accordance with authorizations issued under FESA and CESA.</p> <p>Any such work stoppages and the measures taken to facilitate the removal of the species, if any, will be documented in a memorandum prepared by the Project Biologist and submitted to the Authority within 2 business days of the work stoppage.</p>	Construction	Monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Halt work to relocate special-status wildlife species (if possible)/report findings	Condition of construction contract/condition of regulatory permits	<p>Impact BIO#2: Permanent Conversion or Degradation of Habitat for and Mortality of Bay Checkerspot Butterfly</p> <p>Impact BIO#3: Permanent Conversion or Degradation of Habitat for and Mortality of Vernal Pool Crustaceans</p> <p>Impact BIO#4: Removal or Pruning of Elderberry Plants Potentially Supporting Valley Elderberry Longhorn Beetle</p> <p>Impact BIO#6: Permanent Conversion of Habitat for and Direct Mortality of Steelhead and Pacific Lamprey, and Permanent Conversion of Essential Fish Habitat for Pacific Coast Salmon</p> <p>Impact BIO#7: Permanent Conversion or Degradation of Habitat for and Direct Mortality of California Tiger Salamander</p> <p>Impact BIO#8: Permanent Conversion or Degradation of Habitat for and Direct</p>

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
										Mortality of California Red-Legged Frog Impact BIO#9: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Foothill Yellow-Legged Frog Impact BIO#10: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Western Spadefoot Impact BIO#11: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Western Pond Turtle Impact BIO#12: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Blunt-Nosed Leopard Lizard Impact BIO#13: Permanent Conversion or Degradation of Habitat for and Direct Mortality of San Joaquin Coachwhip, Northern California Legless Lizard, and Coast Horned Lizard Impact BIO#14: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Giant Garter Snake Impact BIO#15: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Short-Eared Owl and Grasshopper Sparrow Impact BIO#16: Permanent Conversion or Degradation of Habitat for Mountain Plover and Disturbance of Western Snowy Plover (Interior Population) Impact BIO#17: Permanent Conversion or Degradation of Habitat for and Direct Mortality or Disturbance of Burrowing Owl Impact BIO#18: Permanent Conversion or Degradation of Habitat for and Disturbance of Golden Eagle and Bald Eagle Impact BIO#19: Injury or Disturbance of California Condor Impact BIO#20: Permanent Conversion or Degradation of Habitat for and Disturbance of Special-Status Raptors (American Peregrine Falcon, Northern Harrier, White-Tailed Kite) and Other Raptors Impact BIO#21: Permanent Conversion or Degradation of Habitat for and Disturbance of Swainson's Hawks Impact BIO#22: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Purple Martin, Olive-Sided

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
										Flycatcher, and Loggerhead Shrike Impact BIO#23: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Least Bell's Vireo, Yellow Warbler, and Yellow-Breasted Chat Impact BIO#24: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Tricolored Blackbird and Yellow-Headed Blackbird Impact BIO#25: Permanent Conversion or Degradation of Habitat for and Disturbance of Sandhill Crane Impact BIO#26: Loss of Denning and Dispersal Habitat for and Direct Mortality or Disturbance of San Joaquin Kit Fox Impact BIO#27: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Fresno Kangaroo Rat Impact BIO#28: Permanent Conversion or Degradation of Habitat for and Direct Mortality of American Badger Impact BIO#29: Permanent Conversion or Degradation of Habitat for and Direct Mortality of San Francisco Dusky-Footed Woodrat and Ringtail Impact BIO#30: Loss of Roost Sites for and Direct Mortality or Disturbance of Special-Status Bats
BIO-MM#14	Avoid Direct Impacts on Bay Checkerspot and Monarch Butterfly Host Plants	Prior to construction, the Project Biologist will survey for Bay checkerspot and monarch butterfly larval host plants—dwarf plantain and purple owl's-clover for Bay checkerspot and native milkweed species for monarch — within suitable habitat. If host plants are found, the Project Biologist will conduct surveys for adult butterflies during the peak of the flight/migration/breeding periods to determine presence/absence. If surveys are not possible due to the timing of the survey relative to the presence of the species, presence may be assumed. Where adult butterflies are present, or assumed to be present, construction personnel will avoid host plants outside permanent impact areas.	Pre-construction/ construction	Surveying/ monitoring/ reporting	Monthly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Pre-construction surveys of monarch and Bay checkerspot butterfly larval host plants and maintain no-work buffer/ report findings	Condition of construction contract/condition of regulatory permits	Impact BIO#2a: Permanent Conversion or Degradation of Habitat for and Mortality of Bay Checkerspot Butterfly Impact BIO#2b: Permanent Conversion or Degradation of Habitat for and Mortality of Monarch Butterfly
BIO-MM#15	Prepare and Implement Bay Checkerspot Butterfly Protection Plan	Prior to final design, the Authority will incorporate features to minimize impacts on Bay checkerspot butterfly dispersal consistent with regulatory authorizations issued under the FESA. Actions may include: <ul style="list-style-type: none"> <li>Plant shrubs or trees along the east side of the viaduct, the predominant direction from which dispersing butterflies are likely to originate. Trees and shrubs will provide a more natural transition over the viaduct.</li> <li>Place lighting under the viaduct in strategic locations to</li> </ul>	Pre-construction	Reporting	Final design	Authority/ Contractor	Authority/ Contractor	Pre-construction surveys of Bay checkerspot butterfly larval host plants and maintain no-work buffer/ report findings	Condition of construction contract/condition of regulatory permits	Impact BIO#2a: Permanent Conversion or Degradation of Habitat for and Mortality of Bay Checkerspot Butterfly Impact BIO#2b: Permanent Conversion or Degradation of Habitat for and Mortality of Monarch Butterfly

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<p>minimize shadows.</p> <ul style="list-style-type: none"> <li>Create vegetated "stepping stones" to attract butterflies under the viaduct and along a path that is the shortest distance between the Coyote Ridge core population and the Tulare Hill sub-population.</li> </ul> <p>If monitoring indicates that dispersal is affected by viaduct shadows, the Authority will develop a translocation project to facilitate Bay checkerspot butterfly dispersal between the core and sub-population. The project may include:</p> <ul style="list-style-type: none"> <li>Conservation of land near the alignment to improve survival conditions for dispersing butterflies.</li> <li>A monitoring and adaptive management process that will detail how the performance criteria of "no net change in dispersal" will be defined and maintained.</li> </ul>								
BIO-MM#16	Provide Compensatory Mitigation for Impacts on Bay Checkerspot Butterfly Habitat	<p>The Authority, in accordance with authorizations issued under the FESA, will determine the compensatory mitigation required to offset impacts on habitat, including critical habitat, for Bay checkerspot butterfly. Compensatory mitigation could include one or more of the following:</p> <ul style="list-style-type: none"> <li>Purchase of credits from an agency-approved conservation bank.</li> <li>Acquisition in fee title of USFWS-approved property</li> <li>Purchase or establishment of a conservation easement with an endowment for long-term management of the property-specific conservation values.</li> <li>An in-lieu fee contribution determined through negotiation and consultation with the USFWS</li> <li>Contribution to SCVHA habitat protection, restoration, or management efforts.</li> </ul> <p>Mitigation for Bay checkerspot butterfly will first prioritize measures within the San Martin critical habitat unit and, to the extent feasible, that contribute to regional conservation efforts (i.e., habitat protection efforts underway by the SCVHA). The second priority will be to implement measures in another critical habitat unit. If mitigation within designated critical habitat is not feasible, the Authority will implement mitigation outside critical habitat that provides an equivalent contribution to Bay checkerspot butterfly recovery.</p> <p>The compensatory mitigation areas and methods selected will include appropriate measures to guide management of habitats (e.g., grazing, weed control), monitor populations, and identify methods to establish or reestablish populations, if necessary:</p> <ul style="list-style-type: none"> <li>Habitat restoration and management will be needed on many Bay checkerspot butterfly habitat areas. Appropriate grazing management should verify that habitats are neither overgrazed nor overgrown. Weeding, biological control, mowing, herbicides, and fire should also be considered as possible tools to</li> </ul>	Pre-construction/ construction/ post-construction	Design/ final design/ compensatory mitigation/ reporting	Monthly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Compensate for impacts on habitat for monarch butterfly/ report findings	Condition of construction contract/condition of regulatory permits	Impact BIO#2a: Permanent Conversion or Degradation of Habitat for and Mortality of Bay Checkerspot Butterfly  Impact BIO#2b: Permanent Conversion or Degradation of Habitat for and Mortality of Monarch Butterfly

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<p>control nonnative plant species.</p> <ul style="list-style-type: none"> <li>Monitoring of populations will serve to identify, on an ongoing basis, populations that are in trouble and in need of recovery efforts, as well as populations that are healthy and suitable as sources of individuals for reintroduction efforts.</li> </ul> <p>Several factors are important in deciding which habitat areas to protect: (1) habitat size and quality, including habitat diversity; (2) location in relation to other habitat patches and to core populations; (3) presence, current or historic, of Bay checkerspot butterflies; and (4) ease and cost of protection. Habitat protection should include buffer zones as necessary. Bay checkerspot butterfly habitat areas considered for mitigation can be ranked in approximate order of priority as follows:</p> <ul style="list-style-type: none"> <li>Core habitat areas                             <ol style="list-style-type: none"> <li>Kirby (3,900 acres)</li> <li>Metcalf (1,100 acres)</li> <li>San Felipe (780 acres)</li> <li>Silver Creek Hills (1,000 acres)</li> </ol> </li> <li>Potential core areas—Santa Teresa Hills (1,100 acres)</li> <li>Larger, good-quality habitat areas near core populations                             <ol style="list-style-type: none"> <li>Tulare Hill (300 acres)</li> <li>North of Llagas Avenue (420 acres),</li> <li>West hills of Santa Clara Valley (74 acres)</li> </ol> </li> <li>Stepping stones—Tulare Hill, Santa Teresa Hills, Redwood City</li> <li>Other current or historic localities or suitable habitat areas, generally larger than 1 hectare (2.5 acres), within the historic range of the butterfly, identified for their habitat value, function as dispersal corridors, proximity to other habitat, or other biological value.</li> </ul> <p>The Authority will submit a memorandum to the USFWS to document compliance with this measure.</p>								
BIO-MM#17	Conduct Pre-Construction Surveys for Vernal Pool Wildlife Species	<p>Prior to any ground-disturbing activities, the Project Biologist will conduct an aquatic habitat assessment and survey for vernal pool wildlife species in seasonal wetlands and vernal pools that overlap with the work area or occur within both the work area and the area extending 250 feet from the outer boundary of the work area where access is available, consistent with the USFWS <i>Survey Guidelines for the Listed Large Brachiopods</i> (USFWS 2015) vernal pool survey protocols. The Project Biologist will visit these areas after the first rain event of the season to determine whether seasonal wetlands and vernal pools have been inundated. A seasonal wetland/vernal pool will be considered to be inundated when it holds more than 3 cm of standing water 24 hours after a rain event. Approximately 2 weeks after the pools have been</p>	Pre-construction/ construction	Aquatic assessment and sampling; reporting	Monthly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Presence-absence surveys of species within the construction footprint conducted 30 days prior to ground disturbance  Report findings at least 30 days prior to ground disturbance	Condition of construction contract/condition of regulatory permits	Impact BIO#3: Permanent Conversion or Degradation of Habitat for and Mortality of Vernal Pool Crustaceans

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		determined to be inundated, the Project Biologist will conduct surveys in appropriate seasonal wetland and vernal pool habitats. The Project Biologist will submit a report to the Authority within 30 days of completing the work.								
BIO-MM#18	Implement Seasonal Vernal Pool Work Restriction	To the extent feasible, ground-disturbing activities will not occur within 250 feet of vernal pools or seasonal wetlands during the rainy season (October 15 to April 15). In the event ground-disturbing activities are to occur within the 250-foot buffer area during the rainy season, such activities should, to the extent feasible, be undertaken when the aquatic features are not inundated. For any work occurring within 250 feet of vernal pools during the rainy season, the Contractor (under the direction of the Project Biologist) will install erosion control measures in those areas where construction activities need to be completed and ESA fencing between the work area and vernal pools.	Pre-construction/ construction	Exclusion fencing; compliance reporting	Follow reporting requirements as established by regulatory compliance permits	Authority/ Contractor	Authority/ Contractor	Follow reporting requirements as established by regulatory compliance permits	Condition of construction contract/condition of regulatory permits	Impact BIO#3: Permanent Conversion or Degradation of Habitat for and Mortality of Vernal Pool Crustaceans
BIO-MM#19	Implement and Monitor Vernal Pool Avoidance and Minimization Measures within Temporary Impact Areas	To the extent feasible, impacts on vernal pools in work areas outside of the permanent right-of-way will be avoided. The Project Biologist will install and maintain exclusionary fencing to prevent impacts on vernal pools from construction activities. When avoidance of impacts on vernal pools is not feasible, the construction activity will be scheduled to occur in the dry season, where feasible. Prior to the initiation of a ground-disturbing activity during the dry season, the Project Biologist will collect a representative sampling of soils from the affected vernal pools to obtain viable plant seeds and vernal pool branchiopod cysts. After collecting the soil, the Project Biologist may also put rinsed gravel in the vernal pools and cover with geotextile fabric to minimize damage to the soils and protect the pools' contours, as provided by regulatory authorizations issued under the FESA. The soils containing seeds and cysts may later be returned to the affected pool after work has been completed or incorporated into other vernal pools, as provided by regulatory authorizations under the FESA.	Pre-construction/ construction	Exclusion fencing; collection of soil material; off-site compensatory mitigation; compliance reporting	Monthly or reporting requirements as established by regulatory compliance permits	Authority/ Contractor	Authority/ Contractor	Monthly or reporting requirements as established by regulatory compliance permits	Condition of construction contract/condition of regulatory permits	Impact BIO#3: Permanent Conversion or Degradation of Habitat for and Mortality of Vernal Pool Crustaceans
BIO-MM#20	Provide Compensatory Mitigation for Impacts on Vernal Pool Fairy Shrimp and Vernal Pool Tadpole Shrimp Habitat	The Authority will provide compensatory mitigation for direct and indirect impacts, including both temporary and permanent impacts, on vernal pool branchiopod habitat at a 1:1 ratio, unless a higher ratio is required by the FESA. Compensatory mitigation will be provided using one or more of the methods described in BIO-MM#10.	Pre-construction/ construction/ post-construction	Design/ final design/ surveying/ compensatory mitigation/ reporting	Monthly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Prepare and implement HMP for temporary and permanent impacts on biological resources/ report findings/ compliance memos	Condition of construction contract/condition of regulatory permits	Impact BIO#3: Permanent Conversion or Degradation of Habitat for and Mortality of Vernal Pool Crustaceans
BIO-MM#21	Implement Avoidance Measures for Elderberry Shrubs outside Permanent	To avoid direct impacts on elderberry shrubs potentially occupied by valley elderberry longhorn beetle that are inside the project footprint but outside permanent impact areas (and where feasible), a biologist with demonstrated	Pre-construction/ construction	Surveying/ monitoring/ compliance reporting	Follow reporting requirements as established by regulatory	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Exclusion fencing/markings	Condition of construction contract/condition of regulatory permits	Impact BIO#4: Removal or Pruning of Elderberry Plants Potentially Supporting Valley Elderberry Longhorn Beetle

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	Impact Areas	<p>experience identifying elderberry shrubs will survey areas modeled as potentially suitable riparian habitat within the project footprint for elderberry no less than 30 days before ground disturbance or vegetation removal. The biologist will mark all elderberry shrubs with bright-colored flagging and record geospatial information using a handheld GPS or mobile device (i.e., smartphone or tablet). Elderberry shrubs outside permanent and temporary impact areas will be included on grading plans, and contractors will comply with the following avoidance and minimization measures from the USFWS' <i>Framework for Assessing Impacts to the Valley Elderberry Longhorn Beetle</i> (USFWS 2017b):</p> <ul style="list-style-type: none"> <li>All areas to be avoided during construction activities will be fenced, flagged, or both as close to construction limits as feasible.</li> <li>Activities that may damage or kill an elderberry shrub (e.g., trenching, paving) may need an avoidance area of at least 20 feet from the drip line, depending on the type of activity.</li> <li>A qualified biologist will provide training for all contractors, work crews, and any on-site personnel on the status of the valley elderberry longhorn beetle, its host plant and habitat, the need to avoid damaging elderberry shrubs, and the possible penalties for noncompliance.</li> <li>A qualified biologist will monitor the work area at project-appropriate intervals to verify that all avoidance and minimization measures are implemented.</li> <li>To the extent feasible, all activities that could occur within 65 feet of an elderberry shrub will be conducted outside the flight season of the valley elderberry longhorn beetle (March–July).</li> <li>Trimming of elderberry shrubs will occur between November and February and will avoid the removal of any branches or stems that are 1 inch or more in diameter.</li> <li>Herbicides will not be used within the drip line of elderberry shrubs. All chemicals will be applied using a backpack sprayer or similar direct application method.</li> <li>Mechanical weed removal within the drip line of elderberry shrubs will be limited to the season when adults are not active (August–February) and will avoid damaging elderberry shrubs.</li> </ul>			compliance permits					
BIO-MM#22	Provide Compensatory Mitigation for Impacts on Valley Elderberry Longhorn Beetle Habitat	<p>The Authority will provide compensatory mitigation for impacts on valley elderberry longhorn beetle habitat, including through transplantation and replacement of elderberry shrubs and maintenance of replacement shrubs, consistent with the USFWS' <i>Framework for Assessing Impacts to the Valley Elderberry Longhorn Beetle</i> (USFWS 2017b), as follows:</p> <ul style="list-style-type: none"> <li>Suitable riparian habitat will be replaced at a minimum of 3:1 (acres of mitigation to acres of impact).</li> </ul>	Pre-construction/ construction/ post-construction	Surveying/ monitoring/ reporting	Follow reporting requirements as established by regulatory compliance permits	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Transplant pre-construction; compensation prior to operation	Condition of construction contract/condition of regulatory permits	Impact BIO#4: Removal or Pruning of Elderberry Plants Potentially Supporting Valley Elderberry Longhorn Beetle

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<ul style="list-style-type: none"> <li>▪ Suitable nonriparian habitat will be replaced at a minimum of 1:1 (acres of mitigation to acres of impact).</li> <li>▪ Individual elderberry shrubs in riparian areas will be replaced through a purchase of two credits at a USFWS-approved bank for each shrub that will be trimmed or removed regardless of the presence of exit holes.</li> <li>▪ Individual elderberry shrubs in nonriparian areas will be replaced through a purchase of one credit at a USFWS-approved bank for each shrub that will be trimmed if exit holes have been found in any shrub in or within 165 feet of the work area.</li> <li>▪ If an elderberry shrub is to be completely removed by the activity, the entire shrub will be transplanted to a USFWS-approved location in addition to the specified credit purchase.</li> </ul> <p>For transplanted elderberry plants, a survival rate of at least 60% of the elderberry plants and 60% of the associated native plants must be maintained throughout the 10-year monitoring period. If survival rates drop below 60% during the monitoring period, failed plantings will be replaced and maintained until the 60% survival rate is achieved.</p>								
BIO-MM#23	Conduct Surveys and Implement Avoidance Measures for Crotch Bumble Bee	<p>Surveys for Crotch bumble bee habitat (as identified by species habitat suitability modeling) in the project footprint will be conducted by qualified biologists within 1 year prior to the start of construction. Surveys will be conducted during four evenly spaced sampling periods during the flight season (March through September) (Thorp et al. 1983). For each sampling event, the biologist(s) will survey suitable habitat using nonlethal netting methods for 1 person-hour per 3 acres of the highest quality habitat or until 150 bumble bees are sighted, whichever comes first. If initial sampling of a given habitat area indicates that the habitat is of low quality or nonexistent, no further sampling of that area will be required. General guidelines and best practices for bumble bee surveys will follow USFWS' <i>Survey Protocols for the Rusty Patched Bumble Bee (Bombus affinis)</i> (USFWS 2019), which are consistent with other bumble bee survey protocols used by The Xerces Society (Hatfield et al. 2017; Washington Department of Fish and Wildlife et al. 2019).</p> <p>If surveys identify occupied Crotch bumble bee habitat within the project footprint, the project biologist will then conduct additional pre-construction surveys of such habitat for active bee nest colonies and associated floral resources (i.e., flowering vegetation on which bees from the colony are observed foraging) no more than 30 days prior to any ground disturbance between March and September. The purpose of this pre-construction survey will be to identify active nest colonies and associated floral resources outside of permanent impact areas that could be avoided by</p>	Pre-construction/ construction	Surveying/ monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority Contractor/ Project Biologist	Pre-construction surveys of Crotch bumble bee habitat/establish and maintain no-work buffer/ report findings	Condition of construction contract; Condition of regulatory permits	Impact BIO#5: Permanent Conversion or Degradation of Habitat for and Mortality of Crotch Bumble Bee

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		construction personnel. The project biologist will establish, monitor, and maintain no-work buffers around nest colonies and floral resources identified during surveys. The size and configuration of the no-work buffer will be based on best professional judgment of the project biologist. At a minimum, the buffer will provide at least 50 feet of clearance around nest entrances and maintain disturbance-free airspace between the nest and nearby floral resources. Construction activities will not occur within the no-work buffers until the colony is no longer active (i.e., no bees are seen flying in or out of the nest for three consecutive days indicating the colony has completed its nesting season and the next season's queens have dispersed from the colony).								
BIO-MM#24	Provide Compensatory Mitigation for Impacts on Crotch Bumble Bee	The Authority will provide compensatory mitigation for impacts on occupied habitat for Crotch bumble bee. Impacts on occupied habitat (confirmed through surveys as described in BIO-MM#23) will be compensated for at a ratio of 3:1, unless a higher ratio is required pursuant to an authorization issued under CESA, through the purchase of CDFW-approved bank credits or through preservation of habitat in perpetuity, including suitable habitat currently preserved by the Authority.	Pre-construction/ construction/ post-construction	Design/ final design/ compensatory mitigation/ reporting	Monthly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Compensate for impacts on habitat for Crotch bumble bee/ report findings	Condition of construction contract/condition of regulatory permits	Impact BIO#5: Permanent Conversion or Degradation of Habitat for and Mortality of Crotch Bumble Bee
BIO-MM#25	Prepare Plan for Dewatering and Water Diversions	Prior to initiating any construction activity that occurs within open or flowing water, or streamside activities, the Authority will prepare a dewatering plan, which will be subject to the review and approval by the applicable regulatory agencies. The plan will incorporate measures to minimize turbidity and siltation. The Project Biologist will monitor the dewatering and/or water diversion sites, including collection of water quality data, as applicable. Prior to the dewatering or diverting of water from a site, the Project Biologist will conduct pre-activity surveys to determine the presence or absence of special-status species within the affected waterbody. In the event that special-status species are detected during pre-activity surveys, the Project Biologist will relocate the species (unless the species is fully protected under state law), consistent with any regulatory authorizations applicable to the species.	Pre-construction/ construction	Design/ final design/ monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Prepare and implement dewatering and waste diversion plan/report findings	Condition of construction contract/condition of regulatory permits	Impact BIO#6: Permanent Conversion of Habitat for and Direct Mortality of Steelhead and Pacific Lamprey, and Permanent Conversion of Essential Fish Habitat for Pacific Coast Salmon Impact BIO#37: Permanent Conversion or Degradation of Aquatic Resources Considered Waters of the U.S. or Waters of the State Impact BIO#38: Permanent Conversion or Degradation of Resources Regulated under California Fish and Game Code Section 1600 et seq. Impact BIO#42: Temporary Disruption of Wildlife Movement Impact HYD#4: Temporary Impacts on Surface Water Quality during Construction
BIO-MM#26	Prepare and Implement a Fish Rescue Plan	If temporary stream dewatering is required, the Authority or a contractor on behalf of the Authority will develop a fish rescue plan. Fish rescue operations will occur at any in-water construction site that occurs in modeled steelhead habitat or habitat identified by project biologists during pre-construction surveys where dewatering and resulting isolation of fish may occur. The fish rescue plan will include detailed procedures for fish rescue and salvage to minimize the number of individuals of listed fish species subject to stranding during dewatering. The plan will identify the appropriate procedures for removing fish from construction zones and preventing fish from reentering	Pre-construction/ construction	Implement fish rescue plan including minimization measures and monitoring, if required	During construction	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	During construction	Condition of construction contract/condition of regulatory permits	Impact BIO#6: Permanent Conversion of Habitat for and Direct Mortality of Steelhead and Pacific Lamprey, and Permanent Conversion of Essential Fish Habitat for Pacific Coast Salmon

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<p>construction zones prior to dewatering and other construction activities.</p> <p>All fish rescue and salvage operations will be conducted under the guidance of a qualified fish biologist (as defined by NMFS) and in accordance with required permits. At each crossing of modeled steelhead habitat, the fish rescue plan will identify the appropriate procedures for excluding fish from the construction zone and for removing fish from areas subject to dewatering. The primary procedure will be to block off the construction area and use seines (nets) or dip nets to collect and remove fish, although electrofishing techniques may also be authorized under certain conditions. It is critical that fish rescue and salvage operations begin as soon as possible and be completed within 48 hours after isolation of a construction area to minimize potential predation and adverse water quality impacts (high water temperature, low dissolved oxygen) associated with confinement. Block nets, sandbags, or other temporary exclusion methods could be used to exclude fish or isolate the construction area prior to the fish removal process. The appropriate fish exclusion or collection method will be determined by a qualified fish biologist, in consultation with a designated NMFS biologist, based on site-specific conditions and construction methods. Capture, release, and relocation measures will be consistent with the general guidelines and procedures set forth in Part IX of the most recent edition of the <i>California Salmonid Stream Habitat Restoration Manual</i> (CDFG 2004) to minimize impacts on listed species of fish and their habitat. A draft plan will be submitted to NMFS at least 48 hours prior to fish rescue and relocation.</p>								
BIO-MM#27a	Implement General Protection Measures for Fish	<p>The Authority or a contractor on behalf of the Authority will implement several general protection measures to protect and minimize effects on steelhead and their habitat during construction. The following measures will be implemented during design:</p> <ul style="list-style-type: none"> <li>▪ Design temporary night lighting of overwater structures (if needed) such that illumination of the surrounding water is avoided.</li> <li>▪ Locate temporary construction areas (e.g., staging, storage, parking, and stockpiling areas) outside of channels and riparian areas wherever feasible.</li> <li>▪ Minimize, to the extent feasible, the placement of footings and columns within the active channel (between top of bank) of steelhead critical habitat.</li> <li>▪ Use low-impact development methods for stormwater treatment, including locations that could otherwise contribute polluted stormwater to streams that provide habitat for fish listed under the ESA. Such measures may consist of pervious hardscapes (for pollutant-generating areas such as parking lots), bioswales,</li> </ul>	Pre-construction/ construction	Implement general protection measures	During construction	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	During construction	Condition of construction contract/condition of regulatory permits	Impact BIO#6: Permanent Conversion of Habitat for and Direct Mortality of Steelhead and Pacific Lamprey, and Permanent Conversion of Essential Fish Habitat for Pacific Coast Salmon

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<p>infiltration basins, rain gardens, and other design measures that will capture and treat polluted runoff before it reaches sensitive natural waterways.</p> <ul style="list-style-type: none"> <li>▪ The following bank stabilization and erosion control measures will be implemented during design and construction to minimize habitat disturbance:</li> <li>▪ Temporarily fence areas of natural riparian vegetation that can be avoided with high-visibility ESA fencing to enforce avoidance.</li> <li>▪ Use “soft” approaches to bank erosion control to the extent possible (e.g., vegetative plantings, placement of large woody debris). Avoid hard bank protection methods (e.g., revetment) wherever feasible.</li> <li>▪ Avoid the use of wood treated with creosote or copper-based chemicals in bank stabilization efforts.</li> <li>▪ Use quarry stone, cobblestone, or their equivalent for erosion control along rivers and streams, complemented with native riparian plantings or other natural stabilization alternatives that will maintain a natural riparian corridor, where feasible. Cobble size types and spacing of riparian plantings and other details on riparian restoration activities will be provided in the restoration and revegetation plan described in BIO-MM#1.</li> <li>▪ Revegetate temporarily disturbed areas with native plants to resemble the existing vegetation.</li> </ul>								
BIO-MM#27b	Work Windows for Fish	<p>Near-water and in-water work will be conducted within specified work windows based on date, channel inundation, and water temperature. Work windows will include the general time periods when effects on migrating juvenile and adult steelhead will be minimal. Additionally, in-water work will be allowed when salmonid use is temperature limited (defined as 1 week of average water temperature of 75°F or more); and work will be allowed in the channel and on the floodplain when channels are dry or ponded:</p> <ul style="list-style-type: none"> <li>▪ During work windows, work will only be allowed in the channel and on the floodplain from 1 hour after sunrise until 1 hour before sunset.</li> <li>▪ Near-water or over-water work is defined as construction activities occurring within the floodplain but not in the wetted channel (e.g., located between the wetted channel and the landside toe of the bordering levees or over the wetted channel). In-water work is defined as work within the wetted channel.</li> <li>▪ The near-water construction work window will be April 30 through December 1. For in-water work, the construction work window will be June 15 through October 15. These periods may be extended subject to receipt of written authorization from NMFS that incidental take limits will not be exceeded.</li> <li>▪ If channels are dry or ponded (i.e., lack continuous flow), or water temperatures average 75°F or more for</li> </ul>	Pre-construction/ construction	Establish work windows	During construction	Authority/ Contractor	Authority/ Contractor	During construction	Condition of construction contract/condition of regulatory permits	Impact BIO#6: Permanent Conversion of Habitat for and Direct Mortality of Steelhead and Pacific Lamprey, and Permanent Conversion of Essential Fish Habitat for Pacific Coast Salmon

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		7 consecutive days, in-water and near-water work can proceed outside the work windows stated above. NMFS will be consulted to verify work can proceed if these conditions are present during construction.								
BIO-MM#27c	Prepare and Implement an Underwater Sound Control Plan	<p>The Authority or a contractor on behalf of the Authority will develop an underwater sound control plan to avoid and minimize potential adverse impacts from in-water pile-driving activities on federally listed salmonid species. Effects will be minimized by limiting the period during which impact pile driving may occur and by limiting or abating underwater noise generated during impact pile driving. The underwater sound control plan will be provided to NMFS for review and approval prior to in-water impact pile driving on steelhead in the context of the following underwater noise thresholds established for disturbance and injury of fish:</p> <ul style="list-style-type: none"> <li>▪ Injury threshold for fish of all sizes includes a peak sound pressure level of 206 decibels relative to 1 micropascal.</li> <li>▪ Injury threshold for fish less than 2 grams is 183 decibels relative to 1 micropascal cumulative sound exposure level and 187 decibels relative to 1 micropascal cumulative sound exposure level for fish greater than or equal to 2 grams.</li> <li>▪ Disturbance threshold for fish of all sizes is 150 decibels root mean square relative to 1 micropascal.</li> </ul> <p>The underwater sound control plan will restrict in-water work to the in-water work window specified in permits issued by the fish and wildlife agencies (including NMFS) and to daylight hours between 1 hour after sunrise and 1 hour before sunset with a 12-hour break between pile driving sessions. The underwater noise generated by impact pile driving will be abated using the best available and practicable technologies. Examples of such technologies include, but are not limited to, the use of cast-in-drilled-hole rather than driven piles; use of vibratory rather than impact pile driving equipment; using an impact pile driver to proof piles initially placed with a vibratory pile driver; noise attenuation using pile caps (e.g., wood or Micarta), bubble curtains, air-filled fabric barriers, or isolation piles; and installation of piling-specific cofferdams. Specific techniques to be used will be selected based on site conditions.</p> <p>In addition to primarily using vibratory pile driving methods and establishing protocols for attenuating underwater noise levels produced during in-water construction activities, the Authority will develop and implement operational protocols for when impact pile driving is necessary. These operational protocols will be used to minimize the effects of impact pile driving on steelhead. These protocols may include, but not be limited to, the following: monitoring the in-water work area for fish that</p>	Pre-construction/ construction	Implement underwater sound control plan measures and monitoring, if required	During construction	Authority/ Contractor	Authority/ Contractor	During construction	Condition of construction contract/condition of regulatory permits	Impact BIO#6: Permanent Conversion of Habitat for and Direct Mortality of Steelhead and Pacific Lamprey, and Permanent Conversion of Essential Fish Habitat for Pacific Coast Salmon

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		may be showing signs of distress or injury as a result of pile-driving activities and stopping work when distressed or injured fish are observed; initiating impact pile driving with a "soft-start," such that pile strikes are initiated at reduced impact and increase to full impact over several strikes to provide fish an opportunity to move out of the area; restricting impact pile-driving activities to specific times of the day and for a specific duration to be determined through coordination with the fish and wildlife agencies; and, when more than one pile-driving rig is employed, initiating pile-driving activities in a way that provides an escape route and avoids "trapping" fish between pile drivers in waters exposed to underwater noise levels that could potentially cause injury.								
BIO-MM#28	Provide Compensatory Mitigation for Permanent Impacts on Steelhead Habitat and Essential Fish Habitat for Pacific Coast Salmon	<p>The Authority will provide compensatory mitigation for permanent impacts on habitat for CCC and SCCC steelhead and designated freshwater EFH for Pacific Coast salmon that is commensurate with the type (spawning, rearing, migratory, or critical habitat) and amount of habitat lost as follows:</p> <ul style="list-style-type: none"> <li>▪ Spawning aquatic and riparian habitat within critical habitat will be protected and restored or protected and enhanced at a minimum of 3:1 (protected:affected) unless different ratios are specified in authorizations issued under the FESA.</li> <li>▪ All rearing and migratory aquatic and riparian habitat within critical habitat will be protected and restored or protected and enhanced at a minimum of 2:1 (protected:affected) or as specified in authorizations issued under the FESA.</li> <li>▪ All other rearing and migratory aquatic and riparian habitat outside of critical habitat will be protected and restored or protected and enhanced at a minimum of 1:1 (protected:affected) or as specified in authorizations issued under the FESA.</li> </ul> <p>Unless agreed upon in coordination with NMFS, compensation will occur within the same distinct population segment domain as the impact was incurred. Where feasible, on-site, in-kind mitigation will be prioritized. Off-site mitigation will prioritize actions recommended in local or regional conservation plans where there is coordination and approval by NMFS. Other options include the purchase of riparian and aquatic habitat credits at an NMFS-approved anadromous fish conservation bank, or through another NMFS-approved conservation option, for the areal extent of riparian and suitable aquatic habitat affected by the action. In the event the Authority chooses not to utilize existing mitigation banks, it will propose other approaches to the applicable regulatory agencies for consideration. Any such approaches will take into account the following:</p> <ul style="list-style-type: none"> <li>▪ Habitat complexity such as floodplain backwaters</li> </ul>	Pre-construction/ construction/ post-construction	Design/ final design/ compensatory mitigation/ reporting	Monthly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Authority will provide compensatory mitigation for steelhead/ salmon impacts	Condition of construction contract/condition of regulatory permits	Impact BIO#6: Permanent Conversion of Habitat for and Direct Mortality of Steelhead and Pacific Lamprey, and Permanent Conversion of Essential Fish Habitat for Pacific Coast Salmon

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<p>(designed to limit stranding); refugia habitat such as deep pools, root wads, undercut banks or boulders; feeding and spawning habitat (riffles and runs); and connectivity with migratory habitat</p> <ul style="list-style-type: none"> <li>Riparian habitat conditions that are consistent with the existing flow regime and maintain and improve habitat characteristics (e.g., shade, formation and maintenance of refugia)</li> <li>Local and regional conservation goals</li> <li>Long-term access for monitoring and maintenance</li> <li>Upstream and downstream conditions</li> </ul> <p>Conservation options developed to offset impacts on steelhead habitat and EFH will be considered in the development of the HMP (BIO-MM#10), Restoration and Revegetation Plan (BIO-MM#1), and Flood Protection Plan (HYD-IAMF#2).</p>								
BIO-MM#29	Conduct Pre-Construction Surveys for California Tiger Salamander	<p>Prior to any ground-disturbing activity scheduled to occur during the dry season (June 1–October 15), the Project Biologist will conduct a pre-construction survey of suitable upland habitat within the work area and extending out 100 feet from the boundary of the work area, where access is available, to determine whether California tiger salamanders are present. Such surveys will be conducted no earlier than 30 days prior to ground-disturbing activities in the work area. The Project Biologist may employ the use of conservation dogs (scent dogs) to augment focused species surveys using methods described in Wasser et al. (2004), Smith et al. (2006), and/ or Filazzola et al. (2017). The Project Biologist will coordinate with USFWS and CDFW before using conservation dogs.</p> <p>In the event that ground-disturbing activities are scheduled to occur during the rainy season (October 15–June 1), in addition to upland surveys, the Project Biologist will survey potential breeding habitat in the work area for the presence of California tiger salamanders using methods from the <i>Interim Guidance on Site Assessment and Field Surveys for Determining Presence or a Negative Finding of the California Tiger Salamander</i> (CDFG and USFWS 2003) or other more recent guidelines, if available.</p>	Pre-construction/ construction	Surveying/ monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Presence-absence surveys of species within the construction footprint conducted 30 days prior to ground disturbance/ report findings	Condition of construction contract/condition of regulatory permits	Impact BIO#7: Permanent Conversion or Degradation of Habitat for and Direct Mortality of California Tiger Salamander
BIO-MM#30	Implement Avoidance and Minimization Measures for California Tiger Salamander	<p>Prior to any ground-disturbing activity, the Contractor, under the direction of the Project Biologist will install WEF along the boundary of the work area containing California tiger salamander suitable habitat or will implement similar measures as otherwise required pursuant to regulatory authorizations issued under the FESA or CESA. WEF must be trenched into the soil at least 4 inches in depth, with the soil compacted against both sides of the fence for its entire length to prevent tiger salamanders from passing under the fence, and must have intermittent exit points. During the dry season (June 1–October 15), the Project Biologist will inspect the WEF at least twice weekly on nonconsecutive days and on a daily basis between</p>	Pre-construction/ construction	Surveying/ monitoring/ reporting	Daily or twice per week inspections (nonconsecutive days)	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Establish WEF	Condition of construction contract/condition of regulatory permits	Impact BIO#7: Permanent Conversion or Degradation of Habitat for and Direct Mortality of California Tiger Salamander

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		<p>October 15 and June 1 or following any rain event. WEF will be installed with turn-arounds at access points to direct California tiger salamander away from gaps in the fencing.</p> <p>To the extent feasible, construction activities will not be conducted within 250 feet of areas identified as occupied California tiger salamander breeding habitat during the rainy season (October 15–June 1). However, construction activities may begin within such areas after April 15 if the breeding habitat is no longer inundated.</p>								
BIO-MM#31	Provide Compensatory Mitigation for Impacts on California Tiger Salamander Habitat	The Authority will provide compensatory mitigation to offset the loss of modeled California tiger salamander habitat. Compensatory mitigation will be provided for impacts on habitat occupied or presumed occupied by California tiger salamander at a ratio of 3:1, unless higher ratios are required through regulatory authorizations issued under the FESA or CESA. Compensatory mitigation will be provided using one or more of the methods described in BIO-MM#10.	Pre-construction/ construction/ post-construction	Design/ final design/ compensatory mitigation/ reporting	Monthly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Authority to provide compensation based on amount suitable habitat for California tiger salamander affected by the project	Condition of construction contract/condition of regulatory permits	Impact BIO#7: Permanent Conversion or Degradation of Habitat for and Direct Mortality of California Tiger Salamander
BIO-MM#32	Conduct Pre-Construction Surveys and Implement Avoidance and Minimization Measures for California Red-Legged Frog	Prior to any ground-disturbing activity scheduled to occur during the dry season (June 1–October 15), the Project Biologist will conduct a pre-construction survey of modeled suitable potential breeding habitat within the work area and extending out 100 feet from the boundary of the work area, where access is available, to determine whether California red-legged frogs are present using methods from the <i>Revised Guidance on Site Assessments and Field Surveys for The California Red-legged Frog</i> (USFWS 2005), or other more recent guidelines, if available. Such surveys will be conducted no earlier than 30 days prior to ground-disturbing activities in the work area. Appropriate avoidance and minimization measures, including moving individuals to nearby ponds, or other appropriate measures, will be implemented based on authorizations issued under the FESA.	Pre-construction/ construction	Surveying/ monitoring/ reporting	Monthly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Conduct pre-construction surveys; Establish ESAs and WEFs; Compliance reporting	Condition of construction contract/condition of regulatory permits	Impact BIO#8: Permanent Conversion or Degradation of Habitat for and Direct Mortality of California Red-Legged Frog
BIO-MM#33	Provide Compensatory Mitigation for Impacts on California Red-Legged Frog Habitat	<p>The Authority, in accordance with authorizations issued under the FESA, will compensate for impacts on habitat, including critical habitat, for California red-legged frog. Compensatory mitigation could include one or more of the following:</p> <ul style="list-style-type: none"> <li>▪ Purchase of credits from an agency-approved conservation bank</li> <li>▪ Acquisition in fee title of USFWS-approved property</li> <li>▪ Purchase or establishment of a conservation easement with an endowment for long-term management of the property-specific conservation values</li> <li>▪ An in-lieu fee contribution determined through negotiation and consultation with the USFWS</li> </ul> <p>Compensatory mitigation for red-legged frog will prioritize lands that will contribute to the recovery of the species</p>	Pre-construction/ construction/ post-construction	Design/ final design/ compensatory mitigation/ reporting	Monthly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Authority to provide compensation based on amount suitable habitat affected by the project	Condition of construction contract/condition of regulatory permits	Impact BIO#8: Permanent Conversion or Degradation of Habitat for and Direct Mortality of California Red-Legged Frog

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<p>and, to the extent feasible, to regional conservation efforts. The recovery plan for the California red-legged frog (USFWS 2002) describes tasks that will contribute to the recovery of the California red-legged frog. To the extent feasible, the compensatory mitigation for California red-legged frog will incorporate one or more of the following conservation needs identified by the recovery plan for the core recovery areas:</p> <ul style="list-style-type: none"> <li>East San Francisco Bay Core Recovery Area: protect existing populations; control nonnative predators; study effects of grazing in riparian corridors, ponds, and uplands (e.g., on East Bay Regional Park District lands); reduce impacts associated with livestock grazing; protect habitat connectivity; minimize impacts of recreation and off-road vehicle use (e.g., Corral Hollow watershed); avoid and reduce impacts of urbanization; protect habitat buffers from nearby urbanization (Recovery Task 1.16)</li> <li>Santa Clara Valley Core Recovery Area: protect existing populations and control nonnative predators (Recovery Task 1.17)</li> </ul> <p>The first priority will be to implement compensatory mitigation within the Wilson Peak Critical Habitat Unit. The second priority will be to implement compensatory mitigation in another designated critical habitat unit. If mitigation within designated critical habitat is not feasible, the Authority will implement compensatory mitigation outside critical habitat that provides an equivalent contribution to California red-legged frog recovery. Compensatory mitigation will be provided for impacts on California red-legged frog breeding and refugia/foraging habitat at a ratio of 3:1 and 2:1, respectively.</p>								
BIO-MM#34	Conduct Pre-Construction Surveys and Implement Avoidance and Minimization Measures for Foothill Yellow-Legged Frog	Prior to any ground-disturbing activity scheduled to occur during the dry season (June 1–October 15), the Project Biologist will survey potential breeding habitat (as identified by species modeling) in the project footprint for the presence of foothill yellow-legged frogs using methods outlined in the <i>Considerations for Conserving the Foothill Yellow-Legged Frog</i> (CDFW 2018d), the <i>Visual Encounter Survey Protocol for Rana boylei in Lotic Environments</i> (Peek et al. 2017), or other more recent guidelines, if available. Surveys will be conducted no more than 30 days before the start of ground-disturbing activities and will be spatially phased to precede construction activities. Appropriate avoidance and minimization measures, including moving individuals to nearby ponds or other appropriate measures, will be implemented with authorizations issued under the CESA.	Pre-construction/ construction	Surveying/ monitoring/ reporting	Monthly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Conduct pre-construction surveys; establish ESAs and WEFs; compliance reporting Surveys conducted 30 days prior to ground-disturbance; submit monthly reports during construction	Condition of construction contract/condition of regulatory permits	Impact BIO#9: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Foothill Yellow-Legged Frog
BIO-MM#35	Provide Compensatory Mitigation for Impacts on Foothill Yellow-Legged Frog Habitat	The Authority, in keeping with the state incidental take permit, will provide compensatory mitigation for impacts on habitat for foothill yellow-legged frog. Impacts on occupied or presumed occupied aquatic habitat will be	Pre-construction/ construction/ post-construction	Design/ final design/ compensatory mitigation/	Monthly or as established by regulatory compliance	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Authority to provide compensation based on	Condition of construction contract/condition of regulatory permits	Impact BIO#9: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Foothill Yellow-Legged Frog

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		compensated for at a ratio of 3:1 for primary breeding and foraging habitat through the purchase of CDFW-approved bank credits or through preservation of occupied habitat in perpetuity.		reporting	agencies			amount suitable habitat affected by the project; prior to operation		
BIO-MM#36	Conduct Pre-Construction Surveys for Special-Status Reptiles and Amphibians	Prior to any ground-disturbing activities, the Project Biologist will conduct pre-construction surveys in suitable habitat to determine the presence or absence of special-status reptile and amphibian species within the work area. Surveys will be conducted no more than 30 days before the start of ground-disturbing activities in a work area. The results of the pre-construction survey will be used to guide the placement of ESAs or conduct species relocation.	Pre-construction/ construction	Surveying/ monitoring/ reporting	Monthly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Conduct pre-construction surveys; establish ESAs and WEFs; compliance reporting Surveys conducted 30 days prior to ground-disturbance; submit monthly reports during construction	Condition of construction contract/condition of regulatory permits	Impact BIO#10: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Western Spadefoot Impact BIO#11: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Western Pond Turtle Impact BIO#13: Permanent Conversion or Degradation of Habitat for and Direct Mortality of San Joaquin Coachwhip, Northern California Legless Lizard, and Coast Horned Lizard
BIO-MM#37	Implement Avoidance and Minimization Measures for Special-Status Reptiles and Amphibians	The Project Biologist will monitor all initial ground-disturbing activities that occur within suitable habitat for special-status reptiles and amphibians, and will conduct clearance surveys of suitable habitat in the work area on a daily basis. If a special-status reptile or amphibian is observed, the Project Biologist will identify actions, to the extent feasible, sufficient to avoid impacts on the species and to allow it to leave the area of its own volition. Such actions may include establishing a temporary ESA in the area where a special-status reptile or amphibian has been observed and delineating a 50-foot no-work buffer around the ESA. In circumstances where a no-work buffer is not feasible the Project Biologist will relocate any of the species observed from the work area. For federally or state-listed species, relocations will be undertaken in accordance with regulatory authorizations issued under the FESA or CESA.	Construction	Surveying/ monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Clearance surveys as needed for special-status reptiles and amphibians/ avoidance or relocation of such species/ report findings	Condition of construction contract/condition of regulatory permits	Impact BIO#10: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Western Spadefoot Impact BIO#11: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Western Pond Turtle Impact BIO#13: Permanent Conversion or Degradation of Habitat for and Direct Mortality of San Joaquin Coachwhip, Northern California Legless Lizard, and Coast Horned Lizard
BIO-MM#38	Conduct Surveys for Blunt-Nosed Leopard Lizard	In accordance with authorizations issued under the FESA, a USFWS-approved biologist will conduct a habitat assessment of the project footprint within 1 year prior to the start of construction to identify all habitat suitable for blunt-nosed leopard lizard within the project footprint. Within 1 year of any ground-disturbing activity, the Project Biologist will conduct surveys for the blunt-nosed leopard lizard in suitable habitats (e.g., areas containing burrows) within the project footprint. These surveys will be conducted in accordance with the <i>Approved Survey Methodology for the Blunt-Nosed Leopard Lizard</i> (CDFW 2019), or other more recent guidelines, if available. The biologist(s) will also document burrows likely used by a lizard or with egg clutches, where feasible.	Pre-construction/ construction	Surveying/ monitoring/ reporting	Within 1 year prior to construction or as required in Survey Methodology	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Within 1 year prior to construction or as required in Survey Methodology	Condition of construction contract/condition of regulatory permits	Impact BIO#12: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Blunt-Nosed Leopard Lizard
BIO-MM#39	Implement Avoidance	For work areas where surveys confirm that blunt-nosed	Pre-construction/	Surveying/	Daily monitoring	Authority/	Authority/	Install WEF	Condition of	Impact BIO#12: Permanent Conversion or

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
	Measures for Blunt-Nosed Leopard Lizard	<p>leopard lizards are absent, the Project Biologist may install WEF along the perimeter of the work area to prevent individual animals from entering the work area. The WEF will be monitored daily and maintained.</p> <p>During the non-active season for blunt-nosed leopard lizards (October 16–April 14), to the extent feasible, ground-disturbing activities will not occur in areas where blunt-nosed leopard lizards or sign of the species have been observed and that contain burrows suitable for blunt-nosed leopard lizards. If ground-disturbing activities are scheduled during the non-active season, suitable burrows identified during the surveys will be avoided through establishment of 50-foot no-work buffers. The Project Biologist may reduce the size of the no-work buffers if information indicates that the extent of the underground portion of burrows is less than 50 feet.</p> <p>During the active season when blunt-nosed leopard lizards are moving aboveground (April 15–October 15), the following measures will be implemented in areas where blunt-nosed leopard lizards or signs of blunt-nosed leopard lizards have been observed:</p> <ul style="list-style-type: none"> <li>▪ <b>Establishment of no-work buffers</b>—The Project Biologist will establish, monitor, and maintain 50-foot no-work buffers around burrows and egg clutch sites identified during surveys. The 50-foot no-work buffers will be established around burrows in a manner that allows for a connection between the burrow site and the suitable natural habitat adjacent to the construction footprint so that blunt-nosed leopard lizards or hatchlings may leave the area after eggs have hatched. Construction activities will not occur within the 50-foot no-work buffers until such time as the eggs have hatched and blunt-nosed leopard lizards have left the area.</li> <li>▪ <b>Fencing of work areas</b>—Prior to installing WEF, the Project Biologist will confirm that no blunt-nosed leopard lizards are present within a work area by conducting focused blunt-nosed leopard lizard observational surveys for 12 days over the course of a 30- to 60-day period. At least one survey session will occur over 4 consecutive days. These observational surveys may be paired with scent detection dog surveys for blunt-nosed leopard lizard scat.</li> </ul> <p>Within 3 days of completing these surveys with negative results, WEF will be installed in a configuration that accounts for burrow locations and enables blunt-nosed leopard lizards to leave the work area. The following day, the Project Biologist will conduct an observational survey. If no blunt-nosed leopard lizards are observed, the Project Biologist will install additional WEF to further enclose the work area. This work area will be monitored daily while the WEF is in place.</p>	construction	monitoring/ reporting		Contractor/ Project Biologist	Contractor/ Project Biologist	where surveys confirm blunt-nosed leopard lizard is absent/ monitor WEF daily/ establish no-work buffers/ report findings	construction contract	Degradation of Habitat for and Direct Mortality of Blunt-Nosed Leopard Lizard

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		If blunt-nosed leopard lizards are observed prior to installing the last of the WEF, the Project Biologist will continue observational surveys until the lizard is observed leaving the work area or until 30 days elapse with no blunt-nosed leopard lizard observations within the work area. The Project Biologist may use conservation dogs to assist with this determination.								
BIO-MM#40	Provide Compensatory Mitigation for Impacts on Blunt-Nosed Leopard Lizard Habitat	The Authority will provide compensatory mitigation to offset the permanent and temporary loss of potentially suitable habitat for the blunt-nosed leopard lizard. Mitigation will be provided at a ratio of 1:1 unless a higher ratio is required by authorizations issued under the FESA. Compensatory mitigation will be provided using one or more of the methods described in BIO-MM#10.	Pre-construction/ construction/ post-construction	Design/ final design/ compensatory mitigation/ reporting	Monthly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Authority to provide compensation based on amount suitable habitat for blunt-nosed leopard lizard affected by the project; prior to operation	Condition of construction contract/condition of regulatory permits	Impact BIO#12: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Blunt-Nosed Leopard Lizard
BIO-MM#41	Conduct Pre-Construction Surveys and Implement Avoidance and Minimization Measures for Giant Garter Snake	<p>Prior to any ground-disturbing activity that occurs within 200 feet of suitable giant garter snake aquatic habitat, the Project Biologist will conduct a pre-construction survey for giant garter snake no earlier than 24 hours before the commencement of the activity. The Project Biologist will remain on-site for the duration of the ground-disturbing activity. If a giant garter snake is encountered during construction, the Project Biologist will direct that work that has the potential to injure the snake be stopped until it is determined that work can continue without potential harm to the snake, or the snake moves out of the immediate work area on its own volition. Pre-construction surveys in work areas will be repeated whenever construction activity lapses for 2 weeks or more.</p> <p>To the extent feasible, WEF will be installed along the upper bank of suitable aquatic habitat located within 200 feet of the boundary of the work area (provided access to such areas is available) or at the boundary of the work area to prevent snakes from moving into upland areas within the work area. The biological monitor will regularly inspect fencing. In addition, the Contractor will maintain all construction equipment to prevent leaks of fuels, lubricants, or other fluids and will conduct service and refueling procedures in uplands at least 100 feet away from wetlands or waterways.</p> <p>To the extent feasible, construction activities within 200 feet of giant garter snake habitat will be conducted between May 1 and October 1, the active period for this species. Conducting construction activities during this period reduces the likelihood of mortality because snakes are expected to actively move and avoid danger. If dewatering of giant garter snake habitat is necessary, any dewatered habitat must remain dry for at least 15 consecutive days after April 15 and prior to excavating or filling of the dewatered habitat.</p>	Pre-construction/ construction	Surveying/ monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist/	Conduct pre-construction surveys; install WEF	Condition of construction contract/condition of regulatory permits	Impact BIO#14: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Giant Garter Snake

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
BIO-MM#42	Provide Compensatory Mitigation for Impacts on Giant Garter Snake Habitat	The Authority will provide compensatory mitigation, in accordance with authorizations issued under the FESA and CESA, for direct and indirect impacts including both temporary and permanent impacts on giant garter snake habitat. Compensatory mitigation will be provided at a minimum ratio of 1:1 for potentially suitable aquatic and upland habitat. Compensatory mitigation will be provided using one or more of the methods described in BIO-MM#10.	Pre-construction/ construction/ post-construction	Design/ final design/ compensatory mitigation/ reporting	Monthly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Authority to provide compensation based on area of habitat for giant garter snake affected by the project; prior to operation	Condition of construction contract/condition of regulatory permits	Impact BIO#14: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Giant Garter Snake
BIO-MM#43	Conduct Pre-Construction Surveys and Delineate Active Nest Buffers for Breeding Birds	No more than 10 days prior to any ground-disturbing activity, including vegetation removal, scheduled to occur during the bird breeding season (February 1 to September 1), the Project Biologist will conduct visual pre-construction surveys within the work area for nesting birds and active nests (nests with eggs or young) of non-raptor species protected under the MBTA and/or the Cal. Fish and Game Code.  In the event that active bird nests are observed during the pre-construction survey, the Project Biologist will delineate no-work buffers and monitor the nests. No-work buffers will be set at a distance of 75 feet, unless a larger buffer is required pursuant to regulatory authorizations issued under the FESA or CESA, or if required by the Project Biologist to ensure the nest is not disturbed. No-work buffers will be maintained until nestlings have fledged and are no longer reliant on the nest or parental care for survival or the Project Biologist determines that the nest has been abandoned. In circumstances where it is not feasible to maintain the standard no-work buffer, the no-work buffer may be reduced, provided that the Project Biologist monitors the active nest during the construction activity to ensure that the nesting birds do not become agitated. Additional measures that may be used when no-work buffers are reduced include visual screens and noise barriers.	Pre-construction/ construction	Surveying/ monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Conduct pre-construction surveys; identify no-work buffers  Surveys conducted prior to ground disturbance	Condition of construction contract/condition of regulatory permits	Impact BIO#15: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Short-Eared Owl and Grasshopper Sparrow  Impact BIO#16: Permanent Conversion or Degradation of Habitat for Mountain Plover and Disturbance of Western Snowy Plover (Interior Population)  Impact BIO#22: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Purple Martin, Olive-Sided Flycatcher, and Loggerhead Shrike  Impact BIO#23: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Least Bell's Vireo, Yellow Warbler, and Yellow-Breasted Chat
BIO-MM#44	Implement Avoidance and Minimization Measures for Mountain Plover and Sandhill Crane	The Authority will implement the following measures to avoid or minimize disturbance of flocks of wintering mountain plovers and sandhill cranes potentially occurring in the San Joaquin Valley Subsection: <ul style="list-style-type: none"> <li>To avoid disturbance of wintering mountain plovers and sandhill cranes in the San Joaquin Valley Subsection, no construction activities involving heavy equipment or loud noise (e.g., pile driving) will be permitted within 250 feet of modeled habitat for mountain plover or within 0.75 mile of sandhill crane roost sites from October 1 to March 15, when large concentrations of both species are most likely to be present.</li> <li>Alternatively, the Authority or its contractor may conduct surveys for and avoid mountain plover wintering sites and sandhill</li> </ul>	Pre-construction, construction	Surveying/ monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Conduct pre-construction surveys; install WEF	Condition of construction contract/condition of regulatory permits	Impact BIO#16: Permanent Conversion or Degradation of Habitat for Mountain Plover and Disturbance of Western Snowy Plover (Interior Population)  Impact BIO#25: Permanent Conversion or Degradation of Habitat for and Disturbance of Sandhill Crane

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<p>crane roost sites prior to construction activities in or adjacent to modeled habitat between January and March 15 (no work could occur from October to December to allow surveys to be conducted). A minimum of four surveys will be conducted from October 1 to December 31 by a qualified biologist (or team of biologists) experienced with observing both species (preferably in the regional RSA) within 0.75 mile of the portion of the project footprint where construction will occur. The Authority or its contractor may also identify mountain plover wintering sites and sandhill crane roost sites to be avoided by contacting local birders or biologists familiar with mountain plover and sandhill crane habitat use within 0.75 mile of the project footprint.</p> <ul style="list-style-type: none"> <li>– Biologists will collect geospatial data on mountain plover (flocks of 30 birds or more) and sandhill crane (roost sites) observations in the field using handheld tablets, smartphones, or GPS units that enable drawing of points and multipoint polygons. After surveys are completed, all observations will be digitized into a single file and shared with the Authority and Contractor.</li> <li>– Contractors will avoid disturbance of mountain plovers by siting all activities between January 1 and March 15 more than 250 feet from observed mountain plover wintering sites.</li> <li>– Contractors will avoid disturbance of observed sandhill crane roost sites by not conducting any nighttime (1 hour before sunset to 1 hour after sunrise) work within 0.75 mile of observed roost sites between January 1 and March 15.</li> </ul>								
BIO-MM#45	Conduct Surveys for Burrowing Owl	No more than 30 days but no less than 14 days prior to any ground-disturbing activity in burrowing owl habitat, the Project Biologist will conduct pre-construction surveys for burrowing owl within suitable habitat located in the work area and/or extending 250 feet from the boundary of the work area, where access is available. Surveys will be conducted in accordance with the SCVHP's condition of approval for covered activities in burrowing owl habitat (County of Santa Clara et al. 2012: page 6-62). This methodology is consistent with the CDFW <i>Staff Report on Burrowing Owl Mitigation</i> (CDFG 2012), but it may be updated based on future changes by the SCVHA.	Pre-construction	Surveying/ monitoring/ reporting	Monthly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Conduct protocol-level surveys; compliance reporting; monthly reporting	Condition of construction contract/condition of regulatory permits	Impact BIO#17: Permanent Conversion or Degradation of Habitat for and Direct Mortality or Disturbance of Burrowing Owl
BIO-MM#46	Implement Avoidance and Minimization Measures for Burrowing Owl	Occupied burrowing owl burrows found during pre-construction surveys will be avoided in accordance with the SCVHP's condition of approval for covered activities in burrowing owl habitat (County of Santa Clara et al. 2012:	Pre-construction	Surveying/ monitoring/ reporting	Weekly or as established by regulatory compliance	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Establish no-work buffers around occupied burrowing owl	Condition of construction contract/condition of regulatory permits	Impact BIO#17: Permanent Conversion or Degradation of Habitat for and Direct Mortality or Disturbance of Burrowing Owl

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		page 6-62). To the extent feasible, the Project Biologist will establish 250-foot no-work buffers around occupied burrowing owl burrows in the work area. An occupied burrow is defined as any burrow at which (1) an adult owl is observed on two or more pre-construction surveys, or (2) a pair of adult owls is observed on one or more pre-construction survey. Construction may proceed outside the 250-foot nondisturbance zone. Construction may proceed inside the 250-foot nondisturbance no-work buffer zone during the breeding season if the season-specific criteria (nesting season: February 1–August 31; non-nesting season: September 1–January 31) described in the SCVHP are met.			agencies			burrows/ relocation as needed/ report findings		
BIO-MM#47	Provide Compensatory Mitigation for Loss of Active Burrowing Owl Burrows and Habitat	To compensate for permanent impacts on occupied burrowing owl breeding habitat, the Authority will provide compensatory mitigation at a minimum 1:1 ratio for occupied breeding and foraging habitat. Lands proposed as compensatory mitigation will meet one of the following criteria: <ul style="list-style-type: none"> <li>Support at least two breeding adult owls for every breeding adult owl displaced by construction of the project</li> <li>Support at least 1 acre of burrowing owl breeding habitat for every acre of habitat affected (i.e., 1:1 mitigation ratio). For the purposes of this measure, burrowing owl breeding habitat is defined as any land cover type with all of the following attributes: <ul style="list-style-type: none"> <li>Open terrain with well-drained soils</li> <li>Short, sparse vegetation with few shrubs and no trees</li> <li>Underground burrows or burrow surrogates (e.g., debris piles, culverts, pipes) for nesting and shelter from predators or weather. Burrows in earthen levees, berms, or canal banks within or along the margins of agricultural fields can be counted as compensatory breeding habitat as long as adjacent fields or pastures are suitable for foraging.</li> <li>Abundant and accessible prey (arthropods, small rodents, amphibians, lizards)</li> </ul> </li> </ul>	Pre-construction/ construction/ post-construction	Design/ final design/ surveying/ compensatory mitigation/ reporting	Monthly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Authority to provide compensation for number of burrowing owl burrows affected by the project; prior to operation	Condition of construction contract/condition of regulatory permits	Impact BIO#17: Permanent Conversion or Degradation of Habitat for and Direct Mortality or Disturbance of Burrowing Owl
BIO-MM#48	Conduct Pre-Construction Surveys for Eagles	At least 1 year prior to the start of any ground-disturbing activities and construction, the Project Biologists will conduct nesting season surveys for eagles. Surveys for bald and golden eagle nests will be conducted within 4 miles of any construction areas supporting suitable nesting habitat and important eagle roost sites and foraging areas. Surveys will be conducted in accordance with the USFWS <i>Interim Golden Eagle Inventory and Monitoring Protocols</i> (Pagel et al. 2010), CDFW's <i>Bald Eagle Breeding Survey Instructions</i> (CDFW 2017), or current guidance. A nesting	Pre-construction/ construction	Surveying/ monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Pre-construction nesting surveys for eagles/ report findings	Condition of construction contract/condition of regulatory permits	Impact BIO#18: Permanent Conversion or Degradation of Habitat for and Disturbance of Golden Eagle and Bald Eagle

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		territory or inventoried habitat will be considered unoccupied by golden eagles only after completing at least two full surveys in a single breeding season. Prior to initial construction activities, the Project Biologist will conduct a pre-construction sweep of the project site for golden eagle use.								
BIO-MM#49	Implement Avoidance Measures for Active Eagle Nests	<p>Prior to the start of any ground-disturbing activity, if an occupied nest (as defined by Pagel et al. 2010) is detected within 4 miles of the work areas, the Authority will implement a 1-mile line-of-sight and 0.5-mile no-line-of-sight no-work buffer during the breeding season (January 1 through August 31) so that construction activities do not result in injury or disturbance to eagles. The no-work buffer will be maintained throughout the breeding season or until the young have fledged and are no longer dependent on the nest or parental care that includes nest use for survival.</p> <p>Buffers around occupied nests may be reduced if the Project Biologist determines that smaller buffers will be sufficient to avoid impacts on nesting eagles. Factors to be considered for determining buffer size will include the presence of natural buffers provided by vegetation or topography, nest height, locations of foraging territory, and baseline levels of noise and human activity. Buffers will be maintained and nests monitored until the Project Biologist has determined that young have fledged and are no longer reliant on the nest or parental care that includes nest use for survival.</p> <p>Eagle nest exclusion zones may be removed if monitoring reveals the nest not to be in use as determined by the Project Biologist. An in-use eagle nest is one that is "a bald or golden eagle nest characterized by the presence of one or more eggs, dependent young, or adult eagles on the nest in the past ten days during the breeding season" (USFWS 2016d). Monitoring to demonstrate whether or not eagle nests are in use will follow observational procedures described by Pagel et al. (2010).</p> <p>In bald and golden eagle nesting territories, the Project Biologist will examine debris piles and determine if there is a potential to attract prey species. If the Project Biologist determines debris piles may attract prey species and pose a danger to eagles, the debris piles will be removed or moved.</p>	Pre-construction/ construction	Surveying/ monitoring/ reporting	Weekly or established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Implement and maintain no line-of-sight no-work buffer during the breeding season/ report findings	Condition of construction contract/condition of regulatory permits	Impact BIO#18: Permanent Conversion or Degradation of Habitat for and Disturbance of Golden Eagle and Bald Eagle
BIO-MM#50	Provide Compensatory Mitigation for Loss of Eagle Nests	If pre-construction surveys identify in-use or alternate eagle nests in the permanent impact area, the Authority, in consultation with the USFWS, will develop a nest relocation or replacement plan for the affected nest(s). The plan will describe why there is no practicable alternative to nest removal while enabling project construction. Any relocation or replacement of eagle nests will be in accordance with the BGEPA and subject to the following minimum requirements:	Pre-construction/ construction/ post-construction	Design/ final design/ surveying/ monitoring/ compensatory mitigation/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Authority to provide compensation based on area of habitat affected by the project; prior to operation	Condition of construction contract/condition of regulatory permits	Impact BIO#18: Permanent Conversion or Degradation of Habitat for and Disturbance of Golden Eagle and Bald Eagle

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<ul style="list-style-type: none"> <li>The nest will be relocated, or a suitable nest will be provided, within the same nesting territory to provide a viable nesting option for the affected eagle pair.</li> <li>Post-construction monitoring to confirm continued nesting within the affected nesting territory will be conducted for a minimum of 3 years using observation procedures described by Pagel et al. (2010).</li> </ul>								
BIO-MM#51	Implement Avoidance Measures for California Condor	<p>During any ground-disturbing activities within the range of the California condor, as delineated in the USFWS database, the Authority will implement the following avoidance measures:</p> <ul style="list-style-type: none"> <li>The Project Biologist will be present for construction activities occurring within 2 miles of known California condor roosting sites.</li> <li>If USFWS informs the Authority or if the Authority is otherwise made aware that California condors are roosting within 0.5 mile of a work area, no construction activity will occur during the period between 1 hour before sunset and 1 hour after sunrise.</li> <li>All construction materials located within work areas, including items that could pose a risk of entanglement, such as ropes and cables, will be properly stored and secured when not in use.</li> <li>Littering of trash and food waste is prohibited. All litter, small artificial items (e.g., screws, washers, nuts, bolts), and food waste will be collected and disposed of from work areas on at least a daily basis.</li> <li>All fuels and components with hazardous materials or wastes will be handled in accordance with applicable regulations. These materials will be kept in segregated, secured, or secondary containment facilities as necessary. Any spills of liquid substances that could harm condors will be immediately addressed.</li> <li>The project will avoid the exposure of wildlife to antifreeze containing ethylene glycol by keeping vehicles/equipment free of leaks, particularly antifreeze, and immediately cleaning up any spills or discharges that arise from leaks.</li> <li>Polychemical lines will not be used or stored on site to preclude condors from obtaining and ingesting pieces of them.</li> <li>If a California condor lands in any work area, the Project Biologist will assess construction activities occurring at the time and determine whether those activities present a potential hazard to the individual condor. Activities determined by the Project Biologist to present a potential hazard to the condor will be stopped until the bird has abandoned the area. Methods approved by the USFWS for hazing California condors to encourage abandonment of the construction site, <i>Guidance on Hazing California Condors</i> (USFWS 2014), may be used as necessary.</li> <li>Prior to construction-related uses of helicopters, the</li> </ul>	Pre-construction/ construction/ post-construction	Compliance report	Prior to operation	Authority/ Contractor	Authority	Prior to operation	Condition of construction contract/condition of regulatory permits	Impact BIO#19: Injury or Disturbance of California Condor

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<p>Project Biologist will coordinate with the USFWS to establish that no California condors are present in the area. If California condors are observed in the area in which helicopters will operate (i.e., the helicopter's flight pattern from its point of origin, during construction use, and on its return flight), helicopter use will not be permitted until the Project Biologist has determined that the California condors have left the area.</p> <ul style="list-style-type: none"> <li>Nighttime light disturbance will be minimized in and adjacent to suitable habitat where California condors may be present. In the event that nighttime lighting is required, it will be focused, shielded, and directed away from adjacent suitable habitat, including nighttime roost areas. The Project Biologist will be on-site during nighttime light use to determine if the lighting poses a risk or otherwise disturbs or harms condors.</li> </ul>								
BIO-MM#52	Conduct Pre-Construction Surveys and Monitoring for Raptors	<p>If construction or other vegetation removal activities are scheduled to occur during the breeding season for raptors (January 1–September 1), no more than 14 days before the start of the activities, the Project Biologist will conduct pre-construction surveys for nesting raptors in areas where suitable habitat is present. Specifically, such surveys will be conducted in habitat areas within the work area and, where access is available. Surveys for all raptors will be conducted within 500 feet of the boundary of the work area, or within 0.5 mile of the boundary of the work area for fully protected raptors, where access is available. If breeding raptors with active nests are found, the Project Biologist will delineate a 500-foot buffer (or as modified by regulatory authorizations for species listed under the FESA or CESA) around the nest to be maintained until the young have fledged from the nest and are no longer reliant on the nest or parental care for survival or until such time as the Project Biologist determines that the nest has been abandoned. If fully protected raptors (e.g., white tailed-kite, golden eagle, American peregrine falcon, bald eagle) with active nests are found, the Project Biologist in conjunction with the Contractor will establish a 0.5-mile buffer around the nest to be maintained until the young have fledged from the nest or the nest fails (as determined by the Project Biologist). Nest buffers may be adjusted if the Project Biologist determines that smaller buffers will be sufficient to avoid impacts on nesting raptors.</p>	Pre-construction/ construction	Surveying/ monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Pre-construction surveys in suitable habitats for nesting raptors/establish no-work buffers/ monitor active raptor nests/ report findings	Condition of construction contract/condition of regulatory permits	Impact BIO#20: Permanent Conversion or Degradation of Habitat for and Disturbance of Special-Status Raptors (American Peregrine Falcon, Northern Harrier, White-Tailed Kite) and Other Raptors
BIO-MM#53	Conduct Surveys for Swainson's Hawk Nests	<p>Surveys must be performed no more than 1 year prior to the commencement of construction activities. The Project Biologist will conduct surveys for Swainson's hawk during the nesting season (March 1–August 31) within both the work area and a 0.5-mile buffer surrounding the work area, provided access to such areas is available. No sooner than 30 days prior to any ground-disturbing activity, the Project Biologist will conduct pre-construction</p>	Pre-construction	Surveying/ monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Pre-construction surveys for nesting Swainson's hawks/ monitor active nests/ report findings	Condition of construction contract/condition of regulatory permits	Impact BIO#21: Permanent Conversion or Degradation of Habitat for and Disturbance of Swainson's Hawks

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		surveys of nests identified during the earlier surveys to determine if any are occupied. The initial nesting season surveys and subsequent pre-construction nest surveys will follow the protocols set out in the <i>Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley</i> (SHTAC 2000).								
BIO-MM#54	Implement Avoidance and Minimization Measures for Swainson's Hawk Nests	Any active Swainson's hawk nests (defined as a nest used one or more times in the last 5 years) found within 0.5-mile of the boundary of the work area during the nesting season (March 1–August 31) will be monitored daily by the Project Biologist to assess whether the nest is occupied. If the nest is occupied, the Project Biologist will establish no-work buffers following CDFW's <i>Staff Report Regarding Mitigation for Impacts to Swainson's Hawks (Buteo swainsoni) in the Central Valley of California</i> (CDFG 1994), and the status of the nest will be monitored until the young fledge or for the length of construction activities, whichever occurs first.  If ground-disturbing activities or other construction activities may cause nest abandonment or forced fledging within the specified buffer area, the biological monitor will monitor the nest site to determine if the nest is abandoned. If an occupied Swainson's hawk nest tree is to be removed as a result of construction, or nest abandonment is observed during construction, an incidental take permit under CESA will be obtained and impacts will be minimized and fully mitigated.	Construction	Surveying/ monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Monitor active Swainson's hawk nests/ establish nest avoidance buffer zones/ report findings	Condition of construction contract/condition of regulatory permits	Impact BIO#21: Permanent Conversion or Degradation of Habitat for and Disturbance of Swainson's Hawks
BIO-MM#55	Provide Compensatory Mitigation for Loss of Swainson's Hawk Nesting Trees and Habitat	To compensate for permanent impacts on active Swainson's hawk nest trees (i.e., trees in which Swainson's hawks were observed building nests during protocol-level surveys described in BIO-MM#53) or recently active nest trees (i.e., trees in which Swainson's hawks have been documented as nesting within any of the previous 5 years) and foraging habitat, the Authority will provide compensatory mitigation that replaces affected nest trees and provides foraging habitat. Lands proposed as compensatory mitigation for Swainson's hawk will meet the following minimum criteria: <ul style="list-style-type: none"> <li>Support at least three mature native riparian trees suitable for Swainson's hawk nesting (i.e., valley oak, Fremont cottonwood, or willow) for each Swainson's hawk nest tree removed by construction of the project extent</li> <li>Support at least one Swainson's hawk nesting territory in the last 5 years</li> <li>Contribute to regional conservation goals for agricultural and wildlife movement preservation where possible.</li> </ul> To compensate for impacts on Swainson's hawk foraging habitat, the Authority will contribute to the project's mitigation commitment for Swainson's hawk foraging habitat, which will be calculated based on the following	Pre-construction/ construction/ post-construction	Design/ final design/ surveying/ compensatory mitigation/ reporting	Monthly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Compensatory mitigation that replaces Swainson's hawk nesting trees and provides natural lands for foraging/ report findings	Condition of construction contract/condition of regulatory permits	Impact BIO#21: Permanent Conversion or Degradation of Habitat for and Disturbance of Swainson's Hawks

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		ratios: <ul style="list-style-type: none"> <li>▪ 1:1 for impacts on Primary Active Foraging Habitat                             <ul style="list-style-type: none"> <li>• 0.75:1 for impacts on Secondary Active Foraging Habitat</li> </ul> </li> <li>▪ 0.5:1 for impacts on Tertiary Active Foraging Habitat</li> </ul>								
BIO-MM#56	Conduct Surveys and Implement Avoidance Measures for Active Tricolored Blackbird Nest Colonies	Prior to initiation of construction at any location within 300 feet of suitable nesting habitat, the Project Biologist with experience surveying for and observing tricolored blackbird will conduct pre-construction surveys to establish use of nesting habitat by tricolored blackbird colonies. Surveys will be conducted in suitable habitat within 300 feet of proposed construction areas, where access allows, during the nesting season (generally March 15–July 31). If construction is initiated near suitable habitat during the nesting season, three surveys will be conducted within 15 days prior to construction, with one of the surveys within 5 days prior to the start of construction. If active tricolored blackbird nesting colonies are identified, construction activities must avoid the nesting colonies and associated habitat during the breeding season (generally March 15–July 31) to the extent practicable within 300 feet of the colony, consistent with the CDFW’s <i>Staff Guidance Regarding Avoidance of Impacts to Tricolored Blackbird Breeding Colonies on Agricultural Fields in 2015</i> (CDFW 2015). This minimum buffer may be reduced in areas with dense forest, buildings, or other habitat features between the construction activities and the active nest colony, or where there is sufficient topographic relief to protect the colony from excessive noise or visual disturbance as determined by a Project Biologist experienced with tricolored blackbird. If tricolored blackbirds colonize habitat adjacent to construction after construction has been initiated, the Authority will reduce disturbance through establishment of buffers or sound curtains, as determined by the Project Biologist.	Pre-construction/ construction	Surveying/ monitoring/ compensatory mitigation/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Pre-construction surveys for tricolored blackbird colonies/ establish no-disturbance buffer/ report findings	Condition of construction contract/condition of regulatory permits	Impact BIO#24: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Tricolored Blackbird and Yellow-Headed Blackbird
BIO-MM#57	Provide Compensatory Mitigation for Impacts on Tricolored Blackbird Habitat	The Authority will provide compensatory mitigation required to offset impacts on tricolored blackbird. Compensatory mitigation will replace permanent loss of habitat with habitat that is commensurate with the type (nesting, roosting, and foraging) and amount of habitat lost. Suitable tricolored blackbird nesting habitat will be permanently protected or restored and managed at a ratio of 3:1 (protected or restored:affected) at a location subject to CDFW approval, and in proximity to the nearest breeding colony observed within the past 15 years, if possible. Suitable breeding season foraging habitat will be protected and managed at a ratio of 1:1 (protected:affected) at a location subject to CDFW approval. Suitable nonbreeding season foraging habitat will be protected or restored at a ratio of 1:1 (protected:affected). Compensatory mitigation will be provided using one or more of the methods described in	Pre-construction/ construction/ post-construction	Design/ final design/ surveying/ compensatory mitigation/ reporting	Monthly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Compensatory mitigation to replace permanent loss of tricolored blackbird nesting habitat/ report findings	Condition of construction contract/condition of regulatory permits	Impact BIO#24: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Tricolored Blackbird and Yellow-Headed Blackbird

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		the HMP.								
BIO-MM#58	Provide Compensatory Mitigation for Impacts on Waterfowl, Shorebird, and Sandhill Crane Habitat	<p>The Authority will provide compensatory mitigation required to offset impacts on waterfowl and shorebirds in the UPR and GEA IBAs. Compensatory mitigation will replace permanent loss of habitat with habitat that is commensurate with the type (nesting, roosting, or foraging) and amount of habitat lost as follows:</p> <ul style="list-style-type: none"> <li>▪ Suitable waterfowl and shorebird nesting and foraging habitat will be permanently protected and enhanced at a suitable location at a ratio of 1:1 (protected:affected) for permanent habitat loss; 1:1 (protected:affected) for habitat where hearing damage could result during operations (residual noise of 93 dBA or greater, as measured outside the HSR right-of-way); and 0.5:1 for habitat where arousal, visual disturbance, or masking effects result from operations (residual noise of 77 dBA or greater, as measured outside of the HSR right-of-way). Protection and enhancement of habitat will be implemented within the GEA and UPR IBAs or a suitable alternative location if locations with the IBAs are found to be infeasible in coordination with local stakeholders.</li> <li>▪ Enhancement activities could include improved water management (to increase food supplies); improvement or replacement of water management infrastructure; vegetation control and management; contouring to increase topographic heterogeneity (to increase habitat diversity); or levee repair, maintenance, and replacement.</li> </ul>	Pre-construction/ construction/ post-construction	Design/ final design/ surveying/ compensatory mitigation/ reporting	Monthly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Compensatory mitigation based on amount of habitat lost and methods described in Compensatory Mitigation Plan	Condition of construction contract/condition of regulatory permits	<p>Impact BIO#25: Permanent Conversion or Degradation of Habitat for and Disturbance of Sandhill Crane</p> <p>Impact BIO#34: Removal or Degradation of Habitat for and Disturbance of Waterfowl and Shorebirds</p> <p>Impact BIO#44: Intermittent Noise Disturbance of Wildlife Using Corridors during Operations</p> <p>Impact BIO#46: Intermittent Visual Disturbance of Wildlife Using Corridors during Operations</p>
BIO-MM#59	Conduct Pre-Construction Surveys for San Joaquin Kit Fox	<p>Within 30 days prior to the start of any ground-disturbing activity, the Project Biologist will conduct pre-construction surveys in suitable kit fox habitat in the work area. The Project Biologist will conduct the surveys in accordance with USFWS' <i>San Joaquin Kit Fox Survey Protocol for the Northern Range</i> (USFWS 1999) between May 1 and September 30 for the purpose of identifying potential San Joaquin kit fox dens. All dens will be mapped and their type and status determined. Den types will be identified as defined in Exhibit A (Definitions) of the USFWS' <i>Standardized Recommendations for Protection of the Endangered San Joaquin Kit Fox prior to or during Ground Disturbance</i> (USFWS 2011). If any occupied or potential dens are found during pre-construction surveys, they will be flagged and a 50-foot no-work buffer will be established around the den until the den type is identified cleared, in accordance with regulations under the FESA and CESA, if necessary to allow construction activities to proceed. The Project Biologist may employ the use of conservation dogs (scent dogs) to augment focused species surveys using methods described in Smith et al. (2006). The Project Biologist will coordinate with USFWS and CDFW before using conservation dogs.</p>	Pre-construction	Surveying/ monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Conduct pre-construction surveys for San Joaquin kit fox dens/ report findings	Condition of construction contract/condition of regulatory permits	Impact BIO#26: Loss of Denning and Dispersal Habitat for and Direct Mortality or Disturbance of San Joaquin Kit Fox

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
BIO-MM#60	Implement San Joaquin Kit Fox Avoidance and Minimization Measures	<p>The Authority will implement USFWS' <i>Standardized Recommendations for Protection of the San Joaquin Kit Fox Prior to or During Ground Disturbance</i> (USFWS 2011) to minimize impacts on this species, including:</p> <ul style="list-style-type: none"> <li>Disturbance of all kit fox dens will be avoided to the extent feasible.</li> <li>Construction activities that occur within 200 feet of any occupied dens will cease within one-half hour after sunset and will not begin earlier than one-half hour before sunrise, to the extent feasible.</li> <li>All construction pipes, culverts, or similar structures with a diameter of 4 inches or greater that are stored within the construction footprint for one or more overnight period will be thoroughly inspected for kit foxes before the pipe is subsequently buried, capped, or otherwise used or moved.</li> <li>If a San Joaquin kit fox is detected within a work area during construction, the Project Biologist will request approval from the USFWS and CDFW to capture and relocate the kit fox if it does not safely leave the area by its own volition.</li> <li>To minimize the temporary impacts of WEF and construction exclusion fencing on kit fox and their movement/migration corridors during construction, artificial escape dens will be installed along the outer perimeter of WEF and construction exclusion fencing. Artificial escape dens or similar escape structures will also be installed at the entrances to temporary wildlife crossing structures to provide escape cover and protection against predation. The artificial escape dens will be located on parcels owned by the Authority or at locations where access is available outside of work areas. The artificial escape dens will be removed at the same time as the WEF and construction exclusion fencing, once construction is complete.</li> </ul>	Pre-construction/ construction	Surveying/ monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Implement USFWS's <i>Standardized Recommendations for Protection of the San Joaquin Kit Fox Prior to or During Ground Disturbance</i> (USFWS 2011)/ report findings	Condition of construction contract/condition of regulatory permits	Impact BIO#26: Loss of Denning and Dispersal Habitat for and Direct Mortality or Disturbance of San Joaquin Kit Fox
BIO-MM#61	Provide Compensatory Mitigation for Impacts on San Joaquin Kit Fox Habitat	The Authority will provide compensatory mitigation for impacts on San Joaquin kit fox habitat through the acquisition of suitable habitat that is acceptable to USFWS and CDFW. Habitat will be replaced at a minimum ratio of 1:1 for high- or moderate-value suitable habitat (natural lands) and at a ratio of 0.5:1 for low-value suitable habitat (urban or agricultural lands), unless a higher ratio is required by regulatory authorizations issued under the FESA and CESA. Compensatory mitigation will be provided using one or more of the methods described in BIO-MM#10.	Pre-construction/ construction/ post-construction	Design/ final design/ surveying/ compensatory mitigation/ reporting	Monthly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Mitigate for impacts on San Joaquin kit fox habitat/ report findings	Condition of construction contract/condition of regulatory permits	Impact BIO#26: Loss of Denning and Dispersal Habitat for and Direct Mortality or Disturbance of San Joaquin Kit Fox
BIO-MM#62	Implement Avoidance and Minimization Measures for Fresno Kangaroo Rat	Prior to any ground-disturbing activity, the Project Biologist will assess suitable habitat within the work area to determine whether kangaroo rat burrows or signs of kangaroo rats are present. If no burrows or signs of kangaroo rats are detected and kangaroo rats are determined to be absent from the work area, the Project	Pre-construction/ construction	Surveying/ monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Establish no-work buffers if burrows or signs of special-status small mammal species are	Condition of construction contract/condition of regulatory permits	Impact BIO#27: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Fresno Kangaroo Rat

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<p>Biologist will oversee the installation, maintenance, and monitoring of WEF along the perimeter of the work area where adjacent to potentially suitable habitat.</p> <p>If kangaroo rat individuals, burrows, or signs of the presence are found within the work area during the habitat assessment, the Project Biologist will conduct protocol-level surveys for Fresno kangaroo rat in accordance with the USFWS <i>Survey Protocol for Determining Presence of San Joaquin Kangaroo Rats</i> (USFWS 2013b), or as otherwise provided pursuant to authorizations issued under the FESA and CESA.</p> <p>In the unlikely event that Fresno kangaroo rat is confirmed present in the work area through the protocol-level surveys, all project activities in the work area will cease and USFWS and CDFW will be notified within 2 business days or as required under authorizations issued under the FESA or CESA. The Project Biologist will install WEF in areas where Fresno kangaroo rats are present and will establish 50-foot no-work buffers to avoid impacts on occupied habitat, unless a different buffer distance is specified under authorizations issued under the FESA and CESA.</p>						detected/relocation as needed/report findings		
BIO-MM#63	Provide Compensatory Mitigation for Impacts on Fresno Kangaroo Rat Habitat	Impacts on habitat occupied by Fresno kangaroo rat will be compensated for in accordance with authorizations issued under FESA and CESA through a HMP prepared in accordance with BIO-MM#10, at a minimum 1:1 ratio for potentially suitable habitat through the purchase of agency-approved bank credits or through preservation of suitable habitat (i.e., alkali sink scrub or grassland on the San Joaquin Valley floor) in perpetuity.	Pre-construction/construction/post-construction	Design/ final design/surveying/compensatory mitigation/reporting	Monthly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Compensate for permanent and temporary loss of suitable habitat for Fresno kangaroo rat/report findings	Condition of construction contract/condition of regulatory permits	Impact BIO#27: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Fresno Kangaroo Rat
BIO-MM#64	Conduct Pre-Construction Surveys for American Badger Den Sites and Implement Avoidance and Minimization Measures	Prior to any ground-disturbing activity, the Project Biologist will conduct pre-construction surveys for American Badger den sites within suitable habitat located within the work area. These surveys will be conducted no less than 14 days and no more than 30 days prior to the start of ground-disturbing activities in a work area. The Project Biologist will establish a 100-foot no-work buffer around occupied maternity dens throughout the pup-rearing season (February 15–July 1) and a 50-foot no-work buffer around occupied dens during other times of the year. If nonmaternity dens are found and cannot be avoided during construction activities, they will be monitored for badger activity. If the Project Biologist determines that dens may be occupied, passive den exclusion measures will be implemented for 3–5 days to discourage the use of these dens prior to project disturbance activities.	Pre-construction/construction	Surveying/monitoring/reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Conduct pre-construction surveys for American badger den sites in suitable habitats/ establish no-work buffer around occupied dens/conduct passive den exclusion for non-maternity dens/report findings	Condition of construction contract/condition of regulatory permits.	Impact BIO#28: Permanent Conversion or Degradation of Habitat for and Direct Mortality of American Badger
BIO-MM#65	Conduct Pre-Construction Surveys for Ringtail and Ringtail Den Sites and Implement Avoidance	Prior to any ground-disturbing activity, the Project Biologist will conduct pre-construction surveys for ringtail and ringtail den sites in suitable habitat within the work area. These surveys will be conducted no more than 30 days before the start of ground-disturbing activities in a work	Pre-construction/construction	Surveying/monitoring/reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Conduct pre-construction surveys for ringtail den sites in suitable	Condition of construction contract/condition of regulatory permits	Impact BIO#29: Permanent Conversion or Degradation of Habitat for and Direct Mortality of San Francisco Dusky-Footed Woodrat and Ringtail

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	Measures	area. The Project Biologist will establish 100-foot no-work buffers around occupied maternity dens throughout the pup-rearing season (May 1–June 15) and a 50-foot no-work buffer around occupied dens during other times of the year.						habitats/ establish no-work buffer around occupied dens/conduct passive den exclusion for non-maternity dens/ report findings		
BIO-MM#66	Conduct Pre-Construction Surveys for Dusky-Footed Woodrat and Implement Avoidance Measures	<p>Prior to any ground-disturbing activity, the Project Biologist will conduct pre-construction surveys for woodrat stick houses within suitable habitat located within the work area. These surveys will be conducted no more than 14 days before the start of ground-disturbing activities in a work area. The Project Biologist will establish a 50-foot no-work buffer around each stick house using ESA fencing. If stick houses are found within temporary or permanent impact areas and cannot be avoided, the following condition will be implemented:</p> <ul style="list-style-type: none"> <li>Removal of woodrat stick houses will not occur between March and May when nesting is most likely. Outside this period, the Contractor, under supervision of the Project Biologist, may dismantle stick houses by hand or using small construction machinery (e.g., Bobcat or similar) and move nesting material to suitable habitat outside the project footprint so that woodrats may rebuild new houses.</li> </ul>	Pre-construction	Surveying/ monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Conduct habitat assessment surveys for special-status small mammal species/ report findings Establish no-work buffers if burrows or signs of special-status small mammal species are detected/ relocation as needed/ report findings	Condition of construction contract/condition of regulatory permits	Impact BIO#29: Permanent Conversion or Degradation of Habitat for and Direct Mortality of San Francisco Dusky-Footed Woodrat and Ringtail
BIO-MM#67	Conduct Pre-Construction Surveys for Special-Status Bat Species	No more than 1 year before the replacement or modification of any bridges or removal of other structures modeled as bat habitat and where access is available, the Project Biologist will conduct a survey of the bridge looking for evidence of roosting bats. If bat sign is detected, biologists will conduct an evening visual emergence survey of the bridge or structure, from a half hour before sunset to 1–2 hours after sunset for a minimum of 2 nights within the season that construction will be taking place. If a potentially active bat roost is in the bridge or structure, passive monitoring with full-spectrum bat detectors will be used to assist in determining species present. To the extent possible, all monitoring will be conducted during favorable weather conditions (calm nights with temperatures conducive to bat activity and no precipitation predicted). The biologists will analyze the bat call data using appropriate software and will prepare a report that will be submitted to the Authority, including an assessment of the significance of the roost for local bat populations.	Pre-construction	Surveying/ monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Conduct visual and acoustic pre-construction survey for roosting bats/ report findings	Condition of construction contract/condition of regulatory permits	Impact BIO#30: Loss of Roost Sites for and Direct Mortality or Disturbance of Special-Status Bats

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
BIO-MM#68	Implement Bat Avoidance and Relocation Measures	If active hibernacula or maternity roosts are identified in the work area or 500 feet extending from the work area during pre-construction surveys, they will be avoided to the extent feasible. If avoidance of a hibernacula is not feasible, the Project Biologist will prepare a relocation plan to remove the hibernacula and provide for construction of an alternative bat roost outside of the work area. The relocation plan will be provided to CDFW for review and input. The Project Biologist will implement the relocation plan before the commencement of any ground-disturbing activities that will occur within 500 feet of the hibernacula. Removal of roosts will be guided by accepted exclusion and deterrent techniques.	Pre-construction/ construction	Surveying/ monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Avoid active or hibernation roosts, if feasible/ if necessary, prepare and implement relocation plan for bat roosts/ report findings	Condition of construction contract/condition of regulatory permits	Impact BIO#30: Loss of Roost Sites for and Direct Mortality or Disturbance of Special-Status Bats
BIO-MM#69	Implement Bat Exclusion and Deterrence Measures	If nonbreeding or nonhibernating individuals or groups of bats are found roosting within the work area, the Project Biologist will facilitate the eviction of the bats by either opening the roosting area to change the lighting and airflow conditions, or installing one-way doors or other appropriate methods.  To the extent feasible, the Authority will leave the roost undisturbed by project activities for a minimum of 1 week after implementing exclusion and/or eviction activities. Steps will not be taken to evict bats from active maternity or hibernacula; instead such features may be relocated pursuant to a relocation plan. If a relocation plan is necessary, the Authority will develop it in consultation with CDFW and/or other experts as necessary.	Pre-construction/ construction	Surveying/ monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Safely evict bats from roosts except for established maternity roosts and occupied hibernation roosts/ report findings	Condition of construction contract/condition of regulatory permits	Impact BIO#30: Loss of Roost Sites for and Direct Mortality or Disturbance of Special-Status Bats
BIO-MM#70	Prepare and Implement an Annual Vegetation Control Plan	Prior to O&M of the HSR, the Authority will prepare an annual vegetation control plan (VCP) to address vegetation removal for the purpose of maintaining clear areas around facilities, reducing the risk of fire, and controlling invasive weeds during the operational phase. The Authority will generally follow the procedures established in Chapter C2 of the California Department of Transportation (Caltrans) Maintenance Manual to manage vegetation on Authority property (Caltrans 2014). Vegetation will be controlled by chemical, thermal, biological, cultural, mechanical, structural, and manual methods. The VCP will be updated each winter and completed in time to be implemented no later than April 1 of each year. The annual update to the VCP will include a section addressing issues encountered during the prior year and changes to be incorporated into the VCP. The plan will describe site-specific vegetation control methods, as outlined below:  <ul style="list-style-type: none"> <li>▪ Chemical vegetation control methods</li> <li>▪ Mowing program consistent with Section 1415 of the FAST Act</li> <li>▪ Other nonchemical vegetation control</li> <li>▪ Other chemical pest control methods (e.g., insects, snail, rodent)</li> </ul>	Pre-construction/ construction/ post-construction	Design/ final design/ compensatory mitigation/ reporting	Yearly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Prepare and implement VCP for vegetation removal for the purpose of maintaining clear areas/ report findings	Condition of construction contract/condition of regulatory permits	Impact BIO#31: Intermittent Disturbance of Habitat for Special-Status Plants during Operations Impact BIO#32: Intermittent Disturbance of Habitat for and Direct Mortality of Special-Status Wildlife during Operations Impact BIO#36: Intermittent Disturbance or Degradation of Special-Status Plant Communities during Operations Impact BIO#39: Intermittent Disturbance or Degradation of Aquatic Resources during Operations

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<p>Only Caltrans-approved herbicides may be used in the vegetation control program. Pesticide application will be conducted by certified pesticide applicators in accordance with all requirements of the California Department of Pesticide Regulation and County Agricultural Commissioners. Noxious/invasive weeds will be treated where requested by County Agricultural Commissioners. The Authority will cooperate in area-wide efforts to control noxious/invasive weeds if such programs have been established by local agencies.</p> <p>To the extent feasible and consistent with the Caltrans (2014) Maintenance Manual requirements, the Authority will also include pollinator conservation measures in the VCP from the <i>Xerces Society Best Management Practices for Pollinators on Western Rangelands</i> (Xerces Society 2018), conservation measures in the <i>Nationwide Candidate Conservation Agreement for Monarch Butterfly on Energy and Transportation Lands</i> (Cardno 2020), or other applicable sources.</p>								
BIO-MM#71	Restore Temporary Riparian Impacts	<p>Within 90 days of completing construction in a work area, the Project Biologist will direct the revegetation of any riparian areas temporarily disturbed as a result of the construction activities, using appropriate native plants and seed mixes. Native plants and seed mixes will be obtained from stock originating from local sources, to the extent feasible. The Project Biologist will monitor restoration activities consistent with provisions in the RRP (BIO-MM#1).</p>	Construction/post-construction	Restoration/monitoring/reporting	Weekly or as established by regulatory compliance agencies	Authority/Contractor/Project Biologist	Authority/Contractor/Project Biologist	Revegetate disturbed riparian areas/report findings	Condition of construction contract/condition of regulatory permits	<p>Impact BIO#35: Permanent Conversion or Degradation of Special-Status Plant Communities</p> <p>Impact BIO#37: Permanent Conversion or Degradation of Aquatic Resources Considered waters of the U.S. or waters of the State</p> <p>Impact BIO#38: Permanent Conversion or Degradation of Resources Regulated under California Fish and Game Code Section 1600 et seq.</p> <p>Impact HYD#4: Temporary Impacts on Surface Water Quality during Construction</p>
BIO-MM#72	Provide Compensatory Mitigation for Permanent Impacts on Riparian Habitat	<p>The Authority will compensate for permanent impacts on riparian habitats at a ratio of 2:1 (mixed riparian and palustrine forested wetland) or 4:1 (California sycamore woodland), unless a higher ratio is required by agencies with regulatory jurisdiction over the resource. Compensatory mitigation may occur through habitat restoration, the acquisition of credits from an approved mitigation bank, participation in an in-lieu fee program or habitat preservation or enhancement at a permittee responsible mitigation site. Mitigation nearest the location of impact will be prioritized, as feasible, unless the conservation value will be greatest in another location.</p>	Pre-construction/construction/post-construction	Design/final design/surveying/compensatory mitigation/reporting	Yearly or as established by regulatory compliance agencies	Authority/Contractor/Project Biologist	Authority/Contractor/Project Biologist	Mitigate permanent riparian habitat impacts through compensation/report findings	Condition of construction contract/condition of regulatory permits	<p>Impact BIO#23: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Least Bell's Vireo, Yellow Warbler, and Yellow-Breasted Chat</p> <p>Impact BIO#35: Permanent Conversion or Degradation of Special-Status Plant Communities</p> <p>Impact BIO#37: Permanent Conversion or Degradation of Aquatic Resources Considered waters of the U.S. or waters of the State</p> <p>Impact BIO#38: Permanent Conversion or Degradation of Resources Regulated under California Fish and Game Code Section 1600 et seq.</p> <p>Impact HYD#5: Permanent Impacts on Surface Water Quality during Construction</p>

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
BIO-MM#73	Restore Aquatic Resources Subject to Temporary Impacts	Within 90 days of the completion of construction activities in a work area, the Authority will begin to restore aquatic resources that were temporarily affected by the construction. As set out in the RRP (BIO-MM#1), such areas will be, to the extent feasible, restored to their natural topography. In areas where gravel or geotextile fabrics have been installed to protect substrate and to otherwise minimize impacts, the material will be removed and the affected features will be restored. The Authority will revegetate affected aquatic resources using appropriate native plants and seed mixes (from local sources where available). The Authority will conduct maintenance monitoring consistent with the provisions of the RRP.	Construction/ post-construction	Restoration/ monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Restore disturbed aquatic resources/ conduct revegetation/ report findings	Condition of construction contract/condition of regulatory permits	Impact BIO#37: Permanent Conversion or Degradation of Aquatic Resources Considered waters of the U.S. or waters of the State  Impact BIO#38: Permanent Conversion or Degradation of Resources Regulated under California Fish and Game Code Section 1600 et seq.  Impact HYD#4: Temporary Impacts on Surface Water Quality during Construction
BIO-MM#74	Prepare and Implement a Compensatory Mitigation Plan for Impacts on Aquatic Resources	The Authority will prepare and implement a CMP that identifies mitigation to address temporary and permanent loss, including functions and values, of aquatic resources as defined as waters of the U.S. under the federal CWA and/or waters of the state under the Porter-Cologne Act. The compensatory mitigation for state- and federally protected wetlands will meet the federal and state policy for no net loss of functions and values. Mitigation implemented under this measure will be consistent with and will help advance mitigation commitments at the program level, including mitigation intended to address impacts in the GEA. Compensatory mitigation may involve the restoration, establishment, enhancement, and/or preservation of aquatic resources through one or more of the following methods: <ul style="list-style-type: none"> <li>▪ Purchase of credits from an agency-approved mitigation bank</li> <li>▪ Preservation of aquatic resources through acquisition of property</li> <li>▪ Establishment, restoration, or enhancement of aquatic resources</li> <li>▪ In-lieu fee contribution determined through consultation with the applicable regulatory agencies</li> </ul> The following ratios will be used for compensatory mitigation for permanent impacts, unless a higher ratio is required pursuant to regulatory authorizations issued under Section 404 of the CWA and the Porter-Cologne Act: <ul style="list-style-type: none"> <li>▪ Vernal pools: 2:1</li> <li>▪ Seasonal wetlands: between 1.1:1 and 1.5:1 based on impact type, function and values lost <ul style="list-style-type: none"> <li>– 1:1 off-site for permanent impacts</li> <li>– 1:1 on-site and 0.1:1 to 0.5:1 off-site for temporary impacts</li> </ul> </li> <li>▪ All other wetland types: 1:1</li> <li>▪ All non-wetland types: mitigated onsite at 1:1 or offsite 1:1 if onsite mitigation is not possible.</li> </ul>	Pre-construction/ Construction/ Post-construction	Design/ final design/ surveying/ compensatory mitigation/ reporting	Yearly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Prepare and implement CMP for temporary and permanent impact on aquatic resources/ report findings	Condition of construction contract/condition of regulatory permits	Impact BIO#37: Permanent Conversion or Degradation of Aquatic Resources Considered waters of the U.S. or waters of the State  Impact BIO#38: Permanent Conversion or Degradation of Resources Regulated under California Fish and Game Code Section 1600 et seq.  Impact HYD#4: Temporary Impacts on Surface Water Quality during Construction  Impact HYD#5: Permanent Impacts on Surface Water Quality during Construction

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<p>For permittee-responsible mitigation involving establishment, restoration, enhancement, or preservation of aquatic resources by the Authority, the CMP will contain, but will not be limited to the following primary information:</p> <ul style="list-style-type: none"> <li>Objectives—A description of the resource types and amounts that will be provided, the type of compensation (i.e., restoration, establishment, enhancement, and/or preservation), and the manner in which the resource functions of the compensatory mitigation project will address the needs of the watershed or ecoregion</li> <li>Site selection—A description of the factors considered during the term sustainability of the resource</li> <li>Adaptive management plan—A management strategy to address changes in site conditions or other components of the compensatory mitigation project</li> <li>Financial assurances—A description of financial assurances that will be provided to support success of the compensatory mitigation</li> </ul> <p>Additional information required in a CMP as outlined in 33 C.F.R. 332.4(c), as deemed appropriate and necessary by the USACE, will also be addressed in the CMP. In circumstances where the Authority intends to fulfill compensatory mitigation obligations by securing credits from approved mitigation banks or in-lieu fee programs, the CMP need only include the name of the specific mitigation bank or in-lieu fee program to be used, the number of credits proposed to be purchased, and a rationale for why this number of credits was determined appropriate.</p>								
BIO-MM#75	Implement Transplantation and Compensatory Mitigation for Protected Trees	<p>Prior to ground-disturbing activities, the Project Biologist will conduct surveys in the work area to identify protected trees.</p> <p>The Project Biologist will establish ESAs around protected trees with the potential to be affected by construction activities, but do not require removal. The Contractor, under the direction of the Project Biologist, will install ESA fencing within the root protection zone. The root protection zone extends beyond the dripline to a distance that is half the distance between the trunk and the dripline.</p> <p>The Authority will provide compensatory mitigation for impacts on protected trees, including impacts associated with removing or trimming a protected tree. Compensation will be based on requirements set out in applicable local government ordinances, policies, and regulations. Compensatory mitigation may include, but is not limited to, the following:</p> <ul style="list-style-type: none"> <li>Transplantation of protected trees to areas outside of the work area.</li> <li>Replacement of protected trees at an off-site location, based on the number of protected trees affected, at a</li> </ul>	Pre-construction/ construction/ post-construction	Surveying/ monitoring/ restoration/ reporting	Monthly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Conduct protected trees surveys/ compensate for impacts and effects on protected tree resources/ prepare and implement a monitoring and maintenance program to monitor transplanted trees/ report findings	Condition of construction contract	Impact BIO#40: Removal or Mortality of Trees Protected under Municipal Tree Ordinances

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<p>ratio not to exceed 3:1 for native trees (except for native oak trees, which will be replaced at a ratio not to exceed 6:1) or 1:1 for ornamental trees, unless higher ratios are required by local government ordinances or regulations.</p> <ul style="list-style-type: none"> <li>Contribution to a tree-planting fund.</li> </ul> <p>The Authority will develop a native oak/protected tree mitigation plan for oak and other protected trees that are transplanted or replaced. The oak/protected tree mitigation plan will include the following:</p> <ul style="list-style-type: none"> <li>The number of affected oak trees and the number of transplanted and replaced native oak trees.</li> <li>A description of the mitigation site and reference site locations.</li> <li>A planting plan that includes planting acorns and understory species.</li> <li>A description of the success criteria that will be used to evaluate performance. Success criteria will be defined to achieve approximate baseline conditions at a minimum.</li> <li>A description of the types of monitoring that will be used to verify that such criteria have been met. Monitoring will occur for a minimum of 10 years by the Project Biologist.</li> <li>A description of the management actions that will be used to maintain the habitat on the mitigation sites and the funding mechanisms for long-term management.</li> <li>A description of remedial actions that will be used if the success criteria are not met.</li> <li>A description of financial assurances that will be provided to demonstrate that the funding to implement mitigation is assured.</li> </ul>								
BIO-MM#76a	Minimize Impacts on Wildlife Movement during Construction	<p>During construction, all known wildlife crossing structures, such as underpasses and culverts, will be maintained unobstructed; no equipment storage, staging, or unnecessary operations will be conducted in such areas. Where an existing underpass or culvert must be closed or obstructed, a temporary crossing structure or an alternative movement corridor will be created. Construction will be timed to minimize impacts on movement by providing at least one crossing feature in a region. For example, to minimize impacts on wildlife using the Fisher Creek culvert, construction at Fisher Creek will not commence until the construction of the Tulare Swale undercrossing is complete. Directional fencing will be placed to funnel individuals to temporary or alternative crossing structures or movement corridors.</p> <p>The Authority will avoid placing fencing, either temporarily or permanently, within known movement routes for wildlife (e.g., the Fisher Creek underpass or culverts and bridges that provide passage under SR 152 in western Pacheco Pass) in those portions of the alignment where the tracks</p>	Pre-construction/ construction	Final design/ surveying/ monitoring/ reporting	Yearly or at other appropriate intervals	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Avoid placement of fencing adjacent to wildlife movement corridors/ report findings	Condition of construction contract	Impact BIO#42: Temporary Disruption of Wildlife Movement

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<p>are elevated (e.g., viaducts or bridges). The Authority will avoid conducting ground-disturbing activities within known wildlife movement routes during nighttime hours, to the extent feasible, and will shield nighttime lighting to avoid illuminating wildlife movement corridors in circumstances where feasible.</p> <p>The Authority will also avoid conducting ground-disturbing activities within known wildlife movement routes during nighttime hours (1 hour before sunset to 1 hour after sunrise), to the extent feasible. Where nighttime work is necessary, the Authority will minimize impacts on adjacent lands by preparing a site-specific lighting information plan. The plan will provide the number of lights to be utilized, the type of lights to be used (i.e., LED, incandescent, or halide), the lumens of the lights, how the lights will be shielded and directed downward, as well as a map that shows the work area, lighting locations, and the orientation of how lighting will be directed. Lighting will use the minimum levels approved by OSHA (29 C.F.R. § 1926.56) for general construction (i.e., 5 foot-candles or 54 lux). Additionally, the plan will include instructions to minimize the direction of construction vehicle headlights toward off-site locations and using low beams or turning off headlights when safety considerations permit. The plan will require minimizing the duration of lighting by using methods other than lighting to ensure security of the construction site during hours it is not in use.</p> <p>To avoid impeding movement of aquatic species, the Authority will employ the use of vibratory (rather than impact) pile driving for work in or within 200 feet of waterbodies that provide habitat for steelhead or giant garter snake. To allow for movement of steelhead and other fish species around dewatered sites, the capture and translocation of fish around the job site to a downstream location will be undertaken on consultation with the NMFS and CDFW.</p> <p>Additionally, the Authority will establish wildlife-friendly fencing at soil stabilization areas and tunnel portals (which occur through the Pacheco Pass region) where a large right-of-way will be required. While access restriction fencing directly adjacent to the rail, tunnel portals, and HSR facilities will still be necessary for human safety and security, it will not be necessary around the larger construction footprints necessary for soil stabilization areas and tunnel portal work areas. Within these areas, a wildlife-friendly fence will be used with the following attributes (Paige 2012):</p> <ul style="list-style-type: none"> <li>▪ Three- or four-strand wire design</li> <li>▪ No more than 40 inches tall (to allow adult mammals to jump over)</li> <li>▪ Bottom 18 inches off the ground (to allow animals to crawl under) (changes in topography such as gullies or</li> </ul>								

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		<p>dips can be used to provide this clearance distance)</p> <ul style="list-style-type: none"> <li>At least 12 inches between the top two wires</li> <li>Smooth top and bottom wires</li> <li>No vertical stays between posts; if stays are necessary, consider stiff plastic or composite stays</li> <li>Wood or steel posts at 16.5-foot intervals</li> <li>Gates, drop-downs, or other passage where wildlife can concentrate and cross</li> <li>Flagging or other measure to increase fence visibility (especially important for low-flying birds)</li> </ul>								
BIO-MM#76b	Minimize Impacts on Wildlife Movement in the Western Pacheco Pass Region	<p>The Authority will implement measures within the western Pacheco Pass region (e.g., the Pacheco Creek Reserve and adjacent areas) to facilitate wildlife movement during construction. To offset noise, visual, lighting, and ground disturbance effects during construction, the Authority will identify, create, and maintain at least two wildlife movement routes through and/or around the construction area to facilitate continued wildlife movement. Wildlife movement areas will be established between natural lands to the east, west, and south of the construction area and existing wildlife crossing location under SR 152. The routes will be fenced on one or both sides to help funnel animals through or around the construction area, will be as wide as possible, and will include predator avoidance cover as well as open areas that provide line of sight. Noise walls will be used, where needed, to create the minimum noise conditions possible. The Authority will consult with SCVHA, Pathways for Wildlife, and other subject matter experts as necessary to identify existing bridges, culverts, and undercrossings under features such as SR 152 that will be suitable crossing locations for this measure.</p> <p>The wildlife movement routes will be established prior to construction, adjusted if necessary, and will be maintained and monitored (using camera stations or other appropriate methods) during construction to ensure that, at any one time, at least two routes are maintained. The corridors will be maintained in a dark state (i.e., shielded from construction-related lighting) if possible. The Authority will work with agency and stakeholder partners—CDFW, USFWS, NMFS, the SCVOSA, SCVHA, Peninsula Open Space Trust, and The Nature Conservancy—to site and design the temporary movement routes.</p>	Pre-construction/ construction	Final design/ surveying/ monitoring/ reporting	Yearly or at other appropriate intervals	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Avoid placement of fencing adjacent to wildlife movement corridors/ report findings	Condition of construction contract	Impact BIO#42: Temporary Disruption of Wildlife Movement
BIO-MM#77a	Design Wildlife Crossings to Facilitate Wildlife Movement	<p>The Authority will design all wildlife crossings created specifically for terrestrial species consistent with the guidelines and recommendations in the WCA (Authority 2020a: Appendix C). The design of wildlife crossings will include the following features:</p> <ul style="list-style-type: none"> <li>To improve use of wildlife crossings, install directional fencing for the maximum feasible distance from each side of wildlife crossing entrances/exits along Monterey Road between Metcalf Road and Tilton Avenue (i.e.,</li> </ul>	Design/ pre-construction/ construction	Design/ final design/ monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Establish wildlife crossings/ report findings	Condition of construction contract/condition of regulatory permits	<p>Impact BIO#43: Permanent Impacts on Wildlife Movement</p> <p>Impact BIO#48: Mortality Resulting from Train Strike during Operations</p> <p>Impact BIO#55: Conflict with Coyote Valley Linkage</p>

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<p>within Coyote Valley). Directional fencing will be designed to benefit the greatest number of movement guilds feasible.</p> <ul style="list-style-type: none"> <li>▪ Wildlife crossing width and height will be maximized and length minimized to the extent feasible.</li> <li>▪ Native earthen bottom</li> <li>▪ Avoid metal walls</li> <li>▪ Unobstructed entrances (e.g., no riprap, energy dissipaters, grates), although vegetative cover, adjacent to and near the entrances of crossings, is permissible</li> <li>▪ Openness and a clear line of sight from end to end</li> <li>▪ Design entrances to minimize light reflection from train lights</li> <li>▪ Cover materials within the crossing such as rock or brush piles where smaller animals can take cover</li> <li>▪ Year-round absence of water for a portion of the width of the crossing (i.e., no flowing water)</li> <li>▪ Where water is likely to be present within a crossing as a result of a high groundwater table or proximity to an existing floodplain, wildlife crossing design will include features to minimize water entry into the crossing (e.g., impermeable groundwater barriers, berms) and to maximize drainage and drying time (e.g., slopes, sump pumps or permeable soils)</li> <li>▪ Where hydrologic flow balancing features (culverts) provide wildlife connectivity, "shelves" will be constructed, where feasible, to allow small and medium animals to pass through the structure when it is flooded</li> <li>▪ Slight grade at approaches to prevent flooding</li> <li>▪ Hydrologic designs (ledges, cross slopes, water detention features, infiltration features, water proofing, or other features) to maintain crossing functionality (a dry crossing path) up to and including 100-year storm events for 95% of the year (347 days)</li> <li>▪ Limited open space distance and absence of permanent physical obstacles between crossing and cover/habitat</li> <li>▪ Separation from human use areas (e.g., trails, multiuse undercrossings, development)</li> <li>▪ Avoidance of artificial light at approaches to wildlife crossings</li> <li>▪ The addition of directional fencing in other important wildlife corridors (e.g., the western Pacheco Pass region) to funnel wildlife to crossing structures</li> <li>▪ Consideration of habitat modification and/or habitat restoration at crossings to facilitate cover for crossing animals</li> </ul> <p>Because land use and other factors could change prior to construction of the project, the Authority will work with agency and stakeholder partners (e.g., CDFW, USFWS, NMFS, SCVOSA, SCVHA, Peninsula Open Space Trust, and The Nature Conservancy) to validate and optimize</p>								

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		<p>wildlife crossing locations at the 75% to 90% design phase. The adjustment of some crossing locations, and the spacing of crossings, up to approximately 0.1 mile, may be necessary to orient crossings most advantageously to protected and natural lands, which is likely to improve the potential for use. In addition, the Authority will plan and prioritize species and wetland and natural community (e.g., sycamore alluvial wetland) mitigation land acquisition—in coordination with the agencies and stakeholders listed above—at or near wildlife crossing entrances to minimize future development and maintain the natural and rural land cover types surrounding wildlife crossing entrances and exits.</p> <p>Further, the Authority will prepare and submit for review a Wildlife Crossing Design, Inspection, and Maintenance Plan. The plan will include the following minimum components:</p> <ul style="list-style-type: none"> <li>▪ A list of movement guild focal species for each wildlife crossing and hydrologic balancing features along the alignment</li> <li>▪ Based on the focal species, identification of which of the above-listed design features (e.g., vegetation at the entrance, cover within the crossing, artificial dens for San Joaquin kit fox, critter shelves) will be included in each crossing's design</li> <li>▪ A funnel fencing plan for wildlife crossing entrances/exits on the east side of Monterey Road in Coyote Valley</li> <li>▪ Frequency of crossing design inspection</li> <li>▪ A list of features to be inspected, criteria for passing inspection, and the response for failed inspection</li> <li>▪ A description of how maintenance decisions will be informed by the wildlife crossing monitoring and adaptive management plan described below in BIO-MM#77b</li> </ul> <p>The Wildlife Crossing Design, Inspection, and Maintenance Plan will be developed in coordination with wildlife agencies—CDFW, USFWS, and NMFS—and local wildlife movement stakeholders (e.g., SCVOSA, SCVHA, Peninsula Open Space Trust, and The Nature Conservancy).</p>								
BIO-MM#77b	Monitoring and Adaptive Management of Wildlife Crossings	<p>The Authority will develop a monitoring and adaptive management plan to monitor the effectiveness and use of crossing designs. The plan will include the following minimum components:</p> <ul style="list-style-type: none"> <li>▪ Monitoring methods—Consistent with local monitoring efforts, which primarily use camera stations and other remote sensing equipment to document use and passage rates, monitoring will be focused on crossings within defined wildlife movement corridors. To the extent feasible, the Authority could also contribute funding to local organizations currently conducting</li> </ul>	Post-construction	Design/final design/monitoring/reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Establish wildlife crossings/report findings	Condition of construction contract/condition of regulatory permits	Impact BIO#43: Permanent Impacts on Wildlife Movement Impact BIO#55: Conflict with Coyote Valley Linkage

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<p>wildlife movement monitoring to meet monitoring requirements outlined in the measure, provided the efforts are occurring within the same defined wildlife movement corridors.</p> <ul style="list-style-type: none"> <li>Monitoring—Monitoring will start following construction, and total initial monitoring period will not exceed 5 years following construction. Additional monitoring associated with adaptive management will be confined to the location triggering the adaptive management and will not exceed 5 years.</li> <li>Success criteria—Wildlife crossings have been designed with minimum dimensions and design criteria for the different movement guilds, as considered in the WCA. Crossings will be considered successful if they are documented during monitoring as having use by one or more of the species guilds they are designed for. The adaptive management plan will outline species and species guild targets for each size and type of wildlife crossing constructed, based on the design criteria and associated expected use of each crossing as outlined in the WCA.</li> <li>Adaptive management—Adaptive management will include modifications to design features, if feasible, such as cover and substrate; use of new technologies to attract animals to the crossing; fencing; adjacent land management changes, if feasible; or other measures that may be determined to be feasible in the future.</li> </ul> <p>The monitoring and adaptive management plan will be developed in coordination with wildlife agency staff and local wildlife movement stakeholders such as SCVHA, SCVOSA, The Nature Conservancy, and Peninsula Open Space Trust.</p>								
BIO-MM#78	Establish Wildlife Crossings at Embankment in West Slope of Pacheco Pass	<p>The Authority will create dedicated wildlife crossings to accommodate wildlife movement across permanently fenced infrastructure in the western portion of the Pacheco Pass Subsection near Casa de Fruta, where wildlife movement will be significantly reduced. Dedicated wildlife crossings will be implemented using one or more methods. The Authority will either construct short segments of open-span bridge/viaduct or will install dedicated wildlife undercrossings. The area proposed for the crossings is known to be geologically unstable, and the Authority has committed to evaluating the area through detailed geotechnical analysis. The wildlife crossing type used will prioritize the use of open-span bridge/viaducts; however, the methods used will depend on the results of detailed geotechnical analysis to ensure safety and security of the rail is considered first.</p> <p>Wildlife undercrossings, if used, will be placed approximately every 0.3 mile and will be no longer than 120 feet, as feasible, where the alignment is at grade, on</p>	Pre-construction/ construction	Design/ final design/ monitoring/ reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Establish wildlife crossings/ report findings	Condition of construction contract/condition of regulatory permits	Impact BIO#43: Permanent Impacts on Wildlife Movement

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		<p>embankment, or trenched at the following locations:</p> <ul style="list-style-type: none"> <li>▪ Crossing A: B3161+34: 120 feet long by 40 feet wide by 23 feet high.</li> <li>▪ Crossing B: B3174+00: 120 feet long by 40 feet wide by 38 feet high</li> <li>▪ Crossing C: B3197+00: 120 feet long by 40 feet wide by 38 feet high</li> <li>▪ Crossing D: B3209+98: 120 feet long by 40 feet wide by 38 feet high</li> </ul> <p>Undercrossings will conform to the minimum spacing and dimensions set forth in the WCA (Authority 2020a: Appendix C) with the exception of length, which will be limited to no more than 120 feet where feasible, unless different dimensions or frequencies are specified in authorizations issued under the FESA or CESA. Additionally, to the extent feasible, specific designs will incorporate the features outlined under BIO-MM#77a to facilitate wildlife movement through dedicated crossings. Open-span bridge/viaducts, if used, will also be placed approximately every 0.3 mile, in the locations noted above, and will be at least 100 feet long. Additionally, to the extent feasible, the bridge/viaducts will be at least 15 feet in height. The Authority may also use some combination of wildlife undercrossings and open-span bridges/viaducts, if the geotechnical analysis indicates some areas are more suitable for a certain type of structure than others.</p>								
BIO-MM#79a	Provide Wildlife Movement between the Santa Cruz Mountains and Diablo Range	<p>The Authority will address effects of permeability reduction caused by construction of the MOWF, HSR guideway, and secured right-of-way, an impact that could not feasibly be avoided. Within 2 years of the start of construction at the MOWF, the Authority will conserve or improve wildlife movement within the Santa Cruz Mountain to the Diablo Range, Santa Cruz Mountain to Gabilan Range, or the Diablo to Gabilan Range wildlife linkages (Penrod et al. 2013) by conserving natural or agricultural lands that provide for wildlife movement, enhancing wildlife movement between the Santa Cruz Mountains and the Diablo Range, or both.</p> <p>The extent of preservation or enhancement will provide for one of the following:</p> <ul style="list-style-type: none"> <li>▪ An increase in permeability of the Santa Cruz Mountains to Diablo Range Wildlife Linkage (as mapped by Penrod et al. 2013) and the Soap Lake 100-year floodplain equivalent to the decrease in permeability at the MOWF in its combination of magnitude and affected area</li> <li>▪ Protection of 238 acres of lands prioritized for their importance to wildlife movement in the Santa Cruz Mountains to Diablo Range Wildlife Linkage and the Soap Lake 100-year floodplain, which corresponds to a 1-to-1 ratio of protected land to project footprint at the</li> </ul>	Post-construction	Compliance report	Prior to operation	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Authority to provide compensation based on area of habitat affected by the project	Condition of regulatory permits	<p>Impact BIO#42: Temporary Disruption of Wildlife and Wildlife Movement</p> <p>Impact BIO#43: Permanent Impacts on Wildlife Movement</p> <p>Impact BIO#51: Permanent Conversion or Degradation of Conservation Areas</p> <p>Impact BIO#53: Conflict with Santa Clara Valley Habitat Plan</p> <p>Impact BIO#55: Conflict with Coyote Valley Linkage</p>

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<p>MOWF</p> <ul style="list-style-type: none"> <li>A combination of enhancement and protection where the implemented percentages of the above enhancement and preservation combine to 100%</li> </ul> <p>Acquisition and enhancement efforts listed above will prioritize lands in either the Santa Cruz Mountains to Diablo Range Wildlife Linkage or the Soap Lake 100-year floodplain, particularly along known wildlife movement routes or corridors, especially those adjacent to or near wildlife crossing structures under UPRR, Monterey Road, and the HSR. The protection of open space corridors between wildlife under crossings and the nearest conserved open space, floodplain, passive recreation, or open agricultural properties will be prioritized when necessary to maintain and facilitate the permanent functionality of wildlife crossings. The prioritization of lands for protection will be developed in coordination with local stakeholders, such as the SCVHA, the SCVOSA, The Nature Conservancy, the Peninsula Open Space Trust, and with wildlife agency staff.</p> <p>Preservation of natural or agricultural lands will be in perpetuity through either fee title acquisition or conservation easement.</p> <p>Enhancement efforts may include enhancement of movement on lands protected by the Authority, or it may entail funding projects that will enhance movement on other protected lands, reduce or eliminate existing barriers to movement, or construct structures to improve wildlife movement.</p>								
BIO-MM#79b	Provide Wildlife Movement between the Diablo Range and Inner Coast Range	<p>Under this measure within the western Pacheco Pass Region, the Authority will design, permit, and construct a wildlife overcrossing, or will contribute funds to the SCVHA for the design, permitting, and construction of a wildlife overcrossing under an agreement with SCVHA (i.e., a Mitigation Credit Agreement or another appropriate funding mechanism that would ensure that a wildlife overcrossing is constructed). To facilitate the implementation of this measure, the Authority will establish a Pacheco Wildlife Movement Working Group, focused on the funding, design, permitting, and construction of a wildlife overcrossing in the region. The wildlife overcrossing would be located and designed through coordination with the working group which will include representatives from Caltrans, wildlife agencies (CDFW, USFWS) and local wildlife movement stakeholders (e.g., SCVOSA, SCVHA, Peninsula Open Space Trust, and The Nature Conservancy). The wildlife overcrossing design and characteristics would be consistent with, and meet the minimum requirements outlined in the <i>Wildlife Crossing Structure Handbook</i> (Clevenger and Huijser 2011), and consistent with guidelines within the <i>Innovative Strategies to Reduce the Costs of Effective Wildlife Overpasses</i></p>	Post-construction	Compliance report	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Authority to provide funding or ensure that a funding mechanism is in place prior to operation	Condition of regulatory permits	Cumulative impacts to wildlife movement

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<p>(McGuire et al. 2021), or other published applicable wildlife overcrossing design or construction guidance. To the extent consistent with the coordination and guidance described above, the wildlife overcrossing will be located east of the Pacheco Creek Reserve and west of the Santa Clara County boundary (the Authority in consultation with wildlife agencies and local wildlife movement stakeholders may adjust the location to the most appropriate location within the Pacheco Pass region). Preliminary evaluations of suitable and efficient site locations indicate a wildlife overcrossing structure in the region would require a one or two span structure with a length of up to 300 feet and a width of up to 130 feet. Preliminary evaluations also indicate that a pre-cast concrete arch approach is the least-cost solution, but the design requires additional validation in terms of site requirements and constructability. If a pre-cast arch bridge is infeasible the Authority assumes a typical reinforced concrete bridge would be used, as described below. Funding for the wildlife overcrossing will come from the Authority to the extent necessary, however the Authority will also seek other funding partners and sources, including wildlife movement stakeholders in the region, through other cost sharing agreements (e.g., Caltrans, CDFW), and through other state or local funding sources (e.g., California Wildlife Conservation Board Prop 68 funding, SCVHA funding, etc.). To the extent feasible, construction of the land bridge will be conducted prior to construction of the Pacheco Pass Subsection or as soon as possible after construction begins. For these reasons the Authority will either contribute funds to SCVHA's overcrossing project via a partnership with SCVHA, or independently construct a wildlife overcrossing as follows:</p> <ul style="list-style-type: none"> <li>▪ A pre-cast concrete arch wildlife overcrossing of no more than 130 feet in width and no more than 300 feet in length, utilizing a location that maximizes ease of construction and cost considerations (such as a location with an adequate median width that a bridge can use two arches to span opposing lanes of traffic) so that suitable habitat can be connected, or</li> <li>▪ A single typical reinforced concrete bridge with one single span no more than 130 feet in width at a location where a bridge of no more than approximately 300 feet in length would span suitable habitats.</li> </ul>								
BIO-MM#80	Minimize Permanent Intermittent Noise, Visual, and Train Strike Impacts on Wildlife Movement	<p>To address the permanent intermittent impact of noise, visual disturbance, and train strike on movement by avian and mammalian wildlife, the Authority will build additional structures to minimize or avoid such impacts. Structures will be designed with the goal of reducing or eliminating the visual presence of the moving train and minimizing exposure to noise produced by HSR trains. With regard to birds, the noise/visual barriers will be</p>	Design/pre-construction/ construction/ post-construction	Design of noise barriers/visual barriers	Weekly or as established by regulatory compliance agencies	Authority/ Contractor	Authority/ Contractor	Design of noise barriers/visual barriers in construction plans	Condition of construction contract	<p>Impact BIO#44: Intermittent Noise Disturbance of Wildlife Using Corridors during Operations</p> <p>Impact BIO#46: Intermittent Visual Disturbance of Wildlife Using Corridors during Operations</p> <p>Impact BIO#47: Intermittent and Permanent Lighting Disturbance of</p>

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<p>designed to minimize exceedance of the following thresholds (as measured at the outer edges of the HSR right-of-way), as described in the WCA:</p> <ul style="list-style-type: none"> <li>Permanent hearing damage: 140 dBA or greater</li> <li>Temporary hearing damage: 93 dBA or greater but less than 140 dBA</li> <li>Masking: 84 dBA or greater but less than 93 dBA</li> <li>Arousal: 77 dBA or greater but less than 84 dBA</li> </ul> <p>To this purpose, the Authority will build opaque noise/visual barriers to cover or obscure some or all of the train, including the OCS, if feasible, at the following locations:</p> <ul style="list-style-type: none"> <li>In the GEA IBA near Volta, between Stations B4550+00 and B4630+00</li> <li>In the UPR IBA (corresponding to the 10-year Pajaro River floodplain), between Stations B1932+00 and B2164+00</li> </ul> <p>The noise/visual barriers will be a minimum height of 17 feet and will be designed to provide a minimum of 10 dBA attenuation of sound generated by HSR operations, as measured 50 feet from the noise barrier. The noise/visual barriers will be constructed in conjunction with the installation of track and OCS and will be completed before HSR train operations begin.</p> <p>For approximately 3.4 miles In the GEA IBA, centered approximately at Mud Slough between Stations B4914+00 and B5095+00, the rail design will be modified to enclose the train's operating envelope and OCS. The enclosure will be constructed using opaque, nonglare materials that provide a minimum of 10 dBA attenuation of sound generated by HSR operations, as measured 50 feet from the enclosure. The enclosure will also be designed to minimize sound generated by HSR train exit and entry. The Authority will design the guideway enclosure in compliance with all HSR design, operations, and maintenance requirements, including but not limited to:</p> <ul style="list-style-type: none"> <li>Train performance</li> <li>Passenger comfort</li> <li>Fire-life-safety readiness and response</li> <li>Loading to viaduct girder structure and embankment foundation</li> <li>100-year service life under suitable, acceptable maintenance practices and costs</li> </ul> <p>The guideway enclosure will be constructed in conjunction with the installation of track and OCS and will be completed before HSR train operations begin. A preliminary engineering feasibility analysis is provided in Appendix 3.7-C, HSR Guideway Enclosure for the Grasslands Ecological Area.</p> <p>If structure designs in the UPR and GEA IBAs can be demonstrated through quantitative modeling to reduce</p>								<p>Wildlife and Wildlife Using Corridors during Operations</p> <p>Impact BIO#48: Mortality Resulting from Train Strike during Operations</p> <p>Impact BIO#49: Injury and Mortality Resulting from Power Line Strike during Operations</p> <p>Impact NV#2: Intermittent Permanent Exposure of Sensitive Receptors to Noise from Train Operations</p> <p>Impact PK#7: Permanent Changes from Noise and Vibration on Parks, Recreation, and Open Space Resource Character and Use</p>

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<p>sound levels outside the HSR right-of-way to less than 77 dBA, no additional measures will be necessary. If residual noise of 77 dBA or more (as measured outside the HSR right-of-way) is still demonstrated, and therefore will exceed one or more of the quantitative noise thresholds, HSR will implement the compensatory mitigation approach described in BIO-MM#58, which requires compensatory mitigation for lost habitat for waterbirds. The amount of compensatory mitigation required under BIO-MM#58, if implemented in concert with this mitigation measure, will depend on the extent of noise reduction that can be demonstrated using noise barriers or enclosures. Mitigation implemented under this measure will be consistent with and will help advance mitigation commitments at the program level, including mitigation intended to address impacts in the GEA.</p> <p>With regard to mammals, potential noise and visual impacts include reduced habitat suitability if train noise or visual impacts impair an animal's ability to forage, evade predators, or conduct other essential behaviors and possible deterrence from crossing the rail alignment at locations intended by HSR design. The noise/visual barriers will be sited to minimize the risk of deterrence on movement corridors critical to the San Joaquin kit fox and the mountain lion. To this purpose, the Authority will build noise/visual barriers at the following locations:</p> <ul style="list-style-type: none"> <li>▪ In Coyote Valley to protect the wildlife crossings sited between Stations B0689+00 and B0704+00</li> <li>▪ In upper Pacheco Creek between Stations B3254+70 and B3303+00</li> <li>▪ At the crossing of the California Aqueduct at Stations B4248+00 to B4249+00</li> </ul> <p>The noise/visual barriers will be a minimum height of 17 feet and will be designed to provide a minimum of 10-dBA attenuation of sound generated by HSR operations, as measured 50 feet from the noise/visual barrier. Noise/visual barriers installed at the Tulare Swale and Fisher Creek wildlife crossing structures in Coyote Valley will extend no less than 720 feet beyond the stationing limits stated above. Noise/visual barriers installed on viaduct sections of the alignment (upper Pacheco Creek and California Aqueduct crossing) will extend no less than 555 feet beyond the stationing limits stated above. The noise/visual barriers will be constructed in conjunction with the installation of track and OCS and will be completed before HSR train operations begin. These length-of-barrier specifications are intended to ensure that the barrier creates a zone of minimized noise, extending several hundred feet from the alignment, that will serve as an attraction cue for animals using sound to locate the crossing locations.</p> <p>The Authority will consult with CDFW, USFWS,</p>								

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		Grasslands Water District, the owner(s) of private properties where noise/visual barriers will be placed, and other local wildlife movement stakeholders as part of final design of noise barriers and the guideway enclosure.								
BIO-MM#81	Minimize Permanent Intermittent Impacts on Terrestrial Species Wildlife Movement	<p>To address the permanent intermittent impact of operations on wildlife movement from train strike and entrapment, the Authority will implement an array of exclusion features for terrestrial species. These features include the following, which are specified in detail in the WCA (Authority 2020a: Appendix C):</p> <ul style="list-style-type: none"> <li>▪ Permanent, 8-foot chain-link fencing along all at-grade, embankment, and trenched profile portions of the rail (excluding the areas noted in the next bullet)</li> <li>▪ Fencing buried 3.5 feet at a 45-degree angle on the outside of the fence beneath the existing grade in the following locations: between Stations B2160 to B2350 (eastern Soap Lake and western Pacheco Pass) and between Station B31545 and B4310 (Pacheco Pass)</li> <li>▪ Angled barbed wire at the top of chain-link fencing to prevent large animals from jumping over the fence and into the right-of-way in the following locations: between Stations B2160 to B2350 (eastern Soap Lake and western Pacheco Pass) and between Station B31545 and B5337 (Pacheco Pass and San Joaquin Valley)</li> <li>▪ Fine-mesh (0.25- to 0.5-inch mesh size) fencing or other barrier designed to exclude small animals (e.g., California tiger salamander, Fresno kangaroo rat, blunt-nosed leopard lizard, and giant garter snake) and extending at least 2 feet aboveground and at least 6 to 10 inches below-ground with an overhanging 90-degree lip (minimum 6 inches) to prevent climbing in the following locations: between Stations B800 and B900; between Stations B3148 and B3223; and between Station B4050 and Station B5337</li> <li>▪ All gates designed to prevent animal access</li> <li>▪ Jump out exit features that allow large mammals such as deer to exit the fenced right-of-way will be placed near at-grade road crossings in Coyote Valley at the following station numbers: B688, B691, B703, B730, B759, B761, B822, B823, B862, B863, B902, B935, B971, and B972</li> <li>▪ Small, one-way exit flaps will be provided on each of the four fenced sections at each fence opening in Coyote Valley</li> <li>▪ Prevent wildlife entry into the rail alignment at unfenced, at-grade rail sections using Rosehill anti-trespass panels or another method that has been shown to be effective for targeted focal species</li> <li>▪ WEF, exit features, and exclusion devices will be inspected at least monthly to enforce proper function as described in the WCA (Authority 2020a: Appendix C).</li> </ul> <p>The success of exclusion fencing and crossings deterrents</p>	Design/ pre-construction/ construction/ post-construction	Design of fencing and other wildlife movement plans	As needed	Authority/ Contractor	Authority/ Contractor	Design of wildlife movement plans	Condition of construction contract	Impact BIO#48: Mortality Resulting from Train Strike during Operations

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<p>to prohibit wildlife entry into the railway will be monitored, likely by cameras on the train, to determine effectiveness. If the deterrent is proven ineffective, and wildlife is gaining entry into the rail alignment with a frequency that is determined detrimental to rail function or wildlife populations, additional measures such as noise signals (an alarm sound that warns or scares the animal into leaving the location) or olfactory repellents will be implemented in the region of effect until wildlife entry into the right-of-way is effectively addressed.</p> <p>Access roads and the associated curbs and drainage systems can, where constructed, pose barriers to movement and entrapment opportunities for small mammals, amphibians, and reptiles. To minimize the potential for these effects, drainage inlets associated with construction or access roads will be constructed with escape tubes or ladders as described in Appendix 3 of <i>Measures to Reduce Road Impacts on Amphibians and Reptiles in California: Best Management Practices and Technical Guidance</i> (Langton and Clevenger 2021) when within 300 feet of occupied California red-legged frog aquatic habitat, 1.24 miles of occupied California tiger salamander aquatic habitat, and 200 feet of occupied giant garter snake aquatic habitat. When and where curbs are needed, they should be angled or include escape gaps as described in <i>Guidelines for Amphibian and Reptile Conservation during Road Building and Management Activities in British Columbia</i> (Ministry of Environment and Climate Change Strategy 2020) when within the distances of occupied amphibian and reptile aquatic habitat described in the prior sentence.</p>								
BIO-MM#82	Minimize Permanent Intermittent Impacts on Aerial Species Wildlife Movement	<p>To address the permanent intermittent impact of operations on aerial wildlife movement from train strike and entrapment, the Authority will implement an array of deterrent and diversion features for avian species. These features include the following, which are specified in detail in the WCA (Authority 2020a: Appendix C):</p> <ul style="list-style-type: none"> <li>▪ Install pigeon wire or other features to discourage birds from perching on OCS throughout the project</li> <li>▪ In selected areas, place flight barriers such as fencing, pole barriers or a tubular screen (Life Impacto Cero 2015) to the height of OCS to avoid birds flying into the rail alignment and being struck by the train in the following locations: between Stations B2872 and 2930 (near the San Jose International Airport); between Stations B2164 and B2255 (eastern Soap Lake); between Stations B2340 and B3325 (western Pacheco Pass); and between Stations B4035 and B4310 (eastern Pacheco Pass).</li> <li>▪ Modify OCS poles to preclude bird entrapment in hollow poles (e.g., avoid the use of tubular poles or cap openings in all poles)</li> </ul>	Design/ pre-construction/ construction	Design of OCS and other wildlife movement plans	As needed	Authority/ Contractor	Authority/ Contractor	Design of wildlife movement plans	Condition of construction contract	Impact BIO#48: Mortality Resulting from Train Strike during Operations Impact BIO#49: Injury and Mortality Resulting from Power Line Strike during Operations

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<ul style="list-style-type: none"> <li>Design aerial structures and tunnel portals to discourage bats from roosting in expansion joints or other crevices; light tunnel entrances</li> </ul>								
BIO-MM#83	Implement Removal of Carrion that May Attract Condors and Eagles	During operations in California condor and eagle foraging areas, automated security monitoring and track inspections will be used to detect fence failures or the presence of a carcass (carrion) within the right-of-way that could be an attractant to condors and eagles. Dead and injured wildlife found in the right-of-way will be removed when the train is not in operation. This measure will apply between Stations B2164 and B2255 (eastern Soap Lake); between Stations B2340 and B3325 (western Pacheco Pass); and between Stations B4035 and B4310 (eastern Pacheco Pass).	Construction/operation	Monitoring/reporting	Weekly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Remove carrion from right-of-way/report findings	Condition of construction contract/condition of regulatory permits	Impact BIO#48: Mortality Resulting from Train Strike during Operations
BIO-MM#84a	Avoid and Minimize Impacts on Conservation Areas	The Authority will coordinate with affected landowners or easement holders to determine if final project designs can be refined to avoid or minimize impacts on conservation areas (those areas held in fee title and/or held under conservation easements for the purposes of conservation). Examples may include minor design changes to HSR facilities that allow for continued access to all or part of a conservation area, changes that will facilitate effective placement of wildlife crossings, or other changes that minimize effects on other conservation work that has been completed or that is in progress on the conservation areas.	Pre-construction/ construction/ post-construction	Design/ final design/ surveying/ compensatory mitigation/ reporting	Yearly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Mitigate permanent and temporary impacts on conservation areas through compensation/ report findings	Condition of construction contract/condition of regulatory permits	Impact BIO#51: Permanent Conversion or Degradation of Conservation Areas Impact BIO#53: Conflict with Santa Clara Valley Habitat Plan
BIO-MM#84b	Provide Compensatory Mitigation for Impacts on Conservation Areas	The Authority will provide compensatory mitigation to offset impacts on conservation areas (those areas held in fee title and/or held under conservation easements for the purposes of conservation). Compensatory mitigation, identified through consultation with the affected organizations, will replace the permanent loss of conservation areas with lands that are commensurate with the land cover type and ecological function of the lands lost at a ratio of 2:1 (protected:affected). In addition, the Authority will compensate affected organizations (e.g., The Nature Conservancy, SCVHA, SCVOSA, San Benito Land Trust, CDFW) for any incurred penalties (i.e., fees or other monetary considerations resulting from the termination of a conservation easement or establishment of a new conservation easement, as well as funding to offset staff time associated with identifying and protecting replacement sites) resulting from the permanent loss of a conservation area. Mitigation implemented under this measure will be consistent with and will help advance mitigation commitments at the program level, including mitigation intended to address impacts in the GEA.	Post-construction	Design/ final design/ surveying/ compensatory mitigation/ reporting	Yearly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Authority/ Contractor/ Project Biologist/ Mitigation Manager	Authority to provide compensation based on conservation areas affected by the project prior to operation	Condition of regulatory permits	Impact BIO#51: Permanent Conversion or Degradation of Conservation Areas Impact BIO#53: Conflict with Santa Clara Valley Habitat Plan
BIO-MM#85	Provide Compensatory Mitigation for Impacts on California Sycamore Woodland at the	To offset permanent impacts at the Pacheco Creek Open Space Regional Reserve and alleviate conflict with the SCVHP, the Authority will provide compensatory mitigation at a 1:1 ratio. The replacement reserve will be of the same	Post-construction	Design/ final design/ surveying/ compensatory	Yearly or as established by regulatory compliance	Authority/ Contractor/ Project Biologist/ Mitigation	Authority/ Contractor/ Project Biologist/ Mitigation	Authority to provide compensation based on area of	Condition of regulatory permits	Impact BIO#53: Conflict with Santa Clara Valley Habitat Plan

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
	Pacheco Creek Open Space Regional Reserve	acreage as the existing reserve (8.2 acres) or greater, and it will be primarily composed of a contiguous patch of the California sycamore alluvial woodland, the conservation target on which the reserve was formed. Mitigation lands can be co-located with the mitigation under BIO-MM#72 to meet the 10-acres minimum patch size requirement stipulated in Objective 9.2 of the SCVHP. This mitigation may be accomplished through preservation, enhancement, or restoration, or a combination thereof, with a preference given to mitigation opportunities in the Pajaro River HUC-8 watershed.		mitigation/reporting	agencies	Manager	Manager	Pacheco Creek Open Space Reserve affected by the project prior to operation		
BIO-MM#86	Provide Compensatory Mitigation for Impacts on Monarch Butterfly Habitat	<p>To compensate for permanent impacts on monarch butterfly habitat (breeding and foraging habitat for the monarch butterfly), the Authority will provide compensatory mitigation at a minimum 1:1 ratio for occupied breeding and foraging habitat, unless a higher ratio is required by the FESA. The Authority, in accordance with authorizations issued under the FESA, will determine the compensatory mitigation required to offset impacts on habitat for monarch butterfly. Compensatory mitigation could include one or more of the following:</p> <ul style="list-style-type: none"> <li>▪ Purchase of credits from an agency-approved conservation bank</li> <li>▪ Acquisition in fee title of USFWS-approved property</li> <li>▪ Purchase or establishment of a conservation easement with an endowment for long-term management of the property-specific conservation values</li> <li>▪ An in-lieu fee contribution determined through negotiation and consultation with the USFWS</li> <li>▪ Contribution to monarch conservation and/or restoration initiatives in the project region (if available)</li> </ul> <p>Mitigation for monarch butterfly will prioritize areas with any future designated critical habitat (if the monarch is listed, and critical habitat is designated) and with existing monarch butterfly populations and suitable milkweed populations to support breeding. The secondary priority will be to create suitable habitat in other areas, if feasible (i.e., establish self-sustaining milkweed populations). The compensatory mitigation areas and methods selected will include appropriate measures to guide management of habitats (e.g., grazing, weed control), monitor populations, and identify methods to establish or reestablish populations, if necessary.</p> <p>As described under BIO-MM#10, the Authority will prepare and implement an HMP that will include the considerations listed in this measure. The HMP will also set success criteria and define monitoring requirements so that species habitat can be adaptively managed.</p>	Pre-construction/post-construction	Design/ final design/ compensatory mitigation/ reporting	Monthly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Compensate for impacts on habitat for monarch butterfly/ report findings	Condition of construction contract/condition of regulatory permits	Impact BIO#2b: Permanent Conversion or Degradation of Habitat for and Mortality of Monarch Butterfly
BIO-MM#87	Conduct Pre-Construction Surveys and Implement	Prior to any ground-disturbing activity, regardless of the time of year, the Project Biologist (a biologist with mountain lion experience and approved by CDFW) will	Pre-construction/ construction	Surveying/ monitoring/	Monthly or as established by regulatory	Authority/ Contractor/	Authority/ Contractor/	Pre-construction coordination with CDFW to	Condition of construction contract/condition of	Impact BIO#26a: Loss of Breeding, Foraging, Denning and Dispersal Habitat for and Direct Mortality or Disturbance of

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
	Avoidance and Minimization Measures for Mountain Lion Dens	<p>conduct pre-construction surveys for known or potential mountain lion dens within suitable habitat located within the work area and within 1,970 feet of the work area (unless a different buffer distance is required under authorizations under the CESA). These surveys will be conducted no less than 14 days and no more than 30 days prior to the start of ground-disturbing activities in a work area. Known and potential mountain lion den types will be defined as follows (terminology generally consistent with the USFWS (2011) guidance for another mammal in the region, San Joaquin kit fox).</p> <ul style="list-style-type: none"> <li>▪ Known den—Any existing natural den or human-made structure that is used or has been used at any time in the past by a mountain lion. Evidence of use may include historical records; past or current radio telemetry or tracking study data; mountain lion sign, such as tracks, scat, and/or prey remains; or other reasonable proof that a given den is being or has been used by a mountain lion.</li> <li>▪ Potential den—Any thick vegetation, boulder piles, rocky outcrops, or undercut cliffs within the species' range for which available evidence is insufficient to conclude that it is being used or has been used by a mountain lion. Potential dens will include the following characteristics: (1) refuge from predators (coyotes, golden eagles, other mountain lions) or (2) shielding of the litter from heavy rain and hot sun.</li> </ul> <p>The Project Biologist will use location-specific survey methods to identify known and potential dens. The survey method will consider topography, vegetation density, safety, and other factors. Surveys will be conducted by a qualified biologist (i.e., a biologist with demonstrated experience in mountain lion biology, identification, and survey techniques) and may involve the establishment of camera stations, scent stations, pedestrian surveys (looking for tracks, caches, etc.), the use of scent detection dogs, monitoring GPS collars (if available), or other appropriate methods as determined in coordination with CDFW. Survey methods used will be designed to avoid the disturbance of known or potential dens to the extent feasible.</p> <p>If known or potential mountain lion dens are identified or observed during pre-construction surveys, mountain lion dens will be assumed to have kittens present until the Project Biologist can document that they are not present and/or that the den is not being used. A nondisturbance buffer of at least 1,970 feet will be established around the known or potential den until the Project Biologist can document and confirm that the den is not occupied. If the den is determined to be occupied, the 1,970-foot nondisturbance buffer will be maintained until the den is confirmed abandoned by the Project Biologist. Construction may proceed if the Project Biologist</p>		reporting	compliance agencies	Project Biologist	Project Biologist	develop a survey protocol and surveys of mountain lion dens and maintain no-work buffer/ report findings	regulatory permits	Mountain Lion

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		determines that the den is not being used by mountain lions.								
BIO-MM#88	Provide Compensatory Mitigation for Impacts on Mountain Lion Habitat	The Authority will provide compensatory mitigation for impacts on mountain lion suitable habitat through the preservation of suitable habitat that is acceptable to CDFW. Habitat will be replaced at a minimum ratio of 2:1 for permanent impacts on breeding/foraging habitat and high-priority foraging and dispersal habitat and at a ratio of 1:1 for low-priority foraging and dispersal habitat, unless a higher ratio is required by regulatory authorizations issued under CESA. Compensatory mitigation will be provided using one or more of the methods described in BIO-MM#10 and will, where feasible and acceptable to CDFW, contribute to preserving important movement lands across the HSR alignment.	Pre-construction/ construction/ post-construction	Design/ final design/ compensatory mitigation/ reporting	Monthly or as established by regulatory compliance agencies	Authority/ Contractor/ Project Biologist	Authority/ Contractor/ Project Biologist	Compensate for impacts on habitat for mountain lion core and patch habitat	Condition of construction contract/ condition of regulatory permits	Impact BIO#26a: Loss of Breeding, Foraging, Denning and Dispersal Habitat for and Direct Mortality or Disturbance of Mountain Lion
BIO-MM#89	Minimize the Impacts of Operational Lighting on Wildlife Species	To address the permanent and intermittent impacts from ALAN, the Authority will implement measures to minimize the intensity and duration of operational lighting of permanent facilities (e.g., traction power facilities, radio sites, and maintenance facilities), as well as intermittent train lighting, and will install noise/visual barriers at essential wildlife crossings to shield views of the operational train and its headlights. Outdoor lighting at operational facilities will be consistent with minimum OSHA requirements established by 29 C.F.R. Section 1926.56 when the facilities are in use. The Authority will minimize the duration of lighting at operational facilities by using methods other than lighting (e.g., remote monitoring systems) to ensure security of facilities during nighttime hours when they are not in use. Train headlights will use the minimum standard allowed by the FRA under 49 C.F.R. Section 229.125 (a single headlight of at least 200,000 candelas) within the following stationing limits (areas with low existing ALAN exposure): <ul style="list-style-type: none"> <li>▪ B670 to B1020 (Coyote Valley) and B1750 to B5335 (areas east of Gilroy).</li> </ul> If feasible (as determined through compliance with OSHA requirements and other applicable standards), as determined by the Authority, operational facilities, including trains, will use lighting that avoids shorter wavelengths of light (i.e., blue wavelengths). Lamps will have the lowest color temperature feasible for the desired application; green and red lighting appears to have the least wildlife impact and will be appropriate for some applications, such as security lighting (Longcore and Rich 2016; Kayumov et al. 2005).	Operations	Reporting and monitoring	Monthly	Authority/ Contractor	Contractor	Implement measures to minimize the intensity and duration of operational lighting of permanent facilities and intermittent train lighting	Reporting contract requirements/ specifications	Impact BIO#47: Intermittent and Permanent Lighting Disturbance of Wildlife and Wildlife Using Corridors during Operations
<b>Hydrology and Water Resources</b>										
HYD-MM#1	Prepare and Implement a Groundwater Adaptive Management and Monitoring	To minimize potential impacts on public and private water supplies derived from groundwater resources, including water supply wells, springs, and seeps, as well as from surface water resources supported by groundwater, the	Design/ pre-construction/ construction/	Reporting and monitoring/ design/ plan preparation/	Follow reporting requirements as established by regulatory	Authority/ Contractor	Authority/ Contractor	Follow reporting requirements as established by regulatory	Reporting contract requirements/ specifications	Impact HYD#10: Temporary Impacts on Groundwater and Surface Water Hydrology during Tunnel Construction

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
	Program	<p>Authority proposes to implement a long-term Groundwater Adaptive Management and Monitoring Program (GAMMP), which will include ongoing monitoring, management, and reporting activities to detect, address, and remedy groundwater and hydrology impacts that may arise during and after tunneling in a timely manner.</p> <p>GAMMP requirements for stream flows, wetland inundation, and the biological resources that are supported by groundwater-dependent water resources, including plants, wildlife, wetlands, and habitats, are discussed in Mitigation Measure BIO-MM#9 in Section 3.7. Although mitigation for stream flows and wetland inundation is relevant to the hydrology and water resources impacts described in Section 3.8, mitigation requirements for stream flows and wetland inundation have been developed to sustain existing biological functions and values. The GAMMP requirements described here also apply to Mitigation Measure BIO-MM#9.</p> <p>The GAMMP will advance a flexible strategy to respond to monitoring information that indicates changes to existing conditions resulting from project activities. In addition, if monitoring demonstrates that adaptive management actions taken to address such changes are not achieving the intended outcomes, management actions will be modified, or other strategies implemented to meet the objectives. In summary, the intent of the GAMMP is to:</p> <ul style="list-style-type: none"> <li>▪ Define a study area and identify locations where impacts are likely to occur using detailed geological information generated by the geotechnical investigation and existing data sources.</li> <li>▪ Establish baseline groundwater and surface water hydrology conditions with data collection and in situ monitoring devices.</li> <li>▪ Develop a groundwater model that can be used to predict where groundwater and surface water impacts are likely to occur. The model will be updated during construction with additional geological information generated during tunnel construction, and the updated model will be used to predict potential changes in groundwater conditions and anticipate adaptive management needs.</li> <li>▪ Develop a monitoring program to detect real-time changes in groundwater and surface water conditions during and after construction through comparison to baseline conditions and use of paired reference sites.</li> <li>▪ Establish numeric triggers that require implementation of adaptive management measures to avoid or reduce impacts on groundwater and surface water resources during construction. Adaptive management measures may include modifying construction methods, providing supplemental water to affected resources, and other feasible measures that will reduce or avoid a predicted</li> </ul>	post-construction	report compliance	compliance permits			compliance permits		

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		<p>impact.</p> <ul style="list-style-type: none"> <li>To the extent feasible, provide water quality treatment for groundwater inflows and beneficially reuse groundwater inflows as part of the adaptive management program or discharge treated groundwater to receiving waterbodies.</li> <li>Generate reports to keep the public and resources agencies apprised of groundwater and surface water conditions before, during, and after construction as well as contribute to the body of scientific knowledge about the complex hydrogeology of the Pacheco Pass area.</li> </ul> <p><b>Goals, Objectives, and Review/Approval of GAMMP</b></p> <p>The purpose of the GAMMP is to maintain the minimum baseline range of well productivity, spring and seep flow, and measured groundwater levels within documented seasonal variation to:</p> <ul style="list-style-type: none"> <li>Maintain water resource conditions during construction substantially like flows documented during pre-construction/baseline monitoring.</li> <li>Detect any material changes in conditions that may forewarn of conditions that have potential to affect groundwater and surface water resources.</li> <li>Avoid or minimize disruptions in public and private water supplies with adaptive management measures.</li> </ul> <p>Prior to construction, the GAMMP will be submitted to the U.S. Department of the Interior, Bureau of Reclamation, SWRCB, RWQCBs, and local groundwater management agencies such as the SCVWD, San Benito County, and Merced County for review (and approval as applicable).</p> <p><b>Assessment, Modeling, and Monitoring Actions</b></p> <p><b>Define Groundwater Study Area and Area of Potential Effects</b></p> <p>A hydrogeologist will review existing geologic maps, groundwater monitoring data, results of the geotechnical investigation, and other data sources as necessary to define a groundwater study area around the proposed tunnels as well as downstream of the proposed tunnels along receiving waterbodies (i.e., Pacheco Creek, Ortega Creek, and Romero Creek). Within the groundwater study area, an area of direct surface water drawdown associated with groundwater inflows into the interior of the tunnels will be identified. The area of potential effect will also include, as appropriate, downstream reaches of receiving waterbodies specifically including Pacheco Creek.</p> <p><b>Baseline Inventory and Monitoring of Groundwater and Surface Water Resources</b></p> <p>The Authority, to the extent feasible, will establish baseline hydrologic conditions within the groundwater study area through data collection and monitoring. The baseline inventory will include surveying and mapping all surface water resources within the groundwater study area. Baseline surveys will characterize potential surface water</p>								

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		<p>and groundwater resources within the groundwater study area, including but not limited to:</p> <ul style="list-style-type: none"> <li>General characteristics (e.g., age of well, depth of pump and screen, production capacity, water level, water flow, water quality, use of water) and locations of public and private water supply wells, springs, and seeps.</li> <li>Reviewing well completion reports associated with public and private water supply wells in the vicinity of the proposed tunnels and any relevant hydrology data from gaging stations on Pacheco Creek.</li> <li>Monitoring groundwater pressures within geotechnical bore holes and wells as well as monitoring of seeps and springs to collect information on flows.</li> <li>Typical responses of wells, springs, and seeps to seasonal changes and weather fluctuations.</li> <li>Establishing baseline water quality through field and laboratory testing. Parameters measured with field instrumentation will include dissolved oxygen, electrical conductivity, pH, oxidation-reduction potential, temperature, and turbidity. Laboratory testing will include total hardness, calcium, magnesium, sodium, potassium, total alkalinity, hydroxide, carbonate, bicarbonate, chloride, sulfate, nitrate as N, fluoride, nitrite as N, and Title 22 metals (i.e., mercury, antimony, arsenic, barium, beryllium, cadmium, total chromium, cobalt, copper, lead, manganese, molybdenum, nickel, selenium, silver, thallium, vanadium and zinc).</li> </ul> <p><b>Groundwater Modeling</b></p> <p>A hydrogeologist will build a gridded surface water/groundwater model prior to commencing any tunneling activities. The purpose of the modeling will be to identify potential locations, durations, and extents of drawdown effects on the groundwater table and resulting surface water hydrology effects associated with tunneling; support the selection of appropriate locations to monitor groundwater drawdown during and after construction and reference sites that will not be affected by tunnel-related groundwater effects; identify properties where temporary water supply facilities may be necessary to remedy any shortages during tunneling; and estimate required storage capacity of temporary water supply facilities to offset estimated shortages. The model will be calibrated using baseline data collected through data collection and monitoring and structural geologic information generated from the geotechnical investigation, which will include faults and fractures in the area. The model will be updated during the construction period, and it will be used during tunneling to predict where groundwater conditions are expected to change substantially. In this way, the model will be used to predict the specific locations where adaptive management measures may be necessary, as well as the specific</p>								

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		<p>adaptive management measures that may remedy the impact such that impacts can be anticipated by the Contractor and remedial measures can be implemented in a timely fashion. Model inputs will include rainfall, groundwater elevations, historical rainfall, and temperature data and model outputs will include evapotranspiration gaging, spring and stream flow rates, and surface water outflows.</p> <p><b>Construction Monitoring</b></p> <p>The Authority will designate locations and methodologies for monitoring wells, springs, and seeps that are most likely to be affected by tunneling as indicated by groundwater modeling. The purpose of this monitoring is to capture nearly real-time changes in groundwater conditions (e.g., flow, pressure readings) that might be related to tunnel construction. Monitoring data collected during construction will be compared to baseline ranges of data collected during pre-construction monitoring and with paired reference sites that are not expected to be affected by groundwater drawdown. The monitoring plan will include a schedule for monitoring that reflects periods when effects are most likely to occur at specific locations (e.g., when tunneling is nearing areas with high quantities of groundwater inflows). The monitoring plan will account for a potential delay between groundwater drawdown associated with tunneling and the appearance of surface water effects. In addition, the plan will require additional monitoring efforts if groundwater levels are found to be affected beyond the predicted area of effect established by pre-construction groundwater modeling in order to capture the full extent of potential effects on wells and springs. The following actions will be required to monitor groundwater and hydrology conditions during construction:</p> <ul style="list-style-type: none"> <li>▪ Update and calibrate groundwater model with structural geology (e.g., faults and fracture trends), water pressures, groundwater inflows, water quality, temporal changes, and other observations and monitoring data. Use model to help predict potential groundwater effects in advance of tunnel construction heading.</li> <li>▪ Establish remotely accessed telemetry system for measuring real-time variations in groundwater pressures and select spring/stream flows within area of potential drawdown and paired reference sites.</li> <li>▪ Measure pressure changes in monitoring wells and existing water supply wells near tunnel construction for early indicators of potential effects on wells, springs, and streams.</li> <li>▪ During construction, monitor flows of springs and streams weekly or bimonthly for early detection of any changes in comparison to the baseline data and reference sites.</li> <li>▪ Compare minimum flow range of monitored resources to paired reference sites outside of construction</li> </ul>								

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		<p>influence to determine if factors, related or not related to construction, may be influencing trend (e.g., seasonal changes).</p> <ul style="list-style-type: none"> <li>Emphasize more frequent monitoring intervals as the TBM approaches critical ranges predicted by the groundwater model or as effects of water flows become more apparent as the TBM approaches established monitoring points.</li> <li>Test water quality of groundwater inflows for comparison to baseline water quality of springs and stream flows. Changes in water chemistry may indicate that streams or springs have tapped into different groundwater resources as a result of water losses into tunnel.</li> <li>Track groundwater recovery using pressure transducers or piezometers between the spring locations and increasing distance with the TBM that has passed a resource.</li> <li>Measure travel time through the system.</li> <li>Measure water quality parameters.</li> <li>Track groundwater and spring/seep flow recovery.</li> <li>Use of an on-site rainfall gaging station to correlate recovery of resources with rainfall quantities.</li> </ul> <p><b>Post-Construction Monitoring</b>                      The extent of water drawdown is not predictable at this time, but implementation of the GAMMP is intended to monitor and detect hydrological changes that may result from tunneling activities. Upon completion of tunnel construction (i.e., lining system installation, backfill grouting), tunnels are generally sealed from the groundwater system, and leakage into the tunnels is stopped. Under such conditions, groundwater resources will recover from tunneling effects by being recharged by natural precipitation. However, this could take months to years after the final tunnel lining system is installed (Berg 2012). Additional monitoring will be developed to observe recovery of water resources after tunnel construction activities are completed. The monitoring will continue until such time that conditions are comparable to the ranges of baseline conditions established before construction.</p> <ul style="list-style-type: none"> <li>The post-construction monitoring program will be modified to focus on areas where the GAMMP has documented water resource effects during construction, until such time that recovery of the water resources is complete.</li> <li>The gridded surface water/groundwater model will be updated and calibrated it with the data collected during tunnel construction. The modeling program will be used to help predict rates of recovery for water resources affected during construction.</li> </ul> <p><b>Remedial Actions</b>  <b>Beneficial Reuse of Groundwater Inflows</b></p>								

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		<p>Two general scenarios are available for the contractor to manage groundwater inflows into the tunnel during construction: discharge into a waterbody or disposal at a publicly owned treatment works. To minimize temporary indirect reductions in groundwater levels along receiving waterbodies (e.g., Pacheco Creek, Ortega Creek, Romero Creek) and conserve water, the Authority will prioritize discharging groundwater into receiving waterbodies under applicable permits from resources agencies or beneficially reusing the water as part of the adaptive management program after treatment with a temporary active treatment system. Off-haul and disposal of contaminated groundwater at a publicly owned treatment facility will only be considered if the Authority demonstrates that providing adequate levels of treatment prior to discharge is technically infeasible using the best available and economically practicable technology. Discharging treated groundwater inflows into receiving waterbodies will provide opportunities for water to percolate back into the water table, recharge downstream aquifers, and offset potential downstream reductions in groundwater levels and stream flows. Additionally, the Authority will consider using the treated effluent from the active treatment system to provide supplemental nonpotable water as needed based on construction monitoring and adaptive management triggers, but only if the effluent meets appropriate water quality standards for the end use of the water. Providing adequate levels of water quality treatment to meet water quality standards for discharges into receiving waterbodies or reuse as part of the adaptive management program is expected to be challenging due to high pH levels associated with exposure to cement grouts and concrete as well as other construction materials in the interior of the tunnels. To meet water quality standards for beneficial reuse, settling ponds, storage tanks, and a series of treatment systems may be necessary. Only treated groundwater that meets appropriate water quality standards will be beneficially reused or discharged into receiving waterbodies.</p> <p><b>Adaptive Management Measures</b> Adaptive management measures will be implemented to remedy observed impacts on water supplies.</p> <p><b>Adaptive Management Triggers</b> The GAMMP will establish quantitative triggers that forewarn of potential effects on surface water resources and groundwater levels and begin the implementation of adaptive management measures. Quantitative adaptive management triggers will be established for each potentially affected seep, spring, well, or water resource based on comparisons to the baseline inventory or reference sites. Quantitative adaptive management triggers may include, but will not be limited to, exceeding or falling below specified flow rates of springs and seeps;</p>								

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		<p>water levels falling below screened intervals of existing wells; and well productivity falling below certain rates. Additionally, adaptive management measures will be considered if any landowner or public water agency reports changes in their water supply, as described below.</p> <p><b>Notifications and Hotline</b></p> <p>The Authority will establish a hotline for property owners and public water agencies to report changes to wells, springs, and seeps on their property during construction. The hotline number will be included in the notice to be sent to all property owners and public water agencies prior to construction and will be prominently posted at each of the work areas. The Authority will check the hotline daily and respond to all calls within 24 hours.</p> <p><b>Pre-Tunneling Supplemental Water Infrastructure Provision</b></p> <p>In advance of tunneling and as approved by landowners and public water agencies, the Authority will install water tanks and water lines on properties with wells, springs, and seeps not already equipped with sufficient storage capacity in the area where groundwater modeling predicts that an effect on groundwater levels could occur.</p> <p>The tanks and lines will be sufficiently sized to make up the potential shortfall of capacity up to the average baseline water supply and use based on pre-construction monitoring data for the period the groundwater is affected. Tanks, lines, appurtenances, and all other associated temporary facilities required for the provision of supplemental water supplies will consist of inert materials that will not contribute to the degradation of water quality, such as chemical leaching from synthetic materials.</p> <p>Temporary facilities used to provide supplement water to surface water resources like streams and creeks will be shielded from solar radiation or adequately insulated to prevent substantial increases in water temperature. The Authority will be responsible for installing and maintaining all temporary facilities required to convey, store, and use supplemental water. After installation, the temporary water supply facilities will be inspected and tested to verify that it is in proper working order prior to engaging tunneling activities that may affect the existing water supply. Once monitoring demonstrates that affected resources have recovered to existing conditions are within the range of natural variation, the Authority will be responsible for removing these temporary facilities.</p> <p>Additionally, the Authority will review currently planned and permitted landowner development projects within the groundwater study area. If it is determined that the water supply of planned or permitted developments could be adversely affected during or after construction of tunnels, the Authority will provide water tanks or temporary water supply facilities with sufficient storage capacity to offset any shortfalls generated by tunneling activities.</p>								

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		<p>The required storage capacity of temporary water supply facilities will be calculated by a hydrogeologist. The hydrogeologist will calculate potential water supply shortages and identifying the storage capacity required to remedy estimated shortages. The predictive groundwater model will be used to estimate changes in groundwater levels and associated water supply shortages, unless more precise methods are available prior to and during project construction.</p> <p><b>Adaptive Management Measures</b></p> <p>If, during construction, monitoring indicates that adaptive management triggers have been met, the Authority will initiate appropriate actions to arrest or minimize further changes in the water resources. All employees engaged in implementation of the following adaptive management measures will be properly trained on appropriate mitigation procedures so that they are executed in a timely manner. The following adaptive management measures will be implemented, as necessary:</p> <p><b>Additional Monitoring and Engineering Controls to Minimize Groundwater Inflows</b></p> <p>As appropriate, during construction, additional engineering controls and monitoring methods will be implemented to minimize potential inflows. Additional monitoring actions will be required to determine effective engineering controls that can more effectively arrest or mitigate water losses. Additional monitoring actions will include geotechnical investigations to identify appropriate modification of construction methods; these additional investigations could include probe drilling ahead of the TBM, surface exploratory drilling, and installing additional monitoring instrumentation. These monitoring methods will inform whether increasing quantities of pre-excavation and backfill grout can further reduce or prevent high inflow rates.</p> <p><b>Upgrade Existing Water Supply Wells and/or Provide Supplemental Water</b></p> <p>If, during tunneling, a landowner, planned/permitted project proponent, or public water agency notifies the Authority that their water supply and use is being negatively affected, as soon as possible and no more than 8 hours later, the Authority will inspect the well, seep, or spring, verify there is a change from baseline conditions based on available pre-construction monitoring data and, if warranted, initiate the provision of supplemental water to the affected party. Where an effect is verified, the Authority will:</p> <ul style="list-style-type: none"> <li>Assess if the change in conditions can be addressed by modifying the well equipment, such as by lowering the pump within the well, cleaning the pump, or providing a larger pump; if so, the Authority will implement such changes. The Authority will provide supplemental water</li> </ul>								

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		<p>as necessary during the time period required to modify the well equipment.</p> <ul style="list-style-type: none"> <li>▪ If supplemental water is the selected approach, the Authority will initiate provision of supplemental water from the previously placed water tank or water line or fill the landowner's existing tank with supplemental water. Supplemental potable water will be purchased from a water retailer or a commercial water delivery service. For nonpotable water, the Authority will consider using effluent from active treatment systems used to treat groundwater inflows, but only if the effluent meets water quality standards appropriate for end uses of the water supply. Alternatively, the Authority will consider using recycled water available from water retailers or publicly owned treatment works, such as the South County Regional Wastewater Authority in Gilroy, provided that recycled water is of adequate quality to meet end water uses. By 2025, the SCVWD is planning to make an additional 8 billion gallons of recycled water per year available (SCVWD and City of San Jose 2012), so it is believed that an adequate supply of recycled water will be available for use during tunnel construction, because similar tunnel mitigation programs only used 60 million gallons total over the course of several years (Berg 2012). Lastly, the Authority will coordinate with the appropriate water agencies to determine whether water impounded by the existing Pacheco Reservoir along North Fork Pacheco Creek may be used for nonpotable supplemental water.</li> <li>▪ In coordination with the landowner or public water agency, water provided could be a combination of potable water meeting regulatory requirements for human consumption and, where applicable, water of equal or better quality than water supply used for landscaping and livestock watering. If preconstruction data are not available to determine the quality of water used for landscape and livestock, supplemental water will meet state and federal drinking water standards.</li> <li>▪ The Authority will continue to refill the tank or tanks or operate supplemental water lines on an ongoing basis until it is determined that well or spring production capacity has been restored such that baseline average water supply and use conditions are restored, the existing well has been modified to restore baseline average water supply and use, or another long-term measure is implemented, as discussed in the next item.</li> <li>▪ Supplemental water discharged into surface waterbodies must comply with water quality standards. As previously described, water supply infrastructure will consist of inert materials that have low to no risk of leaching into the supplemental water supply. This infrastructure will also be either shielded or otherwise insulated from solar radiation to prevent substantial increases in water temperature in receiving</li> </ul>								

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		<p>waterbodies. If conventionally treated potable or recycled water will be used to supplement surface water flows in waterbodies, the water will be aerated, circulated, exposed to ultraviolet light, or otherwise treated to reduce concentrations of chlorine and other byproducts of water treatment prior to discharge.</p> <p><b>Provide Supplemental Water Outside of Area of Predicted Effects</b></p> <p>The Authority will establish contingency procedures to provide supplemental water outside the area of predicted effects and within the groundwater study area, if warranted by monitoring. As soon as possible and no more than 24 hours after notification, the Authority will inspect affected resources, verify if there is a change from baseline conditions based on available pre-construction monitoring data and, if warranted, initiate the provision of supplemental water to the affected landowner. Where an effect is verified, the Authority will:</p> <ul style="list-style-type: none"> <li>▪ Assess if the change in conditions can be addressed by modifying the well equipment, such as by lowering the pump within the well, cleaning the pump, or providing a larger pump, and if so, will implement such changes. The Authority will provide supplemental water as necessary during the time period required to modify the well equipment.</li> <li>▪ Begin providing supplemental water to the landowner(s) to make up for the shortfall, such as by providing on-call commercial water truck delivery to the property.</li> <li>▪ Within 1 week of verified effect, the Authority will work with the landowner(s) to increase commercial water delivery service, install a tank and water lines or fill an existing tank, as necessary, to provide any shortfall in supply relative to the baseline average water supply and use for the period of effect.</li> <li>▪ The Authority will have staff, equipment, and supplies readily available for quick response, such as by having an on-call commercial service in place or staging materials at one of the work areas (e.g., trucks; water containers; tanks; plumbing pipe, fixtures, and hoses).</li> <li>▪ In coordination with the landowner(s), water provided could be a combination of potable water meeting regulatory requirements for human consumption and nonpotable water for landscaping and livestock consumption.</li> <li>▪ The Authority will continue to provide supplemental water to make up shortfalls until the Authority can document that the project is not causing an effect or, if it is causing an effect, until it is determined that well or spring production capacity has been restored such that baseline average water supply and use conditions are restored, the existing well has been modified to restore baseline average water supply and use, or another</li> </ul>								

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		<p>long-term measure is implemented, as discussed in the following items.</p> <p><b>Reporting Actions</b></p> <p>The following reports will be prepared, published, and posted on a publicly accessible internet website to keep stakeholders and the public informed of baseline conditions observed, impacts and remedial actions taken during construction, and post-construction recovery of water resources. Additionally, making this information publicly available will assist the broader scientific community with understanding the complex geology and hydrology of the area.</p> <ul style="list-style-type: none"> <li>▪ Prepare and publish annual summary reports. The first annual summary report will be published by January 31 of the year following initiation of pre-construction monitoring. Annual summary reports will be prepared before, during, and after tunnel construction. Preparation and publication of these reports will persist until post-construction monitoring has ended. Annual summary reports will summarize the content of the quarterly construction and post-construction monitoring reports, including the results of all monitoring performed during the calendar year, discussion of how monitoring results relate to progression of tunnel construction, comparison of monitoring data to baseline data or paired reference sites, remedial actions taken during construction if any and descriptions of their efficacy at achieving intended results, and post-construction monitoring efforts.</li> <li>▪ Prepare and publish quarterly pre-construction monitoring reports that summarize baseline conditions observed since preparation and publication of the previous report, including seasonal and long-term responses of monitoring sites to rainfall.</li> <li>▪ Prepare and publish quarterly construction monitoring reports that summarize all construction monitoring of water resources as well as any adaptive management measures implemented in response to monitoring observations or notifications from landowners.</li> <li>▪ Prepare and publish quarterly post-construction monitoring reports to document recovery of water resources once the tunnels are complete.</li> </ul> <p>Prepare and publish a comprehensive tunneling report that describes the results of this GAMMP, whether it was effective at identifying and remediating observed impacts, lessons learned, and a summary of all data collected as part of baseline data collection, construction monitoring, and post-construction recovery. This report will include descriptions of observed effects on surface water and groundwater resources, including changes in groundwater quality, during tunneling and any remedial actions taken to reduce effects, including frequency and quantity of any</p>								

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		supplemental water provided to landowners. The report will also include summaries of the duration of impact and recovery for wells, seeps, springs, and surface water resources.								
<b>Hazardous Materials and Waste</b>										
HMW-MM#1	Limit Use of Extremely Hazardous Materials near Schools during Construction	Prior to construction, the Contractor will prepare a memorandum regarding hazardous materials BMPs related to construction activity for approval by the Authority. The memorandum will confirm that the contractor will not handle or store an extremely hazardous substance (as defined in California Public Resources Code Section 21151.4) or a mixture containing extremely hazardous substances in a quantity equal to or greater than the state threshold quantity specified pursuant to subdivision (j) of Section 25532 of the Health and Safety Code within 0.25 mile of a school. The memorandum will acknowledge that prior to construction activities, signage will be installed to delimit all work areas within 0.25 mile of a school, informing the contractor not to bring extremely hazardous substances into the area. The Contractor will be required to monitor all use of extremely hazardous substances. The above construction mitigation measure for hazardous materials and wastes is consistent with California Public Resources Code Section 21151.4. The memorandum will be submitted to the Authority prior to any construction involving an extremely hazardous substance.	Pre-construction/ construction	Reporting/ monitoring	Memorandum approved 30 days prior to start of construction; during construction, submit weekly reports or reporting requirements as established by the approved memorandum	Authority/ Contractor/ Hazardous Material Monitor	Contractor	Hazardous materials memorandum/ weekly reporting	Hazardous materials memorandum	Impact HMW#12: Intermittent Impacts from Hazardous Materials and Wastes Activities near Schools during Construction
<b>Safety and Security</b>										
SS-MM#3	Install Emergency Vehicle Detection	Prior to construction, the contractor will install emergency vehicle detection equipment at the following intersections on Monterey Road: Bernal Road northbound ramps, Flintwell Way, Ford Road, Monterey Plaza Driveway, Blossom Hill Road eastbound ramps, Chynoweth Avenue, Edenvue Drive, Branham Lane, Skyway Drive, Senter Road, Capitol Expressway eastbound ramps and Capitol Expressway westbound ramps. The contractor will prepare all materials necessary for and seek the approval of the cities of San Jose, Morgan Hill, and Gilroy for the implementation of these improvements.  This mitigation measure will apply to areas of San Jose where EVP is not already in place and in Morgan Hill and Gilroy.	Pre-construction/ construction	Install emergency vehicle access detection equipment and monitor	As needed	Authority/ Contractor	Authority/ Contractor	Installation of equipment	Condition of construction contract	Impact S&S#1: Temporary Impacts on Emergency Access and Response Times from Temporary Roadway and Highway Closures, Relocations, and Modifications  Impact S&S#3: Permanent Impacts on Emergency Access and Response Times from Permanent Roadway and Highway Closures, Relocations, and Modifications  Impact S&S#4: Continuous Permanent Impacts on Emergency Access and Response Times
SS-MM#4	Install Emergency Vehicle Response Improvements	This measure includes three components: <ul style="list-style-type: none"> <li>▪ San Jose Diridon Station Area: Emergency Vehicle Priority Plan and priority treatments</li> <li>▪ Downtown Gilroy Station Area Emergency Vehicle Priority Plan and priority treatments; and</li> <li>▪ At-Grade Crossing Emergency Vehicle Priority Treatment Plan and associated improvements</li> </ul> <b>San Jose Diridon Station Area</b>	Pre-construction/ construction	Install emergency vehicle access detection equipment and monitor	As needed	Authority/ Contractor	Authority/ Contractor	Installation of equipment	Condition of construction contract	Impact S&S#4: Continuous Permanent Impacts on Emergency Access and Response Times

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<p>Prior to construction, to mitigate fire station emergency access and response time impacts related to the San Jose Diridon Station, the Authority's Contractor will develop an emergency vehicle priority plan and install emergency vehicle priority treatments and new traffic control devices as needed for San Jose Fire Station 30. It is anticipated that this may include installation of emergency vehicle priority treatments where they do not exist on Auzerais Avenue between Sunol Street and Delmas Avenue, West San Carlos Street between Bird Avenue and Delmas Avenue, and Bird Avenue between Park Avenue and West Virginia Street. The Contractor will prepare all materials necessary for and obtain the approval of the City of San Jose for implementation of these emergency vehicle priority treatments.</p> <p><b>Downtown Gilroy Station Area</b></p> <p>Prior to construction, to mitigate fire station emergency access and response time impacts related to the Downtown Gilroy Station, the Authority's contractor will develop an emergency vehicle priority plan and install emergency vehicle priority treatments and new traffic control devices as needed for the Gilroy fire station at 7070 Chestnut Street. It is anticipated that this may include installation of emergency vehicle priority treatments where they do not exist on 10th Street between Monterey Road and Camino Arroyo. The Contractor will prepare all materials necessary for and obtain the approval of the City of Gilroy for implementation of these emergency vehicle priority treatments.</p> <p><b>At-Grade Crossings</b></p> <p>Prior to operations that are expected to result in an exceedance of the 30-second delay threshold, to mitigate fire station/first responder emergency access impacts related to added travel time from increased gate-down time at at-grade crossings, the Authority will conduct monitoring and make a fair-share contribution to implement phased emergency vehicle priority treatment strategies. Where impacts are identified based on monitoring or predicted to occur due to planned HSR service increases, the Authority will develop an Emergency Vehicle Priority Treatment Plan in conjunction with local agencies, including local cities, local fire departments, and local first responders. The Authority will make a fair share contribution toward emergency vehicle priority treatments related to the level of impact of increased gate down time associated with HSR train operations. The Authority's fair share contribution will take the form of providing capital funds for project implementation to local agencies, who will be responsible for implementation of capital improvements as well as ongoing operations and maintenance of any facilities constructed.</p>								

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		<p>Monitoring will involve collecting travel time data for a 1-mile section (i.e., 0.5 mile on either side of the at-grade crossing) of the at-grade crossing street during weekday peak periods (7 a.m. to 9 a.m. and 4 p.m. to 6 p.m.). The data will be collected on 12 days during each monitoring year from Tuesday to Thursday over a 2-week period in early May and early October.</p> <p>Travel time data will be collected at the following intervals:</p> <ul style="list-style-type: none"> <li>▪ 1 year prior to initiation of new HSR service to establish a baseline emergency response travel times for each corridor,</li> <li>▪ Monthly for the first 6 months of initial operations<sup>5</sup> and annually thereafter for 3 years, and</li> <li>▪ Starting approximately 6 months after initiation of any subsequent increase in HSR service, and annually thereafter for 3 years.</li> </ul> <p>Travel time data will be collected at the following at-grade crossing locations:</p> <ul style="list-style-type: none"> <li>▪ Branham Avenue (San Jose)</li> <li>▪ Chynoweth Avenue (San Jose)</li> <li>▪ Skyway Drive (San Jose)</li> <li>▪ Blanchard Road (San Jose)</li> <li>▪ Palm Avenue (San Jose)</li> <li>▪ Live Oak Avenue (Morgan Hill)</li> <li>▪ East Main Street (Morgan Hill)</li> <li>▪ East Dunne Avenue (Morgan Hill)</li> <li>▪ San Pedro Avenue (Morgan Hill)</li> <li>▪ Tennant Avenue (Morgan Hill)</li> <li>▪ East Middle Avenue (Morgan Hill)</li> <li>▪ San Martin Avenue (San Martin)</li> <li>▪ Church Avenue (Gilroy)</li> <li>▪ Masten Avenue (Gilroy)</li> <li>▪ Rucker Avenue (Gilroy)</li> <li>▪ Buena Vista Avenue (Gilroy)</li> <li>▪ Cohansey Avenue (Gilroy)</li> <li>▪ Las Animas Avenue (Gilroy)</li> <li>▪ Leavesley Road (Gilroy)</li> <li>▪ IOOF Avenue (Gilroy)</li> <li>▪ Lewis Street (Gilroy)</li> <li>▪ Martin Street (Gilroy)</li> <li>▪ 6th Street (Gilroy)</li> <li>▪ 7th Street (Gilroy)</li> <li>▪ 10th Street (Gilroy)</li> </ul> <p>An Emergency Vehicle Priority Treatment Plan will be developed for at-grade crossing locations where an increase in emergency response times of 30 seconds or more above baseline travel time will occur due to HSR service. The performance standard for the plan is to</p>								

<sup>5</sup> Initial HSR operations will be more limited in scope than full operations expected by 2040. Chapter 2 of the Final EIR/EIS identifies that initial operations will include a maximum of two trains per peak hour per direction, which corresponds to up to four one-way trains per hour or every 15 minutes on average, which will have much less effect on emergency vehicle response times than full Phase I operations. With full Phase I operations, the project will have up to seven trains per peak hour per direction, which corresponds to up to 28 one-way trains per hour on average at full service by 2040. The intent of monitoring initial operations is to identify the potential need for emergency vehicle response time improvements early enough to be in place prior to full operations.

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<p>reduce the response time increases resulting from HSR train operation effects on gate down time to less than 30 seconds. If initial operations do not result in exceedance of the 30-second threshold, then, using monitoring data for initial operations, the Authority will evaluate whether future planned HSR service increases are likely to result in new or additional delays above the 30-second threshold. If such effects are predicted for planned HSR service increases, then the Authority will develop the Emergency Vehicle Priority Vehicle Treatment Plan to account for those effects and will coordinate with local cities, fire departments, and first responders to implement the appropriate treatments prior to the planned HSR service increases that will result in exceedance of the 30-second threshold.</p> <p>Emergency vehicle priority treatment strategies may include constructing improvements to streets parallel to the HSR corridor to speed travel to adjacent grade-separated crossings of the rail line or to provide new emergency service facilities (i.e., new fire stations or ambulance/paramedic staging facilities) on the opposite side of the corridor where there are no adjacent grade-separated crossings. The strategies may include, but are not limited to, the following:</p> <ul style="list-style-type: none"> <li>▪ EVP equipment at roadway traffic signals</li> <li>▪ Route-based roadway traffic signal priority control systems</li> <li>▪ Emergency vehicle and transit queue bypass lanes at roadway intersections</li> <li>▪ Roadway capacity and operational improvements to facilities paralleling the rail line to improve access to adjacent grade-separated rail crossings</li> <li>▪ Construction of new fire stations to reduce fire station response times in affected areas and provision of funding for the initial operating costs for up to 5 years for new fire stations (based on estimated impacts illustrated on Figure 3.11-10 in the Final EIR/EIS, this measure presumes that one new fire station may be required in South San Jose, one in south Morgan Hill/San Martin, and one in Gilroy)</li> <li>▪ Provision of additional equipment for existing fire stations to expand the capacity of existing fire stations to respond to multiple emergency calls in affected areas</li> <li>▪ Increase in contracted first responder ambulance services to reduce first responder ambulance response times in affected areas</li> </ul> <p>For the Authority-owned railroad operations involving at-grade operations between CP Lick in San Jose to Gilroy, this measure will also include Authority partnership with local public emergency service providers and local jurisdictions to provide real-time information regarding train location and at-grade crossing gate operations to</p>								

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<p>facilitate better emergency response route planning. This may be facilitated through one-way data output from the HSR operational control center and/or through installation of trackside equipment and hardwire connections. Implementation of any physical installations of trackside equipment or communication connections will be via Authority funding of local jurisdictions to install such equipment or communication connections and associated software.</p> <p>As an alternative to these strategies, the Authority and a local agency may reach a mutual agreement to have the Authority make an in-lieu payment toward other infrastructure projects including nearby grade-separation projects. If the Authority and a local agency are seeking an agreement prior to operations, then the Authority will conduct additional modelling of potential HSR effects of emergency response utilizing emergency service provider response time data, as available, to validate the modelling. This additional modelling will be used to support the estimation of the need for, and potential extent of, one or more of the improvement measures noted above. The in-lieu payment will be the capital contribution that the Authority will have otherwise made to one or more of the above emergency vehicle priority treatment strategies.</p> <p>As noted above, if cities choose not to implement and operate emergency vehicle priority treatments using construction funds provided by the Authority, impacts will be considered significant and unavoidable. In that case, some of the site-specific traffic mitigation measures identified in Section 3.2 will be required to help reduce traffic congestion/delays at intersections adjacent or near at-grade crossings during peak hours at certain intersections where the project will affect emergency vehicle response times due to increased gate-down time. The following traffic mitigation measures will help to reduce peak hour traffic delays at intersections adjacent to or near at-grade crossings with significant emergency vehicle response time delays:</p> <ul style="list-style-type: none"> <li>▪ TR-MM#1e: Monterey Road/Chynoweth Avenue-Roeder Road—Widen and Reconfigure</li> <li>▪ TR-MM#1t: Monterey Road/San Martin Avenue—Restripe Southbound Approach</li> <li>▪ TR-MM#1u: Monterey Road/IOOF Avenue—Widen and Reconfigure Southbound Approach</li> <li>▪ TR-MM#1w: Chestnut Street/Luchessa Street—Reconfigure Southbound Approach</li> <li>▪ TR-MM#1x.6: East Main Avenue/Depot Street—Install Traffic Signal</li> <li>▪ TR-MM#1x.8: Llagas Road/San Martin Avenue—Install Traffic Signal</li> <li>▪ TR-MM#1x.9: School Access/IOOF Avenue—Install Traffic Signal</li> </ul>								

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		<ul style="list-style-type: none"> <li>TR-MM#1x.10: SR 25/Bloomfield—Install Traffic Signal</li> </ul> <p>Although these traffic mitigation measures will help to address traffic delays at adjacent or nearby intersections, they will not change gate-down times. As such, if cities choose not to implement and operate emergency vehicle priority treatments discussed above using construction funds provided by the Authority, then the impact will remain significant and unavoidable.</p>								
<b>Socioeconomics and Communities</b>										
SO-MM#1	Implement Measures to Reduce Impacts Associated with Residential Displacement (NEPA Effect Only)	<p>At least 1 year prior to construction (in the specific residential areas noted below), the Authority will minimize impacts in residential areas by conducting special outreach to affected homeowners and residents to understand their special relocation needs fully. In addition to the relocation assistance required under the federal Uniform Relocation Assistance and Real Property Acquisition Policies Act and the California Relocation Act, in areas with inadequate relocation availability in reasonable proximity to displacements, the Authority will make efforts to locate suitable replacement properties that are comparable to those currently occupied by these residents and/or support the construction of suitable replacement facilities, if necessary.</p> <p>This measure applies only to the areas of insufficient residential relocation availability as follows:</p> <ul style="list-style-type: none"> <li>Unincorporated Merced County—There is an estimated residential availability deficit of 22 units in this area within the unincorporated county area, but there is surplus residential relocation availability in nearby Los Banos. Some homeowners and residents may desire to remain in the unincorporated County areas outside Los Banos instead of relocating to available units within Los Banos, and this measure will only apply to those who desire to remain in the unincorporated County areas.</li> </ul> <p>In cases where residents wish to remain in the immediate vicinity and there is inadequate local relocation availability, the Authority will take measures to purchase vacant land or buildings in the area and consult with local authorities over matters such as zoning, permits, and moving of homes and connection of services and utilities, as appropriate. The Authority will document implementation of this measure through annual reporting.</p> <p>With application of this mitigation measure, the Authority will assist these displaced residents with finding new suitable housing within the communities they currently reside in, if desired. The Authority, as a condition of providing funding, will require implementing partners to implement relevant IAMFs and direct mitigation measures discussed in the Final EIR/EIS.</p>	Pre-construction/ construction/ post-construction	Reporting	Monthly	Authority	Authority	Monthly reporting	Authority to provide compensatory mitigation The Authority will meet with affected residents and property owners and design appropriate measures to minimize impacts	Impact SOCIO#6: Displacements and Relocations of Residences
<b>Agricultural Farmland</b>										

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
AG-MM#1	Conserve Important Farmland (Prime Farmland, Farmland of Statewide Importance, Farmland of Local Importance, and Unique Farmland)	<p>The Authority has entered into an agreement with the DOC California Farmland Conservancy Program to implement agricultural land mitigation for the HSR system. The Authority will fund the California Farmland Conservancy Program's work to identify suitable agricultural land for mitigation of impacts and to fund the purchase of agricultural conservation easements from willing sellers. The performance standards for this measure are to preserve Important Farmland in an amount commensurate with the quantity and quality of converted farmlands in the same agricultural regions as the impacts occur, at a replacement ratio of not less than 1:1 for lands that are permanently directly converted to nonagricultural use by the project.</p> <p>In addition to mitigation for Important Farmlands that are permanently directly converted to nonagricultural use, the Authority will fund the purchase of an additional increment of acreage for agricultural conservation easements at a ratio of not less than 0.5:1 for Important Farmland within a 25-foot-wide area adjacent to permanently fenced HSR infrastructure to mitigate for permanent indirect effects. The Authority will document implementation of this measure through annual issuance of a compliance memorandum. Mitigation implemented under this measure will be consistent with and will help advance mitigation commitments at the program level, including mitigation intended to address the conversion of Important Farmland. Figure 3.14-5 in the Final EIR/EIS illustrates how mitigation ratios will be applied to parcels of Important Farmland affected by the project.</p>	Pre-construction	Compliance reporting	Monthly	Authority and California Farmland Conservancy	Authority	Monthly reporting prior to construction	The Authority has entered into an agreement with the Department of Conservation and its California Farmland Conservancy Program to implement agricultural land mitigation for the HSR system.	<p>Impact AG#2: Permanent Conversion of Important Farmland to Nonagricultural Use</p> <p>Impact AG#3: Permanent Creation of Remnant Parcels of Important Farmland</p>
AG-MM#2	Minimize the Area of Important Farmland (Prime Farmland, Farmland of Statewide Importance, Farmland of Local Importance, and Unique Farmland) Required for HSR Guideway	To minimize direct and indirect impacts on Important Farmland resulting in permanent conversion of Important Farmland to nonagricultural use, mitigation will restrict the project footprint to the minimum dimensions and area required to operate and maintain the aerial guideway. The Authority will design the permanent right-of-way so that it will not exceed the dimensions or area required to operate and maintain the aerial guideway, specifically 40 feet on either side of the track centerline, with the exception of the proposed viaduct section near Casa de Fruta, between stations 3220 and 4250, where permanent right-of-way must be 45 feet on either side of the track centerline, in order to minimize the area of Important Farmland permanently converted to nonagricultural use by the project.	Design/ construction	Restrict project footprint where feasible	As needed	Authority/ Contractor	Authority	Restrictions to project footprint where feasible	Condition of construction contract	<p>Impact AG#2: Permanent Conversion of Important Farmland to Nonagricultural Use</p> <p>Impact AG#3: Permanent Creation of Remnant Parcels of Important Farmland</p>
AG-MM#3	Evaluate Modified Access to Remnant Parcels with Landowner Input	Prior to construction where partial property acquisitions will result in division of agricultural parcels by the HSR alignment or facilities (i.e., severed parcels), the Authority will evaluate potential for modified access with the property owner's input to allow continued use of agricultural lands and facilities. Any such access will remain within the approved project footprint. Modified	Design/ pre-construction/ construction	Modify access where feasible	As needed	Authority/ Contractor	Authority	Access modifications	Condition of construction contract	Impact AG#3: Permanent Creation of Remnant Parcels of Important Farmland

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		access could include the design of overcrossings or undercrossings to allow farm equipment passage. The Contractor will prepare a technical memorandum for Authority review and approval detailing the Contractor's outreach to affected property owners, evaluation results, and what measures were implemented to address severed parcels. Any modified access will remain within the existing footprint.								
AG-MM#4	Relocate and Reconnect Drainage Facilities before Disconnecting Original Facilities	Where relocating an agricultural drainage facility on Important Farmland within the project footprint will be necessary, the Contractor will verify the replaced facility is operational prior to disconnecting the original facility, where feasible. The Authority will coordinate with landowners during preliminary engineering for construction procurement or during final design for construction to determine drainage facility relocation preferences that will reduce impacts on continued operation of drainage facilities. These relocation preferences will be included in the construction contract and include proximity to and clearance from existing infrastructure, access, slope, and the ability to stay within public road rights-of-way or existing easements, where feasible. The construction contractor will document all relocations in a memorandum for Authority review and approval. Relocation of the drainage facility will be coordinated with landowners and will remain within the existing project footprint.	Design/ pre-construction/ construction	Ensure relocation of agricultural drainage is successful	As needed	Authority/ Contractor	Authority	Monitoring	Condition of construction contract	Impact AG#4: Temporary Disruption of Agricultural Infrastructure Serving Important Farmland Impact AG#5: Permanent Disruption of Agricultural Infrastructure Serving Important Farmland
AG-MM#5	Avoid Infrastructure Serving Important Farmland near Casa de Fruta (from Station 3148+60 to Station 3154)	In order to avoid impacts on irrigation infrastructure on Important Farmland, the Authority will convert the embankment to an aerial guideway near Casa de Fruta (from Station 3148+60 to Station 3154). The Authority will implement this design refinement, consistent with geotechnical investigations to confirm to the feasibility of a viaduct in this location, during preliminary engineering for construction procurement or during final design for construction. The construction contractor will implement the revised design. Modification of design will remain within the existing project footprint.	Design/ pre-construction/ construction	Change in design to aerial guideway	As needed	Authority/ Contractor	Authority	Design change	Condition of construction contract	Impact AG#5: Permanent Disruption of Agricultural Infrastructure Serving Important Farmland
<b>Parks, Recreation, and Open Space</b>										
PR-MM#1	Provide Access to Trails during Construction	Prior to construction-related ground-disturbing activities affecting trails, the Contractor will prepare a technical memorandum documenting how connections to the unaffected trail portions and nearby roadways will be maintained during construction. The Contractor will provide alternative access via a temporary detour or permanent realignment of the trail using existing roadways or other public rights-of-way. This will include a detour during construction while portions of Highway 87 Bikeway North are closed. The Contractor will provide detour signage and lighting and alternative routes that meet public safety requirements. The technical memorandum will be submitted to the Authority for review and approval.	Design/ pre-construction	Prepare technical memorandum	Prior to construction and as needed	Authority/ Contractor	Authority	Reporting	Condition of construction contract	Impact PK#2: Temporary Changes to Access or Use of Parks

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		Upon approval by the Authority, the Contractor will implement the activities identified in the technical memorandum. These technical memoranda would be provided to the OWJ to demonstrate how access would be maintained. The activities will be incorporated into the design specifications and will be a pre-condition requirement.								
PR-MM#2	Provide Temporary Park Access	Prior to construction-related ground-disturbing activities affecting park access, the Contractor will prepare a technical memorandum documenting how connections to the unaffected park portions or nearby roadways will be maintained during construction. The technical memorandum will be submitted to the Authority for review and approval. Upon approval by the Authority, the Contractor will implement the activities identified in the technical memorandum. These technical memoranda would be provided to the OWJ to demonstrate how access would be maintained. The activities will be incorporated into the design specifications and will be a pre-condition requirement.	Design/ pre-construction	Prepare technical memorandum	Prior to construction and as needed	Authority/ Contractor	Authority	Reporting	Condition of construction contract	Impact PK#2: Temporary Changes to Access or Use of Parks
PR-MM#3	Provide Permanent Park Access	During the design phase, the Contractor will prepare a technical memorandum documenting how access to parks and trails will be maintained or established following completion of construction activities. The technical memorandum will be submitted to the Authority for review and approval. Upon approval by the Authority, the Contractor will implement the activities identified in the technical memorandum. These technical memoranda would be provided to the OWJ to demonstrate how access would be maintained. The activities will be incorporated into the design specifications and will be a pre-condition requirement.	Design/ pre-construction	Prepare technical memorandum	Prior to construction and as needed	Authority/ Contractor	Authority	Reporting	Condition of construction contract	Impact PK#4: Permanent Changes Affecting Access to or Circulation in Parks, Recreational Facilities, and Open Space Resources Impact PK#6: Permanent Acquisition of Parks, Recreation, and Open Space Resources
PR-MM#4	Implement Project Design Features	Upon approval by the Authority, the Contractor will implement project design features identified in the technical memorandum prepared as part of PK-IAMF#1. The project design features will be incorporated into the design specifications and will be a pre-condition requirement.	Design/ pre-construction	Incorporate design changes	Prior to construction and as needed	Authority/ Contractor	Authority	Reporting	Condition of construction contract	Impact PK#2: Temporary Changes to Access or Use of Parks
PR-MM#5	Implement Measures to Reduce Impacts Associated with the Relocation of Important Facilities	Prior to construction, the Authority will minimize impacts resulting from the acquisition, displacement, and/or relocation of key community facilities. The Authority will consult with the appropriate parties before land acquisition to assess potential opportunities to reconfigure land use and buildings or to relocate affected facilities, as necessary, to minimize the disruption of facility activities and services, and also to provide for relocation that allows the community currently being served to continue to use these services.  The Authority will continue to implement a comprehensive non-English speaking language outreach program as land acquisition begins. This program will facilitate the	Design/ pre-construction	Consult with affected parties to assess potential for land use reconfiguration	Design and prior to construction	Authority/ Contractor	Authority	Reporting	Condition of construction contract	Impact PK#6: Permanent Acquisition of Parks, Recreation, and Open Space Resources

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<p>identification of approaches that will maintain continuity of operation and allow space and access for the types of services currently provided and planned for these facilities. To avoid disruption to these community amenities, the Authority will provide for reconfiguring land uses or buildings, or relocating community facilities before demolishing existing structures. The Authority will document compliance with this measure through annual reporting.</p> <p>Related impacts for other resources have mitigation measures that will further reduce the likelihood for impacts on parks, recreation, open space, and school district play areas. For example, mitigation measures for noise and vibration and the potential impacts of implementing them are presented in Section 3.4. The following mitigation measures identified for other resources will be relevant for parks, recreation, open space, and school district play areas.</p> <ul style="list-style-type: none"> <li>▪ AQ-MM#1: Implement Additional On-Site Emissions Controls to Reduce Fugitive Dust</li> <li>▪ AQ-MM#2: Offset Project Construction Emissions in the San Francisco Bay Area Air Basin</li> <li>▪ AQ-MM#4: Offset Project Construction Emissions in the San Joaquin Valley Air Basin</li> <li>▪ BIO-MM#80: Minimize Permanent Intermittent Noise, Visual, and Train Strike Impacts on Wildlife Movement</li> <li>▪ NV-MM#1: Construction Noise Mitigation Measures</li> <li>▪ NV-MM#2: Construction Vibration Mitigation Measures</li> <li>▪ NV-MM#3: Implement Proposed California High-Speed Rail Project Noise Mitigation Guidelines</li> <li>▪ NV-MM#4: Support Potential Implementation of Quiet Zones by Local Jurisdictions</li> <li>▪ NV-MM#8: Project Vibration Mitigation Measures</li> <li>▪ SS-MM#2: Construct Temporary Access Roads and Driveways for Morgan Hill Charter School</li> </ul>								
PR-MM#6	Minimize Construction Noise Impacts During Noise Sensitive Special Events	During preparation of the construction management plan, the Contractor will modify the schedule of construction activity to minimize construction noise disruption of noise sensitive outdoor events (such as concerts and weddings) at the Morgan Hill Community and Cultural Center and Villa Mira Monte. The Contractor will coordinate with representatives from the Morgan Hill Community and Cultural Center and Villa Mira Monte in developing the construction management plan.	Pre-construction/ construction	Prepare technical memorandum/ compliance reporting	Monthly	Authority/ Contractor	Contractor	Prepare a construction management plan	Condition of construction contract	Impact PK#1: Temporary Changes from Noise, Vibration, and Construction Emissions on Use and User Experience of Parks, Recreational Facilities, and Open Space Resources
<b>Aesthetics and Visual Quality</b>										
AVQ-MM#1	Minimize Visual Disruption from Construction Activities	<p>Prior to construction, the Contractor will prepare a technical memorandum identifying how the project will minimize construction-related visual/aesthetic disruption using the following strategies:</p> <ul style="list-style-type: none"> <li>▪ Minimize pre-construction clearing to that necessary for construction.</li> </ul>	Pre-construction/ construction/ post-construction	Prepare technical memorandum	Prior to construction	Authority/ Contractor	Contractor	Prior to construction	Contract requirements and specifications	<p>Impact AVQ#1: Temporary Direct Impacts on Visual Quality and Scenic Vistas</p> <p>Impact AVQ#18: Temporary Direct Impacts on Nighttime Light Levels</p>

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<ul style="list-style-type: none"> <li>Limit the removal of buildings to those that will conflict with project components.</li> <li>Where possible, preserve existing vegetation, particularly vegetation along the edge of construction areas that may help screen views.</li> <li>After construction, regrade areas disturbed by construction, staging, and storage to original contours and revegetate with plant material similar in numbers and types to that removed, based on local jurisdictional requirements. If no local jurisdictional requirements exist, replace removed vegetation at a 1:1 replacement ratio for shrubs and small trees and a 2:1 replacement ratio for mature trees. For example, if the Contractor removes 10 mature trees in an area, replant 20 younger trees that within 5 to 15 years (depending on the growth rates of the trees) will be of a height and spread to provide visual screening similar to the visual screening provided by the trees that were removed for construction. Replacement shrubs will be a minimum of 5-gallon planter size, and replacement trees will be a minimum 24-inch box and minimum 8 feet in height.</li> <li>To the extent feasible, locate construction staging sites outside of the immediate foreground distance (0 to 500 feet) of existing residential neighborhoods, recreational areas, or other land uses that include highly sensitivity viewers. Where such siting is unavoidable, screen staging sites from viewers using appropriate solid screening materials such as temporary fencing and walls. Paint over or remove any graffiti or visual defacement of temporary fencing and walls within 5 business days of it occurring.</li> </ul> <p>The Contractor will submit the technical memorandum to the Authority for review and approval.</p>								
AVQ-MM#2	Minimize Light Disturbance during Construction	<p>Prior to construction activities requiring nighttime construction, the Contractor will prepare a technical memorandum describing how the Contractor will shield nighttime construction lighting and direct it downward in a manner to minimize the light that falls outside the construction site boundaries.</p> <p>The Contractor will submit the technical memorandum to the Authority for review and approval.</p>	Pre-construction/ construction	Prepare technical memorandum	Prior to construction	Authority/ Contractor	Contractor	Prior to construction	Contract requirements and specifications	Impact AVQ#1: Temporary Direct Impacts on Visual Quality and Scenic Vistas Impact AVQ#18: Temporary Direct Impacts on Nighttime Light Levels
AVQ-MM#4	Provide Vegetation Screening along At-Grade and Elevated Guideways Adjacent to Residential Areas	<p>Prior to operations and maintenance of the HSR system, the Contractor will plant trees or other vegetation along the edges of the HSR rights-of-way in locations adjacent to residential areas to screen the elevated guideway from the residential area. The species of trees to be installed will be selected based on their mature size and shape, growth rate, hardiness, and drought tolerance. No species listed by the Invasive Species Council of California will be planted. At maturity, the crowns of trees used will be tall enough to partially or fully screen views of the elevated guideway from adjacent at-grade areas. Upon maturity,</p>	Construction/ post-construction	Plant trees/ compliance report	Prior to operation planting trees; within 90 days of completing any construction section or segment documenting the species of trees that were incorporated into	Authority/ Contractor	Contractor	Prior to operation planting trees; within 90 days of completing any construction section or segment documenting the species of trees that were incorporated into	Contract requirements, specifications; landscaping, and maintenance will be provided by the Contractor for its scope of work until completion of the work at which time the Authority will	Impact AVQ#5: Permanent Direct Impacts on Visual Quality—Communications Hill Landscape Unit Impact AVQ#19: Permanent Direct Impacts on Nighttime Light Levels at Fixed Locations

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<p>trees will allow ground-level views under the crowns (with pruning if necessary) and will not interfere with the 15-foot clearance requirement for the guideway. The trees will be maintained. Irrigation systems will be installed in the tree planting areas.</p> <p>The Contractor will prepare a technical memorandum within 90 days of completing any construction section or subsection documenting the species of trees that were incorporated into the edges of the HSR right-of-way adjacent to residential uses. The Contractor will submit the technical memorandum to the Authority to document compliance.</p>			design			design	assume responsibility for landscaping or assign the responsibility to other third parties	
AVQ-MM#5	Replant Unused Portions of Lands Acquired for the HSR	<p>Prior to operations and maintenance, the Contractor will plant vegetation on land acquired for the project (e.g., shifting roadways) that was not used for the HSR, related supporting infrastructure, or other higher or better use. Planting design will allow adequate space between the vegetation and the HSR alignment and catenary lines. All street trees and other visually important vegetation removed in these areas during construction will be replaced with similar vegetation that, at maturity, will be similar in size and character to the removed vegetation. Replaced shrubs will be minimum 5-gallon planter size, and trees will be minimum 24-inch box and 8 feet in height. The Authority will provide for continuous maintenance with appropriate irrigation systems. The Contractor will install the irrigation system within the planting areas. No species listed by the Invasive Species Council of California will be planted.</p>	Post-construction/operations	Plant vegetation; reporting	Prior to operation and maintenance planting trees; monthly reporting	Authority	Authority	Prior to operation and maintenance planting trees; monthly reporting	Authority to implement appropriate landscape and maintenance plan	Impact AVQ#5: Permanent Direct Impacts on Visual Quality—Communications Hill Landscape Unit
AVQ-MM#6	Screen Traction Power Distribution Stations and Radio Communication Towers	<p>Within 90 days of completing traction power substation or radio tower construction, the Contractor will screen from public view the traction power substations (located at approximately 30-mile intervals along the HSR guideway), including radio towers where required, through the use of landscaping or solid walls/fences. Screening will consist of context-appropriate landscaping of a type and scale that does not draw attention to the station or feature. Plant species will be selected based on their mature size and shape, growth rate, hardiness, and drought tolerance. Planted shrubs will be a minimum 5-gallon planter size, and trees will be a minimum 24-inch box and 8 feet in height. No species listed by the Invasive Species Council of California will be planted. The landscaping will be continuously maintained, and appropriate irrigation systems will be installed in the landscaped areas. Walls will be constructed of cinderblock or similar material and will be painted a neutral color to blend in with the surrounding context. If a chain-link or cyclone fence is used, it will include slats in the fencing.</p> <p>Any graffiti or visual defacement or damage of fencing and walls will be painted over or repaired within a reasonable period as agreed between the Authority and local</p>	Construction/post-construction	Reporting	Monthly	Contractor/ Authority	Contractor	Construction/ monthly reporting	Contract requirements/ specifications	Impact AVQ#19: Permanent Direct Impacts on Nighttime Light Levels at Fixed Locations

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<p>jurisdiction. The mitigation measures are typical of visual treatments applied on linear transportation facilities; they have been defined to be specific in range, implementable according to context, and designed in coordination with local jurisdictions.</p> <p>The Contractor will prepare a technical memorandum documenting how the requirements in this measure were implemented. The Contractor will submit the technical memorandum to the Authority to document compliance.</p>								
<b>Cultural Resources</b>										
CUL-MM#1	Mitigate Adverse Effects on Archaeological and Built Environment Resources Identified during Phased Identification and Comply with the Stipulations Regarding the Treatment of Archaeological and Historic Built Resources in the PA and MOA	<p>Once parcels are accessible and surveys have been completed, including consultation as stipulated in the MOA, additional archaeological and built environment resources may be identified. For newly identified eligible properties that will be adversely affected, the following processes will be followed, which are presented in detail in the BETP and ATP:</p> <ul style="list-style-type: none"> <li>▪ The Authority will consult with the MOA signatories and concurring parties to determine the preferred treatment of the properties/resources and appropriate mitigation measures.</li> <li>▪ For CRHR-eligible archaeological resources, the Authority will determine if these resources could feasibly be preserved in place, or if data recovery is necessary. The methods of preservation in place will be considered in the order of priority provided in CEQA Guidelines Section 15126.4(b)(3). If data recovery is the only feasible treatment the Authority will adopt a data recovery plan as required under CEQA Guidelines Section 15126.4(b)(3)(C).</li> <li>▪ Should data recovery be necessary, the principal investigator (PI), in consultation with the MOA signatories and consulting parties, will prepare a data recovery plan for approval from the Authority and in consultation with the MOA signatories. Upon approval, the PI will implement the plan.</li> <li>▪ For archaeological resources the Authority will also determine if the resource is a unique archaeological site under CEQA. If the resource is not a historical resource but is an archaeological site, the resource will be treated as required in Cal. Public Res. Code Section 21083.2 by following protection, data recovery, and other appropriate steps outlined in the ATP. The ATP outlines the review and approval requirements for these documents.</li> <li>▪ For historic built resources, the PI will amend the BETP to include the treatment and mitigation measures identified by the Authority in consultation with the MOA signatories and concurring parties. The PI will implement the treatment and mitigation measures accordingly.</li> </ul>	Pre-construction/ construction	Reporting	Weekly	Contractor/ Authority	Contractor/ Authority	Pre-construction surveys and construction/ weekly reporting or as dictated by the ATP and the MOA	PA	<p>Impact CUL#1: Permanent Disturbance of Unknown Archaeological Sites</p> <p>Impact CUL#2: Permanent Disturbance of a Known Archaeological Site</p> <p>Impact CUL#4: Permanent Demolition, Destruction, Relocation, or Alteration of Built Resources or Setting</p>

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
CUL-MM#2	Halt Work in the Event of an Archaeological Discovery, and Comply with the PA, MOA, ATP, and all State and Federal Laws, as Applicable	<p>During construction (any ground-disturbing activities, including cleaning and grubbing), should there be an unanticipated discovery, the Contractor will follow the procedures for unanticipated discoveries as stipulated in the PA, MOA, and associated ATP. The procedures must also be consistent with the following: the SOI's Standards and Guidelines for Archaeology and Historic Preservation (48 Fed. Reg. 44716-42), as amended; and Guidelines for the Implementation of CEQA, as amended (14 Cal. Code Regs. Chapter 3, Article 9, §§ 15120-15132). Should the discovery include human remains, the Authority will comply with federal and state regulations and guidelines regarding the treatment of human remains, including relevant sections of NAGPRA (§ 3(c)(d)); Cal. Health and Safety Code, Section 8010 et seq.; and Cal. Public Res. Code Section 5097.98; and consult with the NAHC, tribal groups, and the SHPO.</p> <p>In the event of an unanticipated archaeological discovery, the Contractor will cease work in the immediate vicinity of the find, based on the direction of the archaeological monitor or the apparent location of cultural resources if no monitor is present. If no qualified archaeologist is present, no work can commence until it is approved by the qualified archaeologist in accordance with the MOA, ATP, and monitoring plan. The Contractor's qualified archaeologist will assess the potential significance of the find and make recommendations for further evaluation and treatment as necessary. These steps may include evaluation for the CRHR and NRHP, and necessary treatment to resolve significant effects if the resource is a historical resource or historic property. If, after documentation is reviewed by the Authority, and it determines it is a historic property and the SHPO concurs that the resource is eligible for the NRHP, or the Authority determines it is eligible for the CRHR, the Authority will consider preservation in place in the order of priority provided in CEQA Guidelines Section 15126.4(b)(3) and in consultation with the signatories and consulting parties to the MOA. If data recovery is the only feasible mitigation, then the PI will prepare a data recovery plan as required under CEQA Guidelines Section 15126.4(b)(3)(C), the MOA, and ATP, for the Authority's approval.</p> <p>The Contractor will notify the Authority, who will notify the CSLC, if the find is a cultural resource on or in the submerged lands of California and consequently under the jurisdiction of the CSLC. The Authority will comply with all applicable rules and regulations promulgated by CSLC with respect to cultural resources in submerged lands.</p> <p>If human remains were discovered on state-owned or private lands the Contractor will contact the relevant County Coroner to allow the Coroner to determine if an investigation regarding the cause of death is required. If</p>	Construction	Reporting	During construction	Contractor/ Authority	Contractor	Daily logs during active monitoring	ATP/MOA	Impact CUL#1: Permanent Disturbance of Unknown Archaeological Sites Impact CUL#2: Permanent Disturbance of a Known Archaeological Site

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<p>no investigation is required and the remains are of Native American origin the Authority will contact the NAHC to identify the most likely descendant (MLD). The MLD will be empowered to reinter the remains with appropriate dignity. If the MLD fails to make a recommendation the remains will be reinterred in a location not subject to further disturbance, and the location will be recorded with the NAHC and relevant Information Center of the California Historic Resources Information System. If human remains are part of an archaeological site, the Authority and Contractor will, in consultation with the MLD and other consulting parties, consider preservation in place as the first option, in the order of priority called for in CEQA Guidelines Section 15126.4(b)(3).</p> <p>In consultation with the relevant Native American tribes, the Authority may conduct scientific analysis on the human remains if called for under a data recovery plan and amenable to all consulting parties. The Authority will work with the MLD to satisfy the requirements of Cal. Public Res. Code Section 5097.98. Performance tracking of this mitigation measure will be based on successful implementation and acceptance of the documentation by the SHPO and appropriate consulting parties.</p>								
CUL-MM#3	Other Mitigation for Effects on Pre-Contact Archaeological Sites	<p>As a result of limited access to private properties during the environmental review phase of this project, the Authority's ability to fully identify and evaluate archaeological resources within the APE has also been limited. Thus, most of the project APE has not been subject to archaeological field inventories. Because pedestrian field surveys are a necessary component of the archaeological resource identification and evaluation effort, the commitment to complete the field surveys prior to ground-disturbing activities associated with the project is codified in the MOA that will be executed as a condition of the Final EIR/EIS.</p> <p>Access to previously inaccessible properties to complete the archaeological resource identification effort is expected to be available after the ROD, during the construction phase of the project. However, because of the design constraints associated with constructing an HSR system, the ability to shift the alignment to avoid any newly identified archaeological resources at this late phase of the project delivery process is substantially limited or unlikely, because the alignment is already established. As such, impacts on as-yet-unidentified significant archaeological resources as a result of this project are anticipated; however, the nature and quantity of such impacts remains unknown until completion of the archaeological field identification and evaluation effort.</p> <p>The MOA and ATP include protocols for the identification, evaluation, treatment, and data-recovery mitigation of as-yet-unidentified archaeological resources. Efforts to</p>	Pre-construction	Pre-construction surveys	Prior to ground-disturbing activities	Authority	Authority	Prior to ground-disturbing activities	ATP/ MOA	Impact CUL#1: Permanent Disturbance of Unknown Archaeological Sites Impact CUL#2: Permanent Disturbance of a Known Archaeological Site

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		develop meaningful mitigation measures for effects on as-yet-undiscovered Native American archaeological resources that cannot be avoided will be negotiated with the tribal consulting parties. Measures negotiated among the MOA signatories and tribal consulting parties will be the Authority's responsibility to implement.								
CUL-MM#4	Minimize Adverse Effects through Relocation of Historic Buildings and Structures	The Authority-prepared MOA and BETP may identify historic properties/historical resources for relocation to avoid their destruction and minimize adverse effects resulting from physical damage or alteration. The development of plans for relocation and the implementation of relocation will take place before construction within 1,000 feet of the properties. The relocation of the historic properties/historical resources will be specified in the BETP by the Authority or the PI, depending on when the location is identified, and take into account the historic site and layout (i.e., the orientation of the buildings to the cardinal directions), and their potential reuse. The Contractor's qualified architectural historian, along with an interdisciplinary team of professionals as appropriate, will prepare a relocation plan that will provide for protection and stabilization of the buildings or structures before, during, and after the move, as well as measures to address inadvertent damage. The plan will be subject to review and approval by the Authority, in consultation with the MOA signatories and concurring parties. The relocation will be implemented according to the plan. As the design progresses, the Authority may determine that additional properties require this mitigation.	Design/ pre-construction/ construction	Identification and treatment of historical resources	As needed	Authority/ Contractor	Authority	Weekly reporting	MOA/ATP/PA	Impact CUL#4: Permanent Demolition, Destruction, Relocation, or Alteration of Built Resources or Setting
CUL-MM#6	Prepare and Submit Additional Recordation and Documentation	The Authority-prepared MOA and BETP will identify specific historical resources that the project will physically alter, damage, relocate, or destroy and that will require documentation. This documentation may consist of preparation of updated recordation forms (DPR 523), or may be consistent with the Historic American Buildings Survey (HABS), the Historic American Engineering Record (HAER), or the Historic American Landscape Survey (HALS) programs; a Historic Structure Report; or other recordation methods stipulated in the MOA and described in the BETP. The specific mitigation for each property will be determined in consultation with the MOA signatories and concurring parties. The BETP will detail the appropriate type and level of recordation for each property. The recordation undertaken by this treatment will focus on the aspect of integrity the project will affect for each historic property subject to this treatment. For example, historic properties in an urban setting that will experience an adverse visual effect will be photographed to capture exterior and contextual views; interior spaces will not be subject to recordation if they will not be affected. The BETP will specify the appropriate method of documentation for each property, resulting from	Design/ pre-construction	Identification and treatment of historical resources	As needed	Authority/ Contractor	Authority	Weekly reporting	MOA/BETP/PA	Impact CUL#4: Permanent Demolition, Destruction, Relocation, or Alteration of Built Resources or Setting

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<p>consultation with the SHPO, MOA signatories, and concurring parties. Such documentation will follow the appropriate guidance for the recordation format and program selected.</p> <p>Copies of the documentation will be provided to the consulting parties and offered to the appropriate local governments, historical societies and agencies, or other public repositories, such as libraries, as specified in the BETP. The documentation will also be offered in printed and electronic form to any repository or organization to which the SHPO, the Authority, and the local agency with jurisdiction over the property, through consultation, may agree. The electronic copy of the documentation may also be placed on an agency or organization's website. As the design progresses, additional properties may be determined by the Authority as requiring documentation.</p> <p>In general, photography should capture views of the historic property from multiple views, and could include reproduction of historic images, and architectural or engineering drawings as well. The Contractor will complete all fieldwork necessary for photodocumentation, architectural or engineering drawings, and digital recordation through geographic information system or global positioning system, and the Authority and SHPO will approve it before project construction begins. The written data will include a narrative for the historic property that will utilize existing inventory, evaluation, and nomination documents to the extent possible.</p> <p>This kind of documentation will require the Contractor to engage an interdisciplinary team to adequately complete this mitigation. The team will likely be required to include, at a minimum, an architectural historian, a historian, and a photographer. Other team members may include a landscape architect or computer-aided design and drafting technician. The BETP will detail the required personnel and qualification standards for these preparers. The Authority will submit the documentation to the SHPO for review and comment. If the documentation is to follow the HABS/HAER/HALS program, consultation by the Authority with the National Park Service (NPS) will be required. The Contractor's qualified team will prepare the final documentation, NPS will approve it, and the Authority will submit it to the Library of Congress. The BETP will identify the distribution of printed and electronic copies of the photodocumentation, as well as permanent archival disposition of the record, if applicable.</p>								
CUL-MM#7	Prepare Interpretive or Educational Materials	The Authority-prepared MOA and BETP will identify historic properties and historical resources that will be subject to historic interpretation or preparation of educational materials. Interpretive and educational materials will address the significance of the properties that will be affected by the project. Interpretive or	Post-Construction	Reporting	Annual	Authority/ Contractor	Post-construction/annual reporting	Authority, in consultation with SHPO and appropriate consulting parties	BETP, photographic documentation, plan for repairs to historic properties	Impact CUL#4: Permanent Demolition, Destruction, Relocation, or Alteration of Built Resources or Setting

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<p>educational materials could include, but are not limited to, brochures, videos, websites, study guides, teaching guides, articles or reports for general publication, commemorative plaques, or exhibits. The BETP will specify the agreed-upon method of interpretation for each property, resulting from consultation with the SHPO, MOA signatories, and concurring parties. The Contractor will be responsible for assembling the appropriate interdisciplinary team to fulfill this mitigation. The BETP will specify the required professionals and their qualifications.</p> <p>In the preparation of the interpretive or educational materials, the Contractor's team will utilize previous research included in the environmental technical documents, images, narrative history, drawings, or other material produced for other mitigation measures. The interpretive or educational materials will be made available to the public in physical or digital formats, at local libraries, historical societies, or public buildings, as specified in the BETP.</p>								
CUL-MM#10	Station Design Consistent with the Secretary of the Interior's Standards for the Treatment of Historic Properties	<p>Prior to HSR station construction adjacent to or on an NRHP or CRHR site, the Contractor will prepare a historic properties compatibility report for Authority review and approval. Several HSR stations will be constructed adjacent to or on the site of NRHP/CRHR-listed or NRHP/CRHR-eligible railroad stations, within historic districts, or in proximity to other historic properties. At the time of the RODs for each project section, the station locations will be identified; station design will be prepared post-ROD. The Authority will issue requests for qualifications (RFQ) to receive statements of qualifications (SOQ) from qualified firms (Contractor) for station designs and related services. Such firms will be contracted to provide professional consultant and design services for all design stages through final design. Selected firms will be responsible for making their designs context-sensitive and meeting the SOI's standards for the treatment of historic properties. The Section 106 MOA and BETP will identify stations that require this mitigation measure, as appropriate. The MOA and BETP will also specify consultation roles of MOA signatories and interested parties in the design of the stations. At a minimum, the Authority's professionally qualified architectural historians and the SHPO will receive the opportunity to review and comment on the designs.</p> <p>If the proposed location is on the site of or adjacent to historic properties, the Contractor at a minimum will include on their team a professionally qualified architectural historian, and may also be required to include a historical architect, a landscape architect with experience related to historic properties, an archaeologist, or other historic preservation professionals. The</p>	Design/ pre-construction	Compatibility report	Prior to ground-disturbing activities	Authority/ Contractor	Authority	Prior to ground-disturbing activities	MOA/BETP/PA	Impact CUL#4: Permanent Demolition, Destruction, Relocation, or Alteration of Built Resources or Setting

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<p>Authority's professionally qualified staff will review and approve selected professionals' qualifications.</p> <p>The Authority will require the Contractor to provide three schemes for Authority review, including an evaluation of each scheme. The deliverables will also include drawings, such as plans, elevations, and renderings. The Contractor must include in each evaluation a historic property design compatibility report prepared by a qualified architectural historian describing how the scheme is consistent with the SOI's Standards for Rehabilitation for infill designs or additions, and if any restoration or rehabilitation will be required of the historic buildings and structures and how such restoration is consistent with the SOI's Standards for Restoration. The report will reference applicable NPS Preservation Briefs, such as #14 New Exterior Additions to Historic Buildings, and discuss size, scale, and massing of the proposed project and how it will be differentiated from the historic property. It will also include application of the criteria of adverse effect (36 C.F.R. § 800.5) to each proposed scheme to ascertain that the selected design will not adversely affect historic properties. For the purposes of evaluating effects on historic properties, the Contractor may be required to produce renderings that include adjacent properties. The Authority's professionally qualified staff will review and comment on the report, and they may require revision prior to transmitting it to the SHPO and other MOA signatories and consulting parties, as specified in the MOA and BETP.</p>								
<b>Section 4(f) <sup>6</sup></b>										
4F-MM#1 (NEPA Only)	Coordinate with Santa Clara County Department of Parks and Recreation	<p>The Authority will consult with the Santa Clara County Department of Parks and Recreation and provide a Draft of any technical memorandum or designs prepared per PK-IAMF#1 for Coyote Creek Parkway County Park to the County for review and input prior to finalization.</p> <p>The Authority will consult with the Department and provide a Draft of any technical memorandum or designs prepared per Mitigation Measure PR-MM#2 for Coyote Creek Parkway County Park and Field Sports County Park to the County for review and input prior to finalization.</p>	Design/pre-construction	Provide review opportunity to Santa Clara County Department of Parks and Recreation	Design and prior to construction	Authority/ Contractor	Authority	Reporting	Condition of construction contract	Responds to County requests stated in the County's comment on the Individual 4(f) Evaluation of Two Parks in Santa Clara County.
<b>Environmental Justice<sup>7</sup></b>										
EJ-MM#1	Minimize Residual Severe Noise Impacts in Environmental Justice Communities	To minimize residual severe noise impacts in environmental justice communities (as defined by having low-income populations or minority populations greater than in the reference community), the final technical report required per Mitigation Measure NV-MM#3 will include an	Design/pre-construction/ construction	Evaluate noise impacts and potential additional practicable	Annually during design phase and construction	Authority/ Contractor	Authority	Documentation of design impact analysis, assessment of practicable	Condition of construction contract	Noise effects described in Chapter 5, Environmental Justice, Table 5-26.

<sup>6</sup> The final column titled "Impact # and Impact Title" does not show impact numbers for the Section 4(f)/6(f) evaluations, but it does describe the request by Santa Clara County that generated this commitment.

<sup>7</sup> In Chapter 5, Environmental Justice, the analysis is organized by subject and not by impact numbers. Consequently, the final column titled "Impact # and Impact Title" does not show impact numbers for the Environmental Justice analysis, but it does describe the relevant impact addressed by the mitigation.

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		assessment of whether remaining severe noise impacts, after application of recommended noise treatments and direct mitigations, may disproportionately impact low-income populations or minority populations. For impacted receptors within environmental justice communities, property owners will be notified of the potential noise impact and the Authority's proposed noise treatments and direct mitigations for their property. If the report finds that severe noise impacts may disproportionately impact low-income populations or minority populations, the Authority will prepare an additional report to assess whether any additional practicable measures may be undertaken to avoid, eliminate, or reduce the noise impacts that disproportionately impact environmental justice communities. The Authority will seek and consider the input of affected sensitive receptors in low-income populations or minority populations prior to finalizing the report.		measures during design phase and conduct outreach				measures, and outreach conducted		
SC/NSJ-OMM#1	Noise Treatments for Residential Buildings A Caltrain Corridor to Address Existing Noise	Provide funding in an amount not to exceed <sup>8</sup> \$75,000 in total and \$25,000 per building for installation of building insulation and window treatments for up to three building façades affected by existing noise between Santa Clara Station and I-880.  See measure description, cost estimate, and roles and responsibilities sections in corresponding profile No. 1 in Final EIR/EIS, Volume 2, Appendix 5-C, Attachment A.	Design/pre-construction/ construction (completion prior to HSR operation)	Implement noise treatment program	Quarterly	Authority/ Contractor	Authority	Documentation of homes treated and treatments implemented	Authority contract with implementing firm	Noise effects described in Chapter 5, Environmental Justice, Table 5-26.
SC/NSJ-OMM#2	El Camino Real and Benton Street Safety Improvements	The City of Santa Clara has identified a suite of safety improvements at the intersection of El Camino Real and Benton Street, including decorative crosswalk, curb extensions, pedestrian crosswalk motion sensor, and signal improvements (leading pedestrian interval, countdown timers, accessible pedestrian signal). The Authority will either contribute \$500,000 for the full suite of improvements or will fund certain discrete improvements up to \$500,000. See footnote 8.  The Authority, as a condition of providing funding, will require the implementing entity to implement relevant IAMFs and direct mitigation measures applied to the Preferred Alternative during the construction of this improvement.  See measure description, cost estimate, and roles and responsibilities sections in corresponding profile No. 2 in Final EIR/EIS, Volume 2, Appendix 5-C, Attachment A.	Design/ pre-construction/ construction (completion prior to HSR operation)	Provide funding to an implementing entity.  Implementing entity to be determined by the Authority.  Potential or anticipated implementing entity may be:  City of Santa Clara	Upon funding	Authority	Authority	Provision of funding to implementing entity	Authority agreement with implementing entity	Noise effects described in Chapter 5, Environmental Justice, Table 5-26.
SJD-OMM#2	Noise Treatments for Homes Affected by Freeway Noise (I-	Provide funding in an amount not to exceed \$793,000 in total and \$12,632 per single-family home and \$25,000 per multifamily building for building insulation and window	Design/ pre-construction/ construction	Implement noise treatment program	Quarterly	Authority/ Contractor	Authority	Documentation of homes treated and treatments	Authority contract with implementing firm	Noise effects described in Chapter 5, Environmental Justice, Table 5-26.

<sup>8</sup> For all "not to exceed" costs specified in mitigation measures labeled as "OMM," all such cost ceilings may be adjusted for inflation by the Authority.

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
	280/SR-87)	treatments for homes directly adjacent to and affected by existing freeway noise adjacent to Interstate (I-) 280 and State Route (SR) 87 in these areas: Adjacent to the west side of SR 87 (between San Fernando St. and Auzerais Ave.); and adjacent to the north side of I-280 (between Delmas Ave and Los Gatos Creek). See also footnote 8. See measure description, cost estimate, and roles and responsibilities sections in corresponding profile No. 5 in Final EIR/EIS, Volume 2, Appendix 5-C, Attachment A.	(completion prior to HSR operation)					implemented		
SJD-OMM#3	Reestablish Inez C. Jackson Library at the African American Community Service Agency (AACSA) Family Resource Center	Provide funding in an amount not to exceed \$100,000 for the reestablishment of the Inez C. Jackson Library space at the African American Community Service Agency (AACSA) Family Resource Center in San Jose. See also footnote 8. AACSA is willing to provide the space for the library but needs funding to renovate and modernize the space and to provide new furniture, books, computers and other electronics, and audio-visual equipment. The space will also need to be made Americans with Disabilities Act compliant.  The Authority, as a condition of providing funding, will require the implementing entity to implement relevant IAMFs and direct mitigation measures applied to the Preferred Alternative during the construction of this improvement.  See measure description, cost estimate, and roles and responsibilities sections in corresponding profile No.6 in Final EIR/EIS, Volume 2, Appendix 5-C, Attachment A.	Design/pre-construction/ construction (completion prior to HSR operation)	Provide funding to an implementing entity.  Implementing entity to be determined by the Authority.  Potential or anticipated implementing entity may be: AACSA	Upon funding	Authority	Authority	Provision of funding to implementing entity	Authority agreement with implementing entity	Noise effects described in Chapter 5, Environmental Justice, Table 5-26.
GWG-OMM#1	Gardner Elementary School Noise Treatments	Provide funding for noise treatments such as a sound wall barrier or other building and window insulation improvements to the buildings and walls adjacent to West William Street and Willis Avenue facades. Funding for the sound wall would not exceed \$588,000. See also footnote 8. The sound wall will either be: (1) on school property along the south side of W. William Street (and the northwest side of Willis Avenue) or (2) be north of W. William Street (if permission can be obtained from Caltrans/City of San Jose presuming public ownership). Funding for building/window treatments would not exceed \$125,000 in total and \$25,000 per multifamily building. Window treatments and building insulation could be applied to buildings facing I-280 along W. William Street and the building on the northeast side of the campus along Willis Avenue. See also footnote 8.  Santa Clara VTA's I-280 Soundwalls Project is currently proposing to construct soundwalls on I-280 between SR 87 and Los Gatos Creek including adjacent to the I-280 southbound lanes adjacent to the Gardner Elementary School. This project is scheduled to go through environmental clearance from 2020 to 2022, design and engineering in 2022 and 2023, and construction between 2023 and 2024. If the I-280	Design/pre-construction/ construction (completion prior to HSR operation)	Provide funding to an implementing entity.  Implementing entity to be determined by the Authority.  Potential or anticipated implementing entities may be: the San Jose Unified School District (SJUSD) or VTA	Upon funding	Authority	Authority	Provision of funding to an implementing entity	Authority agreement with an implementing entity.	Noise effects described in Chapter 5, Environmental Justice, Table 5-26.

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<p>Soundwalls Project is advanced, then GWG-OMM#1 will be redundant with the soundwall project, provided a soundwall is placed adjacent to the southbound I-280 lanes such that it reduced traffic noise for the Gardner Elementary School. In that instance, this measure allows for the funds for noise treatments at the school to instead be provided to VTA to support the I-280 Soundwalls Project, provided the soundwalls installed will benefit the Gardner Elementary School and provided the San Jose to Merced HSR project section is fully funded prior to construction of the I-280 Soundwalls Project. If the project section is funded after construction of the I-280 Soundwalls Project, then the Authority will not be able to fund the Soundwalls Project. If no funding is provided to the VTA I-280 Soundwalls Project by the Authority and the soundwalls project is completed and there still remain traffic noise effects to the Gardner Elementary School, then the Authority could provide funding for school building treatments as needed to address that residual noise.</p> <p>The Authority, as a condition of providing funding, will require the implementing entity to implement relevant IAMFs and direct mitigation measures applied to the Preferred Alternative during the construction of this improvement. See measure description, cost estimate, and roles and responsibilities sections in corresponding profile No. 7 in Final EIR/EIS, Volume 2, Appendix 5-C, Attachment A.</p>								
GWG-OMM#2	Noise Treatments for Certain Residential Buildings	<p>Provide funding for building insulation and window treatments for up to 43 homes affected by existing freeway noise adjacent to the west side of SR 87 (between W Virginia St. and Brown St.) and adjacent to the south side of I-280 (between Spencer Ave. and Los Gatos Creek) to address existing noise. The improvement will consist of building and window insulation improvements for the homes. Funding for building and window insulation for 43 single-family homes will not exceed \$543,000 in total and \$12,632 per single-family home. See footnote 8.</p> <p>If the Santa Clara VTA's I-280 Soundwalls Project is advanced (currently scheduled to be constructed by 2024), it will include soundwalls on the south side of I-280 between Los Gatos Creek and SR 87, which will obviate the need for building noise treatments in the neighborhood adjacent to I-280. If that happens, then this measure will only include treatments along SR 87 for up to approximately 15 homes and any homes on the south side of I-280 between Los Gatos Creek and SR 87 with residual traffic noise effects after soundwall construction (for example where gaps in soundwalls may exist) and funding will not exceed \$190,000. See footnote 8.</p> <p>See measure description, cost estimate, and roles and responsibilities sections in corresponding profile No. 8 in Final EIR/EIS, Volume 2, Appendix 5-C, Attachment A.</p>	Design/ pre-construction/ construction (completion prior to HSR operation)	Implement noise treatment program	Quarterly	Authority/ Contractor	Authority	Documentation of homes treated and treatments implemented	Authority contract with implementing firm	Noise effects described in Chapter 5, Environmental Justice, Table 5-26.

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
GWG-OMM#3	Fuller Park/Fuller Avenue Recreational Amenities	Provide funding in an amount not to exceed \$190,000 for recreational amenities at Fuller Park and along Fuller Avenue. See also footnote 8. A number of small vacant parcels are scattered throughout the Gardner/Willow Glen community, all owned by public entities. For example, a parcel adjacent to the intersection of Coe and Bird Avenues was improved by residents with landscaping, heritage lights, and a walking path some years ago. This space has fallen into disrepair but has been funded for renovation per the Greater Gardner Neighborhood Improvement Plan. Fuller Park is of specific concern given the low quality of existing material; that is, turf and fencing. Renovation of this Fuller Park site could include children's play areas with equipment, picnic benches, fitness equipment, bicycle racks, or other smaller amenities. The Authority, as a condition of providing funding, will require the implementing entity to implement relevant IAMFs and direct mitigation measures applied to the Preferred Alternative during the construction of this improvement. See measure description, cost estimate, and roles and responsibilities sections in corresponding profile No. 9 in Final EIR/EIS, Volume 2, Appendix 5-C, Attachment A.	Design/ pre-construction/ construction (completion prior to HSR operation)	Provide funding to an implementing entity.  Implementing entity to be determined by the Authority.  Potential or anticipated implementing entity may be: City of San Jose	Upon funding	Authority	Authority	Provision of funding to implementing entity	Authority agreement with implementing entity	Noise effects described in Chapter 5, Environmental Justice, Table 5-26.
WGTA-OMM#3	Noise Treatments for Residential Buildings Along SR 87 to Address Existing Noise	Provide funding in an amount not to exceed \$945,000 in total, \$12,632 per single-family home, \$25,000 per multifamily building, and \$75,000 for improvements to one side of a multifamily building facing the railroad alignment only for building insulation and window treatments for homes affected by existing freeway noise adjacent to the east side of State Route (SR) 87 between Virginia St. and Shadowgraph Drive. The measure will consist of building and window insulation improvements for the homes along SR 87. See measure description, cost estimate, and roles and responsibilities sections in corresponding profile No. 12 in Final EIR/EIS, Volume 2, Appendix 5-C, Attachment A. See footnote 8.	Design/ pre-construction/ construction (completion prior to HSR operation)	Implement noise treatment program	Quarterly	Authority/ Contractor	Authority	Documentation of homes treated and treatments implemented	Authority contract with implementing firm	Noise effects described in Chapter 5, Environmental Justice, Table 5-26.
WGTA-OMM#4	Rocketship Mateo Sheedy Elementary School Public Address System Upgrade	Provide funding in an amount not to exceed \$200,000 for an upgrade of the existing public address (PA) system within the school to help overcome disturbance from outside noise including airplane noise. The Authority, as a condition of providing funding, will require the implementing entity to implement relevant IAMFs and direct mitigation measures applied to the Preferred Alternative during the construction of this improvement. See improvement description, cost estimate, and roles and responsibilities sections in corresponding profile No. 13 in Final EIR/EIS, Volume 2, Appendix 5-C, Attachment A. See footnote 8.	Design/ pre-construction/ construction (completion prior to HSR operation)	Provide funding to an implementing entity.  Implementing entity to be determined by the Authority.  Potential or anticipated implementing	Upon funding	Authority	Authority	Provision of funding to implementing entity	Authority agreement with implementing entity	Noise effects described in Chapter 5, Environmental Justice, Table 5-26.

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
				entity may be: Rocketship Mateo Sheedy Elementary School						
WGTA-OMM#5	Tamien Park Sports Field Netting	<p>Provide funding in an amount not to exceed \$16,000 for sports field ball netting along the west side of the existing park to reduce the chance of soccer balls, basketballs or other field sports balls landing in the active railroad right-of-way to the west of the park. This will reduce the potential for individuals to enter the railroad right-of-way to retrieve lost balls. The netting will be installed on the park property and not within the railroad right-of-way.</p> <p>The Authority, as a condition of providing funding, will require the implementing entity to implement relevant IAMFs and direct mitigation measures applied to the Preferred Alternative during the construction of this improvement.</p> <p>See measure description, cost estimate, and roles and responsibilities sections in corresponding profile No. 14 in Final EIR/EIS, Volume 2, Appendix 5-C, Attachment A. See footnote 8.</p>	Design/ pre-construction/ construction (completion prior to HSR operation)	<p>Provide funding to an implementing entity.</p> <p>Implementing entity to be determined by the Authority.</p> <p>Potential or anticipated implementing entity may be:</p> <p>City of San Jose</p>	Upon funding	Authority	Authority	Provision of funding to implementing entity	Authority agreement with implementing entity	Noise effects described in Chapter 5, Environmental Justice, Table 5-26.
SSJ-OMM#2a	Monterey Road Pedestrian/Bike Overpass at Skyway	<p>Provide funding for pedestrian overcrossing of Monterey Road at Skyway Drive. The improvement will provide an east-west connection, which will improve safety for students, pedestrians, and bicyclists.</p> <p>The Authority will provide funding for this overcrossing, and the City of San Jose will implement. The City is considering potential grade separation of the railroad crossings at this location. If grade separation is realized, then the underlying residual safety effect related to emergency vehicle response times will be avoided. Consequently, if the City is advancing the grade separations toward completion by the time the HSR project will become operational (nominally 2031 based on the Authority's 2020 Revised Business Plan) or within several years of commencement of HSR service between San Jose and Gilroy, then, provided there is agreement of both the Authority and the City, the Authority could instead provide the equivalent funding that would have gone to the pedestrian overcrossings to fund the grade separation project(s). The Authority's funding commitment for SSJ-OMM#2a, SSJ-OMM#2b, and SSJ-OMM#2c shall not exceed \$36.4 million in total for all three measures combined. See Footnote 8.</p> <p>The Authority, as a condition of providing funding, will require the implementing entity to implement relevant IAMFs and direct mitigation measures applied to the Preferred Alternative during the construction of this</p>	Design/ pre-construction/ construction (completion prior to HSR operation)	<p>Provide funding to an implementing entity.</p> <p>Implementing entity to be determined by the Authority.</p> <p>Potential or anticipated implementing entity may be:</p> <p>City of San Jose</p>	Upon funding	Authority	Authority	Provision of funding to implementing entity	Authority agreement with implementing entity	Safety (emergency vehicle response delay) effects described in Chapter 5, Environmental Justice, Table 5-26.

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		improvement. See measure description, cost estimate, and roles and responsibilities sections in corresponding profile No. 16 in Final EIR/EIS, Volume 2, Appendix 5-C, Attachment A.								
SSJ-OMM#2b	Monterey Road Pedestrian/Bike Overpass at Branham	<p>Provide funding for pedestrian overcrossing of Monterey Road at Branham Lane. The improvement will provide an east-west connection, which will improve safety for students, pedestrians, and bicyclists.</p> <p>The Authority will provide funding for this overcrossing, and the City of San Jose will implement. The City is considering potential grade separation of the railroad crossings at this location. If grade separation is realized, then the underlying residual safety effect related to emergency vehicle response times will be avoided. Consequently, if the City is advancing the grade separations toward completion by the time the HSR project will become operational (nominally 2031 based on the Authority's 2020 Revised Business Plan) or within several years of commencement of HSR service between San Jose and Gilroy, then, provided there is agreement of both the Authority and the City, the Authority could instead provide the equivalent funding that would have gone to the pedestrian overcrossings to fund the grade separation project(s). The Authority's funding commitment for SSJ-OMM#2a, SSJ-OMM#2b, and SSJ-OMM#2c shall not exceed \$36.4 million in total for all three measures combined.</p> <p>The Authority, as a condition of providing funding, will require the implementing entity to implement relevant IAMFs and direct mitigation measures applied to the Preferred Alternative during the construction of this improvement.</p> <p>See measure description, cost estimate, and roles and responsibilities sections in corresponding profile No. 16 in Final EIR/EIS, Volume 2, Appendix 5-C, Attachment A. See footnote 8.</p>	Design/ Pre-construction/ Construction (Completion prior to HSR operation)	<p>Provide funding to an implementing entity.</p> <p>Implementing entity to be determined by the Authority.</p> <p>Potential or anticipated implementing entity may be: City of San Jose</p>	Upon Funding	Authority	Authority	Provision of funding to implementing entity	Authority agreement with implementing entity	Safety (emergency vehicle response delay) effects described in Chapter 5, Environmental Justice, Table 5-26.
SSJ-OMM#2c	Monterey Road Pedestrian/Bike Overpass at Chynoweth	<p>Provide funding for pedestrian overcrossing of Monterey Road at Chynoweth Avenue. The improvement will provide an east-west connection, which will improve safety for students, pedestrians, and bicyclists.</p> <p>The Authority will provide funding for this overcrossing, and the City of San Jose will implement. The City is considering potential grade separation of the railroad crossings at this location. If grade separation is realized, then the underlying residual safety effect related to emergency vehicle response times will be avoided. Consequently, if the City is advancing the grade separations toward completion by the time the HSR project will become operational (nominally 2031 based on the Authority's 2020 Revised Business Plan) or within several years of commencement of HSR service between</p>	Design/ Pre-construction/ Construction (Completion prior to HSR operation)	<p>Provide funding to an implementing entity.</p> <p>Implementing entity to be determined by the Authority.</p> <p>Potential or anticipated implementing entity may be:</p>	Upon Funding	Authority	Authority	Provision of funding to implementing entity	Authority agreement with implementing entity	Safety (emergency vehicle response delay) effects described in Chapter 5, Environmental Justice, Table 5-26.

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<p>San Jose and Gilroy, then, provided there is agreement of both the Authority and the City, the Authority could instead provide the equivalent funding that would have gone to the pedestrian overcrossings to fund the grade separation project(s). The Authority's funding commitment for SSJ-OMM#2a, SSJ-OMM#2b, and SSJ-OMM#2c shall not exceed \$36.4 million in total for all three measures combined. See footnote 8.</p> <p>The Authority, as a condition of providing funding, will require the implementing entity to implement relevant IAMFs and direct mitigation measures applied to the Preferred Alternative during the construction of this improvement.</p> <p>See measure description, cost estimate, and roles and responsibilities sections in corresponding profile No. 16 in Final EIR/EIS, Volume 2, Appendix 5-C, Attachment A.</p>		City of San Jose						
SSJ-OMM#3	Noise Treatments for Residential Buildings Along US 101 to Address Existing Noise	<p>This measure will upgrade existing residential structures to improve noise attenuation along certain portions of U.S. Highway (US) 101. This measure will apply to up to 20 residential units along the west side of US 101 from Blossom Hill Road to SR 85, including the southbound exit ramp to SR 85.</p> <p>Noise barriers already exist in most of these residential areas adjacent to US 101. These barriers have been built as part of roadway improvement projects for noise abatement purposes and provide acoustical shielding at outdoor use areas and at ground-level facades of buildings. Accordingly, the proposed offsetting mitigation measure will instead focus on addressing indoor noise level through retrofitting up to 20 homes with noise reduction features, including upgraded windows and insulation. Funding for this measure shall not exceed \$500,000 in total, \$12,632 per single-family home, and \$25,000 per multifamily building. See Footnote 8.</p> <p>See measure description, cost estimate, and roles and responsibilities sections in corresponding profile No. 17 in Final EIR/EIS, Volume 2, Appendix 5-C, Attachment A.</p>	Design/ pre-construction/ construction (completion prior to HSR operation)	Implement noise treatment program	Quarterly	Authority/ Contractor	Authority	Documentation of homes treated and treatments implemented	Authority contract with implementing firm	Noise effects described in Chapter 5, Environmental Justice, Table 5-26.
SSJ-OMM#4	Caroline Davis Intermediate School All-Weather Turf and Track	<p>Provide funding in an amount not to exceed \$1,250,000 for upgrade of an existing natural turf to an all-weather turf and all-weather track at (Caroline) Davis Intermediate School. This will ensure year-round use for students, the community, and for sporting activities. This could include light standards, goal posts, striping, seating, turf, and track. See footnote 8.</p> <p>The Authority, as a condition of providing funding, will require the implementing entity to implement relevant IAMFs and direct mitigation measures applied to the Preferred Alternative during the construction of this improvement.</p> <p>See measure description, cost estimate, and roles and responsibilities sections in corresponding profile No. 18 in</p>	Design/ pre-construction/ construction (completion prior to HSR operation)	<p>Provide funding to an implementing entity.</p> <p>Implementing entity to be determined by the Authority.</p> <p>Potential or anticipated implementing</p>	Upon funding	Authority	Authority	Provision of funding to implementing entity	Authority agreement with implementing entity	Noise effects described in Chapter 5, Environmental Justice, Table 5-26.

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		Final EIR/EIS, Volume 2, Appendix 5-C, Attachment A.		entity may be: Oak Grove School District (OGSD)						
MH-OMM#3	Noise Treatments for Residential Buildings Along West Side of US 101	This measure will upgrade existing residential structures to improve noise attenuation along US 101 to promote a healthier community and improve the quality of life in the neighborhood. Residences in Morgan Hill are adjacent to the west side of US 101 from approximately 0.35 mile north of East Main Avenue to Diana Avenue and from San Pedro Avenue to Barret Avenue. Noise barriers already exist along approximately one-third of the length of these residential areas adjacent to US 101. This measure will provide resources to retrofit homes with noise reduction features, including upgraded windows and insulation. Funding for this measure shall not exceed \$1.1 million in total, \$12,500 per single-family home, and \$25,000 per multifamily building. See footnote 8. See measure description, cost estimate, and roles and responsibilities sections in corresponding profile No. 21 in Final EIR/EIS, Volume 2, Appendix 5-C, Attachment A.	Design/ pre-construction/ construction (completion prior to HSR operation)	Implement noise treatment program	Quarterly	Authority/ Contractor	Authority	Documentation of homes treated and treatments implemented	Authority contract with implementing firm	Noise effects described in Chapter 5, Environmental Justice, Table 5-26.
MH-OMM#4	Fund 30% Design of Master Plan for Caltrain Station and Access	Provide funding in an amount not to exceed \$500,000 of the 30% design for a Master Plan for Caltrain Station and Access in Morgan Hill. Does not include funding for capital improvements or subsequent design. See footnote 8. See measure description, cost estimate, and roles and responsibilities sections in corresponding profile No. 22 in Final EIR/EIS, Volume 2, Appendix 5-C, Attachment A.	Design/ pre-construction/ construction (completion prior to HSR operation)	Provide funding to an implementing entity.  Implementing entity to be determined by the Authority.  Potential or anticipated implementing entity may be:  City of Morgan Hill	Upon funding	Authority	Authority	Provision of funding to implementing entity	Authority agreement with implementing entity	Noise effects described in Chapter 5, Environmental Justice, Table 5-26.
MH-OMM#5	Fund School Bus Route Study	Provide funding in an amount not to exceed \$60,000 for a study to be prepared to evaluate and recommend potential enhancements to Morgan Hill Unified School District's bus routes. The study will focus on the effects of the institution of at-grade HSR service through the City of Morgan Hill. Using the locations of Morgan Hill Unified School District's students and school sites, the current route structure will be reviewed and assessed. Alternative route structures	Design/ pre-construction/ construction (completion prior to HSR operation)	Provide funding to an implementing entity.  Implementing entity to be determined by	Upon funding	Authority	Authority	Provision of funding to implementing entity	Authority agreement with implementing entity	Noise effects described in Chapter 5, Environmental Justice, Table 5-26.

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<p>and service patterns will be developed and tested to assess if modifications could be made that will reduce the effects (delay) of additional gate-down time on bus service. As part of the study, the local community, stakeholders, and school officials will be engaged so their input can be heard and incorporated into the work. See footnote 8.</p> <p>Does not include funding for additional buses, bus operations, capital improvements or subsequent study.</p> <p>See measure description, cost estimate, and roles and responsibilities sections in corresponding profile No. 23 in Final EIR/EIS, Volume 2, Appendix 5-C, Attachment A.</p>		<p>the Authority.</p> <p>Potential or anticipated implementing entity may be: Morgan Hill Unified School District</p>						
G-OMM#1	Sidewalk and Curb Improvement	<p>Provide funding in an amount not to exceed \$500,000 to improve sidewalks and curb ramps throughout the City of Gilroy in accordance with the results of the upcoming Citywide Sidewalk Condition Assessment Project. Currently, there are several sidewalks throughout the city that have gaps in the pedestrian network, damaged sidewalks, and curb ramps that are not compliant with current Americans with Disability Act (ADA) standards. The offsetting mitigation measure will make such improvements to the sidewalks and curb ramps identified in the assessment to improve pedestrian circulation and safety throughout the city. Sidewalk and Curb Improvement will be within the Gilroy Neighborhood Revitalization Strategy Area nominally along the HSR alignment between Las Animas Ave. on the north and US 101 on the south. See footnote 8.</p> <p>The Authority, as a condition of providing funding, will require the implementing entity to implement relevant IAMFs and direct mitigation measures applied to the Preferred Alternative during the construction of this improvement.</p> <p>See measure description, cost estimate, and roles and responsibilities sections in corresponding profile No. 26 in Final EIR/EIS, Volume 2, Appendix 5-C, Attachment A.</p>	Design/ pre-construction/ construction (completion prior to HSR operation)	<p>Provide funding to an implementing entity.</p> <p>Implementing entity to be determined by the Authority.</p> <p>Potential or anticipated implementing entity may be: City of Gilroy</p>	Upon funding	Authority	Authority	Provision of funding to implementing entity	Authority agreement with implementing entity	Safety (emergency vehicle response delay) effects described in Chapter 5, Environmental Justice, Table 5-26.
G-OMM#2	Bikeway Improvements (IOOF Avenue, Monterey Road, 6th Street, 4th Street, and Alexander Street)	<p>Provide funding in an amount not to exceed \$550,000 for bikeway enhancements to five roads within the City of Gilroy (IOOF Avenue, Monterey Road, 6th Street, 4th Street, and Alexander Street) in accordance with the Gilroy Station Area Plan and the City of Gilroy's Bicycle/Pedestrian Transportation Plan as follows:</p> <ul style="list-style-type: none"> <li>▪ IOOF Avenue: Class II bike lanes along IOOF Avenue between Monterey Road and Murray Avenue.</li> <li>▪ Monterey Road: Class II bike lanes between the northern Gilroy City limit and 3rd Street.</li> <li>▪ 6th Street: Additional bicycle markings between Chestnut Street and Camino Arroyo.</li> <li>▪ 4th Street: A bike boulevard along 4th Street between Monterey Road and Miller Avenue.</li> <li>▪ Alexander Street: Bike lanes between Lewis Street and</li> </ul>	Design/ pre-construction/ construction (completion prior to HSR operation)	<p>Provide funding to an implementing entity.</p> <p>Implementing entity to be determined by the Authority.</p> <p>Potential or anticipated implementing entity may be:</p>	Upon funding	Authority	Authority	Provision of funding to implementing entity	Authority agreement with implementing entity	Safety (emergency vehicle response delay) effects described in Chapter 5, Environmental Justice, Table 5-26.

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<p>Chestnut Street.</p> <p>The Authority, as a condition of providing funding, will require the implementing entity to implement relevant IAMFs and direct mitigation measures applied to the Preferred Alternative during the construction of this improvement.</p> <p>See measure description, cost estimate, and roles and responsibilities sections in corresponding profile No. 27 in Final EIR/EIS, Volume 2, Appendix 5-C, Attachment A. See also footnote 8.</p>		City of Gilroy						
G-OMM#3	Neighborhood Street Lighting	<p>Provide funding in an amount not to exceed \$250,000 for neighborhood street lighting within the Gilroy Neighborhood Revitalization Strategy Area nominally along the HSR alignment between Las Animas Ave. on the north and US 101 on the south. The measure will install new streetlights in areas where the streetlights do not currently meet the City of Gilroy's minimum standards for streetlight spacing.</p> <p>The Authority, as a condition of providing funding, will require the implementing entity to implement relevant IAMFs and direct mitigation measures applied to the Preferred Alternative during the construction of this improvement.</p> <p>See measure description, cost estimate, and roles and responsibilities sections in corresponding profile No. 28 in Final EIR/EIS, Volume 2, Appendix 5-C, Attachment A. See also footnote 8.</p>	Design/ pre-construction/ construction (completion prior to HSR operation)	<p>Provide funding to an implementing entity.</p> <p>Implementing entity to be determined by the Authority.</p> <p>Potential or anticipated implementing entity may be:</p> <p>City of Gilroy</p>	Upon funding	Authority	Authority	Provision of funding to implementing entity	Authority agreement with implementing entity	Safety (emergency vehicle response delay) effects described in Chapter 5, Environmental Justice, Table 5-26.
G-OMM#4	Murray Avenue Sidewalk Gap Closure Project	<p>Provide funding in an amount not to exceed \$1,235,000 to the City of Gilroy to construct approximately 2,000 linear feet of sidewalk on the west side of Murray Avenue between Kishimura Drive and Leavesley Road.</p> <p>The Authority, as a condition of providing funding, will require the implementing entity to implement relevant IAMFs and direct mitigation measures applied to the Preferred Alternative during the construction of this improvement.</p> <p>See measure description, cost estimate, and roles and responsibilities sections in corresponding profile No. 29 in Final EIR/EIS, Volume 2, Appendix 5-C, Attachment A. See also footnote 8.</p>	Design/ pre-construction/ construction (completion prior to HSR operation)	<p>Provide funding to an implementing entity.</p> <p>Implementing entity to be determined by the Authority.</p> <p>Potential or anticipated implementing entity may be: City of Gilroy</p>	Upon funding	Authority	Authority	Provision of funding to implementing entity	Authority agreement with implementing entity	Safety (emergency vehicle response delay) effects described in Chapter 5, Environmental Justice, Table 5-26.
G-OMM#5	IOOF Bicycle/ Pedestrian Overcrossing and Complete Streets	<p>Provide funding in an amount not to exceed \$13.2 million for a bicycle and pedestrian overcrossing at IOOF Avenue as well as additional complete street improvements, such as high visibility crosswalks, Americans with Disability Act (ADA) curb ramps, Class II bike lanes, and rectangular</p>	Design/ pre-construction/ construction (completion prior to HSR)	<p>Provide funding to an implementing entity.</p>	Upon funding	Authority	Authority	Provision of funding to implementing entity	Authority agreement with implementing entity	Safety (emergency vehicle response delay) effects described in Chapter 5, Environmental Justice, Table 5-26.

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<p>rapid flashing beacons on IOOF Avenue in the vicinity of Gilroy Prep School, South Valley Middle School, and Rebekah Children's Services.</p> <p>The Authority, as a condition of providing funding, will require the implementing entity to implement relevant IAMFs and direct mitigation measures applied to the Preferred Alternative during the construction of this improvement.</p> <p>See measure description, cost estimate, and roles and responsibilities sections in corresponding profile No. 30 in Final EIR/EIS, Volume 2, Appendix 5-C, Attachment A. See also footnote 8.</p>	operation)	<p>Implementing entity to be determined by the Authority.</p> <p>Potential or anticipated implementing entity may be: City of Gilroy</p>						
G-OMM#6	Noise Reduction Program	<p>This measure will upgrade existing residential structures to improve noise attenuation along US 101 in the area adjacent to the west side of US 101 from south of Las Animas Avenue to Leavesley Road, from Adams Court to San Ysidro Park, and from San Ysidro Park to north of East 7th Street. Funding for this measure shall not exceed \$1.15 million in total, \$12,500 per single-family home, and \$25,000 per multifamily building.</p> <p>This measure will provide resources to retrofit homes with noise reduction features, including upgraded windows and insulation.</p> <p>See measure description, cost estimate, and roles and responsibilities sections in corresponding profile No. 31 in Final EIR/EIS, Volume 2, Appendix 5-C, Attachment A. See also footnote 8.</p>	Design/ pre-construction/ construction (completion prior to HSR operation)	Implement noise treatment program	Quarterly	Authority/ Contractor	Authority	Documentation of homes treated and treatments implemented	Authority contract with implementing firm	Noise effects described in Chapter 5, Environmental Justice, Table 5-26.
G-OMM#8	Rebekah Children's Services New Security Fence and Gate	<p>Provide funding in an amount not to exceed \$100,000 to install fencing around the perimeter of the Rebekah Children's Services facility. See also footnote 8.</p> <p>The Authority, as a condition of providing funding, will require the implementing entity to implement relevant IAMFs and direct mitigation measures applied to the Preferred Alternative during the construction of this improvement.</p> <p>See measure description, cost estimate, and roles and responsibilities sections in corresponding profile No. 33 in Final EIR/EIS, Volume 2, Appendix 5-C, Attachment A.</p>	Design/ pre-construction/ construction (completion prior to HSR operation)	<p>Provide funding to an implementing entity.</p> <p>Implementing entity to be determined by the Authority.</p> <p>Potential or anticipated implementing entity may be: Rebekah Children's Services</p>	Upon funding	Authority	Authority	Provision of funding to implementing entity	Authority agreement with implementing entity	Safety (emergency vehicle response delay) effects described in Chapter 5, Environmental Justice, Table 5-26.
SJV-OMM#1	Volta Elementary School Improvements	<p>Provide funding in an amount not to exceed \$5 million to improve and expand Volta Elementary School. These funds could be used for tree planting and other landscaping; window replacement; insulation installation;</p>	Design/ pre-construction/ construction (completion prior	Provide funding to an implementing entity.	Upon funding	Authority	Authority	Provision of funding to implementing entity	Authority agreement with implementing entity	Noise effects described in Chapter 5, Environmental Justice, Table 5-26.

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		and construction of permanent classrooms to replace the portables, a parking area, or a community room at Volta Elementary School. Funds also could be used for water supply improvements and other critical safety features required for school expansion. See also footnote 8. The Authority, as a condition of providing funding, will require the implementing entity to implement relevant IAMFs and direct mitigation measures applied to the Preferred Alternative during the construction of this improvement. See measure description, cost estimate, and roles and responsibilities sections in corresponding profile No. 37 in Final EIR/EIS, Volume 2, Appendix 5-C, Attachment A.	to HSR operation)	Implementing entity to be determined by the Authority.  Potential or anticipated implementing entity may be: Los Banos Unified School District						
SJV-OMM#2	Volta Community Park at the Volta Elementary School	Provide funding in an amount not to exceed \$1,153,000 for development at the Volta Elementary School campus for use as a community park. The park could include a combination of turf, ball courts, shade structures, picnic tables, and play equipment and will be accessible to the broader community. This measure will also include fencing (to separate the park from the school for potential after hours use) and a small parking lot. The Authority, as a condition of providing funding, will require the implementing entity to implement relevant IAMFs and direct mitigation measures applied to the Preferred Alternative during the construction of this improvement. See measure description, cost estimate, and roles and responsibilities sections in corresponding profile No. 38 in Final EIR/EIS, Volume 2, Appendix 5-C, Attachment A. See also footnote 8.	Design/ pre-construction/ construction (completion prior to HSR operation)	Provide funding to an implementing entity.  Implementing entity to be determined by the Authority.  Potential or anticipated implementing entity may be: Los Banos Unified School District	Upon funding	Authority	Authority	Provision of funding to implementing entity	Authority agreement with implementing entity	Adverse effects related to visual aesthetics

AACSA	African American Community Services Agency	CMP	compensatory mitigation plan	HABS	Historic American Buildings Survey	NCCAB	North Central Coast Air Basin
ACE	Altamont Corridor Express	CP	control point	HAER	Historic American Engineering Record	NEPA	National Environmental Policy Act
ALAN	artificial light at night	CRHR	California Register of Historical Resources	HALS	Historic American Landscape Survey	NMFS	National Marine Fisheries Service
APE	area of potential effect	CRPR	California Rare Plant Ranks	HMP	habitat mitigation plan	NO <sub>x</sub>	nitrogen oxides
ATC	automatic train control	CSLC	California State Lands Commission	HSR	high-speed rail	NPS	National Park Service
ATP	Archaeological Treatment Plan	CWA	Clean Water Act	HST	high-speed train	NRCS	Natural Resources Conservation Service
Authority	California High-Speed Rail Authority	dB	decibel	HUC	hydrologic unit code	NRHP	National Register of Historic Places
BAAQMD	Bay Area Air Quality Management District	dBA	A-weighted decibel	I-	Interstate	NZE	near-zero emissions
BEMP	built environment monitoring plan	DPR	Department of Parks and Recreation	IAMF	impact avoidance and minimization feature	O <sub>3</sub>	ozone
BETP	built environment treatment plan	EFH	essential fish habitat	IBA	Important Bird Area	OCS	overhead contact system
BGEPA	Bald and Golden Eagle Protection Act	EIR/EIS	environmental impact report/environmental impact statement	L <sub>eq</sub>	equivalent sound level	OGSD	Oak Grove School District
BMP	best management practice	EMMA	Environmental Mitigation Management and Assessment system	LOS	level of service	O&M	operations and maintenance
BRMP	biological resources management plan	EO	Executive Order	MBARD	Monterey Bay Air Resources District	OMM	offsetting mitigation measure
Cal.	California	ESA	environmentally sensitive area	MBTA	Migratory Bird Treaty Act	OSHA	Occupational Safety and Health Administration
Caltrans	California Department of Transportation			MLD	most likely descendant	PA	Programmatic Agreement
CARB	California Air Resources Board	Fast Act	Fixing America's Surface Transportation Act	MOA	memorandum of agreement	PA	public address
CCC	Central California coast	FESA	Federal Endangered Species Act	MOU	memorandum of understanding	PI	principal investigator
C.F.R.	Code of Federal Regulations	FRA	Federal Railroad Administration	MOWF	maintenance of way facility	PM <sub>2.5</sub>	particulate matter less than or equal to 2.5 microns in diameter
CDFW	California Department of Fish and Wildlife	GAMMP	groundwater adaptive management and monitoring program	mph	miles per hour	PM <sub>10</sub>	particulate matter less than or equal to 10 microns in diameter
CEQA	California Environmental Quality Act	GEA	Grasslands Ecological Area	MTC	Metropolitan Transportation Commission	Res.	Resources
CESA	California Endangered Species Act	GIS	geographic information system	NAGPRA	Native American Grave Protection and Repatriation Act	REQ	request for qualifications
cm	centimeter	GPS	global positioning system	NAHC	Native American Heritage Commission	ROD	record of decision

RRP	Restoration and Revegetation Plan
RSA	resource study area
RTP	regional transportation plan
RWQCB	Regional Water Quality Control Board
SB	Senate Bill
SCCC	south-central California coast
SCVHA	Santa Clara Valley Habitat Agency
SCVHP	Santa Clara Valley Habitat Plan
SCVOSA	Santa Clara Valley Open Space Authority
SCVWD	Santa Clara Valley Water District
SFBAAB	San Francisco Bay Area Air Basin
SHPO	State Historic Preservation Officer
SJUSD	San Jose Unified School District
SJVAB	San Joaquin Valley Air Basin
SJUVAPCD	San Joaquin Valley Unified Air Pollution Control District SJVAPCD San Joaquin Valley Air Pollution Control District
SOI	Secretary of the Interior
SOQ	statement of qualifications
SR	State Route
SWRCB	State Water Resources Control Board
TAMC	Transportation Agency for Monterey County
TBM	tunnel boring machine
UPR	Upper Pajaro River
UPRR	Union Pacific Railroad
U.S.	United States
US	U.S. Highway
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
VCP	vegetation control plan
VERA	Voluntary Emission Reduction Agreement
VMT	vehicle miles traveled
VOC	volatile organic compound
VTA	Santa Clara Valley Transportation Authority
WCA	wildlife corridor assessment
WCP	Weed Control Plan
WEAP	worker environmental awareness program
WEF	wildlife exclusion fencing
WGTA	Washington/Guadalupe, Tamien, and Alma/Almaden
ZE	zero emissions
ZEV	zero emissions vehicle

**Table 2. San Jose to Merced Project Section Impact Avoidance and Minimization Features**

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism
<b>Transportation</b>									
TR-IAMF#1	Protection of Public Roadways during Construction	Prior to Construction, the Contractor shall provide a photographic survey documenting the condition of the public roadways along truck routes providing access to the proposed project site. The photographic survey shall be submitted for approval to the agency responsible for road maintenance and the Authority. The Contractor shall be responsible for the repair of any structural damage to public roadways caused by HSR construction or construction access, returning any damaged sections to the equivalent of their original pre HSR construction structural condition or better. The Contractor shall survey the condition of the public roadways along truck routes providing access to the proposed project site after construction is complete. The Contractor shall complete a before- and after-survey report and submit it to the Authority for review, indicating the location and extent of any damage.	Pre-construction/post-construction	Survey/ reporting	Immediately prior to and immediately following construction, and during construction as needed.	Authority/ Contractor	Contractor	Provide a photographic survey	Condition of construction contract
TR-IAMF#2	Construction Transportation Plan	<p>The design-build contractor shall prepare a detailed Construction Transportation Plan (CTP) for the purpose of minimizing the impact of construction and construction traffic on adjoining and nearby roadways in close consultation with the local jurisdiction having authority over the site. The Authority must review and approve the CTP before the Contractor commences any construction activities. This plan will address, in detail, the activities to be carried out in each construction phase, with the requirement of maintaining traffic flow during peak travel periods. Such activities include, but are not limited to, the routing and scheduling of materials deliveries, materials staging and storage areas, construction employee arrival and departure schedules, employee parking locations, and temporary road closures, if any. The CTP will provide traffic controls pursuant to the California Manual on Uniform Traffic Control Devices sections on temporary traffic controls (Caltrans 2012) and will include a traffic control plan that includes, at a minimum, the following elements:</p> <ul style="list-style-type: none"> <li>▪ Temporary signage to alert drivers and pedestrians to the construction zone.</li> <li>▪ Flag persons or other methods of traffic control.</li> <li>▪ Traffic speed limitations in the construction zone.</li> <li>▪ Temporary road closures and provisions for alternative access during the closure.</li> <li>▪ Detour provisions for temporary road closures—alternating one-way traffic will be considered as an alternative to temporary closures where practicable and where it will result in better traffic flow than a detour.</li> <li>▪ Identified routes for construction traffic.</li> <li>▪ Provisions for safe pedestrian and bicycle passage or convenient detour.</li> <li>▪ Provisions to minimize access disruption to residents, businesses, customers, delivery vehicles, and buses to the extent practicable—where road closures are required during construction, limit to the hours that are least disruptive to access for the adjacent land uses.</li> <li>▪ Provisions for farm equipment access.</li> <li>▪ Provisions for 24-hour access by emergency vehicles.</li> <li>▪ Safe vehicular and pedestrian access to local businesses and residences during construction. The plan will provide for scheduled</li> </ul>	Design/ construction	<p>Prepare plan/ reporting</p> <p>Consult with local city, county, transit agencies, and any key stakeholders identified by the Authority, which stakeholders shall include the SAP Center, on the draft CTP. Such consultation shall be undertaken prior to seeking Authority review and approval of the CTP. Comments from consulted entities on the CTP will be included in any draft CTP submitted for Authority approval.</p>	At incorporation or completion of design/ implementation during construction	Authority/ Contractor	Contractor	Prepare and implement CTP	Condition of construction contract

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism
		<p>transit access where construction will otherwise impede such access. Where an existing bus stop is within the work zone, the design-builder will provide a temporary bus stop at a safe and convenient location away from where construction is occurring in close coordination with the transit operator. Adequate measures will be taken to separate students and parents walking to and from the temporary bus stop from the construction zone.</p> <ul style="list-style-type: none"> <li>Advance notification to the local school district of construction activities and rigorously maintained traffic control at all school bus loading zones, to provide for the safety of schoolchildren. Review existing or planned Safe Routes to Schools with school districts and emergency responders to incorporate roadway modifications that maintain existing traffic patterns and fulfill response route and access needs during project construction and HSR operations.</li> <li>Identification and assessment of the potential safety risks of project construction to children, especially in areas where the project is located near homes, schools, day care centers, and parks.</li> <li>Promotion of child safety within and near the project area. For example, crossing guards could be provided in areas where construction activities are located near schools, day care centers, and parks.</li> </ul> <p>CTPs will consider and account for the potential for overlapping construction projects.</p>							
TR-IAMF#3	Off-Street Parking for Construction-Related Vehicles	The Contractor shall identify adequate off-street parking for all construction-related vehicles throughout the construction period to minimize impacts to public on-street parking areas. If adequate parking cannot be provided on the construction sites, the Contractor shall designate a remote parking area and arrange for the use a shuttle bus to transfer construction workers to/from the job site. This measure shall be addressed in the CTP.	Design/ construction	Prepare plan	Prior to construction	Authority/ Contractor	Contractor	Prepare CTP/identify adequate off-street parking for all construction-related vehicles	Condition of construction contract
TR-IAMF#4	Maintenance of Pedestrian Access	The Contractor shall prepare specific construction management plans to address maintenance of pedestrian access during the construction period. Actions that limit pedestrian access will include, but not be limited to, sidewalk closures, bridge closures, crosswalk closures or pedestrian rerouting at intersections, placement of construction-related material within pedestrian pathways or sidewalks, and other actions that may affect the mobility or safety of pedestrians during the construction period. If sidewalks are maintained along the construction site frontage, provide covered walkways and fencing. The plan objective shall be to maintain pedestrian access where feasible (i.e., meeting design, safety, Americans with Disabilities Act (ADA) requirements). This measure shall be addressed in the CTP.	Design/ construction	Prepare plan	Prior to construction	Authority/ Contractor	Contractor	Prepare construction management plans that address maintenance of pedestrian access	Condition of construction contract
TR-IAMF#5	Maintenance of Bicycle Access	The Contractor shall prepare specific construction management plans to address maintenance of bicycle access during the construction period. Actions that limit bicycle access will include, but not be limited to, bike lane closures or narrowing, closure or narrowing of streets that are designated bike routes, bridge closures, placement of construction-related materials within designated bike lanes or along bike routes, and other actions that may affect the mobility or safety of bicyclists during the construction period. Maintain bicycle access where feasible (i.e., meeting design, safety, ADA requirements). This measure shall be addressed in	Design/ construction	Prepare plan	Prior to construction	Authority/ Contractor	Contractor	Prepare construction management plans that address maintenance of bicycle access	Condition of construction contract

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism
		the CTP.							
TR-IAMF#6	Restriction on Construction Hours	The Contractor shall limit construction material deliveries between 7 a.m. and 9 a.m. and between 4 p.m. and 6 p.m. on weekdays to minimize impacts to traffic on roadways. The Contractor shall limit the number of construction employees arriving or departing the site between the hours of 7 a.m. and 8:30 a.m. and 4:30 p.m. and 6 p.m. Areas where these restrictions will be implemented will be determined as part of the CTP. Based on Authority review of the CTP the restricted hours maybe altered due to local travel patterns.	Construction	CTP to be prepared prior to construction followed by reporting	Prior to construction/ weekly	Authority/ Contractor	Contractor	Prepare CTP/limit construction materials deliveries and employee arrival and departures	Condition of construction contract
TR-IAMF#7	Construction Truck Routes	The Contractor shall deliver all construction-related equipment and materials on the appropriate truck routes and shall prohibit heavy-construction vehicles from using alternative routes to get to the site. Truck routes will be established away from schools, day care centers, and residences, or along routes with the least impact if the Authority determines those areas are unavoidable. This measure shall be addressed in the CTP.	Construction	CTP to be prepared prior to construction followed by reporting	Prior to construction/ weekly	Authority/ Contractor	Contractor	Prepare CTP/ establish truck routes	Condition of construction contract
TR-IAMF#8	Construction during Special Events	<p>The Contractor shall provide a mechanism to prevent roadway construction activities from reducing roadway capacity during major athletic events or other special events that substantially (10% or more) increase traffic on roadways affect by project construction. Mechanisms include the presence of police officers directing traffic, special-event parking, use of within-the-curb parking, or shoulder lanes for through-traffic and traffic cones. This measure shall be addressed in the CTP.</p> <p>The Contractor shall identify adequate off-street parking using existing remote parking areas or vacant land to replace any temporary displacement of parking utilized for special events at the SAP Center on a 1:1 basis during construction.</p>	Design/Construction	<p>CTP to be prepared prior to construction followed by reporting</p> <p>During design, Authority Contractor(s) will work with and consult with the SAP Center on the preferred design and location of temporary 1:1 replacement parking for SAP Center parking losses during Project construction.</p>	Prior to construction/ weekly	Authority/ Contractor	Contractor	Prepare CTP/ event coordination	Condition of construction contract
TR-IAMF#9	Protection of Freight and Passenger Rail during Construction	The Contractor shall repair any structural damage to freight or public railways that may occur during the construction period, and return any damaged sections to their original structural condition. If necessary, during construction, a "shoofly" track will be constructed to allow existing train lines to bypass any areas closed for construction activities. Upon completion, tracks will be opened and repaired; or new mainline track will be constructed, and the "shoofly" will be removed. Contractor repair responsibility will be included in the design/build contract.	Construction	CTP to be prepared prior to construction followed by reporting	Weekly	Authority/ Contractor	Contractor	Repair structural damage to freight or public railways	Condition of construction contract
TR-IAMF#11	Maintenance of Transit Access	The Contractor shall prepare specific construction management plans to address maintenance of transit access during the construction period. Actions that limit transit access will include, but not be limited to, roadway lane closures or narrowing, closure or narrowing of streets that are designated transit routes, bus stop closures, bridge closures, placement	Construction	CTP to be prepared prior to construction followed by reporting	Prior to construction/ weekly	Authority/ Contractor	Contractor	Prepare Construction Management Plans to address maintenance of transit access	Condition of construction contract

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism
		of construction-related materials within designated transit lanes, bus stop or layover zones or along transit routes, and other actions that may affect the mobility or safety of bus transit during the construction period. Maintain transit access where feasible (i.e., meeting design, safety, ADA requirements). This measure shall be addressed in the CTP.							
TR-IAMF#12	Pedestrian and Bicycle Safety	Prior to construction, the Contractor shall provide a technical memorandum describing how pedestrian and bicycle accessibility will be provided and supported across the HSR corridor, to and from stations and on station property. Priority of safety for pedestrians and bicycles and vulnerable populations over motor vehicle access will be done in a way so as to encourage maximum potential access from non-motorized modes. Local access programs, such as Safe Routes to Schools, shall be maintained or enhanced. Access to community facilities for vulnerable populations shall be maintained or enhanced.	Pre-construction	Prepare technical memorandum	Prior to construction	Authority/ Contractor	Contractor	Preparation of a pedestrian and bicycle accessibility technical memorandum	Condition of construction contract
<b>Air Quality and Greenhouse Gases</b>									
AQ-IAMF#1	Fugitive Dust Emissions	<p>During construction, the Contractor shall employ the following measures to minimize and control fugitive dust emissions. The Contractor shall prepare a fugitive dust control plan for each distinct construction segment. At a minimum, the plan shall describe how each measure will be employed and identify an individual responsible for ensuring implementation. At a minimum, the plan shall address the following components unless alternative measures are approved by the applicable air quality management district:</p> <ul style="list-style-type: none"> <li>▪ Cover all vehicle loads transported on public roads to limit visible dust emissions, and maintain at least 6 inches of freeboard space from the top of the container or truck bed.</li> <li>▪ Clean all trucks and equipment before exiting the construction site using an appropriate cleaning station that does not allow runoff to leave the site or mud to be carried on tires off the site.</li> <li>▪ Water exposed surfaces and unpaved roads at a minimum three times daily with adequate volume to result in wetting the top 1 inch of soil while avoiding overland flow. Rain events may sufficiently wet the top 1 inch of soil to alleviate the need to manually apply water.</li> <li>▪ Limit vehicle travel speed on unpaved roads to 15 miles per hour (mph).</li> <li>▪ Suspend any dust-generating activities when average wind speed exceeds 25 mph.</li> <li>▪ Stabilize all disturbed areas, including storage piles that are not being used on a daily basis for construction purposes, by using water, a chemical stabilizer/suppressant, or hydro mulch or by covering with a tarp or other suitable cover or vegetative ground cover. In areas adjacent to organic farms, the Authority will use nonchemical means of dust suppression.</li> <li>▪ Stabilize all on-site unpaved roads and off-site unpaved access roads using water or a chemical stabilizer/suppressant. In areas adjacent to organic farms, the Authority will use nonchemical means of dust suppression.</li> <li>▪ Apply water to or presoak all areas where land clearing, grubbing, scraping, excavation, land leveling, grading, cut-and-fill, and demolition activities are carried out.</li> <li>▪ For buildings up to six stories tall, wet all exterior surfaces of buildings during demolition.</li> </ul>	Construction	Prepare plan/ Reporting	Weekly	Authority/ Contractor	Contractor	Prepare a fugitive dust control plan	Condition of construction contract

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism
		<ul style="list-style-type: none"> <li>Limit or expeditiously remove the accumulation of mud or dirt from adjacent public streets at a minimum of once daily, using a vacuum type sweeper.</li> <li>After the addition of materials to or the removal of materials from the surface or outdoor storage piles, apply sufficient water or a chemical stabilizer/suppressant.</li> </ul>							
AQ-IAMF#2	Selection of Coatings	<p>During construction, the Contractor will use:</p> <ul style="list-style-type: none"> <li>Low-volatile organic compound (VOC) paint that contains less than 10% of VOC contents (VOC, 10%).</li> </ul> <p>Super-compliant or Clean Air paint that has a lower VOC content than that required by Bay Area Air Quality Management District Regulation 8, Rule 3, Monterey Bay Unified Air Pollution Control District Rule 426, and San Joaquin Valley Unified Air Pollution Control District Rule 4601, when available. If not available, the Contractor will document the lack of availability, recommend alternative measure(s) to comply with Regulation 8, Rule 3, Rule 426, and Rule 4601 or disclose absence of measure(s) for full compliance, and obtain concurrence from the Authority.</p>	Construction	Low-VOC paint use	Monthly	Authority/ Contractor	Contractor	Use of low-VOC paint during construction	Condition of construction contract
AQ-IAMF#3	Renewable Diesel	<p>During construction, the Contractor will use renewable diesel fuel to minimize and control exhaust emissions from all heavy-duty diesel-fueled construction diesel equipment and on-road diesel trucks. Renewable diesel must meet the most recent ASTM D975 specification for Ultra Low Sulfur Diesel and have a carbon intensity no greater than 50% of diesel with the lowest carbon intensity among petroleum fuels sold in California. The Contractor will provide the Authority with monthly and annual reports, through the Environmental Mitigation Management and Application (EMMA) system, of renewable diesel purchase records and equipment and vehicle fuel consumption. Exemptions to use traditional diesel can be made where renewable diesel is not available from suppliers within 200 miles of the project site. The construction contract must identify the quantity of traditional diesel purchased and fully document the availability and price of renewable diesel to meet project demand.</p>	Construction	Renewable diesel fuel use	Monthly	Authority/ Contractor	Contractor	Use of renewable diesel fuel during construction	Contract requirements and specifications
AQ-IAMF#4	Reduce Criteria Exhaust Emissions from Construction Equipment	<p>Prior to issuance of construction contracts, the Authority will incorporate the following construction equipment exhaust emissions requirements into the contract specifications:</p> <ul style="list-style-type: none"> <li>All heavy-duty off-road construction diesel equipment used during the construction phase will meet Tier 4 engine requirements.</li> <li>A copy of each unit's certified tier specification and any required CARB or air pollution control district operating permit will be made available to the Authority at the time of mobilization of each piece of equipment.</li> <li>The Contractor will keep a written record (supported by equipment-hour meters where available) of equipment usage during project construction for each piece of equipment.</li> <li>The Contractor will provide the Authority with monthly reports of equipment operating hours (through the EMMA system) and annual reports documenting compliance.</li> </ul>	Pre-construction	Contract specifications	Prior to construction	Authority	Authority	Exhaust emissions requirements incorporated into contract specifications	Contract requirements and specifications
AQ-IAMF#5	Reduce Criteria Exhaust Emissions from On-Road Construction Equipment	<p>Prior to issuance of construction contracts, the Authority will incorporate the following material-hauling truck fleet mix requirements into the contract specifications:</p>	Pre-construction	Contract specifications	Prior to construction	Authority	Authority	Material hauling truck fleet mix requirements incorporated into	Contract requirements and specifications

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism
		<ul style="list-style-type: none"> <li>All diesel on-road trucks used to haul construction materials, including fill, ballast, rail ties, and steel, shall use a model year 2010 or newer engine.</li> <li>The Contractor will provide documentation to the Authority of efforts to secure such a fleet mix.</li> <li>The Contractor will keep a written record of equipment usage during project construction for each piece of equipment and provide the Authority with monthly reports of VMT (through EMMA) and annual reports documenting compliance.</li> </ul>						contract specifications	
AQ-IAMF#6	Reduce the Potential Impact of Concrete Batch Plants	Prior to construction of any concrete batch plant, the Contractor will provide the Authority with a technical memorandum documenting consistency with the Authority's concrete batch plant siting criteria and utilization of typical control measures. Concrete batch plants will be sited at least 1,000 feet from sensitive receptors, including places such as daycare centers, hospitals, senior care facilities, residences, parks, and other areas where people may congregate. The concrete batch plant will implement typical control measures to reduce fugitive dust such as water sprays, enclosures, hoods, curtains, shrouds, movable and telescoping chutes, central dust collection systems, and other suitable technology, to reduce emissions to be equivalent to the USEPA AP-42 controlled emission factors for concrete batch plants. The Contractor will provide to the Authority documentation that each batch plant meets this standard during operation.	Construction	Prepare plan/reporting	Prior to construction of concrete batch plants	Authority/ Contractor	Contractor	Preparation of a concrete batch plant technical memorandum	Contract requirements and specifications
<b>Noise and Vibration</b>									
NV-IAMF#1	Noise and Vibration	<p>Prior to construction, the Contractor shall prepare and submit to the Authority a noise and vibration technical memorandum documenting how the FTA and FRA guidelines for minimizing construction noise and vibration impacts will be employed when work is being conducted within 1,000 feet of sensitive receptors. Typical construction practices contained in the FTA and FRA guidelines for minimizing construction noise and vibration impacts include the following:</p> <ul style="list-style-type: none"> <li>Construct noise barriers, such as temporary walls or piles on excavated material, between noisy activities and noise sensitive resources.</li> <li>Route truck traffic away from residential streets, when possible.</li> <li>Construct walled enclosures around especially noisy activities or around clusters or noise equipment.</li> <li>Combine noisy operations so that they occur in the same period.</li> <li>Phase demolition, earthmoving, and ground impacting operations so as not to occur in the same time period.</li> <li>Avoid impact pile driving where possible in vibration sensitive areas.</li> </ul>	Pre-construction/ construction	Prepare technical memorandum/ compliance reporting	Monthly	Authority/ Contractor	Contractor	Prepare a construction noise and vibration technical memorandum	Condition of construction contract
<b>Electromagnetic Fields and Electromagnetic Interference</b>									
EMF/EMI-IAMF#1	Preventing Interference with Adjacent Railroads	TM 3.00.10. Implementation Stage Electromagnetic Compatibility Program Plan (ISEP) requires coordination with adjacent railroads. During Project Design the Contractor will work with the engineering departments of railroads that operate parallel the HSR to apply standard design practices to prevent interference with the electronic equipment operated by these railroads. Prior to operation and maintenance of each operating segment, the Contractor shall certify through issuance of a technical memorandum to the Authority that design provisions to prevent	Design/ construction	Prepare technical memorandum/ compliance reporting	Monthly	Authority/ Contractor	Contractor/ Authority	Prepare electromagnetic compatibility technical memorandum	Condition of construction contract

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism
		interference have been established and have been determined to be effective prior to the activation of potentially interfering systems of the HSR. The Contractor will work with the railroad engineering departments where these railways parallel the HSR to apply the standard design practices to prevent interference with the electronic equipment operated by these railroads. Design provisions to prevent interference will be put in place and determined to be adequately effective by a qualified electrical engineering professional prior to the HSR activation of potentially interfering systems. The HSR Design Criteria Manual (DCM) Chapter 26 summarizes the applicable electromagnetic interference/electromagnetic field (EMI/EMF) design standards that the Authority will use for the project.							
EMF/EMI-IAMF#2	Controlling Electromagnetic Fields/Electromagnetic Interference	<p>Prior to construction, the Contractor will prepare an electromagnetic field/electromagnetic interference technical memorandum for review and approval by the Authority. The HSR project shall adhere to international guidelines and comply with applicable federal and state laws and regulations. The HSR project design will follow TM 300.10, ISEP, the CHSR DCM Chapter 26, which provides detailed EMC design criteria for the HSR systems and equipment, and the HSR DCM Chapter 22, which addresses grounding requirements for third-party metallic structures, including fences and pipelines, which are parallel and adjacent to the CHSTS right of way. These documents describe the design practices to avoid EMI and to provide for HSR operational safety. Some measures of the ISEP include:</p> <ul style="list-style-type: none"> <li>▪ During the planning stage through system design, the Authority will perform electromagnetic compatibility (EMC)/EMI safety analyses, which will include identification of existing nearby radio systems, design of systems to prevent EMI with identified neighboring uses, and incorporation of these design requirements into bid specifications used to procure radio systems.</li> <li>▪ Pipelines and other linear metallic objects that are not sufficiently grounded through the direct contact with earth will be separately grounded in coordination with the affected owner or utility to avoid possible shock hazards. For cases where metallic fences are purposely electrified to inhibit livestock or wildlife from traversing the barrier, specific insulation design measures will be implemented.</li> <li>▪ HSR standard corrosion protection measures will be implemented to eliminate risk of substantial corrosion of nearby metal objects.</li> </ul>	Design/ construction	Prepare technical memorandum/ compliance reporting	Monthly	Authority/ Contractor	Contractor/ Authority	Prepare EMI/EMF technical memorandum	Condition of construction contract
<b>Public Utilities and Energy</b>									
PUE-IAMF#1	Design Measures	The HSR project design incorporates utilities and design elements that minimize electricity consumption (e.g., using regenerative braking, energy-saving equipment on rolling stock and at station facilities, implementing energy saving measures during construction, and automatic train operations to maximize energy efficiency during operations). Thus, the project will not overburden utility services. The design elements are included in the design-build contract. Additionally, the Authority has adopted a sustainability policy that establishes project design and construction requirements that avoid and minimize impacts	Design/ construction	Reporting	At incorporation or completion of design/monthly reporting (during construction)	Authority/ Contractor	Contractor	Incorporate utilities and design elements that minimize electrical consumption into design	Condition of construction contract
PUE-IAMF#2	Irrigation Facility	Where relocating an irrigation facility is necessary, the Contractor will verify the new facility is operational prior to disconnecting the original	Design/ pre-	Reporting	Monthly	Authority/	Contractor	Verify new irrigation facilities are	Condition of

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism
	Relocation	facility, where feasible. Irrigation facility relocation preferences are included in the construction contract and reduce unnecessary impacts to continued operation of irrigation facilities. The Contractor shall document all relocations in a memorandum for Authority review and approval.	construction			Contractor		operational prior to disconnecting original facility	construction contract
PUE-IAMF#3	Public Notifications	Prior to construction in areas where utility service interruptions are unavoidable, the Contractor will notify the public through a combination of communication media (e.g., by phone, email, mail, newspaper notices, or other means) within that jurisdiction and the affected service providers of the planned outage. The notification will specify the estimated duration of the planned outage and will be published no less than 7 days prior to the outage. Construction will be coordinated to avoid interruptions of utility service to hospitals and other critical users. The Contractor will submit the public communication plan to the Authority 60 days in advance of the work for verification that appropriate messaging and notification are to be provided.	Pre-construction/ construction	Public notification	Monthly	Authority/ Contractor	Contractor	Public notification of utility service interruptions 60 days in advance of work for verification	Condition of construction contract
PUE-IAMF#4	Utilities and Energy	Prior to construction, the Contractor shall prepare a technical memorandum documenting how construction activities will be coordinated with service providers to minimize or avoid interruptions. It will include upgrades of existing power lines to connect the HSR system to existing utility substations. The technical memorandum shall be provided to the Authority for review and approval.	Design/ pre-construction	Prepare a technical memorandum	At incorporation or completion of design/monthly reporting (during construction)	Authority/ Contractor	Contractor	Prepare service provider coordination technical memorandum	Condition of construction contract
<b>Biological and Aquatic Resources</b>									
BIO-IAMF#1	Designated Project Biologist, Designated Biologists, Species-Specific Biological Monitors, and General Biological Monitors	At least 15 business days prior to commencement of any ground-disturbing activity, including but not limited to geotechnical investigations, utility realignments, creation of staging areas, or initial clearing and grubbing, the Authority will submit the name(s) and qualifications of Project Biologists, Designated Biologists, Species-Specific Biological Monitors, and General Biological Monitors retained to conduct biological resource monitoring activities and implement avoidance and minimization measures. No ground disturbing activity will begin until the Authority has received written approval from the U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), where applicable, and the California Department of Fish and Wildlife (CDFW) that the biologists and monitors have been approved to conduct the specified work. The Project Biologist is responsible for ensuring the timely implementation of the biological avoidance and minimization measures as outlined in the Biological Resources Management Plan (BRMP), and for guiding and directing the work of the Designated Biologists and Biological Monitors. Designated Biologists will be responsible for directly overseeing and reporting the implementation of general and species-specific conservation measures. In some instances, Designated Biologists will only be approved for specific species, in which case they will only be authorized to conduct surveys and implement measures for the species for which they have been approved. Species-Specific Biological Monitors will be responsible for implementation of species-specific measures for the species for which they have been approved, and will report directly to a Designated Biologist. General Biological Monitors will report directly to a Designated Biologist or to the Project Biologist. General Biological Monitors will be responsible for conducting Worker Environmental Awareness Program (WEAP) training, implementing general conservation measures, conducting general	Pre-construction	Compliance reporting	15 days prior to ground disturbance	Authority	Authority	Submit names of biologists and monitors to regulatory agencies	Condition of construction contract

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism
		compliance monitoring, and reporting on compliance monitoring activities. The term Project Biologist is used in these IAMFs to mean the Project Biologist, Designated Biologists, Species-Specific Biological Monitors, and General Biological Monitors, as appropriate. When the Authority is specified as implementing an IAMF, it is assumed that the Authority, or its contractor or agent, is implementing the IAMF under the supervision of biologists and biological monitors, as appropriate.							
BIO-IAMF#2	Facilitate Agency Access	Throughout the construction period, the Authority will allow access by the USFWS, NMFS, U.S. Army Corps of Engineers (USACE), CDFW, and State Water Resources Control Board (SWRCB) to the project site. Because of safety concerns, all visitors will check in with the Authority's resident engineer prior to entering the project footprint. In the event that agency personnel visit the project footprint, the Project Biologist will prepare a memorandum within 3 business days after the visit documenting the issues raised during the field meeting. The Project Biologist will report any issues regarding regulatory compliance raised by agency personnel to the Authority.	Construction	Compliance reporting	3 days after regulatory agency site visit	Authority/ Contractor	Contractor	Prepare memorandum documenting agency site visit	Condition of construction contract
BIO-IAMF#3	Prepare WEAP Training Materials and Conduct Construction Period WEAP Training	<p>Prior to any ground-disturbing activity, the Project Biologist will prepare a WEAP for the purpose of training construction crews to recognize and identify sensitive biological resources that may be encountered in the vicinity of the project footprint. The WEAP training materials will be submitted to the Authority for review and approval. A video of the WEAP training prepared and presented by the Project Biologist and approved by the Authority may be used if the Project Biologist is not available to present the training in person.</p> <p>At a minimum, WEAP training materials will include the following information: key provisions of the federal Endangered Species Act (federal ESA), the California Endangered Species Act (CESA), the Bald and Golden Eagle Protection Act (BGEPA), the Migratory Bird Treaty Act (MBTA), California Fish and Game Code 1600, Porter-Cologne Water Quality Control Act (Porter-Cologne), and the Clean Water Act (CWA); the consequences and penalties for violation or noncompliance with these laws and regulations and project authorizations; identification and characteristics of special-status plants, special-status wildlife, jurisdictional waters, and special-status plant communities and explanations about their ecological value; hazardous substance spill prevention and containment measures; the contact person in the event of the discovery of a dead or injured wildlife species; and review of avoidance, minimization, and mitigation measures.</p> <p>The Project Biologist will present WEAP training to all construction personnel before they work in the project footprint. As part of the WEAP training, construction timing in relation to species' habitat and life-stage requirements will be detailed and discussed on project maps, which will show areas of planned minimization and avoidance measures. Crews will be informed during the WEAP training that, except when necessary as determined in consultation with the Project Biologist, travel within the project footprint is restricted to established roadbeds, which include all pre-existing and project-constructed unimproved and improved roads. A fact sheet conveying this information will be prepared by the Project Biologist for distribution to the construction crews and to others who enter the project footprint. Fact sheet information will be duplicated in a wallet-sized format and will be provided in other languages as necessary</p>	Pre-construction	Training program/ reporting	Annual (training)/ monthly (reporting)	Contractor/ Authority	Contractor/ Authority	Prepare WEAP/ annual training/ monthly reporting	WEAP

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism
		<p>to accommodate non-English speaking workers. All construction staff will attend the WEAP training prior to beginning work on-site, and will attend the WEAP training on an annual basis thereafter.</p> <p>Upon completion of the WEAP training, each member of the construction crew will sign a form stating that they attended the training, understood the information presented, and agreed to comply with the requirements set out in the WEAP training. The Project Biologist will submit the signed WEAP training forms to the Authority on a monthly basis. On an annual basis, the Authority will certify that WEAP training had been provided to all construction personnel. On a monthly basis, the Project Biologist will provide updates relevant to the training to construction personnel during the daily safety ("tailgate") meeting.</p>							
BIO-IAMF#4	Conduct Operation and Maintenance Period WEAP Training	<p>Prior to initiating operation and maintenance (O&amp;M) activities, O&amp;M personnel will attend a WEAP training session arranged by the Authority. At a minimum, O&amp;M WEAP training materials will include the following information: key provisions of the ESA, CESA, the BGEPA, the MBTA, Porter-Cologne, and the CWA; the consequences and penalties for violation or noncompliance with these laws and regulations and project authorizations; identification and characteristics of special-status plants, special-status wildlife, jurisdictional waters, and special-status plant communities and explanations about their ecological value; hazardous substance spill prevention and containment measures; and the contact person in the event of the discovery of a dead or injured wildlife species. The training will include an overview of provisions of the biological resources management plan, annual vegetation, and management plan, weed control plan and security fencing and wildlife exclusion fencing maintenance plans pertinent to O&amp;M activities. A fact sheet prepared by the Authority environmental compliance staff will be prepared for distribution to the O&amp;M employees. The training will be provided by the Authority environmental compliance staff. The training sessions will be provided to employees prior to their involvement in any O&amp;M activity and will be repeated for all O&amp;M employees on an annual basis. Upon completion of the WEAP training, O&amp;M employees will, in writing, verify their attendance at the training sessions and confirm their willingness to comply with the requirements set out in those sessions.</p>	Post-construction	Training program/ reporting	Annual	Contractor/ Authority	Contractor/ Authority	WEAP training/ annual reporting	WEAP
BIO-IAMF#5	Prepare and Implement a Biological Resources Management Plan	<p>Prior to any ground-disturbing activity, the Project Biologist will prepare the BRMP, which will include a compilation of the biological resources avoidance and minimization measures applicable to the HSR section. All project environmental plans, such as the Restoration and Revegetation Plan (RPP) and Weed Control Plan (WCP), will be included as appendices to the BRMP. The BRMP is intended to serve as a comprehensive document that sets out the range of avoidance and minimization measures to support the appropriate and timely implementation of those measures. The implementation of these measures will be tracked through final design, construction, and operation phases. The BRMP will contain, but not be limited to, the following information:</p> <ul style="list-style-type: none"> <li>▪ A master schedule that shows construction of the project, pre-construction surveys, and establishment of buffers and exclusions zones to protect sensitive biological resources.</li> <li>▪ Specific measures for the protection of special-status species.</li> </ul>	Pre-construction	Prepare plan	Prior to any ground-disturbing activity	Authority/ Contractor	Contractor	Prepare BRMP	USFWS, USACE, SWRCB, and CDFW permits

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism
		<ul style="list-style-type: none"> <li>▪ Identification (on construction plans) of the locations and quantity of habitats to be avoided or removed, along with the locations where habitats are to be restored.</li> <li>▪ Identification of agency-approved Project Biologist(s) and Biological Monitor(s), including those responsible for notification and report of injury or death of federally or State-listed species.</li> <li>▪ Measures to preserve topsoil and control erosion.</li> <li>▪ Design of protective fencing around Environmentally Sensitive Areas (ESAs) and the construction staging areas.</li> <li>▪ Locations of trees to be protected as wildlife habitat (roosting sites) and locations for planting replacement trees.</li> <li>▪ Specification of the purpose, type, frequency, and extent of chemical use for insect and disease control operations as part of vegetative maintenance within sensitive habitat areas.</li> <li>▪ Specific measures for the protection of vernal pool habitat and riparian areas. These measures may include erosion and siltation control measures, protective fencing guidelines, dust control measures, grading techniques, construction area limits, and biological monitoring requirements.</li> <li>▪ Provisions for biological monitoring during ground disturbing activities to confirm compliance and success of protective measures. The monitoring will: (1) identify specific locations of wildlife habitat and sensitive species to be monitored; (2) identify the frequency of monitoring and the monitoring methods (for each habitat and sensitive species to be monitored); (3) list required qualifications of biological monitor(s); (4) identify the reporting requirements; and (5) provide an accounting of impacts to special-status species habitat compared to pre-construction impact estimates.</li> </ul> <p>The BRMP will be submitted to the Authority for review and approval prior to any ground disturbing activity.</p>							
BIO-IAMF#6	Establish Monofilament Restrictions	<p>Prior to any ground-disturbing activity, the Project Biologist will verify that plastic monofilament netting (erosion control matting) or similar material is not being used as part of erosion control activities. The Project Biologist will identify acceptable material for such use, including: geomembranes, coconut coir matting, tackified hydroseeding compounds, and rice straw wattles (e.g., Earthsaver wattles: biodegradable, photodegradable, burlap). Within developed or urban areas, the Project Biologist may allow exceptions to the restrictions on the type of erosion control material if the Project Biologist determines that the construction area is of sufficient distance from natural areas to ensure the avoidance of potential impacts to wildlife.</p>	Pre-construction	Compliance reporting	Monthly	Authority/ Contractor	Contractor	Monthly reporting	Condition of construction contract
BIO-IAMF#7	Prevent Entrapment in Construction Materials and Excavations	<p>At the end of each work day during construction, the Authority will cover all excavated, steep-sided holes or trenches more than 8 inches deep and that have sidewalls steeper than 1:1 (45 degree) slope with plywood or similar materials, or provide a minimum of one escape ramp per 100 feet of trenching (with slopes no greater than 3:1) constructed of earth fill or wooden planks. The Project Biologist will thoroughly inspect holes and trenches for trapped animals at the start and end of each work day.</p> <p>The Authority will screen, cover, or elevate at least 1 foot above ground, all construction pipe, culverts, or similar structures with a diameter of 3 inches or greater that are stored overnight within the project footprint. These pipes, culverts, and similar structures will be inspected by the</p>	Construction	Monitoring/ compliance reporting	Daily monitoring/ monthly reporting	Authority/ Contractor	Contractor	Daily monitoring/ monthly reporting	Condition of construction contract

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism
		Project Biologist for wildlife before such material is moved, buried, or capped.							
BIO-IAMF#8	Delineate Equipment Staging Areas and Traffic Routes	Prior to any ground-disturbing activity, the Authority will establish staging areas for construction equipment in areas that minimize effects to sensitive biological resources, including habitat for special-status species, seasonal wetlands, and wildlife movement corridors. Staging areas (including any temporary material storage areas) will be located in areas that will be occupied by permanent facilities, where practicable. Equipment staging areas will be identified on final project construction plans. The Authority will flag and mark access routes to ensure that vehicle traffic within the project footprint is restricted to established roads, construction areas and other designated areas.	Pre-construction	Compliance reporting	Monthly	Authority/ Contractor	Contractor	Monthly reporting	Condition of construction contract
BIO-IAMF#9	Dispose of Construction Spoils and Waste	During ground-disturbing activities, the Authority may temporarily store excavated materials produced by construction activities in areas at or near construction sites within the project footprint. Where practicable, the Authority will return excavated soil to its original location to be used as backfill. Any excavated waste materials unsuitable for treatment and reuse will be disposed at an off-site location, in conformance with applicable state and federal laws.	Construction	Compliance reporting	Monthly	Authority/ Contractor	Contractor	Monthly reporting	Condition of construction contract
BIO-IAMF#10	Clean Construction Equipment	Prior to any ground-disturbing activity, the Authority will ensure that all equipment entering the Work Area is free of mud and plant materials. The Authority will establish vehicle cleaning locations designed to isolate and contain organic materials and minimize opportunities for weeds and invasive species to move in and out of the project footprint. Cleaning may be done by washing with water, blowing with compressed air, brushing, or other hand cleaning. The cleaning areas will be located so as to avoid impacts to surface waters and appropriate Stormwater Pollution Prevention Plan (SWPPP) best management practices (BMP) will be implemented so as to further control any potential for the spread of weeds or other invasive species. Cleaning stations will be inspected regularly (at least monthly).	Pre-construction	Compliance reporting	Monthly	Authority/ Contractor	Contractor	Monthly reporting	Condition of construction contract
BIO-IAMF#11	Maintain Construction Sites	Prior to any ground-disturbing activity, the Authority will prepare a construction site BMP field manual. The manual will contain standard construction site housekeeping practices required to be implemented by construction personnel. The manual will identify BMPs for the following topics; temporary soil stabilization, temporary sediment control, wind erosion control, non-storm water management, waste management and materials control, rodenticide use, and other general construction site cleanliness measures.  All construction personnel will receive training on BMP field manual implementation prior to working within the project footprint. All personnel will acknowledge, in writing, their understanding of the BMP field manual implementation requirements. The BMP field manual will be updated by January 31st of each year. The Authority will provide, on an annual basis, training updates to all construction personnel.	Pre-construction	Reporting	Monthly	Authority/ Contractor	Contractor	Monthly reporting	Condition of construction contract
BIO-IAMF#12	Design the Project to be Bird Safe	Prior to final construction design, the Authority will ensure that the catenary system, masts, and other structures such as fencing, electric lines, communication towers and facilities are designed to be bird and raptor-safe in accordance with the applicable recommendations presented in <i>Suggested Practices for Raptor Protection on Power Lines</i> :	Pre-construction	Design	Prior to final design	Authority	Authority	Bird- and raptor-safe design overhead contact system, masts, and other structures such as fencing	Condition of construction contract

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism
		<p><i>The State of the Art in 2006</i> (APLIC 2006) and <i>Reducing Avian Collisions with Power Lines: State of the Art in 2012</i> (APLIC 2012), and other guidelines related to collisions with buildings available from the American Bird Conservancy (Sheppard and Phillips 2015). Applicable recommendations include, but are not limited to:</p> <ul style="list-style-type: none"> <li>▪ Ensuring sufficient spacing of phase conductors to prevent bird electrocution.</li> <li>▪ Configuring lines to reduce vertical spread of lines and/or decreasing the span length if such options are feasible.</li> <li>▪ Marking lines and fences (e.g., Bird Flight Diverter for fencing and lines) to increase the visibility of lines and reduce the potential for collision. Where fencing is necessary, using bird compatible design standards to increase visibility of fences to prevent collision and entanglement.</li> <li>▪ Installing perch guards to discourage avian presence on and near project facilities.</li> <li>▪ Minimizing the use of guywires. Where the use of guywires is unavoidable, demarcating guywires using the best available methods to minimize avian strikes (e.g., line markers).</li> <li>▪ Reusing or co-locating new transmission facilities and other ancillary facilities with existing facilities and disturbed areas to minimize habitat impacts and avoid collision risks.</li> <li>▪ Structures will be monopole or dual-pole design versus lattice tower design to minimize perching and nesting opportunities. Communication towers will conform to <i>Recommended Best Practices for Communication Tower Design, Siting, Construction, Operation, Maintenance, and Decommissioning</i> (UFWS 2018).</li> <li>▪ Use of facility lighting that does not attract birds or their prey to project sites. These include using non-steady burning lights (red, dual red and white strobe, strobe-like flashing lights) to meet Federal Aviation Administration requirements, using motion or heat sensors and switches to reduce the time when lights are illuminated, using appropriate shielding to reduce horizontal or skyward illumination, and avoiding the use of high-intensity lights (e.g., sodium vapor, quartz, and halogen). Lighting will not be installed under viaduct and bridge structures in riparian habitat areas.</li> <li>▪ Use of facility designs and architecture that minimizes the potential for bird collisions with buildings, to the extent feasible and consistent with local design requirements.</li> </ul> <p>Additional bird operational actions will be required for the Grasslands Ecological Area, dry lakes and playas, Audubon Important Bird Areas and documented avian movement corridors. These measures include:</p> <ul style="list-style-type: none"> <li>▪ Avoid, to the extent feasible, siting transmission lines across canyons or on ridgelines to prevent bird and raptor collisions.</li> <li>▪ Install bird flight diverters on all facilities spanning or within 1,000 feet of stream and wash channels, canals, ponds, and any other natural or artificial body of water.</li> <li>▪ Fencing or other type of flight diverter will be installed on all viaduct structures to encourage birds and raptors to fly over the HSR and avoid flying directly in the path of on-coming trains.</li> <li>▪ Use of bird-friendly lighting on all stationary light sources (i.e., lighting with shorter wavelengths toward the blue and green spectrum),</li> </ul>							

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		provided it is consistent with safety and security requirements.							
<b>Hydrology and Water Resources</b>									
HYD-IAMF#1	Storm Water Management	Prior to construction, the Contractor shall prepare a storm water management and treatment plan for review and approval by the Authority. During the detailed design phase, each receiving stormwater system's capacity to accommodate project runoff will be evaluated. As necessary, on-site stormwater management measures, such as detention or selected upgrades to the receiving system, will be designed to provide adequate capacity and to comply with the design standards in the latest version of Authority Technical Memorandum 2.6.5, Hydraulics and Hydrology Guidelines. On-site stormwater management facilities will be designed and constructed to capture runoff and provide treatment prior to discharge of pollutant-generating surfaces, including station parking areas, access roads, new road over- and underpasses, reconstructed interchanges, and new or relocated roads and highways. Low-impact development techniques will be used to detain runoff on site and to reduce off site runoff such as constructed wetland systems, biofiltration and bioretention systems, wet ponds, organic mulch layers, planting soil beds, and vegetated systems (biofilters), such as vegetated swales and grass filter strips, will be used where appropriate.	Design	Prepare plan	At incorporation or completion of design	Authority/ Contractor	Contractor	Prepare a stormwater management and treatment plan	Condition of construction contract
HYD-IAMF#2	Flood Protection	<p>Prior to construction, the Contractor shall prepare a flood protection plan for Authority review and approval. The project will be designed both to remain operational during flood events and to minimize increases in 100-year or 200-year flood elevations, as applicable to locale. Design standards will include the following:</p> <ul style="list-style-type: none"> <li>Establish track elevation to prevent saturation and infiltration of stormwater into the sub-ballast.</li> <li>Minimize development within the floodplain, to such an extent that water surface elevation in the floodplain will not increase by more than 1 foot, or as required by state or local agencies, during the 100-year or 200-year flood flow [as applicable to locale]. Avoid placement of facilities in the floodplain or raise the ground with fill above the base-flood elevation.</li> <li>Design the floodplain crossings to maintain a 100-year floodwater surface elevation of no greater than 1 foot above current levels, or as required by state or local agencies, and project features within the floodway itself will not increase existing 100-year floodwater surface elevations in Federal Emergency Management Agency-designated floodways, or as otherwise agreed upon with the county floodplains manager.</li> </ul> <p>The following design standards will minimize the effects of pier placement on floodplains and floodways:</p> <ul style="list-style-type: none"> <li>Design site crossings to be as nearly perpendicular to the channel as feasible to minimize bridge length.</li> <li>Orient piers to be parallel to the expected high-water flow direction to minimize flow disturbance.</li> <li>Elevate bridge crossings at least 3 feet above the high-water surface elevation to provide adequate clearance for floating debris, or as required by local agencies.</li> <li>Conduct engineering analyses of channel scour depths at each crossing to evaluate the depth for burying the bridge piers and</li> </ul>	Design	Prepare plan	At incorporation or completion of design	Authority/ Contractor	Contractor	Prepare flood protection plan	Condition of construction contract

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism
		<p>abutments. Implement scour-control measures to reduce erosion potential.</p> <ul style="list-style-type: none"> <li>Use quarry stone, cobblestone, or their equivalent for erosion control along rivers and streams, complimented with native riparian plantings or other natural stabilization alternatives that will restore and maintain a natural riparian corridor.</li> <li>Place bedding materials under the stone protection at locations where the underlying soils require stabilization as a result of stream-flow velocity.</li> </ul>							
HYD-IAMF#3	Prepare and Implement a Construction Stormwater Pollution Prevention Plan	<p>Prior to Construction (any ground disturbing activities), the Contractor shall comply with the State Water Resources Control Board (SWRCB) Construction General Permit requiring preparation and implementation of a SWPPP. The Construction SWPPP will propose BMPs to minimize potential short-term increases in sediment transport caused by construction, including erosion control requirements, stormwater management, and channel dewatering for affected stream crossings. These BMPs will include measures to incorporate permeable surfaces into facility design plans where feasible, and how treated stormwater will be retained or detained on site. Other BMPs shall include strategies to manage the amount and quality of overall stormwater runoff. The Construction SWPPP will include measures to address, but are not limited to, the following:</p> <ul style="list-style-type: none"> <li>Hydromodification management to verify maintenance of pre-project hydrology by emphasizing on site retention of stormwater runoff using measures such as flow dispersion, infiltration, and evaporation (supplemented by detention where required). Additional flow control measures will be implemented where local regulations or drainage requirements dictate.</li> <li>Implementing practices to minimize the contact of construction materials, equipment, and maintenance supplies with stormwater.</li> <li>Limiting fueling and other activities using hazardous materials to areas distant from surface water, providing drip pans under equipment, and daily checks for vehicle condition.</li> <li>Implementing practices to reduce erosion of exposed soil, including soil stabilization, regular watering for dust control, perimeter siltation fences, and sediment catchment basins.</li> <li>Implementing practices to maintain current water quality, including: siltation fencing, wattle barriers, stabilized construction entrances, grass buffer strips, ponding areas, organic mulch layers, inlet protection, storage tanks and sediment traps to arrest and settle sediment.</li> <li>Where feasible, avoiding areas that may have substantial erosion risk, including areas with erosive soils and steep slopes.</li> <li>Using diversion ditches to intercept surface runoff from off site.</li> <li>Where feasible, limiting construction to dry periods when flows in water bodies are low or absent.</li> <li>Implementing practices to capture and provide proper off-site disposal of concrete wash water, including isolation of runoff from fresh concrete during curing to prevent it from reaching the local drainage system, and possible treatments (e.g., dry ice).</li> <li>Developing and implementing a spill prevention and emergency response plan to handle potential fuel and/or hazardous material</li> </ul>	Pre-construction/ construction	Permit compliance	At incorporation or completion of design/ during monthly construction report	Authority/ Contractor	Contractor	Prepare construction SWPPP	Condition of construction contract

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism
		<p>spills.</p> <p>Implementation of a SWPPP will be performed by the construction contractor's as directed by the Contractor's Qualified SWPPP Practitioner or designee. As part of that responsibility, the effectiveness of construction BMPs must be monitored before, during and after storm events. Records of these inspections and monitoring results are submitted to the local regional water quality control board (RWQCB) as part of the annual report required by the Statewide Construction General Permit. The reports are available to the public online. The SWRCB and RWQCB will have the opportunity to review these documents.</p>							
HYD-IAMF#4	Prepare and Implement an Industrial Stormwater Pollution Prevention Plan	<p>Prior to construction of any facility classified as an industrial facility, the Contractor shall comply with existing water quality regulations. The stormwater general permit requires preparation of a SWPPP and a monitoring plan for industrial facilities that discharge stormwater from the site, including vehicle maintenance facilities associated with transportation operations. The permit includes performance standards for pollution control.</p>	Design/ construction	Permit compliance	At incorporation or completion of design/during monthly operation report	Authority/ Contractor	Contractor	Prepare operational SWPPP	Condition of construction contract
HYD-IAMF#5	Tunnel Design Features and Construction Methods	<p>The Contractor shall implement the following tunnel design features and construction methods to avoid and/or minimize the potential for groundwater depletion during tunnel construction and operation, and consequential potential for hydrologic changes that may affect groundwater and/or surface water resources in areas overlying the tunnel alignment. Two types of potential effects must be considered, (1) temporary effects that occur due to construction; and (2) permanent effects that could occur over the lifetime of the project.</p> <p>Hydraulic conductivity of the subsurface strata is expected to be low along many parts of the Pacheco Pass tunnel alignments based on evaluation of the construction of previous tunnels nearby and of the geological strata along the proposed tunnel alignment (Authority 2017b). However, certain sections of the tunneled alignments (e.g., fault zones, zones of highly fractured or sheared rock, or other pervious deposits) could exhibit higher hydraulic conductivity, higher rates of groundwater inflow into excavated opening(s) and higher water pressure(s) on tunnel's permanent structure (final liner). Subsurface conditions for the Pacheco tunnels could include groundwater pressures up to 435 psi (Authority 2017b).</p> <p>The amount of groundwater depletion will depend upon the geotechnical and hydrogeological conditions along the tunnel alignment, the tunnel construction methods utilized, and design features that will minimize such inflows. Temporary inflows into the tunnel and groundwater flow around the outside of the tunnel (annular flow) during construction are likely unavoidable. Thus, temporary effects on surface and groundwater conditions are possible even with implementation of this IAMF. Methods implemented to control potential effects will depend on the consequences and nature of the anticipated effects.</p> <p>The tunnels at Pacheco Pass could be constructed using tunnel boring machine (TBM) tunneling methods or conventional mined tunnel methods such as the sequential excavation method (SEM). Cross passages will most likely be constructed using a conventional mining approach. The table below summarizes the potential for temporary and permanent groundwater effects for the two primary tunneling methods. It</p>	Design/ pre-construction; construction/ post-construction	Design/ reporting	Monthly/annually/ as-needed	Authority/ Contractor	Authority	At incorporation or completion of design/ during monthly construction report	Condition of construction contract

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism
		<p>should be recognized that potential for groundwater effects also depends on geologic and groundwater conditions as well. See table in Final EIR/EIS, Volume 2, Appendix 2-E under Hydrology and Water Resources.</p> <p><b>Tunnel Design to Avoid Permanent Groundwater Depletion</b></p> <p>Tunnels shall be designed to be watertight, smooth, durable, and low maintenance to generally maintain existing groundwater levels over the tunnel structures throughout the tunnel design service life. Tunnel lining shall consist of one- or two-pass lining systems to meet HSR design criteria requirements.</p> <ul style="list-style-type: none"> <li> <p><b>TBM Methods</b>—One-pass tunnel lining construction entails the installation of a precast concrete segmental lining with gaskets at each segment joint to construct an essentially watertight tunnel lining. The segmental lining is installed from within the shield at the rear of a TBM. A dual system of gaskets can be utilized to increase safety factors for resisting water pressures and arrest groundwater intrusion into the final tunnel structure. The feasibility for watertight linings are generally limited to magnitudes of water pressure less than 40 bars (580 psi).</p> <p>A two-pass tunnel lining system involves two stages of construction and will be used in tunnels where groundwater pressures exceed the capacity of state-of-the-art one-pass linings available at the time of project construction. During the first stage of construction, an initial ground support system (e.g., precast segmental lining for a TBM tunnel) will be erected during the excavation cycle to maintain stability of the excavated opening, minimize water inflows and protect workers. During the second stage, a watertight membrane together with a cast-in-place concrete liner will be installed as the final component and permanent support of a two-pass lining system. This two-pass lining approach has been used in long, high-speed rail tunnel projects with high ground water pressures, such as in tunnels in the Lyon-Turin line, the Gotthard Base Tunnel (Switzerland), and the Vienna-St. Pölten Railway Line (Austria).</p> </li> <li> <p><b>Conventional Tunneling Methods</b>—Conventional tunneling methods using drill and blast or mechanical excavation will also be designed to be undrained and watertight to arrest or minimize potential groundwater depletion effects. The initial concrete linings used for temporary excavation support will likely consist of sprayed shotcrete, reinforced or unreinforced, and may be preceded by implementation of grouting measures that may control groundwater inflows during excavation. Following application of initial shotcrete support and prior to installation of permanent (final) lining, a waterproofing membrane will be installed. Often “compartmentalization” of waterproofing membrane is implemented, including grouting hoses, to allow local repairs to be made later in case groundwater leakage is identified in course of the liner service life. The shape and size of the tunnel cross section of a conventionally mined tunnel will be designed and adjusted to accommodate ground conditions, including potentially high groundwater pressures.</p> </li> </ul> <p>The specific tunnel lining type will be determined during final design, informed by Phase 2 geotechnical investigations proximate to the tunnel alignment. The Contractor shall utilize state-of-the-art technology</p>							

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		<p>available to ensure that potential groundwater depletion is avoided or minimized to the greatest degree practicable.</p> <p><b>Construction Methods to Minimize Temporary Groundwater Depletion</b></p> <p>The following construction methods shall be employed to avoid and minimize temporary groundwater depletion due to tunnel construction.</p> <p><u>TBM Methods</u></p> <p>TBM requirements shall include:</p> <ul style="list-style-type: none"> <li>▪ Capability to control potential water inflows by using a closed-face, shielded TBM including special shield provisions (multiple brush system with inflatable seals) to maintain waterproofed excavation on a temporary basis prior to segmental liner installation;</li> <li>▪ Capability of systematic probe drilling, monitoring of water inflows, and pre-excavation grouting and backfilling with two-component grout. Grouting requirements include providing adequate backfill grouting, monitoring grout volumes, and using appropriate grout mixes to prevent grout washout; these measures will improve watertight performance of tunnel linings; and</li> <li>▪ Check-grouting through dedicated sockets in precast segmental liner to completely fill the annular opening due to TBM over-excavation, between the segments and the ground.</li> </ul> <p>Pre-excavation grouting can be performed from the TBM, provided the TBM is delivered with built-in capability, including grout ports through the TBM cutter-head and through the shield, and set-up for concurrent drilling and grouting of multiple holes. For predominantly non-cohesive soils, or cohesive soils, Slurry TBMs or Earth Pressure Balance (EPB) TBMs, respectively, as well as variable density TBMs, use pressurized tunnel face and pressurized tunnel perimeter around the tunnel shield to counterbalance external earth and groundwater pressures to minimize groundwater inflow during tunnel construction and work in concert with special layered shield brush-system with inflatable seals, to assure shield water-tightness during the tunnel excavation.</p> <p><u>Conventional Tunneling Methods</u></p> <p>Conventional tunneling methods require access to the open face of the tunnel are limited to ground which can remain stable during excavation. In very hard rock, drill and shoot methods are required. In medium to soft rock, a road header can be employed and in stiff clay and soil an excavator can be used. Conventional tunneling is a very flexible method and can adapt to varying ground conditions and changing geometry. Support type and excavation methods can be adapted to meet the ground conditions including the ability to vary the support types, size of opening, ring closure time and the excavation technique as well as other factors. Tunneling can be done full face or in several drifts and benches. Typically, the cyclic steps of excavation included loosening and removing material in short sets of 3 feet to 10 feet before placing support measures. The freshly exposed ground must remain stable long enough to allow workers time to put initial support measures such as dowels, mesh, shotcrete, and lattice girders in place. The face and sides of the tunnel are exposed during the time between excavation and placement of support. For this reason, conventional tunneling methods are limited to stiff soil or rock. Construction below the water table in fractured rock or</p>							

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		<p>highly permeable ground such as sand, requires ground modification measures such as grouting or ground freezing in advance of excavation. Such measures are usually employed for short stretches of tunnel or adits but generally are cost prohibitive for long tunnels where use of a TBM is much more economical.</p> <p>In conventional mined tunnel segments and cross passages, the Contractor shall use pre-excavating grouting techniques as the preliminary primary method of groundwater control to lower ground permeability and minimize or arrest ground water inflow into the excavated openings, prior to excavation of cross passages and other underground structures. Pre-excavation grouting will be adjusted as necessary to control ground water inflows. Pre-excavation grouting for conventionally mined tunnels will be carried out within the tunnel by face grouting or radial grouting. Ground improvement measures such as jet grouting and ground freezing, as applicable to specific ground conditions, are other methods which may be used to stabilize the excavation and seal off water during construction. As tunnel inflows may become mixed with construction materials such as concrete and grout that could otherwise affect water quality, tunnel inflows will be collected and pre-treated prior to any discharge into surface water or groundwater as necessary to maintain baseline water quality.</p> <p><b>Monitoring and Remedial Action</b></p> <p>Hydrogeologic information from pre-construction subsurface investigations will be used to model existing hydrogeologic features and evaluate potential effects of tunneling on the local groundwater regime. Based on assessment of existing conditions and anticipated effects of construction to groundwater regime, the Contractor will identify the specific methods (based on the methods described above) to minimize construction effects to the existing groundwater regime and suggest refined tunnel excavation methods and/or design to minimize or eliminate the risk and likelihood of impacts to groundwater.</p> <p>In order to check that these approaches are performing as anticipated, a groundwater instrumentation and monitoring program will be implemented. Prior to any disturbance of the groundwater regime by construction or pre-construction activities, baseline groundwater and surface water conditions will be established by systematic monitoring for a period of at least three years. Baseline monitoring shall include measurements of groundwater levels and groundwater quality as well as measurements of flow rates and hydroperiod of surface water features including creeks and ponds and precipitation.</p> <p>During tunnel construction and operation, monitoring of groundwater conditions shall consist of systematic observation, measurement, and reporting of changes in (1) water levels in monitoring wells and existing water supply wells; (2) conditions at local springs and surface water bodies; (3) groundwater and surface water chemistry; and 4) quantity and quality of groundwater inflows to the tunnel.</p> <p>Should unanticipated groundwater inflows be such that excavation by conventional tunneling methods is only possible with dewatering, design of dewatering measures shall specify horizontal and vertical limits on lowering of the groundwater table. Controlled dewatering, if necessary, could be accomplished by vertical or horizontal wells or vacuum drains and could be done from the ground surface or from within the tunnel. If</p>							

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		<p>monitoring and modeling indicate that water levels outside of the immediate vicinity of the tunnel could be affected, a simultaneous pumping and recharge system could be used to maintain existing water levels away from the immediate vicinity of the tunnel.</p> <p>Following initial construction of the tunnel, if groundwater inflow and/or annular flow around the completed tunnel indicates substantial ongoing groundwater depletion, then remedial action, primarily consisting of additional grouting into void spaces around the tunnel exterior and/or other appropriate actions shall be employed.</p>							
<b>Geology, Soils, Seismicity and Paleontological Resources</b>									
GEO-IAMF#1	Geologic Hazards	<p>Prior to construction, the Contractor shall prepare a Construction Management Plan (CMP) addressing how the Contractor will address geologic constraints and minimize or avoid impacts to geologic hazards during construction. The plan will be submitted to the Authority for review and approval. At a minimum, the plan will address the following geological and geotechnical constraints/resources:</p> <p>a. Groundwater Withdrawal. Controlling the amount of groundwater withdrawal from the project, by re-inject groundwater at specific locations if necessary, or use alternate foundation designs to offset the potential for settlement. This control is important for locations with retained cuts in areas where high groundwater exists, and where existing buildings are located near the depressed track section.</p> <p>b. Unstable Soils. Employing various methods to mitigate for the risk of ground failure from unstable soils. If soft or loose soils are encountered at shallow depths, they can be excavated and replaced with competent soils. To limit the excavation depth, replacement materials can also be strengthened using geosynthetics. Where unsuitable soils are deeper, ground improvement methods, such as stone columns, cement deep-soil-mixing (CDSM), or jet-grouting, can be used. Alternatively, if sufficient construction time is available, preloading—in combination with prefabricated vertical drains (wicks) and staged construction—can be used to gradually improve the strength of the soil without causing bearing-capacity failures.</p> <p>c. Subsidence. The Authority addresses subsidence in its design and construction processes. For the initial design, survey monuments were installed to establish a datum and set an initial track profile. In the construction phase, the design-build (DB) Contractors for track bed preparation will conduct topographic surveys for preparation of final design. Because subsidence could have occurred since the original benchmarks (survey monuments) were established, the DB contractor's topographic surveys will be used to help determine whether subsidence has occurred. The updated topographic surveys will also be used to establish the top of rail elevations for final design where the HSR system is outside established floodplain areas and above water surface elevations. Where the HSR system is in floodplain areas susceptible to flooding, consideration is being given to overbuild the height of the rail bed in anticipation of future subsidence.</p> <p>d. Water and Wind Erosion. The Contractor will implement erosion control methods as appropriate from the various erosion control methods documented in the Construction Storm Water Pollution Prevention Plan (SWPPP) (See HYD-IAMF#3), the Caltrans Construction Manuals, and</p>	Design/ construction	Prepare plan	At incorporation or completion of design/during monthly construction report	Authority/ Contractor	Contractor	Prepare CMP	Condition of construction contract

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism
		<p>the construction technical memorandum (see GEO-IAMF#6), and in coordination with other erosion, sediment, stormwater management and fugitive dust control efforts. Water and wind erosion control methods may include, but are not limited to, use of revegetation, stabilizers, mulches, and biodegradable geotextiles.</p> <p>e. Soils with Shrink-Swell Potential. In locations where shrink-swell potential is marginally unacceptable, soil additives will be mixed with existing soil to reduce the shrink-swell potential. Construction specifications will be based upon the decision whether to remove or treat the soil. This decision is based on the soils, specific shrink-swell characteristics, the additional costs for treatment versus excavation and replacement, as well as the long-term performance characteristics of the treated soil.</p> <p>f. Soils with Corrosive Potential. In locations where soils have a potential to be corrosive to steel and concrete, the soils will be removed and buried structures will be designed for corrosive conditions, and corrosion-protected materials will be used in infrastructure.</p>							
GEO-IAMF#2	Slope Monitoring	During Operation and Maintenance, the Authority shall incorporate slope monitoring by a Registered Engineering Geologist into the Operation and Maintenance procedures. The procedures shall be implemented at sites identified in the CMP where a potential for long-term instability exists from gravity or seismic loading including but not limited to at-grade sections where slope failure could result in loss of track support, or where slope failure could result in additional earth loading to foundations supporting elevated structures.	Operation	Prepare plan/ monitoring	Monthly during operation	Authority/ Contractor	Contractor	Slope monitoring during operation	Condition of construction contract
GEO-IAMF#3	Gas Monitoring	<p>Prior to construction, the Contractor shall prepare a Construction Management Plan (CMP) addressing how gas monitoring will be incorporated into construction best management practices. The CMP will be submitted to the Authority for review and approval. Hazards related to potential migration of hazardous gases due to the presence of known oil and gas fields, areas of active or historic landfills, or other subsurface sources can be reduced or eliminated by following strict federal and state Occupational Safety &amp; Health Administration (OSHA/Cal-OSHA) regulatory requirements for excavations, and by consulting with other agencies as appropriate, such as the Department of Conservation (Division of Oil and Gas)<sup>9</sup> and the California Environmental Protection Agency, Department of Toxic Substances Control, regarding known areas of concern.</p> <p>Practices will include using safe and explosion-proof equipment during construction, and testing for gases regularly. Installation of passive or active gas venting systems, gas collection systems, as well as active monitoring systems and alarms will be required in underground construction areas and facilities where subsurface gases are present. Installing gas-detection systems can monitor the effectiveness of these systems.</p>	Design/ construction	Prepare plan/ design	Prior to construction	Authority/ Contractor	Contractor	Preparation of a CMP	Condition of construction contract
GEO-IAMF#4	Historic or Abandoned Mines	Prior to Construction, the Contractor shall prepare a CMP addressing how historic and abandoned mines will be incorporated into construction best management practices. The CMP will be submitted to the Authority	Design/ construction	Prepare plan/ design	Prior to construction	Authority/ Contractor	Contractor	Preparation of a CMP	Condition of construction contract

<sup>9</sup> Now known as California Geologic Energy Management Division (CalGEM)

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		for review and approval. Depending on the properties of an individual mine, mitigations to address historic or abandoned mines could include: a. CERCLA Cleanup. Environmental cleanups at sites that are releasing or threatening to release hazardous substances such as heavy metals from acid mine drainage. b. Non-CERCLA Cleanup. Cleanups of non-hazardous substance-related surface disturbance such as revegetation of disturbed areas, stabilization of mine tailings, reconstruction of stream channels and floodplains. c. Safety Mitigation. Mitigation of physical safety hazards such as closure of adits and shafts and removal of dangerous structures.							
GEO-IAMF#5	Hazardous Minerals	Prior to construction, the Contractor shall prepare a Construction Management Plan (CMP) addressing how the Contractor will minimize or avoid impacts related to hazardous minerals (i.e., radon, mercury, and naturally occurring asbestos (NOA)) during construction. The CMP will be submitted to the Authority for review and approval. The CMP shall include appropriate provisions for handling hazardous minerals including but limited to dust control, control of soil erosion and water runoff, and testing and proper disposal of excavated material.	Design/ construction	Design/ monitoring/ reporting	Prior to construction	Authority/ Contractor	Contractor	Preparation of a CMP	Condition of construction contract
GEO-IAMF#6	Ground Rupture Early Warning Systems	Prior to construction, the Contractor shall document how the project design incorporates installation of early warning systems, triggered by strong ground motion association with ground rupture. Known nearby active fault will be monitored. Linear monitoring systems such as time domain reflectometers or similar technology shall be installed along rail lines in the zone of potential ground rupture. These devices emit electronic information that is processed in a centralized location and will be used to temporarily control trains, thus reducing accidents due to fault creep. Damage to infrastructure from fault creep can be mitigated with routine maintenance including minor realignment.	Design/ pre-construction	Design/ monitoring	Prior to construction	Authority/ Contractor	Contractor	Preparation of a CMP	Condition of construction contract
GEO-IAMF#7	Evaluate and Design for Large Seismic Ground Shaking	Prior to construction, the Contractor shall document through preparation of a technical memorandum how all HSR components were evaluated and designed for large seismic ground shaking. Prior to final design, the Contractor will conduct additional seismic studies to establish up-to-date estimation of levels of ground motion. The most current Caltrans seismic design criteria at the time of design will be used in the design of any structures supported in or on the ground. These design procedures and features reduce to the greatest practical extent for potential movements, shear forces, and displacements that result from inertial response of the structure. In critical locations, pendulum base isolators may be used to reduce the levels of inertial forces. New composite materials may also be used to enhance seismic performance.	Design	Design/ studies	Prior to construction	Contractor/ Authority	Contractor/ Authority	At incorporation or completion of design	Seismic ground shaking design technical memorandum
GEO-IAMF#8	Suspension of Operations during an Earthquake	Prior to Operation and Maintenance activities, the Contractor shall document in a technical memorandum how suspension of operations during or after an earthquake was addressed in project design. Motion-sensing instruments to provide ground motion data and a control system to shut down HSR operations temporarily during or after a potentially damaging earthquake will be incorporated into final design. Monitoring equipment will be installed at select locations where high ground motions could occur. The system will then be inspected for damage due to ground motion and/or ground deformation, and then returned to service when appropriate.	Design/ construction/ operation	Reporting	As needed based on an earthquake event	Contractor/ Authority	Contractor/ Authority	At incorporation or completion of design/ during monthly construction report	Technical memorandum prepared as needed based on an earthquake event

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GEO-IAMF#9	Subsidence Monitoring	Prior to operation and maintenance, the Authority shall develop a stringent track monitoring program. Once tracks are operational, a remote monitoring program will be implemented to monitor the effects of ongoing subsidence. Track inspection systems will provide early warning of reduced track integrity. HSR train sets will be equipped with autonomous equipment for daily track surveys. This specification will be added to HSR train bid packages. If monitoring indicates that track tolerances are not met, trains will operate at reduced speed until track tolerances are restored. In addition, the Contractor responsible for wayside maintenance will be required to implement a stringent program for track maintenance.	Design/ operation	Program development	Monthly	Authority/ Contractor	Contractor	Develop a stringent track monitoring program	Condition of construction contract
GEO-IAMF#10	Geology and Soils	<p>Prior to construction, the Contractor shall document through issuance of a technical memorandum how the following guidelines and standards have been incorporated into facility design and construction:</p> <ul style="list-style-type: none"> <li>2015 American Association of State Highway and Transportation Officials (AASHTO) Load and Resistance Factor Bridge Design Specifications and the 2015 AASHTO Guide Specifications for Load and Resistance Factor Seismic Bridge Design, or their most recent versions. These documents provide guidance for characterization of soils, as well as methods to be used in the design of bridge foundations and structures, retaining walls, and buried structures. These design specifications will provide minimum specifications for evaluating the seismic response of the soil and structures.</li> <li>Federal Highway Administration (FHWA) Circulars and Reference Manuals: These documents provide detailed guidance on the characterization of geotechnical conditions at sites, methods for performing foundation design, and recommendations on foundation construction. These guidance documents include methods for designing retaining walls used for retained cuts and retained fills, foundations for elevated structures, and at-grade segments. Some of the documents include guidance on methods of mitigating geologic hazards that are encountered during design.</li> <li>American Railway Engineering and Maintenance-of-Way Association (AREMA) Manual: These guidelines deal with rail systems. Although they cover many of the same general topics as AASHTO, they are more focused on best practices for rail systems. The manual includes principles, data, specifications, plans, and economics pertaining to the engineering, design, and construction of railways.</li> <li>California Building Code: The code is based on 2015 International Building Code (IBC). This code contains general building design and construction requirements relating to fire and life safety, structural safety, and access compliance.</li> <li>IBC and American Society of Civil Engineers (ASCE)-7: These codes and standards provide minimum design loads for buildings and other structures. They will be used for the design of the maintenance facilities and stations. Sections in IBC and ASCE-7 provide minimum requirements for geotechnical investigations, levels of earthquake ground shaking, minimum standards for structural design, and inspection and testing requirements.</li> <li>Caltrans Design Standards: Caltrans has specific minimum design and construction standards for all aspects of transportation system</li> </ul>	Design/ construction/ operation	Design/ reporting	At incorporation or completion of design/ during monthly construction reporting	Authority/ Contractor	Contractor	Prepare technical memorandum/ implementation of guidelines during design, construction, and operation phases	Condition of construction contract

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		<p>design, ranging from geotechnical explorations to construction practices. These amendments provide specific guidance for the design of deep foundations that are used to support elevated structures, for design of mechanically stabilized earth (MSE) walls used for retained fills, and for design of various types of cantilever (e.g., soldier pile, secant pile, and tangent pile) and tie-back walls used for retained cuts.</p> <ul style="list-style-type: none"> <li>Caltrans Construction Manuals: Caltrans has a number of manuals including Field Guide to Construction Dewatering, Caltrans Construction Site BMPs Manual and Construction Site BMP Field Manual and Troubleshooting Guide. These provide guidance and best management practices for dewatering options and management, erosion control and soil stabilization, non-storm water management, and waste management at construction sites.</li> <li>American Society for Testing and Materials (ASTM): ASTM has developed standards and guidelines for all types of material testing- from soil compaction testing to concrete-strength testing. The ASTM standards also include minimum performance requirements for materials.</li> </ul>							
GEO-IAMF#11	Engage a Qualified Paleontological Resources Specialist	<p>Prior to the 90% design milestone for each construction package (CP) within the Project Section, the Contractor will retain a paleontological resources specialist (PRS) responsible for:</p> <ul style="list-style-type: none"> <li>Reviewing the final design for the CP, and</li> <li>Developing a detailed Paleontological Resources Monitoring and Mitigation Plan (PRMMP) for the CP. The PRS will be responsible for implementing the PRMMP, including delivery of WEAP Training, and evaluation and treatment of finds, if any, per the PRMMP and for each CP. A Supervising Paleontologist, who is also a PRS, will be retained and act as Lead Paleontologist for the CP if there are multiple PRS' retained for a single CP.</li> </ul> <p>Retention of PRS staff will occur in a timely manner, in advance of the 90% design milestone for each CP, such that the PRS is on board and can review the 90% design submittal without delay when it becomes available. If feasible, the same PRS will be responsible for all CPs within the project section. However, if efficiency dictates, separate qualified PRSs may be retained for the various Project Section CPs. Should a CP retain more than one PRS, a supervising paleontologist will be identified.</p> <p>All PRS staff will meet or exceed the qualifications for a Principal Paleontologist as defined in the California Department of Transportation's (Caltrans') current <i>Standard Environmental Reference</i>, Chapter 8 (Caltrans 2014). Appointment of PRS staff will be subject to review and approval by the Authority.</p>	Design	Contractor will retain paleontological resources specialist	Prior 90% design milestone for each CP	Authority/ Contractor	Contractor	Retain Paleontological Resources Specialist (PRS)	Condition of construction contract
GEO-IAMF#12	Perform Final Design Review and Triggers Evaluation	<p>For each CP within the project section, the responsible PRS will evaluate the 90% design submittal to identify the portions of the CP that will involve work in paleontologically sensitive geologic units (either on the surface or in the subsurface), in consideration of the final Paleontological Resources Technical Report prepared for the project section. Evaluation will consider the location, areal extent, anticipated depth of disturbance, the construction techniques that are planned/proposed, and the geology of the CP and vicinity. The evaluation and resulting recommendations will be consistent with guidance in the Society of Vertebrate Paleontology</p>	Design	Reporting	Each CP	Authority/ Contractor	Contractor	CP reporting	Condition of construction contract

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism
		<p>(SVP) <i>Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources</i> (SVP Impact Mitigation Guidelines Revision Committee 2010), the <i>SVP Conditions of Receivership for Paleontologic Salvage Collections</i> (SVP Conformable Impact Mitigation Guidelines Committee 1996), and relevant guidance from Chapter 8 of the current <i>Caltrans Standard Environmental Reference</i> (Caltrans 2014).</p> <p>The purpose of the Final Design Review and Triggers Evaluation will be to develop specific language detailing the paleontological monitoring and other requirements applicable to each CP within the project section. Paleontological protection requirements identified through the Final Design Review and Triggers evaluation will be recorded in a concise technical memorandum (“Final Design Review Requirements for Paleontological Resources Protection”) and will then be incorporated in full detail into the PRMMP for each CP. Portions of the CP requiring paleontological monitoring will also be clearly delineated in the project construction documents for each CP.</p>							
GEO-IAMF#13	Prepare and Implement Paleontological Resources Monitoring and Mitigation Plan	<p>Following the Final Design Review and Triggers Evaluation for each CP, the PRS will develop a CP-specific PRMMP. For greater efficiency, PRMMPs may be combined such that they cover more than one CP, as long as the specific requirements of this IAMF are satisfied explicitly and in detail for each CP included.</p> <p>The PRMMP for each CP will incorporate the findings of the Design Review and Triggers Evaluation for that CP and will be consistent with the <i>SVP Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources</i> (SVP Impact Mitigation Guidelines Revision Committee 2010), the <i>SVP Conditions of Receivership for Paleontologic Salvage Collections</i> (SVP Conformable Impact Mitigation Guidelines Committee 1996), and relevant guidance from Chapter 8 of the current <i>Caltrans Standard Environmental Reference</i> (Caltrans 2014). As such, the PRMMP will provide for at least the following:</p> <ul style="list-style-type: none"> <li>▪ Implementation by qualified personnel, as follows: <ul style="list-style-type: none"> <li>– The PRS will be required to meet or exceed Principal Paleontologist Qualifications per Chapter 8 of the current <i>Caltrans Standard Environmental Reference</i> (Caltrans 2014). The Supervising Paleontologist may, but not necessarily, be the PRS who prepares the PRMMP.</li> <li>– Paleontological Monitors will be required to meet or exceed Paleontological Monitor qualifications per Chapter 8 of the current <i>Caltrans Standard Environmental Reference</i> (Caltrans 2014).</li> </ul> </li> <li>▪ Pre-construction survey by qualified personnel, with salvage or protection in place, as appropriate, in areas where the CP will result in surface disturbance of geologic units identified as highly sensitive for paleontological resources (“highly sensitive units”).</li> <li>▪ Pre-construction and construction-period coordination procedures and communications protocols.</li> <li>▪ Paleontological monitoring by qualified staff for all ground-disturbing activities known to involve, or potentially involve, highly sensitive units and for activities involving other geologic units in any areas where the</li> </ul>	Design	Reporting	Each CP	Authority/ Contractor	Contractor	CP reporting	Condition of construction contract

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism
		<p>PRS considers it warranted based on the results of the TR or field surveys. In all areas subject to monitoring, monitoring will initially be conducted full-time during all grading and excavation activities, but the PRMMP may provide for monitoring frequency in any given location to be reduced once 50% of the ground-disturbing activity in that location has been completed, if the reduction is appropriate based on the implementing PRS's professional judgment in consideration of actual site conditions.</p> <ul style="list-style-type: none"> <li>▪ If the PRS considers it warranted, monitoring will also be stipulated for construction drilling operations. In general, small diameter (i.e., &lt;18 inches) drilling activities or drilling activities using bucket augers tend to pulverize impacted sediments and contained fossils and not typically monitored. The portion of the PRMMP monitoring program for drilling operations will be developed in conjunction with the CP design and geotechnical teams, in consideration of the nature, depth, and location of drilling needed, and the anticipated equipment and staging configurations.</li> <li>▪ Provisions for the content and delivery of paleontological resources WEAP training.</li> <li>▪ In-progress documentation of monitoring (and, if applicable, salvage/recovery operations) via "construction dailies" or a similar means.</li> <li>▪ Provisions for a "stop work, evaluate, and treat appropriately" response in the event of a known or potential paleontological discovery, including finds in highly sensitive units as well as finds, if any, in units identified as less sensitive, or non-sensitive, for paleontological resources.</li> <li>▪ Sampling and recovery procedures consistent with SVP Standard Procedures (SVP Impact Mitigation Guidelines Revision Committee 2010) and the SVP Conditions of Receivership (SVP Conformable Impact Mitigation Guidelines Committee 1996). Recovery procedures will provide for recovery of both macrofossils and microfossils.</li> <li>▪ A repository agreement providing for appropriate curation of recovered materials, consistent with the SVP Conditions of Receivership (SVP Conformable Impact Mitigation Guidelines Committee 1996). If more than one repository institution is designated, separate repository agreements must be provided.</li> <li>▪ Final report preparation procedures consistent with Caltrans Standard Environmental Reference Chapter 8 provisions for the Paleontological Monitoring Report and Paleontological Stewardship Summary (Caltrans 2014).</li> <li>▪ Procedures for the preparation, identification, and analysis of fossil specimens and data recovered, consistent with the SVP Conditions of Receivership (SVP Conformable Impact Mitigation Guidelines Committee 1996) and any specific requirements of the designated repository institution(s).</li> </ul>							
GEO-IAMF#14	Provide WEAP Training for Paleontological Resources	Prior to groundbreaking for each CP within the project section, the Contractor will provide paleontological resources WEAP training delivered by the Supervising Paleontologist. All management and supervisory personnel and construction workers involved with ground-disturbing activities will be required to take this training before beginning	Pre-construction	Training program/ reporting	Annual (training)/ monthly (reporting)	Contractor/ Authority	Contractor/ Authority	WEAP training	Condition of construction contract

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism
		<p>work on the project. Refresher training will also be made available to management and supervisory personnel and workers as needed, based on the judgment of the PRS.</p> <p>At a minimum, paleontological resources WEAP training will include information on:</p> <ul style="list-style-type: none"> <li>▪ Coordination between construction staff and paleontological staff</li> <li>▪ Construction and paleontological staff roles and responsibilities in implementing the PRMMP</li> <li>▪ The possibility of encountering fossils during construction</li> <li>▪ The types of fossils that may be seen and how to recognize them</li> <li>▪ Proper procedures in the event fossils are encountered, including the requirement to halt work in the vicinity of the find and procedures for notifying responsible parties in the event of a find</li> </ul> <p>Training materials and formats may include, but are not necessarily limited to, in-person training, prerecorded videos, posters, and informational brochures that provide contacts and summarize procedures in the event paleontological resources are encountered. WEAP training contents will be subject to review and approval by the Authority. Paleontological resources WEAP training may be provided concurrently with cultural resources WEAP training.</p> <p>Upon completion of any WEAP training, the Contractor will require workers to sign a form stating that they attended the training and understand and will comply with the information presented. Verification of paleontological resources WEAP training will be provided to the Authority by the Contractor.</p>							
GEO-IAMF#15	Halt Construction, Evaluate, and Treat if Paleontological Resources Are Found	<p>If known or potential fossil materials are discovered during construction, regardless of the individual making a paleontological discovery, all activity in the immediate vicinity of the discovery will halt and the find will be protected from further disturbance. If the discovery is made by someone other than the PRS or qualified paleontological monitor, the person who made the discovery will immediately notify construction supervisory personnel, who will notify the PRS. Notification to the PRS will take place promptly (prior to the close of work the same day as the find), and the PRS will evaluate the find and prescribe appropriate treatment as soon as feasible. Work may continue on other parts of the site while evaluation (and, if needed, treatment) takes place, as long as the find can be adequately protected in the judgment of the PRS.</p> <p>If the PRS determines that treatment is warranted, such treatment, and any required reporting, will proceed consistent with the PRMMP. The Contractor will be responsible for ensuring prompt and accurate implementation, subject to verification by the Authority.</p> <p>The stop work requirement does not apply to drilling since drilling typically cannot be suspended in mid-course. However, if finds are made during drilling, the same notification and other follow-up requirements will apply. The PRS will coordinate with construction supervisory and drilling staff regarding the handling of recovered materials.</p> <p>The requirements of this IAMF will be detailed in the PRMMP and presented as part of the paleontological resources WEAP training.</p>	Construction	Reporting	Daily logs during active monitoring	Authority/ Contractor	Contractor	Weekly reporting (if resource is identified during construction)	PRMMP, WEAP

**Hazardous Materials and Wastes**

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism
HMW-IAMF#1	Property Acquisition Phase 1 and Phase 2 Environmental Site Assessments	During the right-of-way acquisition phase, Phase 1 environmental site assessments (ESA) shall be conducted in accordance with standard ASTM methodologies to characterize each parcel. The determination of parcels that require a Phase 2 ESA (e.g., soil, groundwater, soil vapor subsurface investigations) will be informed by a Phase 1 ESA and may require coordination with state and local agency officials. If the Phase 2 ESA concludes that the site is impacted, remediation or corrective action (e.g., removal of contamination, in-situ treatment, or soil capping) will be conducted with state and local agency officials (as necessary) and in full compliance with applicable state and federal laws and regulations.	Pre-construction/ construction	Prepare plan	Monthly	Authority/ Contractor	Contractor	Prepare Phase 1 ESA	Condition of construction contract
HMW-IAMF#2	Landfill	Prior to Construction (any ground-disturbing activities), the Contractor shall verify to the Authority through preparation of a technical memorandum that methane protection measures will be implemented for all work within 1,000 feet of a landfill, including gas detection systems and personnel training. This will be undertaken pursuant to State of California Title 27, Environmental Protection – Division 2, Solid Waste, and the hazardous materials best management practices plan.	Pre-construction/ construction	Reporting	Monthly	Authority/ Contractor	Authority	Monthly record keeping	Condition of construction contract
HMW-IAMF#3	Work Barriers	Prior to construction (any ground-disturbing activities), the Contractor shall verify to the Authority through preparation of a technical memorandum the use of work barriers. Nominal design variances, such as the addition of a plastic barrier beneath the ballast material to limit the potential release of volatile subsurface contaminants, may be implemented in conjunction with site investigation and remediation.	Pre-construction/ construction	Prepare technical memorandum	Monthly	Authority/ Contractor	Contractor	Prepare work barrier technical memorandum	Condition of construction contract
HMW-IAMF#4	Undocumented Contamination	Prior to construction, the Contractor shall prepare a CMP addressing provisions for the disturbance of undocumented contamination. The plan will be submitted to the Authority for review and approval. Undocumented contamination could be encountered during construction activities and the Contractor will work closely with local agencies to resolve any such encounters and address necessary clean-up or disposal. Copies of all required hazardous material documentation shall be provided within 30 days to the Authority.	Pre-construction/ construction	Prepare plan/ reporting	As needed	Authority/ Contractor	Contractor	Prepare CMP/ reporting as needed	Condition of construction contract
HMW-IAMF#5	Demolition Plans	Prior to construction that involves demolition, the Contractor shall prepare demolition plans for the safe dismantling and removal of building components and debris. The demolition plans will include a plan for lead and asbestos abatement. The plans shall be submitted to the Project Construction Manager (PCM) on behalf of the Authority for verification that appropriate demolition practices have been followed consistent with federal and state regulations regarding asbestos and lead paint abatement.	Pre-construction/ construction	Prepare plan/ reporting	As needed	Authority/ Contractor	Contractor	Prepare demolition plans/reporting as needed	Condition of construction contract
HMW-IAMF#6	Spill Prevention	Prior to construction (any ground-disturbing activities), the Contractor shall prepare a Construction Management Plan addressing spill prevention. A Spill Prevention, Control, and Countermeasure (SPCC) plan (or Soil Prevention and Response Plan if the total above-ground oil storage capacity is less than 1,320 gallons in storage containers greater than or equal to 55-gallons) shall prescribe BMPs to follow to prevent hazardous material releases and clean-up of any hazardous material releases that may occur. The plans will be prepared and submitted to the PCM on behalf of the Authority and shall be implemented during Construction.	Pre-construction/ construction	Prepare plan/ reporting	As needed	Authority/ Contractor	Contractor	Prepare CMP/ reporting as needed	Condition of construction contract
HMW-IAMF#7	Transport of Materials	During construction, the Contractor will comply with applicable state and	Pre-construction/	Regulation	Monthly	Authority/	Contractor	Weekly record	Condition of

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism
		federal regulations, such as the Resource Conservation and Recovery Act (RCRA), Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), the Hazardous Materials Release Response Plans and Inventory Law, and the Hazardous Waste Control Act. Prior to construction the Contractor will provide the Authority with a hazardous materials and waste plan describing responsible parties and procedures for hazardous waste and hazardous materials transport.	construction	compliance/ reporting		Contractor		keeping/monthly reporting	construction contract
HMW-IAMF#8	Permit Conditions	During construction, the Contractor will comply with the State Water Resources Control Board Construction Clean Water Act Section 402 General Permit conditions and requirements for transport, labeling, containment, cover, and other BMPs for storage of hazardous materials during construction. Prior to construction, the Contractor shall provide the Authority with a hazardous materials and waste plan describing responsible parties and procedures for hazardous waste and hazardous materials transport, containment, and storage BMPs that will be implemented during construction.	Pre-construction/ construction	Prepare a plan	Prior to construction	Authority/ Contractor	Contractor	Provide a hazardous materials and waste plan	Condition of construction contract
HMW-IAMF#9	Environmental Management System	To the extent feasible, the Authority is committed to identifying, avoiding, and minimizing hazardous substances in the material selection process for construction, operation, and maintenance of the HSR system. The Authority will use an Environmental Management System to describe the process that will be used to evaluate the full inventory of hazardous materials as defined by federal and state law employed on an annual basis and will replace hazardous substances with nonhazardous materials. The Contractor shall implement the material substitution recommendation contained in the annual inventory.	Pre-construction/ construction	Reporting	Annual	Authority/ Contractor	Contractor	Annual reporting	Condition of construction contract/ Environmental Management System
HMW-IAMF#10	Hazardous Materials Plans	Prior to Operations and Maintenance activities, the Authority shall prepare hazardous materials monitoring plans. These will use as a basis source, such as a hazardous materials business plan as defined in Title 19 California Code of Regulations and a SPCC plan.	Post-construction	Prepare plans	Prior to operations	Authority	Authority	Prepare hazardous materials monitoring plans	Condition of construction contract
<b>Safety and Security</b>									
SS-IAMF#1	Construction Safety Transportation Management Plan	Prior to construction (any ground-disturbing activity), the Contractor shall prepare for submittal to the Authority a construction safety transportation management plan. The plan will describe the Contractor's coordination efforts with local jurisdictions for maintaining emergency vehicle access. The plan will also specify the Contractor's procedures for implementing temporary road closures including: access to residences and businesses during construction, lane closures, signage and flag persons, temporary detour provisions, alternative bus and delivery routes, emergency vehicle access, and alternative access locations. The Contractor shall prepare and submit monthly reports to the Authority documenting construction transportation plan implementation activities for compliance monitoring.	Pre-construction/ construction	Prepare plan	Monthly	Authority/ Contractor	Contractor	Prepare Construction Safety Transportation Management Plan	Condition of construction contract
SS-IAMF#2	Safety and Security Management Plan	Sixty days after receiving from the Authority a construction notice-to-proceed, the Contractor shall provide the Authority with a technical memorandum documenting how the following requirements, plan, programs and guidelines were considered in design, construction and eventual operation to protect the safety and security of construction workers and users of the HSR. The Contractor shall be responsible for implementing all construction-related safety and security plans and the Authority shall be responsible for implementing all safety and security plans related to HSR operation.	Pre-construction/ construction	Prepare plan	Sixty days after receiving a construction notice to proceed	Contractor/ Authority	Contractor/ Authority	Prepare technical memorandum documenting compliance with safety requirements, plans, programs, and guidelines	Condition of construction contract

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism
		<p>Workplace worker safety is generally governed by the Occupational Health and Safety Act of 1970, which established the OSHA. OSHA establishes standards and oversees compliance with workplace safety and reporting of injuries and illnesses of employed workers. In California, OSHA enforcement of workplace requirements is performed by Cal-OSHA. Under Cal-OSHA regulations, as of July 1, 1991, every employer must establish, implement, and maintain an injury and illness prevention program.</p> <p>The Authority has adopted a Safety and Security Management Plan to guide the safety and security activities, processes, and responsibilities during design, construction and implementation phases of the project to protect the safety and security of construction workers and the public. A Systems Safety Program Plan (SSPP) and a System Security Plan will be implemented prior to the start of revenue service to guide the safety and security of the operation of the high-speed rail system.</p> <p>Prior to Construction, the Contractor shall provide the Authority with a Safety and Security Management Plan documenting how they will implement the Authority's safety and security requirements within their project scope.</p> <p>Implement site-specific health and safety plans and site-specific security plans to establish minimum safety and security guidelines for contractors of, and visitors to, construction projects. Contractors will be required to develop and implement site-specific measures that address regulatory requirements to protect human health and property at construction sites.</p> <p>Preparation of a Valley Fever action plan that includes: A) information on causes, preventative measures, symptoms, and treatments for Valley Fever to individuals who could potentially be exposed through construction activities (i.e., construction workers, monitors, managers, and support personnel); B) continued outreach and coordination with California Department of Public Health; C) coordination with county departments of public health to ensure that the above referenced information concerning Valley Fever is readily available to nearby residents, schools, and businesses and to obtain area information about Valley Fever outbreaks and hotspots; and D) provide a qualified person dedicated to overseeing implementation of the Valley Fever prevention measures to encourage a culture of safety of the contractors and subcontractors. The Valley Fever Health and Safety (VFHS) designee shall coordinate with the county Public Health Officer and oversee and manage the implementation of Valley Fever control measures. The VFHS designee is responsible for ensuring the implementation of measures in coordination with the county Public Health Officer. Medical information will be maintained following applicable and appropriate confidentiality protections. The VFHS in coordination with the county Public Health Officer will determine what measures will be added to the requirements for the Safety and Security Management Plan regarding preventive measures to avoid Valley Fever exposure. Measures shall include, but are not limited to the following: A) train workers and supervisors on how to recognize symptoms of illness and ways to minimize exposure, such as washing hands at the end of shifts; B) provide washing facilities nearby for washing at the end of shifts; C) provide vehicles with enclosed, air conditioned cabs and make sure workers keep the windows closed; D) equip heavy equipment cabs with</p>							

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism
		<p>high efficiency particulate air (HEPA) filters; and E) make NIOSH approved respiratory protection with particulate filters as recommended by the CDPH available to workers who request them.</p> <p>System safety program plans incorporate FRA requirements and are implemented upon FRA approval. FRA's SSPPs requirements will be determined in FRA's new System Safety Regulation (49 C.F.R. 270).</p> <p>Rail systems must comply with FRA requirements for tracks, equipment, railroad operating rules and practices, passenger safety, emergency response, and passenger equipment safety standards found in 49 C.F.R. Parts 200-299.</p> <p>The HSR <i>Urban Design Guidelines</i> (Authority 2011) require implementing the principles of crime prevention through environmental design. The Contractor shall consider four basic principles of crime prevention through environmental design during station design and site planning: territoriality (design physical elements that express ownership of the station or site); natural surveillance (arrange physical features to maximize visibility); improved sightlines (provide clear views of surrounding areas); and access control (provide physical guidance for people coming and going from a space). The HSR design includes emergency access to the rail right-of-way, and elevated HSR structure design includes emergency egress points.</p> <p>Implement fire/life safety and security programs that promote fire and life safety and security in system design, construction, and implementation. The fire and life safety program is coordinated with local emergency response organizations to provide them with an understanding of the rail system, facilities, and operations, and to obtain their input for modifications to emergency response operations and facilities, such as evacuation routes. The Authority will establish fire/life safety and security committees throughout the HSR section.</p> <p>Implement system security plans that address design features intended to maintain security at the stations within the track right-of-way, at stations, and onboard trains. A dedicated police force will ensure that the security needs of the HSR system are met.</p> <p>The design standards and guidelines require emergency walkways on both sides of the tracks for both elevated and at grade sections and the provision of appropriate space as defined by fire and safety codes along at-grade sections of the alignment to allow for emergency response access.</p> <p>Implement standard operating procedures and emergency operating procedures, such as the FRA-mandated Roadway Worker Protection Program to address the day-to-day operation and emergency situations that will maintain the safety of employees, passengers, and the public.</p>							
SS-IAMF#3	Hazard Analyses	<p>The Authority's hazard management program includes the identification of hazards, assessment of associated risk, and application of control measures (mitigation), to reduce the risk to an acceptable level. Hazard assessment includes a preliminary hazard analysis (PHA) and threat and vulnerability assessment (TVA).</p> <p>The Authority's programmatic PHAs are developed in conformance with the FRA's <i>Collision Hazard Analysis Guide: Commuter and Intercity Passenger Service</i> (FRA 2007) and the U.S. Department of Defense's System Safety Program Plan (MIL-STD-882) to identify and determine</p>	Pre-construction/ construction	Reporting	Monthly	Authority	Authority	Monthly reporting	Condition of construction contract

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism
		<p>the facility hazards and vulnerabilities so that they can be addressed by—and either eliminated or minimized—the design.</p> <p>TVAs establish provisions for the deterrence and detection of, as well as the response to, criminal and terrorist acts for rail facilities and system operations. Provisions include right-of-way fencing, intrusion detection, security lighting, security procedures and training, and closed-circuit televisions. Intrusion-detection technology could also alert to the presence of inert objects, such as toppled tall structures or derailed freight trains, and stop HSR operations to avoid collisions.</p> <p>During design and construction, the Contractor will conduct site-specific PHA and TVA assessments to apply the programmatic work to their specific project designs.</p> <p>The Authority’s safety and security committees will be responsible for implementing the recommendations contained in the hazard analysis during HSR operation.</p>							
SS-IAMF#4	Oil and Gas Wells	<p>Prior to ground-disturbing activities, the Contractor shall identify and inspect all active and abandoned oil and gas wells within 200 feet of the HSR tracks. Any active wells will be abandoned and relocated by the Contractor in accordance with the California Department of Conservation, Division of Oil, and Gas and Geothermal Resources (DOGGR) standards in coordination with the well owners. In the event that relocated wells do not attain the current production rates of the now-abandoned active wells, the Authority will be responsible for compensating the well owner for lost production. All abandoned wells within 200 feet of the HSR tracks will be inspected and re-abandoned, as necessary, in accordance with DOGGR standards and in coordination with the well owner. The Contractor will provide the Authority with documentation that the identification and inspection of the wells has occurred prior to construction.</p>	Pre-construction	Regulatory compliance/ reporting	Monthly	Authority	Authority	Compliance with DOGGR standards/ monthly reporting	Condition of construction contract
<b>Socioeconomics and Communities</b>									
SOCIO-IAMF#1	Construction Management Plan	<p>Prior to construction, the Contractor shall prepare a CMP providing measures that minimize impacts on low-income households and minority populations. The plan shall be submitted to the Authority for review and approval. The plan will include actions pertaining to communications, visual protection, air quality, safety controls, noise controls, and traffic controls to minimize impacts on low-income households and minority populations. The plan will verify that property access is maintained for local businesses, residences, and emergency services. This plan will include maintaining customer and vendor access to local businesses throughout construction by using signs to instruct customers about access to businesses during construction. In addition, the plan will include efforts to consult with local transit providers to minimize impacts on local and regional bus routes in affected communities.</p>	Design/construction	Prepare plan	At incorporation or completion of design/monthly reporting (during construction)	Authority/ Contractor	Contractor	Prepare CMP	Condition of construction contract
SOCIO-IAMF#2	Compliance with Uniform Relocation Assistance and Real Property Acquisition Policies Act	<p>The Authority must comply with the Uniform Relocation Assistance and Real Property Acquisition Policies Act, as amended (Uniform Act). The provisions of the Uniform Act, a federally mandated program, will apply to all acquisitions of real property or displacements of persons resulting from this federally assisted project. It was created to provide for fair and equitable treatment of all affected persons. Additionally, the Fifth Amendment of the U.S. Constitution provides that private property may</p>	Design/construction/ operation	Reporting and meeting with interested parties	Monthly	Authority	Authority	Comply with Uniform Act/monthly reporting and record keeping	Compliance with acts, creation of ombudsman office, and reporting

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism
		<p>not be taken for a public use without payment of "just compensation."</p> <p>The Uniform Act requires that the owning agency provide notification to all affected property owners of the agency's intent to acquire an interest in their property. This notification includes a written offer letter of just compensation. A right-of-way specialist is assigned to each property owner to assist him or her through the acquisition process. The Uniform Act also provides benefits to displaced individuals to assist them financially and with advisory services related to relocating their residence or business operation. Benefits are available to both owner occupants and tenants of either residential or business properties.</p> <p>The Uniform Act requires provision of relocation benefits to all eligible persons regardless of race, color, religion, sex, or national origin. Benefits to which eligible owners or tenants may be entitled are determined on an individual basis and explained in detail by an assigned right-of-way specialist.</p> <p>The California Relocation Assistance Act essentially mirrors the Uniform Act and also provides for consistent and fair treatment of property owners. However, because the project will receive federal funding, the Uniform Act takes precedence. Owners of private property have federal and state constitutional guarantees that their property will not be acquired or damaged for public use unless owners first receive just compensation. Just compensation is measured by the "fair market value," where the property value is considered to be the highest price that will be negotiated on the date of valuation. The value must be agreed upon by a seller who is willing, not obliged to sell, but under no particular or urgent necessity and by a buyer who is ready, willing, and able to buy but under no particular necessity. Both the owner and the buyer must deal with the other with the full knowledge of all the uses and purposes for which the property is reasonably adaptable and available (Code of Civil Procedure Section 1263.320a).</p> <p>More detailed information about how the Authority plans to comply with the Uniform Act and the California Relocation Assistance Act is provided in the following three detailed relocation assistance documents modeled after Caltrans versions:</p> <ul style="list-style-type: none"> <li>▪ <i>Your Rights and Benefits as a Displacee under the Uniform Relocation Assistance Program (Residential)</i></li> <li>▪ <i>Your Rights and Benefits as a Displacee under the Uniform Relocation Assistance Program (Mobile Home)</i></li> <li>▪ <i>Your Rights and Benefits as a Displaced Business, Farm, or Nonprofit Organization under the Uniform Relocation Assistance Program</i></li> </ul>							
SOCIO-IAMF#3	Relocation Mitigation Plan	<p>Before any acquisitions occur, the Authority will develop a relocation mitigation plan, in consultation with affected cities and counties and property owners. In addition to establishing a program to minimize the economic disruption related to relocation, the relocation mitigation plan will be written in a style that also enables it to be used as a public-information document.</p> <p>The relocation mitigation plan will be designed to meet the following objectives:</p> <ul style="list-style-type: none"> <li>▪ Provide affected property and business owners and tenants a high level of individualized assistance in situations when acquisition is necessary and the property owner desires to relocate the existing land</li> </ul>	Design/construction	Prepare plan	Prior to acquisitions	Authority	Authority	Develop relocation mitigation plan	Condition of construction contract

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism
		<p>use.</p> <ul style="list-style-type: none"> <li>Coordinate relocation activities with other agencies acquiring property resulting in displacements in the study area to provide for all displaced persons and businesses to receive fair and consistent relocation benefits.</li> <li>Make a best effort to minimize the permanent closure of businesses and non-profit agencies as a result of property acquisition.</li> <li>Within the limits established by law and regulation, minimize the economic disruption caused to property owners by relocation.</li> <li>In individual situations, where warranted, consider the cost of obtaining the entitlement permits necessary to relocate to a suitable location and take those costs into account when establishing the fair market value of the property.</li> <li>Provide those business owners who require complex permitting with regulatory compliance assistance.</li> </ul> <p>The relocation mitigation plan will include the following components:</p> <ul style="list-style-type: none"> <li>A description of the appraisal, acquisition, and relocation process as well as a description of the activities of the appraisal and relocation specialists.</li> <li>A means of assigning appraisal and relocation staff to affected property owners, tenants, or other residents on an individual basis.</li> <li>Individualized assistance to affected property owners, tenants, or other residents in applying for funding, including research to summarize loans, grants, and federal aid available, and research areas for relocation.</li> <li>Creation of an ombudsman's position to act as a single point of contact for property owners, residents, and tenants with questions about the relocation process. The ombudsman will also act to address concerns about the relocation process as it applies to the individual situations of property owners, tenants, and other residents.</li> </ul>							
<b>Station Planning, Land Use, and Development</b>									
LU-IAMF#1	HSR Station Area Development: General Principles and Guidelines	Prior to Operation and Maintenance, the Authority shall prepare a memorandum for each station describing how the Authority's station area development principles and guidelines are applied to achieve the anticipated benefits of station area development. Refer to HSR Station Area Development General Principles and Guidelines, February 3, 2011.	Post-construction	Reporting	For each station	Authority	Authority	Authority will prepare a technical memorandum for each station	Condition of construction contract
LU-IAMF#2	Station Area Planning and Local Agency Coordination	Prior to Operation and Maintenance, the Authority shall prepare a memorandum for each station describing the local agency coordination and station area planning conducted to prepare the station area for HSR operations. Refer to HSR Station Area Development: General Principles and Guidelines, February 3, 2011.	Post-construction	Reporting	For each station	Authority	Authority	Authority will prepare a technical memorandum for each station	Condition of construction contract
LU-IAMF#3	Restoration of Land Used Temporarily during Construction	Prior to any ground-disturbing activities at the site of land to be used temporarily during construction, the Contractor shall prepare a restoration plan addressing specific actions, sequence of implementation, parties responsible for implementation and successful achievement of restoration for temporary impacts. Before beginning construction use of land, the Contractor shall submit the restoration plan to the Authority for review and obtain Authority approval. The restoration plan shall include time-stamped photo documentation of the pre-	Pre-construction	Prepare restoration plan	Prior to construction	Authority/ Contractor	Contractor	Contractor will prepare a restoration plan	Condition of construction contract

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism
		construction conditions of all temporary staging areas. All construction access, mobilization, material laydown, and staging areas will be returned to a condition equal to the pre-construction staging condition. This requirement is included in the construction contract requirements.							
<b>Agricultural Farmland</b>									
AG-IAMF#1	Restoration of Important Farmland Used for Temporary Staging Areas	<p>Prior to any ground-disturbing activities at the site of a temporary construction staging area located on Important Farmland, the Contractor shall prepare a restoration plan addressing specific actions, sequence of implementation, parties responsible for implementation and successful achievement of restoration for temporary impacts. Actions shall include removing and stockpiling the top 18 inches of soil for replacement on-site during restoration activities. Before beginning construction use of sites on Important Farmland, the Contractor shall submit the restoration plan to the Authority for review and obtain Authority (and if applicable, the landowner) approval. The restoration plan shall include time-stamped photo documentation of the pre-construction conditions of all temporary staging areas.</p> <p>All construction access, mobilization, material laydown, and staging areas on Important Farmlands will be returned to a condition equal to the pre-construction staging condition. This requirement is included in the construction contract requirements.</p>	Pre-construction	Reporting	At incorporation or completion of design	Authority/ Contractor	Contractor	Prepare restoration plan	Condition of construction contract
AG-IAMF#2	Permit Assistance	<p>Prior to disturbance causing activities affecting any segment of a confined animal facility, the Authority will assign a representative to act as a single point of contact to assist each confined animal facility owner during the process of obtaining new or amended permits or other regulatory compliance necessary to the continued operation or relocation of the facility. The Authority will consider and may provide compensation when acquisition of a confined animal site will require either relocation of the facility or amendment of its existing regulatory permits. The Authority will create a permit assistance center for landowners and operators whose operations will be out of compliance with permits because of the HSR. This permit center will focus on helping the permit holders modify or obtain any new permits that are required because of the HSR impacts.</p>	Pre-construction	Reporting	Monthly	Authority	Authority	At incorporation or completion of design/monthly reporting during construction	Condition of construction contract
AG-IAMF#3	Farmland Consolidation Program	<p>The Authority will establish and administer a farmland consolidation program to sell remnant parcels to neighboring landowners for consolidation with adjacent farmland properties. In addition, the program will assist the owners of remnant parcels in selling those remnants to adjacent landowners, upon request. The goal of the program is to provide for continued agricultural use on the maximum feasible amount of remnant parcels that otherwise may not be economic to farm. The program will focus on severed remainder parcels, including those that were under Williamson Act or Farmland Security Act contract at the time of right-of-way acquisition and have become too small to remain in the local Williamson Act or Farmland Security Act program. The program will assist landowners in obtaining lot line adjustments where appropriate to incorporate remnant parcels into a larger parcel that is consistent with size requirements under the local government regulations.</p> <p>The program will operate for a minimum of 5 years after construction of the section is completed. The Authority shall document implementation of this measure through issuance of a compliance memorandum- after the minimum operation period of 5 years has elapsed. The document shall</p>	Operation	Establish program	Program will operate for a minimum of 5 years after construction of the project section is completed	Authority	Authority	Establish farmland consolidation program	Condition of construction contract

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism
		be filed with the EMMA system.							
AG-IAMF#4	Notification to Agricultural Property Owners	Prior to the start of any construction activity adjacent to farmland, the Authority shall provide written notification to agricultural property owners or leaseholders immediately adjacent to the disturbance limits for the HSR project section. The notification is to indicate the intent to begin construction, including an estimated date for the start of construction. In order to provide agricultural property owners or leaseholders sufficient lead time to make any changes to their operations due to project section construction, this notification shall be provided at least 3 months, but no more than 12 months, prior to the start of construction activity.	Pre-construction	Public notification	Monthly	Authority	Authority	Notification to adjacent property owners and leaseholders at least 3 months, but no more than 12 months, prior to the start of construction activity	Condition of construction contract
AG-IAMF#5	Temporary Livestock and Equipment Crossings	Prior to the start of any construction activity adjacent to any farmland, the Authority shall coordinate with agricultural property owners or leaseholders to provide temporary livestock and equipment crossings to minimize impacts to livestock movement, as well as routine operations and normal business activities, during project construction.	Pre-construction	Public coordination/ project design	Monthly	Authority	Authority	Coordination with agricultural property owners and leaseholders, design of livestock and equipment crossings	Condition of construction contract
AG-IAMF#6	Equipment Crossings	During final design, and in coordination with the property owners of land in use for agricultural operations, the Authority shall finalize the realignments of any affected access roads to provide equipment crossings to minimize impediments to routine agricultural operations and normal business activities that may result from long-term project operation.	Final design	Public coordination	Monthly	Authority	Authority	Coordination with agricultural property owners and leaseholders, design of agricultural access road realignments	Condition of construction contract
<b>Parks, Recreation, and Open Space</b>									
PK-IAMF#1	Parks, Recreation, and Open Space	<p>Prior to construction, the Contractor shall prepare and submit to the Authority a technical memorandum that identifies project design features to be implemented to minimize impacts on parks, recreation and open space. Typical design measures to avoid or minimize impacts to parks and recreation may include:</p> <ul style="list-style-type: none"> <li>Provide safe and attractive access for present travel modes (e.g., motorists, bicyclists, pedestrians—as applicable) to existing park and recreation facilities.</li> <li>Design guideway, system, and station features in such a way as to enhance the surrounding local communities. Provide easy crossings of the guideway which allows for community use under the guideway or at station areas.</li> </ul>	Pre-construction	Reporting	At incorporation or completion of design/ monthly reporting during construction	Authority/ Contractor	Contractor	Prepare technical memorandum that documents project design features that minimize impacts on park, recreation, and open space	Condition of construction contract
<b>Aesthetics and Visual Quality</b>									
AVQ-IAMF#1	Aesthetic Options	Prior to construction, the Contractor shall document, through issue of a technical memorandum, how the Authority's aesthetic guidelines have been employed to minimize visual impacts. The Authority seeks to balance providing a consistent, project-wide aesthetic with the local context for the numerous high-speed rail non-station structures across the state. Examples of aesthetic options will be provided to local jurisdictions that can be applied to non-standard structures in the high-speed rail system. Refer to Aesthetic Options for Non-Station Structures, 2017	Pre-construction	Reporting	At incorporation or completion of design/monthly reporting during construction	Authority/ Contractor	Contractor	Prepare aesthetics technical memorandum	Condition of construction contract
AVQ-IAMF#2	Aesthetic Review Process	Prior to construction, the Contractor will document that the Authority's aesthetic review process has been followed to guide the development of non-station area structures. Documentation will be accomplished through	Pre-construction	Reporting	At incorporation or completion of design/monthly	Authority/ Contractor	Contractor	Prepare aesthetics review process technical memorandum	Condition of construction contract

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism
		issuance of a technical memorandum to the Authority. The Authority will identify key non-station structures recommended for aesthetic treatment; consult with local jurisdictions on how best to involve the community in the process; solicit input from local jurisdictions on their aesthetic preferences; evaluate aesthetic preferences for potential cost, schedule, and operational impacts and compatibility with project-wide aesthetic goals, include recommended aesthetic approaches in the construction procurement documents; and work with the Contractor and local jurisdictions to review and incorporate designs and local aesthetic preferences into final design and construction. Refer to Aesthetic Options for Non-Station Structures, 2017.			reporting during construction				
<b>Cultural Resources</b>									
CUL-IAMF#1	Geospatial Data Layer and Archaeological Sensitivity Map	Prior to construction (any ground-disturbing activities) and staging of materials and equipment, the Contractor's archaeologist or geoarchaeologist shall prepare a geospatial data layer identifying the locations of all known archaeological resources and built historic resources that require avoidance or protection, and areas of archaeological sensitivity that require monitoring within the area of potential effect (APE). The Contractor's archaeologist, who meets the Secretary of the Interior's Professional Qualifications Standards provided in 36 Code of Federal Regulations (CFR) Part 61, is to use, as appropriate, a combination of the following: known locations of archaeological sites and built historic properties, tribal consultation, landforms, depositional processes, distance to water, mapping provided in the Archaeological Treatment Plan, or historic mapping. This mapping is to be updated as the design progresses if it results in an expansion of the area of ground disturbance/APE, including temporary construction easements and new laydown and access areas. This mapping will be used to develop an archaeological monitoring plan to be prepared by the Contractor's archaeologist, and upon approval by the Authority, implemented by the Contractor's archaeologist. When design is sufficiently advanced, a geospatial data layer will be produced by the Contractor overlaying the locations of all known archaeological resources and built historic resources within the APE, for which avoidance measures are necessary, and all archaeologically sensitive areas, for which monitoring is required.	Design/ pre-construction	Prepare plan	At incorporation or completion of design	Contractor's archaeologist or geoarchaeologist	Authority	Prepare geospatial data layer	Condition of construction contract
CUL-IAMF#2	WEAP Training Session	Prior to construction (any ground-disturbing activity), construction contractor personnel who work on site will attend a WEAP training session provided by the Contractor. The WEAP will include cultural resources awareness training performed by the Contractor's archaeologist who meets the Secretary of the Interior's Professional Qualification Standards provided in 36 CFR Part 61. The Contractor will develop instructional materials and a fact sheet for distribution to the construction crews, and submit the materials, as well as qualifications of the personnel providing the training, to the Authority for approval at least 15 days prior to being permitted on-site access. The training will address measures required to avoid or protect built historic resources, educate crews on artifacts and archaeological features they may encounter and the mandatory procedures to follow should potential cultural resources be exposed during construction. Translation services shall be provided by the Contractor for non-English speaking participants. The training sessions shall be given prior to the initiation of any ground disturbance	Pre-construction	Training program/ reporting	Annual (training)/ monthly (reporting)	Authority/ Contractor	Contractor	WEAP training	Condition of construction contract

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism
		<p>activities and repeated on an annual basis. Additionally, new construction crewmembers shall attend an initial WEAP training session prior to working on site.</p> <p>On completion of the WEAP training, construction crews will sign a form stating that they attended the training, understood the information presented, and will comply with the WEAP requirements. The Contractor's archaeologist will submit the signed WEAP training forms to the Mitigation Manager on a monthly basis. On an annual basis, the Contractor will provide the Authority with a letter indicating that regular WEAP training has been implemented and will provide at least one PowerPoint annually of the WEAP training. On a monthly basis, the Contractor's archaeologist will provide updates and synopsis of the training to workers during the daily safety ("tailgate") meeting. Construction crews will be informed during the WEAP training that, to the extent possible, travel within the marked project site will be restricted to established roadbeds.</p>							
CUL-IAMF#3	Pre-Construction Cultural Resource Surveys	<p>Prior to construction (any ground-disturbing activities in areas not yet surveyed) and the staging of materials and equipment, the Contractor shall conduct pre-construction cultural resource surveys. Resulting from lack of legal access, much of the construction footprint may not have been surveyed. Once parcels are accessible, the Contractor will have archaeologists or architectural historians, as appropriate, who meet the Secretary of the Interior professional qualification standards survey and complete reporting in appropriate document for archaeology and / or built resources, in accordance with documentation requirements stipulated in the Programmatic Agreement. Identified resources shall be evaluated for the National Register of Historic Places (NRHP) and the California Register of Historical Resources (CRHR). The qualified archaeologist or architectural historian, as appropriate, will assess the potential to affect to historic properties (NRHP) by applying the effects criteria in 36 CFR Part 800.5(a)(1), and the potential of significant impacts to historical resources (CRHR) by applying the criteria in California Environmental Quality Act (CEQA) Guidelines 15064.5(b). Should the Authority and FRA determine, in consultation with the State Historic Preservation Office (SHPO), that any newly identified historic properties or historical resources will be adversely affected, the Built Environment Treatment Plan or Archeological Treatment Plan, as appropriate, will be amended, to document mitigation measures agreed upon by the MOA signatories. The schedule of these surveys will be dependent on the timing of obtaining legal access to the properties and may be driven by the need to complete construction-related activities, e.g., geotechnical borings, laydown yards, etc. Prior to beginning surveys, updated records searches may be required by the FRA and Authority, depending on the length of the passage of time, to validate that accurate information was obtained regarding previous inventory and evaluation efforts. The Contractor's archaeologist, in consultation with the Authority, will determine if an updated records search is required. If an updated records search is necessary, the search shall be performed by the Contractor's archaeologist.</p>	Pre-construction	Conduct pre-construction surveys; Identify historic and/or cultural resources	Surveys conducted prior to ground disturbance	Authority/ Contractor	Contractor	Cultural resource surveys conducted prior to ground disturbance	Condition of construction contract
CUL-IAMF#4	Relocation of Project Features when Possible	<p>Changing the rail alignment to avoid newly discovered sites is likely infeasible; however, access areas and laydown sites may be relocated should their proposed location be found to be on archaeological sites or</p>	Construction	Relocation of access areas and laydown sites	As needed	Authority/ Contractor	Contractor	Relocation access areas and laydown sites as needed to	Condition of construction contract

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism
		have the potential to affect historic built resources in the vicinity. The Contractor will delineate all avoidance and protection measures for identified archaeological and built resources on construction drawings.						avoid archeological or historic built resources	
CUL-IAMF#5	Archaeological Monitoring Plan and Implementation	Prior to construction, the Contractor's professionally qualified archaeologist, as defined in the Programmatic Agreement, will prepare a monitoring plan based on the results of geospatial data layer and archaeological sensitivity map. The plan is to be reviewed and approved by the Authority prior to any ground-disturbing activities. During construction (any ground-disturbing activities) or staging of materials or equipment, the Contractor will be responsible for implementing the monitoring plan and providing archaeological and tribal monitoring of ground-disturbing construction activities with a potential to affect archaeological remains in areas identified as archaeologically sensitive in the Archaeological Treatment Plan. The Contractor shall obtain Authority approval of all persons providing archaeological or tribal monitoring.	Pre-construction/ construction	Prepare and implement monitoring plan	Prior to construction (prepare plan)/ during construction (implement plan)	Authority/ Contractor	Contractor	Prepare archaeological monitoring plan	Condition of construction contract
CUL-IAMF#6	Pre-Construction Conditions Assessment, Plan for Protection of Historic Built Resources, and Repair of Inadvertent Damage	<p>Prior to construction (any ground-disturbing activities that are within 1,000 feet of a historic built property), the Contractor may be required to assess the condition of construction-adjacent historic properties, and prepare a Plan for the Protection of Historic Built Resources and Repair of Inadvertent Damage. The MOA and Built Environment Treatment Plan (BETP) will stipulate for which properties the plan is to be prepared. MOA signatories and consulting parties may comment on the adequacy of the assessments. Protection measures will be developed in consultation with the landowner or land-owning agencies as well as the SHPO and the MOA signatories and consulting parties, as required by the Programmatic Agreement. As the design progresses, additional properties may be identified by the Authority as requiring this plan. The plan shall record existing conditions in order to (1) establish a baseline against which to compare the property's post-project condition, (2) to identify structural deficiencies that make the property vulnerable to project construction related damage, such as vibration, and (3) to identify stabilization or other measures required to avoid or minimize inadvertent adverse effects. The plan will be further described in the BETP and be prepared by an interdisciplinary team, including (but not limited to) as appropriate, an architectural historian, architect, photographer, structural engineer, and acoustical engineer. Ambient conditions will be used to identify buildings that are sensitive receptors to construction-related vibration and require vibration monitoring during construction activities. Additional protective measures may be required if the property is vacant during construction.</p> <p>The plan content shall be outlined in the BETP and is to be completed and approved by the Authority, with protective measures implemented before construction begins within 1,000 feet of the subject building. The plan shall describe the protocols for documenting inadvertent damage (should it occur), as well as notification, coordination, and reporting to the SHPO, MOA signatories, and the owner of the historic property. The plan shall direct that inadvertent damage to historic properties shall be repaired in accordance with the Secretary of the Interior's (SOI) <i>Standards for the Treatment of Historic Properties</i> (U.S. Department of the Interior 1995). The plan shall be developed in coordination with the Authority and FRA, and shall be submitted to the SHPO for review and approval. Protective plans will be required for buildings that will be</p>	Pre-construction	Conduct assessment and protection plan	Required if within 1,000 feet of historic built property	Contractor/ Authority	Contractor/ Authority	Assess the condition of construction-adjacent historic properties and prepare a Plan for the Protection of Historic Built Resources and Repair of Inadvertent Damage	MOA/PA/BETP

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism
		moved as part of the project mitigation, including stabilization before, during, and after relocation; protection during temporary storage; and relocation to a new site, followed by rehabilitation.							
CUL-IAMF#7	Built Environment Monitoring Plan	Prior to construction (any ground-disturbing activities within 1,000 feet of a historic property or resource), the Contractor shall prepare a Built Environment Monitoring Plan (BEMP). Draft and final BEMP's will be prepared describing the properties that will require monitoring, the type of activities or resources that will require full-time monitoring or spot checks, the required number of monitors for each construction activity, and the parameters that will influence the level of effort for monitoring. Maximum vibration level thresholds may be established in the Plan for Protection of Historic Resources and Repair of Inadvertent Damage the monitoring of which will be included in this monitoring plan. The BETP will outline the process for corrective action should the protection measures prove ineffective. Consultation procedures will also be defined in the BETP. The Contractor shall develop both the draft and final plans in coordination with the Authority and FRA, and shall be submitted to the SHPO for review and approval. The plan will be implemented prior to any ground-disturbing activities within 1,000 feet of properties identified as requiring monitoring, as specified in the BETP.	Pre-construction	Prepare monitoring plan	Required if within 1,000 feet of historic built property	Contractor/ Authority	Contractor/ Authority	Prepare a BEMP	BETP
CUL-IAMF#8	Implement Protection and/or Stabilization Measures	Implement the plan described in the Plan for Protection of Historic Resources and Repair of Inadvertent Damage and in the Built Environment Treatment Plan. Such protection measures will include, but will not be limited to, vibration monitoring of construction in the vicinity of historic properties; cordoning off of resources from construction activities (e.g., traffic, equipment storage, personnel); shielding of resources from dust or debris; and stabilization of buildings adjacent to construction. Temporary stabilization and protection measures will be removed after construction is complete, and the historic properties will be restored to their pre-construction condition. For buildings that will be moved, treatment will include stabilization before, during, and after relocation; protection during temporary storage; and relocation to a new site, followed by rehabilitation.	Pre-construction	Implement protection and/or stabilization measures	Per BETP	Authority/ Contractor	Contractor	Implement historic built resource protection measures per BETP	BETP

AASHTO	American Association of State Highway and Transportation Officials	CHSR	California high-speed rail	IAMF	impact avoidance and minimization feature	RWQCB	Regional Water Quality Control Board
ADA	Americans with Disabilities Act	CHSTS	California Safety Test Solutions	IBC	International Building Code	SEM	sequential excavation method
APE	area of potential effect	CMP	construction management plan	ISEP	Implementation Stage Electromagnetic Compatibility Program Plan	SHPO	State Historic Preservation Office
AREMA	American Railway Engineering and Maintenance-of-Way Association	CP	construction package	MBTA	Migratory Bird Treaty Act	SOI	Secretary of the Interior
ASCE	American Society of Civil Engineers	CRHR	California Register of Historical Resources	MOA	Memorandum of Agreement	SPCC	Spill Prevention, Control, and Countermeasure
ASTM	American Society for Testing and Materials	CTP	construction transportation plan	mph	miles per hour	SSPP	Systems Safety Program Plan
Authority	California High-Speed Rail Authority	CWA	Clean Water Act	MSE	mechanically stabilized earth	SVP	Society of Vertebrate Paleontology
BEMP	Built Environment Monitoring Plan	DB	design-build	NCCAB	North Central Coast Air Basin	SWPPP	stormwater pollution prevention plan
BETP	built environment treatment plan	DCM	Design Criteria Manual	NIOSH	National Institute for Occupational Safety and Health	SWRCB	State Water Resources Control Board
BGEPA	Bald and Golden Eagle Protection Act	DOGGR	California Department of Conservation, Division of Oil, and Gas and Geothermal Resources	NMFS	National Marine Fisheries Service	TBM	tunnel boring machine
BMP	best management practice	EMC	electromagnetic compatibility	NOA	naturally occurring asbestos	TR	triggers review
BRMP	biological resources management plan	EMF	electromagnetic field	NRHP	National Register of Historic Places	TVA	threat and vulnerability assessment
Cal-OSHA	California Occupational Safety and Health Administration	EMI	electromagnetic interference	O&M	operations and maintenance	Uniform Act	Uniform Relocation Assistance and Real Property Acquisition Policies Act, as amended
Caltrans	California Department of Transportation	EMMA	Environmental Mitigation Management and Assessment	OSHA	Occupational Safety and Health Administration	US	United States
CARB	California Air Resources Board	EPB	Earth Pressure Balance	PA	Programmatic Agreement	USACE	U.S. Army Corps of Engineers
CDFW	California Department of Fish and Wildlife	ESA	Endangered Species Act	PCM	Project Construction Manager	USEPA	U.S. Environmental Protection Agency
CDPH	California Department of Public Health	ESA	environmental site assessment	PHA	preliminary hazard analysis	USFWS	U.S. Fish and Wildlife Service
CDSM	cement deep-soil-mixing	FHWA	Federal Highway Administration	Porter-Cologne	Porter-Cologne Water Quality Control Act	VFHS	Valley Fever Health and Safety
CEQA	California Environmental Quality Act	FRA	Federal Railroad Administration	PRMMP	paleontological resources monitoring and mitigation plan	VMT	vehicle miles traveled
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act	FTA	Federal Transit Administration	PRS	paleontological resources specialist	VOC	volatile organic compound
CESA	California Endangered Species Act	HEPA	high efficiency particulate air	PSI	pounds per square inch	WCP	Weed Control Plan
CFR	Code of Federal Regulations	HSR	high-speed rail	RCRA	Resource Conservation and Recovery Act	WEAP	Worker Environmental Awareness Program



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**APPENDIX D: STATE HISTORIC PRESERVATION OFFICER (SHPO)  
SECTION 106 CONCURRENCE LETTER AND MEMORANDUM OF  
AGREEMENT (MOA), MARCH 11, 2022**





**DEPARTMENT OF PARKS AND RECREATION  
OFFICE OF HISTORIC PRESERVATION**

Lisa Ann L. Mangat, Director

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March 27, 2020

Reply in Reference To: FRA100524A

Brett Rushing  
Cultural Resources Program Manager  
California High-Speed Rail Authority  
770 L Street, Suite 620  
Sacramento, CA 95814

Re: Request for Review and Comment on Findings Presented in the *San Jose to Merced Project Section, Section 106 Finding of Effect Report*, Prepared by ICF (February 2020)

Dear Mr. Rushing:

The California High-Speed Rail Authority (Authority) is continuing consultation with the State Historic Preservation Officer (SHPO) regarding the San Jose to Merced Project Section of the California High-Speed Rail (HSR) Program. This consultation is undertaken in accordance with the *2011 Programmatic Agreement Among the Federal Railroad Administration, the Advisory Council on Historic Preservation, the California State Historic Preservation Officer, and the California High-Speed Rail Authority (PA)*. The Authority is requesting SHPO comments on the *San Jose to Merced Project Section, Section 106 Finding of Effect Report (FOE Report)* prepared by ICF in February 2020 and on a finding of effect on 21 historic built properties and 33 archaeological resources.

The FOE Report assess effects on built environment and archaeological properties that would result from implementation of the Preferred Alternative for the San Jose to Central Valley Wye Project Extent (Preferred Alternative) of the California High-Speed Rail System. The Preferred Alternative consists of portions of the San Jose to Merced Project Section that extends from Scott Boulevard in San Jose to Carlucci Road in Merced County, the western limit of the Central Valley Wye. The Area of Potential Effects delineated for the San Jose to Merced Project Section Archaeological Survey Report (Authority and FRA 2019) and the San Jose to Merced Project Section Historic Architectural Survey Report (Authority and FRA 2019).

The Preferred Alternative has the potential to adversely affect five built environment historic properties, including three that would be demolished (the Madrone Underpass, Live Oak Creamery, and the Cozzi Family Property). Additionally, construction of new HSR station facilities would remove character-defining features and alter historic setting characteristics of the Southern Pacific Depot in San Jose and diminish the agricultural setting of the Negra Ranch. Mitigation Measures, such as a stipulation to involve stakeholders in the development of interpretive or educational materials, will be developed with consulting parties.

The FOE Report also concludes that the Preferred Alternative would potentially adversely affect two archaeological properties (CA-SCL-30/H and CA-338H) in the APE. Another 31 archaeological resources within the APE are assumed to be eligible for listing on the National Register of Historic Places, although formal evaluation of these resources is pending due to lack

of legal access to parcels and rights-of-way. The assessment of effects for all 33 resources will be phased in accordance with 36 CFR § 800.5(a)(3) and PA Stipulation VI.E and VIII.A.1.

Having reviewed your letter and the FOE Report, SHPO offers the following comments:

- SHPO concurs that, pursuant to 36 CFR § 800.5(a)(1) and (2), the Preferred Alternative has the potential to adversely affect the Southern Pacific Depot in San Jose, the Madrone Underpass, Live Oak Creamery, Negra Ranch, and the Cossi Family Property.
- SHPO concurs that, pursuant to 36 CFR § 800.5(b), the Preferred Alternative will have no adverse effect on the Santa Clara Railroad Complex, Sunlite Baking Co., San Martin Winery, Southern Pacific Station in Gilroy, Pacheco California Department of Forestry Station, and the Cottani Family Property.
- SHPO concurs that, pursuant to 36 CFR § 800.4(d)(1), the preferred alternative will have no effect on Pacific Intertie Transmission Line, Villa Mira Monte, Hoenck House, IOOF Orphanage School, Horace Wilson House, Ellis Ranch, Millers Canal, the California Aqueduct, the Delta Mendota Canal, and the San Joaquin & Kings River Main Canal.
- SHPO agrees that, per 36 CFR § 800.5(a)(3) and PA Stipulation VI.E and VIII.A.1., the phased application of the criteria of adverse effect on 33 archaeological resources identified in Table 2 of the Authority's February 28, 2020 letter is appropriate at this time.
- SHPO has no comments on the format or structure of the FOE Report.

If you have any questions or comments, contact State Historian Tristan Tozer at (916) 445-7027 or at [Tristan.Tozer@parks.ca.gov](mailto:Tristan.Tozer@parks.ca.gov).

Sincerely,

A handwritten signature in blue ink, appearing to read 'Julianne Polanco', with a long horizontal line extending to the right.

Julianne Polanco  
State Historic Preservation Officer

**MEMORANDUM OF AGREEMENT  
AMONG THE CALIFORNIA HIGH-SPEED RAIL AUTHORITY, THE SURFACE TRANSPORTATION BOARD,  
AND THE CALIFORNIA STATE HISTORIC PRESERVATION OFFICER  
REGARDING THE SAN JOSE TO MERCED PROJECT SECTION OF THE  
CALIFORNIA HIGH-SPEED RAIL PROGRAM IN  
SANTA CLARA, SAN BENITO, AND MERCED COUNTIES, CALIFORNIA**

**WHEREAS**, the California High-Speed Rail Authority (Authority) proposes to construct the San Jose to Merced Project Section (the Undertaking), an approximately 145-mile portion of the California High-Speed Rail Program in Santa Clara, San Benito, and Merced Counties, which would consist of constructing a new rail alignment, stations, maintenance facilities, electrical substations, and other appurtenant facilities; and

**WHEREAS**, the San Jose to Merced Project Section was identified as an undertaking subject to review under Section 106 of the National Historic Preservation Act (54 United States Code [U.S.C.] § 306108) and its implementing regulations (36 Code of Federal Regulations [CFR] Part 800) in the *Programmatic Agreement among the Federal Railroad Administration, the Advisory Council on Historic Preservation, the California State Historic Preservation Officer, and the California High-Speed Authority regarding compliance with Section 106 of the National Historic Preservation Act as it pertains to the California High-Speed Train Project* executed on July 22, 2011 (**Attachment 1**); and

**WHEREAS**, the *First Amendment to the Programmatic Agreement among the Federal Railroad Administration, the Advisory Council on Historic Preservation, the California State Historic Preservation Officer, and the California High-Speed Rail Authority regarding compliance with Section 106 of the National Historic Preservation Act as it pertains to the California High-Speed Train Project (PA)* was executed on July 21, 2021, extending the expiration of the PA from July 22, 2021 to July 23, 2024 (**Attachment 1**); and

**WHEREAS**, the Authority has coordinated compliance with Section 106 and 36 CFR Part 800 with steps taken to meet the requirements of the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA) and has planned public participation, analysis, and review in such a way to satisfy the requirements of each statute; and

**WHEREAS**, on July 23, 2019, the State of California and the Federal Railroad Administration (FRA) executed a memorandum of understanding under the Surface Transportation Project Delivery Program (known as NEPA Assignment), pursuant to the legal authority under 23 U.S.C. §327; and under NEPA Assignment, the State, acting through the California State Transportation Agency and the Authority, assumed FRA's responsibilities under NEPA and other federal environmental laws, including Section 106; and

**WHEREAS**, the FRA notified the Authority that the FRA would not be participating in consultation regarding the Undertaking; and

**WHEREAS**, government-to-government consultation with federally recognized Native American tribes remains the FRA's responsibility under NEPA assignment; and

**WHEREAS**, on April 18, 2013, the Surface Transportation Board (STB) issued a decision concluding that it has jurisdiction over the construction of the California High-Speed Rail Program, requiring the Authority to obtain STB approval for the construction of each project section, and STB subsequently designated

FRA lead agency to act on its behalf for the purposes of compliance with Section 106 for High-Speed Rail Program undertakings; and on June 23, 2021 the STB designated the Authority as lead Federal agency for Section 106, and the STB accepted the Authority's invitation to be an invited signatory to this memorandum of agreement (MOA); and

**WHEREAS**, on May 20, 2020, the United States Army Corps of Engineers (USACE), San Francisco, Sacramento and Los Angeles districts, sent a letter to the Authority reaffirming their understanding regarding the Authority's role as lead agency for compliance with Section 106, and that the Authority has the responsibility to act on the USACE's behalf for their discretionary federal actions related to all HSR project sections; and

**WHEREAS**, the Undertaking would be designed and constructed using a procurement process, in which the current level of design is generally 15 percent complete and which the Authority's contractor (the Contractor) will advance to 100 percent, potentially resulting in changes to the project footprint; and

**WHEREAS**, the Authority has delineated the Area of Potential Effects (APE) for the Undertaking based on the current level of design in accordance with Stipulation VI.A of the PA to encompass the geographic areas within which the Undertaking may directly or indirectly cause alterations in the character or use of historic properties, as depicted in **Attachment 2**; and

**WHEREAS**, the Authority surveyed the APE for built-environment resources and, in consultation with the California State Historic Preservation Officer (SHPO) and other consulting parties, determined that the APE contains 21 built-environment historic properties listed in or considered eligible for listing in the National Register of Historic Places (listed in **Attachment 3**); and

**WHEREAS**, the Authority has surveyed approximately 0.1 percent of the project footprint for archaeological resources and, in consultation with the SHPO and other consulting parties, determined that the APE contains two known archaeological historic properties (CA-SCL-30/H (P-43-000050) and CA-SCL-338H (P-43-000245)) and 31 other archaeological resources (listed in **Attachment 3**) that are currently unevaluated and presumed NRHP-eligible for planning purposes; and

**WHEREAS**, the Authority proposes to phase the identification and evaluation of archaeological historic properties as provided for in Stipulation VI.E of the PA and 36 CFR 800.4(b)(2); and

**WHEREAS**, the Advisory Council on Historic Preservation (ACHP) notified the Authority that the ACHP would not be participating in consultation regarding the Undertaking by letter on May 3, 2021; and

**WHEREAS**, the Authority, in consultation with the SHPO, STB, and other consulting parties, determined that the Undertaking may have an adverse effect on 5 built-environment historic properties (Southern Pacific Depot, Madrone Underpass, Live Oak Creamery, Negra Ranch, Cozzi Family Property), no adverse effect on 6 built-environment historic properties, and no effect on 10 built-environment historic properties, as documented in the Finding of Effect (FOE) report for the San Jose to Merced Project Section, and as listed in **Attachment 3** of this MOA; the Authority will phase the evaluation and effects assessment for the remaining 33 archaeological properties that have been identified in the APE; and

**WHEREAS**, the Authority will ensure the avoidance, minimization, or resolution of adverse effects of the Undertaking on historic properties through the execution and implementation of this MOA and the implementation of the Archaeological Treatment Plan (ATP; **Attachment 4**) and the Built Environment Treatment Plan (BETP; **Attachment 5**); and

**WHEREAS**, in accordance with Stipulation V.A and V.B of the PA, the Authority has consulted with agencies with jurisdiction over portions of the APE and other parties with a demonstrated interest in the undertaking, a legal or economic relation to an affected historic property, or concern with the Undertaking's effects on historic properties, as noted in **Attachment 6**, about the Undertaking and its effects on historic properties and has taken into account all comments received from them; and

**WHEREAS**, in accordance with Stipulation IV.A.5 and IV.C.2 of the PA, the FRA, with the support of and in coordination with the Authority, has formally consulted with or has made a good faith effort to formally consult with the federally recognized Native American tribes that may attach religious and cultural significance to historic properties within the APE of the Undertaking; the federally recognized tribes that have chosen to participate in the consultation are identified in **Attachment 7**; and

**WHEREAS**, in accordance with Stipulation IV of the PA, the Authority has consulted with or made a good faith effort to consult with California Native American tribes that are on the Native American Heritage Commission's consultation list that are traditionally and culturally affiliated with the APE of the Undertaking; the California Native American tribes that have chosen to participate in the consultation are identified in **Attachment 7**; and

**WHEREAS**, the parties listed in **Attachments 6** and **7** have accepted the Authority's invitation to be consulting parties to the Undertaking (collectively referred to as the Consulting Parties); and

**WHEREAS**, the Authority sought and considered the views of the public on this Undertaking through its public involvement program as part of the environmental review process and requirements of NEPA and CEQA, as described in the Environmental Impact Report/Environmental Impact Statement (EIR/EIS) for the Undertaking, which included distributing informational materials to the public, making presentations and soliciting comments at public meetings, and circulating the draft and final EIR/EIS for public review and comment; and

**WHEREAS**, the Authority and the SHPO are collectively referred to as the Signatories; STB is referred to as an Invited Signatory; and

**WHEREAS**, the Consulting Parties that are not Signatories have been invited to sign this MOA as concurring parties; and

**NOW, THEREFORE**, the Authority and SHPO agree the Undertaking will be implemented in accordance with the following stipulations in order to take into account the effects of the Undertaking on historic properties, and further agree that these stipulations shall govern the Undertaking and all its parts until this MOA expires or is terminated.

#### **STIPULATIONS**

The Authority, with the assistance of its Contractor, shall ensure that the following stipulations of this MOA are carried out:

##### **I. OVERSIGHT AND COORDINATION**

The Authority, as the lead federal agency, will be responsible for ensuring compliance with all stipulations of this MOA, with the exception of government-to-government consultation with federally recognized Native American tribes, which remains the FRA's responsibility under NEPA assignment.

The Authority shall ensure that the terms of this MOA, including the ATP and BETP, are incorporated in their entirety in all contracts, licenses, or other approvals for this Undertaking and shall ensure the completion of all measures specified in this MOA, including in the ATP and BETP.

The Authority shall ensure that it carries out its responsibilities under the PA (as may be amended from time to time) and any subsequent programmatic agreements regarding compliance with Section 106, to the extent such responsibilities are applicable to the Undertaking and in effect.

As an Invited Signatory, STB will receive all documentation related to this MOA and treatment plans, be provided the opportunity to review and comment on such documentation during the implementation of this MOA, and will be part of the ongoing consultation process during implementation of this MOA. The Authority will consider any comments made by STB prior to finalizing all MOA-associated documentation.

## **II. MODIFICATIONS TO THE AREA OF POTENTIAL EFFECTS**

In accordance with the PA, the APE was developed and agreed upon by the Authority and the SHPO, and accounts for potential impacts on both archaeological and built-environment resources that may result from the construction and operation of the Undertaking.

If modifications to the Undertaking, subsequent to the execution of this MOA, necessitate the revision of the APE, the Authority is responsible for informing the Signatories and Invited Signatory, consulting federally recognized Native American tribes, and other Consulting Parties within 15 days of identification of the needed changes in accordance with PA Stipulation VI. The Authority shall document the revised APE in an appropriate supplemental identification report (e.g., APE Modification Memo, addendum Archaeological Survey Report, and/or addendum Historic Architecture Survey Report). The SHPO will have 30 days to review the modified APE. If the SHPO objects to the modified APE, the Authority will revise the APE to address SHPO comments and resubmit for review. The SHPO will have 30 days to review and comment on this revised APE.

## **III. COMPLETION OF HISTORIC PROPERTIES IDENTIFICATION EFFORT PRIOR TO CONSTRUCTION**

The Authority will ensure that any additional historic property identification efforts are completed as outlined below and that documentation of the identification efforts is prepared in accordance with this MOA, including the ATP and BETP and PA Stipulation VI. The Authority will submit documentation of these efforts to the SHPO, Invited Signatory and other interested Consulting Parties for a 30-day review period. Prior to finalizing any inventory and evaluation documentation, the Authority shall consider the comments regarding identification efforts that are received through this consultation process.

Completion of the historic properties identification effort will be consistent with Stipulation VI (Identification of Historic Properties) and IX (Changes in Ancillary Area/Construction ROW) of the PA, including archaeological survey of areas not previously accessible/surveyed prior to construction. The Authority shall provide the Signatories, Invited Signatory and other Consulting Parties with the information necessary to document that efforts to identify and evaluate historic properties in the Undertaking's APE are sufficient to comply with 36 CFR § 800.4(b) and (c).

The Authority will ensure that addendum FOEs (aFOE) are prepared, in accordance with PA Stipulation VII, once supplemental historic property identification efforts are completed. The Authority will submit aFOEs to the Signatories, Invited Signatory and other Consulting Parties with an interest in the historic

property for a concurrent 30-day review period. The Authority shall take into consideration all comments regarding effects received within the review period prior to finalizing aFOEs for submission to the SHPO for review and concurrence. The SHPO shall have an additional 30 days to review final aFOE reports. If the SHPO makes no objection within the final 30-day review period, the findings for resources documented in the aFOE will become final. Should SHPO have any objections, the Authority will follow Stipulation VII.A, Dispute Resolution.

#### **IV. TREATMENT OF HISTORIC PROPERTIES IDENTIFIED IN THE APE**

This MOA outlines the Authority's commitments regarding the treatment of all historic properties, both currently known and yet-to-be-identified, that may be affected by the Undertaking. As allowed under Stipulation VI.C of the PA, this MOA includes provisions for treatment plans that include use of a combined archaeological testing and data recovery program. Two detailed historic property treatment plans have been prepared for the Undertaking: the ATP and the BETP.

The ATP (**Attachment 4**) describes treatments for effects on archaeological properties and Native American traditional cultural properties. The BETP (**Attachment 5**) describes the treatments for effects on the built environment resources. The work described in the treatment plans will be conducted prior to construction, during construction, and/or after construction of the Undertaking in the manner specified in the treatment plans. The treatments to historic properties known at the time of execution of this MOA are summarized in an impact/treatment table, organized by historic property, in **Attachment 3**. The treatment measures listed will be applied to historic properties affected in order to avoid, minimize, and/or mitigate effects of the Undertaking. The Authority shall implement and complete the treatment measures within two (2) years of completion of construction of the Undertaking, or earlier if so specified. The Authority shall ensure that sufficient time and funding are provided to complete all necessary preconstruction commitments before disturbances related to the Undertaking occur.

##### **A. Archaeological Treatment Plan**

The ATP describes in detail the methods that will be employed to complete the historic properties identification effort within the Undertaking's APE as part of the phased identification of archaeological resources. More specifically, the ATP builds upon the identification efforts completed to date and specifies where and under what circumstances further efforts to identify significant archaeological deposits will take place within the Undertaking's areas of physical impact.

The ATP also describes in detail the avoidance, minimization, and/or mitigation treatment measures for all currently known and yet-to-be-identified significant archaeological resources and Native American cultural resources affected by the Undertaking. Additional measures to avoid, minimize, or mitigate adverse effects on archaeological historic properties may be developed in consultation with Consulting Parties as identification and evaluation efforts are performed in future planning and construction phases of the Undertaking. The Authority commits to implementing the terms of the ATP.

The SHPO, the Invited Signatory and other Consulting Parties with an interest in archaeological resources shall have the opportunity to review and comment on cultural resources documentation specified in the ATP in accordance with Stipulation VI of this MOA.

## **B. Built Environment Treatment Plan**

The BETP provides detailed descriptions of treatment measures for built environment historic properties located within the APE that may be affected by the Undertaking. The treatments will be carried out by qualified professionals pursuant to Stipulation III of the PA. The treatment measures are included in the BETP and are intended to avoid, minimize, and/or mitigate adverse effects caused by the Undertaking. The Authority commits to implementing the terms of the BETP.

The Authority shall provide documentation produced under the BETP to the SHPO, the Invited Signatory and other Consulting Parties with an interest in historic properties included in the BETP for review and comment in accordance with Stipulation VI of this MOA.

## **C. Avoidance and Minimization Measures**

The Authority has identified property-specific and programmatic Impact Avoidance and Minimization Features (IAMF) to ensure the Undertaking would result in no adverse effect to 16 built historic properties, as outlined in the BETP (**Attachment 5**).

- a. The Authority will ensure that the IAMFs are incorporated into project design and construction contracts for the Undertaking.
- b. In consultation with SHPO, the Invited Signatory, and other Consulting Parties, the Authority will ensure that the IAMFs are implemented during the appropriate design and construction phases of the Undertaking.
- c. The Authority may revise the IAMFs or develop additional IAMFs to ensure the Undertaking would result in no adverse effects in accordance with Stipulation VII.B below, should project design changes result in new potential effects to previously identified historic properties or to additional historic properties within revised APEs.

## **V. POST-REVIEW DISCOVERIES**

If properties are discovered that may be historically significant or unanticipated effects on historic properties are found, the Authority shall follow the processes detailed in the ATP and BETP.

## **VI. PREPARATION AND REVIEW OF DOCUMENTS**

### **A. Professional Qualifications**

The Authority shall ensure that all cultural resources studies carried out pursuant to this MOA are performed by or under the direct supervision of personnel meeting *The Secretary of the Interior's Professional Qualifications Standards* (48 Federal Register 44738-39) in the disciplines of history, architectural history, historic architecture, and/or archaeology, as appropriate.

### **B. Confidentiality**

The Signatories and the Invited Signatory acknowledge that the handling of documentation regarding historic properties covered by this MOA are subject to the provisions of Section 304 of

the National Historic Preservation Act of 1966 (54 U.S.C. 307103) and Section 6254.10 of the California Government Code (Public Records Act).

### **C. Review**

Unless otherwise specified, parties to this MOA will have 30 calendar days from receipt to provide the Authority comments on all technical materials, findings, and other documentation arising from this MOA. If no comments are received from a party within the 30-calendar-day review period, the Authority may assume that the non-responsive party has no comment. The Authority shall take into consideration all comments received in writing within the 30-calendar-day review period and may make revisions before finalizing the documentation.

For documentation that is amended or revised, the Authority will prepare a comment and response summary or matrix and provide it to Signatories, Invited Signatory and other Consulting Parties.

If a party to this MOA objects to documentation provided for review within 30 calendar days of the receipt of any submissions, the Authority shall resolve the objection in accordance with Stipulation VII.A, below.

### **D. Electronic Submittals**

Unless otherwise requested, documentation produced under this MOA will be distributed electronically. Additionally, electronic mail may serve as an official method of communication regarding this MOA.

## **VII. ADMINISTRATIVE STIPULATIONS**

### **A. Dispute Resolution**

In accordance with Stipulation XVII of the PA, should any Signatory, Invited Signatory or other Consulting Party to this MOA object at any time to any actions proposed or the manner in which the terms of this MOA are implemented, the Authority shall consult with such party to resolve the objection. If the Authority determines that such objection cannot be resolved, the Authority will:

1. Forward all documentation relevant to the dispute, including the Authority's proposed resolution, to the ACHP. The Authority will also provide a copy to all Signatories, the Invited Signatory and other Consulting Parties with a demonstrated interest in the affected property or subject of the dispute. The ACHP shall provide the Authority with its advice on the resolution of the objection within 30 days of receiving adequate documentation. Prior to reaching a final decision on the dispute, the Authority shall prepare a written response that takes into account any advice or comments regarding the dispute from the ACHP, Signatories, Invited Signatory and interested Consulting Parties, and provide them with a copy of this written response. The Authority will then proceed according to its final decision.
2. If the ACHP does not provide its advice regarding the dispute within the 30-day time period, the Authority may make a final decision on the dispute and proceed accordingly. Prior to reaching such a final decision, the Authority shall prepare a written response

that takes into account any comments regarding the dispute from the Signatories, Invited Signatory and other Consulting Parties with a demonstrated interest in the affected property or subject of the dispute and provide them and the ACHP with a copy of such written response.

3. The Authority's responsibility to carry out all other actions subject to the terms of this MOA that are not the subject of the dispute remains unchanged.

## **B. Amendment and Revisions to Attachments**

This MOA may be amended by written agreement of the Signatories and Invited Signatory. Consulting parties shall be afforded 30 days to review and comment on any proposed amendments to this MOA. The Signatories and Invited Signatory shall take into consideration all timely comments received prior to executing an amendment. The amendment will be effective when all Signatories and Invited Signatory that signed the original agreement, sign a copy of the amendment.

The Authority will file a copy of any executed amendment with the ACHP pursuant to 36 CFR 800.6(c)(7).

Notwithstanding the prior paragraph, to address changes in the Undertaking or the treatment of historic properties affected by the Undertaking, the Authority may revise the ATP, the BETP, or other attachments to this MOA in consultation with the Signatories, Invited Signatory and other Consulting Parties, without executing a formal amendment to this MOA. The Authority shall provide proposed ATP or BETP revisions to the Signatories, Invited Signatory and other Consulting Parties with an interest in historic properties that may be affected by the proposed revisions for a 30-day review. The Signatories shall take into consideration all timely comments received prior to agreeing to the revisions. Upon the written concurrence of all the Signatories, such revisions to the ATP, the BETP, or other attachments shall take effect and be considered a part of this MOA.

## **C. Termination**

If any Signatory or Invited Signatory determines that its terms will not or cannot be carried out, that party shall immediately consult with the other Signatories and the Invited Signatory to attempt to resolve the issue under Stipulation VII.A, above, or to develop an amendment under Stipulation VII.B, above. If within 30 days (or another time period agreed to by all Signatories and Invited Signatory) an amendment cannot be reached, any Signatory or Invited Signatory may terminate this MOA upon written notification to the other Signatories and Invited Signatory. Termination hereunder shall render this MOA without further force or effect.

If this MOA is terminated, and the Authority determines that the Undertaking will proceed, the Authority must either execute a new MOA pursuant to 36 CFR § 800.6 prior to proceeding further with the Undertaking or follow the procedures for termination of consultation pursuant to 36 CFR § 800.7. The Authority shall notify the Signatories, Invited Signatory and other Consulting Parties as to the course of action it will pursue.

#### **D. Duration**

If the Authority determines that construction of the Undertaking has not been completed within 10 years following execution of this MOA, the Signatories and Invited Signatory shall consult to reconsider its terms. Reconsideration may include continuation of the MOA as originally executed, amendment, or termination.

This MOA will be in effect through the Authority's implementation of the Undertaking and will terminate and have no further force or effect when the Authority, in consultation with the other Signatories and Invited Signatory, determines that the terms of this MOA have been fulfilled in a satisfactory manner. The Authority shall provide the other Signatories and Invited Signatory with written notice of its determination and of termination of this MOA.

#### **E. Annual Reporting and Meetings**

The Authority shall prepare an annual report documenting the implementation of the actions taken under this MOA as stipulated in the PA Section XVII.C. The annual report shall include specific lists of studies, reports, actions, evaluations, and consultation and outreach efforts related to implementation of this MOA. The Authority will provide the annual report to the SHPO, Invited Signatory and other Consulting Parties. If requested by the SHPO, Invited Signatory and other Consulting Parties, the Authority will coordinate a meeting or call to discuss the annual report.

### **VIII. EFFECTIVE DATE AND EXECUTION**

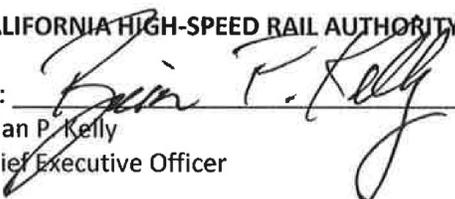
This MOA may be executed in counterparts, with a separate page for each Signatory, and will take effect on the latest date of execution by the Authority and SHPO. STB's signature is not required to execute this MOA or for its effectiveness. Separate concurrence pages may also be provided for each Concurring Party. The Authority shall ensure that each Signatory, Invited Signatory, and each Concurring Party is provided with a copy of the fully executed MOA. The refusal of STB or any Concurring Party to sign this MOA shall not invalidate this MOA or prevent this MOA from taking effect.

Execution of this MOA by the Authority and SHPO and implementation of its terms evidence that the Authority has taken into account the effects of this undertaking on historic properties and afforded the ACHP an opportunity to comment.

**MEMORANDUM OF AGREEMENT**  
**AMONG THE CALIFORNIA HIGH-SPEED RAIL AUTHORITY, THE SURFACE TRANSPORTATION BOARD,**  
**AND THE CALIFORNIA STATE HISTORIC PRESERVATION OFFICER**  
**REGARDING THE SAN JOSE TO MERCED PROJECT SECTION OF THE**  
**CALIFORNIA HIGH-SPEED RAIL PROGRAM**  
**SANTA CLARA, SAN BENITO, AND MERCED COUNTIES, CALIFORNIA**

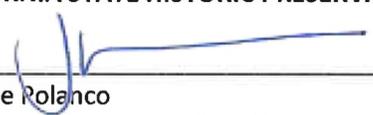
**SIGNATORIES:**

**CALIFORNIA HIGH-SPEED RAIL AUTHORITY**

By:   
Brian P. Kelly  
Chief Executive Officer

Date: 2/17/22

**CALIFORNIA STATE HISTORIC PRESERVATION OFFICER**

By:   
Julianne Rolanco  
State Historic Preservation Officer

Date: 3/11/2022

**INVITED SIGNATORY:**

**SURFACE TRANSPORTATION BOARD**

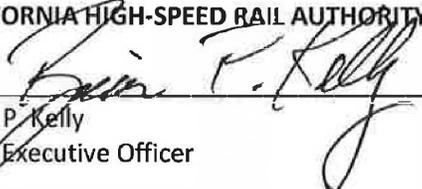
By: \_\_\_\_\_  
Danielle Gosselin  
Acting Director, Office of Environmental Analysis

Date: \_\_\_\_\_

**MEMORANDUM OF AGREEMENT  
AMONG THE CALIFORNIA HIGH-SPEED RAIL AUTHORITY, THE SURFACE TRANSPORTATION BOARD,  
AND THE CALIFORNIA STATE HISTORIC PRESERVATION OFFICER  
REGARDING THE SAN JOSE TO MERCED PROJECT SECTION OF THE  
CALIFORNIA HIGH-SPEED RAIL PROGRAM  
SANTA CLARA, SAN BENITO, AND MERCED COUNTIES, CALIFORNIA**

**SIGNATORIES:**

**CALIFORNIA HIGH-SPEED RAIL AUTHORITY**

By:   
Brian P. Kelly  
Chief Executive Officer

Date: 2/17/22

**CALIFORNIA STATE HISTORIC PRESERVATION OFFICER**

By: \_\_\_\_\_ Date: \_\_\_\_\_  
Julianne Polanco  
State Historic Preservation Officer

**INVITED SIGNATORY:**

**SURFACE TRANSPORTATION BOARD**

By:  Date: March 4, 2022

Danielle Gosselin  
Director, Office of Environmental Analysis

**MEMORANDUM OF AGREEMENT  
AMONG THE CALIFORNIA HIGH-SPEED RAIL AUTHORITY, THE SURFACE TRANSPORTATION BOARD,  
AND THE CALIFORNIA STATE HISTORIC PRESERVATION OFFICER  
REGARDING THE SAN JOSE TO MERCED PROJECT SECTION OF THE  
CALIFORNIA HIGH-SPEED RAIL PROGRAM  
SANTA CLARA, SAN BENITO, AND MERCED COUNTIES, CALIFORNIA**

**CONCURRING PARTIES:**

**CITY OF SAN JOSE**

By: \_\_\_\_\_ Date: \_\_\_\_\_  
Name  
Title

**SAN JOSE HISTORICAL LANDMARKS COMMISSION**

By: \_\_\_\_\_ Date: \_\_\_\_\_  
Name  
Title

**SANTA CLARA VALLEY TRANSPORTATION AUTHORITY**

By: \_\_\_\_\_ Date: \_\_\_\_\_  
Name  
Title

**CITY OF GILROY**

By: \_\_\_\_\_ Date: \_\_\_\_\_  
Name  
Title

**AMAH MUTSUN TRIBAL BAND**

By: \_\_\_\_\_ Date: \_\_\_\_\_  
Valentin Lopez  
Chairperson

**AMAH MUTSUN TRIBAL BAND OF MISSION SAN JUAN BAUTISTA**

By: \_\_\_\_\_ Date: \_\_\_\_\_  
Irenne Zwierlein  
Chairperson

**INDIAN CANYON MUTSUN BAND OF COSTANOAN**

By: \_\_\_\_\_ Date: \_\_\_\_\_  
Ann-Marie Sayers  
Chairperson

**NORTH VALLEY YOKUTS TRIBE**

By: \_\_\_\_\_ Date: \_\_\_\_\_  
Katherine Perez  
Chairperson

**TAMIEN NATION**

By:  \_\_\_\_\_ Date: 03/16/2022  
Quirina Luna Geary  
Chairperson

**ATTACHMENT 3: HISTORIC PROPERTIES WITHIN THE AREA OF POTENTIAL EFFECTS AS LISTED IN THE FINDING OF EFFECT REPORT**

**Built Environment Historic Properties within the San Jose to Merced Project Section Area of Potential Effects**

Property Name and Address	City, County	Effects Finding	Treatment Measures <sup>1</sup>
Santa Clara Railroad Historical Complex 1 Railroad Avenue	Santa Clara, Santa Clara	No Adverse Effect	CUL-IAMF #1—Geospatial Data Layer and Mapping CUL-IAMF #2—Worker Environmental Awareness Program (WEAP) Training Session CUL-IAMF #6—Pre-Construction Conditions Assessment Report (Pre-CCAR), Plan for Protection & Stabilization and Response Plan for Unanticipated Effects & Inadvertent Damage (PPSRP), and Post Conditions Assessment Report (Post-CCAR) CUL-IAMF #7—Built Environment Monitoring Plan CUL-MM #8—Implement Procedures for Unanticipated Effects and Inadvertent Damage
Southern Pacific Depot 65 Cahill Street	San Jose, Santa Clara	Adverse Effect	CUL-IAMF #1—Geospatial Data Layer and Mapping CUL-IAMF #2—WEAP Training CUL-IAMF #6—Pre-CCAR, PPSRP, Post-CCAR CUL-IAMF #7—Built Environment Monitoring Plan CUL-IAMF #8—Implement Protection and/or Stabilization Measures CUL-MM#5—Prepare Additional Documentation CUL-MM#7—Prepare Interpretive Materials CUL-MM #10—Station Design Consistent with the Secretary of the Interior’s Standards for the Treatment of Historic Properties (SOI Standards)
Sunlite Baking Company 145 S. Montgomery Street	San Jose, Santa Clara	No Adverse Effect	CUL-IAMF #1—Geospatial Data Layer and Mapping CUL-IAMF #2—WEAP Training CUL-IAMF #6—PPSRP only CUL-MM #8—Implement Procedures for Unanticipated Effects and Inadvertent Damage
Pacific Intertie Transmission Line n/a	Santa Clara & Merced	No Effect	CUL-IAMF #1—Geospatial Data Layer and Mapping CUL-IAMF #6—PPSRP only CUL-MM #8—Implement Procedures for Unanticipated Effects and Inadvertent Damage
Madrone Underpass Monterey Street	Morgan Hill, Santa Clara	Adverse Effect	CUL-IAMF #1—Geospatial Data Layer and Mapping CUL-MM#5—Prepare Additional Documentation CUL-MM#7—Prepare Interpretive Materials
Villa Mira Monte 17860 Monterey Street	Morgan Hill, Santa Clara	No Effect	CUL-IAMF #1—Geospatial Data Layer and Mapping CUL-MM#5—Prepare Additional Documentation CUL-MM #8—Implement Procedures for Unanticipated Effects and Inadvertent Damage

Property Name and Address	City, County	Effects Finding	Treatment Measures <sup>1</sup>
San Martin Winery 13000 Depot Street	San Martin, Santa Clara	No Adverse Effect	CUL-IAMF #1—Geospatial Data Layer and Mapping CUL-IAMF #2—WEAP Training CUL-IAMF #6—Pre-CCAR, PPSRP, Post-CCAR CUL-IAMF #7—Built Environment Monitoring Plan CUL-IAMF #8—Implement Protection and/or Stabilization Measures CUL-MM #8—Implement Procedures for Unanticipated Effects and Inadvertent Damage
Hoenck House 9480 Murray Avenue	Gilroy, Santa Clara	No Effect	CUL-IAMF #1—Geospatial Data Layer and Mapping CUL-IAMF #6—PPSRP only CUL-MM #8—Implement Procedures for Unanticipated Effects and Inadvertent Damage
IOOF Orphanage School 290 IOOF Avenue	Gilroy, Santa Clara	No Effect	CUL-IAMF #1—Geospatial Data Layer and Mapping CUL-IAMF #6—PPSRP only CUL-MM #8—Implement Procedures for Unanticipated Effects and Inadvertent Damage
Live Oak Creamery		Adverse Effect	CUL-IAMF #1—Geospatial Data Layer and Mapping CUL-MM#5—Prepare Additional Documentation CUL-MM#7—Prepare Interpretive Materials
Southern Pacific Train Station 7250 Monterey Street	Gilroy, Santa Clara	No Adverse Effect	CUL-IAMF #1—Geospatial Data Layer and Mapping CUL-IAMF #2—WEAP Training CUL-IAMF #6—Pre-CCAR, PPSRP, Post-CCAR CUL-IAMF #7—Built Environment Monitoring Plan CUL-IAMF #8—Implement Protection and/or Stabilization Measures CUL-MM #8—Implement Procedures for Unanticipated Effects and Inadvertent Damage CUL-MM #10—Station Design Consistent with the SOI Standards
Horace Willson House 1980 Pacheco Pass Highway	Gilroy, Santa Clara	No Effect	CUL-IAMF #1—Geospatial Data Layer and Mapping CUL-IAMF #6—PPSRP only CUL-MM #8—Implement Procedures for Unanticipated Effects and Inadvertent Damage
Ellis Ranch 4945 Frazier Lake Road	Gilroy, Santa Clara	No Effect	CUL-IAMF #1—Geospatial Data Layer and Mapping CUL-IAMF #6—PPSRP only CUL-MM #8—Implement Procedures for Unanticipated Effects and Inadvertent Damage
Millers Canal n/a	Gilroy, Santa Clara	No Effect	CUL-IAMF #1—Geospatial Data Layer and Mapping CUL-IAMF #2—WEAP Training CUL-IAMF #6—Pre-CCAR, PPSRP, Post-CCAR CUL-IAMF #7—Built Environment Monitoring Plan CUL-IAMF #8—Implement Protection and/or Stabilization Measures

Property Name and Address	City, County	Effects Finding	Treatment Measures <sup>1</sup>
Pacheco California Department of Forestry Station 12280 Pacheco Pass Highway	Santa Clara County	No Adverse Effect	CUL-IAMF #1—Geospatial Data Layer and Mapping CUL-IAMF #6—PPSRP only CUL-MM #8—Implement Procedures for Unanticipated Effects and Inadvertent Damage
California Aqueduct n/a	Volta/Los Banos Merced	No Effect	CUL-IAMF #1—Geospatial Data Layer and Mapping CUL-IAMF #2—WEAP Training CUL-IAMF #6—Pre-CCAR, PPSRP, Post-CCAR CUL-IAMF #8—Implement Protection and/or Stabilization Measures CUL-MM #8—Implement Procedures for Unanticipated Effects and Inadvertent Damage
Delta-Mendota Canal n/a	Los Banos Merced	No Effect	CUL-IAMF #1—Geospatial Data Layer and Mapping CUL-IAMF #2—WEAP Training CUL-IAMF #6—Pre-CCAR, PPSRP, Post-CCAR CUL-IAMF #8—Implement Protection and/or Stabilization Measures CUL-MM #8—Implement Procedures for Unanticipated Effects and Inadvertent Damage
San Joaquin and Kings River— Main Canal n/a	Los Banos Merced	No Effect	CUL-IAMF #1—Geospatial Data Layer and Mapping CUL-IAMF #2—WEAP Training CUL-IAMF #6—Pre-CCAR, PPSRP, Post-CCAR CUL-IAMF #8—Implement Protection and/or Stabilization Measures CUL-MM #8—Implement Procedures for Unanticipated Effects and Inadvertent Damage
Cottani Family Property 23109 Henry Miller Road	Los Banos Merced	No Adverse Effect	CUL-IAMF #1—Geospatial Data Layer and Mapping CUL-IAMF #6—PPSRP only CUL-MM #8—Implement Procedures for Unanticipated Effects and Inadvertent Damage
Negra Ranch 21810 W. Henry Miller Avenue	Los Banos Merced	Adverse Effect	CUL-IAMF #1—Geospatial Data Layer and Mapping CUL-MM#5—Prepare Additional Documentation CUL-MM#7—Prepare Interpretive Materials
Cozzi Family Property 23109 Henry Miller Road	Los Banos Merced	Adverse Effect	CUL-IAMF #1—Geospatial Data Layer and Mapping CUL-IAMF #4—Prepare Relocation Plan, Historic Structures Report, Implement Relocation Plan CUL-MM#5—Prepare Additional Documentation CUL-MM#7—Prepare Interpretive Materials

<sup>1</sup> The full text of these measures can be found in the EIR/EIS and will be attached to any NEPA Record of Decision as a part of the Mitigation Monitoring and Enforcement Plan (MMEP)

**Archaeological Historic Properties within the San Jose to Merced Project Section Area of Potential Effects**

Trinomial	Resource Type	Attributes	Effect Finding	Treatment Measures
CA-SCL-30/H <sup>1</sup>	Contact Period Structures	The third location of Mission Santa Clara de Asis, also known as the Murguiá Mission	Phased	<u>Applies to all archaeological historic properties:</u>
CA-SCL-338H <sup>1</sup>	Historic Buildings	Site of Fisher Ranch or Fisher's Coyote Ranch headquarters, bar, main house, outbuildings, 1850-1960s; [REDACTED]	Phased	
CA-SCL-855	Historic artifacts	Former SPRR-UPRR Yards; refuse scatter in demolished railroad yard	Phased	Inventory (Addenda ASRs)
CA-SCL-690	Pre-contact cemetery	Pre-contact cemetery, with remains largely reburied on-site	Phased	Evaluation (AEPs/AERs)
N/A (P-43-2234)	Historic artifacts	Redeposited historic-period artifact scatter	Phased	Data Recovery (Archaeological Data Recovery Reports)
N/A (P-43-1842)	Demolished historical structures	Dairy farm complex, circa 1915–1940; all structures now demolished.	Phased	Archaeological Monitoring Plan
CA-SCL-448	Pre-contact artifacts	Shell scatter	Phased	Avoidance/Protection Measures/Best Management Practices
CA-SCL-334	Demolished historical structures	Residence and water tower, circa 1890 farmstead, structures now demolished.	Phased	
CA-SCL-161	Pre-contact artifact	Isolate consisting of one chert flake	Phased	Cultural Resources Awareness Training
CA-SCL-167	Pre-contact artifacts	Lithic scatter	Phased	
CA-SCL-168	Pre-contact artifacts	Lithic scatter	Phased	Archaeological/Native American Monitoring
CA-SCL-169	Pre-contact artifacts	Lithic scatter	Phased	Observation of Protocols for Unanticipated Discoveries
CA-SCL-838	Pre-contact habitation and human remains	Occupation site and burials	Phased	
N/A	Unknown	Unknown possible resource; based on Information Center mapping.	Phased	Additional measures to avoid, minimize, or mitigate effects on archaeological historic properties may be developed in consultation with signatories and consulting parties as identification and evaluation efforts are
N/A (P-43-1737/1765)	Pre-contact artifacts	Pre-contact stone tool scatter at D.G. Brewer farm	Phased	
N/A (P-43-1283)	Pre-contact and historic artifacts	Pre-contact and historic-period artifact scatter	Phased	
N/A (P-43-1757)	Removed historical structure	Fourteen Mile House, circa 1870–1890 stage station: structure now removed.	Phased	
CA-SCL-571	Pre-contact artifacts	Stone tool scatter	Phased	

Trinomial	Resource Type	Attributes	Effect Finding	Treatment Measures
CA-SCL-573	Pre-contact artifacts and human remains	Recorded at two locations. Pre-contact burial	<b>Phased</b>	performed in future planning and construction phases of the Undertaking.
CA-SCL-576	Pre-contact artifacts	Lithic scatter	<b>Phased</b>	
CA-SCL-626	Historical structure	Residential structure with historic-period artifact scatter	<b>Phased</b>	
N/A (P-1465)	Historical structures	Pinard Hotel and Saloon location, circa 1890–1895; structures now demolished; associated with 18-Mile House (Madrone) stage station, circa 1858.	<b>Phased</b>	
N/A (P-43-1463)	Historical structure	Pinard House location, circa 1895; structure now demolished.	<b>Phased</b>	
CA-SCL-670	Historical structure	Will Bone House, circa 1899, and historical archaeological remains	<b>Phased</b>	
CA-SCL-673H	Historical structure	Historic structure with associated artifact scatter	<b>Phased</b>	
CA-SCL-722	Pre-contact artifacts	Scatter of fire-cracked rock and lithics	<b>Phased</b>	
CA-SCL-560	Historical structures	Fitzgerald-Allemand Farm, circa 1867–1900 farmstead; refuse scatter and possible features.	<b>Phased</b>	
CA-SCL-116	Pre-contact artifacts	Waste flake scatter	<b>Phased</b>	
CA-SCL-117	Pre-contact habitation	Occupation site	<b>Phased</b>	
CA-SCL-118	Pre-contact habitation and human remains	Occupation site with burials	<b>Phased</b>	
CA-SCL-123	Pre-contact habitation	Occupation site	<b>Phased</b>	
CA-SCL-301	Pre-contact processing	Processing site	<b>Phased</b>	
CA-MER-322	Pre-contact artifacts	Stone tool scatter	<b>Phased</b>	

<sup>1</sup> Denotes a site that has been formally determined NRHP-eligible.

ASR = Archaeological Survey Report  
AEP = Archaeological Evaluation Plan  
AER = Archaeological Evaluation Report  
SPRR = Southern Pacific Railroad  
UPRR = Union Pacific Railroad

## **ATTACHMENT 6: AGENCIES AND OTHER INTERESTED PARTIES CONSULTED**

State Historic Preservation Officer  
Surface Transportation Board  
City of San Jose  
San Jose Historical Landmarks Commission  
Santa Clara Valley Transportation Authority  
Morgan Hill Historical Society  
City of Gilroy

## **ATTACHMENT 7: NATIVE AMERICAN TRIBAL GOVERNMENTS CONSULTED**

Amah Mutsun Tribal Band  
Amah Mutsun Tribal Band of Mission San Juan Bautista  
Indian Canyon Mutsun Band of Costanoan  
North Valley Yokuts Tribe  
Tamien Nation

\* Federally-recognized tribes are noted with an asterik. No asterik denotes that none of the above tribes were federally-recognized at the time of the MOA.

## **APPENDIX E: NMFS BIOLOGICAL OPINION, JUNE 24, 2021**





UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL MARINE FISHERIES SERVICE  
West Coast Region  
650 Capitol Mall, Suite 5-100  
Sacramento, California 95814-4700

Refer to NMFS No: WCRO-2020-02048

**June 24, 2021**

Mr. Serge Stanich  
Director of Environmental Services  
California High Speed Rail Authority  
770 L Street, STE 620  
Sacramento, California 95814

Re: Endangered Species Act Section 7(a)(2) Biological Opinion, and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Response, for the California High Speed Rail San Jose to Merced Project Section

Dear Mr. Stanich:

Thank you for your letter of June 22, 2020, requesting initiation of consultation with NOAA's National Marine Fisheries Service (NMFS) pursuant to section 7 of the Endangered Species Act of 1973 (ESA) (16 U.S.C. 1531 et seq.) for the San Jose to Merced Section of the California High Speed Rail (HSR) project. This consultation was initiated on October 22, 2020, and it was conducted in accordance with the 2019 revised regulations that implement section 7 of the ESA (50 CFR 402, 84 FR 45016).

The enclosed biological opinion is based on our review of the proposed action as detailed in the provided biological assessment, and its effects on the federally listed threatened Central California Coast steelhead (*Oncorhynchus mykiss*) distinct population segment (DPS), South Central California Coast steelhead (*O. mykiss*) DPS, and their designated critical habitats. Based on the best available scientific and commercial information, NMFS concludes that the project is not likely to jeopardize the continued existence of these federally listed species or destroy or adversely modify their critical habitat. NMFS has included an incidental take statement with reasonable and prudent measures and non-discretionary terms and conditions that are necessary and appropriate to avoid, minimize, or monitor the incidental take of federally listed fish that will occur with project implementation. NMFS also reviewed the proposed action for its effects on the federally listed threatened California Central Valley steelhead (*O. mykiss*) DPS and we concur with your conclusion that it is not likely to adversely affect the California Central Valley steelhead DPS.

Thank you, also, for your request for consultation pursuant to the essential fish habitat (EFH) provisions in section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA)(16 U.S.C. 1855(b)) for this action. Enclosed we provide NMFS's review of the potential effects of the proposed action on EFH for Pacific Coast Salmon, as designated under



the MSA. The document concludes that the project will adversely affect the EFH of Pacific Coast Salmon in the action area and has included EFH Conservation Recommendations.

As required by section 305(b)(4)(B) of the MSA, the Authority must provide a detailed response in writing to NMFS within 30 days after receiving an EFH Conservation Recommendation. Such a response must be provided at least 10 days prior to final approval of the action if the response is inconsistent with any of NMFS EFH Conservation Recommendations unless NMFS and the Authority have agreed to use alternative time frames for the Authority's response. The response must include a description of measures proposed by the agency for avoiding, minimizing, mitigating, or otherwise offsetting the impact of the activity on EFH. In the case of a response that is inconsistent with the Conservation Recommendations, the Authority must explain its reasons for not following the recommendations, including the scientific justification for any disagreements with NMFS over the anticipated effects of the action and the measures needed to avoid, minimize, mitigate, or offset such effects (50 CFR 600.920(k)(1)). In your response to the EFH portion of this consultation, we ask that you clearly identify the number of Conservation Recommendations accepted.

Please contact Katie Schmidt at the California Central Valley Office at (916) 930-3685, or at [katherine.schmidt@noaa.gov](mailto:katherine.schmidt@noaa.gov), if you have any questions concerning this consultation, or if you require additional information.

Sincerely,



Cathy Marcinkevage  
Assistant Regional Administrator for  
California Central Valley Office

Enclosure

cc: To the File: ARN 151422-WCR2018-SA00467  
Sue Meyer, California HSR Authority, Natural Resources Permitting Manager,  
[sue.meyer@hsr.ca.gov](mailto:sue.meyer@hsr.ca.gov)  
Mike Aviña, California HSR Authority, Senior Permitting Manager,  
[mike.avina@hsr.ca.gov](mailto:mike.avina@hsr.ca.gov)  
Audrey Van, California HSR Authority, San Jose to Merced Project Manager,  
[audrey.van@hsr.ca.gov](mailto:audrey.van@hsr.ca.gov)  
Ralph Huddleston, California HSR Authority, Senior Permitting Specialist,  
[ralph.huddleston@hsr.ca.gov](mailto:ralph.huddleston@hsr.ca.gov)  
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**Endangered Species Act (ESA) Section 7(a)(2) Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Response**

California High Speed Rail San Jose to Merced Project Section

NMFS Consultation Number: WCRO-2020-02048

Action Agency: California High Speed Rail Authority

Affected Species and NMFS's Determinations:

ESA-Listed Species	Status	Is Action Likely to Adversely Affect Species?	Is Action Likely To Jeopardize the Species?	Is Action Likely to Adversely Affect Critical Habitat?	Is Action Likely To Destroy or Adversely Modify Critical Habitat?
Central California Coast steelhead ( <i>Oncorhynchus mykiss</i> )	Threatened	Yes	No	Yes	No
South-Central California Coast steelhead ( <i>O. mykiss</i> )	Threatened	Yes	No	Yes	No
California Central Valley steelhead ( <i>O. mykiss</i> )	Threatened	No	NA	No	NA

Fishery Management Plan That Identifies EFH in the Project Area	Does Action Have an Adverse Effect on EFH?	Are EFH Conservation Recommendations Provided?
Pacific Coast Salmon	Yes	Yes

**Consultation Conducted By:** National Marine Fisheries Service, West Coast Region

**Issued By:** *A. Catharine Marcinkevage*  
 Cathy Marcinkevage  
 Assistant Regional Administrator for California Central Valley Office

**Date:** June 24, 2021



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## Abbreviations and Acronyms

AMMs	avoidance and minimization measures
Authority	California High Speed Rail Authority
BA	biological assessment
BMPs	best management practices
BPG	Biogeographic Population Group
CCC	Central California Coast
CCO	California Coastal Office
CCV	California Central Valley
CCVO	California Central Valley Office
CDEC	California Data Exchange
cfs	cubic feet per second
CIP	cast-in-place
CMs	conservation measures
CV	Central Valley
dB	decibel
DPS	distinct population segment
DQA	Data Quality Act
EFH	essential fish habitat
EIR/EIS	Environmental Impact Report/Environmental Impact Statement
ESA	Endangered Species Act
FRA	Federal Railroad Administration
GAMMP	groundwater adaptive management and monitoring program
gpm	gallons per minute
HAPCs	Habitat Areas of Particular Concern
HCP	habitat conservation plan
HSR	High Speed Rail
Hz	hertz, cycles per second
ICF	ICF International, Inc.
ILF	in-lieu fee
ITS	incidental take statement
kV	kilovolt
LID	low impact development
LWM	large woody material
MOWF	maintenance-of-way facility
MOWS	maintenance-of-way siding
mph	mile per hour
MSA	Magnuson-Stevens Fishery Conservation and Management Act
NEPA	National Environmental Policy Act
NLAA	not likely to adversely affect
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NTU	nephelometric turbidity unit
OHWM	ordinary high water mark
Opinion	biological opinion

PAHs	polycyclic aromatic hydrocarbons
PBF	physical or biological feature
PCE	primary constituent element
pCMP	preliminary compensatory mitigation plan
PFMC	Pacific Fishery Management Council
RMS	root mean square
ROW	right-of-way
RPMs	reasonable and prudent measures
RRP	restoration and revegetation plan
S-CCC	South-Central California Coast
SCVHA	Santa Clara Valley Habitat Agency
SCVOSA	Santa Clara Valley Open Space Authority
SEL	sound exposure level
SPCCP	spill prevention control and countermeasures plan
SWRCB	State Water Resources Control Board
SWPPP	stormwater pollution prevention plan
TBM	tunnel boring machine
TPSS	traction power substation
UPRR	Union Pacific Railroad
USFWS	United States Fish and Wildlife Service
WEAP	worker environmental awareness program
WOTUS	waters of the United States

## 1. INTRODUCTION

This Introduction section provides information relevant to the other sections of this document and is incorporated by reference into sections 2 and 3, below.

### 1.1. Background

The National Marine Fisheries Service (NMFS) prepared the biological opinion (opinion) and incidental take statement (ITS) portions of this document in accordance with section 7(b) of the Endangered Species Act (ESA) of 1973 (16 USC 1531 et seq.), and implementing regulations at 50 CFR 402, as amended.

We also completed an essential fish habitat (EFH) consultation on the proposed action, in accordance with section 305(b)(2) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) (16 U.S.C. 1801 et seq.) and implementing regulations at 50 CFR 600.

We completed pre-dissemination review of this document using standards for utility, integrity, and objectivity in compliance with applicable guidelines issued under the Data Quality Act (DQA) (section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001, Public Law 106-554). The document will be available within two weeks at the [NOAA Library Institutional Repository](#). A complete record of this consultation is on file at the California Central Valley Office (CCVO) in Sacramento, California.

### 1.2. Consultation History

**March 14, 2011:** The Federal Railroad Administration (FRA) sent a memorandum of understanding to NMFS and to the United States Fish and Wildlife Service (USFWS) designating the California High Speed Rail Authority (Authority) to act on behalf of the FRA as a non-federal representative and the Authority has assumed FRA's responsibilities under Federal environmental laws for the California High Speed Rail (HSR) project.

**May 2, 2017:** NMFS, Authority, and ICF International, Inc. (ICF) staff began holding regular fish and aquatic resource working group meetings regarding the subsection's route and schedule, including pre-consultation technical assistance and initial development of a steelhead habitat model. Additional working group meetings occurred from this date until January 16, 2018, regarding steelhead habitat model parameters and modifications.

**June 15, 2017:** Authority/ICF staff shared a steelhead and Chinook salmon habitat suitability model for the San Jose to Merced Project Section portion in the Central Valley (CV).

**April 18, 2018:** The Authority issued a final memo to NMFS that outlined all creeks and streams they propose removing from the suitable steelhead habitat model developed for the San Jose to Merced HSR Project Section, noting that long-term effects may still come into play through water quality effects but that construction best management practices (BMPs) would likely be sufficient to avoid harm to NMFS trust resources.

**November 8, 2018:** The Authority requested a letter of concurrence from NMFS regarding their not likely to adversely affect (NLAA) determination for proposed Phase 2 Geotechnical

Investigations for the tunnel subsection to collect geotechnical data to inform the preliminary design of the HSR route selection on South-Central California Coast (S-CCC) steelhead distinct population segment (DPS) individuals.

**December 3, 2018:** NMFS issued a concurrence letter regarding the proposed Phase 2 Geotechnical Investigations for the San Jose to Merced HSR Project Section (NMFS 2018b).

**July 23, 2019:** The State of California signed a memorandum of understanding with the FRA in which, pursuant to 23 U.S.C. 327(a)(2)(B), the FRA assigned, and the State (acting through its California State Transportation Agency and the Authority) assumed, all of FRA's responsibilities for environmental review, consultation, or other action required or arising under listed Federal environmental laws, including the ESA, for the assigned railroad projects, including projects necessary for the design, construction, and operation of the HSR system (California State Transportation Agency 2019).

**December 9, 2019:** The Authority made the San Jose to Merced Administrative Environmental Impact Report/Environmental Impact Statement (EIR/EIS) Draft available to NMFS to review and provide comments.

**December 20, 2019:** NMFS staff, Katie Schmidt, submitted comments and questions regarding EIR/EIS sections and topics relevant to NMFS trust resources impacted by the proposed project.

**February 7, 2020:** A field tour was conducted of several of HSR crossings and major interactions with S-CCC or Central California Coast (CCC) steelhead DPS waterways and habitat with staff from ICF, the Authority, and NMFS California Coastal Office (CCO) and CCVO. Rail design and mitigation options were discussed onsite and en route. Visited sites include several locations along Pacheco Creek, Jones Creek in the Soap Lake floodplain, Llagas Creek, Coyote Creek, and Guadalupe River at Highway 87. A second site visit was planned to cover interaction sites north to complete the overview of the entire section.

**March 17, 2020:** The second field tour to visit the remaining crossings was tentatively scheduled for this date; however, due to the emerging outbreak of novel coronavirus SARS-CoV2 and associated NMFS safety and travel restrictions, this tour was pushed back indefinitely.

**May 5, 2020:** The Authority requested a species list from NMFS for the San Jose to Merced HSR Project Section via email.

**May 15, 2020:** NMFS provided an official species list to the Authority for the San Jose to Merced HSR Project Section, which identified the following NMFS trust resources:

- Threatened S-CCC steelhead, *Oncorhynchus mykiss*, DPS (62 FR 43937, 8/18/1997), and its critical habitat (70 FR 52488, 9/2/2005)
- Threatened CCC steelhead, *O. mykiss*, DPS (62 FR 43937, 8/18/1997), and its critical habitat (70 FR 52488, 9/2/2005)
- Pacific Coast Salmon - Coho and Chinook EFH

**June 24, 2020:** The Authority requested formal ESA/MSA consultations (Authority 2019a, 2020c, b, a) for the San Jose to Merced HSR Project Section via email. The provided

consultation packet included a draft biological assessment (BA), maps of the proposed route (Authority 2019f, e), preliminary designs and figures, applicable design standards, proposed conservation measures (Authority 2020a), a preliminary compensatory mitigation plan (pCMP) (Authority 2019a), critical habitat figures, details of the developed steelhead habitat model (Authority 2020b), a steelhead impacts matrix, and other appendices.

**July 7, 2020:** NMFS issued an insufficiency letter with a request for more information regarding the pile driving plans for the section and the dewatering risks associated with the tunnel drilling and construction under the Pacheco Creek watershed.

**July 25, 2020:** Katie Schmidt provided comments and questions on the draft BA and parts of the consultation packet that required more information or clarification before sufficiency could be reached.

**August 14 through August 27, 2020:** A series of virtual workshops were held between Authority staff, ICF consultants, and Katie Schmidt to address the questions and concerns posed, and to clarify project information contained in the draft BA.

**October 14, 2020:** A virtual meeting was held between Authority, ICF, and NMFS staff as a final review of all changes that had occurred to the BA and consultation packet and whether the consultation could be initiated with the information available (several documents were to remain in their preliminary or draft forms). Authority agreed to produce a final revised BA and conservation measure document before the consultation was complete to solidify the project changes discussed in prior meetings.

**October 22, 2020:** NMFS issued a sufficiency letter notifying the Authority that the informational requirements for formal ESA/EFH consultation for the San Jose to Merced HSR Project Section had been met and that the consultation had been initiated.

**October 28, 2020:** The Authority submitted the final BA and conservation measures proposed for the section to NMFS.

**February 23, 2021:** The Authority and NMFS mutually agreed upon an extension date of April 6, 2021.

**May 4, 2021:** During the review of the draft biological opinion, NOAA and Authority representatives discussed the ongoing development of the draft. The Authority shared documentation supporting the independent utility of each of the eight HSR San Francisco to Anaheim Phase I sections, which would eventually link to create the state-wide system (Authority 2009). Because each section has independent utility and could be built, operated, and maintained without building the other sections, NMFS reasonably concluded that an effects analysis of the state-wide system was not required in this opinion. NMFS documented this determination in a memorandum to the file.

**May 27, 2021:** The Authority and NMFS mutually agreed upon a revised extension date of July 1, 2021.

### **1.3. Proposed Federal Action**

Under the ESA, “action” means all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies (50 CFR 402.02). Under MSA, Federal action means any action authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken by a Federal Agency (50 CFR 600.910). Through a memorandum of understanding signed July 1, 2019, pursuant to 23 U.S.C. 327(a)(2)(B), the State of California (acting through its California State Transportation Agency and the Authority) assumed all of FRA’s responsibilities for environmental review, consultation, or other action required or arising under listed Federal environmental laws, including the ESA, for the HSR system. The FRA funded the environmental review and preliminary engineering for the HSR system, as well as the construction activities of the first section to break ground (the Merced to Fresno Project Section).

#### **1.3.1. Project Section Overview**

The Authority proposes to construct, operate, and maintain the HSR San Jose to Merced Project Section, which is one of eight independent project sections comprising Phase I of the HSR system in California. The HSR system would be an electronically powered, steel-wheel-on-steel-rail system with state-of-the-art safety, signaling, and automatic train control systems. The trains would be capable of operating at speeds of up to 220 miles per hour (mph) where the alignment has a fully grade-separated, dedicated track, with the purpose of providing transit connection between the major population centers of the San Francisco Bay Area with the Los Angeles metropolitan region and urban centers in the California Central Valley at final build out. Each section of the HSR system has been designed to have independent utility regardless of whether other sections are completed, principally through the inclusion of logical termini and local benefits (Authority 2009). The proposed San Jose to Merced Project Section would provide the connection between the San Francisco-San Jose Bay Area to the rest of the statewide system. During operation, the San Jose to Merced section would support train service from San Jose to Gilroy, which would increase the connectivity and accessibility between the South Bay and the tri-county Monterey Bay area (Monterey, San Benito, and Santa Cruz counties). Implementation of the San Jose to Merced section also enables early, incremental improvements to the existing train services between San Francisco, San Jose, and Gilroy in coordination with Caltrain. By using lightweight, electrified trains compatible with HSR lines and equipment, Caltrain can operate with faster services within the San Jose to Merced section as well as on the San Francisco Peninsula lines.

More accurately, the San Jose to Merced Project Section will provide connection for the HSR line from Scott Boulevard in Santa Clara County, California, to Carlucci Road in Merced County, California, and not to the City of Merced (Figure 1). The CV Wye project extent, which connects to the end at Carlucci Road, and the Ranch Road to Merced project extent (part of the Merced to Fresno Project Section) will provide the final connection to the City of Merced. These project extents/sections have already received ESA/MSA review and incidental take coverage under NMFS opinion (WCR-2018-10897/WCRO-2018-00285 (NMFS 2019)). Thus, this opinion

considers the route from Scott Boulevard to Carlucci Road as the Authority’s HSR San Jose to Merced section, despite its given title.



Figure 1. Geographic extent of the San Jose to Merced HSR (Scott Blvd to Carlucci Rd) Project Section route in light blue, including its westward connection to the Merced to Fresno section in the California Central Valley at Carlucci Road. The Merced to Fresno section consists of the CV Wye (orange) and its northward connection to Merced (maroon) (Authority 2020c).

Specifically, the Authority’s Preferred Alternative, Alternative 4, was identified in the San Jose to Merced Project Section Draft EIR/EIS for the San Jose to Merced Project Section (Authority 2019f, e) as the most appropriate route to accomplish project goals while minimizing adverse impacts and is the Alternative submitted by the Authority for ESA/MSA consideration in this opinion. The Preferred Alternative of the San Jose to Central Valley Wye section is a 90-mile blended (Caltrain/HSR passenger and freight trains using the same tracks for portions of the alignment), alignment that would operate on two electrified passenger tracks and, for a short portion of the alignment, one conventional freight track predominantly within the existing Caltrain and Union Pacific Railroad (UPRR) right-of-way (ROW). It will extend blended electric-powered passenger railroad infrastructure and service from the southern limit of the Caltrain Peninsula Corridor Electrification Project through Gilroy, California. South and east of Gilroy, California, the HSR would operate on a new dedicated guideway to make the connection via tunnels to the California CV Wye section. Overall, the project section would be comprised of 15.2 miles on viaduct, 30.3 miles at grade, 25.9 miles on embankment, 2.3 miles in trench, and two tunnels with a combined length of 15.0 miles.

In addition to the construction of HSR system infrastructure (the track and route itself) of the Preferred Alternative, the proposed action also includes the construction and/or installation of all associated facilities necessary to support its operation, like train control and communication facilities, transit station modifications, highway and roadway modifications, freight or passenger

rail modifications, maintenance stations, and wildlife crossings. A maximum train speed of 110 mph in the blended guideway would be enabled by continuous access-restriction fencing; four-quadrant gates, roadway lane channels, and railroad trespass deterrents at all public road grade crossings; and fully integrated communications and controls for train operations, grade crossings, and roadway traffic. Caltrain stations would be reconstructed to enable directional running as part of blended operations. For a full description of the auxiliary surface transportation modifications and components of the proposed action (i.e., state highway and local roadway modifications, freight/passenger railroad modifications, bridge reconstructions, traction power substations components, and communication system installation), see BA Chapter 2 (Authority 2020c).

#### Station modifications/redesigns:

- Reconstruction of College Park Caltrain Station
- New dedicated platforms, pedestrian concourse, replacement of 226 parking spaces, street improvements, and other modifications at San Jose Diridon Station (Figure 2)
- Reconstruction of the Morgan Hill Caltrain Station
- Reconstruction of the San Martin Caltrain Station
- Reconstruction of the Gilroy Caltrain Station
- New dedicated platforms/a new HSR station in the Downtown Gilroy Station, with replacement and addition of parking surfaces (Figure 3)

#### Other alignment and ancillary features:

- A 50-acre maintenance-of-way facility (MOWF) in south Gilroy near Bloomfield Avenue
- A 4-acre maintenance-of-way siding (MOWS) facility in the San Joaquin Valley near Henry Miller Road
- Associated railway support structures (e.g., traction power substations (TPSS), switching/paralleling stations)
- Approximately 29 at-grade road crossings
- At least 28 wildlife crossings or jump-outs

#### Electrical interconnections required for operation:

- Two 115/50 kilovolt (kV) or 230/50 kV single-phase transformers for each TPSS
- New 115 kV or 230 kV switching station or reconfiguration of existing facility within fence line
- Electrical network upgrades
- Two reconductor 115 kV power lines
- Co-location of new power lines with existing 230 kV transmission lines

The parts of the proposed action that are most likely to affect species and critical habitat under NMFS jurisdiction are crossings of above-grade or elevated track segments that span over waterways containing coastal steelhead habitat and the tunneling under designated critical habitat; these locations are identified in the Action Area description (section 2.3). All route and electrical interconnection crossings between this project section and steelhead habitat modeled by Authority consultants can be found in Appendix 5-D: Steelhead Crossing Map, Detailed (Authority 2020b).

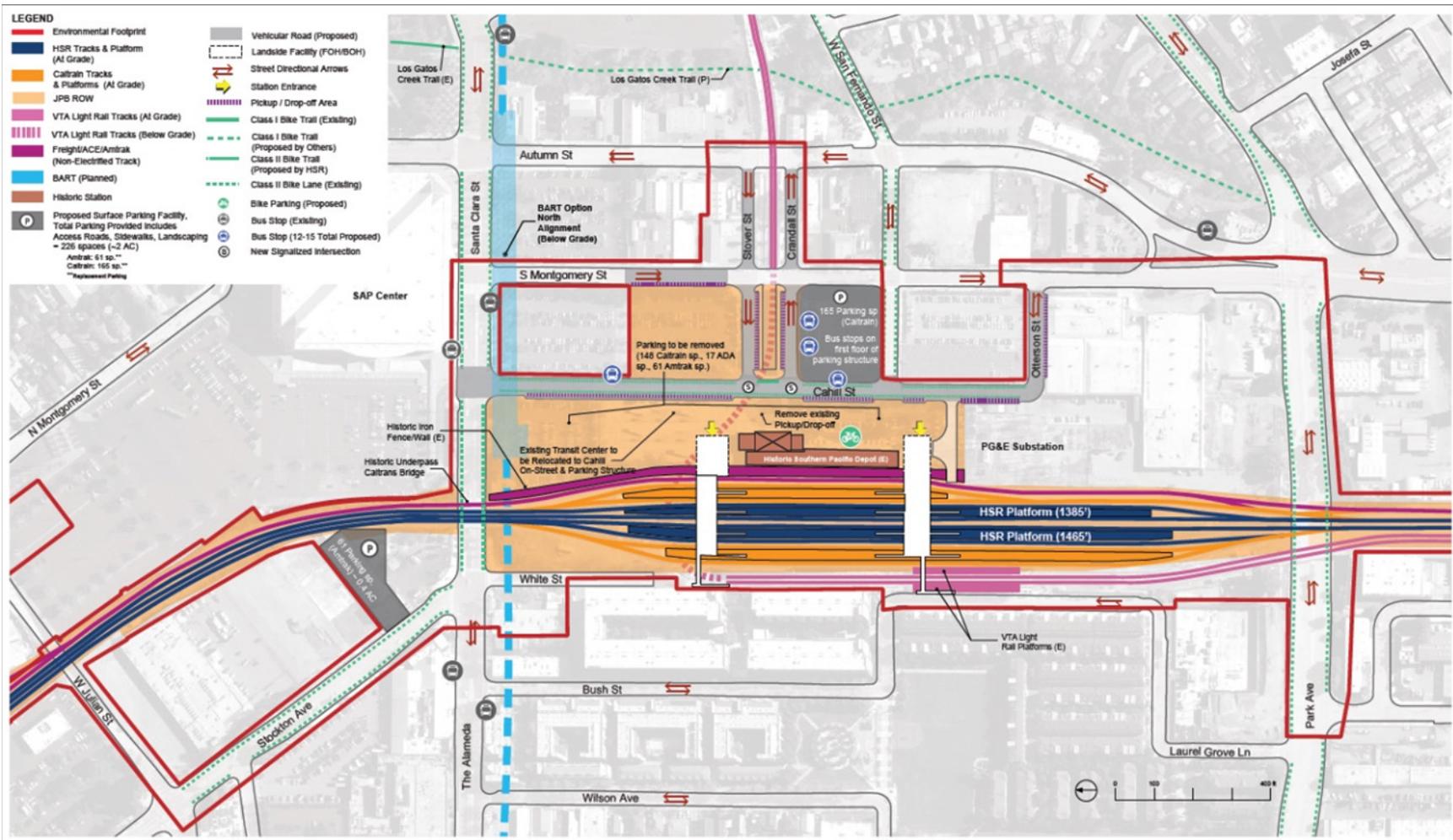


Figure 2. Preliminary design of modification and parking at San Jose Diridon Station (Authority 2020c).

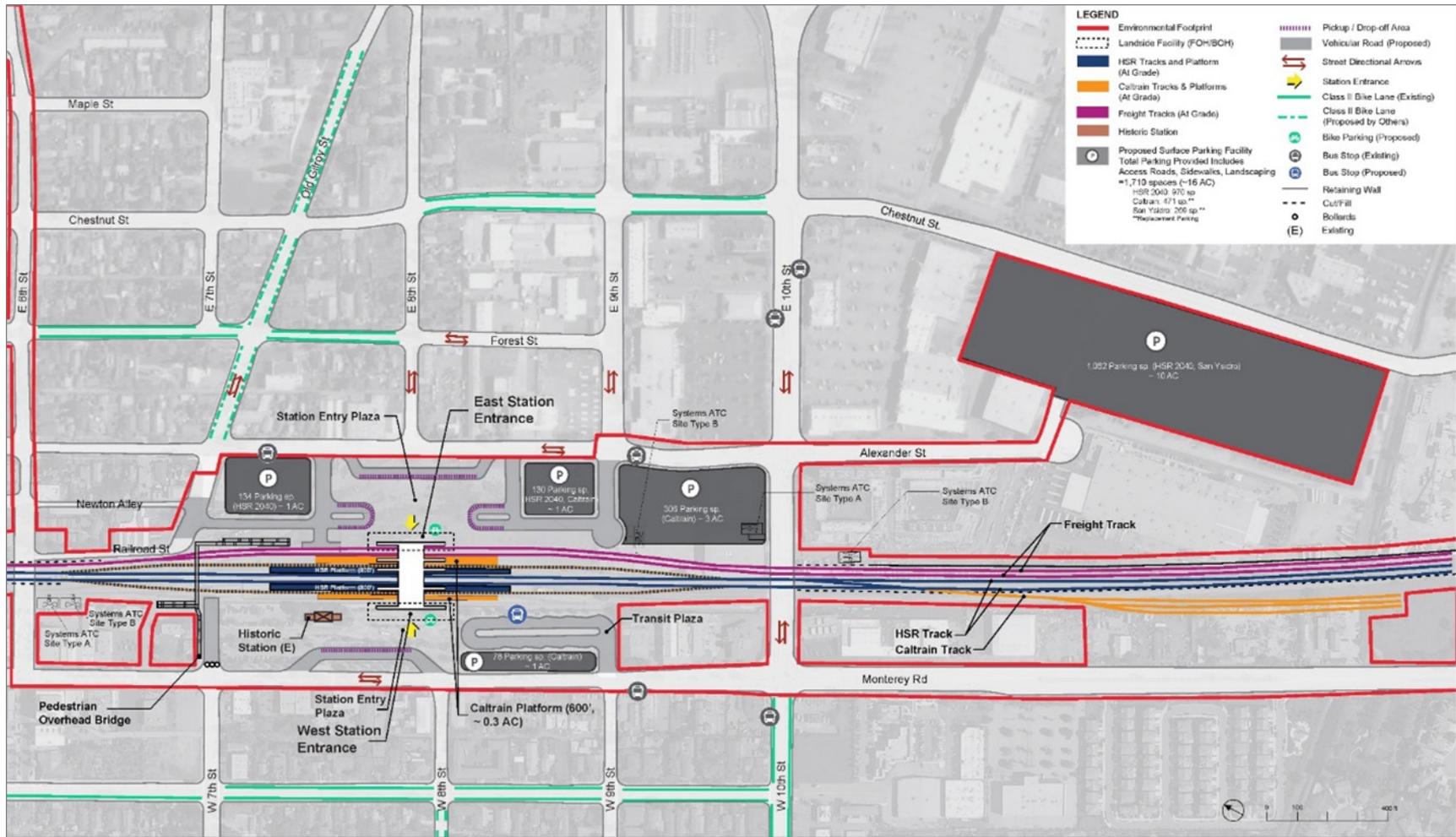


Figure 3. Preliminary design of modification and parking at Downtown Gilroy Station (Authority 2020c).

### **1.3.2. Construction**

The Authority plans to begin implementing its construction plan after receiving the required environmental approvals and permits and securing funding. Given the size and complexity of the HSR project, the Authority assumes the design and construction work would likely be divided into several procurement packages. In general, the procurement packages would be grouped as follows:

- Tunnels
- Civil/structural infrastructure, including at-grade, viaduct, and trench track profiles; utility relocations; and roadway modifications
- Design and construction of passenger stations, maintenance facilities, and wayside facilities
- Rail infrastructure and testing including trackwork, design and construction of direct fixation track and subballast, ballast, ties and rail installation, switches, and special trackwork
- Core systems, such as traction power, train controls, communications, the operations center, and the procurement of trainsets

One or more design-build packages would be developed. The Authority would issue construction requests for proposals, begin right-of-way acquisition, and procure construction management services to oversee physical construction of the project. During peak construction periods, work would occur concurrently in different subsections, with overlapping construction of various project elements. Working hours and the number of workers present at any time would depend on the activities being performed. Construction fencing would be restricted to areas designated for construction staging and areas where public safety or environmentally sensitive resources are a concern. See section 1.3.4 Proposed Conservation Measures or Authority (2020a) Appendix 2-E for more details.

### **Preconstruction**

During final design, the Authority would conduct several pre-construction activities to optimize construction staging and management. These activities include the following:

- Conducting additional geotechnical investigations to define precise geologic, groundwater, and seismic conditions along the alignment.
- Identifying construction laydown and staging areas used for mobilizing personnel, stockpiling materials, and storing equipment for building HSR or related improvements. Precasting yards would be identified for the casting, storage, and preparation of precast concrete segments; temporary spoil storage; workshops, and the temporary storage of delivered construction materials. Field offices and temporary jobsite trailers would also be located at the staging areas.
- Initiating site preparation and demolition, such as clearing, grubbing, and grading, followed by the mobilization of equipment and materials.
- Relocating utilities (overhead tension wires, pressurized transmission mains, oil lines, fiber optical conduits or cables, and communications lines or facilities) prior to construction.

- Implementing temporary, long-term, and permanent road closures to reroute or detour traffic away from construction activities. Handrails, fences, and walkways would be provided for the safety of pedestrians and bicyclists.
- Locating temporary batch plants to produce Portland Cement Concrete or asphaltic concrete needed for roads, bridges, aerial structures, retaining walls, and other large structures. The facilities generally consist of silos containing fly ash, lime, and cement; heated tanks of liquid asphalt; sand and gravel material storage areas; mixing equipment; aboveground storage tanks; and designated areas for sand and gravel truck unloading, concrete truck loading, and concrete truck washout.
- Conducting other studies and investigations, as needed, such as surveys of local business, farms or dairies, and wildlife refuges to identify usage, delivery, shipping patterns, and critical times of the day or year for business, planting, harvesting activities, or recreational activities.

### Major Construction Activities

Major types of construction activities for the project include earthwork; bridge, aerial structure, and roadway crossings; railroad systems; and station construction, as briefly described in the following subsections.

**Earthwork:** Earthwork would be conducted using conventional earthmoving methods and heavy construction equipment, such as dozers, wheel loaders, scrapers, articulated trucks, rear dump trucks, or wagons. The type of equipment used would depend on the hauling distance, with trucks or wagons used for longer distances. The project would require earthwork construction of 53 to 59 miles of embankment or trench construction. The high amount of earthwork is predominantly due to the embankment and at-grade profile through the Morgan Hill and Gilroy Subsection. The project would also require greater quantities of embankment than excavation, requiring approximately an additional 2.3 million and 900,000 cubic yards of material, respectively. While fill material is likely to be acquired locally, ballast and subballast materials may be imported from off-site quarries. To minimize material transport, the preliminary engineering design has identified construction staging sites that would store excavated materials close to where they would be placed, minimizing repetitive handling of materials.

**Bridge and Aerial Structure Construction:** The majority of the elevated guideways would be designed and built using single box segmental girder construction. However, other structural types and construction methods will be considered as needed.

A typical aerial structure foundation pile cap is supported by an average of four large-diameter (5 to 9 feet) bored piles. Depth of piles depends on the geotechnical conditions at each pile site. Pile construction can be achieved by using rotary drilling rigs, and either bentonite slurry or temporary casings may be used to stabilize pile shaft excavation. The estimated pile production rate is 4 days per pile installation. Additional available pile installation methods include bored piles, rotary drilling cast-in-place (CIP) piles, driven piles, and a combination of pile jetting and driving. Following completion of the piles, pile caps can be constructed using conventional methods supported by structural steel: either precast and pre-stressed piles or cast-in-drilled hole piles. For pile caps constructed near existing structures such as railways, bridges, and

underground drainage culverts, temporary sheet piling (i.e., temporary walls) may be used to minimize disturbances to adjacent structures. Sheet piling installation and extraction would likely be achieved using hydraulic sheet piling machines.

Typical aerial structures of up to 90 feet would be constructed using CIP bent caps and columns supported by structural steel and installed upon pile caps. A self-climbing formwork system may be used to construct piers and portal beams more than 90 feet high. The self-climbing formwork system is equipped with a winched lifting device, which is raised up along the column by hydraulic means with a structural frame mounted on top of the previous pour. In general, a 3-day cycle for each 12-foot pour height can be achieved. The final size and spacing of the piers depends on the type of superstructure and spans they are supporting.

The selection of superstructure type would consider the loadings, stresses, and deflections encountered during the various intermediate construction stages, including changes in static scheme, sequence of tendon installation, maturity of concrete at loading, and load effects from erection equipment. Accordingly, the final design will depend on the selected means and methods of construction, such as full-span precast, span-by-span, balanced cantilever segmental precast, and CIP construction on falsework (see Authority (2020c) Chapter 2 for more details on different superstructure designs and construction methods).

**Tunnels:** Tunnels would be used where the HSR system passes through a hill or mountain where the vertical profile is too deep to use an open cut to pass through the topography, such as through the Diablo Mountain Range to the California Central Valley. The project would require the construction of two tunnels—Tunnel 1 in the Morgan Hill and Gilroy Subsection and Tunnel 2 in the Pacheco Pass Subsection. These tunnels would be twin-bore, single-track tunnels, with lengths of approximately 1.6 and 13.5 miles, respectively, and a minimum internal diameter of 29.5 feet. Localized enlargements, or niches, may be required at intervals to accommodate equipment such as overhead contact system tensioning devices, traction power paralleling stations, ventilation fans, communication equipment, signaling equipment, and drainage systems. Cross passages, placed no more than 800 feet apart, would be required between adjacent tunnels to provide emergency exits. The Authority would acquire exclusive underground property approximately 132 feet wide and 62 feet high to accommodate both tunnels and all support elements. Preparation for and construction of these tunnels would generally proceed as follows:

- Construction of access roads to the future tunnel portal sites: a new access road would be constructed on the west side of State Route-152 from Walnut Avenue to the east portal of Tunnel 1, and a new road and bridge across Pacheco Creek would be constructed to the west portal of Tunnel 2. McCabe Road would be improved to provide access to the east portal of Tunnel 2.
- Construction of power system: overhead power lines would be installed to the construction staging areas, and portable diesel generators would be installed to provide backup power supply.
- Preparation of tunnel portals: a large, level area would be constructed at each tunnel portal including installation of retaining walls to minimize grading and slope modification. At the portals for Tunnel 2, this construction would likely include hillside slope reduction or application of drainage techniques, as well as ongoing monitoring and

maintenance, to reduce the potential for landslides. Tunnel portals would initially be used to store precast materials and equipment, assemble and maintain equipment, stockpile tunnel spoils, and conduct ongoing monitoring and measuring of safety and ventilation systems. Portals would also be designed to accommodate housing trailers, ventilation buildings, communications equipment, power facilities, water and sewage, lighting and fencing, and clear areas for parking and storage.

- Manufacturing and transport of precast tunnel support materials: manufacturing of precast materials, such as the tunnel lining segments would occur off-site and be transported to the tunnel portals.

Tunnel excavation would likely be conducted using a combination of tunnel boring machines (TBMs) and conventional tunneling methods at either end of the tunnel portals. The type of machine used would be determined by the Authority's design-build contractor, based on the tunnel length, the particular geology of the project, the amount of groundwater present and its condition, and other factors (further tunneling details available in Authority (2020c): Chapter 3.4 Potential Groundwater Depletion from Tunnel Construction). Tunnel excavation will generate large volumes of soil and rock materials (an estimated 0.5 million cubic yards from Tunnel 1 and 4.3 million cubic yards from Tunnel 2). Tunnel spoils would be temporarily stockpiled at the tunnel portal and, depending on geotechnical properties, distributed along the alignment and reused for embankment fill or non-structural fill. Depending on the rate of excavation completed, the transport of tunnel spoils could require approximately 160 three-axle dump truck trips per day at each tunnel portal.

**Railroad Systems Construction:** The HSR system will include trackwork, traction power electrification, signaling, and communications. After completion of earthwork and structures, trackwork is the first rail system to be constructed, and it must be in place at least locally to start traction power electrification and railroad signaling installation. Trackwork construction generally requires the welding of transportable lengths of steel running onto longer lengths (approximately 0.25 mile), which are placed in position on crossties or track slabs and field-welded into continuous lengths.

Tie and ballast, and slab track construction would be used. Tie and ballast construction, which would be used for at-grade and minor structures, typically uses crossties and ballast that are distributed along the track bed by truck or tractor. In sensitive areas, such as where the HSR is parallel to or near streams, rivers, or wetlands, and in areas of limited accessibility, this operation may be accomplished by using the constructed rail line for material delivery. For major civil structures, slab track construction would be used. Slab track construction is a non-ballasted track form using precast supports to which the track is directly fixed.

Traction power electrification equipment to be installed includes TPSSs, traction power switching and paralleling stations, and the overhead contact system. Traction power facility equipment and houses are typically fabricated and tested in a factory, then delivered by tractor-trailer to a prepared site adjacent to the alignment. Substations are assumed to be located every 30 miles along the alignment. Traction power switching stations are located every 15 miles and traction power paralleling stations every 5 miles along the alignment. The overhead contact system is assembled in place over each track and includes poles, brackets, insulators, conductors,

and other hardware. Signaling equipment to be installed includes wayside cabinets and bungalows, communications radio towers, wayside signals, switch machines, insulated joints, impedance bonds, and connecting cables. The equipment will support automatic train protection; enhanced automatic train protection; and positive train control to maintain train separation, routing at interlocking, and speed.

**Station Construction:** Because the HSR stations in San Jose and downtown Gilroy would be co-located with existing Caltrain stations, existing train operations would be maintained during HSR station construction/modification. The San Jose Diridon Station and downtown Gilroy station would be reconstructed to accommodate the HSR system and the east Gilroy station would be a new station. In summary, station construction would include demolition and site preparation, construction of new buildings and platforms, connecting the electrical and mechanical systems, and finishing with communication and security equipment (more details are in Authority (2020c) Chapter 2.3.3.5 Station Construction).

### 1.3.3. Long-term HSR operations and maintenance plans

The conceptual HSR service plan for Phase 1 describes service from Anaheim/Los Angeles through the CV from Bakersfield to Merced and northwest into the Bay Area, terminating in San Francisco. Subsequent stages of the HSR system include a southern extension from Los Angeles to San Diego via the Inland Empire and an extension from Merced north to Sacramento. Train service would run in diverse patterns between various terminals. Three basic service types are envisioned:

- Express trains would serve major stations only, providing fast travel times between Los Angeles and San Francisco during the morning and afternoon peak.
- Limited-stop trains would skip selected stops along a route to provide faster service between stations.
- All-stop trains would focus on regional service.

The majority of trains would provide limited-stop services and offer a relatively fast run time along with connectivity among various intermediate stations. Numerous limited-stop patterns would be provided to achieve a balanced level of service at the intermediate stations. The service plan envisions at least four limited-stop trains per hour in each direction, all day long, on the main route between San Francisco and Los Angeles. Each intermediate station in the Bay Area, the Central Valley between Fresno and Bakersfield, Palmdale in the high desert, and Sylmar and Burbank in the San Fernando Valley would be served by at least two limited-stop trains every hour—offering at least two reasonably fast trains an hour to San Francisco and Los Angeles. Selected limited-stop trains would be extended south of Los Angeles as appropriate to serve projected demand. The service plan provides direct train service between most station pairs at least once per hour.

In 2029, the assumed first year of HSR operation, two trains per hour would operate during peak travel times and one train per hour off-peak travel times between San Francisco and Bakersfield. When Phase 1 operations occur, this BA assumes the following service:

- Two peak trains per hour from San Francisco and Los Angeles (one in off-peak)

- Two peak trains per hour from San Francisco and Anaheim (one in off-peak)
- Two peak trains per hour from San Jose and Los Angeles
- One peak train per hour from Merced and Los Angeles
- One train per hour (peak and off-peak) from Merced and Anaheim

The Authority will regularly perform maintenance along the track and railroad ROW, as well as on the power systems, train control, signaling, communications, and other vital systems required for the safe operation of the HSR system. The Authority expects maintenance methods to be comparable to those of existing European and Asian HSR systems, adapted to the specifics of the California HSR system, with inspection and maintenance for some project elements occurring several times per week (e.g. track and overhead power system) and some inspection occurring only a few times a year (e.g. structural inspection, vegetation control within the ROW). Approximately every 4–5 years, ballasted track would require tamping. This more intensive maintenance of the track uses a train with a succession of specialized cars to raise, straighten, and tamp the track, using vibrating “arms” to move and position the ballast under the ties. Steel structures would require painting every several years. Fencing and intrusion protection systems would be remotely monitored, as well as periodically inspected, with maintenance taking place as needed. The FRA will specify standards of maintenance, inspection, and other items in a set of regulations to be issued in the next several years.

#### **1.3.4. Proposed Conservation Measures**

The Authority proposes to employ a variety of BMPs and avoidance and mitigation measures (AMMs), also known as conservation measures (CMs), to reduce or avoid adverse impacts to a listed species and the habitats upon which they depend. The CMs that are directly applicable to listed species under NMFS jurisdiction (CCC and S-CCC steelhead) are reproduced below, though other proposed CMs will also be employed and are also expected to protect and conserve NMFS trust resources. A full description of all CMs proposed by the Authority is available in the BA, Appendix 2-E: Conservation Measures (Authority 2020a).

**AMM-FISH-1:** The Authority would implement general protection measures to protect and minimize effects on CCC and S-CCC steelhead and their habitat during construction. The following measures would be implemented during design:

- Design temporary night lighting of overwater structures (if needed) such that illumination of the surrounding water is avoided.
- Locate temporary construction areas (e.g., staging, storage, parking, and stockpiling areas) outside of channels and riparian areas wherever feasible.
- Minimize, to the extent feasible, the placement of footings and columns within the active channel (between top of bank) of steelhead critical habitat.
- The Authority will coordinate with NMFS and the USFWS and request review of design between approximately 75 and 90 percent design completion.
- The Authority has committed to using low-impact development methods for stormwater treatment, including locations that could otherwise contribute polluted stormwater to streams that provide habitat for fish listed under the federal Endangered Species Act (IAMF-HYD-#1). Such measures may consist of pervious hardscapes (for pollutant-generating areas such as parking lots), bioswales, infiltration basins, rain gardens, and

any and all other design measures that would capture and treat polluted runoff before it reaches sensitive natural waterways. Design review would include these systems.

- The following bank stabilization and erosion control measures would be implemented during design and construction to minimize habitat disturbance:
  - Temporarily fence areas of natural riparian vegetation that can be avoided with high-visibility environmentally sensitive areas fence to enforce avoidance.
  - Use “soft” approaches to bank erosion control to the extent possible (e.g., vegetative plantings, placement of large woody debris). Avoid hard bank protection methods (e.g., revetment) wherever feasible.
  - Avoid the use of wood treated with creosote or copper-based chemicals in bank stabilization efforts.
  - Use quarry stone, cobblestone, or their equivalent for erosion control along rivers and streams, complemented with native riparian plantings or other natural stabilization alternatives that would maintain a natural riparian corridor, where feasible. Cobble size types and spacing of riparian plantings, and other details on riparian restoration activities would be provided in the restoration and revegetation plan (RRP) described in AMM-GEN-12.
  - Revegetate temporarily disturbed areas with native plants to resemble the existing vegetation.

**AMM-FISH-2:** Near-water and in-water work would be conducted within specified work windows based on date, channel inundation, and water temperature. Work windows would include the general time periods when effects on migrating juvenile and adult CCC and S-CCC steelhead would be minimal. Additionally, in-water work would be allowed when salmonid use is temperature limited (defined as 1 week of average water temperature of 75°F or more); and work would be allowed in the channel and on the floodplain when channels are dry or ponded.

- During work windows, work would only be allowed in the channel and on the floodplain from 1 hour after sunrise until 1 hour before sunset.
- Near-water or over-water work is defined as construction activities occurring within the floodplain but not in the wetted channel (e.g., located between the wetted channel and the landside toe of the bordering levees or over the wetted channel). In-water work is defined as work within the wetted channel.
- The near-water construction work window would be April 30 through December 1. For in-water work, the construction work window would be June 15 through October 15. These periods may be extended subject to receipt of written authorization from NMFS that incidental take limits would not be exceeded.
- If channels are dry or ponded (i.e., lack continuous flow), or water temperatures average 75°F or more for 7 consecutive days, in-water and near-water work can proceed outside the work windows stated above. NMFS would be consulted to verify work can proceed if these conditions are present during construction.

**AMM-FISH-3:** The Authority would develop and implement an underwater sound control plan outlining specific measures to be implemented to avoid and minimize the effects of impact pile driving on CCC and S-CCC steelhead. Effects would be minimized by limiting the period during which impact pile driving may occur and by limiting or abating underwater noise generated

during impact pile driving. The underwater sound control plan would be provided to NMFS for review and approval prior to in-water impact pile driving. The plan would evaluate the potential effects of impact pile driving on steelhead in the context of the following underwater noise thresholds established for disturbance and injury of fish (Caltrans 2015).

- Injury threshold for fish of all sizes includes a peak sound pressure level of 206 decibels (dB) relative to 1 micropascal.
- Injury threshold for fish less than 2 grams is 183 dB relative to 1 micropascal cumulative sound exposure level, and 187 dB relative to 1 micropascal cumulative sound exposure level for fish greater than or equal to 2 grams.
- Disturbance threshold for fish of all sizes is 150 dB root mean square (RMS) relative to 1 micropascal.

The underwater sound control plan would restrict in-water work to the in-water work window specified in permits issued by the fish and wildlife agencies (including NMFS), and to daylight hours between 1 hour after sunrise and 1 hour before sunset with a 12-hour break between pile driving sessions. The underwater noise generated by impact pile driving would be abated using the best available and practicable technologies. Examples of such technologies include, but are not limited to, the use of cast-in-drilled-hole rather than driven piles; use of vibratory rather than impact pile driving equipment; using an impact pile driver to proof piles initially placed with a vibratory pile driver; noise attenuation using pile caps (e.g., wood or micarta), bubble curtains, air-filled fabric barriers, or isolation piles; and installation of piling-specific cofferdams. Specific techniques to be used would be selected based on site conditions.

In addition to primarily using vibratory pile driving methods and establishing protocols for attenuating underwater noise levels produced during in-water construction activities, the Authority would develop and implement operational protocols for when impact pile driving is necessary. These operational protocols would be used to minimize the effects of impact pile driving on CCC and S-CCC steelhead. These protocols may include, but not be limited to, the following: monitoring the in-water work area for fish that may be showing signs of distress or injury as a result of pile-driving activities and stopping work when distressed or injured fish are observed; initiating impact pile driving with a “soft-start,” such that pile strikes are initiated at reduced impact and increase to full impact over several strikes to provide fish an opportunity to move out of the area; restricting impact pile-driving activities to specific times of the day and for a specific duration to be determined through coordination with the fish and wildlife agencies; and, when more than one pile-driving rig is employed, initiating pile-driving activities in a way that provides an escape route and avoids “trapping” fish between pile drivers in waters exposed to underwater noise levels that could potentially cause injury. These protocols are expected to avoid and minimize the overall extent, intensity, and duration of potential underwater noise effects associated with impact pile-driving activities.

**AMM-FISH-4:** Construction within waterways may require temporary dewatering to minimize potential impacts on fisheries and minimize potential erosion, sediment loss, scour, or increases in turbidity. Fish rescue operations would occur at any in-water construction site that occurs in modeled steelhead habitat or habitat identified by project biologists during pre-construction surveys where dewatering and resulting isolation of fish may occur. Fish rescue and salvage plans would be developed by the Authority and would include detailed procedures for fish rescue

and salvage to minimize the number of individuals of listed fish species subject to stranding during dewatering. The plans would identify the appropriate procedures for removing fish from construction zones and preventing fish from reentering construction zones prior to dewatering and other construction activities. A draft plan would be submitted to the fish and wildlife agencies for review and approval at least 48 hours prior to fish rescue and relocation. An authorization letter from NMFS would be required before in-water construction activities with the potential for stranding fish can proceed.

All fish rescue and salvage operations would be conducted under the guidance of a qualified fish biologist and in accordance with required permits. At each crossing of modeled steelhead habitat, the fish rescue plan would identify the appropriate procedures for excluding fish from the construction zone and for removing fish from areas subject to dewatering. The primary procedure would be to block off the construction area and use seines (nets) or dip nets to collect and remove fish, although electrofishing techniques may also be authorized under certain conditions. It is critical that fish rescue and salvage operations begin as soon as possible and be completed within 48 hours after isolation of a construction area to minimize potential predation and adverse water quality impacts (high water temperature, low dissolved oxygen) associated with confinement. Block nets, sandbags, or other temporary exclusion methods could be used to exclude fish or isolate the construction area prior to the fish removal process. The appropriate fish exclusion or collection method would be determined by a qualified fish biologist, in consultation with a designated fish and wildlife agency biologist, based on site-specific conditions and construction methods. Capture, release, and relocation measures would be consistent with the general guidelines and procedures set forth in Part IX of the most recent edition of the *California Salmonid Stream Habitat Restoration Manual* (Game) 2004) to minimize impacts on listed species of fish and their habitat.

All fish rescue and salvage operations would be conducted under the guidance of a fish biologist meeting the qualification requirements (refer to the following subsection, Qualifications of Fish Rescue Personnel). The following discussion addresses fish collection, holding, handling, and release procedures of the plan. Unless otherwise required by project permits, the Authority would provide the following:

- A minimum 48-hour notice to the appropriate fish and wildlife agencies of dewatering activities that are expected to require fish rescue.
- Unrestricted access for the appropriate fish and wildlife agency personnel to the construction site for the duration of implementation of the fish rescue plan.
- Temporary cessation of dewatering if fish rescue workers determine that water levels may drop too quickly to allow successful rescue of fish.
- A work site that is accessible and safe for fish rescue workers.

**Qualifications of Fish Rescue Personnel:** Personnel active in fish rescue efforts would include at least one person with a 4-year college degree in fisheries or biology or a related degree. This person also must have at least 2 years of professional experience performing field surveys and fish capture and handling procedures affecting juvenile salmonids. The person would have completed an electrofishing training course such as Principles and Techniques of Electrofishing (USFWS, National Conservation Training Center) or similar course, if electrofishing is used. To

avoid and minimize the risk of injury to fish, attempts to seine or net fish would always precede the use of electrofishing equipment.

**Seining and Dipnetting:** Fish rescue and salvage operations would begin immediately after isolating the work area. If the enclosed area is wadeable (less than 3 feet deep), fish can be herded out within the work area by dragging a seine (net) through the enclosure prior to final closure of the downstream end of the isolation area. Depending on conditions, this process may need to be conducted several times. The net or screen mesh would be no greater than 0.125 inch, with the bottom edge of the net (lead line) securely weighted down to prevent fish from entering the area by moving under the net.

After isolation of the work area is complete, remaining fish in the enclosed area would be removed using seines, dip nets, electrofishing techniques, or a combination of these depending on site conditions. Dewatering activities would also conform to the guidelines specified in the Dewatering subsection. Following each sweep of a seine through the enclosure, the fish rescue team would do the following:

- Carefully bring the ends of the net together and pull in the wings, so that the lead line is kept as close to the substrate as possible.
- Slowly turn the seine bag inside out to reveal captured fish, so that fish remain in the water as long as possible before transfer to an aerated container.
- Follow the procedures outlined in the electrofishing section below and relocate fish to a predetermined release site.
- Dipnetting is best suited for small, shallow pools in which fish are concentrated and easily collected. Dip nets would be made of soft (nonabrasive) nylon material and small mesh size (0.125 inch) to collect small fish.

**Electrofishing:** After conducting the herding and netting operations described above, electrofishing may be necessary to remove as many fish as possible from the enclosure. Electrofishing would be conducted in accordance with NMFS electrofishing guidelines (NMFS 2000) and other appropriate fish and wildlife agency guidelines. Electrofishing would be conducted by one or two 3- to 4-person teams, with each team having an electrofishing unit operator and two or three netters. At least three passes would be made through the enclosed cofferdam areas to remove as many fish as possible. Fish initially would be placed in 5-gallon buckets filled with river water. Following completion of each pass, the electrofishing team would do the following:

- Transfer fish into 5-gallon buckets filled with clean river water at ambient temperature.
- Hold fish in 5-gallon buckets equipped with a lid and an aerator, and add fresh river water or small amounts of ice to the fish buckets if the water temperature in the buckets becomes more than 2°F warmer than ambient river waters.
- Maintain a healthy environment for captured fish, including low densities in holding containers to avoid effects of overcrowding.
- Use water-to-water transfers whenever possible.
- Release fish at predetermined locations.
- Segregate larger fish from smaller fish to minimize the risk of predation and physical damage to smaller fish from larger fish.

- Limit holding time to about 10 minutes, if possible.
- Avoid handling fish during processing unless absolutely necessary. Use wet hands or dip nets if handling is needed.
- Handle fish with hands that are free of potentially harmful products, including but not limited to sunscreen, lotion, and insect repellent.
- Avoid anesthetizing or measuring fish.
- Note the date, time, and location of collection; species; number of fish; approximate age (e.g., young-of-the-year, yearling, adult); fish condition (dead, visibly injured, healthy); and water temperature.
- If positive identification of fish cannot be made without handling the fish, note this and release fish without handling.
- In notes, indicate the level of accuracy of visual estimates to allow appropriate reporting to the appropriate fish and wildlife agencies (e.g., “Approx. 10–20 young-of-the-year steelhead”).
- Release fish in appropriate habitat either upstream or downstream of the enclosure, noting release date, time, and location.
- Stop efforts and immediately contact the appropriate fish and wildlife agency if mortality during relocation exceeds the Authority’s authorized take limits.
- Place dead fish of listed species in sealed plastic bags with labels indicating species, location, date, and time of collection, and store them on ice.
- Freeze collected dead fish of listed species as soon as possible and provide the frozen specimens to the appropriate fish and wildlife agencies, as specified in the permits.
- Sites selected for release of rescued fish either upstream or downstream of the construction area would be similar in temperature to the area from which fish were rescued, contain ample habitat, and have a low likelihood of fish reentering the construction area or being impinged on exclusion nets/screens.
- All equipment used in fish rescue and salvage activities must be sterilized prior to use to avoid introductions of aquatic invasive species and limit the spread of disease and parasites. Disinfection protocols are described by CDFW (2016).

**Dewatering:** Dewatering would be performed as specified in AMM-GEN-21 in association with fish rescue operations as described above. A dewatering plan would be submitted as part of the SWPPP/Water Pollution Control Program detailing the location of dewatering activities, equipment, and discharge point. Dewatering pump intakes would be screened to prevent entrainment of juvenile or parr-sized salmonids in accordance with NMFS (1997) screening criteria, including the following:

- Perforated plate: screen openings shall not exceed 3/32 inch (2.38 mm), measured in diameter.
- Profile bar: screen openings shall not exceed 0.0689 inch (1.75 mm) in width.
- Woven wire: screen openings shall not exceed 3/32 inch (2.38 mm), measured diagonally (e.g., 6–14 mesh).
- Screen material shall provide a minimum of 27 percent open area.

During the dewatering process, a qualified biologist or fish rescue team would remain on site to observe the process and remove additional fish using the previously described rescue procedures.

**Contingency Plans:** If fish rescue and salvage operations cannot be conducted effectively or safely by fish rescue workers and surveys observe five or more juvenile steelhead, dewatering must stop until the fish biologist can show that fish have left the area.

**Final Inspections and Reporting:** Upon dewatering to water depths at which neither electrofishing nor seining can effectively occur (e.g., less than 3 inches [0.1 meter]), the fish rescue team would inspect the dewatered areas to locate any remaining fish. Collection by dip net, data recording, and relocation would be performed as necessary according to the procedures outlined previously in Electrofishing. The fish rescue team would notify the Authority when the fish rescue has been completed and construction can recommence. The results of the fish rescue and salvage operations (including date, time, location, comments, method of capture, fish species, number of fish, approximate age, condition, release location, and release time) would be reported to the appropriate fish and wildlife agencies as specified in the pertinent permits.

### **Additional General CMs Pertinent to Steelhead Protection and Avoidance**

- AMM-GEN-1: Project biologists will be assigned to the project section with NMFS approval for relevant species. The approved project biologists would be responsible for oversight of the construction and implementation of CMs and providing compliance and monitoring documentation.
- AMM-GEN-2: NMFS and other resource agency staff will be provided access to the construction site in coordination with construction site safety requirements.
- AMM-GEN-3: A worker environmental awareness program (WEAP) would be developed and trainings and training updates would be conducted by the project biologists for construction personnel working onsite.
- AMM-GEN-4: A WEAP would be created and implemented prior to starting operations and maintenance activities for operations and maintenance staff.
- AMM-GEN-5: A biological resources management plan would be prepared and implemented prior to construction, and would include the terms and conditions of applicable permits as well as the reporting responsibilities required by each regulatory agency.
- AMM-GEN-6: Non-monofilament substitutes would be used instead of plastic monofilament netting or other plastics in erosion control materials.
- AMM-GEN-8: Prior to construction, staging areas will be delineated outside of sensitive environmental areas to the extent practicable. Staging areas will be made in areas that will ultimately be occupied by permanent HSR facilities, reducing the overall disturbance footprint of the project.
- AMM-GEN-9: Waste materials from construction unsuitable for reuse would be disposed of in local landfills permitted to take the materials, in conformance with state and federal regulations.
- AMM-GEN-10: Prior to groundbreaking, all equipment entering the work area will be cleaned of mud and plant materials. Vehicle cleaning areas would be established and designed to contain and isolate organic material to minimize the spread of weed and invasive plant species.
- AMM-GEN-11: Prior to groundbreaking, a construction site BMP field manual would be created with the site housekeeping practices expected for the site and disseminated to the construction personnel. The manual would be updated by January 31 of each year.

- AMM-GEN-12: A RRP for upland vegetation would be prepared where vegetation or soils have been temporarily disturbed. The RRP activities would include (but are not limited to) grading landforms to pre-disturbance conditions, removal of invasive plant species, and revegetating with native plant species to the extent practicable. The RRP would be submitted to NMFS for review when relevant to our regulatory authority.
- AMM-GEN-13: A weed control plan would be prepared and implemented during construction to minimize or avoid the spread of weeds, including surveys, equipment cleaning, weed control treatments (herbicides, manual, and mechanical removal), and success criteria.
- AMM-GEN-14: Environmentally Sensitive Areas would be established with high-visibility fencing or other markers to restrict construction equipment and personnel from disturbing these areas, such as riparian areas not already within the footprint of permanent or temporary work locations.
- AMM-GEN-15: A designated biological monitor would be on site for all construction activities and conduct daily ‘sweeps’ to verify that no listed species are within the areas to be disturbed by the day’s schedule activities.
- AMM-GEN-17: A post-construction compliance report would be submitted to NMFS upon completion of the construction, including the success in meeting the proposed CMs and compensation measures, the observance or interactions with listed species, and other information.
- AMM-GEN-18: A groundwater adaptive management and monitoring program (GAMMP) would be prepared and implemented to minimize and mitigate for potential impacts to wetlands, creeks, ponds, etc., prior to, during, and after tunnel construction. The GAMMP would be submitted to NMFS for review where the section interacts with resources under its regulatory authority. The monitoring program would be designed to detect real-time changes in ground- and surface water in comparison to baseline conditions. Water storage tanks or water lines would be installed prior to tunneling with the purpose of providing supplemental water, in case dewatering associated with tunneling reduces the amount of surface water in a way that negatively impacts listed species.
- AMM-GEN-19: Biologists will verify the mapped land cover and habitats of listed species prior to ground disturbing activities, with the purpose of updating land cover maps used by the project.
- AMM-GEN-20: Biologists and general biological monitors have the authority to stop work to protect any federally listed species within the project footprint. Ground-disturbing activities would be suspended in the construction area where the construction activity could result in take of listed species; work may continue in other areas. Work suspension would continue until the individual leaves voluntarily, is relocated to an approved release area using NMFS-approved handling techniques and relocation methods, or as required by NMFS for those resources.
- AMM-GEN-21: A dewatering and water flow diversion plan would be prepared and submitted for review prior to construction, with measures to minimize turbidity and siltation. Dewatering would occur through flow diversion or isolating the in-water work area by channeling the stream to an alternative course, which would meet NMFS and CDFW fish passage criteria in steelhead waterways.

- AMM-GEN-22: Prior to starting operations and maintenance activities, the Authority would prepare an annual vegetation control plan for the purpose of maintaining clear areas around facilities, controlling invasive weeds, and reducing the risk of fire during the operational phase.
- AMM-GEN-23: NMFS would be notified as soon as practicable but no later than 24 hours after the discovery of a project-related death or injury of a listed species under its regulatory jurisdiction.
- AMM-GEN-24: Material and equipment storage on the floodplain of a river would be limited to April 15 to October 31. Outside of this period, equipment may enter the river channel areas but be removed daily and stored outside of areas subject to flooding.
- AMM-GEN-25: Excavated materials would be temporarily stockpiled in designated areas at or near the excavation site and redistributed according to the RRP.
- AMM-GEN-26: During construction, all known wildlife crossing structures would be maintained to be unobstructed to the extent possible or a temporary crossing area or structure will be created. This includes employing the use of vibratory rather than impact pile driving in or within 200 feet of waterbodies that provide habitat for steelhead.
- AMM-GEN-30: The Authority will build additional structures to address the permanent intermittent noises and vibration created by HSR operations
- AMM-GEN-34: Within 90 days of completing construction, the project biologist would direct the revegetation of riparian areas temporarily disturbed from construction activities with appropriate native plants and seeds, with stock originating from local sources to the extent feasible, consistent with the RRP.
- AMM-GEN-35: Within 90 days of completing construction, the Authority would begin the restoration of aquatic resources that were temporarily affect by construction, consistent with the RRP. If trees were removed, they will be used in bank stabilization efforts during site restoration where feasible and appropriate for enhancement of fish habitat.
- AMM-GEN-36: Prior to groundbreaking, the Authority will conduct a site assessment of the work areas to identify biological and aquatic resources, plant communities, land cover types, and distribution of special status species. Using these results, the Authority would then obtain the necessary authorizations to conduct habitat restoration, enhancement, or creation at the selected sites.
- AMM-GEN-40: Prior to construction, a spill prevention, control, and countermeasure plan will be developed, and it will be implemented during construction.
- AMM-GEN-45: Prior to construction, the Authority will prepare an operational stormwater management and treatment plan. To the extent feasible, stormwater treatment will employ bioretention/biofiltration with a sand/compost mix in filter columns as part of the treatment system for impervious surfaces designated for vehicle use (McIntyre 2015, 2016). If these methods are not feasible, stormwater treatment will use another method that will have equal or greater effectiveness in removing known toxins to aquatic species including steelhead. Low-impact development (LID) techniques will be employed where appropriate.
- AMM-GEN-46: Prior to construction, the Authority will prepare a flood protection plan. The HSR project is designed to remain in operation during flood events and to minimize increases in the 100- or 200-year flood elevations of the locale. This includes the use of native riparian plantings and other natural stabilization alternatives that would restore and

maintain a natural riparian corridor when using quarry stone or cobblestone in erosion control measures along rivers and streams. Review and coordination with NMFS on the flood protection plan will occur where bank stabilization is required in suitable habitat for listed species under NMFS jurisdiction.

- AMM-GEN-47: Prior to groundbreaking, a construction stormwater pollution prevention plan (SWPPP) will be prepared and implemented. The SWPPP would include incorporation of permeable surfaces into facility design where feasible and address how treated stormwater would be retained or detained onsite. Contamination of surface waters would be minimized by restricting fueling and other activities involving hazardous materials would to areas distant from surface water, daily equipment checks for leaks, and use of drip pans under stationary equipment. Current surface water quality would be maintained through the use of siltation fencing, wattle barriers, soil stabilized construction entrances, grass buffer strips, inlet protection, sediment traps, etc. Where and when feasible, construction will be limited to dry periods when waterbody flows are low or absent. A spill prevention and emergency response plan will also be developed and implemented as part of the SWPPP.
- AMM-GEN-48: Prior to the construction of any industrial-classed facility, the Authority would prepare and implement an industrial stormwater pollution prevention plan, as well as comply with existing water quality regulations and permits.
- AMM-GEN-49: The Authority would implement tunnel design features and construction methods that avoid or minimize hydrologic changes in groundwater supplies or surface water resources overlying the tunnel alignment.

### 1.3.5. Compensatory Mitigation

The Authority proposes to balance project objectives with minimizing impacts on waters of the United States (WOTUS) and other sensitive environmental resources, and has selected the preliminary Preferred Alternative route based on assessing the environmental impact of each proposed route. The Authority has also created a preliminary compensatory mitigation plan that identifies potential mitigation options to offset anticipated impacts on regulated WOTUS, and special-status species listed as threatened or endangered under the Federal ESA and/or the California Endangered Species Act, and certain non-listed special status species (Authority 2019a). The preliminary compensatory mitigation plan identifies options that would offset permanent, unavoidable losses of regulated waters and achieve a “no net loss” of wetlands as: 1) mitigation banks, 2) conservation banks, 3) in-lieu fee (ILF) programs, and/or 4) permittee-responsible mitigation. Permittee-responsible mitigation may include creation, restoration, enhancement, or preservation of suitable habitat. The components of the pCMP will undergo development and refinement as the Authority works with the wildlife agencies to complete the compensatory mitigation planning process. As this planning process progresses, the pCMP components will be used as the basis for development of a final compensatory mitigation plan.

The following is a proposed CM that applies to compensatory mitigation for steelhead impacts:

- **CM-FISH-1:** The Authority would provide compensatory mitigation for permanent impacts on habitat for CCC and SCCC steelhead that is commensurate with the type (spawning, rearing, migratory, or critical habitat) and amount of habitat lost as follows:

- Spawning aquatic and riparian habitat within critical habitat would be protected and restored or protected and enhanced at a minimum 3:1 ratio (protected: affected).
- All rearing and migratory aquatic and riparian habitat within critical habitat would be protected and restored or protected and enhanced at a minimum 2:1 ratio (protected: affected).
- All other rearing and migratory aquatic and riparian habitat outside critical habitat would be protected and restored or protected and enhanced at a minimum 1:1 ratio.

Unless agreed upon in coordination with NMFS, compensation would occur within the same DPS domain as the impact was incurred. Where feasible, on-site, in-kind mitigation would be prioritized. Off-site mitigation would prioritize actions recommended in local or regional conservation plans where there is coordination and approval by NMFS. Other options include the purchase of riparian and aquatic habitat credits at a NMFS-approved anadromous fish conservation bank or another NMFS-approved conservation option for the areal extent of riparian and suitable aquatic habitat affected by the proposed action.

The pCMP estimates that a total of 42 acres of mitigation need (31 acres of steelhead spawning, rearing, and migratory habitat and 11 acres of steelhead migratory and rearing habitat after temporary and permanent offset multipliers) will be incurred through the implementation of the Preferred Alternative/Alternative 4. At this time, the pCMP has identified that the mitigation banks that serve the impact area (Pajaro River Mitigation Bank and Sparling Ranch Conservation Bank) do not currently offer steelhead credits. The only in-lieu fee (ILF) program that could provide credits for the anticipated impacts to aquatic resources is the National Fish and Wildlife Foundation Sacramento District ILF Program, which covers the geographic area under jurisdiction of the USACE Sacramento District and is limited to the San Joaquin Valley; therefore this type of compensatory mitigation would also not be suitable to offset impacts to coastal steelhead.

The pCMP provides that the Authority would mitigate impacts to steelhead habitat on permittee-responsible mitigation sites. Regarding permittee-responsible mitigation, there are two properties under consideration that could offer benefit to the steelhead DPSs impacted by the proposed action -the Paxton property and the Montes property. Both properties have the potential to provide benefits to S-CCC steelhead that utilize the Pajaro River watershed if selected for restoration, establishment, or enhancement mitigation. The conservation actions that could occur on these properties may include the expansion of existing waterways, the creation and improvement of on-channel rearing and holding habitat, riparian expansion and restoration of channel complexity, sediment removal and erosion control, and the creation or improvement of backwater habitat. While the quantity of restoration and enhancement opportunities on these properties is unknown, the easement holders (The Nature Conservancy and the Santa Clara Valley Open Space Authority (SCVOSA)) are known to be interested and willing partners. Mitigation actions in this area would primarily contribute to improvements to migration and rearing habitat. Additionally, there may be on-site restoration and enhancement opportunities on Pacheco Creek, near Casa de Fruta, where permanent HSR ROW overlaps with the creek but no permanent construction would occur. There may also be opportunities to partner on restoration and enhancement of habitat on the Pacheco Preserve, a property held by the Santa Clara Valley

Habitat Agency (SCVHA (an interested partner in the region)). However, the pCMP describes potential mitigation at all of the sites described above as opportunities for habitat preservation, restoration, rehabilitation, and/or enhancement. The pCMP has not selected any site(s) on which the Authority proposes to mitigate impacts to steelhead habitat, nor has the pCMP described what specific actions the Authority proposes to mitigate impacts to steelhead habitat because it is unclear on which site(s) the Authority proposes to mitigate impacts to steelhead habitat, nor has the pCMP described when the Authority proposes any such actions would occur.

## **2. ENDANGERED SPECIES ACT: BIOLOGICAL OPINION AND INCIDENTAL TAKE STATEMENT**

The ESA establishes a national program for conserving threatened and endangered species of fish, wildlife, plants, and the habitat upon which they depend. As required by section 7(a)(2) of the ESA, each Federal agency must ensure that its actions are not likely to jeopardize the continued existence of endangered or threatened species, or adversely modify or destroy their designated critical habitat. Per the requirements of the ESA, Federal action agencies consult with NMFS and section 7(b)(3) requires that, at the conclusion of consultation, NMFS provide an opinion stating how the agency's actions would affect listed species and their critical habitats. If incidental take is reasonably certain to occur, section 7(b)(4) requires NMFS to provide an ITS that specifies the impact of any incidental taking and includes non-discretionary reasonable and prudent measures (RPMs) and terms and conditions to minimize such impacts.

The Authority also determined the proposed action is not likely to adversely affect California Central Valley (CCV) steelhead or its critical habitat. Our concurrence is documented in the "Not Likely to Adversely Affect" Determinations section (section 2.12).

### **2.1. Analytical Approach**

This biological opinion includes both a jeopardy analysis and an adverse modification analysis. The jeopardy analysis relies upon the regulatory definition of "jeopardize the continued existence of" a listed species, which is "to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species" (50 CFR 402.02). Therefore, the jeopardy analysis considers both survival and recovery of the species.

This biological opinion relies on the definition of "destruction or adverse modification," which "means a direct or indirect alteration that appreciably diminishes the value of critical habitat as a whole for the conservation of a listed species" (50 CFR 402.02).

The designations of critical habitat for listed species addressed in this opinion use the term primary constituent element (PCE) or essential features. The 2016 critical habitat regulations (50 CFR 424.12) replaced this term with physical or biological features (PBFs). The shift in terminology does not change the approach used in conducting a "destruction or adverse modification" analysis, which is the same regardless of whether the original designation identified PCEs, PBFs, or essential features. In this biological opinion, we use the term PBF to mean PCE or essential feature, as appropriate for the specific critical habitat.

The 2019 regulations define effects of the action using the term "consequences" (50 CFR 402.02). As explained in the preamble to the regulations (84 FR 44977), that definition does not change the scope of our analysis and in this opinion we use the terms "effects" and "consequences" interchangeably.

We use the following approach to determine whether a proposed action is likely to jeopardize listed species or destroy or adversely modify critical habitat:

- Evaluate the rangewide status of the species and critical habitat expected to be adversely affected by the proposed action.
- Evaluate the environmental baseline of the species and critical habitat.
- Evaluate the effects of the proposed action on species and their habitat using an exposure-response approach.
- Evaluate cumulative effects.
- In the integration and synthesis, add the effects of the action and cumulative effects to the environmental baseline, and, in light of the status of the species and critical habitat, analyze whether the proposed action is likely to: (1) directly or indirectly reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species, or (2) directly or indirectly result in an alteration that appreciably diminishes the value of critical habitat as a whole for the conservation of a listed species.
- If necessary, suggest a reasonable and prudent alternative to the proposed action.

## **2.2. Rangewide Status of the Species and Critical Habitat**

This opinion examines the status of each species that would be adversely affected by the proposed action. The status is determined by the level of extinction risk that the listed species face, based on parameters considered in documents such as recovery plans, status reviews, and listing decisions. This informs the description of the species' likelihood of both survival and recovery. The species status section also helps to inform the description of the species' "reproduction, numbers, or distribution" as described in 50 CFR 402.02 (see Table 1 for a description of species, ESA listing classifications, and summary of species status). The opinion also examines the condition of critical habitat throughout the designated area, evaluates the conservation value of the various watersheds and coastal and marine environments that make up the designated area, and discusses the function of the PBFs that are essential for the conservation of the species (see Table 2 for a description of designated critical habitat, designation date and notice, and status summary).

More detailed CCC steelhead DPS and critical habitat listing information can be found at [NOAA Fisheries West Coast Region's protected species CCC steelhead page](#), and more detailed information concerning S-CCC steelhead DPS and their critical habitat listing information can be found at [NOAA Fisheries West Coast Region's protected species S-CCC steelhead page](#).

Table 1. Description of species, ESA listing classifications, and summary of species status.

Species	Listing Classification and Federal Register Notice	Status Summary
<p>Central California Coast steelhead (anadromous <i>O. mykiss</i>) DPS</p>	<p>Original: Threatened, 62 FR 43937, August 18, 1997</p> <p>Current: Threatened, 71 FR 834, January 5, 2006</p>	<p>The CCC steelhead DPS range includes all naturally spawned populations of steelhead in streams from the Russian River (inclusive) to Aptos Creek (inclusive), and the drainages of San Francisco, San Pablo, and Suisun Bays eastward to Chipps Island at the confluence of the Sacramento and San Joaquin Rivers (71 FR 834, (NMFS 2016c)). This excludes the Sacramento-San Joaquin River Basin. Two artificial propagation programs are also considered to be part of the DPS: the Don Clausen Fish Hatchery and Kingfisher Flat Hatchery steelhead hatchery programs (71 FR 834, (NMFS 2016b)). As of 2016, the Don Clausen Hatchery was still in operations producing steelhead juveniles while Kingfisher Flat Hatchery operations had not occurred since 2014.</p> <p>Historically, approximately 70 populations supported the CCC steelhead DPS, with a possible abundance of nearly 100,000 spawning adults throughout its range, but since near the end of the 20<sup>th</sup> century substantial ubiquitous declines have been observed. Currently, the largest population (Russian River) may only see up to 7,000 adult returns while it is more common for most streams to host only 500 fish or less (NMFS 2016c). Their largescale decline has been attributed to a variety of factors but was primarily due to large-scale habitat degradation, historical overfishing, artificial propagation, and periodic climatic events like extended drought and poor ocean conditions. In 2016, a final recovery plan was completed for multiple coastal salmonid species, including CCC steelhead, and a recovery priority number of ‘5’ was assigned to this DPS (NMFS 2016b, c, d). Recovery numbers are assigned based on a combination of the species’ demographic risk and their recovery potential, and lower recovery priority numbers indicate higher priority in recovery plan development and implementation.</p> <p>According to the NMFS 5-year species status review (NMFS 2016b), the status of the CCC steelhead DPS has not changed since 2011, as updated information did not indicate a change in the biological risk category in either direction. The scarcity of CCC steelhead population abundance time-series data continues to hinder trend detection attempts. Steelhead still occur in the North Coastal and Interior strata and, based on more recent information, perhaps the population of the Santa Cruz Mountain stratum is larger than previously thought. However, hatchery-origin fish remain more prevalent than natural-origin fish in the Russian River, and an overall downward abundance trend was observed in one of the more robust populations, Scott Creek. Small fish passage improvement and habitat restoration projects have improved habitat conditions locally; however, the DPS still faces threats throughout the region from both legacy degradation and modification, as well as new urban growth, continued water diversions, and dams (NMFS 2016b).</p>

Species	Listing Classification and Federal Register Notice	Status Summary
South-Central California Coast (S-CCC) steelhead (anadromous <i>O. mykiss</i> ) DPS	<p>Original: Threatened, 62 FR 43937, August 18, 1997</p> <p>Current: Threatened, 71 FR 834, January 5, 2006</p>	<p>The S-CCC steelhead DPS range includes all naturally spawned steelhead populations in streams from the Pajaro River watershed in Santa Clara County in the north (inclusive) to, but not including, the Santa Maria River watershed in Santa Barbara County in the south. The freshwater-resident forms of <i>O. mykiss</i> (rainbow trout) also occur in these watersheds, frequently co-occur in the same river systems, and residents above and below impassable barriers are each other's closest relatives (Clemento et al. 2009, Pearse et al. 2014). Rainbow trout are not included in the S-CCC steelhead DPS. However, rainbow trout parents can produce anadromous offspring (Courter et al. 2013) and supplement the population of the anadromous form in that aspect. Resident populations can also be regarded as important reserves that will conserve the native genetic material of anadromous <i>O. mykiss</i> in the watersheds until the environment can better support anadromy.</p> <p>The historical annual run sizes were estimated at 27,000 adults in major watersheds near the turn of the century; however, now several thousand returning adults for the entire DPS would be considered a promising year (NMFS 2016c). A number of factors lead NMFS to listing S-CCC steelhead as threatened in 1997, including substantial declines to individual populations, the loss of freshwater and estuarine habitat, periodic poor ocean conditions, and a variety of land-use practices that have caused negative impacts at watershed scales (NMFS 2016a). In 2013, a final recovery plan was completed for the DPS and a recovery priority number of '3' was assigned (NMFS 2013).</p> <p>According to the NMFS 5-year species status review (NMFS 2016a), the status of the S-CCC steelhead DPS has likely remained the same since the 2010 5-year review as there was little evidence to indicate a change in either direction. Based on available information, annual runs that are currently being monitored across a limited but diverse set of basins within the range of the DPS are generally characterized as small (&lt;10 fish) but surprisingly persistent. The Carmel River is the only watershed with available long-term monitoring data and a greater abundance that may enable trend detection, as the entire DPS suffers from the lack of comprehensive monitoring in all other streams and no new data has otherwise been made available. A decline has been noted in the Core 1 Carmel River population, a trend likely exacerbated by an extended drought and the influence of released hatchery-reared juvenile <i>O. mykiss</i>. However, the implementation of several habitat-restoring recovery actions may be bolstering abundance as habitat components and access to high quality stream reaches are improved (discussed in the critical habitat section, Table 2).</p>

Table 2. Description of designated critical habitat, designation date and notice, and status summary.

Critical Habitat	Designation Date and Federal Register Notice	Description
CCC steelhead critical habitat	70 FR 52488, September 2, 2005	<p>Designated critical habitat for CCC steelhead includes a total of 1,465 miles of stream habitat and 386 square miles of estuarine habitat in 46 watersheds (70 FR 52488). This encompasses most, but not all, occupied habitat but excludes some occupied habitat based on economic considerations within its range: Russian River 5<sup>th</sup> Field HUC 1114, Bodega 5<sup>th</sup> Field HUC 1115, Marin Coastal 5<sup>th</sup> Field HUC 2201, San Mateo 5<sup>th</sup> Field HUC 2202, Bay Bridges 5<sup>th</sup> Field HUC 2203, Santa Clara 5<sup>th</sup> Field HUC 2205, San Pablo 5<sup>th</sup> Field HUC 2206, and Big Basin 5<sup>th</sup> Field HUC 3304. Critical habitat includes the stream channels in the designated stream reaches and the lateral extent as defined by the ordinary high-water line. In areas where the ordinary high-water line has not been defined, the lateral extent will be defined by the bankfull elevation (70 FR 52488).</p> <p>PBFs include: Freshwater spawning habitat; freshwater rearing habitat; freshwater migration corridors; and estuarine areas.</p> <p>Degraded habitat conditions were one of the primary factors for listing the DPS and all life stages of CCC steelhead are still currently impaired by lack of complexity/shelter (in-stream large woody material (LWM)), high sediment loads, degraded water quality, lack of winter refugia, and reduced access to historic spawning and rearing habitats (NMFS 2016b, c). Habitat conditions are the most degraded in the Santa Cruz Mountains and San Francisco Bay strata. Restoration of steelhead habitat, including fish passage improvements, water conservation, and improvement of instream features has occurred periodically and improved critical habitat functionality, but only in those limited areas (NMFS 2016d). Notably, the development of the 2014 Groundwater Sustainability Management Act is expected to help alleviate the over extraction of aquifers upon which cold water fisheries such as CCC steelhead depend, though it may be some time before beneficial effects are seen. Additionally, the 2016 Adult Use of Marijuana Act legalized the farming of marijuana and is expected to reduce the number of illegal growing operations, reducing the prevalence of destructive marijuana farming on CCC steelhead critical habitat and a portion of the tax revenue paid from legal sales are allocated for environmental damage cleanup.</p>

Critical Habitat	Designation Date and Federal Register Notice	Description
S-CCC steelhead critical habitat	70 FR 52488, September 2, 2005	<p>Designated critical habitat for S-CCC steelhead includes a total of 1,249 miles of stream habitat and three square miles of estuarine habitat in 28 watersheds (NMFS 2013). This encompasses most, but not all, occupied habitat but excludes some occupied habitat based on economic considerations and all military lands within its range: Pajaro River 5<sup>th</sup> Field HUC 3305, Carmel River 5<sup>th</sup> Field HUC 3307, Santa Lucia 5<sup>th</sup> Field HUC 3308, Salinas River 5<sup>th</sup> Field HUC 3309, and Estero Bay 5<sup>th</sup> Field HUC 3310. Critical habitat includes the stream channels in the designated stream reaches and the lateral extent as defined by the ordinary high-water line. In areas where the ordinary high-water line has not been defined, the lateral extent will be defined by the bankfull elevation (70 FR 52488).</p> <p>PBFs include: Freshwater spawning habitat; freshwater rearing habitat; freshwater migration corridors; and estuarine areas.</p> <p>The destruction, modification, and curtailment (blockage) of habitat was a primary cause for the decline of the S-CCC population and a reason for its listing. Many watersheds designated critical habitat still contain high-quality spawning and rearing habitat but are compromised by one or more anthropogenic factors, such as: dams and surface water diversions, groundwater extractions, levees and channelization, recreational facilities, urban development, roads and culverts that block access, agricultural development, non-point source pollution, and mining. While some historical threats have subsided, the historical damage has remained and is the primary reason the DPS remains threatened (NMFS 2016a). Any remaining freshwater and estuarine habitat still accessible to the DPS containing PBFs is considered to have a high intrinsic value to the recovery of the species.</p> <p>A number of recovery actions have been undertaken which could potentially lead to a future increase in individual populations as habitat conditions improve in these watersheds. Major actions include the removal of the San Clemente Dam and improved passage on the Carmel River, water releases from Uvas Dam to improve downstream habitat, modified water releases from Pacheco Dam in Pacheco Creek to improve flow conditions during critical periods, the river restoration associated with the Salinas River Multi-Demonstration project, and the removal of non-native invasive species and restoration efforts in Chorro Creek, San Luis Obispo Creek, Santa Rosa Creek, Pismo Creek, Coon Creek, Walters Creek, and Pennington Creek (NMFS 2013, 2016a).</p>

### 2.2.1. Global Climate Change

Another factor affecting the rangewide status of CCC and S-CCC steelhead, and the aquatic habitats upon which they depend, is climate change. Impacts from global climate change are already occurring in California. For example, average annual air temperatures, heat extremes, and sea level have all increased in California over the last century (Kadir et al. 2013). While snow melt from the Sierra Nevada has declined, total annual precipitation amounts have shown no discernable change (Kadir et al. 2013). CCC and S-CCC steelhead may have already experienced some detrimental impacts from climate change especially during extended drought. NMFS believes the impacts on listed salmonids to date are likely fairly minor because natural, and local, climate factors likely still drive most of the climatic conditions steelhead experience, and many of these factors have much less influence on steelhead abundance and distribution than human disturbance across the landscape. In addition, CCC and S-CCC steelhead are generally not dependent on snowmelt driven streams like the CCV steelhead DPS, and thus are not expected to be directly adversely affected by changes to snow pack.

The threat to the existence of CCC and S-CCC steelhead from global climate change will increase in the future. Modeling of climate change impacts in California suggests that average summer air temperatures are expected to continue to increase (Lindley et al. 2007, Moser et al. 2012). Heat waves are expected to occur more often, and heat wave temperatures are likely to be higher (Hayhoe et al. 2004, Moser et al. 2012, Kadir et al. 2013, Bedsworth et al. 2018). Total precipitation in California may decline while critically dry years may increase (Lindley et al. 2007, Moser et al. 2012, McClure et al. 2013, Bedsworth et al. 2018). Wildfires are also expected to increase in frequency and magnitude (Westerling et al. 2006, Westerling and Bryant 2007, Allen et al. 2010, Westerling et al. 2011, Moser et al. 2012, Bedsworth et al. 2018).

In the San Francisco Bay region<sup>1</sup>, warm temperatures generally occur in July and August, but as climate change takes hold, the occurrences of these events will likely begin in June and could continue to occur in September (Cayan et al. 2012). Climate simulation models project that the San Francisco region will maintain its Mediterranean climate regime, but experience a higher degree of variability of annual precipitation during the next 50 years and years that are drier than the historical annual average during the middle and end of the twenty-first century. The greatest reduction in precipitation is projected to occur in March and April, with the core winter months remaining relatively unchanged (Cayan et al. 2012).

Estuaries, including seasonally closed lagoons, may also experience changes detrimental to the survival and success of salmonids. Estuarine productivity is likely to change based on changes in freshwater flows, nutrient cycling, and sediment amounts (Scavia et al. 2002, Ruggiero et al. 2010). Continued sea level rise (0.42 to 1.67 meters by 2100) is expected to cause sandbars to form farther inland which can affect the amount of time the lagoon is connected to the ocean (Dalrymple et al. 2012, Rich and Keller 2013). In marine environments, ecosystems and habitats important to juvenile and adult salmonids are likely to experience changes in temperatures,

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<sup>1</sup> Both the San Francisco Bay and San Jose regions exhibit similar Mediterranean climate patterns. The action area is located within the Pacheco Pass to San Jose regions.

circulation, water chemistry, and food supplies (Feely et al. 2004, Osgood 2008, Abdul-Aziz et al. 2011, Doney et al. 2012, Turley 2018). The projections described above are for the mid to late 21<sup>st</sup> Century. In shorter time frames, climate conditions not caused by the human addition of carbon dioxide to the atmosphere are more likely to predominate (Cox and Stephenson 2007, Santer et al. 2011).

### **2.3. Action Area**

“Action area” means all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR 402.02). The San Jose to Central Valley Wye HSR project extent begins at the existing San Jose Diridon train station on Scott Boulevard in Santa Clara, Santa Clara County, California. From there it extends south to Gilroy Station in Gilroy, California, and dips down briefly into San Benito County before turning east and tunneling into and under the Diablo Mountain Range near the San Luis Reservoir in Merced County. The route emerges near Santa Nella in Merced County and the project section ends at its connection with the CV Wye section of the HSR project at Carlucci Road in unincorporated Merced County (Figure 1, Figure 4). The action area includes all areas containing the HSR route alignment and features (the railway, embankments, aerial viaducts, trenches, and tunnels); new stations or station upgrades; parking lots; a maintenance-of-way facility (near Turner Island Road near Gilroy); all ancillary features (traction power substations, switching/paralleling stations, and communication/control stations); the necessary electrical interconnections, infrastructure, and upgrades; general network upgrades; wildlife crossings; all necessary modifications to existing highway, roads, and other railways; all HSR permanent and temporary ROW; and all temporary and permanent access roads. All GPS locations provided are approximate.

There are approximately 50 crossings that are expected to have some amount of interactions with species or habitats under NMFS jurisdiction (Figure 5 & 6) and approximately 32 crossings associated with some amount of overwater infrastructure (Figure 6), though many of these interactions or ‘crossings’ are associated with the high voltage connection lines or the proposed access roads and easements. The proposed route (EIR/EIS Preferred Alternative 4) will be examined from east (closest to the connection in the CCV) to west, as if traveling the proposed route. There are approximately seven under-/overcrossings of the route in the upper Pacheco Creek as the HSR route transitions from running underground in a tunnel to tunnel portals to running on an elevated viaduct, before entry into a second shorter tunnel. The first and longer tunnel originating from the CCV begins to interact with S-CCC steelhead watersheds in upper Pacheco Creek near Highway 152 by running underneath and alongside the stream when the route emerges from tunnel portals (Figure 7, Figure 8, and Figure 9). As Pacheco Creek meanders, the elevated viaduct will cross over the streambed several times (Figure 10, Figure 11); however, the exact placement of the supports in or around the streambed is unresolved at this time and the amount of route footprint that overlaps the streambed may increase or decrease as construction designs evolve and finalize. While this specific information is not available, NMFS is able to adequately assess the effects from support placement based on the following aspects of the proposed action.

- The Authority will adhere to their proposed commitment in AMM-FISH-1 to minimize placement of footings and columns within active streambed channels of steelhead critical habitat
- Final design decisions on footing and column placement in and around steelhead waterways will be made with NMFS technical assistance and input to minimize permanent harm to habitat functionality
- The Authority has the design expertise and capability to execute the agreed upon placements

There will likely be some crossings in which footing and columns unavoidably occupy and therefore would be expected to alter stream and sediment dynamics. A general analysis of artificial structure placement in and over waterways is included in this opinion in the effects analysis section 2.5.2.3.

The route over-crossings with major overwater structures expected to interact with species and habitats under NMFS jurisdiction are:

- 1) the elevated HSR viaduct between the two tunneling section near Casa de Fruta and Pacheco Pass Highway/Route 152 that crosses Pacheco Creek (36.984279, -121.382525, Figure 12 and Figure 13);
- 2) a second crossing of Pacheco Creek at lower elevation in the Santa Clara Valley (36.960575, -121.447664, Figure 14 and Figure 15);
- 3) a crossing over Tequisquita Slough (36.959881, -121.452624, Figure 14 and Figure 15);
- 4) a crossing over Miller Canal (36.957067, -121.501305, Figure 16 and Figure 17);
- 5) a crossing over Pajaro River mainstem (36.959315, -121.510344, Figure 16 and Figure 18);
- 6) a crossing over Llagas Creek (37.095616, -121.616306, Figure 20 and Figure 21);
- 7) a crossing over Guadalupe River (37.316871, -121.888413, Figure 23 and Figure 24), and
- 8) a crossing over Los Gatos Creek (37.323550, -121.902557, Figure 23 and Figure 25).

The route also gets close to Uvas Creek (36.964469, -121.532924, Figure 19) and Coyote Creek (37.225572, -121.749263, Figure 22) at its confluence with Fisher Creek. Though the HSR route does not cross these waterbodies, there may be some indirect or auxiliary interaction between the project and species or habitat under NMFS jurisdiction, and they are considered part of the action area until increased project design resolution shows otherwise. Waterways downstream of this action are also considered within its action area to the extent that water quality control monitoring can detect changes in turbidity or pollution from construction or operational stormwater discharges. Sections outside of the San Jose to Merced Project Section will be analyzed in their own biological opinions (Authority 2020c) as those sections are submitted to NMFS for review and will not be contained here, though all sections must be completed for the HSR system to achieve one of its purposes in connecting the major metropolitan and urban areas of the state of California.

The action area would also include any mitigation banks, conservation banks, or any areas restored through the payment of ILFs or permittee-responsible areas restored, or funded by the

Authority, to offset unavoidable adverse effects to special status species or habitats in this section. Since there are no NMFS-approved mitigation banks that offer steelhead or appropriate habitat type credits for the impacted DPSs that also include the action area of the project within their service areas, and there is no in-lieu fee program locations identified that could provide credits suitable to offset impacts to coastal steelhead, the Authority expects to conduct permittee responsible restoration to offset unavoidable impacts to steelhead and their habitats (Authority 2019a). As described in section 1.3.5 of this opinion (Proposed Federal Action/Compensatory Mitigation), while the preliminary compensatory mitigation plan is being drafted and includes several locations where there are opportunities for compensatory mitigation, the pCMP has not selected any site(s) on which the Authority proposes to mitigate impacts to steelhead habitat. Therefore, it is unclear what areas would be affected by proposed the compensatory mitigation component of the proposed action. In the future, when a site(s) for compensatory mitigation is confirmed, reinitiation of consultation may be warranted to analyze the effects of the compensatory mitigation portion of this proposed action, and at that time the action area will be revised to include the identified mitigation site, *or* the restoration component of the compensatory mitigation could be included under NOAA Restoration Center's programmatic approach for fisheries habitat restoration projects in California Coastal counties (NMFS 2017) if a United States Army Corps of Engineers Clean Water Act section 404 permit is required, and ESA section 7 review would occur through that programmatic opinion process.

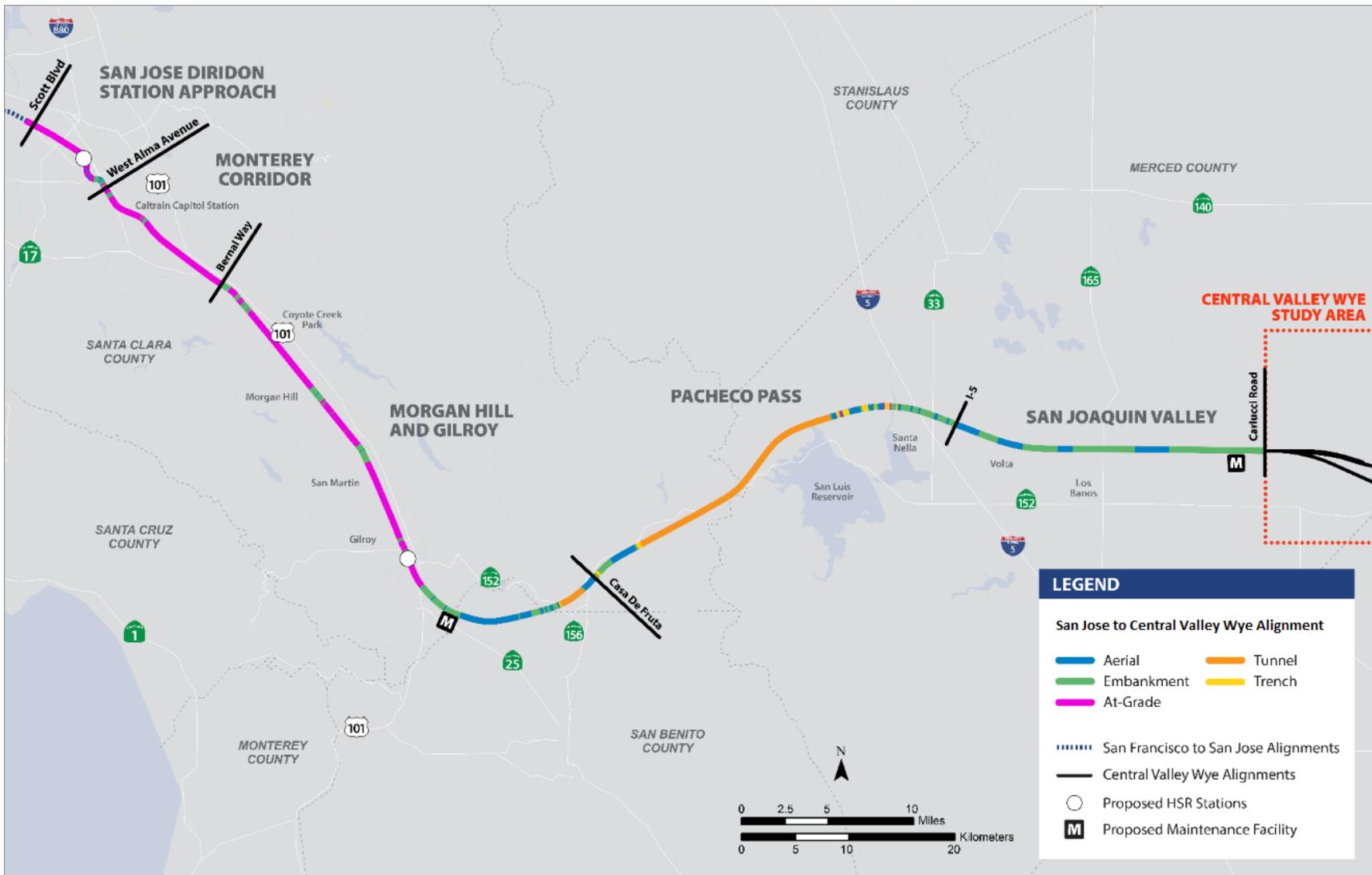


Figure 4. San Jose to Merced HSR Project Section (Scott Blvd to Carlucci Rd) alignment in greater detail, displaying the different track/infrastructure types proposed (aerial structure in blue, embankment support in green, at-grade route in magenta, tunneling in orange, and trench in yellow). The proposed location of a heavy maintenance facility is a black-blocked “M” (Authority 2020c).

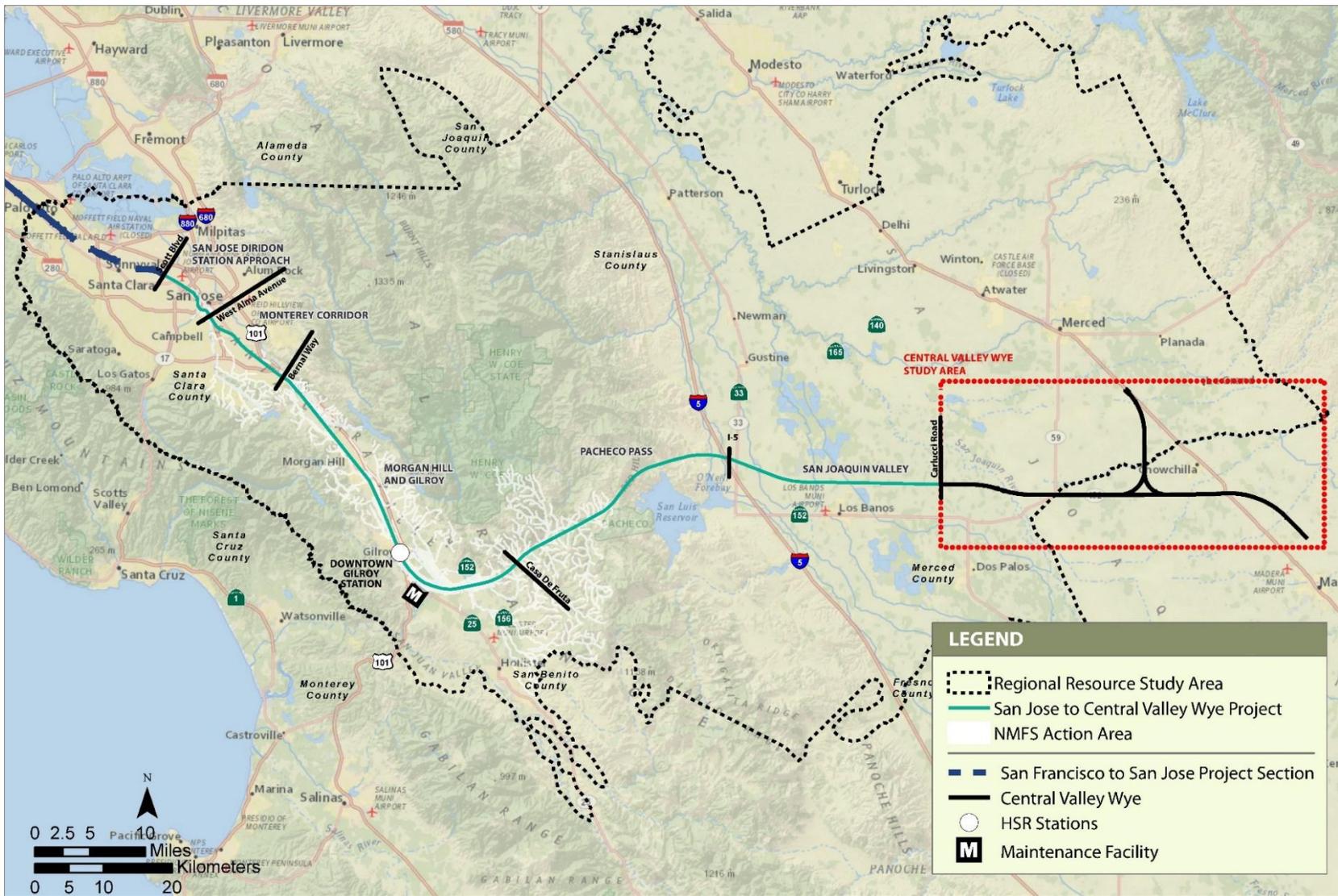


Figure 5. HSR Authority proposed NMFS action area (steelhead model: white stream segments) (Authority 2020c). However, the white area in the figure, which is described as the NMFS Action Area in the legend, does not include all areas described as the action area in this opinion.

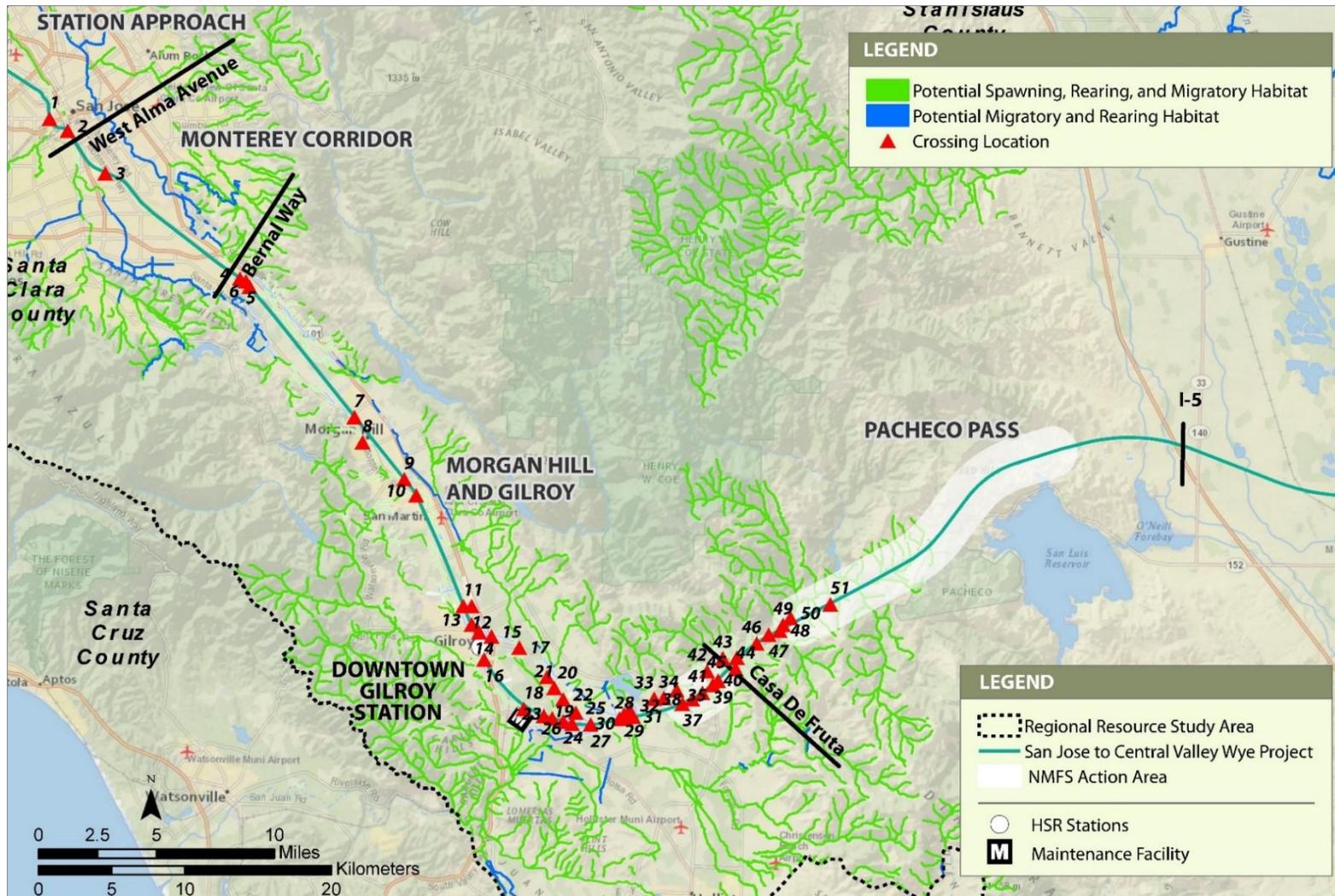


Figure 6. Map of locations where the proposed San Jose to Merced HSR route crosses waterbodies containing potential steelhead habitat (red triangles); however, some are waterways above the tunneled section (white outline) (Authority 2020c). The white area in the figure, which is described as the NMFS Action Area in the legend, does not include all areas described as the action area in this opinion.

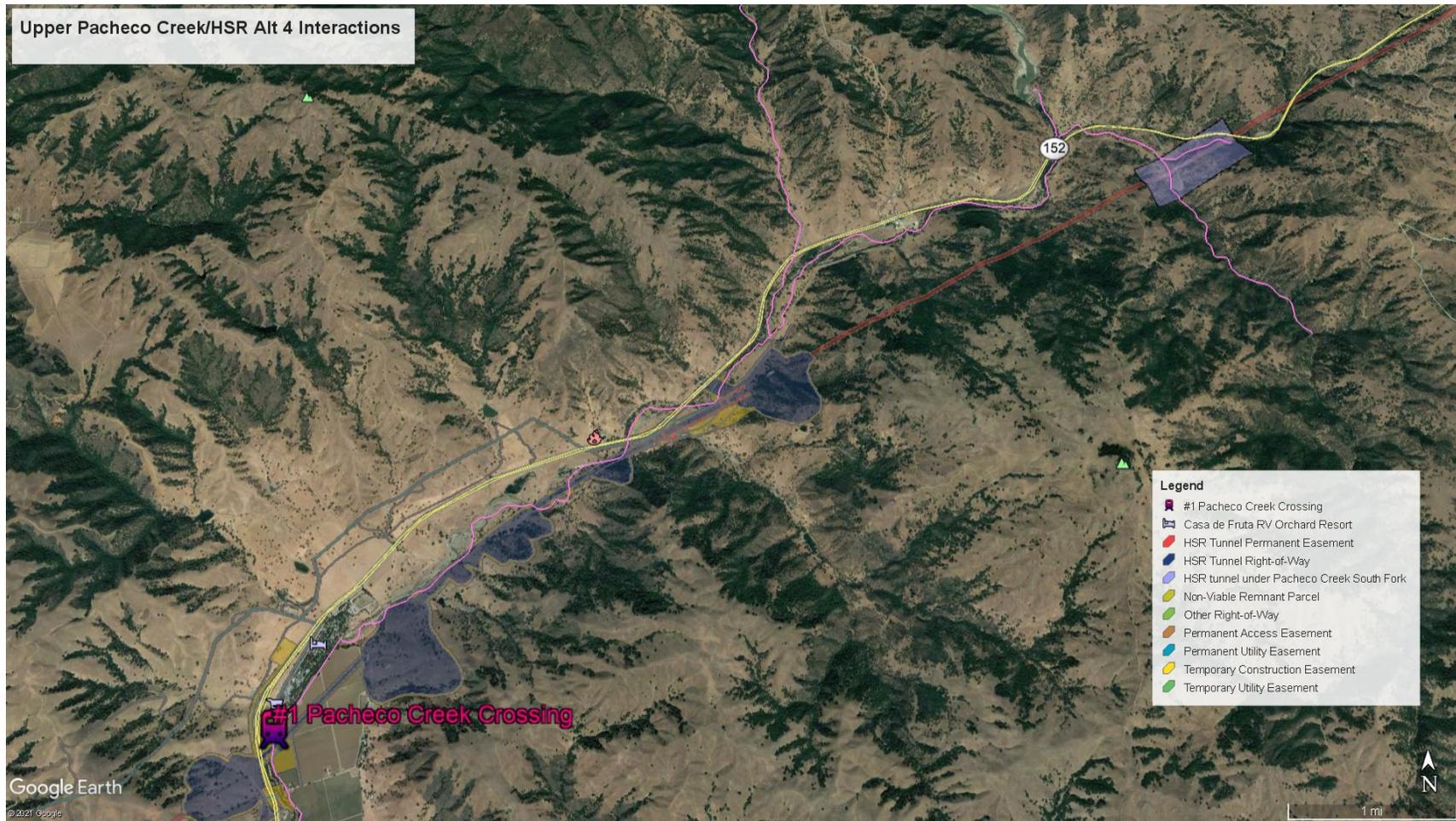


Figure 7. Overview of HSR Alternative 4 route planned for the upper Pacheco Creek tunneling (under-crossings), tunnel portal, and viaducts (overcrossings: Pacheco Creek Crossing #1) in relation to S-CCC steelhead designated critical habitat (pink) before the second tunnel.

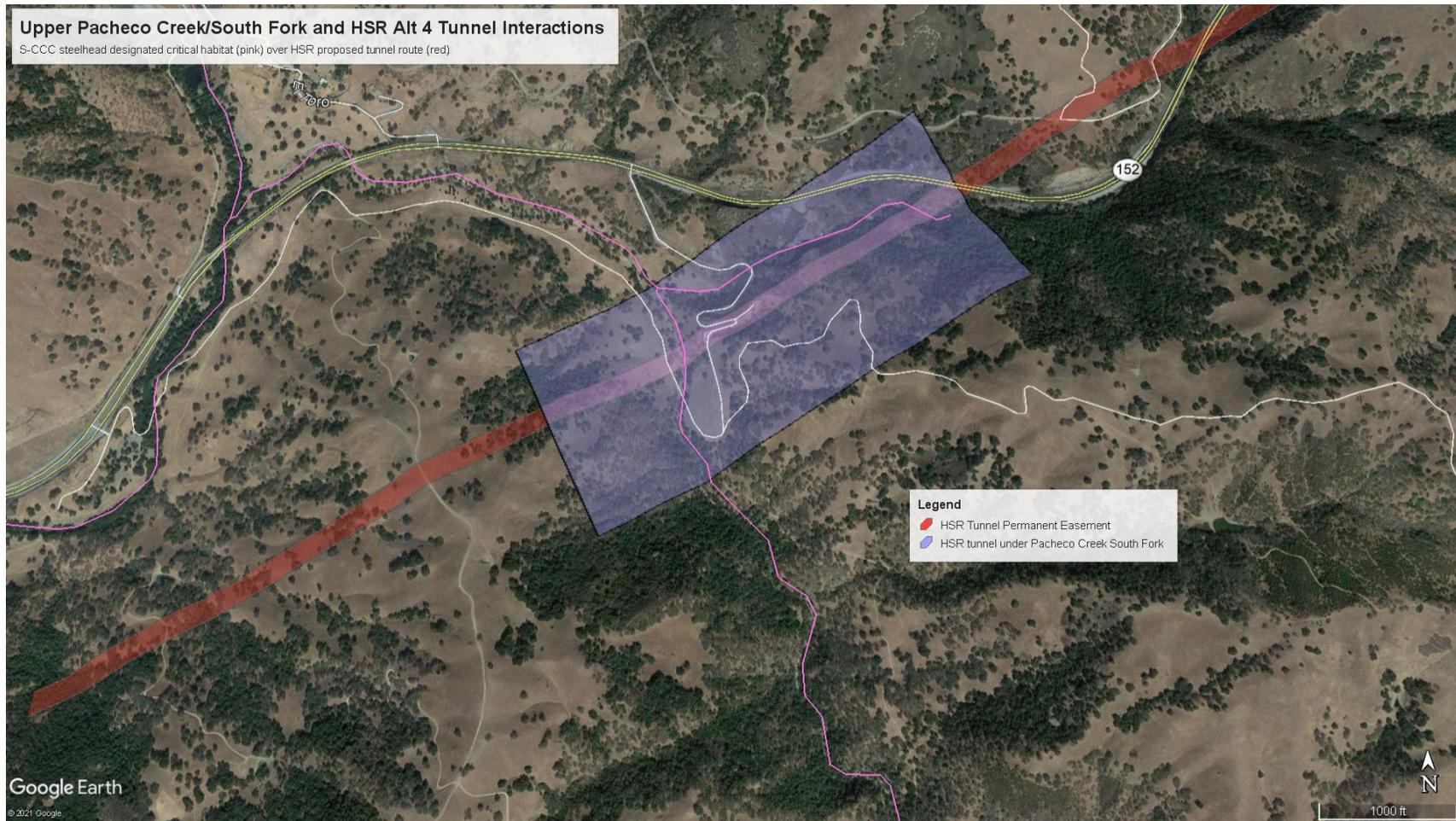


Figure 8. Close-up of HSR Alternative 4 route planned for the upper Pacheco Creek tunneling under-crossings (red) of Pacheco Creek mainstem and South Fork Pacheco Creek in relation to S-CCC steelhead designated critical habitat (pink line and pink layer) near Highway 152.

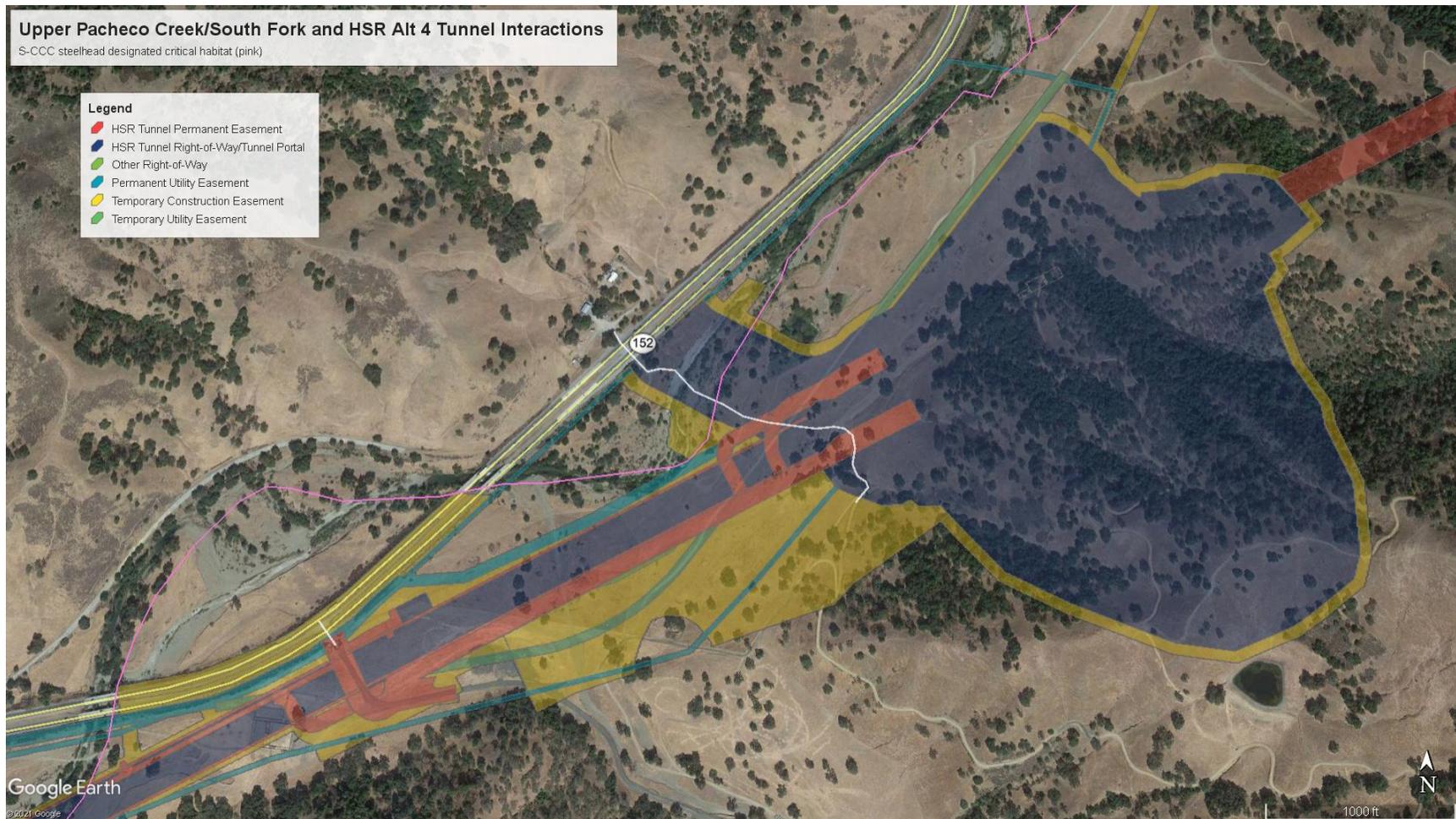


Figure 9. Most eastern tunnel portal and land stabilization area (dark blue) with permanent access from Highway 152 as tunnel transitions to viaduct in relation to S-CCC designated critical habitat in Pacheco Creek (pink line). Yellow layers indicate temporary construction easements, and teal layers indicate electrical interconnections.

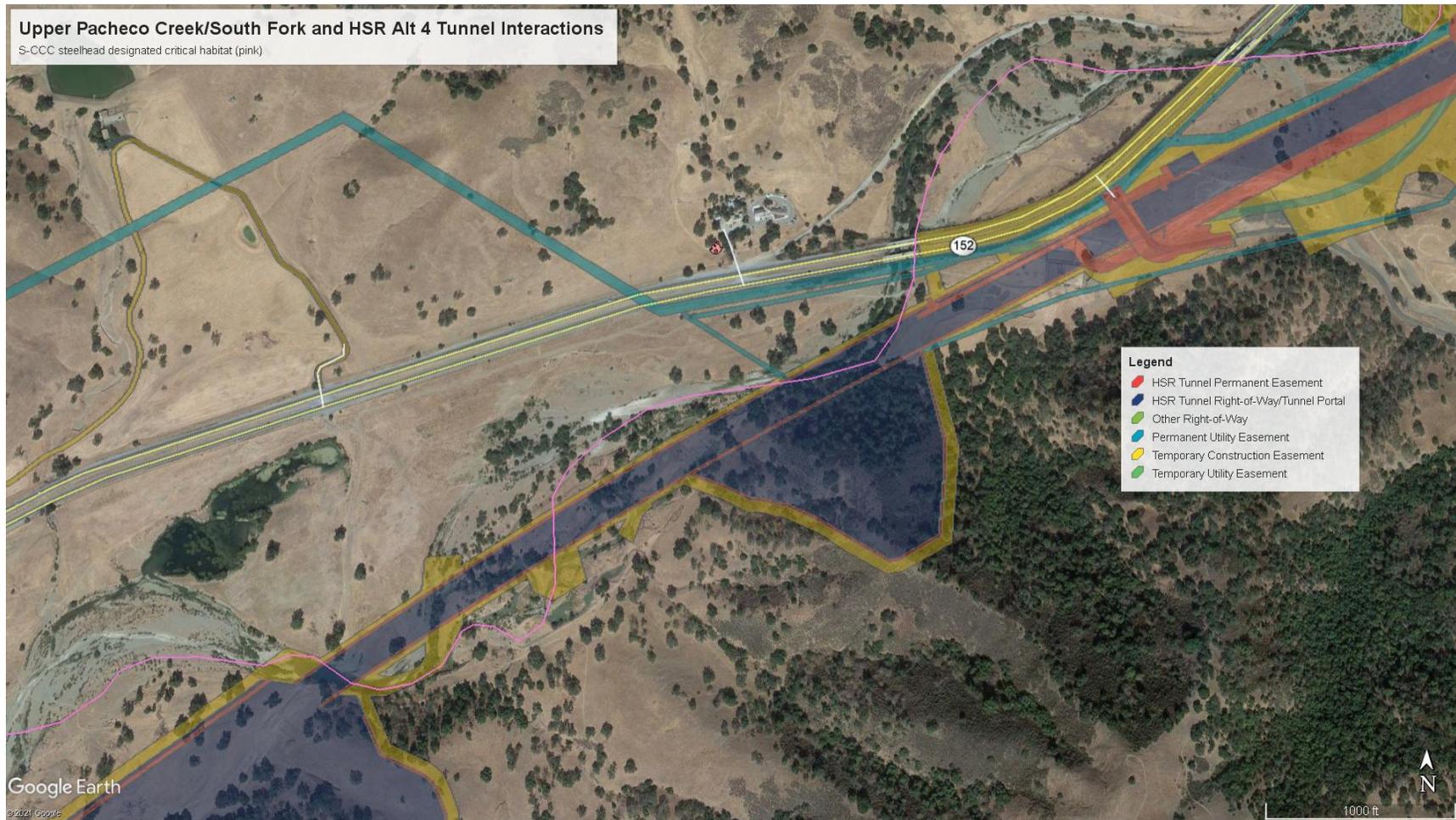


Figure 10. Close up of HSR elevated viaduct and slope stabilization ROW (dark blue) with temporary construction easement estimates (yellow) relative to S-CCC steelhead designated critical habitat in Pacheco Creek (pink line), across from fire station and upstream from Casa de Fruta and overcrossing #1 and downstream from tunnel portal transition. Teal layers indicate electrical interconnections.

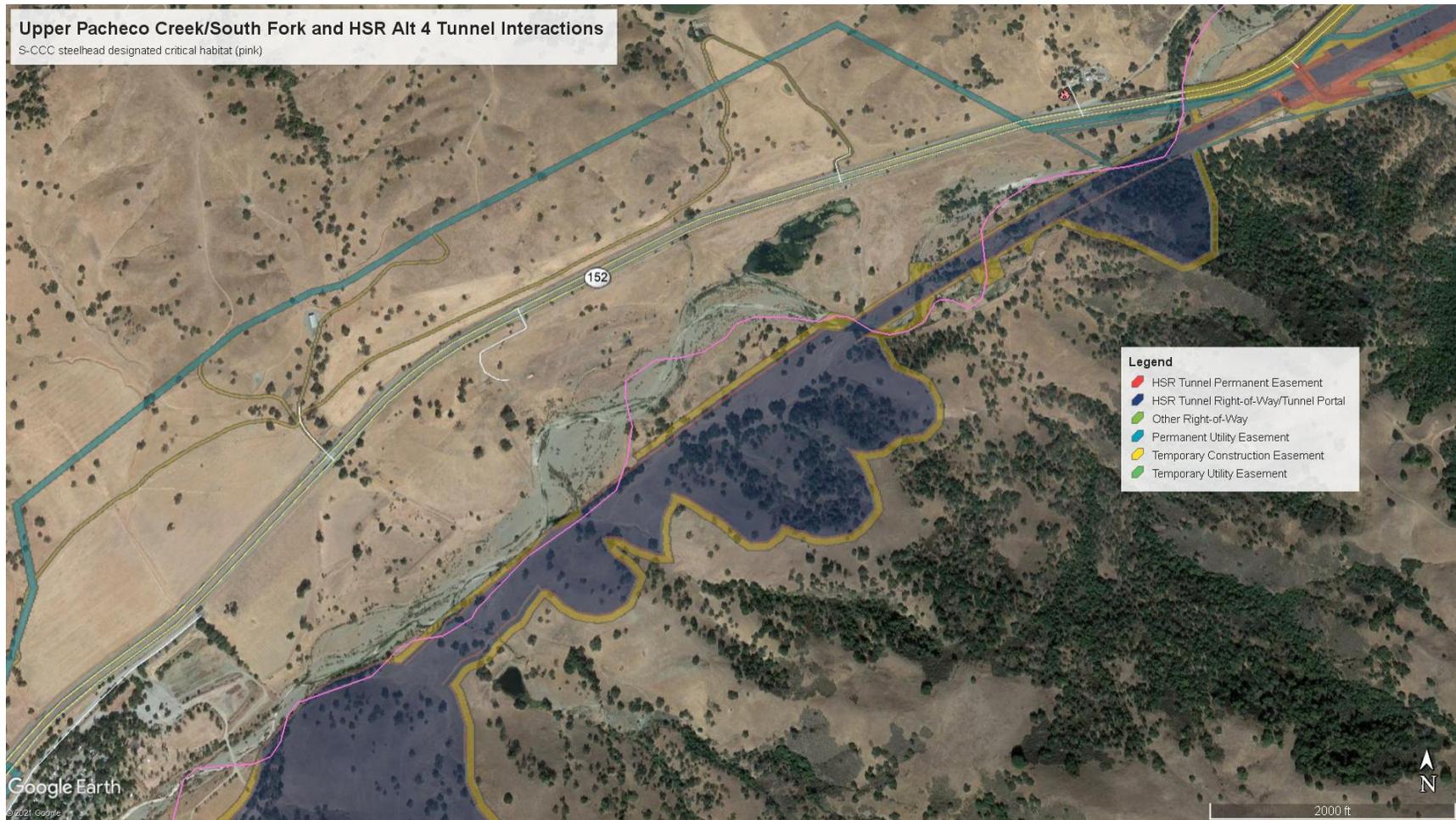


Figure 11. HSR elevated viaduct and slope stabilization ROW (dark blue) with temporary construction easement estimates (yellow) relative to S-CCC steelhead designated critical habitat in Pacheco Creek (pink line), upstream from Casa de Fruta and overcrossing #1 and downstream from tunnel portal transition. Teal layers indicate electrical interconnections.

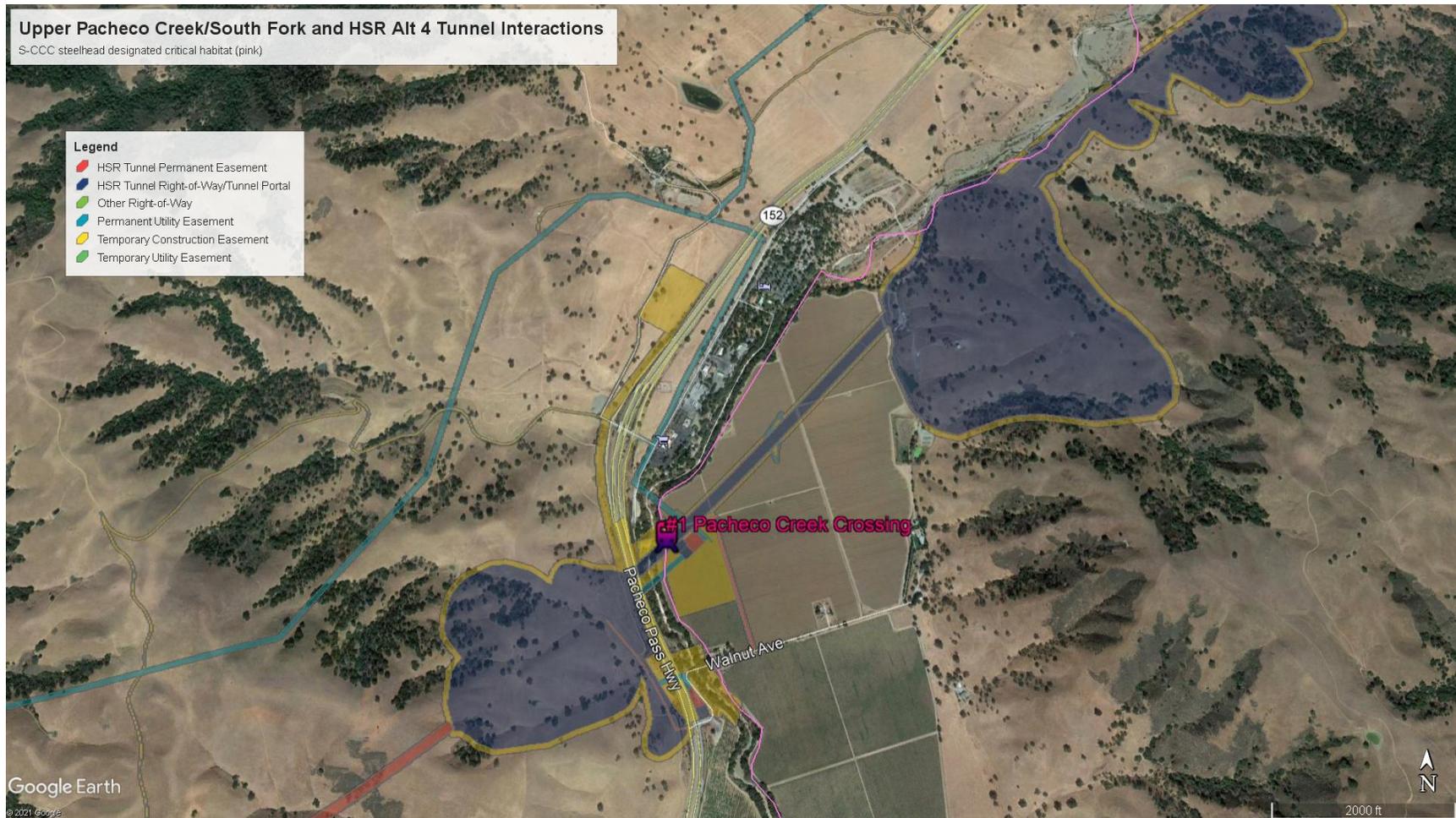


Figure 12. Pacheco Creek Crossing #1 HSR elevated viaduct and slope stabilization ROW (dark blue) with temporary construction easement estimates (yellow) relative to S-CCC steelhead designated critical habitat in Pacheco Creek (pink line), just downstream from Casa de Fruta (bed and shopping cart icon) and before tunnel portal transition to second tunnel (red). Electrical interconnections in teal.

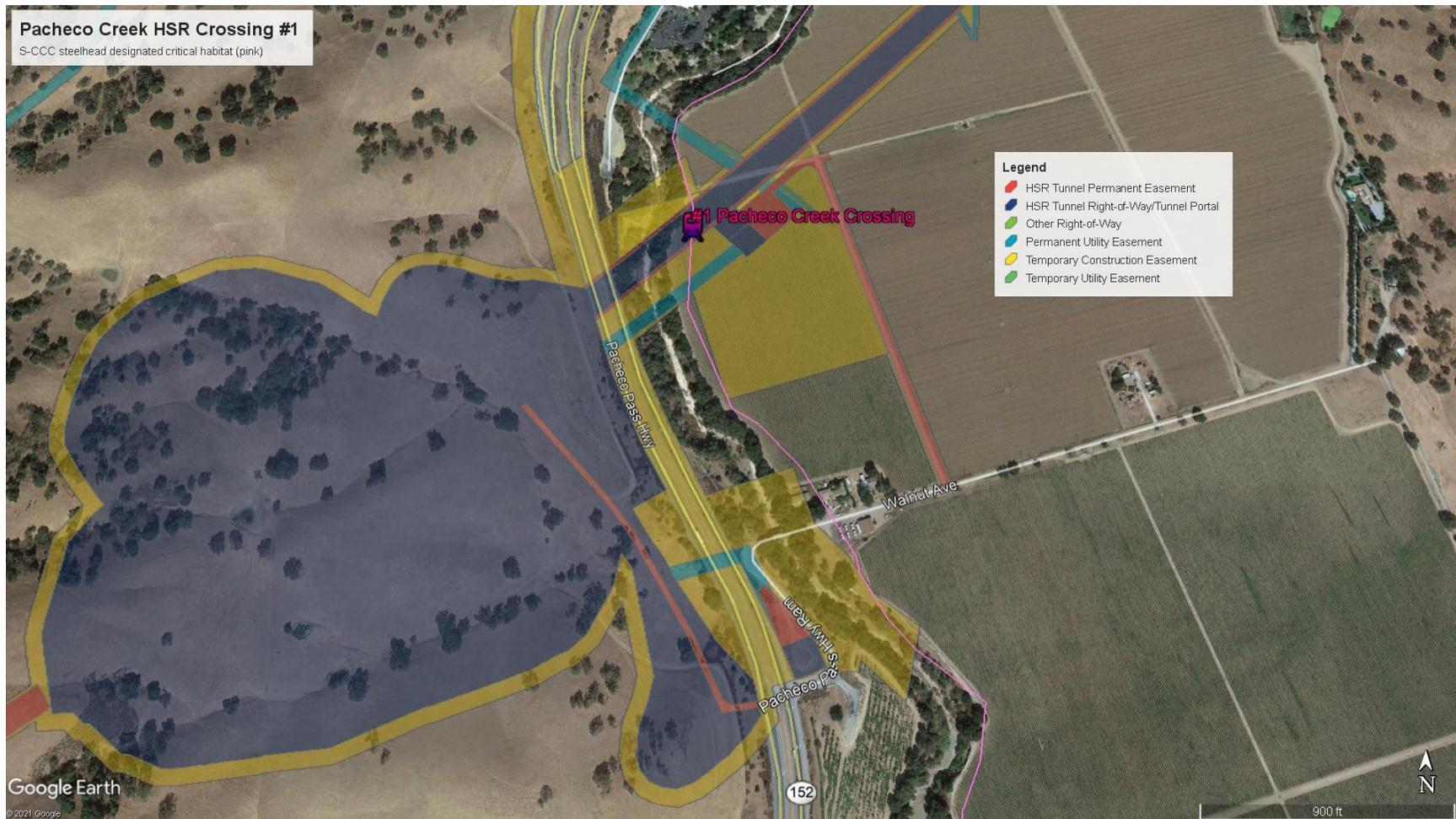


Figure 13. Close-up of Pacheco Creek Crossing #1 HSR elevated viaduct and slope stabilization ROW (dark blue) with temporary construction easement estimates (yellow) relative to S-CCC steelhead designated critical habitat in Pacheco Creek (pink line), just downstream from Casa de Fruta and before tunnel portal transition to second tunnel (red). Electrical interconnections in teal.

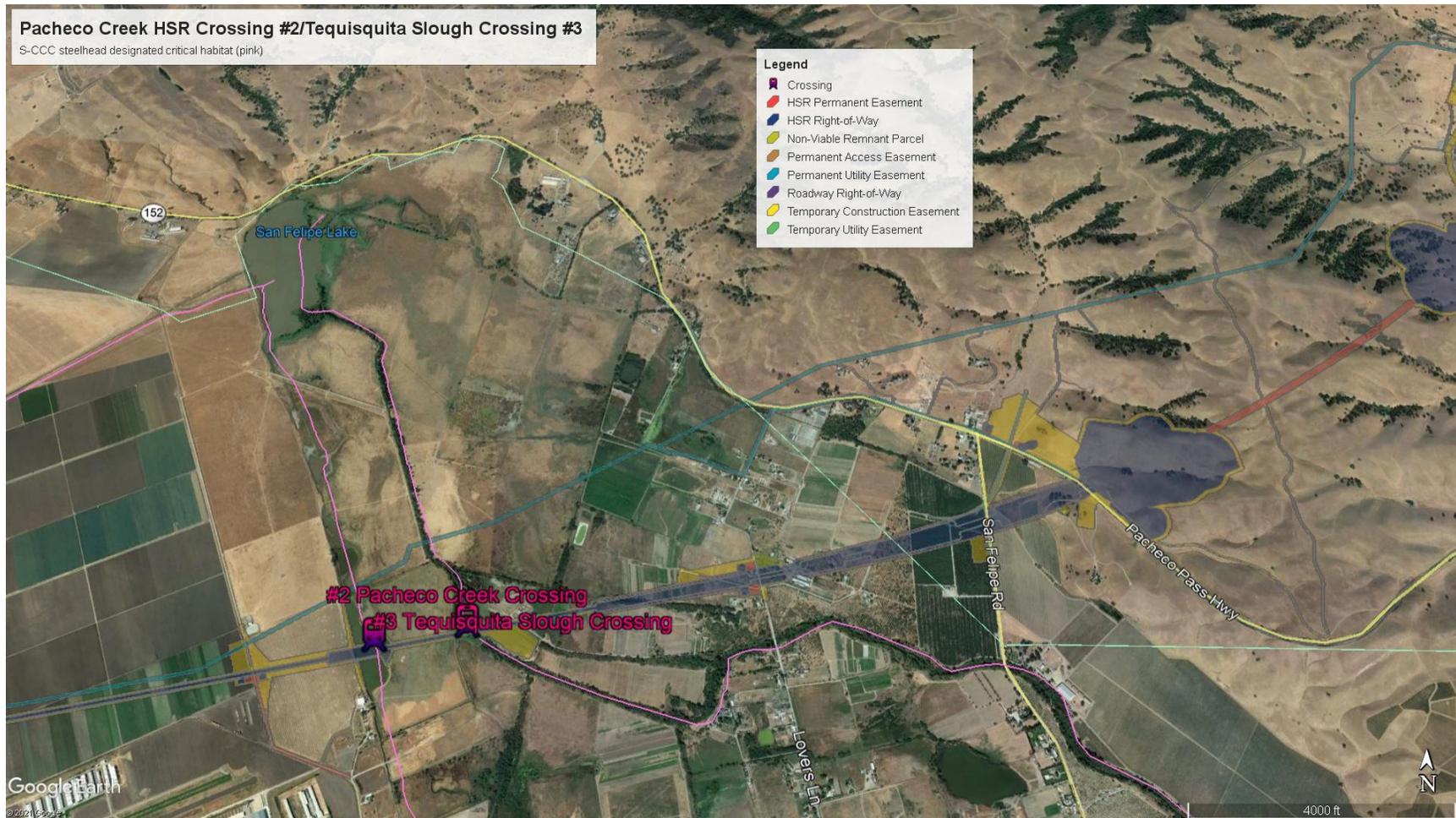


Figure 14. Pacheco Creek Crossing #2 and Tequisquita Slough Crossing #3 by HSR elevated viaduct and slope stabilization ROW (dark blue) with temporary construction easement estimates (yellow) relative to S-CCC steelhead designated critical habitat in the Santa Clara valley floor (pink line), below the final tunnel portal transition from second tunnel (red). Electrical interconnections in teal.



Figure 15. Close up of Pacheco Creek Crossing #2 and Tequisquita Slough Crossing #3 by HSR elevated viaduct/berm and ROW (dark blue) with temporary construction easement estimates (yellow) relative to S-CCC steelhead designated critical habitat in the Santa Clara valley floor (pink line). Electrical interconnections in teal.



Figure 16. Miller Canal crossing #4 and Pajaro River crossing #5 by HSR elevated viaduct and maintenance facility ROW (dark blue) with temporary construction easement estimates (yellow) relative to S-CCC steelhead designated critical habitat (pink line). Electrical interconnections in teal.

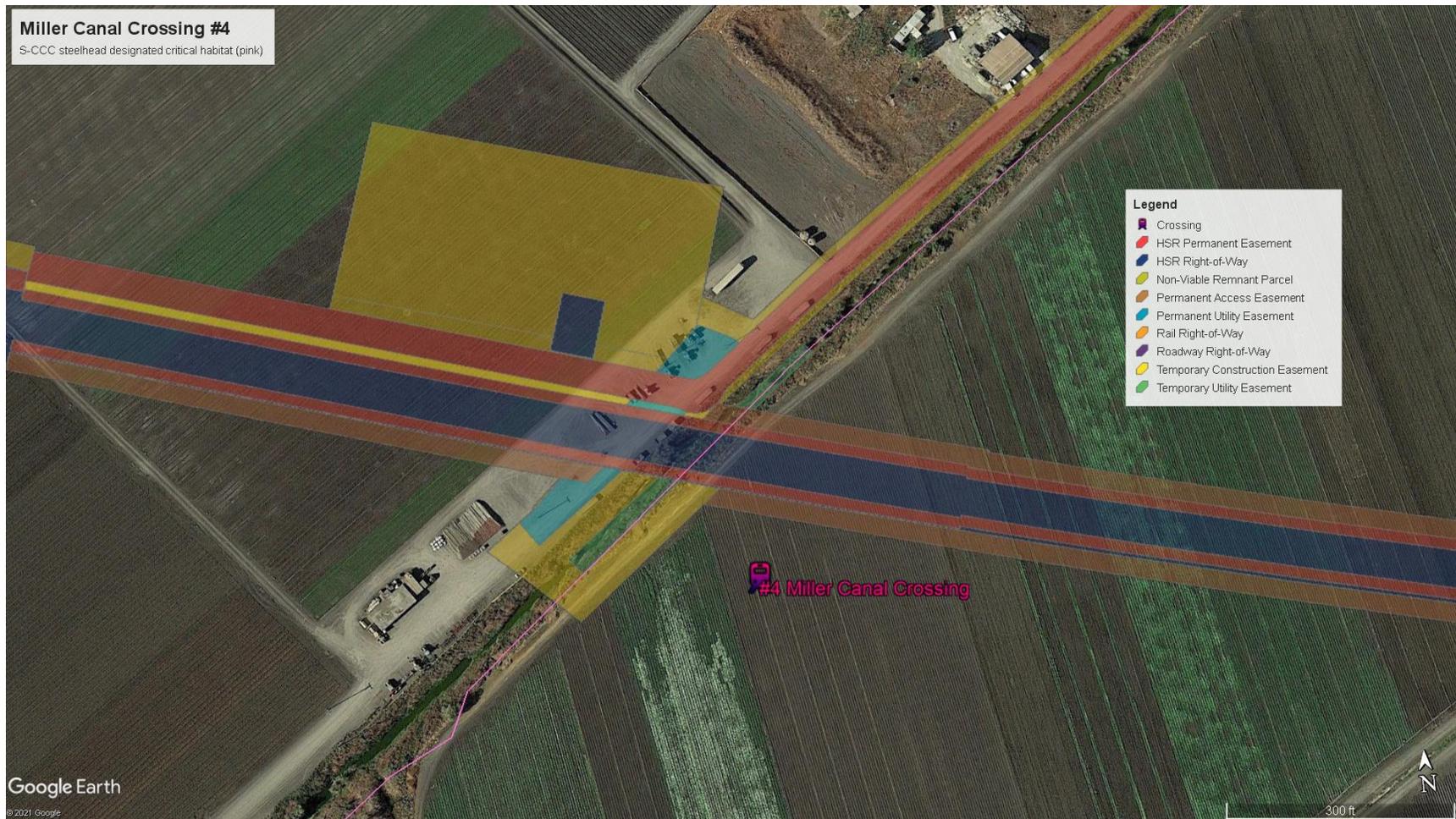


Figure 17. Close-up of Miller Canal crossing #4 by HSR elevated viaduct/berm (dark blue) and permanent ROW (orange) with temporary construction easement estimates (yellow) relative to S-CCC steelhead designated critical habitat (pink line). Electrical interconnections in teal.



Figure 18. Close-up of Pajaro River crossing #5 by HSR elevated viaduct/berm and maintenance facility ROW (dark blue) with temporary construction easement estimates (yellow) relative to S-CCC steelhead designated critical habitat (pink line). Electrical interconnections in teal.



Figure 19. Close-up of HSR elevated viaduct/berm route and maintenance facility ROW (dark blue) with temporary construction easement estimates (yellow) relative to S-CCC steelhead designated critical habitat (pink line) in Uvas Creek. Electrical interconnections in teal.



Figure 20. Llagas Creek crossing #6 by HSR elevated viaduct and ROW (red/dark blue) with temporary construction easement estimates (yellow) relative to S-CCC steelhead designated critical habitat (pink line) near Atherton Way Hidden Pond and Monterey Highway. Electrical interconnections/road re-route in teal.

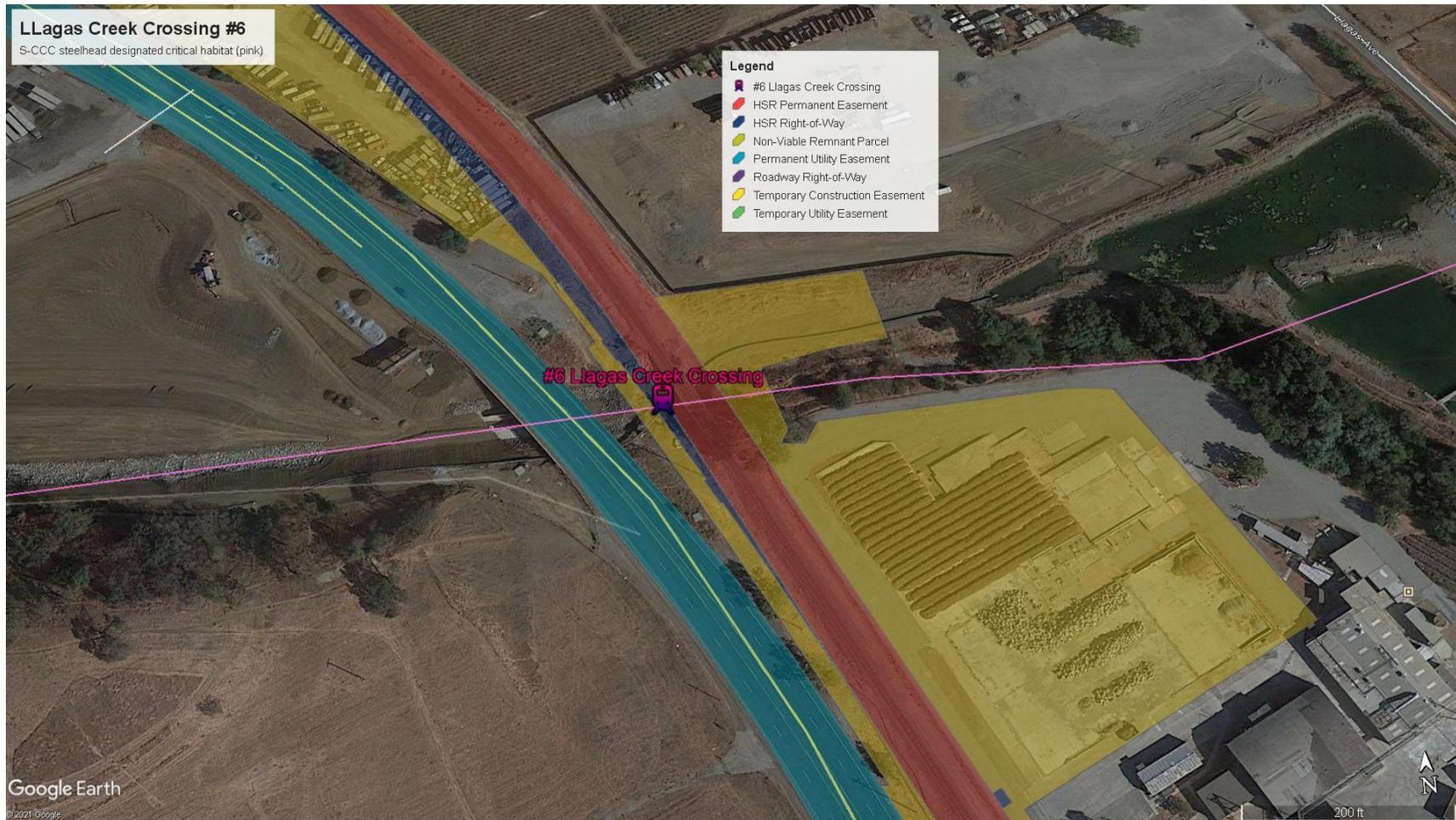


Figure 21. Close-up of Llagas Creek crossing #6 by HSR elevated viaduct and ROW (red/dark blue) with temporary construction easement estimates (yellow) relative to S-CCC steelhead designated critical habitat (pink line) near Atherton Way Hidden Pond and Monterey Highway. Electrical interconnections/road reroute in teal.



Figure 22. Close-up of Coyote Creek and HSR elevated viaduct and ROW (red) and planned wildlife under-crossings (green) with temporary construction easement estimates (yellow) relative to CCC steelhead designated critical habitat (light yellow line) near Monterey Highway/Old Monterey Highway/Highway 101.

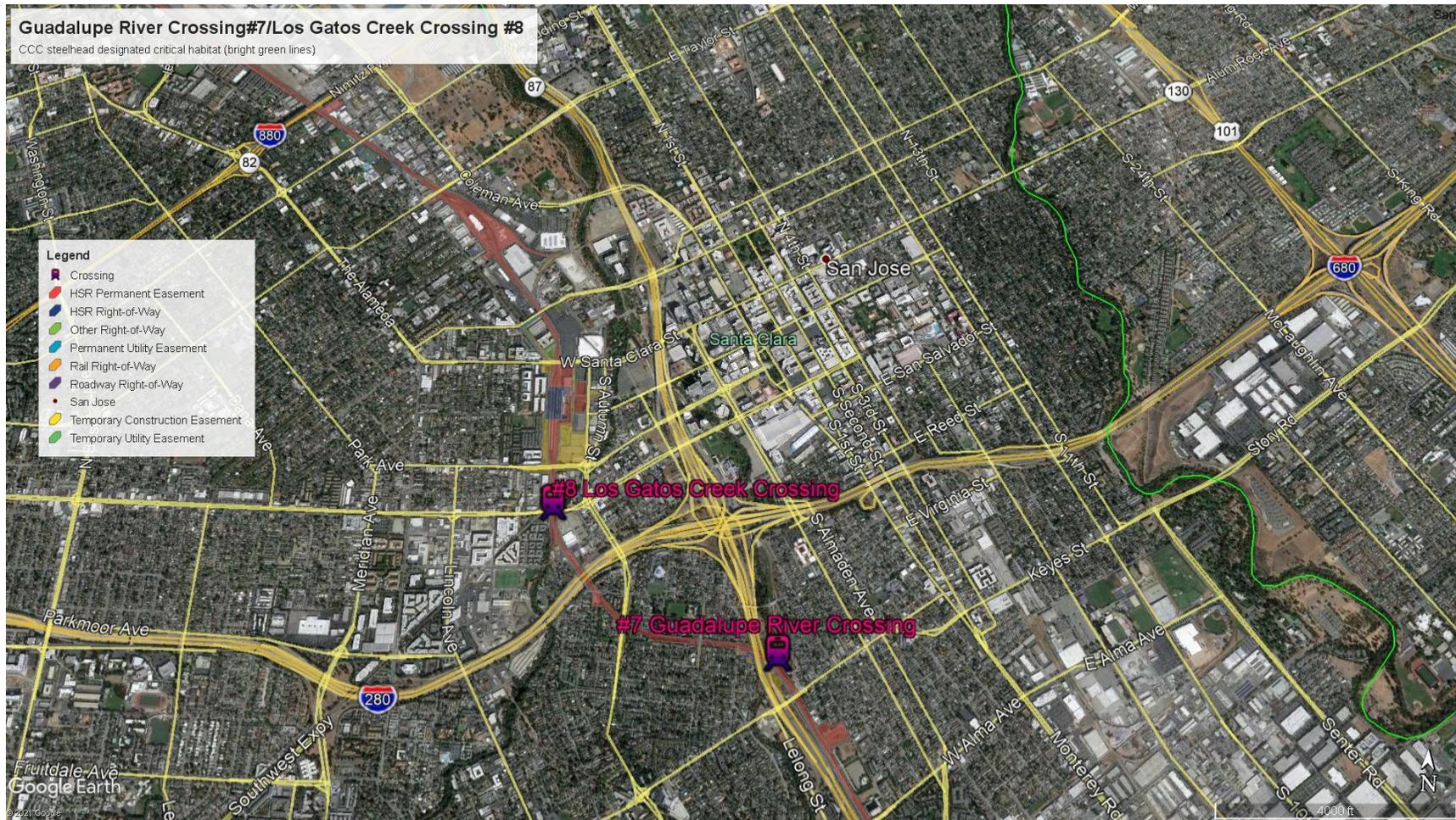


Figure 23. Guadalupe River crossing #7 and Los Gatos Creek Crossing #8 by HSR elevated viaduct, ROW, permanent buildings, and San Jose station (red/dark blue) with temporary construction easement estimates (yellow) relative to CCC steelhead designated critical habitat (bright green line) near Highway 280/680 exchange.

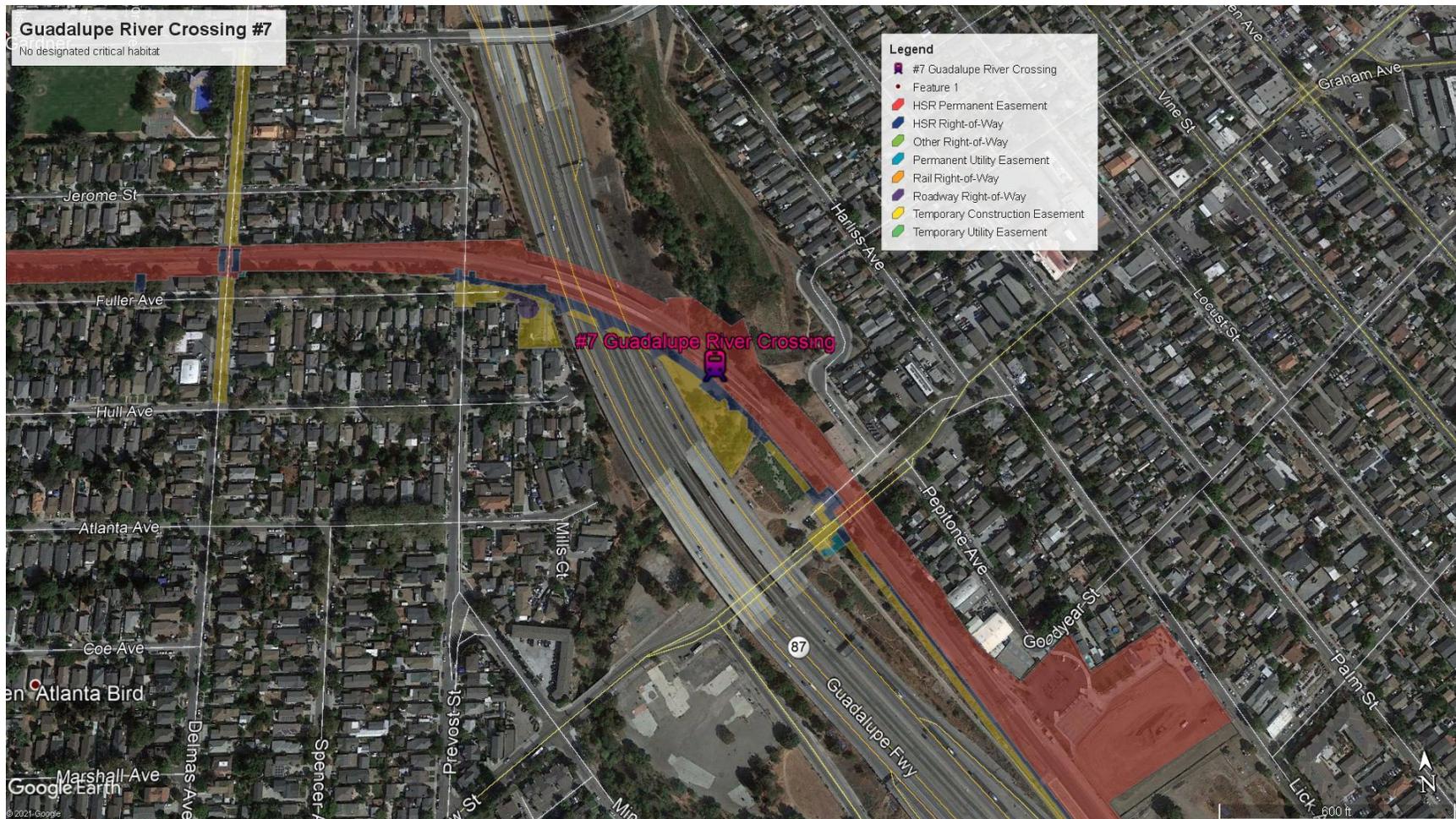


Figure 24. Close-up of Guadalupe River crossing #7 by HSR elevated viaduct, ROW, and permanent buildings (red/dark blue) with temporary construction easement estimates (yellow). No CCC steelhead designated critical habitat in the section of river crossed near Highway 87/Guadalupe Freeway.

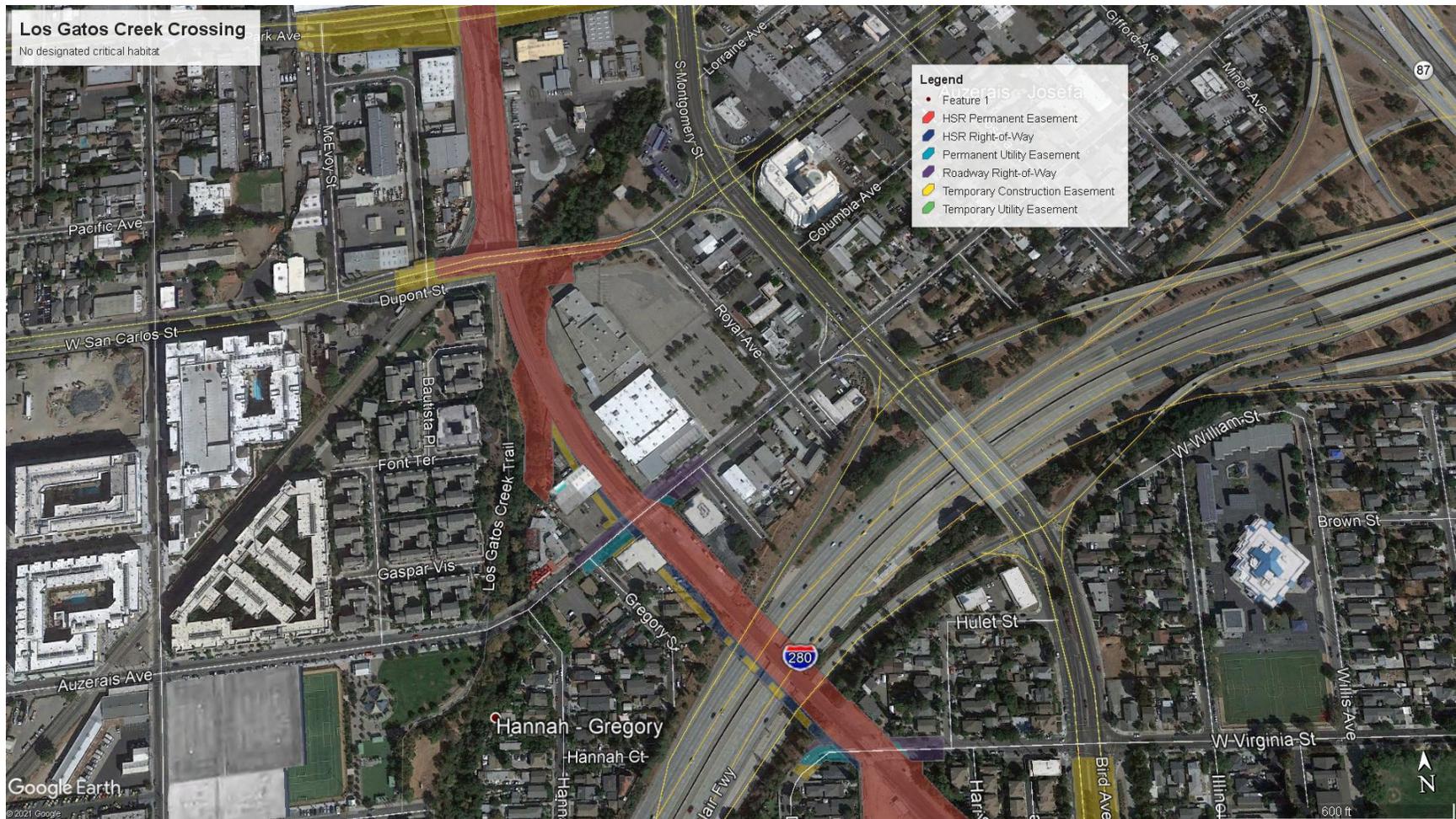


Figure 25. Close-up of Los Gatos Creek Crossing #8 by HSR elevated viaduct, ROW, permanent buildings, and San Jose station (red/dark blue) with temporary construction easement estimates (yellow) in its approach to San Jose Diridon Station. No CCC steelhead designated critical habitat in the section of stream crossed near Highway 280/Highway 87 exchange.

## 2.4. Environmental Baseline

The “environmental baseline” refers to the condition of the listed species or its designated critical habitat in the action area, without the consequences to the listed species or designated critical habitat caused by the proposed action. The environmental baseline includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultations, and the impact of State or private actions which are contemporaneous with the consultation in process. The consequences to listed species or designated critical habitat from ongoing agency activities or existing agency facilities that are not within the agency’s discretion to modify are part of the environmental baseline (50 CFR 402.02).

### 2.4.1. Occurrence of listed species and critical habitat in the action area

The federally listed anadromous species that use and occupy the action area are adult and juvenile S-CCC and CCC steelhead. The Pajaro River is the migration corridor used by S-CCC steelhead to travel between the waterways the project interacts with (major overcrossings #1 through 6) and the Pacific Ocean via Monterey Bay, within the action area, that are also part of their designated critical habitat. All streams in the Pajaro River watershed are considered part of the Interior Coastal Range Biogeographic Population Group (BPG), and the Pajaro River is considered a Core 1 population (Core 1 populations are those identified by NMFS as a high priority for recovery actions based on a variety of factors; populations that should be focused on first in overall recovery efforts and strategies). The Guadalupe River (major overcrossing #7) and Coyote Creek are the migration corridors used by CCC steelhead in the action area, portions of which are also their designated critical habitat, between their upstream spawning and rearing habitats and the Pacific Ocean via San Francisco Bay. Coyote Creek is considered part of the Interior San Francisco Bay Diversity Stratum while Guadalupe River is part of the Coastal San Francisco Bay Diversity Stratum, however both streams’ populations are considered essential populations in the CCC steelhead DPS. The portion of the Guadalupe River where the HSR route crosses (major overcrossing #7) is not CCC designated critical habitat, though CCC steelhead may use the waterway. Similarly, Los Gatos Creek (major overcrossing #8) is also not designated critical habitat but CCC steelhead may use the waterway.

In general, steelhead are described as a highly migratory species that exhibits a great amount of variation in the time and location spent at each life history stage compared to other members of the *Oncorhynchus* genus. Like other Pacific salmon, they follow an anadromous life history pattern of adults spawning in freshwater streams, juveniles undergoing physiological changes that allow them to migrate, feed, and mature in the ocean, to eventually return to their natal waters to complete the cycle and reproduce. While this basic life history pattern is observed by the species, the life history strategies of steelhead are extremely variable between individuals. In addition, steelhead are iteroparous (i.e., can spawn more than once in their lifetime (Busby et al. 1996)) and therefore may be expected to emigrate back down the system after spawning. As such, the determination of the presence or absence of steelhead in the action area accounts for both upstream and downstream migrating adult steelhead (kelts).

#### 2.4.1.1. S-CCC steelhead

Adult S-CCC steelhead typically return to their spawning grounds in winter and early spring (winter-run type). However, the specific timing of their return can vary depending on factors such as available and sufficient flow in migration corridors and sandbar breaching. While the Pajaro River mouth tends to stay open through the summer, the opening can be relatively narrow and shallow. In late September through November as smaller storm flows occur, paradoxically the sandbar may close as sand is pulled off the beach. This forms a lagoon and prevents passage between the upper freshwater system and the ocean. In most years, the Pajaro River mouth is artificially breached by land managers to prevent the lagoon from flooding, typically sometime from late-October to November.

When adults achieve upstream passage, they migrate up to spawning reaches. Once there, females excavate a nest (redd) in gravels and deposit eggs to be fertilized by males. The eggs are covered with additional gravel and the embryos (later alevins) develop. Most adults will die shortly after spawning but, as previously indicated, some may survive spawning and return to the ocean to repeat the process. However, it is rare for steelhead to spawn more than twice before dying and females are more likely to survive to be kelts than males (Keefer et al. 2008, Matala et al. 2016). Kelts are expected to leave the freshwater system for the Pacific Ocean also in the winter while the river mouth sandbar is breached and river flows are higher.

Hatching and fry emergence depends on water temperature, with colder water temperatures extending development. Hatching may occur three weeks to two months after deposit while emergence may occur two to six weeks after hatching (Moyle 2002, Moyle et al. 2008, NMFS 2013). Eggs and fry therefore may be expected in certain sections of the action area between late fall and late spring.

The expression and success of each juvenile life history strategy is dependent on available water resources in the rearing period and access between areas. S-CCC steelhead typically employ an extended freshwater rearing period of one to three years before migrating to the ocean. During rearing, juvenile steelhead may follow various life history paths, transitioning between freshwater, estuarine, and lagoon areas as necessary and available. There is even a type of life history pathway expressed by S-CCC steelhead called “lagoon-anadromous” (Bond 2006) in which a fraction of the juvenile steelhead stay in a lagoon ecosystem for a year before completely out-migrating to the ocean. While rearing, juveniles feed and grow in habitat relatively free of competition and predators (NMFS 2013). Out-migration (emigration) of smolts to the ocean usually occurs in the late winter through the spring again while river mouths are breached.

Adult S-CCC steelhead may be expected in the action area between October and January as they return to spawn and some survive and exit to the Pacific Ocean. The action area of the project does not contain any lagoon or estuarine rearing options for S-CCC juveniles, however <1 year old to +1 year old juveniles may be present in any waterway containing water at any time in the action area as they over summer in freshwater habitat with suitable water temperature and dissolve oxygen levels to complete this life stage. See section 2.4.2: Factors affecting listed species, for a discussion on typical water flow patterns of the area.

#### **2.4.1.2. S-CCC steelhead critical habitat**

The action area contains designated critical habitat that supports the spawning, rearing, and migration activities of S-CCC steelhead. The Pacheco Creek/Pacheco Creek South Fork sections that interact with the HSR tunnel alignment host spawning habitat that is generally rated at good to fair, rearing habitat that is rated fair, and migration habitat that is rated good to fair. At major overcrossing #1, where the HSR will emerge from the hillside tunnel and cross Pacheco Creek for the first time, the spawning and rearing habitat is rated poor while the migration habitat is rated fair. Further downstream at major overcrossing #2, the spawning habitat is rated as poor and migration habitat is rated as fair, rearing habitat is not available. There is no adult holding habitat available in Pacheco Creek.

At nearby Tequisquita Slough, major overcrossing #3, the migration habitat is rated as poor and spawning and rearing habitat are not available, though historically this area was ideal floodplain rearing habitat for the population.

At major overcrossing #4 (Miller Canal), the migration habitat is rated as fair while spawning and rearing habitat are unavailable. At nearby major overcrossing #5, the mainstem of the Pajaro River, the migration habitat is rated as good, while spawning and rearing habitat are unavailable.

The route and footprint of the proposed ROW maintenance facility comes near Uvas Creek, which contains all three habitats types; spawning and rearing habitats rated in fair condition while migration habitat is rated as good.

At major overcrossing #6, over Llagas Creek, the spawning habitat is rated as fair and migration habitat is rated as poor, while rearing habitat is unavailable.

Overall, the habitat conditions in the Pajaro River watershed (part of the Interior Coast Range BPG) were rated as poor in the S-CCC steelhead recovery plan (NMFS 2013) and freshwater rearing habitat is mostly lacking in the project's action area. Previously a primary drainage for this BPG, the Pajaro watershed has been severely impaired by agriculture, urban and residential development, and the water resource use and management associated with such landscape changes. Legacy damage also occurred to the habitat suitability of the watershed through past intensive logging of the old growth forests in the upper watershed of the Pajaro River which removed the input of LWM to the system.

#### **2.4.1.3. CCC steelhead**

Adult winter steelhead freshwater presences varies but is correlated with higher flow events. Adults CCC steelhead express two reproductive ecotypes based on their state of sexual maturity at time of entry to freshwater and the duration of their spawning migration: stream maturing and ocean maturing. Stream maturing adults enter freshwater in an immature condition and require several months of holding in freshwater before spawning while their gonads mature (i.e., also referred to as summer steelhead). Ocean maturing adults enter freshwater with well-developed gonads ready for spawning (i.e., winter steelhead). Adult summer CCC steelhead begin their migration May through October and spawn in January and February, while winter CCC steelhead immigrate December through April and spawn shortly thereafter (Sharpovalov and Taft 1954, Moyle et al. 2008). As noted above, CCC steelhead spawning would be expected to occur from

December through April in spawning reaches. Again, adults may be capable of iteroparity and kelts can return to the ocean after spawning. For the populations of Guadalupe River and Coyote Creek in the action area, there are no sandbar dynamics that would inhibit the migration timing of either reproductive ecotype through the river mouth connections to the San Francisco Bay.

Egg hatch in approximately 25 to 35 days depending on water temperatures, and alevins remain in the gravel redd for two to three weeks after hatching. The fry that emerge from the redd will then rear in edge water habitats and gradually move to deeper faster waters or other areas better suited for rearing.

Juvenile CCC steelhead will rear in freshwater and estuarine habitats for one to two years before completing the transition to a smolt and completing their migration to the ocean. Many factors influence juvenile residence time; in low productivity systems juveniles may rear for more than two years to reach a minimum body size before leaving (McCarthy et al. 2009, Sogard et al. 2009). When juveniles are able to complete the physiological transition to a smolt, they typically emigrate sometime between February and June, with peaks in April and May, in the San Francisco Bay area (Fukushima and Lesh 1998). Due to their extended freshwater residency, juvenile CCC steelhead may be present in the action area in any waterbody providing suitable water quality conditions.

Adult CCC steelhead may be expected in the action area at the earliest in May (arriving summer steelhead) and at the latest in April (leaving winter steelhead that have survived and become kelts). The action area contains freshwater and estuarine rearing options for CCC juveniles, and spawning areas for CCC steelhead, therefore <1 year old to +1 year old juveniles may be present in any waterway containing water at any time in the action area, if suitable water temperatures and dissolved oxygen levels are also present.

#### **2.4.1.4. CCC steelhead critical habitat**

The action area contains designated critical habitat that supports the spawning, freshwater and estuarine rearing, and migration activities of CCC steelhead. The proposed HSR alignment comes close to Coyote Creek and includes a wildlife undercrossing that includes alterations to Fisher Creek, which is tributary to Coyote Creek at their confluence. Coyote Creek itself hosts spawning habitat of poor quality, rearing habitat of poor quality, and migration habitat of fair quality while Fisher Creek would be expected to host non-natal rearing when inundated. Coyote Creek does not offer estuarine habitat in the affected stream section. Water diversions and impoundments (Coyote and Anderson Reservoirs), mining, residential and commercial development, road and railway installations, and channel modifications have caused the greatest amount of impairment to Coyote Creek's functionality as CCC steelhead habitat. Urbanization is still considered a threat to this waterway, but less so when compared to the Guadalupe River (NMFS 2016d).

At major overcrossings #7 over Guadalupe River and #8 over Los Gatos Creek, the actual stream sections crossed by the HSR system are not designated critical habitat for the population. However, the critical habitat designation for the waterway does begin approximately 2 miles downstream and exists in close proximity to the HSR alignment, ROW, and San Jose Diridon Station. The designated critical habitat in the Guadalupe River downstream contains spawning

habitat in poor condition, rearing habitat of poor condition, and its migration habitat is in fair condition. It also offers estuarine habitat of poor condition, as this section of the river is close enough to San Francisco Bay to be tidally influenced. Like other waterways in the Coastal San Francisco Bay Diversity Stratum, the river has experienced a vast amount of urbanization, commercial and residential development, channel modifications, a high degree of road and railway densities, and a lack of large wood material, all of which have severely impaired its ability to support CCC steelhead (NMFS 2016d).

#### **2.4.2. Factors affecting listed species**

In the San Jose-San Francisco Bay Area, water agencies rely on a diverse portfolio of local and imported water sources (Ackerly et al. 2018). For example, while relatively far from the action area, approximately 60% of Bay Area water supply is sourced from the Sierra Nevada (Regional Water Management Group 2019), while some is made available by groundwater desalination and non-potable water reuse. Approximately two-thirds of the action area's community water systems are small, self-sufficient and locally-sourced, and serve less than 10,000 people each, a very small portion of the human population (Ackerly et al. 2018). In an effort to increase the Bay Area's climate change resiliency, efforts are being undertaken to expand water storage and conveyance infrastructure locally while also increasing water recycling, desalination, groundwater augmentation and banking, water transfer, and stormwater harvesting abilities (Ackerly et al. 2018).

Local surface water flows in the action area are directly coupled to winter precipitation, which is highly variable year to year. As such, there are several dams that form reservoirs to store and supply water for human and remaining agricultural needs. For example, the Santa Clara Water District owns and operations the Coyote Dam and LeRoy Anderson Dam on Coyote Creek, the Elmer J. Chesbro Dam on Llagas Creek, and the Uvas Dam on Uvas Creek, forming several, similarly-named reservoirs managed for water storage and delivery within the action area (Santa Clara Valley Water 2020). In the upper Pajaro watershed, the north fork of Pacheco Creek has been dammed by the North Fork Dam and forms the small Pacheco Reservoir (Wikipedia 2020b). The Santa Clara Water District also plans to expand the Pacheco Reservoir so that additional rain runoff can be stored and so that nearby water from San Luis Reservoir can be imported into supplement water needs in the near future. The existing water infrastructure and management has altered and currently controls the hydrographs experienced by steelhead in their accessible habitats.

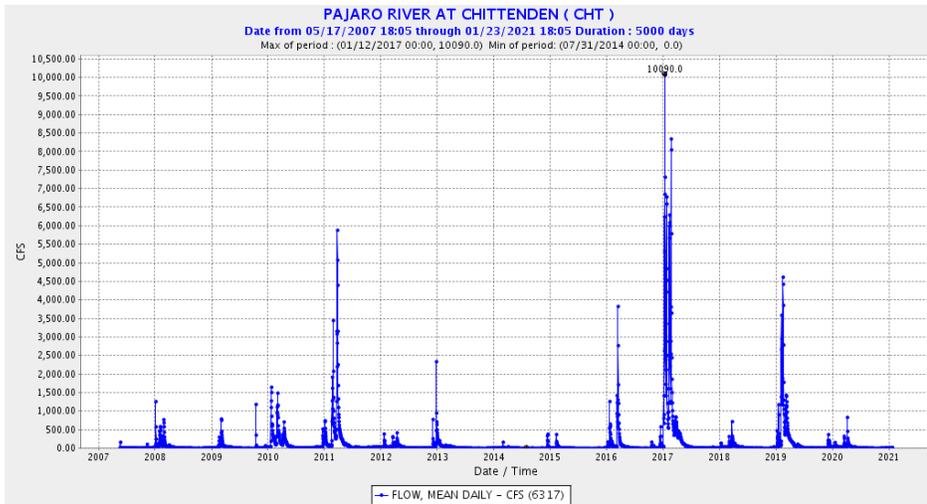
The natural waterbodies within the action area potentially affected by the proposed project vary in length and size. The furthest east stream segment, the South Fork of the Pacheco River, is approximately 48 miles from the Monterey Bay and Pacific Ocean; the affected Uvas and Llagas creeks are approximately 30 to 40 miles from the Monterey Bay and Pacific Ocean; and the Pajaro River mainstem at the crossing location is approximately 26 miles from the Monterey Bay and Pacific Ocean. The affected portion of Coyote Creek near the preferred alternative route is approximately 25 miles to the San Francisco Bay, and the Guadalupe River near the north most crossing is approximately 12 miles from San Francisco Bay (USGS 2015).

Water flow data is available from the California Data Exchange Center (CDEC) online for the Pajaro River at Chittenden (CHT), downstream of project interactions within its watershed.

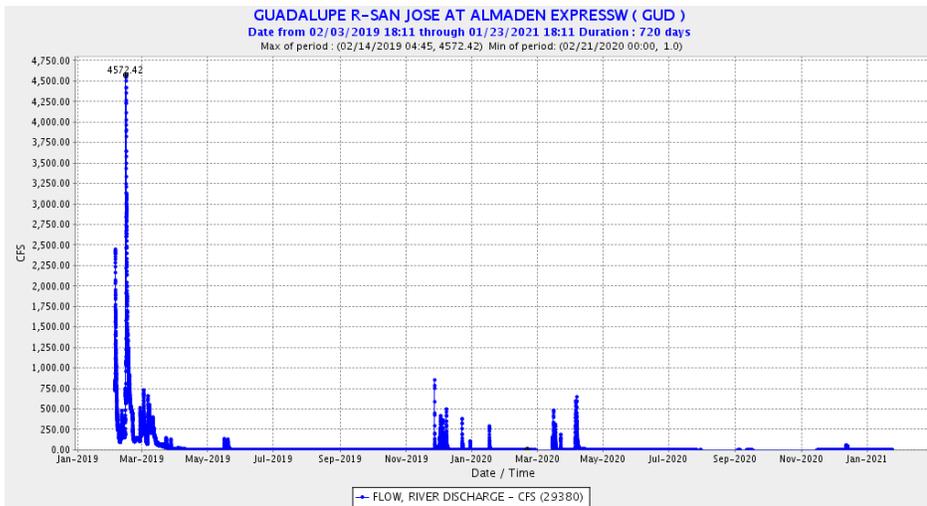
Mean daily flow in cubic feet per second (cfs) has been available since 1993, and is less than 20 river miles from the Pacific Ocean but also receives input from the San Benito River (CDEC 2021c). Water flow data as river discharge in cfs for events is stated as available for Coyote Creek at Madrone (CYO) for events since December 2017 to present, downstream of potential project interactions, but NMFS was unable to recover said data (CDEC 2020). Regarding surface water flows of the Guadalupe River, two data sources are available, one upstream and one downstream of the proposed HSR crossing. Upstream, Guadalupe River at the San Jose at Almaden Expressway (GUD) gauge provides flow as river discharge in cfs for events and data is available since 2016 to present (CDEC 2021a). Downstream, Guadalupe River above Highway 101 at San Jose (GRJ) gauge provides flow as river discharge in cfs for events and data is available since 2009 (CDEC 2021b).

Available CDEC data shows (Figure 26) the expected ‘boom and bust’ cycle of surface water available to CCC/S-CCC steelhead in the action area, with short and abrupt periods of high flows in winter following large precipitation events (atmospheric rivers) with low flow to dry streambeds persisting for extended periods from early summer to late fall/early winter. While the past characterization of the surface water of the area still mostly holds true, the highs and lows of the stream flows are predicted to become even more extreme as climate change progresses.

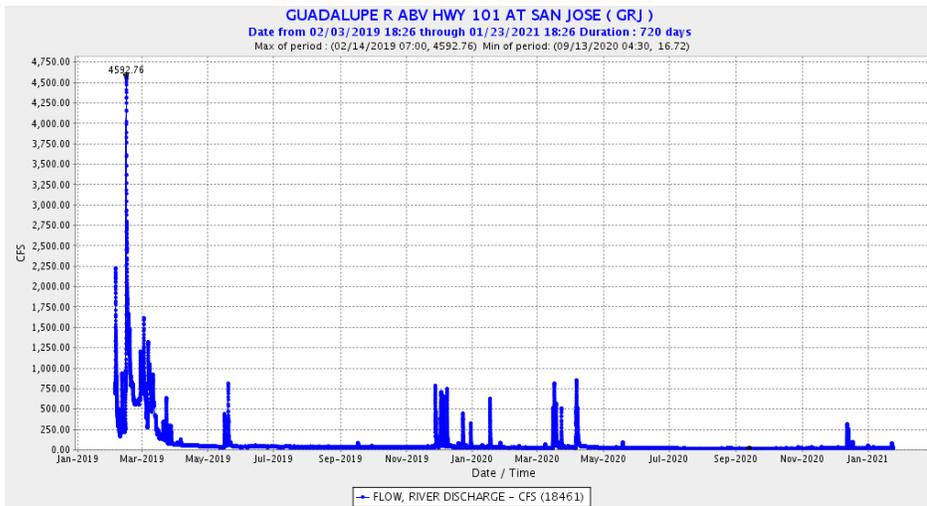
One such extreme precipitation event known as the 2017 Coyote Creek Flood, seen in Figure 26a where the Pajaro River recorded over a mean daily discharge of 10,000 cfs, when flooding outcome was more severe than previous 1997 record floods. The upstream Anderson Reservoir was beyond capacity and overflowed via its spillway into Coyote Creek (Wikipedia 2020a). The inundation of water forced 14,000 residents in low-lying areas to evacuate their homes, forced the closure of Highway 101, and necessitated the rescue of several people as flood waters reached a new record height of 14.4 feet.



a)



b)



c)

Figure 26. Recent stream flow data in the Pajaro River (a) and Guadalupe River (b, c) nearby major HSR crossing locations (CDEC 2021c, a, b).

### 2.4.3. Conservation and restoration efforts in the action area

#### 2.4.3.1. NMFS recovery plans

Recovery is the process by which listed species and their ecosystems are restored to the point that the protections provided by the ESA are no longer necessary to ensure their continued existence. Recovering anadromous species like steelhead in the San Jose-San Francisco Bay Area is challenging due to the area's large and expanding human population, its large percentage of landscape being highly urbanized, the increasing demand for housing that leads to development of the remaining natural and pervious (agricultural) areas, the associated amount and extent of water use and manipulation, and legacy habitat damage that still persists and continues to inhibit steelhead population recovery (NMFS 2013, 2016c, d).

In the Recovery Plans (NMFS 2013, 2016c, d), NMFS established delisting/recovery criteria for the S-CCC and CCC steelhead DPSs, including that both DPSs must have robust, viable populations in several of the major tributaries affected by the proposed project in the action area. Though there are many more recovery actions that are directed to restore the marine, estuarine, and freshwater systems that these species depend on (described fully in their respective recovery plans), there are a series of actions/efforts that must be completed specific to these populations to successfully establish and persist.

Pertinent DPS-wide recovery actions for S-CCC steelhead in the action area include:

- Forming collaborations between water facility owners/operators so that water releases can maintain flows necessary to support all steelhead life history stages and habitat functionality.
- Forming collaborations with responsible agencies on flood control and management programs to ensure appropriate steelhead habitat protection and provisions (e.g., the collaboration between the Pajaro River Bench Excavation Program and US Army Corps of Engineers on lower Pajaro River Flood Control Program).
- Forming collaborations with responsible agencies and organizations in acquisition of fee-title to parcel or establishment of conservation easements over selected streams and riparian corridors to protect steelhead habitat.
- Physically modifying passage barriers to assist up- and downstream migration.
- Forming collaborations between California Department of Transportation and other responsible agencies with oversight on road practices to reduce or remove transportation related passage barriers, including railroad bridges, abutments, and similar structures.
- Enhancement and protection of natural in-channel and riparian habitat including appropriate management of flood control activities.

For the Pajaro River watershed specifically:

- Develop and implement operating criteria to ensure the pattern and magnitude of groundwater extractions and water releases from Uvas and Pacheco dams to provide essential life history and habitat requirements of steelhead.
- Modify passage impediments to allow natural steelhead migration to habitat above Uvas Dam.

- Manage instream mining to minimize impacts to critical steelhead life history patterns in major tributaries including Uvas, Llagas, and Pacheco creeks.

Pertinent DPS-wide recovery actions for CCC steelhead in the action area include:

- Increase the quality and extent of estuarine habitat by remove problematic infrastructure and fill material, and develop and implement estuary inflow and enhancement guidelines.
- Rehabilitate and enhance floodplain connectivity by finding opportunities for planned retreat of current urban development, and encouraging county zoning to consider the 20-year and 100-year flood zones to identify protective and compatible land use designations.
- Improve flow conditions by working with partners to reduce stormwater runoff by removing impervious surfaces and creating or expanding flood retention land and groundwater recharge basins, minimizing impacts to fisheries resources by integrating hydro-modification concerns into development planning, and improved coordination with State Water Resources Control Board (SWRCB) to establish and manage flows that fully protect salmonids.
- Modify or remove physical passage barriers at all new crossing and upgrades to existing bridges, culverts, fills, etc., to accommodate 100-year flood flows and use NMFS 2001 Salmonid Passage Guidelines in their designs or retrofits.
- Improve habitat complexity and riparian conditions through fish restoration projects and funding, by working with other agencies and landowners to keep beavers on the landscape with non-lethal damage management tactics, preserving older large diameter trees for canopy cover, and developing adequately sized riparian setbacks and buffers.
- Improving water quality by reducing toxicity, pollutants, and sediment.

For Coyote Creek (Interior San Francisco Bay Diversity Stratum) specifically:

- Passage barriers downstream of Anderson Dam should be systematically remedied, with priority on barriers lower in the system.
- Assisted or volitional passage programs should be developed and implemented for the movement of steelhead above Anderson Dam and then Coyote Dam to allow use of above reservoir freshwater habitat.
- Flows from Anderson and Coyote Reservoirs should be released in such a way as to benefit all life stages of steelhead within Coyote Creek.
- Where feasible, floodplains and side channels should be reconnected with the active stream channels.
- Instream habitat and cover should be improved downstream of Anderson Dam.
- Efforts should be undertaken to improve water quality throughout the urbanized reaches of Coyote Creek with a focus on limiting or treating urban runoff.

For Guadalupe River (Coastal San Francisco Bay Diversity Stratum) specifically:

- Passage barriers downstream of the reservoirs in the Guadalupe River watershed should be systematically remedied and overall passage improvement has the highest priority in this watershed.
- Assisted or volitional passage programs should be developed and implemented for the movement of steelhead above Lake Almaden and Guadalupe Reservoir.
- Reservoirs in the Guadalupe River watershed should be operated as to benefit steelhead of all life stages.
- Where feasible, floodplains and side channels should be reconnected with the active stream channels, including retrofitting existing development to restore connectivity and allow for natural channel functions.
- Instream habitat and cover should be improved, including the placement of large woody debris, rock weirs, and boulders. This will also increase the instream shelter ratings and pool volumes in degraded reaches.
- Efforts should be made to improve water quality throughout the Guadalupe River watershed, in particular focusing on limiting or treating urban runoff and remediating mercury mine sites.

#### **2.4.3.2. Santa Clara Valley Habitat Conservation Plan**

The Santa Clara Valley Habitat Conservation Plan (HCP) is a framework completed in 2012 that promotes the protection and recovery of natural resources, including endangered species, in the Santa Clara Valley by streamlining the environmental permitting process for planned development and infrastructure projects under the jurisdiction of the County of Santa Clara, the Santa Clara Valley Water District, the Santa Clara Valley Transportation Authority, or the cities of Gilroy, Morgan Hill, and San Jose when they seek to receive endangered species permits (SCVHA 2012b, a). Rather than permitting and mitigating for individual projects, the HCP evaluates the impacts and mitigation requirements comprehensively to better protect, enhance, and restore natural resources in specific areas of Santa Clara County to contribute to the recovery of endangered species (SCVHA 2012b) while offering ESA coverage for actions/projects described in the HCP. The HCP was developed with the help of the Santa Clara Valley Open Space Authority, USFWS, the California Department of Fish and Game, stakeholder groups, and the general public. It asks USFWS to issue a 50-year permit that authorizes the take of the covered species under the Natural Community Conservation Planning Act.

The Santa Clara Valley HCP includes steelhead and rainbow trout in the account of biological resources present with its action area (noting Coyote Creek, Guadalupe River, and tributaries of the Pajaro River as steelhead streams (SCVHA 2012a) and provides provisions and alternative measures for the minimization of take of other listed species affected by the HCP (referred to as covered species), but NMFS was not involved with the formation of the HCP or consulted with to exempt incidental take of S-CCC or CCC steelhead affected by projects otherwise covered by the HCP. Despite not being included as covered species, S-CCC and CCC steelhead may still

receive some conservation benefits from the implementation of the Santa Clara HCP because its strategy includes:

- 1) The creation of a permanent reserve system with an aim to benefit natural communities and ecosystem function, protecting existing open spaces, and at least 100 miles of streams. All land acquisitions for the reserve system to be completed by Year 45 of the HCP permit term.
- 2) Habitat enhancement and restoration for wetland and stream habitat types by improving functional processes, species composition, and community structure; with a minimum of 90 acres of riparian woodland and scrub, wetlands, and ponds; and with a minimum of 1 mile of stream restored regardless of project subcomponent size. Remaining restoration will occur according to ratios of 1:1 or 2:1, with predicted impacts resulting in 500 acres of riparian woodland and scrub, wetlands, and ponds; and up to 10.4 miles of streams restoration needed to offset losses of these lands cover types and contribute to species recovery. Construction of all habitat restoration/creation projects to be completed by Year 40 of the HCP permit term.
- 3) Adaptive management and monitoring of HCP actions and outcomes through detailed guidelines and recommendations for each of the affected land cover types to be offset or restored, including riverine and riparian forests, wetlands, and pond, and for each covered species.

#### **2.4.3.3. Upper Llagas Creek Flood Control Project in Santa Clara County**

This project was originally proposed in 1968 in an effort to reduce and control flooding along 13.9 miles of Llagas Creek (Santa Clara Valley Water District 2019). Through extensive technical assistance with NMFS, the implementation of the project has evolved to include habitat enhancement and improvement tactics in stream reaches that support S-CCC steelhead, and mitigation for unavoidable project adverse effects, including construction of a sinuous flow-flow channel, revegetation with specific native species, sufficient fish passage flowing NMFS guidelines (NMFS 2011), removal of a fish ladder that is a partial passage barrier, a roughened step-pool channel, a re-route around a former gravel pit, and installation of complex habitat features throughout steelhead reaches (NMFS 2018a).

The project also includes the Lake Silveira Mitigation Element, a 52-acre wetland and riparian mitigation plot. The proposed design will eventually revert flow back into a 2,000 foot section historically occupied by the Llagas Creek channel but had since been converted for industrial uses, enhance wetlands around a perennial lake, and improve the natural riparian vegetation by removing invasive species and replacing them with native understory. NMFS concluded that this project, while a flood control action, would ultimately improve the quality, extent, and functionality of critical habitat available in the affected area, improving conditions for S-CCC steelhead overall.

#### **2.4.3.4. Pacheco Reservoir Operations**

From 2010 to 2012, the operating rules for the Pacheco Reservoir above Pacheco Creek were proposed to be revised to improve aquatic habitat downstream of North Fork Dam and also balance the needs of S-CCC steelhead that depend on these flow releases with human water needs (Micko 2014). Acceptance and implementation of revised water release amounts and schedule changes to benefit steelhead life history needs is still forthcoming, and may eventually be considered in conjunction with expansion of the storage capacity of the Pacheco Reservoir.

### **2.5. Effects of the Action**

Under the ESA, “effects of the action” are all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action (see 50 CFR 402.17). In our analysis, which describes the effects of the proposed action, we considered 50 CFR 402.17(a) and (b).

This opinion will consider the consequences to CCC and S-CCC steelhead, and to their critical habitats, as related of the construction of the tunnels, waterway crossings, stations, maintenance yard, utility upgrades, etc., outlined in section 1.3 for the proposed action, the long-term consequences of HSR structure permanence in the landscape, and consequences associated with its operation in the action area, as described in more detail in the 2020 HSR BA (Authority 2020c).

#### **2.5.1. Consequences to individuals**

##### **2.5.1.1. General construction activities**

General construction encompasses work onsite to build the HSR system and necessary utilities, activities like site preparation, creation of access ways and roads, vegetation clearing and grubbing, operation of heavy machinery, vehicles, and tools, installation of falsework, BMPs, and fencing, and out-of-water earthwork and excavation. General construction activities have the potential to introduce noise, vibration, artificial light, and other physical disturbances into the immediate environment in and around the construction zone that can result in the harassment of fish by disrupting or delaying their normal behaviors and use of areas, and in extreme cases causing injury or mortality. These outcomes could occur immediately or later in time. The potential magnitude of effects depends on a number of factors, including type and intensity of disturbance, the proximity of disturbance-generating activities to the water body, the timing of the activities relative to the use and occurrence of the sensitive species in question, the life stages of the species affected, and the frequency and duration of disturbance periods.

Fish may exhibit avoidance behavior near construction activities that displace them from locations they would normally occupy due to the noise generated by the operation of construction machinery or movement of soils and rocks during earthwork periods. Depending on the innate behavior that is being disrupted, the adverse effects could vary. An example of an immediate adverse effect to individuals would be cessation or alteration of migratory behavior.

For juvenile fish, this effect may also include alteration of behaviors that are essential to their maturation and survival, such as feeding or sheltering, which co-occur with their outmigration from freshwater systems. In the context of construction at the stream crossings, the migratory and rearing behaviors of juvenile salmonids are expected to be affected by various construction-related effects.

In the absence of migration pattern alterations, general construction disturbance may increase fish physiological stress and increase risk of mortality. Fish vacating protective habitat due to disturbance may experience increased predation rates and decreased survival rates compared to those left undisturbed is an example of an indirect adverse consequence from construction. In extreme cases, general construction-related effects may also include debris and/or equipment falling into the channel. Such instances could cause physical injury or death if a fish was struck or crushed, or at least, acute avoidance tactics would be taken, altering any normal behaviors and inducing a high degree of acute physiological stress.

To minimize the impacts of construction on listed salmonids, the Authority has proposed to adhere to specific seasonal work windows for in-water and near-water construction activities of the HSR system in the section (pile-driving activities and associated consequences will be discussed in section 2.5.1.3 Vibratory and impact pile driving, below).

Proposed seasonal work windows:

- In-water work within the wetted channel: June 15 – October 15
- Near-water or over-water work: April 30 – December 1

Proposed daily work hours:

- In the channel or on the floodplain: 1 hour after sunrise until 1 hour before sunset

Proposed work window exceptions (with NMFS confirmation):

- When channels are dry, ponded, lack continuous flow, or
- Water temperatures average 75°F or more for 7 consecutive days

Adult S-CCC steelhead would not be expected to be able to reach the Pacheco Creek or Llagas Creek work areas until after the Pajaro River sandbar was breached, which typically occurs in late December. Since the in-water work window ends mid-October, an overlap between spawning behaviors, egg incubation, and in-water construction work are not expected and S-CCC steelhead redd success should not be impacted through this effect pathway. There is a low probability that near or overwater work may disturb the activities of adult S-CCC steelhead if they are spawning near work areas, as overlap may occur with the near-/over-water work window and spawning/egg incubation until December 1 of each year.

Adult CCC steelhead in this area are expected to display a winter-run life history, and peak spawning activity would be expected to occur December to February. While the proposed in-water work window is expected to avoid most of the spawning activity, downstream migration of kelt CCC steelhead can occur until as late as May. There is also a low probability in-water work would encounter small number of adult CCC steelhead migrating or possibly holding in

freshwater pools over summer months. At the locations within the action area where this encounter could occur (Guadalupe River and Coyote Creek), the probability of adult presence is very low, but not impossible, if water conditions are suitable in summer months. And similarly to S-CCC steelhead adults, there is a low possibility that near or overwater work may disturb the activities of early spawning adult S-CCC steelhead in Coyote Creek or Guadalupe River near work areas until December 1 of each year.

In addition to the seasonal work windows, active work conducted in the channels or on the floodplains would be limited to daily hours from one hour after sunrise to one hour before sunset. These daily work hour restrictions are likely to further minimize adverse construction disturbance effects on fish migration and movement behaviors during crepuscular periods and at night. Research suggests that adult steelhead show the greatest amount of upstream movement in river mainstems from early dawn until approximately 0800 hours and show somewhat more movement nocturnally compared to mid-morning and evening hours (Keefer et al. 2012). Steelhead juveniles are known to change diel movement tactics as they leave their natal streams (Chapman et al. 2012) but given the diversity of stream habitats involved in this section of the HSR, it is difficult to predict juvenile steelhead movement patterns for each crossing location and how those patterns might change under the influence of daytime construction disturbance.

Because salmonid use of waterways is generally limited by warm water temperatures and adequate flows, the Authority has also requested an exception to the work windows for in-water and near-water construction if local water temperatures are on average 75°F or more for seven consecutive days. One study of juvenile steelhead in southern California streams reported survival and normal foraging and activity in waters that would be considered lethal (>77°F), however cool water refugia were not available to steelhead in this study (Spina 2006) and the author notes that in other studies where microhabitat selection was possible, steelhead were observed to move to their preferential water temperature ranges (Nielsen et al. 1994, Ebersole et al. 2001). If water temperatures exceed preferred steelhead temperature maximum (most studies show steelhead prefer water temperatures below 68°F) for a week or more, fish are likely to have already vacated the area to seek cool water refugia elsewhere and would no longer be present in the waterways near the construction sites to experience associated adverse effects. Seven consecutive days is ample time for individuals to move to other areas where water temperatures are more suitable or complete their outmigration to the Pacific Ocean. In such cases, there is no cause for construction to adhere to the work windows designed to avoid steelhead use if construction impacts to individual steelhead would not be likely. If such an environmental situation occurs prior to the in-water/near-water work window start, the Authority or its contractors will contact NMFS to confirm with staff that local water temperatures measured 75°F or more for at least seven consecutive days, that steelhead presence is not expected in the area, and that construction may commence outside of the stated work windows because additional interaction with steelhead is not expected to occur. Conversely, if water temperatures drop below 75°F again, the Authority and its contractors propose to revert back to the original work windows intended to minimize adverse construction effects to steelhead in the action area.

All construction activities, such as preparing the construction footprint and staging areas, are expected to create a small amount fugitive dust that may settle into nearby waterways. But, because of the expected small amount and limited duration (standard construction practices include watering dirt roads to suppress dust creation from vehicle/equipment movement), any

turbidity increases caused by dust input will be a minimal impact to any fish occupying affected waters. Dust effects are expected to persist only as long as active construction is occurring and are therefore temporary.

Viaduct construction activity in or near waterways also includes the placement of structures, movement of materials, and disturbance of soils in the water channels and riparian corridor. Such disturbance is likely to mobilize sediment and increase the likelihood of erosion, possibly sending it into associated waterways at elevated rates, particularly after the first rain event. Localized increases in erosion and in-water turbidity are expected to have adverse effects on rearing steelhead present in the action area during the proposed construction windows. For salmonids specifically, high sedimentation and turbidity levels has been shown to decrease juvenile growth and survival as a result of reduced prey detection and availability, and individual physical injury rates increase in high turbidity due to increased activity in association with gill fouling and even peer aggression (Bash et al. 2001). Sigler et al. (1984), in a lab study using juvenile steelhead and coho salmon, found individuals to preferentially occupy parcels of water between 57 and 77 nephelometric turbidity units (NTU) when given a choice. This result suggests that juvenile salmonids may avoid waters of very low turbidities (i.e., clear waters). Coupled with information presented by Gregory (1993) which found that juvenile Chinook salmon decrease predator avoidance behaviors at increased turbidities, juvenile salmonids may avoid clear waters where they are easily visible to predators but since they experience negative physiological effects in muddy waters, they may be most successful overall in slightly cloudy waters. Adherence to the SWPPP and implementation and maintenance of erosion control BMPs will be especially important in preventing sediment-laden stormwater from adversely affecting incubating redds in spawning reaches, even after active construction ceases for the winter period. Disturbed areas are to be stabilized and re-contoured so as to not cause long-term sedimentation effects. Given the proposed development of a SWPPP and the other erosion control BMPs included in the project description and general Authority construction guidelines, it is unlikely that construction activities will alter the natural range of in-river turbidities to a degree that would adversely affect the salmonids using the action area, therefore adverse effects are expected to be minimal.

In summary, harm and harassment of listed steelhead due to general construction activities is expected to occur through disruption of normal fish behaviors and their use of the aquatic habitats near construction zones. Equipment operation, construction noise, soil disturbance, and general human presence in and near waterways and floodplain is expected to elicit these responses. These proposed in-water and near-/over-water work windows align with windows recommended by NMFS during early technical assistance meetings to avoid the majority of the time periods adult CCC/S-CCC steelhead would be expected to use freshwater habitats, but do not completely eliminate the probability of encountering and disturbing adult behaviors and use of their freshwater habitats. Because juvenile steelhead may utilize freshwater habitats to rear for multiple years before leaving for the ocean, juvenile steelhead could be present in any waterbody or ponded pools near the work areas, if that waterbody was connected to a steelhead waterway at any point in the year and given suitable water conditions. Given typical steelhead life history patterns for freshwater habitat use in the action area and the expected encounter probabilities during the proposed work windows, there is a low impact risk to individual adult CCC/S-CCC steelhead, and a moderate risk to juvenile steelhead, from general construction disturbance. Adults or juveniles may be deterred from using waterways near work areas, may delay their

migration or spawning, and may experience elevated stress levels due to active general construction occurring in, near, or over waterways. Acute injury or mortality from general construction activity is not anticipated to be an adverse effect because it would require an extreme event to occur (e.g., overwater support failure resulting in debris and construction materials violently crashing down into a waterway containing listed species). Overall, adhering to the seasonal and daily work windows will substantially decrease the probability that listed fish will be present in the waterways affected by construction by decreasing the overlap between fish use and construction activities, therefore decreasing the extent of harm to individuals of these populations.

#### **2.5.1.2. Potential contamination of waterways from construction, equipment operations, staging, storage, and maintenance**

All activities that involve construction near, in, or over water (including seasonally dry channels) have some potential to deliver contaminants to surface waters, likely in liquid or particulate forms. Contaminants originating from construction areas can also be delivered to surface waters through stormwater discharges. Contaminants may also enter the aquatic environment through disturbance, resuspension, or discharge of contaminated soil and sediments from construction sites. Introduced or contamination originating from resuspension would be expected to be temporary in nature, persisting as long as stormwater discharges continue or as long as construction is ongoing. The proposed overcrossing sites in the action area have sediments that have been affected by historical and current urban discharges but, no specific information on sediment contaminants at these sites is currently available.

The operation of construction equipment/heavy machinery is likely to deposit trace amounts of heavy metals throughout the construction area (Paul and Meyer 2001). Heavy metals, even in trace amounts, have been shown to alter juvenile salmonid behavior through disruptions of various physiological mechanisms including sensory dampening, endocrine disruption, neurological dysfunction, and metabolic disruption (Scott and Sloman 2004). Oil-based products used in combustion engines for both fuel and mechanical lubrication contain polycyclic aromatic hydrocarbons (PAHs), which have been known to bio-accumulate in other fish taxa and cause carcinogenic, mutagenic, and cytotoxic effects to fish (Johnson et al. 2002, Incardona et al. 2009, Hicken et al. 2011). Studies have shown that increased exposure of salmonids to PAHs also results in reduced immunosuppression and therefore increases their susceptibility to pathogens (Arkoosh et al. 1998, Arkoosh and Collier 2002). Resuspension of contaminated sediments may also have adverse effects on fish that encounter sediment plumes or come into contact with deposited or newly exposed sediment. Exposure to contaminated sediments, either through direct exposure (e.g., swimming through plumes of re-suspended sediment) or foraging on contaminated food sources, could harm steelhead.

Though these substances can kill fish or elicit sub-lethal effects when introduced into waterways in sufficient concentrations, adverse effects from hazardous materials from HSR construction is not expected due to the numerous AMMs and BMPs integrated into the proposed action to control such pollutants and the implementation of an appropriate spill prevention control and countermeasures plan (SPCCP) and SWPPP. For example, the construction staging areas will be established in the same footprints that will ultimately be occupied by permanent HSR facilities when possible, to further reduce the amount of disturbance and temporary impacts to natural

habitats. All equipment entering work areas will be cleaned of mud and therefore also be cleaned of any adherent trace contaminant material. Additional staging and material/equipment storage areas may occur seasonally in the floodplain of waterways, restricted to the period of April 15 to October 31, and only when areas are dry. At all other times, equipment may enter the river channel area for daily use but will be removed and stored outside areas subject to possible flooding at the end of each work day. Construction will be limited to dry periods when waterbody flows are low or absent, whenever feasible. Refueling and other maintenance would be conducted in areas distant from surface water and equipment would be checked daily for leaks. Any equipment or vehicles to be driven/operated in the floodplain or over water will be checked and maintained daily to ensure proper working conditions and prevention of leaks, and collection pans or absorbent pads will be placed underneath stationary equipment. Surface water quality would be maintained through the use of siltation fencing, wattle barriers, soil-stabilized construction entrances/exits, grass buffer strips, inlet protection, sediment traps, infiltration basins, etc. A spill prevention and emergency response plan will also be developed as part of the SWPPP. Due to the proposed pollution prevention BMPs/AMMs/CMs, adverse consequences to steelhead resulting from these activities are not expected to occur.

### **2.5.1.3. Vibratory and impact pile driving**

Construction will require the use of both vibratory and impact pile driving to place the permanent columns that will support the HSR tracks for at least eight waterway crossings, and to stabilize slopes and abutments. Use of impact pile driving would be minimized through first using vibratory pile driving or placement of cast-in-drilled-hole concrete piles to the extent feasible, before impact pile driving is employed. Temporary sheet piles for cofferdams will be placed via vibratory pile driving into the wetted channel to form a dry work area. When construction is complete, vibratory pile driving will be used to remove the temporary cofferdam sheet piles. The Authority is not proposing the use of temporary support piles or the installation of falsework in conjunction with pile driving for this project section. An Underwater Sound Control Plan (AMM-FISH-3) and a Fish Rescue and Salvage Plan (AMM-FISH-4) are also proposed as part of the project.

Pile driving near or in water has the potential to kill, injure, and cause death of steelhead through infection via internal injuries, or cause sensory impairments leading to increased susceptibility to predation. The pressure waves generated from driving piles into river bed substrate propagate through the water and can damage a fish's swim bladder and other internal organs by causing sudden rapid oscillations in water pressure, which translates to rupturing or hemorrhaging tissue in the bladder when the air in the swim bladder expands and contracts in response to the pressure oscillations (Gisiner 1998, Hastings and Popper 2005, Popper et al. 2006). Sensory cells and other internal organ tissue may also be damaged by pressure waves generated during pile driving activities as sound reverberates through a fish's viscera (Caltrans 2015). In addition, morphological changes (damage) to the form and structure of auditory organs (sacculus and lagenar maculae) have been observed after intense noise exposure (Hastings and Popper 2005). Smaller fish with lower mass are more susceptible to the impacts of elevated sound fields than larger fish, so acute injury resulting from acoustic impacts are expected to scale based on the mass of a given fish. Since juveniles and fry have less inertial resistance to a passing sound wave, they are more at risk for non-auditory tissue damage (Popper and Hastings 2009) than larger fish (yearlings and adults) of the same species. Beyond immediate injury, multiple studies

have also shown responses in the form of behavioral changes in fish due to human-produced noises (Wardle et al. 2001, Slotte et al. 2004, Hastings and Popper 2005, Popper and Hastings 2009, Vracar and Mijic 2011, Martin and Popper 2016, Pavlock McAuliffe 2016, Hawkins et al. 2017, Rountree et al. 2020).

Based on recommendations from the Fisheries Hydroacoustic Working Group (FHWG), NMFS uses an interim dual metric criteria to assess onset of injury for fish exposed to pile driving sounds (NMFS 2008a, Caltrans 2015, 2019). The interim thresholds of underwater sound levels denote the expected instantaneous injury/mortality, cumulative injury, and behavioral changes in fishes. Impact pile driving is normally expected to produce underwater pressure waves at all three threshold levels. Vibratory pile driving generally stays below injurious thresholds but often introduces pressure waves that will incite behavioral changes. Even at great distances from the pile driving location underwater pressure oscillations/noises from pile driving is likely to induce flight responses, hiding, feeding interruption, or area avoidance, effectively blocking natural fish movement and use of the affected area. For a single strike, the peak exposure level (peak) above which injury is expected to occur is 206 dB (reference to 1 micro-pascal [ $1\mu\text{pa}$ ] squared per second). However, cumulative acoustic effects are expected for any situation in which multiple strikes are being made to an object with a single strike peak dB level above the effective quiet threshold of 150 dB. Therefore, the accumulated sound exposure level (SEL) above which injury of fish is expected to occur is 187 dB for fish greater than 2 grams in weight and 183 dB for fish less than 2 grams. If either the peak SEL or the accumulated SEL threshold is exceeded, then physical injury is expected to occur. Behavioral effects may still occur below the thresholds for injury. NMFS uses a 150 dB root-mean-square (RMS) threshold for behavioral responses in salmonids and it is assumed that pile driving sounds less than 150 dB do not result in injury. Though the dB value is the same, the 150 dB RMS threshold for behavioral effects is unrelated to the 150 dB effective quiet threshold.

The Authority included a hydroacoustic analysis in the submitted BA (Authority 2020c), using anticipated pile sizes, the current alignment design, and the hydroacoustic data available in Caltrans (2015) to estimate probable underwater pressure outcomes. The pile sizes proposed in the alignment design are 16-inch concrete piles. In the current design, most piles to be driven using impact pile driving are located on land while 103 may be driven in water (major overcrossing #6, Llagas Creek). Sound levels produced by piles being driven on land are typically less than those of the same size driven in water. However, there are no data in Caltrans (2015) for 16-inch piles driven on land, so underwater information was used to represent the worst-case scenario. Data were reported for 16.5-inch concrete piles driven in water with a bubble curtain and data were reported for 18-inch concrete piles driven in water (Table 3).

Table 3. Real (observed field data reported in Caltrans (2015)) and assumed (\*) hydroacoustic outputs for in-water impact pile driving measured at 10 meters from the struck pile, selected to represent the underwater sounds expected from the HSR project.

<b>Pile Size/Situation</b>	<b>Attenuation</b>	<b>Peak</b>	<b>SEL</b>	<b>RMS</b>
16.5-inch	Bubble curtain	182 dB	159 dB	171 dB
18-inch	No bubble curtain	185 dB	155 dB	166 dB
*16.5-inch	None	187 dB	164 dB	176 dB

The analysis also assumes that up to 20 piles may be driven per day and that it would take 800 strikes to drive each pile (20 piles x 800 strikes = 16000 strikes per day). Currently there are no data supporting fish tissue recovery between pile strikes so all strikes in one day in which the affected waterbody experiences pile driving are counted together regardless if there is a break in between strikes. After an overnight period, or after 12 hours, accumulated SEL is considered reset to zero.

Using the assumed worst-case scenario underwater sound levels in Table 3 for a 16.5-inch concrete pile without attenuation, and 16,000 impact strikes per day, the Authority’s provided hydroacoustic analysis and the NMFS Pile Driving Calculator (NMFS 2008a) estimate that the distance that instantaneous mortality due to underwater pressures above the 206 dB peak threshold would be expected to occur is within 1 meter from the driven pile. For fish less than 2 grams (as would be expected in any areas containing spawning habitat, i.e., major overcrossings # 1, 2, 6, and 7) the distance at which injury is expected to occur due to cumulative SEL exposure above 183 dB is within 86 meters from the driven pile (Table 4). For fish above 2 grams (as could be expected in all wetted steelhead habitat locations), the distance at which injury is expected to occur due to cumulative SEL exposure above 187 dB is also 86 meters from the driven pile. The distance within which behavior changes are expected is 541 meters from the driven pile, where the RMS sound will be above 150 dB RMS. SELs below 150 dB are assumed to not accumulate or cause fish injury, or be significantly different from ambient conditions, (i.e., effective quiet).

Table 4. Estimated threshold distances to in-water adverse effects using assumed hydroacoustic metrics (187 dB peak, 164 dB SEL, 176 dB RMS) and 16,000 strikes/day, calculated by the NMFS pile driving calculator (NMFS 2008a).

<b>Underwater sound control measures</b>	<b>Peak (dB) ≥ 206</b>	<b>Cumulative SEL (dB) ≥187 Fish ≥ 2 g</b>	<b>Cumulative SEL (dB) ≥183 Fish &lt; 2 g</b>	<b>RMS (dB) ≥150</b>
No attenuation	1 meter	86 meters	86 meters	541 meters
Attenuation	0 meters	40 meters	40 meters	251 meters

Underwater sound control measures/minimization measures are incorporated into conservation measures proposed by the Authority and to the extent feasible whenever impact pile driving is performed (e.g., de-watered cofferdams, bubble curtains, and vibration-damping pile caps). Given that at least one underwater sound measure would be employed during impact pile driving, 5 dB assumed hydroacoustic dampening (182 dB peak, 159 dB SEL, 171 dB RMS) would result in no instantaneous mortality threshold distance, a reduction of cumulative SEL (for all sizes of fish) threshold distances to only 40 meters, and a reduction of RMS threshold distance to 251 meters from the driven pile, with 16,000 strikes per day (Table 4).

Though the underwater pressure waves are expected to affect relatively large areas of the wetted channels, the number of individual fish affected by pile driving is expected to be small due to the life history patterns of the fishes, the in-water/pile driving work windows, and environmental factors that limit fish use of a waterway, such as expected seasonal low flow patterns. Restricting impact pile driving to the in-water/pile driving work window avoids the primary migration periods of both CCC and S-CCC steelhead adults and juveniles in the action area, and should

also completely avoid egg incubation, alevins development, and fry emergence timing. However, rearing juveniles may remain in the action area throughout the year, including during the in-water work window. Therefore, juvenile steelhead are the life history stage principally at risk of exposure to pile-driving noise. In-water pile driving would start no earlier than June 15, which would limit the potential overlap between juvenile use of an area and hydroacoustic exposure, but not eliminate the risk. Adverse effects on juvenile steelhead would occur within areas subjected to pile driving and underwater sound levels associated with potential injury and behavioral effects, for as long as the pile driving is occurring. Underwater noise levels would return to baseline levels following cessation of pile driving. These adverse effects would occur for a total of approximately 44 days while work was completed (assuming that work at different sites is not concurrent, which would reduce the number of days needed).

In summary, any CCC or S-CCC steelhead juveniles present during the in-water/pile driving work window are expected to be adversely affected by the hydroacoustic effects produced by pile driving. These juveniles are expected to experience temporary disturbance of normal behaviors and migratory patterns from both impact and vibratory pile driving in-water and on land near waterways, and in a few instances, underwater pressure waves created by impact pile driving may cause injury and mortality. Because of the timing of the proposed work windows and fish use of the waterway, and what is known about the current abundance of these species in the action area, the overall number of individuals to be adversely affected is expected to be very low with perhaps at most one or two individuals experiencing injury. Otherwise, most will experience temporary increases to their risk of mortality from predation and reduced fitness from expending energy with a temporary reduction in feeding opportunity.

#### **2.5.1.4. Cofferdam installation, flow redirection, and dewatering**

During the in-water work windows, cofferdams will be installed on the river bank or near the water line to isolate and dewater areas below the ordinary high water mark (OHWM) before the construction. Cofferdams will be made of sheet piles, gravel-filled sandbags, or comparable materials. Any sheet piling will be installed around the work area to form a cofferdam via vibratory hammer pile driving (effects of vibratory pile driving examined above, section 2.5.1.3). Cofferdams are also effective as an underwater sound mitigation measure once installed. Dry work areas below the OHWM may also be established using sandbags, or other barriers similar to those listed above, in channels dry at the time of the start of work, installed before flows begin following local rainfall. This will redirect water around the active construction and maintain dry work areas while still allowing for stream flow in an alternate course. The alternative course may be some portion of the natural course, a pipe, or a constructed artificial channel.

Dewatering will be required when the isolated area contains ponded water within the work area portion of the isolation barrier, so that the soils below the OHWM may be accessed. Dewatering is projected to be employed at approximately 40 locations in the action area. Pumped out water will be directed or trucked to nearby infiltration pits/basins that will allow the water to return to the local water table without affecting in-stream water quality. Pump intakes would be screened to prevent the entrainment of juvenile or parr-sized salmonids from entering the pump system, screen mesh size determined according to NMFS (1997) guidelines. At the end of the work season, prior to the rainy season, water will be allowed to re-enter the work area by the isolating

structures and the alternate flow pathway will be decommissioned. The sheet piles will be removed via a vibratory hammer and the areas will be restored to pre-construction condition.

The adverse effects associated with cofferdam installation via vibratory pile driving are expected to be much less than the pile driving effects described previously. Vibratory pile driving is not anticipated to produce peak or accumulative SEL levels that would cause instantaneous mortality or internal injuries, however behavioral changes and physiological stress is expected. The effect size of these impacts are well contained within the distance limits estimated for in-water impact pile driving. Other types of isolation barrier construction (i.e., sandbags) are not expected to cause disturbance or harassment of steelhead beyond levels already analyzed in the general construction activities, section 2.5.1.1.

Entrainment of juvenile into the pump intakes will be prevented by using the screens specified by NMFS guidelines however even if properly screened, juveniles remain at risk of being impinged upon the screen surface when intake velocity of the pump exceeds the swimming capabilities of juvenile fish. Injury resulting from impingement may be minor and create no long-term harm to the fish, or result in injuries leading to mortality either immediately or at some time in the future after contact with the screen, including predation or infections from wounds and abrasions associated with the screen contact. As the pumping activities will all follow NMFS screening guidelines, injury to fish caused by impingement will be minimized. As pumping activities may occur for several years during construction, a portion of fish exposed to the pumping activities are expected to result in injury or death from impingement.

Given that isolation barrier construction will occur during the dry season/within the work windows and likely in dry streambeds in advance of stream flows and steelhead use, the risk of exposure through overlapping stream use is low. However, there is a possibility that cofferdam installation will need to occur in a wetted channel or isolated pools of suitable temperatures and expose juvenile steelhead to adverse effects. Steelhead could be exposed to adverse effects associated with elevated turbidities if trapped inside a cofferdam being dewatered and if dewatered water is discharged into surface waters and its water quality is not sufficiently controlled. While the dewatering and water diversion plan has not been fully drafted (AMM-GEN-21), it is assumed that construction will utilize silt/turbidity curtains while working in water to minimize the mobilization of sediments into the water column outside of the turbidity barrier, as occurred during in-water construction at the San Joaquin River for an HSR viaduct bridge.

Inside a cofferdam being dewatered, turbidity is expected to be elevated and trapped juveniles are likely to experience respiratory stress and potentially asphyxiate if not captured and relocated promptly (see section 2.5.1.5 below). Similarly, it is expected that any water pumped out during dewatering will either be managed by collection into an infiltration basin or discharged behind the in-water turbidity curtain to control the impacts to downstream turbidity levels. Because of these CMs, and previously analyzed turbidity control BMPs, it is not expected that downstream turbidity will increase from the discharge water pumped from cofferdams. Turbidity may be temporarily elevated shortly after flows are restored to a dewatered area or channel, but in light of expected turbidity levels in the first rain flush of the season (expected to co-occur with rewetting the work area), the additional temporary elevation in turbidity associated with the proposed action is expected to be indistinguishable from background turbidity levels.

A portion of the streambed may temporarily be unavailable for steelhead use while the isolation barrier is intact and dewatered, while simultaneously having stream flows redirected into an artificially constructed channel during the work window. While juvenile steelhead would be unable to rear or feed in the streambed bottom isolated due to the cofferdam or flow reroute, the relative amount of area removed from their access would be relatively negligible. Because the Authority proposes to constructing the artificial channels so that they meet NMFS fish passage criteria (NMFS 2011) to ensure the flow re-routes do not become passage barriers, changes to the movement patterns of fishes is not expected. Both of these impacts are temporary as the stream flow and streambed access would be restored following the seasonal removal of these structures.

#### **2.5.1.5. Fish capture, handling, and relocation associated with dewatering**

If water temperatures remain suitable during the in-water work windows, there is also a small possibility that juvenile steelhead may become entrapped or stranded during cofferdam installation or stream re-routing in wetted areas, and risk asphyxiation or experience mortality. They may become injured or die during the dewatering process while entrapped and are expected to experience higher levels of physiological stress at sub-lethal levels. Entrapped fish will require capture and release (AKA “fish rescue”) before they asphyxiate or the area is pumped dry to maximize their probability of survival and minimize the project’s harm and injury to listed fishes from dewatering activities. A fish rescue plan will be drafted and approved by NMFS before dewatering activities that may involve fish commence, and will include methods for minimizing stress and the risk of mortality from capture and handling of fish (see AMM-FISH-4 (Authority 2020c, a)).

Prior to any potential fish rescue or fish handling associated with dewatering, the Authority or its contractors will contact NMFS so that such activities can be coordinated, staff are aware and available to respond to the activities, and to help ensure minimal adverse effects to fish through appropriate capture and handling procedures. It is expected that the number of juvenile salmonids to require fish rescue and handling will be very low, due to the seasonal in-water work windows, expected low abundance, and because dewatering and pumping should only occur at each location once per construction season during cofferdam establishment.

Stranded juvenile CCC/S-CCC steelhead would likely experience increased stress levels, shock, and suffer mild injuries during capture and handling, even if seasoned fisheries biologists perform the fish rescue with appropriate equipment under ideal conditions. Some juveniles may be killed during capture, handling, or transport, while others may be disoriented at release, leaving them more susceptible to predation. Furthermore, fish are more likely to develop serious infections from small wounds inflicted during handling compared to unhandled fish. The expected rate of immediate juvenile salmonid mortality due to capture and handling is expected to be low (i.e., no more than 3% of the total number of juveniles relocated). It is also possible that some juveniles will avoid the capture methods and die while hiding due to asphyxiation extremely elevated turbidity in the available water, desiccation, or receive fatal wounds in the dewatering/fish capture process. These potential adverse effects would be expected to occur at any of the construction sites that require dewatering with the steelhead habitat model area. Ideally, construction would not commence until channels are seasonally dry, however some

juveniles may become entrapped in any ponded water within the construction zones. Though individual juveniles will experience increased stress and harm, it is preferable to capture and relocate them into connected aquatic habitat compared to the eventual mortality these individual would otherwise likely experience. Proposed CM AMM-FISH-4, which focuses on dewatering and fish rescue, was developed with technical assistance from NMFS staff and duplicated measures established in prior opinions dealing with Central Valley salmonids (Term and Condition 1i, (NMFS 2019)), and is expected to minimize stress, injury, and mortality of juvenile steelhead during capture and relocation to the greatest extent possible. Adults are not expected to become entrapped by a cofferdam/dewatering barrier and therefore would not be adversely affected by dewatering activities.

#### **2.5.1.6. Tunneling**

Much of the Preferred Alternative route from the California Central Valley to Gilroy (the Pacheco Pass Subsection) will be in a tunnel and tunneling/boring through the Diablo Range will be required. Tunnel boring has the potential to cause fractures in rock that can deplete groundwater levels and therefore could impact the hydrology of groundwater-dependent aquatic features on the surface (i.e., seeps, springs, creeks, and streams) and any SCCC steelhead using Pacheco Creek. There is no work window proposed for tunneling and TBM operations. To assess the potential for, and the likely magnitude and duration of, groundwater depletion, the following was evaluated:

- The tunneling methods to avoid and minimize short-term and long-term groundwater depletion
- Geologic setting
- How the tunneling methods and geologic setting combine to inform assumptions about the potential for effect
- The maximum spatial extent of groundwater depletion

There are two methods of tunneling being considered for HSR tunnel construction: TBMs and conventional methods. A roadheader is a more conventional method of tunnel excavation that consists of a boom-mounted cutting head, a loading device usually with a conveyor, and a crawler traveling track to move the machine forward into the rock face. The use of drill-and-blast techniques and hydraulic excavators may also be required. Both TBMs and conventional methods are likely to be used during construction, depending on the geology encountered.

The TBM-driven tunnels would be lined with bolted and gasketed concrete segments. These watertight segments would provide the primary groundwater control mechanism for the tunnel; therefore, significant long-term impacts on the groundwater system are not anticipated. However, temporary and localized impacts on the groundwater system may be experienced near the tunnel heading during excavation as a result of inflows at the tunnel face. This is of particular concern with a TBM operating in open mode and can be exacerbated by the use of pre-excavation drainage ahead of the face. The Authority plans to mitigate temporary impacts by using pre-excavation grouting to decrease the permeability of the ground around the tunnel or by using a pressurized TBM operating in closed mode to create a water barrier.

The conventionally excavated tunnels are currently anticipated to contain permanent formation drains behind the tunnel lining. This method has potential to result in permanent impacts on the local groundwater system in the area. For areas along the alignment identified as being sensitive to drawdown because of biological factors, the Authority plans to implement strict groundwater controls, may remove formation drains from the design plans in these section, and use a lining that would be designed as a watertight structure that would resist the full hydrostatic head.

The tunneling methods chosen, the pretreatment of the ground mass, and the tunnel lining design are significant factors in avoiding and minimizing groundwater depletion. At final build-out, groundwater intrusion into the tunnel would be an unsafe condition for train operations, and thus the tunneling methods and minimization measures employed are expected to avoid groundwater entry into the tunnel (and limit groundwater loss) as much as possible. It is also expected that the tunneling crew would seal the tunnel if and when leaks occur as quickly as possible during construction. The tunnel must be dry to operate the electrified HSR system, so all groundwater leaks would be permanently sealed when tunnel construction was complete, so impacts to the ground- and surface water levels are anticipated to be temporary and limited to the active tunneling period. The size and extent of temporary groundwater depletion would largely depend on the geology of the ground surrounding the excavation.

The proposed tunnels traverse the Diablo Range, one of three prominent northwest-trending physiographic features in the region, along with the Santa Clara Valley and southern Santa Clara Valley. The western and eastern margins of the Diablo Range are geologically composed of sedimentary rock described as the Great Valley Sequence, and the core or middle part of the Diablo Range consists of metamorphosed rock called the Franciscan Complex. The Great Valley Sequence is composed primarily of the Panoche Formation (unmetamorphosed sandstone, conglomerate, marine shales, generally considered weak rock for tunneling, HSR BA), while the Franciscan Complex is composed of Franciscan mélangé (deformed and variably metamorphosed rock) and metagraywacke (fine-to-medium grained, poorly sorted, homogenous, dense, gray sandstones) types. These sediment types were confirmed when encountered in previous HSR tunneling investigations (NLAA letter of concurrence issued by NMFS in 2018 to these activities (NMFS 2018b)) and other projects through the Diablo Range near the proposed route area (United States Bureau of Reclamation 1976, 1986, Geomatrix Consultants 2006).

Tunnel 1 begins at the southern end of the Santa Clara Valley (from Gilroy) and curves gently to the northwest, terminating near California State Highway 152 just south of the Casa De Fruta restaurant where the route emerges to cross Pacheco Creek. The proposed tunnel is approximately 8,200 feet long, has a maximum depth of ground cover of 700 feet, and would be excavated through the Panoche Formation. The Santa Clara Tunnel was also excavated from Panoche Formation material in the action area, it encountered: approximately 60 percent sandstone with shale interbeds, described as a blocky and seamy rock mass; approximately 25 percent shale with sandstone or siltstone interbeds, classified as crushed; and approximately 15 percent shear zones that may exhibit caving or squeezing conditions. These shear zones were reported in the Santa Clara Tunnel to vary in thickness from paper-thin clay gouge seams to zones of gouge matrix over 60 feet wide. Considering the length of Tunnel 1, it is anticipated that it can be excavated by either TBM or roadheader method. Based on the geologic terrain of the region but limited information on the water level in the nearby creeks, it is estimated that the maximum groundwater head for Tunnel 1 would be on the order of 250 feet. For the Santa Clara

Tunnel, 95 percent of the tunnel was driven with less than 15 gallon per minute (gpm), or 0.04 cfs, inflows at the heading and 5 percent of inflows exceeded this amount. Groundwater inflows for the Santa Clara Tunnel decreased significantly within several days. Groundwater inflows into Tunnel 1 are anticipated to be similar.

Tunnel 2 begins approximately 3 miles east of the Casa De Fruta restaurant and exits the Diablo Range near Santa Nella, California. It has a total length of approximately 13.5 miles, with a maximum cover depth of 1,200 feet, and the encountered sediments vary. The groundwater depletion analysis for Tunnel 2 was broken down into subsections in the BA but is summarized here. Considering the length of Tunnel 2, the Authority anticipates that it will be excavated using TBM methods. It is estimated that the maximum groundwater head encountered could be on the order of 550 feet or tunneling could encounter a perched water table to the west of the active Ortigalita fault with significant amounts of water. In addition, the Ortigalita fault also intersects the San Luis Reservoir to the south, which could allow some water to flow along the fault from the reservoir. This is based on the groundwater levels estimated from a limited number of borings that were drilled in the area for the Pacheco Tunnel Reach 2 geology investigation (NMFS 2018) and the water level in the nearby creeks. Soil conditions around Tunnel 2 are anticipated to consist of mostly moist conditions, with anticipated local heading inflows likely of 200 gpm (0.54 cfs), down to less than 15 gpm in other areas. For the extreme combination of high rock mass permeability and high groundwater head (near Ortigalita fault and nearby San Luis Reservoir), temporary heading inflows greater than 200 gpm could occur. According to available data of other geotechnical activities, groundwater inflows decreased significantly within several days. Groundwater inflows into this section of Tunnel 2 are anticipated to be similar.

Based on the information gained from construction of the Irvington and Arrowhead tunnels (water conveyance tunnels), it is expected that the proposed HSR tunnel construction will likely affect groundwater and surface water resources within a maximum distance of approximately 1 mile from the tunnel alignments, but with most effects occurring within 0.25 to 0.5 mile of the tunnel alignments (Authority 2020c). Most resources within 1 mile of the tunnel alignments are expected to experience limited effects and the effects on surface water would be indistinguishable when compared to natural variability. The groundwater and surface water resources that directly overlie or are near the proposed tunnel alignments are anticipated to have the highest potential to be affected by tunneling. Effects on surface water features are expected to be temporary, lasting months to years after the tunnels become watertight.

Surface water conditions and flows in Pacheco Creek and supporting tributaries are ephemeral and dependent on annual rains. Potential groundwater depletion due to tunneling is a high concern in areas where the tunnel route occurs directly underneath the surface water features that are also designated S-CCC steelhead critical habitat (though this is not to say groundwater depletion is not of concern along the rest of the route in the S-CCC recovery domain). Pacheco Creek and Pacheco Creek South Fork exist over proposed tunneling Stations 3480 to 3520. In this section, the Authority predicts that some heading inflows may be 200 gpm or more temporarily, until tunnel leaks are sealed. 1 cfs of flow is approximately 374 gpm, so most of the impact would be less than 1 cfs of groundwater flow. Therefore, even if 200 gpm directly translated into an equal depletion of surface water, at most a temporary deficit of 0.5 cfs would be expected to be experienced by the surface water in Pacheco Creek. This deficit amount would

only be expected to negatively impact egg, alevin, fry, or juvenile survival if a dry year type had already caused surface water elevation to be critically low.

Given the ecology of S-CCC steelhead using this area, this potential amount of flow deficit would likely only have adverse consequences if redds containing eggs existed in the overlying waterbodies *and* surface water conditions were already experiencing low or critically low water year conditions. The most serious outcome of tunnel dewatering would be reduced water quality and flow conditions of incubating redds with developing redds or alevins, which would lead to increased embryo/fry mortality and decreased production potential for the Pacheco Creek population. Outcomes for emerged fry to adult S-CCC steelhead could range from temporary displacement from the critical habitat to entrapment in pooled areas, depending on the extent of surface water draw down. Supplemental water with suitable water quality parameters may be sufficient to avoid redd failure, while fish capture and relocation (fish rescue) could be employed to avoid mortality to other S-CCC life stages. To further reduce the risk to species such as steelhead that may be using surface water during critical and sensitive life history periods, the Authority proposed AMM-GEN-18, which is to prepare and implement a groundwater adaptive management and monitoring program (GAMMP) prior to, during, and after tunnel construction. NMFS would be included in the program review and receive updates from the GAMMP, which aims to monitor and detect changes to groundwater before consequences manifest to overlying biological resources. The GAMMP will establish baseline groundwater and surface water hydrology conditions and the Authority will use these data to develop a model to predict if and how groundwater and surface water impacts are likely to occur.

In conjunction with the GAMMP monitoring, the Authority has also proposed to remediate adverse effects of tunneling on habitat function if the GAMMP detects deficiencies in surface waters that would lead to adverse effects to listed species. Specifically, supplemental water would be secured and made available to make up for any deficits in surface waters, according to a Pre-Tunneling Supplemental Water Provision Plan. The quality of the supplemental water would be determined in the Pre-Tunneling Plan and established considering the life history needs of the species present and typical baseline conditions for the given season and water year (Authority 2020a), including considering temperature, pH, and dissolved oxygen requirements. NMFS would receive regular reports on the surface and groundwater conditions as tunneling progressed.

The Authority proposed to discharge treated groundwater inflows back into receiving waterbodies. This would provide opportunities for water to percolate back into the water table, recharge downstream aquifers, and offset potential downstream reductions in groundwater levels and stream flows. Additionally, the Authority would consider using the treated effluent from the active treatment system to provide supplemental non-potable water as needed based on construction monitoring and adaptive management triggers, but only if the effluent meets appropriate water quality standards for the end use of the water. Providing adequate levels of water quality treatment to meet water quality standards for discharges into receiving waterbodies or reuse as part of the adaptive management program is expected to be challenging due to high pH levels associated with exposure to cement grouts and concrete as well as other construction materials in the interior of the tunnels. To meet water quality standards for beneficial reuse, settling ponds, storage tanks, and a series of treatment systems may be necessary. Only treated groundwater that meets appropriate water quality standards, as outlined in the GAAMP in

coordination with the applicable resource agency, would be beneficially reused or discharged into receiving waterbodies.

While extent of water drawdown is not completely predictable at this time, groundwater resources are expected to recover from any tunneling effects by being recharged by natural precipitation. However, recharge could take months to years after the final tunnel lining system is installed, and there is a very low probability that groundwater and surface water hydrology could be permanently altered to the detriment of S-CCC steelhead. As such, the Authority proposes to compensate for this loss of habitat if it is determined through direct monitoring or data interpretation that substantial disruption (i.e., loss of 0.5 acre or greater) to habitat supporting special-status species has likely occurred during or after construction of the tunnel, and that habitat restoration efforts did not achieve success criteria or that such restoration was determined unfeasible.

Another effect of tunneling or excavating underground considered is the vibration from the operation of the tunneling machinery. The operation of the TBM will create vibrations that could propagate through the substrate and into the water column, which could affect steelhead if present in overlying waterbodies concurrent with tunneling excavation. Caltrans (2015) does not report any source levels associated with tunneling, but National Grid (2018) does report underwater sound levels in the water column immediately adjacent to an operating TBM. The reported sound levels there are 178 dB peak and 175 dB RMS. Therefore, it is assumed the TBM would generate continuous sound disturbance similar to a vibratory driver. As such, injury and accumulative effects would not be anticipated but, assuming that these source levels were measured at 10 meters from the TBM, the 150 dB RMS behavioral criterion would be exceeded within 464 meters of the TBM and steelhead using the waterway would alter their normal behaviors, including leaving the area or sheltering in place and experience elevated stress levels until TBM operations underneath the waterway ceased.

In summary, tunneling may have adverse consequences to S-CCC steelhead that use the Pacheco Creek watershed. There may be temporary deficits in the surface flow of overlying waterbodies that could negatively affect the survival of sensitive early life stages of S-CCC steelhead if tunneling dewatering occurs at the same time S-CCC steelhead are using the waterbodies. However, after considering the information provided on prior tunneling efforts in the region and, assuming that groundwater outflows will be similar, and evaluating the Authority's proposal to offset any measureable decreases in available surface water with supplemental water of sufficient quality the surface water reductions, changes in surface flows would be expected to occur for no more than two years, as the tunnel will be sealed as track/tunnel progress is completed and, would be expected to result in a less than 1 cfs deficit, if measureable at all after supplemental water is released. The groundwater tables are expected to return to normal levels quickly, based on data from past tunneling projects that occurred locally, and therefore no lasting impacts to the S-CCC steelhead population are expected due to tunneling, nor is it expected that tunneling will change the functionality of the designated critical habitat of Pacheco Creek in the long-term. During TBM and excavation operations under S-CCC waterways, behavioral changes and physiological stress are expected as the machinery creates vibrations similar to those of vibratory pile driving, while operations are ongoing and during the period when fish are using the waterways. Adverse effects from beneficial groundwater recharge from tunnel dewatering are not expected because flows ultimately discharged to surface waters containing S-CCC steelhead

would be closely monitored to ensure the discharged waters meet strict water quality standards that would not be expected to harm steelhead.

#### **2.5.1.7. Curing new concrete**

The pouring of new concrete may negatively affect water quality by increasing the pH of water in contact with curing surfaces, though the amount the curing cement will increase pH in water decreases over time as the concrete cures. These pH changes can affect fish to varying degrees through direct damage to gills, eyes, and skin, and interfere with fishes' ability to dispose of metabolic wastes (ammonia) through their gills (Washington Department of Fish and Wildlife 2009). In addition, alkali may leak from freshly cast concrete for some time after curing if in contact with water, up to several days to months depending on the water in the water-cement ratio of the mix (CTC & Associates 2015).

Because the casting and curing of concrete will be done “in-the-dry,” the potential that the curing concrete will adversely affect water quality and fish health is greatly reduced. New concrete is expected to mature and be practically inert within six months after casting, but it is possible that raised river heights caused by rain in the months following project completion may cause water to be in contact with the concrete before curing is complete. The relatively larger amount of stream volume expected when the concrete is in the last stages of maturing and is in contact with raised water levels is expected to dampen any potential changes in pH of stream water from contact down to immeasurable differences due to volumetric dilution, even if listed fishes are present while the cement is still precipitating alkali. Therefore, adverse effects to steelhead from chemical changes from new concrete are not expected to occur. Once the concrete is completely cured and chemically inert, potential pH changes are expected to cease.

#### **2.5.1.8. Vibration and noise from HSR train operations**

Once the California HSR system is completely constructed and regular ridership commences complete with regular schedules, trains running on the viaducts and tracks may disrupt normal fish behavior due to the noise and vibration that comes from high speed operation of the rolling stock and passenger cars. Japan's Shinkansen HSR is reported as running up to thirteen trains in each direction at peak hours with (Central Japan Railway Company 2019), sixteen cars in tow each (likely out of the major metropolitan hub of Tokyo, Japan). While it is currently unknown if the California HSR system will eventually run as many trains as the Shinkansen system per hour over CCC/S-CCC steelhead habitat waterways, it is expected that daily disturbance due to the train's schedule could occur often throughout the day and night once the system is in operation.

Quantification of the effects of HSR systems on aquatic organisms or fish is lacking, however it is generally accepted that transportation noise pollutes aquatic and marine environments (i.e. ship traffic in waterways and automotive and rail traffic over bridges permeating into the aquatic environment (Popper and Hastings 2009, Martin and Popper 2016, Pavlock McAuliffe 2016, Hawkins et al. 2017)), and that HSR systems regularly cause disturbance to human residents that live in close proximity to tracks in operation (Yokoshima et al. 2017), therefore disturbance to fish utilizing habitat under viaduct crossings is similarly expected. Studying fish responses to varying levels and types of transportation/disturbance sounds have produced unclear results (Federal Railroad Administration 2012), however, it can be assumed that due to the speed, wind

shear, and vibrations that will be associated with the HSR operations (Hunt and Hussein 2007), fish will be startled as engines and passenger cars pass overhead throughout a 24-hour period. A study of ambient noise in large rivers with variously-sized bridges carrying both automotive and train (passenger or freight was not specified) overhead (Vracar and Mijic 2011), observed a maximum is at 22 hertz (Hz) with a mean level of 95 dB approximately 3-5 kilometers from the bridges, roads, and railways at the most comparably-sized river. While the waterbody sizes in this study were different than the areas being analyzed in this opinion, the trains running overhead in the study would likely be louder than the HSR system, and the measurement was taken from quite a distance away from sources, it offers insight into the expected maximum impact to the underwater sound environment from regular HSR operations, which are expected to be much quieter.

There are some mechanisms the Authority can incorporate to dampen operational vibration and sounds that transmit down the columns into the river channel and water column, but it is currently undecided which if any dampening tactics will be used and to what degree they will be incorporated into the track design (Authority 2019c, d). Adult steelhead that are temporarily startled by vibrations or sound are expected to leave the immediate area, moving either upstream or downstream. This would alter their migration and holding patterns. Juvenile steelhead are also expected to be startled and alter their migration patterns, and their foraging and resting behaviors. An unwarranted startle response would make juveniles susceptible to attack from piscivorous predators and increase their risk of mortality. Adverse effects associated with noise and vibration from train operation are expected to persist in perpetuity, as long as the HSR system is in operation.

## **2.5.2. Consequences to critical habitat**

### **2.5.2.1. Site preparation and vegetation removal**

Site preparation is required and will likely occur early in the seasonal near-water work window periods (April 30 onward) and will include pre-construction surveys, sensitive habitat identification, the installation of exclusionary fencing, and other similar BMPs intended to minimize impacts to natural habitats. Site preparation will also include earth moving, leveling, slope grading, excavation, road installation, and relocation or installation of HSR utilities. In the process of preparing the site for major construction, riparian vegetation and trees may be trimmed or removed for construction access and permanent structure placement. The consequences to individual fish from general construction activities near waterways is discussed above in section 2.5.1.1; this section will analyze the consequences of vegetation removal from site preparation and construction on the functionality of the critical habitat impacted by these activities.

The expected decreases in riparian vegetation will create physical changes in the habitat, which are expected to cumulatively decrease the survivorship of juvenile steelhead that use the area (Bjornn and Reiser 1991). Changes in vegetative cover can influence the macroinvertebrate prey assemblage, through alterations in shading, water temperatures, and nutrient inputs, to one less supportive of juvenile growth (Meehan et al. 1977). Removal of riverine vegetation will also reduce the natural cover that was previously available on site and reduce the general habitat complexity that would otherwise be beneficial to rearing steelhead's growth, survival, and

eventual migration out of freshwater. Particularly, at major overcrossings #5 through 8, riparian vegetation removals would decrease habitat complexity in stretches of streams that are already relatively sparsely covered due to long-term anthropogenic modifications and urbanization. Removing riparian trees also removes potential sources of large woody debris input over the long term, a legacy issue for critical habitat in the action area.

The Authority proposes to replace all removed vegetation with native plants on-site to resemble the existing community and to use ‘soft’ approaches to bank erosion where feasible, including vegetative plantings in bank stabilization efforts. Though the Authority has proposed to replant the disturbed areas with native riparian species (plan forthcoming, anticipated at a higher ratio than what was removed), there will be temporary reductions of vegetative cover at all crossing construction locations until the plantings establish and flourish. The period of reduced riverine vegetation functionality will begin when site preparation commences and will persist for several years while construction is ongoing, until replanting occurs. The replanting will likely take at least one year to execute, and it will be several years to decades until the vegetation matures to the pre-disturbance state, depending on the age of the trees removed. During this lengthy interim, juvenile steelhead are expected to experience reductions to their individual fitness due to these habitat changes. After the disturbed areas are fully restored with native plantings and ‘soft’ bank stabilization methods, there is potential for the critical habitat to be of greater complexity and functionality than its current baseline status, in some of the more degraded areas.

#### **2.5.2.2. Installing hard armoring and bank/slope stabilization measures**

Riprap/revetment will be placed into some stream banks throughout the action area, and several large slopes will be permanently stabilized near Pacheco Creek, to protect and secure the HSR tunnel portals, viaduct column footings, access roads, and other structures placed in stream channels within the OHWM or floodplain areas. As previously stated, “soft” approaches which incorporate vegetative plantings and large woody debris into the stabilization and revetment designs will be used to the extent possible. A combination of both tactics will likely be used at each site to maintain a more natural riparian corridor and maintain or increase steelhead habitat functionality, while ensuring bank and slope stability.

The consequences of installing bank armoring and slope stabilization on individual fish is covered under the discussion of general construction effects, as described in section 2.5.1.1. Once installed, hard revetment or riprap on stream banks removes the marginal shallow water habitat at the water/bank interface that provides refugia for rearing steelhead due to its shallow water prism, reduces the total amount of riparian vegetation that could be established in the future through physical occupation, changes the prey base through alteration of the benthic substrate type and local water dynamics, and often provides ambush habitat for non-native piscivorous fishes which are attracted to artificial hard surfaces with stark shading (Tiffan et al. 2016). In addition, the act of bank stabilization is expected to prevent normal stream processes from occurring, like natural stream braiding and erosion processes, which would otherwise create the habitat complexity that supports rearing salmonids and provide gravels for spawning or host prey species. Instead, the placement of any riprap or revetment is expected to perpetuate the channelization and homogenization of affected streams into the future. Therefore, the habitat changes that follow placement of the riprap is expected to have a negative impact through

alteration of freshwater rearing habitats of juvenile CCC and S-CCC steelhead and will likely decrease their survivorship and growth in the area (Knudsen and Dilley 1987, Fischenich 2003).

Major slope stabilizations near Pacheco Creek will remove the possibility of those sediments gradually eroding and becoming a source for gravels in Pacheco Creek used by S-CCC steelhead. This will be detrimental to rearing habitat PBFs, because stream sediments are habitat for macroinvertebrate prey necessary to support juvenile growth, and to spawning habitat PBFs through removal of a portion of the source of spawning gravels in Pacheco Creek. However, the size of the permanent slope stabilization (though a large public work at a human scale) is relatively minor compared to the amount of area still available to contribute gravel upstream for natural erosion processes and gravel supply to this watershed, it is not anticipated that the slope stabilizations will have a measurable effects on the sediment type, size, or amount available to S-CCC steelhead critical habitat PBFs in Pacheco Creek.

### **2.5.2.3. Placement of permanent HSR structures and associated shading**

At least eight major overcrossings would be constructed or modified as part of the proposed action, spanning waterways and stream channels used by CCC and S-CCC steelhead and hosting their designated critical habitat, in perpetuity. Some overcrossings are new structures, while others may utilize or retrofit existing railroad bridges in a blended service pattern or completely replace existing overwater crossings to become dedicated HSR structures. The crossings span, at the smallest, at approximately 100 feet in length and 80 feet in width, and, at the largest, 450 feet in length and 430 feet in width. Estimates indicate the structures would cover approximately 0.13 acres up to 2 acres of steelhead habitat at each overcrossing, for an approximation of a little less than 1 acre of habitat covered by HSR structures at each major crossing location, directly covering at total of 6.56 acres of steelhead habitat, including spawning habitat, rearing habitat, and migration corridors depending on location.

Overwater structures affect the amount of light that reaches the water column and the bottom of a streambed, which limits or prevents riparian and aquatic plant growth underneath and around the structure due to shading. Introduced shade has cascading effects on the benthic ecosystem immediately underneath the structure. This changes the type and amount of prey available to rearing juvenile steelhead that use these areas. Also, the shade created by artificial structures is drastic or sharp compared to that cast by overhanging vegetation (i.e., low and wide structures create stark high light and low light areas in the water column/substrate, versus the gradual and diffuse shading created by tree leaves). Predators are likely to hide in the shadowed areas to ambush prey, such as juvenile salmonids, coming in from bright light areas with greater success compared to predators not hiding in stark shadows (Helfman 1981). In some cases, overwater structures can serve as novel roosting or nesting for piscivorous birds (PFMC 2014), however at this time avian predators are not a notable source of mortality for juvenile salmonids in the recovery plans for the Santa Clara basin (NMFS 2013, 2016c, d). Therefore, the localized shading below the overhead crossings will cause negative changes to the rearing habitat PBFs in ways that are expected to reduce the overall fitness and survivorship of juvenile steelhead that must use the waterways.

The footings of the support columns of the HSR viaduct crossings will also permanently and physically occupy riparian and floodplain habitat due to their placement in these natural areas,

though the Authority has designed the viaduct crossings to avoid placement in the active water channels to the extent practicable. While most of the support columns and footings will not be in water during normal flow conditions, during periods of flood flows or a wetter than average water year, the column footings are likely to interact with the stream flow as water levels rise. These structures will create a new source of water turbulence as they interact with the flows, and affect the water velocities steelhead will experience while using the areas under the viaduct crossings. In addition, the change in hydrodynamics around the hard artificial structures has the potential to create abnormal erosion and sediment deposition rates upstream and downstream from the supports and footings (Oregon Water Resources Research Institute 1995). Since Pacheco Creek hosts steelhead spawning habitat (i.e., available gravel), the area is also expected to provide suitable habitat for the benthic macroinvertebrate prey of rearing steelhead (Merz 2001, Merz and Ochikubo Chan 2005). Therefore, scour around these footings may remove or alter the local gravel beds and deposits, degrading PBFs of juvenile rearing habitat and adult spawning habitat.

The Authority has proposed to offset the occupational footprint of the viaducts over riparian habitat used by steelhead through compensatory mitigation (CM-FISH-1, discussed below in section 2.5.1.7). To reduce the overall impacts to channel dynamics from permanent structures, AMM-FISH-1 identifies that:

- The design-build team will minimize, to the extent feasible, the placement of footings and columns within the active channel (between top of bank) of steelhead critical habitat.
- The Authority will coordinate with NMFS and the USFWS and request review of design between approximately 75 and 90 percent design completion.

To address scour and sedimentation impacts, proposed AMM-GEN-46 also identifies that:

- Piers will be oriented parallel to the expected high-water flow direction to minimize flow disturbance.
- Engineering analyses will be conducted on the channel scour depths at each crossing to evaluate the depth for burying the bridge piers and abutments. Implement scour-control measures to reduce erosion potential around the piers and abutments.
- Bedding materials will be placed under the (revetment) stone protection at locations where the underlying soils require stabilization to prevent winnowing of soils as a result of streamflow velocity.

There is also a possibility that overwater HSR crossing structures may require nighttime lighting for operational safety reasons. It is likely that both juvenile steelhead and piscivorous predators will be attracted to night lighting in waterbodies in which they co-occur, degrading the value of rearing and juvenile migration PBFs in the area by concentrating predators and increasing the risk of mortality to individual juvenile steelhead over time at lighted locations.

Adverse effects to CCC and S-CCC steelhead critical habitat PBFs, especially to those necessary for juvenile fitness, are expected to occur due to the placement of permanent structure in and over waterbodies hosting steelhead spawning, rearing, and migration habitat and these adverse effects will persist as long as the structures remain. These long-term adverse effects are expected to be largely remedied by incorporating plantings and large woody debris in nearby bank

stabilization structures, or by installing fish habitat in the form of large woody debris such as root wads near pier footings to provide juveniles with escapement cover.

#### **2.5.2.4. Installation of culverts and wildlife crossings and implications for PBFs of migration habitat**

Several HSR crossings and proposed wildlife crossings will require the use of culverts or box culverts over CCC/S-CCC steelhead waterways; the project section is expected to require the use of twelve culverts according to the BA. While also causing the same adverse effects to critical habitat described above in connection to the placement of artificial structures and bank stabilization, modifications to confine and redirect streambeds like culverts also have the potential to restrict or prevent the movement of steelhead, affecting migratory corridor PBFs. Adverse impacts on the connectivity between spawning areas, rearing habitat, and estuarine rearing habitat will have adverse consequences for all life stages and therefore on the recovery potential of the populations that use affected waterways. Urban development and the associated implementation of transportation projects and railroad bridges are specifically listed as a threat to CCC steelhead through habitat modifications in their recovery plan (NMFS 2016d).

AMM-GEN-27 addresses HSR effects on wildlife movement, including influences of culverts and bridges on steelhead passage and migration corridors. While balancing the needs for terrestrial species to pass through the wildlife crossings on a dry portion of the crossing width, the CM proposes to use native earthen bottoms, avoidance of using artificial lights to wildlife crossing approaches, and that culverts and bridges within steelhead habitat replaced or modified by the proposed action will meet CDFW (2004) and NMFS (2011) fish passage requirements and be developed in coordination with NMFS staff (Authority 2020a). Because the culverts and box culverts are designed and constructed with technical assistance from NMFS as proposed, adverse impacts on migratory PBFs are not anticipated. Furthermore, more detailed culvert and box culvert designs would be required to enable analyses on passage conditions at different flow amounts, and additional incidental take coverage would be required if NMFS found that fish passage was restricted by the culvert designs selected.

#### **2.5.2.5. Impacts from HSR system operation over time**

##### *General HSR System Operation*

Currently, the state of California's electricity grid would power the HSR system, and is expected to require less than 1% of the state's future projected energy demands (Authority and FRA 2018). Because the power supplied by California's electricity grid is not necessarily from 100% renewable clean energy sources at this time, the Authority will instead obtain the quantity of power required for the HSR system by paying a clean-energy premium for the electricity consumed, with a goal of a net-zero rail system (Authority 2019b). Renewable energy sources such as sun, wind, geothermal, and bioenergy are cited as options. Over time, use of such renewable sources would be expected to decrease the amount of carbon released into the atmosphere; however, if hydropower was utilized, the perpetuation of greenhouse gas release from reservoirs could be considered an adverse effect of the HSR system (Deemer et al. 2016). Additionally, reliance on hydropower for electricity would likely be further linked to the decline of salmonids in California as dams continue to block salmonids from a majority of their

spawning and holding habitats (NMFS 2013, 2014, 2016c, d), as well as controlling and adversely altering the water flow and water temperature regimes downstream. Since hydropower is not cited as a possible renewable energy source for the HSR system, it is not expected that the creation of the electricity used to power the high speed trains will cause adverse effects to listed salmonids or their designated critical habitat beyond baseline conditions.

### *Operational Pollution and Stormwater*

While the HSR system is a passenger train designed to run on electricity and will not carry any cargo composed of hazardous material (Authority and FRA 2018), other sources of pollution are still expected to occur. While the exact vehicle type has not been selected, the HSR will use electronic propulsion power supplied by an overhead system on a steel-wheel-on-steel-rail track. Such systems are widely regarded as one of the least polluting transportation systems available, with the Japanese Shinkansen touting 1/8 to 1/12 the carbon emissions per passenger as an airplane for the same distance (Central Japan Railway Company 2019). However, all trains and machinery require lubricants that release PAHs, and the braking system will also release heavy metals and other compounds during breaking as the breaking pad materials are worn down and degraded by use (Brooks 2004, Burkhardt et al. 2008, Bobryk 2015, Levengood et al. 2015). Therefore, train operations are expected to contribute low-levels of heavy metals such as zinc, copper, lead, nickel, manganese, chromium, and iron to the environment immediately near tracks, and most studies indicate that the concentration of these metals and PAHs increases drastically at station platforms and at maintenance yards (Bukowiecki et al. 2007, Wilkomirski et al. 2011, Wilkomirski et al. 2012).

The Authority proposes to capture all stormwater runoff from created impervious surfaces (Authority and FRA 2018, Authority 2020c). In other sections, all stormwater runoff created by the HSR system, including the tracks, support structures, maintenance facilities, stations, passenger parking lots, and ROW access roads will be redirected as sheet flow into adjacent drainage systems or swales to infiltration basins designed as water quality control measures. No runoff from the proposed action will be directly discharged to any surface water body, including runoff from bridges, overpasses, underpasses, and aerial structures. The Authority is implementing LID designs and other stormwater BMPs to manage and treat stormwater and protect water quality as it leaves HSR station and passenger parking lot areas. Measures may include vegetated stream setbacks, vegetated buffer zones, tree planting and preservation, and/or vegetated swales (bioswales), in accordance with the Phase II Small Municipal Separate Stormwater Permit (State Water Board Order 2013-0001-DWQ). In addition, there are some studies that suggest that the green spaces created by railway ROW can be beneficial habitat for wildlife when not disturbed by regular railway operations (Lucas et al. 2017).

The exact stormwater control and treatment designs are still forthcoming, but due to the high degree of stormwater management attention in the BA (Authority 2020c), in addition to (Authority 2019g) public stormwater outreach efforts and LID stormwater control design plans in past documents (Authority 2012), it is anticipated the Authority will adequately control and treat all transportation pollution created by operation of the HSR system before discharge. Therefore, it is not expected that steelhead water quality or water quantity PBFs in critical habitat will be degraded or adversely affected through the introduction of heavy metals, PAHs, tire wear particles, and other general transportation pollution created or introduced by the project. In

addition, it is expected that the HSR system will decrease the amount of passenger vehicles driving between the California Central Valley and the Santa Clara/San Jose Bay Area serviced by the system; therefore, overall transportation pollution that stormwater carries into adjacent waterways may decrease over time as HSR ridership increases and vehicular use decreases, potentially improving water quality over time.

### *HSR System Maintenance*

As with any major transportation or infrastructure system that provides a service to the public, the Authority will perform regular structural, erosion, and disaster (flood, fire, and earthquake) safety checks to ensure the integrity of the tracks and support columns of the HSR system. Such protocol formations are in their infancy, and draft plans are not available to review, however it is assumed that some safety checks will be performed on these viaduct crossings and require personnel to be in close proximity to the river channels, and possibly require putting personnel or equipment in water. NMFS expects that the Authority will be in contact with staff when draft safety check protocols are available so that a determination can be made regarding listed salmonid interactions with Authority staff and actions at that time.

Similarly, it is expected that vegetation control near HSR tracks and column footings will be required in the future. Vegetation control plans and protocols have not been drafted, but these activities would likely include manual removals, such as trimming and “weed whacking”, and also some forms of herbicide application. If vegetation control is required in the riparian corridor, in floodplain habitat, or near waterways containing listed fish, the Authority will need additional ESA section 7 consultation with NMFS to ensure adverse effects to steelhead critical habitat are minimized and incidental take coverage is obtained prior to the commencement of such activities.

### *Catastrophic Accidents*

A catastrophic derailment of the system while running is possible and a crash from a viaduct would certainly affect the immediate riparian environment around and below the accident, if a derailment were to occur while crossing a waterway. However, rigorous safety testing, which will occur before passenger trips commence, and many safety protocols will be followed during regular operations, so a derailment occurring at all is extremely unlikely. The comparative Japanese Shinkansen system has been in operation since 1964 and has no record of fatalities, injuries, or derailments (Sim 2017), despite some lapses in inspection protocols and material vetting before an oil leak was discovered and resolved on December 11, 2017. However other HSR systems have experienced crashes or derailments, such as the Santiago de Compostela rail disaster in 2013, the Wenzhou train collision in 2011, and the Eschede train disaster in Germany in 1998 (Wikipedia 2019). Compared to the total number of HSR systems in operation worldwide and the number of their lines and daily trip schedules, and their overall safety record, the occurrence of a derailment or catastrophic crash in the California HSR system would be is not expected to occur.

### 2.5.2.6. Compensatory Mitigation

As part of their proposed action, the Authority has proposed replanting and restoring habitat areas disturbed temporarily by HSR system construction, including augmenting or improving steelhead habitat as part of the project design whenever feasible. However, spawning, rearing, and migratory PBFs of steelhead habitat, including some in CCC/S-CCC steelhead designated critical habitat, will be permanently occupied by HSR structures, permanently over-shaded by HSR structure, or otherwise permanently modified in adverse ways by HSR actions. Also, some minor tributaries, canals, and other waterbodies (not part of designated critical habitat) are proposed to be permanently removed for the proposed maintenance facility and at sites subject to extensive cut-and-fill activities for slope stabilization. These waterbodies that are proposed for permanent removal only include areas that S-CCC steelhead may potentially use for rearing if sufficiently inundated in years with above average rainfall. Some of the waterbodies proposed for permanent removal are engineered agricultural discharge channels and stock ponds, and though several are ephemeral tributaries to steelhead creeks, these waterways do not contain rearing PBFs of good quality and are largely unsuitable or undesirable for steelhead use. Permanent removal of waterbodies will result in all current habitat functions supported by those waterbodies, and any future potential habitat functions, being lost. Removal of these waterbodies is not expected to have a measureable effect on PBFs associated with water quantity downstream because is not expected to alter flow patterns or water availability in the main designated critical habitat stream channels, as rain water entering the watershed will either enter the creeks through another pathway or infiltrate to the groundwater table, which will also maintain the surface water flow. The Authority proposes compensatory mitigation for the permanent removal of waterbodies accessible to adult or juvenile steelhead.

Table 5. S-CCC steelhead habitat amounts estimated to be impacted by the project (acres rounded from provided data, CH = designated critical habitat).

<b>Habitat Impact Type</b>	<b>Vegetation Removal (acres)</b>	<b>Dewatered or Benthic/Streambed Disturbance (acres)</b>	<b>Permanent Artificial Structures (acres)</b>	<b>Total Impacted Acreage</b>
Temporary Impacts to CH	22.57	18.95	0.44	41.96
Permanent Impacts to CH	22.28	1.67	8.61	32.56
Impacts to Other Steelhead Habitat	0.11	1.73	3.49	5.33

Table 6. CCC steelhead habitat amounts estimated to be impacted by the project (acres rounded from provided data, CH = designated critical habitat).

Habitat Impact Type	Vegetation Removal (acres)	Dewatered or Benthic/Streambed Disturbance (acres)	Permanent Artificial Structures (acres)	Total Impacted Acreage
Temporary Impacts to CH	0	0	0	0
Permanent Impacts to CH	0.18	0	0	0.18
Impacts to Other Steelhead Habitat	1.46	1.21	0.90	3.57

Based on the steelhead model developed by the Authority and designated critical habitat layers, 32.56 acres of permanent impacts and 41.96 acres of temporary impacts will occur to S-CCC steelhead designated critical habitat, with an additional 5.33 acres of permanent and temporary impacts to habitat accessible to S-CCC steelhead but not included in the critical habitat designation for the DPS (Table 5). And based on the steelhead model and designated critical habitat layers, 0.18 acres of permanent impacts will occur to CCC steelhead designated critical habitat, with an additional 3.57 acres of permanent and temporary impacts to habitat accessible to CCC steelhead but not included in the critical habitat designation for the DPS (Table 6). The Authority proposed CM-FISH-1 in which it would provide compensatory mitigation that is commensurate with the type of habitat affected (spawning, rearing, migratory, or critical habitat) and the amount of habitat lost in the following ratios (Authority 2020a). For spawning aquatic and riparian habitat within critical habitat, offset would be provided at a minimum 3:1 ratio (protected: affected); for all rearing and migratory aquatic and riparian habitat within critical habitat offset would be provided at a minimum 2:1 ratio (protected: affected), and for all other rearing and migratory aquatic and riparian habitat outside critical habitat offset would be provided at a minimum 1:1 ratio.

Unless agreed upon in coordination with NMFS, compensation would occur within the same DPS domain as the impact was incurred. Where feasible, on-site, in-kind mitigation would be prioritized. Off-site mitigation would prioritize actions recommended in local or regional conservation plans where there is coordination and approval by NMFS.

The Authority estimates that this section of the HSR project incurs approximately 42 acres of mitigation need (31 acres of spawning, rearing, and migratory habitat and 11 acres of potential migratory and rearing habitat) (Authority 2019a).<sup>2</sup> However, if less habitat acreage is impacted through complete avoidance through design/route decisions, or if on-site habitat restoration, rehabilitation, or augmentation was incorporated to a degree that maintained or enhanced

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<sup>2</sup> The total estimated mitigation need of 42 acres is the sum of area where there would be permanent impacts to critical habitat and impacts to other steelhead habitat, without areas where there would be temporary impacts to critical habitat. The areas where there would be permanent and temporary impacts to critical habitat mostly overlap.

steelhead habitat functionality to pre-project condition or better, then the total amount of acres incurring mitigation need would be reduced.

As described in section 1.3.5 of this opinion (Proposed Federal Action/Compensatory Mitigation), since there are no NMFS-approved mitigation banks that offer steelhead or appropriate habitat type credits that also include the action area of the project within their service areas, and there is currently no in-lieu fee program that could provide credits suitable to offset impacts to coastal steelhead, the Authority expects to conduct permittee responsible restoration to offset unavoidable impacts to steelhead and their habitats (Authority 2019a). However, the pCMP describes potential mitigation at all of the sites described there as opportunities for habitat preservation, restoration, rehabilitation, and enhancement. The pCMP has not selected any site(s) on which the Authority proposes to mitigate impacts to steelhead habitat, nor has the pCMP described what specific actions the Authority proposes to mitigate impacts to steelhead habitat because it is unclear on which site(s) the Authority proposes to mitigate impacts to steelhead habitat, nor has the pCMP described when the Authority proposes any such actions would occur.

When any of these compensatory mitigation options are undertaken and implemented in full, NMFS expects these actions to have temporary adverse effects and permanent beneficial effects to S-CCC steelhead. Offset options still need to be identified for the CCC steelhead DPS. However, there is not enough information on the compensatory mitigation component of the proposed action at this time to determine and analyze what temporary adverse effects are expected to occur as a consequence of that component. Nor is there enough information on the compensatory mitigation component of the proposed action at this time to determine and analyze the expected relevance of any beneficial effects of that component to the listed steelhead and critical habitat that would be adversely affected by other components of the proposed action. Nor is there enough information on the compensatory mitigation component of the proposed action at this time to determine and analyze the expected reliability and effectiveness of any beneficial effects of that component. Nor is there enough information on the compensatory mitigation component of the proposed action at this time to determine and analyze whether there would be any potential delay between the expected adverse effects of other components of the proposed action and the expected beneficial effects of the compensatory mitigation component. In the future, when a site(s) for compensatory mitigation is confirmed and additional information about the proposed compensatory mitigation is available, reinitiation of consultation may be warranted to analyze the effects of the compensatory mitigation portion of this proposed action, *or* the restoration component of the compensatory mitigation could be included under NOAA Restoration Center's programmatic approach for fisheries habitat restoration projects in California Coastal counties (NMFS 2017) if a United States Army Corps of Engineers Clean Water Act section 404 permit is required, and ESA section 7 review would occur through that programmatic opinion process.

## **2.6. Cumulative Effects**

“Cumulative effects” are those effects of future state or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation (50 CFR 402.02 and 402.17(a)). Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA.

Human population growth in the action area will put increasing pressure on listed species and their habitats, as larger populations will require construction of new roadways, electric power generation facilities, utilities, schools, hospitals, and commercial and industrial facilities. Projections show that the populations of Santa Clara, San Benito, and Merced Counties will continue to grow at an average of 2 percent per year. By 2040, projections show that the population in each county will increase to 371,111, 75,941, and 2,403,756, respectively, which is a net increase of approximately 30 percent per county from 2020 (California Department of Finance (CDOF) 2016).

Urbanization primarily results in the conversion of agricultural, range, or natural lands to developed lands for housing, commercial, or governmental purposes. Urbanization effects on natural areas include habitat loss, degradation, and fragmentation, which leads to declines in overall habitat functionality. The loss of habitat occurs incrementally as urban areas grow outward. The quality of remaining habitat at the edge of urban areas is degraded by pets (e.g., dogs and cats); the increased presence of humans; invasive species; and increased noise, light, and non-point source pollution. Development associated with urbanization can alter or block wildlife movement, impair typical behavioral patterns, and reduce food resource availability. Habitat loss and degradation can result in the reduction of food resources and breeding opportunities, which can then decrease survivability and make local populations more vulnerable to stochastic events.

Urban and suburban environments also affect an area's hydrology, water quantity, and water quality. Development leads to the rerouting, straightening, and hardening of creeks, streams, and rivers. The hardening of previously pervious land cover types can increase peak flows during storm events and cause erosion. Development also brings an increase in non-point source pollutants such as trash, oil, gasoline, and chemical fertilizers and pesticides.

A primary concern for steelhead in the area is that the stormwater volume and contaminant load from impervious surfaces is likely to increase following HSR build-out, despite the Authority planning on treating all of its stormwater prior to discharge, because of the urban development expected to be associated with the project. Pollutants become more concentrated on impervious surfaces until either they degrade in place, or are transported via wind, precipitation, or active site management to another location. Stormwater runoff delivers a wide variety of pollutants to aquatic ecosystems, many of which are not listed by the EPA or SWRCB, so discharge of such pollutants often goes unregulated and uncontrolled. Increased urbanization of streams generally leads to decreases in the health and abundance of aquatic species (Hecht et al. 2007, Sandahl et al. 2007, Scholz 2011, McIntyre et al. 2012, McIntyre et al. 2015, Closs et al. 2016, Feist et al. 2017), including the abundance and health of salmonids of various species, both directly and indirectly through habitat effects. Most recently, mass mortality events of pre-spawn adult coho salmon have been linked to a vulcanization agent found in tire wear particles introduced to waterways through urban stormwater inputs that include road runoff (Scholz 2011, Spromberg et al. 2016, Feist et al. 2017, Tian et al. 2021), and this toxicant likely has similar implications to other salmonid species as well (McIntyre et al. 2018).

Post-construction stormwater runoff often picks up a variety of pollutants from both diffuse (nonpoint) and point sources before depositing them into receiving water bodies (EPA 1993). Constituents may include, but are not limited to: fertilizers, herbicides, insecticides, and

sediments (landscaping/agriculture); oil, grease, PAHs, and other toxic compounds from motor vehicle operations (roads and parking lots); pathogens, bacteria, and nutrients (pet/dairy wastes, faulty septic systems); toxic metals and metalloid like aluminum, arsenic, copper, chromium, lead, mercury, nickel, and zinc (from building decay, manufacturing or industry byproducts); and the atmospheric deposition onto impervious surfaces from other surrounding land uses (manufacturing industry, freight and trucking exhaust, agriculture field treatments). Therefore, stormwater pollution created by local urban development associated with HSR station placement may be more likely to have a greater impact on aquatic life in receiving waterbodies than the stormwater output of the HSR project itself, since stormwater impacts directly associated with the HSR project will be more carefully planned and monitored compared to these non-federal actions.

Fish exposure to these ubiquitous pollutants in the freshwater and estuarine habitats is likely to cause multiple adverse sublethal effects to steelhead and salmon, even at pre-project, ambient levels (Spromberg and Meador 2005, Hecht et al. 2007, Sandahl et al. 2007, Macneale et al. 2010, Feist et al. 2017). For instance, stormwater contaminants accumulate in the tissues of juvenile salmonids, acquired from contaminant accumulation in the tissues of their prey (bio-accumulation). Depending on the level of concentration, those contaminants can cause a variety of lethal and sub-lethal effects on salmon and steelhead, including disrupted behavior, reduced olfactory function, immune suppression, reduced growth, disrupted smoltification, hormone disruption, disrupted reproduction, cellular damage, and physical and developmental abnormalities (Hecht et al. 2007). Predators of salmonids, like killer whales (*Orcinus orca*), harbor seals (*Phoca vitulina*), and California sea lions (*Zalophus californicus*), are in turn at risk of ingesting toxins that have bio-accumulated in their salmonid prey or are adversely affected in other ways by stormwater toxins, even when far removed from the area of exposure (Grant and Ross 2002, Mos et al. 2006, NMFS 2008b).

Even at very low levels, chronic exposures to those contaminants have a wide range of adverse effects on the ESA-listed species considered in this opinion, including:

- Increases in early development issues in gastrulation, organogenesis (exposure of adults, sub-lethal effects passed to resulting offspring) which lowers hatching success.
- Decreases in juvenile survival through reduction in foraging efficiency, reduced growth rates and condition index.
- Increased delay in, or issues occurring during smoltification (only in salmonids) rooted in anion exchange, thyroxin blood hormone, and salinity tolerance.
- Increases in mortality due to increased susceptibility to diseases and pathogens, and depressed immune-competence.
- Decreased survivorship due to increased predation, reduced predator detection, less shelter use, and less use of schooling behaviors.
- Changes or delays to migration patterns, use of rearing habitats, ability of adults to home to natal streams, and spawning site selection.
- Changes to reproductive behaviors that affect production, including altered courtship behavior, reduced number of eggs produced, and decreased fertilization success.

Data that quantify the exact sublethal effects of urban stormwater on steelhead and Chinook salmon are limited, which makes analyzing the effects of new or additional sources of non-point

stormwater discharge on these populations difficult. It is reasonable, however, to conclude that stormwater that is not sufficiently treated coming from sources outside of the Authority's jurisdiction will cause persistent adverse effects to listed salmonids that are realized at a watershed/basin level.

Finally, some continuing non-Federal activities are reasonably certain to contribute to climate effects within the action area. However, it is difficult if not impossible to distinguish between the action area's future environmental conditions caused by global climate change that are properly part of the environmental baseline vs. cumulative effects. Therefore, all relevant future climate-related environmental conditions in the action area are described in the environmental baseline (section 2.4).

## **2.7. Integration and Synthesis**

The Integration and Synthesis section is the final step in our assessment of the risk posed to species and critical habitat as a result of implementing the proposed action. In this section, we add the effects of the action (section 2.5) to the environmental baseline (section 2.4) and the cumulative effects (section 2.6), taking into account the status of the species and critical habitat (section 2.2), to formulate the agency's biological opinion as to whether the proposed action is likely to: (1) Reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing its numbers, reproduction, or distribution; or (2) appreciably diminish the value of designated or proposed critical habitat as a whole for the conservation of the species.

### **2.7.1. Summary of Effects of the Proposed Action on Listed Species**

Most adverse effects to CCC and S-CCC steelhead individuals analyzed in this opinion will occur during the construction and tunneling periods of the proposed action, and are expected to be short-term disturbances; disruptions of normal behaviors, migration, and habitat use; temporary decreases in survivorship probabilities; and for very few individuals of each DPS, a short period in which some fish may be injured or be killed during cofferdam dewatering, fish capture and relocation, and during in-water impact pile driving. There are at least eight major overcrossings across the landscape in the action area at which these adverse effects will occur, and a period of two to ten years during construction when the effects may occur at any one construction site. After construction is complete and the areas are rehabilitated with vegetative replanting and large woody material, adverse effects associated with construction are expected to cease. One continuing effect of operations of the HSR system will be the disturbance associated with running high speed trains over waterways containing juvenile steelhead. Rail operations are expected to disrupt individual juvenile behaviors in perpetuity and will slightly increase the risk of predation to those juveniles when escapement cover is not readily available, resulting in reduced survival at HSR crossings.

### **2.7.2. Summary of Effects of the Proposed Action on PBFs of Designated Critical Habitat**

The implementation of the proposed action will unavoidably alter S-CCC and CCC designated critical habitat. The placement of permanent, artificial, impervious structures (bridges and viaduct overcrossing structures and their footings) over waterways and in spawning reaches, in

rearing areas, and in the floodplain is expected to remove proportional amounts of critical habitat through spatial occupation, change the aquatic ecosystem structure below the structures due to shading, create ambush predator habitat, and degrade freshwater habitat functionality locally. These impacts will in turn reduce the fitness and survivorship of juvenile steelhead using rearing and migratory habitat PBFs at each site within the action area. The installation of project structures also precludes the potential for these riparian and floodplain areas from returning to a completely natural state in the future, though the Authority proposes to restore and replant the areas to the extent possible. Once the HSR system is operational, railway pollution and automotive pollution sourced from HSR properties and parking lots will be controlled and prevented from entering waters containing steelhead critical habitat PBFs through the incorporation of LID designs and effective stormwater treatment and control devices.

As described in section 2.5.2.6, Effects of the Action/Compensatory Mitigation, there is not enough information on the compensatory mitigation component of the proposed action at this time to determine and analyze temporary adverse effects and permanent beneficial effects expected to occur as a consequence of that component. Therefore, we do not consider any effects expected to occur as a consequence of that component in our jeopardy and adverse modification conclusions in this opinion. In the future, when a site(s) for compensatory mitigation is confirmed and additional information about the proposed compensatory mitigation is available, reinitiation of consultation may be warranted to analyze the effects of the compensatory mitigation portion of this proposed action, *or* the restoration component of the compensatory mitigation could be included under NOAA Restoration Center's programmatic approach for fisheries habitat restoration projects in California Coastal counties (NMFS 2017) if a United States Army Corps of Engineers Clean Water Act section 404 permit is required, and ESA section 7 review would occur through that programmatic opinion process.

### **2.7.3. Summary of Environmental Baseline**

Pajaro River S-CCC steelhead are considered a Core 1 population (high/highest priority for recovery) while CCC populations in Coyote Creek and Guadalupe River/Los Gatos Creek are considered essential with a secondary priority rating for recovery. Current critical habitat conditions in the Pajaro River are considered poor because of previous land use conversions, old-growth forest logging, and water resource development associated with agriculture, urban and residential development, and most of the freshwater estuarine rearing habitat is gone. Similarly, CCC designated critical habitat conditions are poor or the functionality of remaining critical habitat is greatly reduced due to human modifications associated with water resource development for human use, urbanization, and transportation installations, particularly due to railways.

A continuing pressure on steelhead in the action area is the full development local watersheds dependent on precipitation and the human population's use and reliance on this resource. Local water supplies are already limited and the area depends heavily on imported freshwater, and increased stormwater harvesting is planned for the future. The expectations of climate change in the action area is that precipitation, which already comes in 'boom and bust' events, will begin to fluctuate evermore so between extreme highs and lows, and that dry year types may become more frequent, in addition to becoming more severe, and that overall averages will be warmer, with the area becoming more chaparral-like with less fog cover (Ackerly et al. 2018). Better

water quality control and adequate treatment of new sources of urban stormwater discharges throughout the action area are needed to ensure that the water quality of aquatic habitats will be maintained at sufficient levels into the future to sustain listed salmonids and human populations through all water year types. Some recovery actions and other conservation efforts have occurred that will benefit the DPSs, mainly habitat restoration projects and fish passage improvements, but it is questionable whether these efforts will be sufficient to remedy the existing degradation of the functionality of critical habitat or be resilient enough to outpace the expected outcomes of climate change to realize the recovery of these populations, considering the status quo.

#### **2.7.4. Summary of Cumulative Effects**

Beyond state and federal actions, urban development in the communities around HSR stations is expected increase in general as commuters and businesses capitalized on the convenience of being near a mode of transportation that provides fast access between the San Francisco/San Jose Bay Area, the California Central Valley and the southern California/Los Angeles metropolitan areas. And as the local human population increases, cumulative water quality impacts are also expected to increase, through increased urbanization effects, increased impervious surface cover, increased stormwater runoff and contaminate loads, increased discharges from wastewater treatment plants, and an increase in the demand for drinking water. This carries the potential of overdrawing local surface and groundwater supplies available for human use and not protecting sufficient amounts for CCC and S-CCC steelhead life history needs in surface waterbodies during dry and drought periods.

#### **2.7.5. Effects of the Proposed Action on the Survival and Recovery of the DPSs and Designated Critical Habitat**

Both S-CCC and CCC steelhead are listed as threatened under the ESA and the most recent 5-year status reviews for the DPSs concluded that the threatened status is still applicable (NMFS 2016a, b). They remain listed as threatened in large part because of widespread freshwater and estuarine habitat degradation and land use conversion for urban development and human use. The ubiquitous artificial modifications to, and destruction of, the freshwater and estuarine habitats upon which these species depend still persist and adverse effects are expected to increase as the human population continues to grow in the Santa Clara Valley/San Jose Bay Area. Specifically, railroad and transportation bridges and infrastructures have been identified as a threat to the CCC steelhead DPS due to the habitat changes associated with the infrastructure and past instances where railroad bridges and culverts impeded fish passage. Large scale restoration actions that improve the amount, quality, and access to freshwater and estuarine rearing habitats; remedy adult and juvenile passage conditions at impeding structures; allocate surface water for fish and wildlife uses at sufficient quantities and qualities; and install large woody material in streams are necessary to recover these species as self-sufficient, viable, wild breeding populations.

As another railroad/transportation project, the HSR system has the potential to further negatively impact the survival and recovery potential of the S-CCC and CCC DPSs. However, the consequences of construction are mostly attributed to temporary disturbances to a few individuals per year for each DPS, and at most a few individuals may experience injury or mortality in a worst case scenario per year construction is ongoing. The Pajaro River watershed

hosts one of the larger S-CCC populations in its diversity group; the Coyote Creek and Guadalupe River also host one of the larger/largest in their respective diversity strata. Therefore, the total numbers of fish anticipated to be directly taken during construction of the proposed action is expected to be relatively small compared to the respective populations in each DPS, and have little measurable effect to the productivity potential of each DPS as a whole. Furthermore, since the construction phase of the project is temporary, once the HSR section is complete most incidental take avenues expected to result in direct injury or mortality of individuals will cease. In the long-term, the proposed action is not expected to reduce the survival and recovery potentials of the S-CCC or CCC DPSs.

The potential for long-term adverse changes to the freshwater habitats from the installation of the HSR system into the landscape are expected to be adequately addressed by incorporating steelhead needs into the project designs. The conservation measures proposed by the Authority acknowledge the utility of large woody material and vegetative riparian plantings in bank/slope stabilization measures, the need to restore or augment steelhead habitat onsite, and to meet steelhead passage requirements when installing bridges and culverts. Therefore, the proposed project is not expected to appreciably diminish the value of designated or proposed critical habitat as a whole for the conservation of the species.

Combining the adverse and beneficial effects associated with this proposed action, the environmental baseline and the cumulative effects, and taking into account the status of the species affected by the project, the proposed action is not expected to appreciably reduce the likelihood of survival or recovery of the listed species.

## **2.8. Conclusion**

After reviewing and analyzing the current status of the listed species and critical habitat, the environmental baseline within the action area, the effects of the proposed action, the effects of other activities caused by the proposed action, and cumulative effects, it is NMFS's biological opinion that the proposed action is *not* likely to jeopardize the continued existence of CCC steelhead or S-CCC steelhead, or destroy or adversely modify their respective designated critical habitat.

## **2.9. Incidental Take Statement**

Section 9 of the ESA and Federal regulations pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without a special exemption. "Take" is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. "Harm" is further defined by regulation to include significant habitat modification or degradation that actually kills or injures fish or wildlife by significantly impairing essential behavioral patterns, including breeding, spawning, rearing, migrating, feeding, or sheltering (50 CFR 222.102). "Incidental take" is defined by regulation as takings that result from, but are not the purpose of, carrying out an otherwise lawful activity conducted by the Federal agency or applicant (50 CFR 402.02). Section 7(b)(4) and section 7(o)(2) provide that taking that is incidental to an otherwise lawful agency action is not considered to be prohibited taking under the ESA if that action is performed in compliance with the terms and conditions of this incidental take statement (ITS).

### 2.9.1. Amount or Extent of Take

In the biological opinion, NMFS determined that incidental take is reasonably certain to occur as follows:

1. General construction activities described in section 2.5.1.1 occurring in and near waterways are expected to harass adult and juvenile CCC and S-CCC steelhead by causing them to alter their normal behaviors associated with breeding, feeding, or sheltering, and create the likelihood of injury, even during the proposed in-water work window, due to disturbance. Because of the low amount of adult abundance in these watersheds during the work windows, it is expected that no more than 2 adult CCC steelhead and 2 adult S-CCC steelhead would be harassed by general construction activities per year construction is occurring. Juvenile abundance is expected to be slightly greater in these waterways as resident *O. mykiss* parents may also produce anadromous steelhead offspring in addition to anadromous juveniles produced by anadromous parents (McEwan 2001, Courter et al. 2013, Pearse and Campbell 2018) and due to the fact that juvenile steelhead may spend multiple years in freshwater before emigrating. Therefore, it is expected that no more than 5 juvenile CCC steelhead and no more than 5 juvenile S-CCC steelhead would be harassed by general construction activities per year construction is occurring.
2. In-water activities that contact the stream banks, stream margin, and channel bottom in association with, such as in-water work, cofferdam dewatering, and pile driving for both pile installation and removal (described in sections 2.5.1.1, 2.5.1.3, and 2.5.1.4), are expected to elevate turbidity locally and downstream of the construction locations, and will harm and harass adult and juvenile CCC and S-CCC steelhead by causing them to alter their normal behaviors, their migration patterns, and induce respiratory stress, as long as the elevated turbidities persist.
3. Vibratory and impact pile driving in and near waterways (section 2.5.1.3), and tunneling under waterways (section 2.5.1.6) are expected to harass, wound, or kill adult and juvenile CCC and S-CCC steelhead by introducing underwater pressure waves into the aquatic environment. The pressure waves created by pile driving and tunneling activities are expected to persist only as long as these activities are ongoing.
  - a. The underwater pressure waves from vibratory pile driving and tunneling under waterways are not expected to reach injurious or mortalities levels ( $<206$  dB<sub>PEAK</sub>,  $<150$  dB<sub>RMS</sub>) but will harass and significantly disrupt normal fish behaviors up to 541 meters both upstream and downstream from the pile driving/tunneling location without attenuation.
  - b. The underwater pressure waves from impact pile driving are expected to exceed injurious and mortality levels ( $\geq 206$  dB<sub>PEAK</sub>,  $\geq 183$  dB<sub>SEL</sub> cumulative for fish less than 2 grams bodyweight,  $\geq 187$  dB<sub>SEL</sub> cumulative for fish greater than 2 grams bodyweight, and  $\geq 150$  dB<sub>RMS</sub>) and harm listed fish as follows (from calculations in section 2.5.1.3): Instantaneous mortality is expected within a 1-meter radius from the driven pile. For fish less than 2 grams, injury leading to death due to cumulative SEL

exposure above 183 dB is expected out to an 86-meter radius from the driven pile without the use of underwater sound control measures. For fish greater than 2 grams, injury leading to death due to cumulative SEL exposure above 187 dB is also expected out to an 86-meter radius from the driven pile without the use of underwater sound control measures.

4. Cofferdam dewatering (section 2.5.1.4) is expected to harass, wound, or kill juvenile CCC and S-CCC steelhead by entrapping them, necessitating their capture, handling, and relocation (section 2.5.1.5), which is likely to stress, shock, and injure them, resulting in immediate or delayed death, or susceptibility to predation. The number of juveniles salmonids entrapped by cofferdams, requiring capture and relocation is expected to be low, no more than 5 individuals from the CCC steelhead DPS and no more than 10 individuals from the S-CCC steelhead DPS over the course of construction of the San Jose to Merced Project Section. It is also possible fish will evade capture and become impinged on the intake screen or be wounded in other ways during dewatering. It is also estimated that no more than 3% of the total number of juveniles (which is no more than one juvenile from the CCC steelhead DPS and one juvenile from the S-CCC steelhead DPS) is expected to die due to capture, handling, and relocation by the Authority or its contractors.
5. Tunneling and surface water reduction due to groundwater dewatering associated with tunneling is expected to harm, wound, or kill juvenile S-CCC steelhead and incubating S-CCC steelhead redds in the Pacheco Creek watershed. Reductions in surface waters are also likely to dewater incubating eggs in redds, decreasing the amount of oxygen available to developing eggs and alevins, likely leading to increased egg/alevins/fry mortality rates and a decrease in S-CCC steelhead production rates in the Pacheco Creek watershed, especially during drier water years. Reductions in surface waters are likely to strand juvenile steelhead, causing them stress and injury from asphyxiation, potentially leading to death. The surface reductions are expected to persist for no more than two years following tunneling activities below the affected waterway.
6. Regular HSR operations (section 2.5.1.8) are expected to harass and cause behavioral changes and increased stress in juvenile and adult CCC and S-CCC steelhead as trains running overhead introduce sudden noise and vibrations into the underwater environment below. Disturbing fish will cause a net energy loss by unnecessarily expending energy through either interrupting breeding, resting or feeding, and potentially delay migration timing. Juvenile steelhead are likely to be startled by vibrations and noise created when high speed trains pass over the viaducts, causing them to flee when they otherwise may be resting or foraging, potentially creating situations in which they are more likely to be predated upon in these areas over the long term.
7. Site preparation, relocation of utilities, permanent waterbody removal, and vegetation removal in and near waterways (section 2.5.2.1) are expected to harm adult and juvenile CCC and S-CCC steelhead by reducing habitat quality (vegetation removal, temporary and permanent land disturbance and alteration, permanent natural waterbody removal, changes in natural shading) and these alterations are expected to reduce the growth and survival of salmonids in the action area, decreasing their overall fitness. Effects are

expected to persist for several years until the aquatic habitats are restored and vegetative plantings mature to pre-disturbance functionality, or indefinitely, depending on the alteration.

8. Placement of riprap and bank stabilization measures (section 2.5.2.2) is expected to harm juvenile CCC and S-CCC steelhead because the use of “hard” stabilization methods (i.e., riprap/revetment) will reduce the amount of feeding and sheltering/escapement areas locally. A reduction in the amount of feeding and resting areas is expected to reduce the fitness of fishes that would have otherwise used this area, in perpetuity.
9. Placement of permanent artificial structures and associated shading (section 2.5.2.3) is expected to harm juvenile CCC and S-CCC steelhead because the permanent structure occupation of habitat effectively reduces the amount of feeding and resting areas locally, and the shading of the viaduct over stream channels will change the local aquatic ecosystem composition/available salmonid prey base, and create ambush habitat for predators of juvenile steelhead, in perpetuity.

For incidental take avenues 2, 3, 5, 6, 7, 8, and 9, NMFS cannot, using the best available information, quantify and track the amount or number of individuals that are expected to be incidentally taken because of the variability and uncertainty associated with the population sizes of the species, annual variation in the timing of migration, and variability regarding individual habitat use of the action area. However, it is possible to express the extent of incidental take in terms of ecological surrogates for those elements of the proposed action that are expected to result in incidental take.

These ecological surrogates are measurable, and the Authority or its contractors can monitor them to determine whether the level of anticipated incidental take is exceeded over the course of project implementation. All incidental take and ecological surrogates are summarized in Table 7.

#### **2.9.1.1. Incidental take associated with elevated in-stream turbidity plumes**

The most appropriate threshold for incidental take consisting of fish disturbance and sub-lethal effects associated with elevated turbidity is an ecological surrogate of the amount of increase in turbidity generated by in-water activities such as pile driving, stream bottom disturbance, and cofferdam dewatering (incidental take form #2). Increased turbidity is expected to cause harm and harass adult and juvenile CCC and S-CCC steelhead through elevated stress levels and disruption of normal habitat use locally. These responses are linked to decreased growth, survivorship, and overall reduced fitness as described for underwater noise avoidance, up to respiratory distress and reduced gill function.

The surrogate for turbidity increases will be based on juvenile salmonid sensitivity to raised turbidity levels. While NTUs can range over a 1,000 NTU in winter flood condition, typical conditions in an undisturbed stream is usually less than 50 NTU (however, local CDEC monitoring stations do not collect turbidity data). 50 NTU is already above the range at which steelhead experience reduced growth rates (25 NTU) but below the range steelhead would be expected to actively avoid the area. Therefore, within the already established disturbance surrogate for pile driving (section 2.9.1.2, below), water downstream of construction activities

cannot be more than 50 NTU above the turbidity level observed in upstream measurements. Downstream of the construction underwater noise/pile driving disturbance surrogate boundary (see section 2.9.1.3 below), turbidity immediately downstream cannot measure more than 25 NTU above the ambient turbidity level in water measured immediately upstream of project activities. Since in-river values change daily, the upstream comparison value must therefore be taken daily, in association with the downstream readings, during in-water pile driving. Exceeding these tiered turbidity thresholds will be considered as exceeding the expected incidental take levels, triggering reinitiation of consultation.

### **2.9.1.2. Incidental take associated with underwater sound, pressure waves, and vibration from construction activities**

The most appropriate threshold for incidental take consisting of temporary fish displacement, behavior modification and slight increases in stress levels associated with vibratory pile driving and tunneling (#3a), and impact pile driving (#3b) underwater sound greater than 150 dB<sub>RMS</sub> but less than cumulatively injurious SEL (183 to 187 dB) is an ecological surrogate of the amount of area expected to experience the elevated underwater sound levels due to these activities within a certain distance from the construction activity.

Vibratory pile driving, impact pile driving, and underground tunneling are all expected to produce underwater pressure levels over 150 dB<sub>RMS</sub> out to 541 meters from the location of the activities. Though these elevated levels are not expected to injure or kill fish directly, they are expected to cause disruption of normal habitat utilization and elicit temporary behavioral effects in juvenile and adult salmonids, leading to harm as described in section 2.5.1.6 and tunneling effects analyses. Any behavioral alterations in juvenile fish are expected to decrease their fitness and ultimate survival by decreasing feeding opportunities that will decrease their growth, and by causing area avoidance, which will delay their downstream migration and increase their predation risk. Adult fitness is expected to decrease slightly when area avoidance delays their upstream migration. This surrogate will apply to incidental take forms #3a and #3b, and is defined by the boundary of the location of the disruptive activity out to 541 meters upstream and downstream of the location. All other types of temporary disturbance effects related to noise or vibrations created by equipment operation, construction noise, and human presence is expected to also be contained within this boundary of anticipated incidental take, during the proposed work windows. Exceeding 150 dB<sub>RMS</sub> beyond 541 meters from the active construction site or tunneling location will be considered exceeding expected incidental take levels for this surrogate.

Impact pile driving is expected to produce underwater pressure levels over 206 dB<sub>PEAK</sub> out to 1 meter from the driven pile and cause instantaneous mortality within this boundary. Impact pile driving is also expected to produce underwater pressure levels over 183 and 187 dB<sub>SEL</sub> cumulative out to 86 meters from the driven pile and cause sublethal injuries leading to death within this boundary, in addition to causing stress, disturbance, behavioral changes, and migration delays. Therefore, exceeding 187 dB<sub>SEL</sub> cumulative beyond 86 meters from the driven pile, or exceeding 206 dB<sub>PEAK</sub> beyond 1 meter from the driven pile will be considered exceeding expected incidental take levels from this effect avenue triggering reinitiation of consultation.

### **2.9.1.3. Incidental take associated with reductions in surface water flow from groundwater dewatering associated with tunneling activities**

The most appropriate threshold for incidental take associated with surface water reductions caused by groundwater dewatering from tunneling is the amount of reduction to available surface waters (#5). Reducing surface water flows during S-CCC steelhead redd incubation periods is expected to result in embryo death and a decrease in hatching success when flows are not sufficiently offset. The Authority has proposed to monitoring the surface and groundwater levels during tunneling activities to ensure surface water is not adversely reduced, and to supplement the affected area with replacement water of sufficient quality (dissolved oxygen, temperature, and pH, free of pathogens) to support all affected steelhead life stages. In the areas in which S-CCC steelhead spawning and critical habitat in Pacheco Creek and Pacheco Creek South Fork overlap with tunneling activities, the Authority estimates that dewatering/heading inflow rates may be slightly more than 200 gpm, which is approximately 0.5 cfs. If steelhead redds are present, or suspected to be present, in waterways overlying or downstream of the tunneling locations, the measurable reduction in surface waters due to tunnel dewatering is likely to be less than 1 cfs compared to upstream measurements. When a measurable reduction is detected, supplemental water will then be provided to resolve the deficit. Within the time period between detecting surface flow deficits and offsetting the difference with supplemental water input, eggs and alevins incubating in redds are expected to experience increased risk of mortality and other sublethal effects leading to decreased survivorship. Therefore, tunnel dewatering leading to surface water flow deficits greater than 1 cfs after input of supplemental water will be considered exceeding expected incidental take levels from this effect avenue, triggering reinitiation of consultation.

Additionally, surface water level must be maintained with at least 20 centimeters of stream depth over the redds until all fry emerge, using supplemental water of sufficient quality and quantity as to not cause further egg/alevin/fry mortalities. It is assumed that no additional take will be associated with supplemental water input. Stream flow reductions below these thresholds during tunneling will be considered exceeding allowable incidental take levels. If NMFS agrees via technical assistance that steelhead redds are not expected to be present but juvenile, yearling, or adult steelhead are likely to be present, then the amount of allowable surface water reduction may be up to 3 cfs compared to upstream, if Pacheco Creek is running at least 25 cfs daily. The Authority has proposed to monitor surface flow and stream condition during the tunneling period; these observations can be used to evaluate whether any flow reductions will lead to additional steelhead stranding or being isolated in pools, thereby causing a greater amount of incidental take of S-CCC steelhead than what is encompassed by this ecological surrogate, which would also exceed this ecological surrogate, triggering reinitiation of consultation.

### **2.9.1.4. Incidental take associated with vibration and noise from regular HSR train operations**

The most appropriate threshold for incidental take associated with fish disturbance from HSR passenger trains running overhead occupied habitats (#6) is the addition of that noise and vibration to the underwater sound environment experienced by fish. However, quantifying the underwater sound signature emanating from high speed train operation specifically are not directly available in scientific literature, but estimates are available of overall underwater sound

environments currently affected by anthropogenic noise over and near monitored waterways near passenger car railways. Roundtree et al. (2020) quantified that brook/creek habitats contained averages of 99.4 dB re 1 $\mu$ PA RMS while river habitats contained averages of 101.1 dB re 1 $\mu$ PA RMS. These situations are comparable to future HSR operations as some overcrossings will be blended with other railway operations, and some HSR overcrossings will be in close proximity to highway and other vehicular traffic (the only likely difference in the underwater sound environment will be a lack of boat traffic in the affected area due to the small size of most of the waterways in the action area). The train underwater sound contributions in Roundtree et al. (2020) were noted as being relatively brief and bolstered by any use of train horn. The distance to bridge was noted as being approximately 500 meters. Therefore, it is expected that the sound environment under and near HSR crossings will not exceed 100 dB re 1 $\mu$ PA RMS beyond 500 meters from the crossing location in the affected waterbody. This is similar to the disturbance limit established for vibratory pile driving, the main difference being that this disturbance is expected to occur regularly in perpetuity, affecting all future generations of steelhead in the action area. Causing the underwater sound environment to regularly exceed 100 dB re 1 $\mu$ PA RMS beyond 500 meters from the mid-line of the overcrossing bridge/culvert/viaduct structure will be considered exceeding expected incidental take levels from this effect avenue.

#### **2.9.1.5. Incidental take associated with placement of riprap, bank and slope stabilization, habitat occupation by permanent structures and artificial materials, shading, and other habitat alterations**

The most appropriate measurement of harm to CCC and S-CCC steelhead and the functionality of their habitats associated with site preparation, utility placement, vegetation removal, slope stabilization and permanent waterbody removal (#7); placement of permanent riprap and bank stabilization (#8); and permanent structure and otherwise occupation by artificial material and associated shading (#9) is a surrogate of the total amount of area affected by the degradation of habitat that could have otherwise supported steelhead. The artificial hard structures and materials will occupy benthic substrates that would have otherwise supported benthic prey of juvenile salmonids, reducing feeding opportunities and negatively affecting their future potential growth rates. The hard structures in stream bed, and the new water velocities created around them, also reduce the possibility of natural processes from otherwise occurring in the area, like aquatic vegetation or LWM establishment, preventing juveniles from resting or sheltering in the immediate project area. Any shading is related and proportional to the amount and degree of artificial structures overhanging the wetted channels and riparian corridor, and will change the local ecosystem structure and increase the amount of water column ambush predator habitat. While habitat functionality will not be lost completely in most cases, except for the permanent removal of natural waterbodies, the habitat alterations are expected to result in functional decreases that will be maintained in perpetuity; therefore, the adverse effects associated with these structures will also remain as long as the artificial structure and riprap remain.

The Authority estimates that a total of approximately 33 acres of S-CCC steelhead designated critical habitat will be permanently affected by the project section and that 42 acres of designated critical habitat will be temporarily affected by section construction. A total of 0.18 acres of CCC designated critical habitat will be permanently or temporarily impacted by the project. While oblique shading would cause a greater amount of area to be affected under the aerial structures caused by differing sunlight angles throughout the day, these amounts are omitted from this total

for simplicity and because the area directly under the structure will experience the greatest reduction in surface lighting. Exceeding these total acreages stated above as surrogate amounts for incidental take described in #7, #8, and #9 above will be considered as exceeding the expected incidental take levels. If NMFS determines that onsite restoration, installed steelhead habitat augmentations, ‘soft’ bank armoring, or other steelhead habitat improvements undertaken, funded, or implemented by or on the behalf of the Authority are expected to adequately restore habitat functionality to prior levels or better, the improved/rehabilitated acreages will not be counted in the amount totaled towards the ‘affected steelhead habitat’ limits above.

Table 7. Summary of incidental take and ecological surrogates.

<b>Incidental Take (#)</b>	<b>Form of Incidental Take</b>	<b>Measurable Limit</b>	<b>Duration</b>
#1 General construction activities	Harassment	2 adult CCC steelhead 5 juvenile CCC steelhead 2 adult S-CCC steelhead 5 juvenile S-CCC steelhead	Per year construction is ongoing
#2 Elevated turbidity	Harm and harassment	In-stream turbidity immediately downstream of construction elevated no more than 50 NTUs compared to in-stream turbidity measurements immediately upstream of construction, within 541 meters from construction site. Beyond the 541-meter boundary, in-stream turbidity can be elevated no more than 25 NTUs compared to upstream measurements.	While construction is ongoing
#3a Vibratory pile driving, #3b Impact pile driving, #3a Tunneling vibrations	Harassment Injure Kill	Underwater noise/pressure may be no more than: <ul style="list-style-type: none"> <li>● 206 dB<sub>PEAK</sub> beyond 1 meter from driven pile</li> <li>● 187 dB<sub>SEL</sub> cumulative beyond 86 meters from driven pile</li> <li>● 150 dB<sub>RMS</sub> beyond 541 meters from driven pile or tunneling location</li> </ul>	While pile driving or tunneling is ongoing
#4 Cofferdam dewatering and fish capture/relocation	Capture Injure Kill	5 juvenile CCC steelhead 10 juvenile S-CCC steelhead No more than 3% mortality at immediate release	Over the course of construction of the section, when fish are handled by Authority staff/contractors

<b>Incidental Take (#)</b>	<b>Form of Incidental Take</b>	<b>Measurable Limit</b>	<b>Duration</b>
#5 Tunneling surface water reductions	Harassment Harm	When S-CCC steelhead redds are present in overlying waters, no more than 1 cfs reduction in flow and surface level water depth maintenance of at least 20 centimeters over all redds. When S-CCC steelhead redds are not present but individuals may be using surface waters, no more than 3 cfs reduction in flow if at least 25 cfs still available in Pacheco Creek.	Surface water reductions should cease within 3 years after tunnel construction and sealing is complete
#6 HSR operation noise/vibration	Harassment	Underwater noise/pressure not to exceed 100 dB re 1µPA RMS beyond 500 meters at all major crossing locations due to HSR operations	Permanent intermittent
#7 General habitat alteration/ vegetation removal/ waterbody removal, #8 Placement of riprap/ bank stabilization, #9 Permanent structures and shading	Harm through reduced survival and fitness	1 acre of permanent impacts to CCC steelhead designated critical habitat 33 acres of permanent impacts to S-CCC steelhead designated critical habitat	Maximum amount of permanently affected habitat section implementation

### 2.9.2. Effect of the Take

In the biological opinion, NMFS determined that the amount or extent of anticipated take, coupled with other effects of the proposed action, is not likely to result in jeopardy to the species or destruction or adverse modification of critical habitat.

### 2.9.3. Reasonable and Prudent Measures

“Reasonable and prudent measures” are nondiscretionary measures that are necessary or appropriate to minimize the impact of the amount or extent of incidental take (50 CFR 402.02).

1. Measures shall be taken by the Authority and its contractors to minimize the extent of disturbance, harassment, injury, and mortality to CCC and S-CCC steelhead caused by

construction activities and HSR operation in the action area, related to the consequences of the proposed action as discussed in this opinion.

2. Measures shall be taken by the Authority and its contractors to reduce the extent of harm, degradation, and alteration to the designated critical habitats of CCC and S-CCC steelhead, and other habitats which support these species in the action area, related to the consequences of the proposed action as discussed in this opinion.
3. The Authority or its contractors shall prepare and provide NMFS with updates, reports, and plans pertinent to monitoring the impacts to and amount of incidental take of listed species under NMFS jurisdiction in the action area.

#### **2.9.4. Terms and Conditions**

The terms and conditions described below are non-discretionary, and the Authority or any applicant must comply with them in order to implement the RPMs (50 CFR 402.14). The Authority or any applicant has a continuing duty to monitor the impacts of incidental take and must report the progress of the action and its impact on the species as specified in this ITS (50 CFR 402.14). If the entity to whom a term and condition is directed does not comply with the following terms and conditions, protective coverage for the proposed action would likely lapse.

1. The following terms and conditions implement reasonable and prudent measure 1:
  - a. Measures shall be taken to maintain, monitor, and adaptively manage all CMs, AMMs, and BMPs with NMFS staff as they pertain to protecting listed species under NMFS jurisdiction throughout the life of the project to ensure their effectiveness.
  - b. The Authority and its contractors shall work in coordination with NMFS throughout HSR project active construction phases by holding meetings between NMFS, USFWS, CDFW, Authority, and design-build contractor staff at least once a year construction is ongoing so that impacts on and interactions with listed fishes can be reduced or avoided to the greatest extent possible.
  - c. The Authority and its contractors shall work in coordination with NMFS before and during active HSR operations and maintenance activities to develop specific BMPs and standard maintenance protocols so that impacts on, and interactions with, listed fishes can be reduced or avoided to the greatest extent possible.
    - i. The Authority shall request NMFS review on draft plans for vegetation removal activities and herbicide use as regular maintenance near waterways containing listed salmonids, prior to undertaking said activities. NMFS comments shall be incorporated into vegetation removal and maintenance plans.
    - ii. The Authority shall request NMFS review on drafts of HSR safety check protocols when possibility of interaction with listed fishes or their habitats is likely, prior to establishing said safety protocols.

- d. In the course of monitoring the construction portion of the project, the Authority or its contractors shall contact and coordinate with NMFS within 24 hours after direct observation that incidental take of a listed fish or exceedance of its ecological surrogate has occurred (Table 7), or is suspected of being exceeded, so that both agencies can discuss how or whether incidental take levels can return back below applicable levels. Construction shall cease until coordination can take place and an adaptive management plan is adopted.
- e. The Authority shall ensure its contractors comply with the terms and conditions in this opinion by including them in future contracts through specific requirements that address:
  - i. Adherence to the NMFS terms and conditions identified in this opinion as part of the award packages as necessary to reduce and limit the amount of incidental take of listed anadromous fishes;
  - ii. Explicit assignment of the responsibilities of implementation of the environmental CMs/AMMs/BMPs proposed for this action and related to NMFS trust resources required to meet the terms and conditions as part of the award packages, and;
  - iii. Explicit assignment of responsibilities of the monitoring of NMFS resources and associated ecological surrogates to ensure the performance of the CMs/AMMs/BMPs associated with the terms and conditions stated below, as part of project award packages.
- f. The schedule of the construction activities near steelhead waterways shall be adopted into the work plan as proposed in AMM-FISH-2 to avoid or limit construction interactions with CCC and S-CCC steelhead. Deviations from the proposed work windows or daily work windows shall require technical assistance approval from NMFS staff before the change is adopted into the construction schedule.
- g. During construction activities, but especially pertaining to impact and vibratory pile driving periods:
  - i. If any steelhead or salmon is injured or killed within the action area in relation to project activities, the Authority and its contractors shall cease construction actions and contact NMFS staff immediately to assign species identity.
  - ii. If dead, the fish shall be recovered and placed on ice or frozen until transfer to NMFS can occur. If injured, the fish shall be gently handled only to take a photograph to enable later species assignment. Then it shall be immediately released back into the waterbody it was taken in, preferably in a shaded area with overhanging or in-water vegetation. However, the injured individual shall not be pursued if it proceeds to exit the immediate area under its own volition before being photographed.
  - iii. Construction activities shall not resume until NMFS can evaluate the situation and determine if the take could have been avoided.

- h. During in-water pile driving for installation and removal of cofferdams and permanent structures:
  - i. Piles and sheet piles shall be driven as far as possible with vibratory hammering before using an impact hammer.
  - ii. The underwater sound environment shall be monitored whenever in-water impact pile driving is employed to ensure ecological surrogates are not exceeded.
  - iii. At least one underwater sound control measure shall be employed whenever in-water impact pile driving is used, such as cushion blocks, bubble curtains, de-watered cofferdams, or de-water caissons around the pile being driven.
  - iv. Piles and cofferdams shall be inspected daily for accumulated debris and debris shall be removed. If the debris is natural large woody material, the Authority shall return the large woody material back to the waterway downstream of their structure or make the material available for restoration activities, preferably for fish habitat onsite.
- i. A qualified biologist shall conduct water quality monitoring upstream and downstream of the location of in-water construction activities to ensure turbidity plumes created by construction do not exceed 50 NTUs above natural upstream measurements within 541 meters from location of in-water activities (the disturbance surrogate boundary), or 25 NTUs downstream of the disturbance surrogate boundary. If an in-river turbidity reading exceeds these thresholds, construction will cease and turbidity/sedimentation control AMMs/BMPs shall be adjusted until turbidity readings downstream cease exceeding the established thresholds.
- j. During the in-water work windows, if cofferdams require dewatering, the enclosed area shall be checked for steelhead, according to the best recommendations of the assigned, on-site fish biologist, but considering the following:
  - i. A final dewatering and fish capture/relocation plan shall be submitted to NMFS for review no later than 30 days prior to implementation.
  - ii. NMFS staff shall be notified of any planned “fish rescue” or salvage activities at least two business days before fish capture and relocation activities begin, so that staff can advise these efforts or make a field visit to observe, if deemed necessary.
  - iii. Juvenile steelhead entrapped shall be captured using nets (seines) or electrofishing of enclosed areas, water temperature permitting (less than 65°F). Fishing equipment used shall be in good condition and decontaminated if used outside of the watershed prior to the fish salvage event.
  - iv. Persons performing salmonid captures shall be experienced juvenile salmonid handlers and be familiar with the fishing equipment in use.

- v. If electrofishing is selected to be used in fish capture, the operator of the equipment shall have at least 100 hours of practical experience using such equipment in the field.
  - vi. Clean relocation equipment and containers shall be available and ready to receive fish on site during all fishing/fish salvage activities, preferably under shade.
  - vii. Captured *O. mykiss* shall be counted and assessed visually for immediate health condition and tentatively assigned to steelhead or resident life history group.
  - viii. If a steelhead dies, see retaining and reporting a mortality procedures above (Term and Condition 1g).
  - ix. The water quality of the transport water shall be monitored to ensure sufficient oxygen and temperature levels are maintained. Transport water shall be within 5°F of the stream water to minimize shock and transport stress, and less than 64°F overall.
  - x. Captured juvenile steelhead shall be held in transport containers for no more than 30 minutes before release. Release locations shall be nearby, be the same water body from which they were removed, and the selected release area shall have complex shaded habitat if at all available, so juveniles may rest or hide after release.
  - xi. A report on fish rescue and relocation efforts and results shall be submitted to NMFS within 30 days of conclusion of the activities, indicating the number of salmonids that were handled, the number injured or killed, the transport water quality readings, total time in transport, and the location they were released into.
- k. The Authority and its contractors shall ensure that surface water reductions in Pacheco Creek do not reach a level that will be detrimental to the survival and success of S-CCC steelhead eggs, alevins, fry, or juveniles beyond the ecological surrogate threshold.
- i. The Authority and its contractors shall send the GAMMP in advance of tunneling activities under the Pacheco Creek watershed to NMFS for approval before commencing tunneling activities.
  - ii. Surface water level and flow monitoring shall be conducted upstream and downstream of affected stream reaches during normal S-CCC use periods of Pacheco Creek and Pacheco Creek South Fork.
  - iii. If NMFS expects that S-CCC steelhead may be using Pacheco Creek during tunneling dewatering periods, the Authority and its contractors shall prepare sufficient supplemental water to offset potential surface water reductions well in advance of active tunneling reaching sensitive stream reaches.

- iv. Provided supplemental water shall be of suitable quality (temperature, pH, and dissolved oxygen levels, and be free of pathogens) and of sufficient quantity to avoid a detectible deficit in surface water beyond the ecological surrogate threshold so that all life stages of S-CCC steelhead dependent on the surface water of the Pacheco Creek watershed will be supported. Supplemental water shall be provided as long as all life stages are present in the Pacheco Creek watershed and tunnel dewatering is causing surface water flow to be reduced.
  - v. Tunneling operations shall cease if surface water monitoring indicates that the ecological surrogate threshold amount may be exceeded or has been exceeded, despite supplement water additions, though existing tunnel area shall be sealed and capped to prevent further groundwater dewatering during interim, and NMFS shall be contacted immediately. Tunneling operations shall only continue once NMFS agrees a suitable plan of action has been created and in place to avoid additional S-CCC steelhead take.
1. The Authority and its contractors shall prepare and adhere to a SPCCP and SWPPP for each construction site discussed in this opinion, to minimize the probability of introducing pollution into waterways and to reduce the amount discharged should an accidental or uncontrolled discharge occur.
    - i. Construction stormwater and erosion AMMs and BMPs shall be established prior to the start of construction and earthwork, and be maintained and monitored regularly to ensure effectiveness.
    - ii. Accidental spill containment and clean-up materials shall be present at all work locations and be accessible to construction crews at all times, to ensure rapid response to events. Materials and available amounts shall be adequate for the machinery and chemicals expected onsite.
    - iii. All equipment maintenance and fueling shall occur in paved areas whenever possible, and occur at least 200 feet away from the wetted channel, using full spill or leak containment systems.
    - iv. Equipment shall be checked for leaks and maintained regularly to ensure proper function before entering water channels or traveling over water channels. Equipment to be used stationary over water for long periods shall have drip pans or absorbent pads placed underneath to catch any and all leaks.
    - v. Should an accidental spill or discharge into steelhead habitat occur, NMFS shall be contacted within 24 hours with information regarding the event, including type of spill or breach, event duration, estimates on the amount and concentration of materials discharged, Authority/contractor immediate response, and the Authority's and their contractors proposed long-term resolution to avoid such events. Environmental samples shall be taken and documentation made to track the efficacy of containment and clean-up efforts.

2. The following terms and conditions implement reasonable and prudent measure 2:

- a. The Authority and its design-build team shall work with NMFS staff to ensure viaduct and crossing footings placed within the OHWM will demonstrate minimal hydraulic effects and not significantly alter the hydrology of steelhead critical habitat in ways that may impede their migration or cause changes in geomorphic processes that could alter the amount or availability of spawning habitat (i.e., gravel beds) through holding working group meetings when 75% and 90% project designs are available for the sections interacting with NMFS trust resources.
- b. The Authority and its design-build team shall seek technical assistance from NMFS during the design phase (before construction) of overcrossings that involve alterations to stream bed bottoms such as in association with culverts or box culverts to be placed in designated CCC or S-CCC steelhead critical habitat to ensure the selected designs do not impede fish passage and sufficiently meet fish passage criteria (Game) 2004, NMFS 2011).
- c. The Authority and its design-build team shall provide final crossing designs of each major overcrossing to NMFS at least one year prior to construction mobilization and site preparation start dates for consultation and coordination purposes, in case new information or project design changes warrant consultation re-initiation or opinion amendments.
  - i. If consultation reinitiation or opinion amendments are not required, the Authority and its construction contractors shall again contact NMFS at least two months ahead of construction mobilization to discuss adaptively managing or avoiding interactions with special status anadromous fishes and the habitats they use in the upcoming construction season.
- d. Decreases to the riparian vegetation available locally shall be minimized.
  - i. Riparian vegetation removal shall be limited to the extent practicable for structure placement and construction access, and both trimming and removal shall be limited to the absolute minimum amount required for construction.
  - ii. Riparian vegetation not planned for removal shall be clearly marked and areas of special biological significance that contain native, over-hanging riverine trees, floodplain habitat, or other habitat features that offer in-water heterogeneity such as large woody debris shall be fenced off or clearly marked before removal activities begin to ensure those resources are avoided and preserved.
  - iii. Remaining trees shall be protected from damage during construction activities and during riprap placement to ensure their continuing survival as part of the riverine habitat. Protective measures may include wrapping their trunks with burlap and/or creating a scaffold buffer of scrap timber around the trunks, in both cases to buffer against damage. A qualified biologist shall confirm proper application of these protective measures and tree survival through the construction and restoration process.

- e. Trees to be removed for the project shall be surveyed for species and number. The Authority or its contractors shall replant native species onsite at minimum a 3:1 ratio in-kind for the number of individual trees removed once construction is complete. Plantings shall be monitored and cared for at least three years after planting to ensure survival.
- f. Native trees and large woody material removed for the project during site preparation shall either be placed back into the waterway to provide cover and habitat for listed salmonids, be secured in an affected waterway as fish habitat augmentation near major overcrossings, or be incorporated into bank stabilization and other 'soft' armoring designs for the project (FEMA 2009).
- g. In-stream woody material refugia shall be placed and secured within 500 meters of overcrossing and viaduct footings in affected streams to minimize predation of juveniles expected from the regular disturbance of HSR trains running over the river channel on the viaducts and the artificial structures attracting more piscivorous predators to the area than would be expected without the overwater structures and ongoing HSR operations. The Authority shall contact NMFS for technical assistance on the placement and amount needed to provide optimal refuge for juveniles to hide in and avoid predation.
  - i. The Authority shall estimate the distance to which 100 dB re 1 $\mu$ PA occurs in the underwater environment due to the normal operation of high speed trains running over waterways using empirical underwater sound monitoring taken once track sections are complete and the HSR system is operational, to better inform placement of fish habitat augmentation structures relative to HSR structures in and around streams.
- h. The Authority shall design temporary and permanent night lighting of overwater structures so that the surface of the water is not illuminated and attractive to piscivorous predators and juvenile steelhead.
- i. Temporary construction materials and BMPs shall consist of natural biodegradable materials and the use of plastic (such as monofilament and Visqueen) shall be minimized to the extent practicable. All materials intended for temporary use onsite shall be removed within 60 days post construction/project completion or at least three days before anticipated rainfall to reduce pollution and trash entering the waterways.
- j. Temporary construction areas shall be utilized for staging, storage, parking, and stockpiling outside of the water channels, floodplains, and riparian areas whenever practicable.
- k. The amount of new impervious surfaces placed or created in the action area by the proposed project shall be minimized, the use of permeable pavements or surfaces in lieu pavement or gravel shall be considered whenever feasible.

- l. No environmental designs or project features shall include the incorporation or use of new or recycled tire particles or materials, especially not in stormwater infrastructure or in aquatic habitat restoration designs.
- m. Disturbed areas that were graded will be re-contoured and stabilized at the end of the construction year to ensure erosion and sediment mobilization into steelhead waterways will be avoided. Once construction is complete, all disturbed areas shall be naturalized to the extent practicable.
- n. The placement of artificial structures in the riparian corridor and on the river banks shall be limited to the extent practicable, both above and below the OHWM.
  - i. The placement of riprap on the river bank shall be limited to the amount described in the submitted project BA or less. "Soft" or green approaches to bank stabilization shall be utilized to the extent practicable, hard bank protection methods shall be avoided whenever feasible, and all tactics shall include the placement of large woody material.
  - ii. Wood treated with creosote or copper-based chemicals shall be avoided for use in bank stabilization efforts.
  - iii. Whenever revetment/riprap must be used, quarry stone, cobblestone, or their equivalents shall be used and complemented with native riparian plantings, and other natural stabilization alternatives with the goal of maintaining a natural riparian corridor (FEMA 2009).
  - iv. Temporarily disturbed areas shall be revegetated with native plants that resemble or improve the existing native vegetation diversity based on historical, locally appropriate assemblages.
  - v. When revetment/riprap is placed, voids created by the boulders shall be filled by smaller diameter rocks/gravel when below the OHWM to avoid supporting piscivorous predator ambush habitat.
- o. The use of pesticides and herbicides shall be avoided near wetted channels, floodplains, and uplands during weed control activities, and amounts used minimized, to the extent practicable.
- p. Temporary sheet piles shall be completely removed from streams once construction is complete.
  - i. Sediment suspension created during the removal of temporary sheet piles and cofferdams shall be controlled by encircling the in-water work area with a silt curtain, pulling the piles out slowly, and filling any streambed holes left by the piles with clean, native sediment, or appropriately-sized spawning gravel following pile removal.

3. The following terms and conditions implement reasonable and prudent measure 3:

- a. The Authority and its contractors shall coordinate with NMFS, whenever NMFS requests, to allow staff safe and reliable access through HSR ROW and construction sites when site visits, in-stream monitoring, or fish salvage operations are required.
  - i. The Authority shall designate an on-site point of contact who can facilitate access and ensure safety through HSR construction sites and ROW, and update NMFS of their contact information regularly.
- b. Annual updates and reports required by these terms and conditions shall be submitted by December 31<sup>st</sup> of each year of construction.
- c. Monitoring reports related to RPM 3 shall include record of adherence to project schedules, project milestone completion dates, and details regarding AMM/BMP implementation and performance, as well as any observed incidental take, incidents, or encounters relating to NMFS resources or their ecological surrogates.
- d. Updates and reports required by these terms and conditions shall be sent to:

California Central Valley Office – c/o Cathy Marcinkevage  
National Marine Fisheries Service  
650 Capitol Mall, Suite 5-100  
Sacramento, CA 95814  
Erin.strange@noaa.gov

California Coastal Office – c/o Joel Casagrande  
National Marine Fisheries Service  
777 Sonoma Avenue, Room 325  
Santa Rosa, CA 95404  
Joel.casagrande@noaa.gov

## **2.10. Conservation Recommendations**

Section 7(a)(1) of the ESA directs Federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of the threatened and endangered species. Specifically, conservation recommendations are suggestions regarding discretionary measures to minimize or avoid adverse effects of a proposed action on listed species or critical habitat or regarding the development of information (50 CFR 402.02).

- The Authority and its contractors should incorporate LID designs and features into HSR ROW and access roads, station design, maintenance facilities, utilities, and parking areas whenever feasible, including tree plantings, vegetated roofs, stormwater planters, infiltration or lined rain gardens, bioswales, vegetated strips, bioretention devices, and the enhancement of onsite hydrologic features that maximum water evapotransport and groundwater infiltration to minimize degradation to CCC and S-CCC designated critical habitat water quality and habitat function. Doing so would aid in the restoration of the functionality of existing critical habitat water quality and water quantity PBFs in general,

and improve the resiliency and probability of recovery of CCC and S-CCC steelhead in the region.

- The Authority and its contractors should notify NMFS if any steelhead or salmonid juveniles are observed to be naturally isolated in disconnected or ponded water within their ROW and anticipate the fish being in danger of dying from receding water levels so that appropriate wildlife and fishery agencies may coordinate a fish rescue effort. The Authority and its contractors should enable and facilitate site and area access through the ROW/construction zone until the fish salvage efforts conclude. Any steelhead juveniles handled, injured, or killed by other organizations in this manner will not be tallied toward the incidental take associated with the Authority's incidental take for the proposed project, instead any incidental take associated with the rescue effort would be covered by permits held by the fish and wildlife agency sponsoring the rescue effort. Doing so will improve the probability the individuals relocated will survive to adulthood and improve the cohort productivity of the CCC/S-CCC steelhead populations involved.
- The Authority and its contractors should continue to work cooperatively with other State and Federal agencies, private landowners, governments, and local land management groups to identify opportunities for cooperative analysis, monitoring, and funding to otherwise support steelhead and watershed restoration projects and recovery action projects in the action area. Doing so would aid restoration of the functionality of existing critical habitats in general, and improve the resiliency and probability of recovery of CCC and S-CCC steelhead in the region.
- The Authority should use biodegradable oil in equipment and onsite vehicles. Doing so will reduce the amount of construction equipment contamination resultant from the project, and available critical habitat quality will be better maintained, in support of CCC/S-CCC steelhead.
- The Authority should submit a final CMP to NMFS prior to implementation of the proposed action. The final CMP should demonstrate that the compensatory mitigation plan for unavoidable impacts to steelhead habitat adequately meets the Authority's conservation goals and ratio targets proposed in CM-FISH-1. The final CMP should include:
  - Updated and accurate acreage estimates of types of steelhead habitat (spawning, rearing, and migratory, and designated critical habitat or auxiliary habitat, by DPS) to be temporary and permanently impacted by the project (permanent structures and bank/slope stabilization measures).
  - Updated and accurate acreage estimates of planned on-site restoration, including riparian replantings, incorporation of large woody material, enhancement of fish habitat, and where "soft" bank/slope stabilization designs were selected for use over hard revetment or riprap.
  - Identification of the property or properties selected to provide compensatory offsets for unavoidable impacts to S-CCC/CCC steelhead habitats, and

identification of the conservation partners and agencies that will be responsible for holding and maintaining the conservation easements or fee-title to the identified parcels in perpetuity.

## **2.11. Reinitiation of Consultation**

This concludes formal consultation for the proposed action.

As 50 CFR 402.16 states, reinitiation of consultation is required and shall be requested by the Federal agency or by the Service where discretionary Federal agency involvement or control over the action has been retained or is authorized by law and if:

- (1) The amount or extent of incidental taking specified in the ITS is exceeded,
- (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion,
- (3) the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in the biological opinion, or
- (4) a new species is listed or critical habitat designated that may be affected by the action.

An example of when reinitiation of consultation will likely be warranted under 50 CFR 402.16 is if the Authority or its contractors do not adhere to the work windows or daily work hours as proposed. In addition, when a site(s) for compensatory mitigation is confirmed and additional information about the proposed compensatory mitigation is available, reinitiation of consultation may be warranted to analyze the effects of the compensatory mitigation portion of this proposed action, *or* the restoration component of the compensatory mitigation could be included under NOAA Restoration Center's programmatic approach for fisheries habitat restoration projects in California Coastal counties (NMFS 2017) if a United States Army Corps of Engineers Clean Water Act section 404 permit is required, and ESA section 7 review would occur through that programmatic opinion process.

## 2.12. “Not Likely to Adversely Affect” Determinations

Species	Scientific Name	Original Listing Status	Current Listing Status	Critical Habitat Designated
California Central Valley steelhead DPS	<i>Oncorhynchus mykiss</i>	3/19/1998 63 FR 13347 Threatened	1/5/2006 71 FR 834 Threatened	9/2/2005 70 FR 52488

California Central Valley (CCV) steelhead and its critical habitat occur downstream but within the watersheds potentially affected by the implementation of the San Jose to Merced Project Section. The connection point or action area of the HSR section considered in this opinion ends at least 5 miles upstream from the Middle San Joaquin River (in which individual CCV steelhead could reasonably occur in the future as restoration efforts and passage improvement projects proceed), and at least 16 miles upstream from the nearest waterbody designated as CCV steelhead critical habitat (the Merced River confluence with the Lower San Joaquin River). Consequences to CCV steelhead and a nonessential experimental 10(j) population of reintroduced CV spring-run Chinook salmon were considered in the opinion issued in 2019 for the Merced to Fresno HSR section, the next contiguous portion of the HSR system, which also includes the CV Wye connection (NMFS 2019). All reasonable and expected impacts to these populations from the HSR project for that action area are considered and contained in that opinion and will not be duplicated here.

Authority staff and ICF consultants considered the likelihood that individual CCV steelhead might access the CV waterways that interact with the HSR footprint proposed in the San Jose to Merced (in waterways crossed west of the CV Wye connection). In early technical assistance with NMFS staff (Kozlowski et al. 2017, 2018), despite this area historically hosting highly productive rearing for juvenile CCV steelhead, it was determined that all existing waterways of the San Jose to Merced HSR footprint have been highly manipulated and effectively block upstream progress in almost all water year types. Only in extreme, well above average water years would these multiple water control structures be expected to be overtopped enough to allow CCV steelhead passage to the San Jose to Merced project footprint. And during such extreme rainfall and flood years, we assume HSR construction would cease until on-the-ground conditions improved, precluding overlap between CCV steelhead presence and construction activities. The occurrence of such a situation would be so rare it would be considered a discountable consequence of the project, as it is extremely unlikely to occur. Furthermore, the currently proposed construction, operational, and maintenance CMs/AMMs/BMPs for the HSR system are expected to adequately avoid, minimize, and control any effects caused within the action area (e.g., contamination from accidental spills, sedimentation) so that these effects will not be transported and affect individuals or critical habitat functionality downstream. Therefore, NMFS concurs with the Authority’s determination that the proposed San Jose to Merced Project Section is not likely to adversely affect CCV steelhead nor their designated critical habitat.

### 3. MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT ESSENTIAL FISH HABITAT RESPONSE

Section 305(b) of the MSA directs Federal agencies to consult with NMFS on all actions or proposed actions that may adversely affect EFH. Under the MSA, this consultation is intended to promote the conservation of EFH as necessary to support sustainable fisheries and the managed species' contribution to a healthy ecosystem. For the purposes of the MSA, EFH means “those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity”, and includes the physical, biological, and chemical properties that are used by fish (50 CFR 600.10). Adverse effect means any impact that reduces quality or quantity of EFH, and may include direct or indirect physical, chemical, or biological alteration of the waters or substrate and loss of (or injury to) benthic organisms, prey species and their habitat, and other ecosystem components, if such modifications reduce the quality or quantity of EFH. Adverse effects on EFH may result from actions occurring within EFH or outside of it and may include site-specific or EFH-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 CFR 600.810). Section 305(b) of the MSA also requires NMFS to recommend measures that can be taken by the action agency to conserve EFH. Such recommendations may include measures to avoid, minimize, mitigate, or otherwise offset the adverse effects of the action on EFH [CFR 600.905(b)].

This analysis is based, in part, on the EFH assessment provided by the Authority and descriptions of EFH for Pacific Coast salmon (PFMC 2014) contained in the fishery management plans developed by the Pacific Fishery Management Council (PFMC) and approved by the Secretary of Commerce.

#### 3.1. Essential Fish Habitat Affected by the Project

The geographic extent of salmon freshwater EFH is described as all water bodies currently or historically occupied by PFMC-managed salmon within the USGS 4th field hydrologic units identified by the fishery management plan (PFMC 2014). This designation includes the 18050003 – Coyote hydrologic unit for all run-types of Chinook salmon, *O. tshawytscha*, and coho salmon, *O. kisutch* in the Santa Clara Valley and the 18040001 – Middle San Joaquin-Lower Chowchilla hydrologic unit for all runs of Chinook salmon in the California Central Valley that historically and currently use these watersheds. The fishery management plan also identifies Habitat Areas of Particular Concern (HAPCs) for Pacific Coast Salmon as: complex channel and floodplain habitat, spawning habitat, thermal refugia, estuaries, and submerged aquatic vegetation.

Within the Santa Clara Valley portion of the action area, the Coyote hydrologic unit contributes to EFH watershed historically utilized by both Chinook and coho salmon, though currently may only occasionally host spawning of stray Central Valley fall-run Chinook salmon originating from Feather River Fish Hatchery and Mokelumne River Hatchery (Garcia-Rossi and Hedgecock 2002, Leal and Watson 2018, Leal 2021). Complex channels and floodplain habitats, and estuaries as well as their associated vegetation, may be found within Guadalupe River, Los Gatos Creek, and Coyote Creek, but have been degraded by urbanization and channelization of the waterways. Likewise, the floodplain of the Guadalupe River has also been highly urbanized and

developed. Spawning habitat, if still available, is highly constrained in the action area. The watershed is currently impacted by the impassable LeRoy Anderson Dam.

Within the California Central Valley portion action area, the Middle San Joaquin-Lower Chowchilla hydrologic unit contributes to EFH watersheds utilized by Chinook salmon, including a fall-run and a nonessential experimental population of re-introduced spring-run Chinook salmon, though the spring-run historically dominated this watershed (NMFS 2014). The San Joaquin River is historical habitat for these two runs and contains the southernmost populations of Chinook salmon, though anthropogenic changes in the environment have severely impacted their ability to use this basin over the last century. The combined Sacramento – San Joaquin River system once supported Chinook salmon runs comparable to those of the Columbia and Fraser rivers (NMFS 2014). The freshwater Pacific Coast Salmon EFH components affected by this project include juvenile rearing habitat in floodplains, and the juvenile and adult migration corridors. The areas affected by the project footprint were historically vast floodplain and meandering channel habitat for the lower San Joaquin River but have been converted to agricultural fields or for cattle grazing, or are maintained as wildlife refuges or hunting clubs for waterfowl.

### **3.2. Adverse Effects on Essential Fish Habitat**

Adverse effects of the proposed action on coho salmon and Chinook salmon EFH would be similar to the effects of the action on CCC/S-CCC steelhead and their designated critical habitats discussed in section 2.5, Effects of the Action. In summary, adverse effects to EFH quality include:

1. Temporary sedimentation and turbidity
2. Introduction of hazardous materials and contaminants to waterways and ecosystems during construction
3. Conversion of natural areas for project needs leading to the removal of EFH, including permanent removal of tributaries and minor waterbodies (HAPCs: complex channel and floodplain)
4. Temporary to long-term reductions in riparian vegetation (HAPCs: complex channel and floodplain, submerged aquatic vegetation)
5. Permanent placement of artificial structures in and over waterways, estuary habitat, and riparian corridors (HAPCs: complex channel and floodplain)
6. Permanent increases in impervious surfaces in the landscape, increased urbanization
7. Creation of predator cover and visual barriers
8. Permanent effects on foraging resources through shading (HAPCs: complex channel and floodplain, submerged aquatic vegetation)
9. Permanent bank and slope stabilization, hard armoring (HAPCs: complex channel and floodplain)
10. Permanent intermittent transportation noise

Proposed projects that occur in or along waterways often cause significant long-term or permanent negative impacts to aquatic habitat, and the HSR system is no different as the route crosses these watersheds multiple times in this section. Additionally, improved transportation infrastructure is associated with increased human population growth and urbanization effects that

combine to cumulatively decrease the functionality of aquatic ecosystems over large landscapes via individually smaller but pervasive public and private actions (i.e., land development from rural/agriculture to housing and commercial lots, increased water demands, increases in impervious surfaces, point and non-point source pollution increases, increases in aquatic recreation, increases in bank protections to protect new land development, etc.). Therefore, direct and immediate impacts from construction are expected, and long-term effects of the existence and operation of the HSR system are expected into the future, as the implementation of the project will affect the quality and quantity of Pacific Coast Salmon EFH.

### **3.3. Essential Fish Habitat Conservation Recommendations**

Many of the Pacific Salmon EFH concerns presented above are expected to be addressed through the ESA consultation RPM's 1-3 (section 2.9.3) and the Authority's plan to restore and rehabilitate salmonid habitat onsite and to also offset unavoidable impacts through permittee-responsible mitigation is expected to augment and improve the condition and availability of Pacific Coast Salmon EFH within the action area.

In addition to these efforts, NMFS determined that the following conservation recommendations are also necessary to avoid, minimize, mitigate, or otherwise offset the impact of the proposed action on EFH.

1. To address the increased impervious surface cover, increased general urbanization and continuing development and occupation of natural areas (#3 through #9), NMFS recommends the Authority examine its ROW and access road designs of the immediate project areas to maintain a contiguous, functional riparian corridor, to maintain natural hydrologic connectivity, and to create or maintain access to existing floodplain habitat whenever possible. Such designs could also include incorporation of stormwater treatment/LID tactics to treat project-associated stormwater before discharge and use of permeable pavements, further decreasing HSR indirect negative impacts on Pacific Coast Salmon EFH watersheds.
2. To address the creation of predator cover through installation of permanent in-water/over-water structures, shading, and offset the effects of permanent intermittent noise (#5, #7, #10), NMFS recommends also installing in-river LWM around or adjacent to the HSR viaduct crossing and footings so that juvenile Chinook and coho may also have access to predator refuges nearby the impacted locations. Enhance in-stream fish habitat by providing root wads and deflector logs below the stabilized bank, and by planting shaded riverine aquatic cover vegetation, as part of bank revitalization in conjunction with support footings so that the likelihood of scour caused by structure placement is reduced. The Authority should work with NMFS staff to ensure LWM installations are placed in arrangements and in sufficient numbers so that maximal benefits and use of salmon juveniles are likely and expected (Dollof and Melvin 2003).
3. To address potential effects of hard armoring to stabilize the banks and slopes (#9), NMFS recommends utilizing alternatives to traditional riprap and hard armoring, such as designing compacted fill lifts and vegetation plantings to stabilize banks while also enhancing the limited rearing and foraging EFH locally available to juvenile salmonids. This could involve

placing granular soil under compost socks above the OHWM. The compacted fill lifts would consist of compost socks, would have a minimum durability of one year and would be composed of biodegradable jute, sisal, burlap, or coir fiber fabric. A 12-inch diameter compost sock would be installed on the face of each lift and then the compost sock and soil at each lift would be wrapped with biodegradable material. The process would be repeated until the top of the site is reached. Once the compost socks and soil wraps have been placed, two 6-foot live willow branch cuttings would be placed per linear foot in each of the lifts and a 2-inch layer of topsoil would be placed over the cuttings. Hard bank protection should be a last resort and the following options should be explored beforehand for efficacy (tree revetments, stream flow deflectors, and vegetative riprap (FEMA 2009)). Exchanging riprap placement for these recommendations helps restore the disturbed ground, decreases the chance of future erosion events, and moves the riverbank back to a more natural state while still providing the stabilization needed for the continuous operations of the HSR system.

4. To address long-term reductions in riparian vegetation (effect #4), in areas where levees are under the jurisdiction of the United States Army Corps of Engineers or any other flood management agency, apply for and obtain a vegetation variance which will allow for the Authority or its contractors to re-plant the area with native species as described above in conservation recommendation #3, at least in the lower one-third of the waterside of the levee.
5. To address expected decreases in EFH water quality due to increased urbanization and stormwater discharge associated with HSR system implementation (effect #6), NMFS recommends that the Authority take efforts beyond its own properties to help the local communities (perhaps through permitting guidance or knowledge exchanges with the communities stations are located within):
  - a. Install and monitor vegetated buffers along stormwater drains to streams, compost based bioretention filters, or bioswales in upland areas with the goals of trapping sediment, removing nutrients, tire wear particles, and metals, and moderating water temperatures, as feasible.
  - b. Increase stormwater quality monitoring following National Pollutant Discharge Elimination System and State Water Resources Control Board requirements from all stormwater discharge points, and before and after pollution control BMPs to establish their performance over time, and adapt/replace/maintain stormwater quality BMPs, as necessary.
  - c. Increase public access to knowledge about water quality issues and encourage local efforts to improve watershed water quality in general, especially regarding urban pollution that affects salmon EFH.

Fully implementing these five EFH conservation recommendations and RPM's 1-3 (section 2.9.3 of the Opinion) would protect, by avoiding or minimizing the adverse effects described in section 3.2, above, Pacific Coast salmon EFH and HAPCs.

### **3.4. Statutory Response Requirement**

As required by section 305(b)(4)(B) of the MSA, the Authority must provide a detailed response in writing to NMFS within 30 days after receiving an EFH Conservation Recommendation. Such a response must be provided at least 10 days prior to final approval of the action if the response is inconsistent with any of NMFS's EFH Conservation Recommendations unless NMFS and the Federal agency have agreed to use alternative time frames for the Federal agency response. The response must include a description of the measures proposed by the agency for avoiding, minimizing, mitigating, or otherwise offsetting the impact of the activity on EFH. In the case of a response that is inconsistent with the Conservation Recommendations, the Federal agency must explain its reasons for not following the recommendations, including the scientific justification for any disagreements with NMFS over the anticipated effects of the action and the measures needed to avoid, minimize, mitigate, or offset such effects (50 CFR 600.920(k)(1)).

In response to increased oversight of overall EFH program effectiveness by the Office of Management and Budget, NMFS established a quarterly reporting requirement to determine how many conservation recommendations are provided as part of each EFH consultation and how many are adopted by the action agency. Therefore, we ask that in your statutory reply to the EFH portion of this consultation, you clearly identify the number of conservation recommendations accepted.

### **3.5. Supplemental Consultation**

The Authority must reinitiate EFH consultation with NMFS if the proposed action is substantially revised in a way that may adversely affect EFH, or if new information becomes available that affects the basis for NMFS's EFH Conservation Recommendations (50 CFR 600.920(l)).

## 4. DATA QUALITY ACT DOCUMENTATION AND PRE-DISSEMINATION REVIEW

The Data Quality Act (DQA) specifies three components contributing to the quality of a document. They are utility, integrity, and objectivity. This section of the opinion addresses these DQA components, documents compliance with the DQA, and certifies that this opinion has undergone pre-dissemination review.

### 4.1. Utility

Utility principally refers to ensuring that the information contained in this consultation is helpful, serviceable, and beneficial to the intended users. The intended users of this opinion are the California High Speed Rail Authority. Other interested users could include the United States Army Corps of Engineers, USFWS, California Department of Fish and Wildlife, SCVOSA, SCVHA, and the citizens of California. Individual copies of this opinion were provided to the Authority. The document will be available within two weeks at the [NOAA Library Institutional Repository](#). The format and naming adheres to conventional standards for style.

### 4.2. Integrity

This consultation was completed on a computer system managed by NMFS in accordance with relevant information technology security policies and standards set out in Appendix III, 'Security of Automated Information Resources,' Office of Management and Budget Circular A-130; the Computer Security Act; and the Government Information Security Reform Act.

### 4.3. Objectivity

Information Product Category: Natural Resource Plan

**Standards:** This consultation and supporting documents are clear, concise, complete, and unbiased; and were developed using commonly accepted scientific research methods. They adhere to published standards including the NMFS ESA Consultation Handbook, ESA regulations, 50 CFR 402.01 et seq., and the MSA implementing regulations regarding EFH, 50 CFR 600.

**Best Available Information:** This consultation and supporting documents use the best available information, as referenced in the References section. The analyses in this opinion and EFH consultation contain more background on information sources and quality.

**Referencing:** All supporting materials, information, data and analyses are properly referenced, consistent with standard scientific referencing style.

**Review Process:** This consultation was drafted by NMFS staff with training in ESA and MSA implementation, and reviewed in accordance with West Coast Region ESA quality control and assurance processes.

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**APPENDIX F: USACE LEDPA CONCURRENCE LETTER, MARCH 20, 2020  
AND USEPA LEDPA CONCURRENCE LETTER, MARCH 18, 2020**





**DEPARTMENT OF THE ARMY**  
U.S. ARMY CORPS OF ENGINEERS, SACRAMENTO DISTRICT  
1325 J STREET  
SACRAMENTO CA 95814-2922

March 20, 2020

Regulatory Division (SPK-2009-01484)

Mark McLoughlin  
California High Speed Rail Authority  
770 L Street, Suite 800  
Sacramento, California 95814  
[Mark.McLoughlin@hsr.ca.gov](mailto:Mark.McLoughlin@hsr.ca.gov)

Dear Mr. McLoughlin:

I am writing in response to your February 4, 2020, Checkpoint C Package for the proposed San Jose to Merced Section of the California High-Speed Rail (CAHSR) Project, in accordance with our *National Environmental Policy Act/Clean Water Act Section 404/Rivers and Harbors Act Section 14 Integration Process for the California High-Speed Train Program Memorandum of Understanding* dated November 2010 (NEPA/404/408 MOU). This letter is the U.S. Army Corps of Engineers' formal response.

As a cooperating agency for preparation of the San Jose to Merced Project Section Environmental Impact Report/Environmental Impact Statement (EIR/EIS) and in fulfillment of our responsibilities under the NEPA/404/408 MOU, we offered feedback to the California High-Speed Rail Authority (Authority) on the preliminary Least Environmentally Damaging Practicable Alternative (LEDPA) determination and draft Compensatory Mitigation Plan for the San Jose to Merced Section of the CAHSR Project. The Authority submitted the San Jose to Merced Section Checkpoint C Package to our office on February 4, 2020. We attended the February 18, 2020 Checkpoint C Meeting and provided comments on the Checkpoint C documents to your staff the same day. Additionally, we provided formal comments on the Checkpoint C Package via email on March 13, 2020.

After reviewing the data provided, we concur that Alternative 4, from Scott Boulevard in the City of Santa Clara to Carlucci Road in unincorporated Merced County, appears to be the preliminary LEDPA. The following are the design options that would be implemented for each of the five subsections of Alternative 4:

<b>Subsection</b>	<b>Design Option</b>
San Jose Diridon Station Approach	Blended, At-Grade
Monterey Corridor	Blended, At-Grade
Morgan Hill and Gilroy	Blended, At-Grade to Downtown Gilroy
Pacheco Pass	Tunnel
San Joaquin Valley	Henry Miller Road

The following are the design options that would be implemented for the specified ancillary features of Alternative 4:

Ancillary Feature	Design Option
San Jose Diridon Station	At-Grade
Downtown Gilroy Station	At-Grade
Maintenance of Way Facility	South of Gilroy D

Please be aware that this determination is being made prior to the circulation of the public Draft Environmental Impact Statement and will be revisited if additional substantive information becomes available after public comments are received.

In addition, we concur that the draft Compensatory Mitigation Plan may provide sufficient mitigation to meet the needs of the project under Section 404 of the Clean Water Act. However, the Corps cannot make a permit decision until we receive a final mitigation plan in accordance with 33 CFR Part 332, *Compensatory Mitigation for Losses of Aquatic Resources*. We will continue to work with the Authority towards development of a final mitigation plan that satisfies the requirements of 33 CFR Part 332.

We appreciate your willingness to work with this office to reach this concurrence. If you have any questions, please contact Mr. Zachary Fancher at our Enforcement/Special Projects Branch, 1325 J Street, Room 1350, Sacramento, California 95814-2922, by email at [Zachary.J.Fancher@usace.army.mil](mailto:Zachary.J.Fancher@usace.army.mil), or by telephone at 916-557-6643.

Sincerely,



Michael S. Jewell  
Chief, Regulatory Division

cc:

Mr. Sam Ziegler, U.S. Environmental Protection Agency, Region IX, [Ziegler.Sam@epa.gov](mailto:Ziegler.Sam@epa.gov)  
Ms. Connell Dunning, U.S. Environmental Protection Agency, Region IX, [Dunning.Connell@epa.gov](mailto:Dunning.Connell@epa.gov)  
Mr. Mike Aviña, California High-Speed Rail Authority, [mike.avina@hsr.ca.gov](mailto:mike.avina@hsr.ca.gov)  
Mr. Dan McKell, California High-Speed Rail Authority, [Dan.McKell@hsr.ca.gov](mailto:Dan.McKell@hsr.ca.gov)  
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Mr. Ryan Larson, U.S. Army Corps of Engineers, [Ryan.T.Larson2@usace.army.mil](mailto:Ryan.T.Larson2@usace.army.mil)  
Mr. Bryan Matsumoto, U.S. Army Corps of Engineers, [Bryan.T.Matsumoto@usace.army.mil](mailto:Bryan.T.Matsumoto@usace.army.mil)



**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY**  
**REGION IX**  
75 Hawthorne Street  
San Francisco, CA 94105

March 18, 2020

Mark McLoughlin  
California High-Speed Rail Authority  
770 L Street, Suite 800  
Sacramento, CA 95814

**Subject:** San Jose to the Central Valley Wye Project Extent: Checkpoint C Summary Report, Request for Agreement on Preliminary Least Environmentally Damaging Practicable Alternative and Preliminary Compensatory Mitigation Plan

Dear Mr. McLoughlin:

Thank you for the opportunity to provide comments in advance of publication of the Draft Environmental Impact Statement (DEIS) for the San Jose to Merced project section of California High Speed Rail (HSR). This letter responds to your February 4, 2020 request for agreement on the Preliminary Least Environmentally Damaging Practicable Alternative (LEDPA) determination for the proposed Alternative 4, which provides for blended, at-grade service from San Jose to downtown Gilroy, primarily utilizing the existing Caltrain right-of-way in this portion of the project section. We appreciate the clarifications provided on the Checkpoint C materials in response to comments provided by our agency via email on March 13, 2020 and at the Checkpoint C meeting on February 18, 2020.

EPA feedback is aimed at integrating permitting requirements of Clean Water Act (CWA) Section 404 with NEPA requirements. The purpose of this letter is to provide EPA's "agreement" with "Checkpoint C", a step in the integration process described in the *NEPA/ CWA Section 404/Rivers and Harbors Act Section 14 (33 U.S.C. 408) Integration Process for the California High-Speed Train Program Memorandum of Understanding* (NEPA/404 MOU) dated December 2010. To facilitate effective integration of CWA Section 404 and NEPA for this project, EPA continues to coordinate closely with your agency and the U.S. Army Corps of Engineers (Corps).

*Least Environmentally Damaging Practicable Alternative (LEDPA)*

After reviewing the information provided in the Checkpoint C Summary Report, and per the NEPA/404 MOU, EPA provides agreement with CHSRA's determination that Alternative 4 is the preliminary LEDPA for the San Jose to Central Valley Wye Project Extent of HSR. As this determination has been made prior to public circulation of the DEIS, it will be revisited if necessary should additional information become available after public comments are received.

*Draft Compensatory Mitigation Plan*

The Draft Compensatory Mitigation Plan is a conceptual strategy specifying resources available for the establishment and/or rehabilitation of aquatic resources. The submitted Checkpoint C Summary Report provides a general overview of mitigation needs, opportunities, and plausible implementation scenarios. According to the submittal, Alternative 4 will result in permanent impacts to 56.2 acres of wetlands and 40.2

acres of other waters of the United States (WOUS). Of that, 22.1 acres consist of constructed waters (irrigation canals, ditches, and constructed basins) that will be replaced on-site in coordination with the landowner or operator of the facility. Most of these features will be replaced in-kind, in the same location or immediately adjacent to the project footprint, with functions of the existing constructed features being retained. Temporary impacts to any WOUS will also be mitigated on site and in kind whenever practical. Off-site mitigation is proposed for all other permanent, direct impacts on jurisdictional waters, totaling approximately 74.3 acres of impact. The submittal presents a preliminary determination that compensation for these unavoidable impacts on jurisdictional waters can likely be completed through a combination of approved mitigation bank credits, available credits from the NFWF ILF Program, and permittee responsible mitigation.

Per the NEPA/404 MOU, EPA provides agreement that the Draft Compensatory Mitigation Plan may provide sufficient mitigation to meet the needs of the project under Section 404 of the Clean Water Act. EPA expects that more site-specific information will be made available prior to Clean Water Act Section 404 permitting. Specifically, the Final Mitigation Plan should include information on all key elements of the mitigation rule (Subpart J of the 404(b)(1) Guidelines at 40 CFR Part 230) in order to ensure compliance. EPA looks forward to collaborating with your agencies and Corps staff in the use of the program technical procedures to implement a watershed approach to mitigation. Required compensatory mitigation will be determined through completion of the Corps SPD Mitigation Ratio Setting Checklist. Permitted impacts to WOUS will be confirmed during project construction. We understand that impacts will likely be refined and reduced as design advances, and we recommend that all possible measures be taken to reduce impact numbers through further avoidance and minimization measures. We are particularly concerned about the estimated 27.1 acres of impact to Alkali Vernal Pools, as impacts to these rare aquatic features are incredibly difficult to mitigate due to their unique soil and hydrology requirements. If impacts to waters of the U.S. are reduced as a result of changes in project design, adjustments to the amount of compensatory mitigation will be made accordingly.

Thank you for requesting EPA's agreement on the LEDPA and Draft Compensatory Mitigation Plan. We look forward to further participation in the development of environmental documents for this project. EPA will ultimately review EISs for each section of the California HSR system pursuant to NEPA, Council on Environmental Quality (CEQ) regulations (40 CFR Parts 1500-1508), and Section 309 of the Clean Air Act. EPA will also review CWA Section 404 permit applications for each HSR section for compliance with EPA's 404(b)(1) Guidelines (40 CFR 230.10). We appreciate this opportunity to address potential environmental issues as early as possible. If you have any questions regarding our comments please contact the NEPA lead for this project, Clifton Meek, at (415) 972-3370 or by email at [meek.clifton@epa.gov](mailto:meek.clifton@epa.gov).

Sincerely,

Connell Dunning, Transportation Team Lead  
Environmental Review Branch  
Tribal, Intergovernmental & Policy Division

CC Via Email:

Mike Aviña, California High Speed Rail Authority  
Dan McKell, California High Speed Rail Authority  
Zachary Fancher, U.S. Army Corps of Engineers

## APPENDIX G: SECTION 4(F) CONCURRENCE LETTER





September 21, 2021

Jon Cicirelli, Director  
City of San Jose Department of Parks, Recreation & Neighborhood Services  
200 E. Santa Clara Street  
San Jose, CA 95113

Dear Mr. Cicirelli:

On April 24, 2020, the California High-Speed Rail Authority (Authority) released a Draft Environmental Impact Report (EIR)/Environmental Impact Statement (EIS) for the San Jose to Merced Project Section of the statewide California High-Speed Rail (HSR) System in accordance with the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA). This Draft EIR/EIS documents engineering, environmental analysis, public and agency involvement, and ensuring compliance with state and federal environmental laws and regulations for the proposed project. One federal law, Section 4(f), is the subject of this concurrence request. The Draft EIR/EIS also detailed preliminary determinations for Fuller Park, a Section 4(f) resource located in the City of San Jose. The Authority is currently preparing an Administrative Final EIR/EIS, which includes responses to comments received on the Draft EIR/EIS (including those received from the city) and updated Section 4(f) evaluations.

In addition, on July 10, 2020, the Authority released a Draft EIR/EIS for the San Francisco to San Jose Project Section of the California HSR System also in accordance with CEQA and NEPA. The San Francisco to San Jose Project Section alternatives are divided into geographic subsections. The fifth subsection is the San Jose Diridon Station Approach Subsection between Scott Boulevard in Santa Clara and West Alma Avenue in San Jose. To support a station-to-station analysis with logical termini for the San Francisco to San Jose Project Section, the analysis of the San Jose Diridon Station Approach Subsection was incorporated into San Francisco to San Jose Project Section Draft EIR/EIS. The San Jose Diridon Station Approach Subsection was fully analyzed as part of the San Jose to Merced Project Section Draft EIR/EIS and corresponding technical reports. As a result of incorporating the subsection analysis in both project sections, Section 4(f) resources including Fuller Park in the City of San Jose, are also included in the San Francisco to San Jose Project Section Draft EIR/EIS analysis.

The Authority's Preferred Alternative for the San Jose to Merced Project Section is Alternative 4, which is the same as Alternative A for the San Francisco to San Jose Project Section in the San Jose Diridon Station Approach Subsection. Alternative A is the Authority's Preferred Alternative for that project section. Thus, the Section 4(f) findings under both project sections for each resource are the same, and the Authority is requesting concurrence from the City for these resources for both project sections.

Section 4(f) of the United States Department of Transportation Act of 1966, as amended, and codified in 49 United States Code (U.S.C.) Section 303, declares that “it is the policy of the United States Government that special effort should be made to preserve the natural beauty of the countryside and public park and recreation lands, wildlife and waterfowl refuges and historic sites.” The Authority is responsible for Section 4(f) compliance for the HSR Program pursuant to 23 U.S.C. Section 237, under the NEPA Assignment Memorandum of Understanding (MOU) between the Federal Railroad Administration and the State of California, effective July 23, 2019, the Authority is the federal lead agency and is responsible for compliance with NEPA and other federal environmental laws, including Section 4(f) (49 U.S.C. § 303) and related U.S. Department of Transportation orders and guidance. In general, Section 4(f) specifies that the Authority may only approve a project that “uses” the resources mentioned above, if (1) there is no prudent and feasible alternative that avoids the use of Section 4(f) resources, and (2) the project includes all possible planning to minimize harm to those resources. In lieu of making these findings, the Authority also can approve the use of a Section 4(f) resource if it determines that the project will have a “*de minimis*” impact on that resource and the official with jurisdiction over the resource concurs in that determination. For parks, recreation areas, and refuges, the official with jurisdiction (OWJ) is the agency (or agencies) that owns or administers the property.

Additionally, the Authority may approve the temporary occupancy of a Section 4(f) property as minimal and not a use, if the “temporary occupancy” of the property meets the criteria under 23 U.S.C § 774.13(d): it would be of shorter duration than construction; there would be no change in ownership of the land; the scope of the work would be minor; there would be no temporary or permanent adverse changes to the activities, features, or attributes of the property; the property would be fully restored to a condition at least as good as it was prior to the project, that the temporary use would not interfere with the protected activities of the park; and the official with jurisdiction over the resource concurs in that determination.

The Authority has determined that Fuller Park located within the City of San Jose is a Section 4(f) resource; is within the resource study areas of both project sections; and that your agency is the OWJ with respect to this resource. The purpose of this letter is to request concurrence with findings the Authority has made with respect to the *de minimis* finding for Fuller Park, and the minimal nature of the temporary occupancy for Fuller Park. The basis for these findings was originally detailed in Chapter 4, Section 4(f)/6(f) of the San Jose to Merced and San Francisco to San Jose Project Section Draft EIR/EISs<sup>1</sup> and which have been subsequently revised in the Administrative Final EIR/EISs for both project sections based on written and oral comments received on the

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<sup>1</sup> Chapter 4, Section 4(f)/6(f), of the San Jose to Merced Project Section Draft EIR/EIS is available at the Authority’s website: [https://hsr.ca.gov/programs/environmental/eis\\_eir/draft\\_san\\_jose\\_merced.aspx](https://hsr.ca.gov/programs/environmental/eis_eir/draft_san_jose_merced.aspx) and Chapter 4, Section 4(f)/6(f), of the San Francisco to San Jose Project Section Draft EIR/EIS is available at: <https://hsr.ca.gov/programs/environmental-planning/project-section-environmental-documents-tier-2/san-francisco-to-san-jose-project-section-draft-environmental-impact-report-environmental-impact-statement/>.

April 2020 and July 2020 Draft EIR/EISs. A summary of the Authority's findings is set forth below. As noted, the Authority's Preferred Alternative is Alternative 4 for San Jose to Merced and Alternative A for San Francisco to San Jose, which is the same for both project sections in the San Jose Diridon Station Approach Subsection. For simplicity, in the following discussions, references to findings for the Preferred Alternative apply to and are the same for both project sections.

### **Fuller Park *De Minimis* and Temporary Occupancy Exception Findings**

The Preferred Alternative would be at grade and on an embankment adjacent to the park, permanently affecting 0.03 acre (2.6 percent) of the park as shown on Figure 1. The area permanently affected would be acquired by the Authority and includes 0.02 acre currently used for UPRR operations located west of Delmas Avenue. The 0.02 acre contains the existing train control site and an unpaved access road from Fuller Avenue. The Preferred Alternative would shift the existing site approximately 20 feet west and provide a new access road from Fuller Avenue. The Authority would also use this area for a train control site. This permanent easement would maintain public passage when not in use for service vehicles or maintenance of the train control site. This portion of the park does not contain any recreational facilities and is currently used for train operations. East of Delmas Avenue, 0.01 acre of the park adjacent to the current Caltrain right-of-way would be incorporated into the HSR right-of-way. This area is on the northeastern edge of the park, directly adjacent to the existing right-of-way, and does not contain any recreational facilities (Figure 1).

Preferred Alternative construction in these areas would not require closure of the park and the park would remain open for continued use during construction and operations. Access to the park from Fuller Street would not be temporarily or permanently affected. Existing vegetation and/or landscaping within the construction area would be temporarily disturbed, but the affected portions would be restored to pre-construction conditions. Prior to any ground-disturbing activities at the park, a restoration plan would be prepared by the Authority addressing specific actions, sequence of implementation, parties responsible for implementation, and successful achievement of restoration for temporary impacts, such as replanting trees and vegetation that would be removed. Before beginning construction, the contractor would submit the restoration plan for review and obtain Authority approval. The Authority would provide the restoration plan to the City of San Jose Department of Parks, Recreation & Neighborhood Services for review and comment before implementation.

Also, east of Delmas Avenue, another 0.01 acre would be used as an access temporary construction easement (TCE). This area is also on the northeastern edge of the park adjacent to the existing right-of-way and does not contain any recreational facilities (Figure 1). The Authority has determined that the temporary occupancy of Fuller Park under the Preferred Alternative meets the criteria for temporary occupancy that are so minimal so as to not constitute a use (i.e., occupancy would be of shorter duration than construction; there would be no change in ownership of the land; scope of the work would be minor such that both the nature and magnitude of changes to the Section 4(f)

Mr. Jon Cicirelli  
September 21, 2021  
Page 4

The permanent and temporary occupancy impacts under the Preferred Alternative on Fuller Park would not adversely affect the protected activities, features, or attributes that qualify the park for protection under Section 4(f). Therefore, with the City of San Jose Department of Parks, Recreation & Neighborhood Service's concurrence, the Authority has concluded that the permanent impacts on Fuller Park under the Preferred Alternative would be *de minimis* and intends to approve the determination that the temporary occupancy exception meets the criteria for a temporary occupancy that is "so minimal so as to not constitute a use" pursuant to 23 C.F.R. 774.13(d).

Based on the information set forth above, the Authority has determined that the Preferred Alternative would not adversely affect or otherwise restrict the public's use of the trail or park, nor would it adversely affect the features, attributes, or activities that make the resources eligible for Section 4(f) protection. The Authority seeks your concurrence in this determination. A concurrence clause is provided at the end of this letter for this purpose.

We respectfully request your reply to this matter within 30 days of receipt of this letter. We look forward to continuing our successful working relationship with you as we work to deliver the nation's first HSR project.

Please return a scanned copy of this letter by email to [Brett.Rushing@hsr.ca.gov](mailto:Brett.Rushing@hsr.ca.gov).

Sincerely,



Brett Rushing  
Supervising Environmental Planner  
[Brett.Rushing@hsr.ca.gov](mailto:Brett.Rushing@hsr.ca.gov)

**CONCURRENCE:**

Based on the information set forth in this letter and on the documents referenced herein, the City of San Jose Department of Parks, Recreation & Neighborhood Services concurs with the Authority's determinations that the San Jose to Merced Project Section and the San Francisco to San Jose Project Section would not adversely affect the activities, features, or attributes that make Fuller Park eligible for Section 4(f) protection. Therefore, the City of San Jose Department of Parks, Recreation & Neighborhood Services concurs in the Authority's determinations that the San Jose to Merced Project Section as well as the San Francisco to San Jose Project Section, would have *de minimis* impact on Fuller Park, and that the temporary occupancy of Fuller Park would be so minimal so as to not constitute a use in accordance with Section 4(f) of the U.S. Department of Transportation Act of 1966.



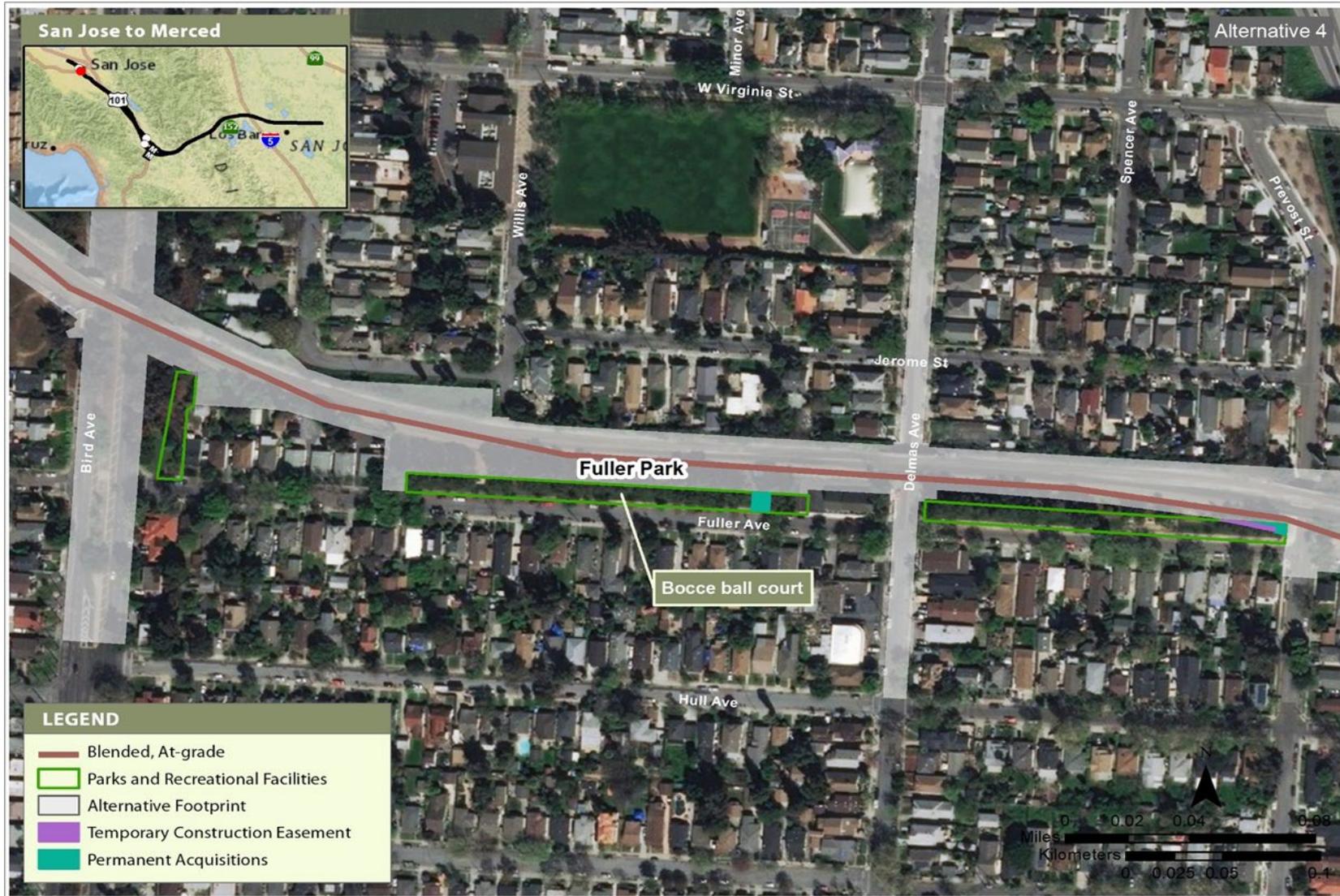
09/28/2021

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Jon Cicirelli, Director  
City of San Jose Department of Parks,  
Recreation & Neighborhood Services

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Date



Note: The Authority's Preferred Alternative (Alternative 4 and Alternative A) are the same for the San Jose to Merced Project Section and the San Francisco to San Jose Project Section, respectively in the San Jose Diridon Station Approach Subsection.

**Figure 1 Fuller Park**

## **APPENDIX H: COMMENTS RECEIVED BETWEEN THE PUBLICATION OF THE FINAL EIR/EIS AND THE APRIL 28, 2022 BOARD MEETING**



## **APPENDIX H: COMMENTS RECEIVED BETWEEN THE PUBLICATION OF THE FINAL EIR/EIS AND THE APRIL 28, 2022 BOARD MEETING**

When a comment letter is received after the close of the public comment period, neither a California Environmental Quality Act (CEQA) nor a National Environmental Policy Act (NEPA) lead agency has an obligation to respond. (Pub. Resources Code, § 21091, subd. (d)(1); Pub. Resources Code, § 21092.5, subd. (c); 40 Code of Federal Regulations [C.F.R.] 1503.4.) However, a lead agency may, in its discretion, choose to respond. Consistent with that discretion, this appendix summarizes written comments received outside the comment period and the California High-Speed Rail Authority's (Authority) response.

This summary will be updated after Authority Board consideration of the San Jose to Merced Project Section Final Environmental Impact Report/Environmental Impact Statement (Final EIR/EIS), if the document and the project section are approved. Any such update will be posted alongside final decision documents on the Authority's website.

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#	First Name	Last Name	Business/ Organization	Summary of Stakeholder Comments/Issues	Response/Status Update
001	Kathy	Robinson	Charities Housing	Commenter expressed interest in potential impacts on Charities Housing property at 611 El Camino Real, Santa Clara, as well as the status of the design.	The Authority coordinated with the commenter and provided information about the property in question, as well as the current status of the project.
002	David	McFeely	Individual	Commenter asked about how to access an electronic copy of the Final EIR/EIS, as well as the costs for a printed copy.	The Authority provided the link to the Authority's website where the commenter can download the Final EIR/EIS and offered to send a USB drive if desired. The Authority followed up with detailed information for the cost of printing each volume and how to place an order via Copymat.
003	Benoit	Mercier	Individual	Commenter asked if the final alignment would go through Morgan Hill.	The Authority directed the commenter to Chapter 2 of the Final EIR/EIS, where all four project alternatives are described in detail, and explained that the Preferred Alternative (Alternative 4) would operate mostly within the current Caltrain right-of-way in Morgan Hill.
004	Christophe	Rebboah	Rebekah Children's Services	Commenter requested additional information regarding at-grade crossings in Gilroy, specifically IOOF Avenue, and the environmental enhancements relevant to Rebekah Children's Services.	The Authority coordinated with the commenter and provided information regarding a pedestrian overcrossing at IOOF Avenue, offsetting mitigation measures included in Chapter 5 of the Final EIR/EIS, and a security fence that would be installed at the Rebekah Children's Services facility.
005	Eliyahu	Kamisher	Bay Area News Group	Commenter identified a discrepancy in the Final EIR/EIS Summary related to the number of residential displacements.	The Authority confirmed that the text in question was a typo and corrected it in the Errata to the Final EIR/EIS.
006	Paul	Welka	Individual	Commenter does not support Alternative 3, specifically the viaduct to East Gilroy, which they worry would bypass the transportation network in downtown Gilroy.	The Authority acknowledges the commenter's opposition to Alternative 3. As described in Chapter 8 of the Final EIR/EIS, the Authority's Preferred Alternative is Alternative 4, which would include a station in downtown Gilroy.
007	Danny	Garza	Individual	Commenter expressed an interest in funding for Gardner residents to use the community pool at Biebrach Park.	The Authority acknowledges the comment. For more information on impacts on environmental justice communities and proposed offsetting mitigation measures, please refer to Chapter 5 of the Final EIR/EIS.

#	First Name	Last Name	Business/ Organization	Summary of Stakeholder Comments/Issues	Response/Status Update
008	Michelle	Wendler	Watry Design, Inc	Commenter requested guidance to interpret the design plans included in Volume 3, specifically in relation to the SAP Center parking and the Diridon design variant.	The Authority met with the commenter and provided clarifications.
009	Gene	Zanger	Casa de Fruta	Commenter requested guidance to interpret the design plans included in Volume 3, specifically related to a viaduct on a specific property.	The Authority staff met with the commenter and provided information about the proposed design through the property in question.
010	Yvonne	Arroyo	Santa Clara Valley Water District	Commenter requested an electronic copy of the Final EIR/EIS to avoid having to download each individual file separately.	The Authority provided the Final EIR/EIS to the commenter via a Dropbox link on March 3, 2022.
011	Joseph	Coughlan	Individual	Commenter requested a single PDF for the entire Final EIR/EIS.	The Authority explained that due to file size the Final EIR/EIS is not available as a single PDF but offered to send a thumb drive to the commenter if desired.
012	Linda	Barbosa	Individual	Commenter suggests the route be revised to go over Altamont Pass.	The Authority acknowledges the commenter's preference for an alternative over Altamont Pass. Please refer to Standard Response SJM-Response-ALT-1: Alternatives Selection and Evaluation Process in Volume 4 of the Final EIR/EIS which explains that the Authority previously considered the Altamont Pass in the Program EIR/EIS for the Bay Area to Central Valley portion of the HSR System and selected the Pacheco Pass for the reasons disclosed in the prior document.
013	Emily	Chen	Individual	Commenter requested to be removed from the mailing list.	The Authority removed the commenter from the mailing list, as requested.
014	Pat	Mapelli	Graniterock Construction	Commenter requested information on the right-of-way acquisition timeline and the location for where acquisition would begin.	The Authority coordinated with the commenter and provided information about the status of the project and the timing of potential right-of-way acquisition.
015	Ben	Leech	Individual	Commenter requested an electronic copy of the Historic Architectural Survey Report and the Section 106 Findings of Effect Report.	The Authority provided the requested material on March 16, 2022. Confidential information was redacted as necessary.
016	Karen	Uyeda	Individual	Commenter requested a USB drive of the Final EIR/EIS.	The Authority mailed the Final EIR/EIS on a USB drive to the address provided.

#	First Name	Last Name	Business/ Organization	Summary of Stakeholder Comments/Issues	Response/Status Update
017	Amer	Iqbal	Los Banos Unified School District	Commenter requested a follow-up discussion with the Authority regarding a play area and shade structure at Volta Elementary School and the timeline for the project.	The Authority's coordination with the commenter began in fall 2021 regarding the location for a play area and shade structure at the school. The Authority continued coordination and provided information about the status and timing of the project.
018	Carmel	de Bertaut	Individual	Commenter requested an electronic copy of the Final EIR/EIS.	The Authority provided the Final EIR/EIS to the commenter via a Dropbox link on March 15, 2022.
019	Kristin	King	Individual	Commenter does not support the project based on the cost and timeline and suggests highway improvements instead.	The Authority acknowledges the commenter's opposition to the project.
020	Edmund	Sullivan	Santa Clara Valley Habitat Agency	Commenter expressed support for the California High-Speed Rail project and the San Jose to Merced Project Section and appreciates the ongoing coordination with the Authority.	The Authority acknowledges the commenter's support and appreciates the Santa Clara Valley Habitat Agency's effort throughout the environmental review to provide input as part of the consultation process for this project.
021	Naomi	Torres	Juan Bautista de Anza National Historic Trail, National Park Service	Commenter provides a description of the Juan Bautista de Anza National Historic Trail history and resources and acknowledges the information presented in the Final EIR/EIS related to this trail. The commenter also expressed interest in continuing coordination with the Authority.	The Authority acknowledges the information provided by the commenter and will coordinate in the future with National Park Service as necessary concerning the national historic trail.
022	Connell	Dunning	Environmental Protection Agency	Commenter expressed appreciation for the collaborative approach taken by the Authority throughout the EIR/EIS process, especially related to wildlife movement and associated mitigation developed in the Final EIR/EIS. Commenter also commended the extensive community outreach and the proposed improvements to offset adverse effects on minority communities and low-income communities.	The Authority acknowledges the comment and appreciates the Environmental Protection Agency's efforts throughout the environmental review to provide input as part of the consultation process for this project.

#	First Name	Last Name	Business/ Organization	Summary of Stakeholder Comments/Issues	Response/Status Update
023	Kelly	Woburn	Individual	Commenter requested a method to download the Final EIR/EIS faster to avoid having to download each individual file separately.	The Authority explained that due to file size the Final EIR/EIS is not available as a single PDF. The Authority provided the Final EIR/EIS to the commenter via a Dropbox link on March 29, 2022, and offered to send a USB drive to the commenter if desired.
024	Lesley	Miles	Weston Miles Architects	Commenter asked for a link to the comment area of the document.	The Authority provided the link to Volume 4 of the Final EIR/EIS.
025	Jessica	LeVan	Individual	Commenter expressed concern for safety and emergency response within Morgan Hill and requested grade-separations at Tilton Avenue, East Dunne Avenue, and Tennant Avenue.	The Authority acknowledges the commenter's concern. Please refer to the analysis presented in Section 3.11.6.2, Emergency Services, and Section 3.11.6.3, Community Safety and Security, of the Final EIR/EIS. Please also refer to Section 17.4.1, SJM-Response-GS-1: Requests for Grade Separations, as well as Section 17.8.2, SJM-Response-SS-2: Emergency Vehicle Response Time.
026	Yudhvir	Sidhu	Individual	Commenter expressed concern for safety and emergency response within Morgan Hill and requested grade-separations at Tilton Avenue, East Dunne Avenue, and Tennant Avenue.	The Authority acknowledges the commenter's concern. Please refer to the analysis presented in Section 3.11.6.2, Emergency Services, and Section 3.11.6.3, Community Safety and Security, of the Final EIR/EIS. Please also refer to Section 17.4.1, SJM-Response-GS-1: Requests for Grade Separations, as well as Section 17.8.2, SJM-Response-SS-2: Emergency Vehicle Response Time.
027	Sam	Calson	Individual	Commenter expressed concern for safety and emergency response within Morgan Hill and requested grade-separations at Tilton Avenue, East Dunne Avenue, and Tennant Avenue.	The Authority acknowledges the commenter's concern. Please refer to the analysis presented in Section 3.11.6.2, Emergency Services, and Section 3.11.6.3, Community Safety and Security, of the Final EIR/EIS. Please also refer to Section 17.4.1, SJM-Response-GS-1: Requests for Grade Separations, as well as Section 17.8.2, SJM-Response-SS-2: Emergency Vehicle Response Time.
028	Dominic	Wilde	Individual	Commenter expressed concern for safety and emergency response within Morgan Hill and requested grade-separations at Tilton Avenue, East Dunne Avenue, and Tennant Avenue.	The Authority acknowledges the commenter's concern. Please refer to the analysis presented in Section 3.11.6.2, Emergency Services, and Section 3.11.6.3, Community Safety and Security, of the Final EIR/EIS. Please also refer to Section 17.4.1, SJM-Response-GS-1: Requests for

#	First Name	Last Name	Business/ Organization	Summary of Stakeholder Comments/Issues	Response/Status Update
					Grade Separations, as well as Section 17.8.2, SJM-Response-SS-2: Emergency Vehicle Response Time.
029	Krista	Rupp	Individual	Commenter expressed concern for safety and emergency response within Morgan Hill and requested grade-separations at Tilton Avenue, East Dunne Avenue, and Tennant Avenue.	The Authority acknowledges the commenter's concern. Please refer to the analysis presented in Section 3.11.6.2, Emergency Services, and Section 3.11.6.3, Community Safety and Security, of the Final EIR/EIS. Please also refer to Section 17.4.1, SJM-Response-GS-1: Requests for Grade Separations, as well as Section 17.8.2, SJM-Response-SS-2: Emergency Vehicle Response Time.
030	Elizabeth	Rojo	Individual	Commenter expressed concern for safety and emergency response within Morgan Hill and requested grade-separations at Tilton Avenue, East Dunne Avenue, and Tennant Avenue.	The Authority acknowledges the commenter's concern. Please refer to the analysis presented in Section 3.11.6.2, Emergency Services, and Section 3.11.6.3, Community Safety and Security, of the Final EIR/EIS. Please also refer to Section 17.4.1, SJM-Response-GS-1: Requests for Grade Separations, as well as Section 17.8.2, SJM-Response-SS-2: Emergency Vehicle Response Time.
031	Sashidhar	Battu	Individual	Commenter expressed concern for noise, vibration, traffic, and safety (especially near schools) in Morgan Hill and suggested an alignment next to US-101.	The Authority acknowledges the commenter's concern. Please refer to Appendix 2-I, Alternatives Considered During Alternatives Screening Process, where alignment options following U.S. Highway 101 were considered and withdrawn from further analysis.
032	Alicia	Carlson	Individual	Commenter expressed concern for noise, vibration, traffic, and safety (especially near schools) in Morgan Hill and suggested an alignment next to US-101.	The Authority acknowledges the commenter's concern. Please refer to Appendix 2-I, Alternatives Considered During Alternatives Screening Process, where alignment options following U.S. Highway 101 were considered and withdrawn from further analysis.
033	Desiree	Stanley	Individual	Commenter expressed concern for noise, vibration, traffic, and safety (especially near schools) in Morgan Hill and suggested an alignment next to US-101.	The Authority acknowledges the commenter's concern. Please refer to Appendix 2-I, Alternatives Considered During Alternatives Screening Process, where alignment options following U.S. Highway 101 were considered and withdrawn from further analysis.
034	Christina	Turner	City of Morgan Hill	Comment on the Business Plan made the following relevant comments:	The following responses are provided: <ul style="list-style-type: none"> <li>• Comment noted regarding grade separations. The Final EIR/EIS includes Standard Response SJM-GS-1,</li> </ul>

#	First Name	Last Name	Business/ Organization	Summary of Stakeholder Comments/Issues	Response/Status Update
				<ul style="list-style-type: none"> <li>The Authority should budget for grade separations to address safety impacts</li> <li>The Authority should prioritize funding to communities with significant safety impacts such as Morgan Hill and take the lead on those grant opportunities re: grade separations.</li> <li>The Business Plan should prioritize negotiations with UPRR to allow HSR to operate mostly within existing right of way and provide electrified tracks from San Jose to Gilroy.</li> <li>Prioritize funding for electrification of tracks from San Jose to Gilroy to ensure future rail service for South County.</li> <li>Identify a funding plan for future Bookend and Connectivity projects in Morgan Hill such as grade separations and Caltrain station refinements to mitigate impacts.</li> </ul>	<p>Requests for Grade Separation that provides a detailed response concerning grade separations and Alternative 4.</p> <ul style="list-style-type: none"> <li>Section 3.11, Safety and Security, analyzes safety impacts and concludes that with project design features and mitigation, the project would not have significant safety impacts, provided that local jurisdictions are willing to implement necessary improvements funded by the Authority regarding emergency vehicle response delay.</li> <li>The comment regarding UPRR negotiation is noted. It is a priority of the Authority to obtain agreement with UPRR in this project section. Alternative 4 uses the existing right of way as much as is feasible.</li> <li>The comment regarding priority for electrification funding is noted. Electrification is part of Alternative 4. The project is pending obtaining construction funding.</li> <li>Comment noted. See prior response regarding grade separations. As described in Chapter 5, the Authority has included an offsetting mitigation measure to fund 30% design of potential Caltrain station access improvements.</li> </ul>
035	Ben Austin Ellen	Ewell Ewell Wehr	Ewell Group on behalf of Grassland Water District, Grassland Resource Conservation District, the Grassland Fund, and the Grassland Environmental Education Center	<p>Commenter acknowledges how some of their comments submitted on the Draft EIR/EIS and the Revised/Supplemental Draft EIR/EIS were addressed in the Final EIR/EIS. The commenter focused on the following remaining concerns:</p> <ul style="list-style-type: none"> <li>Feasibility of below-ground option through GEA including cost</li> <li>Feasibility of above-ground enclosure at Volta including cost</li> <li>Assertions of unmitigated impacts to birds and other sensitive species near Volta due to the use of an improper GEA boundary.</li> </ul>	<p>The issues raised in this comment letter have been addressed in detail in responses to comments on the Draft EIR/EIS and the Supplemental EIR/EIS. To summarize prior responses concerning the issues raised again in this letter:</p> <ul style="list-style-type: none"> <li><i>Below-ground option through GEA:</i> The impacts to wildlife, including waterfowl, are determined to be less than significant within the GEA and surrounding areas in the San Joaquin Valley with proposed mitigation and thus there is no requirement to adopt a tunnel alignment to mitigate significant impacts. As explained in Appendix 2-I, Alternatives Screening, a tunnel design would be substantially more expensive than the current proposed design in the San Joaquin Valley which is a</li> </ul>

#	First Name	Last Name	Business/ Organization	Summary of Stakeholder Comments/Issues	Response/Status Update
				<ul style="list-style-type: none"> <li>Effectiveness and enforceability of design features and mitigation and request for 1) Framework Agreement to allow consultation with the GEA Working Group; and 2) Consultation with the Working Group during development of mitigation plans.</li> <li>Uncertain commitment to locate O&amp;M facilities away from GEA resources.</li> </ul>	<p>combination of embankment and viaduct sections. Prior estimates of tunnel options by the Authority in 2018 were approximately \$1.1 billion compared to the cost for the current design in the relevant area of \$390 million. Based on the substantially higher cost, a below-grade alternative through the GEA was not carried forward for study in the Draft EIR/EIS based on cost infeasibility. (See Final EIR/EIS, Appendix 2-I, Alternatives Screening, p. 2-I-43.) The 2018 cost figures remain a reasonable assessment of the below-grade costs, and they continue to support the infeasibility conclusion for a below grade alternative through the GEA. Moreover, the project section is not currently funded and the addition of a potential addition \$710 million is a substantial change in cost and would increase the financial challenge to realize the project.</p> <ul style="list-style-type: none"> <li><i>Feasibility of above-ground enclosure at Volta.</i> The project includes an above-ground enclosure at the most critical portion in the San Joaquin Valley segment for birds which is in the Audubon Important Bird Area (IBA) in the GEA. Near Volta, the project includes opaque noise barriers (minimum height 17 feet) which will reduce noise impacts on wildlife along with the potential for encroachment by birds when transiting across the HSR ROW. The impacts to wildlife, including waterfowl, giant garter snake, and tricolored blackbird, among others, are determined to be less than significant within the GEA and surrounding areas (such as Volta) in the San Joaquin Valley with proposed mitigation and thus there is no requirement to add an additional above-ground enclosure near Volta to mitigate significant impacts. The proposed enclosure in the Audubon IBA has a cost of approximately \$142 million (\$2021) for an approximately 3.4-mile segment or approximately \$42 million per mile. Based on the 7,500-foot length of the proposed barrier at Volta and the cost of a standard noise barrier in Appendix 3.7-C, the cost of the barrier</li> </ul>

#	First Name	Last Name	Business/ Organization	Summary of Stakeholder Comments/Issues	Response/Status Update
					<p>is estimated as \$11.1 million. Using the per mile estimate for an enclosure (and presuming costs would scale), the potential cost for a 7,500-foot long enclosure could be \$59 million. The project section is not currently funded and the addition of additional \$48 million would increase the financial challenge to realize the project and is not necessary since the proposed mitigation will reduce impacts to a less than significant level.</p> <ul style="list-style-type: none"> <li> <p><i>GEA Boundaries.</i> Collectively, as clarified in the Final EIR/EIS and unless otherwise noted, when the Authority refers to the GEA, it refers to all areas within the GEA as defined by the Ramsar Convention, areas within the Audubon GEA IBA, and areas within the GWMA (as expanded in 2005), as well as areas within the San Luis and Merced National Wildlife Refuges. In other words, the largest geographic extent of the GEA is considered. References in the Draft EIR/EIS to specific conservation areas as they are defined in the Draft EIR/EIS (e.g., the Volta Wildlife Management Area or the Mud Slough Conservation Easement) or to specific areas of analysis (e.g., the Audubon GEA IBA) are therefore specific to the resources being evaluated in the EIR/EIS and are purposely used in the analysis. This issue is further explained in the Final EIR/EIS, Volume 4, Chapter 17, Standard Response SJM-Response BIO-4: Grasslands Ecological Area Boundary.</p> </li> <li> <p><i>Effectiveness and enforceability of design features and mitigation and request for consultation:</i> The Authority has appreciated the input of stakeholders interested in the GEA through the environmental process. The Authority intends to continue to reach out to stakeholder during the subsequent detailed design phase. BIO-MM#58 includes the requirement to coordinate with local stakeholders concerning compensatory mitigation for impacts to waterfowl and other birds relative to the GEA IBA. BIO-MM#80</p> </li> </ul>

#	First Name	Last Name	Business/ Organization	Summary of Stakeholder Comments/Issues	Response/Status Update
					<p>requires consultation with USFWS, CDFW, Grasslands Water District, and private property owners, and other local wildlife movement stakeholders as part for development of the noise barriers and the guideway enclosure. BIO-MM#P1 requires coordination with USFWS, CDFW and the Grasslands Water District concerning the location of easements to fulfill the program level commitment for agricultural, conservation or open space easements on 10,000 acres of land generally located within or adjacent to the GEA.</p> <ul style="list-style-type: none"> <li>• <i>Uncertain commitment to locate O&amp;M facilities away from GEA resources.</i> Table 8-3 includes the preferred locations for a paralleling station, ATC, and switching station at the location further from GEA resources. The response to comment 1678-2180 has been revised to delete reference to selection of location during the design phase. Adoption of the preferred alternative would include adoptions of the locations in table 8-3.</li> </ul>
036	Eugene and Carolyn	Vierra	Baker, Manock & Jensen on behalf of Eugene and Carolyn Vierra	<p>Commenter provides the following comments:</p> <ul style="list-style-type: none"> <li>• Final EIR/EIS completely ignores their comments on the Draft EIR/EIS and the Revised/Supplemental Draft EIR/EIS.</li> <li>• Concern about impacts of the HSR Project on tenants' homes/displacement, impact on farmlands, and irrigation facilities.</li> <li>• Impacts to managed honeybees and associated economic impacts.</li> <li>• Urge the Authority to select the No Action Alternative or analyze other alternatives since the EIR/EIS only analyzed one alternative in the San Joaquin Valley.</li> </ul>	<p>Responses to comments:</p> <ul style="list-style-type: none"> <li>• <i>Response to Comments:</i> All comments were considered and responded to: Please see Volume IV, Chapter 26: Vierra Draft EIR/EIS comments Pages 26-1 to 26-5, Responses Pages 26-6 to 26-14, Vierra Revised/Supplemental Draft EIR/EIS comments Pages 26-441 to 26-445, Responses Pages 26-446 to 26-450.</li> <li>• <i>Impacts:</i> The EIR/EIS discloses impacts to residents (including renters and owners), displacement, effects on farmlands, and irrigation facilities and identifies measures and mitigation to reduce those impacts. Renters that are displaced will receive relocation assistance to support finding alternative housing. Owners will be compensated at fair market value. Irrigation facilities will be avoided and/or restored if disturbed. Description of relevant project features and mitigation can be found in Section 3.12, Socioeconomics and Communities, Section 3.14,</li> </ul>

#	First Name	Last Name	Business/ Organization	Summary of Stakeholder Comments/Issues	Response/Status Update
					<p>Agricultural Farmland, Section 3.06, Public Utilities and Energy.</p> <ul style="list-style-type: none"> <li><i>Honeybees:</i> Impact BIO#33 in the Final EIR/EIS was revised to provide additional information on this topic. The information supports a finding that the project would not substantially affect the honeybee population.</li> <li><i>Alternatives:</i> As described in Appendix 2-I, Alternative screening, the Authority has previously considered different horizontal alignments north and south of the proposed Henry Miller Road alignment and vertical alignments (e.g., tunnel options) as required by NEPA and CEQA. The prior evaluations indicated that other alignments would have higher overall impacts than the proposed design.</li> </ul>
037	Eugene and Carolyn	Vierra	Individual	<p>Commenter provides the following comments:</p> <ul style="list-style-type: none"> <li>Concern about impacts of the HSR Project on tenants' homes/displacement, impact on farmlands and tenant farmers, and irrigation facilities.</li> <li>Concern about separation of land in small parcels that cannot be efficiently farmed.</li> <li>Impacts due to 13 obstacles between the California Aqueduct and Volta including aqueducts, roads, railroad tracks, cannery property, farm properties, a holding pond, irrigation facilities and canals</li> <li>Urge the Authority to move HSR to SR 140 outside of Gustine, or move to the east so that it intersects with Henry Miller Avenue; or do not route HSR through the Central Valley entirely.</li> </ul>	<p>Responses to comments:</p> <ul style="list-style-type: none"> <li><i>Impacts:</i> The EIR/EIS discloses impacts to residents (including renters and owners), displacement, effects on farmlands (and irrigation facilities) and identifies measures and mitigation to reduce those impacts. Renters that are displaced will receive relocation assistance to support finding alternative housing. Owners will be compensated at fair market value. Irrigation facilities will be avoided and/or restored if disturbed. Description of relevant project features and mitigation can be found in Section 3.12, Socioeconomics and Communities, Section 3.14, Agricultural Farmland, Section 3.06, Public Utilities and Energy.</li> <li><i>Small Parcels:</i> The analysis in Section 3.14, Agricultural Farmland included analysis (Impact AG#3) of the potential for severing parcels and the potential creation of uneconomic small parcels.</li> <li><i>Alternatives:</i> As described in Appendix 2-I, Alternative screening, the Authority has previously considered different horizontal alignments north (including along SR 140) and south of the proposed Henry Miller Road</li> </ul>

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					alignment and vertical alignments (e.g., tunnel options) as required by NEPA and CEQA. The prior evaluations indicated that other alignments would have higher overall impacts than the proposed design. The commenters' suggestion that HSR not be routed in the Central Valley is noted, but the project is already constructed in the Central Valley and a route through the Central Valley was previously selected through the Program EIR/EIS as the spine of the high-speed rail system connecting southern and northern California.
038	Alvaro	Meza	Gilroy Unified School District	The District supports Alternative 4 including the Authority's commitment to implement IOOF bicycle/pedestrian overcrossing and complete streets improvements.	Comment noted. The Authority has appreciated the District's involvement throughout the environmental review process and the environmental justice community improvements planning process.
039	Jim	Goddard	Sharks Sports & Entertainment	<p>Comments:</p> <ol style="list-style-type: none"> <li>1. Requests to be consulted early in the design process for any elements that may affect the SAP Center Lots ABC including development of any relocation mitigation/condemnation per SOCIO IAMF#3</li> <li>2. Requests to be consulted early in development of the Construction Transportation Plan (CTP)</li> <li>3. Requests Contractor to identify existing and potential park areas within reasonable walking distance of the Arena, including all logistical details as part of TR-IAMF#8</li> <li>4. Requests communication and collaborations between Contractor and SSE regarding traffic control, parking, safety, etc., and post-event reporting</li> <li>5. Requests preparation of an "up to date, field-verified, industry-standard" parking study as part of DISC Planning including</li> </ol>	<p>Responses:</p> <ol style="list-style-type: none"> <li>1. <u>Consultation (Design)</u>: The Authority has clarified TR-IAMF#8 to include a requirement to consult with Sharks Sports &amp; Entertainment (SSE) during design of replacement parking in the SAP Center Lots ABC in the MMEP. Per SOCIO-IAMF#3, before any acquisitions occur, the Authority will develop a relocation mitigation plan in consultation with affected cities and counties and property owners, and the relocation mitigation plan will include individualized assistance to tenants for relocation.</li> <li>2. <u>Consultation (CTP)</u>: The Authority has clarified that TR-IAMF#2 includes a requirement to consult with SSE during CTP development.</li> <li>3. <u>TR-IAMF#8 Implementation</u>. The MMEP clarifies that the Authority will work with and consult with the SAP Center on the preferred design and location of temporary 1:1 replacement parking for SAP Center parking impacts during construction. Additionally, TR-IAMF#8 requires the Authority's "Contractor [to] identify adequate off-street parking using existing remote</li> </ol>

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				<p>existing and forecasted parking and spaces needed to meet transit project demand.</p> <p>6. Authority did not commit to the preparation or implementation of a Parking and Transportation Management District as requested by City of San Jose (Comment 1654-1408). Authority should commit to join.</p> <p>7. Construction of replacement parking in a part of Lots ABC would impair non-parking special event uses.</p> <p>8. Off-street parking areas are not identified for construction vehicles (TR-IAMF#3).</p> <p>9. There are no measures to ensure pedestrian and bicycle access (TR-IAMF#4, #5, and #12).</p> <p>10. Comments about construction hours not being consistent with City of San Jose hours (TR-IAMF#6).</p> <p>11. Truck Haul routes are not yet identified (TR-IAMF#7).</p> <p>12. Mechanisms to prevent construction from reducing roadway capacity during special events are not yet identified (TR-IAMF#8).</p> <p>13. CTP must include performance standards for contractors and other implementing requirements.</p> <p>14. Final EIR/EIS does not include adequate description of specific impacts to SAP Center on event days.</p> <p>15. The parking study/inventory used in the EIR/EIS is inadequate and outdated and should be updated.</p> <p>16. The statements in the EIR/EIS re: the Downtown West and parking are</p>	<p>parking areas or vacant land to replace any temporary displacement of parking utilized for special events at the SAP Center on a 1:1 basis during construction.”</p> <p>4. <u>Communication and collaboration with SSE</u>: As noted above, the Authority/Contractor will consult with SSE during preparation of the CTP and design of replacement parking. The MMEP includes this requirement: <i>During design, Authority Contractor(s) will work with and consult with the SAP Center on the preferred design and location of temporary 1:1 replacement parking for SAP Center parking losses during Project construction.</i> The Authority will coordinate with local affected businesses, including SSE, in the preparation of the Construction Transportation Plan.</p> <p>5. <u>New Parking Study for DISC</u>: Comment Noted. This request would be up to the DISC partners to consider. This does not concern the adequacy of the EIR/EIS.</p> <p>6. <u>Parking and Transportation Management District</u>: As noted in the response to comments, the Authority will consider separately to join the proposed Parking and Transportation Management District but doing so is not required to address a significant impact identified in the EIR/EIS.</p> <p>7. <u>Non-Parking Special Event Use of Lots ABC</u>: As shown in Final EIR/EIS Volume III, Book 4A, Sheet 4, the replacement parking structure would occupy only a relatively small portion (0.7 to 0.9 acres of total parking area of 9.6 acres) of Lots ABC, leaving most of the Lots ABC available for use of special events.</p> <p>8. <u>Off Street Parking Areas (TR-IAMF#3)</u>: This comment was submitted on the Draft EIR/EIS. Please refer to response to comment 1748-3057.</p> <p>9. <u>Pedestrian and bicycle access (TR-IAMF#4, #5, and #12)</u>: This comment was submitted on the Draft</p>

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				<p>inaccurate. There is no obligation for Downtown West project to increase the available parking supply by 350 spaces in the area.</p> <p>17. Transit use at Oracle Park and Chase Center are not appropriate comparisons to SAP Center. Examples of SFpark Pilot Project are not applicable to SAP Center.</p> <p>18. SSE thinks impacts of Alt. 4 with the DDV may be bigger than 432 spaces.</p> <p>19. The location of the additional 35 spaces displaced by the DDV is unclear.</p> <p>20. There is no evaluation of construction effects on SAP Center over multi-years.</p> <p>21. The use of parking shuttles is not acceptable to SSE.</p> <p>22. The graphics do not show how the track shift with the DDV will affect Lots ABC operations.</p> <p>23. There is no proof that existing and new transit services will offset parking demand.</p> <p>24. Based on the slow implementation of the San Jose General Plan, the automobile will be the main means of transportation in the South Bay for a long time.</p>	<p>EIR/EIS. Please refer to response to comment 1748-3057.</p> <p>10. <u>Construction hours (TR-IAMF#6)</u>: This comment was submitted on the Draft EIR/EIS. Please refer to response to comment 1748-3057.</p> <p>11. <u>Truck Haul routes (TR-IAMF#7)</u>: This comment was submitted on the Draft EIR/EIS. Please refer to response to comment 1748-3057.</p> <p>12. <u>Mechanisms to avoid reducing roadway capacity during special events (TR-IAMF#8)</u>: This comment was submitted on the Draft EIR/EIS. Please refer to response to comment 1748-3057.</p> <p>13. <u>CTP performance standards</u>: This comment was submitted on the Draft EIR/EIS. Please refer to response to comment 1748-3057 and 1748-3117.</p> <p>14. <u>Specific analysis of impacts to SAP Center on event days</u>: This comment was submitted on the Draft EIR/EIS. Please refer to response to comment 1748-3073, 1748-3093, and Standard Response SJM-Response-TR-2: Construction Traffic and Parking Management Details.</p> <p>15. <u>The parking study/inventory used in the EIR/EIS</u>: This comment was submitted on the Draft EIR/EIS. Please refer to responses to comment 1748 overall and in specific response 1748-3042 and 1748-3050.</p> <p>16. <u>Downtown West and Parking</u>: The EIR/EIS describes the situation with Downtown West and Parking as follows in Section 3.19, Cumulative Impacts: <i>According to the final parking requirements associated with the May 25, 2021, approval of the Google Project and an agreement between the City of San Jose, Sharks Sports and Entertainment, and Google, there are approximately 2,850 available parking spaces on property that will be redeveloped as part of the project, and the developer and the City anticipate replacement of that parking and the development of at least 1,150</i></p>

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					<p><i>additional spaces, for a total of 4,000 publicly-accessible parking spaces at full buildout, all within one-third mile of the south entrance to the SAP Center. Of those spaces, at least 85 percent (3,400 spaces) would be available for SAP Center event use (City of San Jose 2021a). According to presentation material associated with the May 2021 approval of the Google Project, the project will result in a net increase of at least 350 parking spaces available for SAP Center event use (City of San Jose 2021b). The 2021a reference is to the written agreement between the City, SSE and Google (specifically Exhibit K, "Downtown West Parking Requirements") and is quoted accurately. The 2021b reference is to the City of San Jose's presentation at the approval hearing for the Google Project. The comment provides no substantiation as to why this information does not accurately represent the agreement or the presentation of the City of San Jose.</i></p> <p>17. <u>Transit use at Oracle Park, Chase Center and parking policies in San Francisco not comparable:</u> The examples described in the EIR/EIS of the effect of transit and parking policies are real-world evidence that additional transit and parking management can work to match parking demand to parking supply, and the Authority has determined that these examples are relevant factors to the analysis in the Final EIR/EIS.</p> <p>18. <u>Impacts of Alt. 4 with DDV:</u> The comment expresses concern but provides no evidence to dispute the EIR/EIS estimate of temporarily displaced parking spaces. The Draft and Final EIR/EIS fully described the impacts associated with the DDV/TDV, including loss of parking space.</p> <p>19. <u>Parking spaces displaced by the DDV:</u> The area of displaced parking spaces with the DDV are shown in the Final EIR/EIS Volume III, Book 4A, Sheet 4.</p> <p>20. <u>Construction effects on SAP Center over multi-years:</u> The EIR/EIS is explicit that construction in the Diridon</p>

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					<p>area will take place over multiple years and effects on parking, access, and traffic will occur over the construction period. However, construction activity will not be uniform over that period or occur in all areas of construction at the same time or pace. Thus, construction effects will wax and wane in specific areas as construction proceeds. The EIR/EIS discloses all the impacts that would occur over the construction period.</p> <p>21. <u>Parking Shuttles</u>: The SSE's objection to shuttles to noted. However, parking shuttles are a technically feasible method to provide access from remote areas and are a common method familiar to most people. Parking shuttles are commonly used for many large events. The comment does not substantiate why shuttles cannot work.</p> <p>22. <u>Track shift with the DDV</u>: The location of tracks with the DDV are shown in the Final EIR/EIS Volume III, Book 4A, Sheet 4. One can see the difference in track locations by comparing the track locations in Book 4A Sheet 3 (which shows Alt. 4 without the DDV) and Book 4A sheet 4 (which shows Alt. 4 with the DDV).</p> <p>23. <u>Effect of Existing and New Transit</u>: The analysis in the EIR/EIS looks at conditions with direct BART service immediately across the street from the SAP Center, combined with increased Caltrain service, and HSR service. That future scenario will be quite different from the present, which has limited transit usage by SAP Center users. The EIR/EIS substantiates that the additional transit service will result in a substantial increase in transit usage for the SAP Center and surrounding area. The EIR/EIS assumptions are conservative in not assuming all SAP users (or HSR riders) utilize transit to access the area. The comment provides no evidence as to why the EIR/EIS assumptions regarding increased transit use are not feasible.</p>

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					24. <u>Automobile Use</u> : As noted above, the transit situation in the future will be quite different than present conditions. The EIR/EIS does not assume no use of automobile use to access the Diridon Station or SAP Center, but rather has modelled modes of access and analyzed potential reduction of parking demand based on feasible mode shares in light of the changing transit conditions over time.
040	Garrett	Root	SWCA	Requested a copy of a DPR-523 Form from the Draft EIR Historic Architectural Survey Report Appendix	The requested document has been provided.
041	Luna	Sharon	SMNA	<ol style="list-style-type: none"> <li>1. The Draft EIR and Final EIR refer to water contamination and mitigations to move forward regarding habitats. However, do you know that the unincorporated areas of Santa Clara County (San Martin, Morgan Hill and Gilroy) are on wells and septic systems could be affected with contamination. San Martin in particular has already experienced a perchlorate spillage that will be in water for another 80 years. What steps are being taken to protect the water sources for the residents of San Martin? What type of bonds would be set or put into play to compensate should wells be contaminated during construction? If this has been addressed or researched?</li> <li>2. Please show a detailed diagram/map of the route the HSR rail will travel when going through San Martin? Clearly point out all changes and what will look like once completed.</li> <li>3. Why is Colony Ave. going to be effected with HSR? Is it a construction area or part of HSR route? A recently approved project off of California Ave. and concern is that the</li> </ol>	<ol style="list-style-type: none"> <li>1. The EIR/EIS analyzes water quality impacts of the project in Section 3.8, Hydrology and Water Quality and hazardous materials and wastes in Section 3.10, Hazardous Materials and Waste. The Authority is aware that rural areas, like San Martin, use wells and septic systems. The Authority also identified known Potential Environmental Concern (PEC) sites based on existing records in Section 3.10, including those in the vicinity of San Martin as shown in Figure 3.10-4. The Hazard Materials and Wastes Technical Report identifies the Olin Corporation (Site 60 on Figure 3.10-4 in Section 3.10) along Tennant Avenue and describes that this site is contaminated by perchlorate, so the Authority is aware of the local perchlorate contamination. The Authority and its construction contractors will implement controls during construction and operations to control water quality effects of the project including HYD-IAMF#3, which requires the preparation and implementation of a construction stormwater pollution prevention plan which will address water quality effects during construction and requires best management practices including for handling contaminated soil, sanitary and septic waste, and liquid waste. The Authority will also implement HMW-IAMF#1 which will completion of further environmental site assessments to assess potential contamination in</li> </ol>

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				<p>HSR will be overhead of this project. Is this true?</p> <ol style="list-style-type: none"> <li>4. Please explain why Option 4 is the preferred choice for HSR.</li> <li>5. Is the piece of HSR going through San Martin at grade all the way through? Please explain.</li> <li>6. Will train horns be sounding at any areas in San Martin and if so how many times and how long. How can this be reduced?</li> <li>7. With HSR traveling through San Martin every hour, what are the mitigations concerning SM Gwinn Elementary school?</li> <li>8. What are the plans for relocation of residents, business &amp; residents in the immediate vicinity of the HSR?</li> <li>9. What is the allowable distance of the above from the trains traveling 110 mph?</li> <li>10. What are mitigation for farmers who travel East to West from HSR areas for their crops is this being considered &amp; is there compensated?</li> <li>11. What are the specific plans for construction and staging of equipment and supplies in the forementioned?</li> <li>12. With the influx of numerous trains traveling North-South, there is tremendous impact for emergency vehicles, especially for Fire responding to emergency on East-West. How will this be mitigated?</li> </ol>	<p>areas of right of way and implementation of any necessary remediation or corrective action in compliance with state and federal laws and regulations, and HMW-IAMF#4, which requires procedures in the event of encountering previously undocumented contamination.</p> <ol style="list-style-type: none"> <li>2. The route of the preferred alternative (Alternative 4) is shown in a general figure in Volume 1, Chapter 2, Figure 2-65. The specific alignment through San Martin is shown in the preliminary engineering drawings in Volume III, Book 4A, Sheet 20 and Sheet 21. Through San Martin, Alternative 4 will include two additional tracks adjacent to the existing track and reconfiguration of the platforms at the Caltrain Station, but the rail right of way will otherwise look similar to the existing railroad. A visual simulation for all alternatives at San Martin Road near Monterey Road is found in Volume I, Section 3.16, Figure 3.16-37.</li> <li>3. The Preferred Alternative (Alternative 4) would not affect properties along Colony Avenue. Alternative 4's effects in San Martin related to the railway alignment are near Monterey Road and the existing railroad. Alternative 2 would affect properties along Colony Avenue north of San Martin Avenue due to a grade separation included with Alternative 2.</li> <li>4. As explained in Volume I, Chapter 8, Alternative 4 is the Preferred Alternative because, compared to the other alternatives analyzed in the EIR/EIS, it has the lowest impacts relative to the following areas: construction disruption; displacements of residences, businesses, and community/public facilities; wildlife habitat; farmlands, park resources, and cultural resources. In addition, Alternative 4 allows provides for the opportunity to extend electrified service from San Jose to Gilroy and is the lowest cost of all the alternatives.</li> </ol>

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					<p>5. The Preferred Alternative (Alternative 4) is at-grade through San Martin. Alternatives 1 and 3 are on a viaduct. Alternative 2 is on an embankment.</p> <p>6. Per Federal Railroad Administration (FRA) regulations, trains must sound horns when crossing at-grade crossings, so horns will be sounded when HSR trains cross through the E. San Martin Avenue, Church Avenue and Master Avenue at-grade crossings. Horns are sounded by trains in advance of the crossing from until the entire train clears the crossing. In addition, horns would be sounded when passing through the Caltrain train station as a safety measure. As explained in Volume I, Section 3.4, Noise and Vibration, the Authority has identified mitigation, including noise barriers and sound insulation to reduce noise effects identified as significant. As shown in maps in Volume II, Appendix 3.4-C, Noise Impact Locations, Figure C-72 and Figure C-73, noise impacts to sensitive receptors with Alternative 4 in San Martin (from California Avenue to Masten Avenue) would be moderate, which is considered less than significant. The nearest locations of severe/significant impacts are to some receptors between Masten Avenue and Buena Vista Avenue. In addition, if the County of Santa Clara desires to advance a quiet zone, the Authority would provide technical support for a quiet zone application to the FRA. A quiet zone can alleviate the mandatory requirement to sound horns at at-grade crossing and can be approved by the FRA where safety and warning measures controlling access are considered adequate to control safety by the FRA.</p> <p>7. The nearest buildings at the Gwinn Elementary School are approximately 250 feet from the nearest proposed Alternative 4 railroad tracks. The noise analysis did not indicate any significant impacts to receptors at school buildings at this location (residences between the school and the tracks were identified with</p>

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					<p>moderate/less than significant impacts as well). No acquisition of property from the school would occur with Alternative 4. The right of way would be fenced where it is not at present (as for example at the end of North St. on the east side) for the entire right of way to enhance safety. Four quadrant gates would be added to the at-grade crossing at San Martin Avenue to limit the ability of individuals to go around the gates.</p> <p>8. As presented in Section 3.12, Socioeconomics and communities, within San Martin with Alternative 4, based on the preliminary design, there will be 1 residential displacement and 16 business displacements (all other alternatives would have higher residential and business displacements). As explained in Section 3.12, Socioeconomics and Communities, the Authority will implement state and federal relocation requirements, which will include relocation assistance for displaced residents and businesses to find new locations and to provide funding to compensate for initial cost differences. The Authority will compensate property owners at fair market value for acquired properties.</p> <p>9. There are no state or federal minimum distances setbacks from a railroad right of way edge. Due to the space necessary for the supports for the overhead electric system, electrical safety clearance and maintenance access, the edge of the right of way will vary but will usually be at least 20 feet from the nearest track.</p> <p>10. Impacts to farmlands and farming are addressed in Volume I, Section 3.14, Agricultural Farmland. During construction, the Authority will implement AG-IAMF#5, which requires that prior to the start of any construction activity adjacent to any farmland, the Authority shall coordinate with agricultural property owners or leaseholders to provide temporary livestock and equipment crossings to minimize impacts to livestock</p>

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					<p>movement, as well as routine operations and normal business activities. The Authority will also implement AG-IAMF#6, which requires that, during final design, and in coordination with the property owners of land in use for agricultural operations, the Authority shall finalize the realignments of any affected access roads to provide equipment crossings to minimize impediments to routine agricultural operations and normal business activities that may result from long-term project operation to help maintain access to farmlands. The Authority will compensate for acquired farmland at fair market value, and the EIR/EIS has also addressed the potential for the creation of small uneconomic farmland parcels. No public road crossings will be blocked in San Martin, so farmers using those road crossings will have access across the railroad as they do at present.</p> <p>11. Staging areas are identified in the preliminary engineering drawings in Volume III, Book 4A, Sheets 20 and 21 in/near San Martin. Specific construction timing and plans will be developed during the subsequent detailed design phase.</p> <p>12. Potential impacts on Emergency Vehicle Response is analyzed in Volume I, Section 3.11, Safety and Security. The EIR/EIS identifies mitigation that includes a suite of potential improvements to address emergency vehicle response delays where they are identified through future monitoring and forecasting.</p>
042	RC	Sherwood	Individual	The commenter opposes the project as a waste of tax dollars and would prefer expansion of I-5 and SR 99.	The commenter's opposition is noted.
043	Dr. Mark	Marshall	Los Banos USD	The commenter supports the project noting the collaboration with the school district to develop the offsetting mitigation included in the Final EIR/EIS for school improvements and a community park at the Volta Elementary school.	The comment is noted and appreciated.

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044	John	Boldischar	Individual	The commenter notes they live within 200 feet of the rail lines and feels excessive vibration at night when freight trains pass through and request the rails to be upgraded as part of the project.	Vibration impacts are analyzed in Section 3.4, Noise and Vibration. As explained, due to the heavier weight of freight trains, they usually have higher potential vibration generation compared to lighter passenger trains. Where significant vibration effects are identified in association with the HSR project, Mitigation Measure NV-MM#8 requires design improvements to control vibration effects.
45.1	Tiffany, J.P.	Yap, Rose	Center for Biological Diversity	Commenter states that the Authority minimized the area's importance for wildlife connectivity in both Coyote Valley and Pacheco Pass, contrary to local experts. Commenter further states that the mitigation measures to reduce effects on wildlife movement do not adequately address the Project's impacts to local and regional wildlife connectivity and requests that certification of the EIR be postponed until the issues raised can be addressed.	<p>The Authority disagrees. The Final EIR/EIS clearly acknowledges that Coyote Valley and Pacheco Pass provide for important wildlife movement corridors. The WCA states that Coyote Valley "has been identified as an area important to wildlife movement between the Santa Cruz Mountains and the Diablo Range (Phillips et al. 2008, SCVOSA 2017) "See WCA Section 4.3.9, pg. 4-22. The Final EIR also states "[a]lthough corridors occur in all subsections, those in the Santa Clara Valley (specifically, the Coyote Valley, Soap Lake, and Pacheco Pass), the western Pacheco Pass region, and San Joaquin Valley (GEA) have been identified by the CDFW and local stakeholders as particularly important to wildlife movement and habitat connectivity at the regional and state scale." See Final EIR/EIS Section 3.7.6.2, pg. 3.7-54. For that reason, the Authority committed to maintaining and improving wildlife movement opportunities in both areas, particularly through the addition of BIO-MM#79b <i>Provide Wildlife Movement between the Diablo Range and Inner Coast Range</i>. SCVHA stated "[t]he HSRA commitment to design, permit and fund a land bridge over SR 152 in Pacheco Pass, in collaboration with other partners, is the crown jewel of this mitigation approach to address habitat fragmentation." See SCVHA letter, March 16,2022.</p> <p>The Final EIR/EIS presents a thorough analysis of the project's effects, incorporates avoidance, minimization, and mitigation measures as appropriate, identifies the least impactful alternative with the fewest impacts on wetlands and habitats, and serves the board and the public with a</p>

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					<p>transparent informed decision-making document. The commenter does not raise new information regarding impacts to wildlife movement and there is no basis for delaying certification of the Final EIR.</p> <p>It should be noted that wildlife crossing design is intended to progress along with project design after certification of the Final EIR. To help improve siting and design of the wildlife crossings as more information becomes available between environmental review and construction, a commitment to provide for agency and stakeholder review of the 75-90% designs was added to BIO-MM#77a in the Final EIR/EIS. POST stated “[w]e appreciate the Authority’s stated commitment in the Final EIR/EIS to work with our agencies to validate and optimize wildlife crossings and adjust locations as needed.” See POST letter April 20, 2022, pg. 4. A wildlife crossing monitoring and adaptive management commitment was also added to BIOMM# 77b, which would gather additional data on animal use prior to installation of crossings and provide for various approaches to improve upon the efficacy of the crossing over time. These two measures would be implemented at the appropriate time to improve certainty around design and siting and characterize use to inform future wildlife movement planning. Note that the Authority has conducted extensive stakeholder outreach to local groups such as Peninsula Open Space Trust and Santa Clara Valley Open Space Authority during the environmental review process and has held numerous workshops with these entities to optimize wildlife undercrossing siting and design to the extent feasible, based on local stakeholder expertise. (See Table 1 1 Santa Clara Valley, Soap Lake, and Western Pacheco Pass Stakeholder Meeting History, Discussion Topics and Outcomes, San Jose to Merced Project Section, Wildlife Corridor Assessment. (Authority 2020:1-4).</p>
45.2	Tiffany, J.P.	Yap, Rose	Center for Biological Diversity	The Final EIR minimizes the importance of local and regional connectivity for sensitive species	The Authority disagrees with the characterization of the majority of the alignment in natural areas as being on an

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				<p>in the Project area: “Fortifying existing barriers with about 90 miles of linear infrastructure, of which the majority is either at-grade with 10-foot high and 1-foot-deep fencing or on an embankment”</p> <p>Commenter states that the Final EIR should consider the adjacent open space (degraded or not), existing conserved lands, and ongoing conservation efforts as part of the existing conditions of the Project area in the assessment and impact analysis.</p> <p>Commenter states that implementing the Project as it is currently proposed with “limited wildlife crossings that are not designed to accommodate the sensitive species that need them” would significantly impact wildlife connectivity and any ongoing and potential future improvements to wildlife connectivity in the Project area.</p>	<p>embankment. Of the 88-mile alignment, 30 miles (34%) is aerial, or tunnel profile and 58 miles (66%) is at-grade (i.e., at-grade, trenched or on embankment). In the natural areas—Coyote Valley, Soap Lake, Pacheco Pass, and Grasslands Important Bird Area—the rail is 42.7 miles long, 26.2 miles (61%) of which are aerial or tunnel and 16.5 miles (39%) of which are at-grade. The rail is at-grade through Coyote Valley, which is approximately 7 miles long. It should be noted that the Authority has received a letter from POST requesting that HSR remain at-grade through Coyote Valley so as to preserve the option of a future overcrossing over rail lines and road. See POST letter April 20, 2022, pg. 3. The rail is a combination of 4 miles (48%) of at-grade and 4.4 miles (52%) of aerial profiles through Soap Lake. The Authority, working with local stakeholders, changed the design in Soap Lake to minimize at-grade and maximize aerial profiles. In Pacheco Pass, the rail alignment is approximately 24 miles long with 15 miles (63%) of tunnel; 4 miles (16%) of aerial; and 5 miles (21%) at-grade. In the Grasslands Audubon Important Bird Area, the rail is approximately 3.3 miles long with 1.5 miles (45%) of at-grade profile and 1.8 miles (55%) of aerial profile.</p> <p>The Authority evaluated extensive information to identify the existing conditions, including adjacent open space and existing conserved lands. See Final EIR/EIS 3.7.5.3, pg. 3.7-27. The Authority also recognized ongoing conservation efforts in the WCA by recognizing the <i>Coyote Valley Landscape Linkage</i>, authored by SCVOSA, stating that it “was an accepted local conservation plan for improving wildlife movement in the Coyote Valley through the improvement, creation, and protection of wildlife crossings.” See WCA Section 4.3.9, pg. 4-22. The Final EIR further recognized ongoing conservation efforts by POST, stating “[s]everal land purchases consistent with the goals of the Coyote Valley Landscape Linkage have been made or are in process and wildlife crossing modifications</p>

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					<p>are in the planning stage.” See WCA Section 5.4.7, pg. 5-21.</p> <p>The Authority disagrees that the project, with mitigation, would significantly impact wildlife connectivity. The evaluation set forth in the WCA and in Section 3.7 of the Final EIR/EIS indicates that the impacts on wildlife movement would be less-than-significant after implementation of mitigation measures. See Final EIR/EIS Section 3.7-10, pg. 3.7-253. The Authority reviewed all literature cited in the CBD comment letter and the literature cited that was not also in the Final EIR/EIS or WCA was found to be consistent with existing condition and impact assumptions and does not require any change to the Final EIR/EIS.</p> <p>Because land use and other factors could change prior to construction of the project, the Authority will work with agency and stakeholder partners (e.g., CDFW, USFWS, NMFS, SCVOSA, SCVHA, Peninsula Open Space Trust, and The Nature Conservancy) to validate and optimize wildlife crossing locations at the 75 to 90 percent design phase. The adjustment of some crossing locations may be necessary to orient crossings most advantageously to protected and natural lands, which is likely to improve the potential for use. In addition, the Authority will plan and prioritize species and wetland and natural community mitigation land acquisition—in coordination with the agencies and stakeholders listed above—at or near wildlife crossing entrances to minimize future development and maintain the natural and rural land cover types surrounding wildlife crossing entrances and exits.</p> <p>Further, the Authority will prepare, in coordination with wildlife agencies—CDFW, USFWS, and NMFS—and local wildlife movement stakeholders (e.g., SCVOSA, SCVHA, Peninsula Open Space Trust, and The Nature Conservancy) a Wildlife Crossing Design, Inspection, and Maintenance Plan. See Final EIR/EIS Section 3.7.8.2, pg.</p>

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					<p>3.7-196. The plan will include the following minimum components:</p> <ul style="list-style-type: none"> <li>• A list of movement guild focal species for each wildlife crossing and hydrologic balancing features along the alignment</li> <li>• Based on the focal species, identification of which of the above-listed design features (e.g., vegetation at the entrance, cover within the crossing, artificial dens for San Joaquin kit fox, critter shelves) will be included in each crossing's design</li> <li>• A funnel fencing plan for wildlife crossing entrances/exits on the east side of Monterey Road in Coyote Valley</li> <li>• Frequency of crossing design inspection</li> <li>• A list of features to be inspected, criteria for passing inspection, and the response for failed inspection</li> <li>• A description of how maintenance decisions will be informed by the wildlife crossing monitoring and adaptive management plan described in BIO-MM#77b.</li> </ul>
45.3	Tiffany, J.P.	Yap, Rose	Center for Biological Diversity	<p>Commenter is concerned with purported impacts on wildlife movement, for mountain lions in particular.</p> <p>The comment states the mountain lion presence, even if rare and in degraded habitat, indicates that many other species may use or move through the area—and that a fortified barrier at-grade could reduce even those rare occasions, which can have a significant impact on population and ecosystem health. The comment also states that local mountain lion populations have low genetic diversity, such that even one migrant every one to two years can benefit the genetics of a small, isolated population, meaning that is critical for the long-</p>	<p>Impacts to wildlife movement for mountain lion were fully evaluated throughout the project section.</p> <p>As described in the Final EIR/EIS, the mountain lion was recently added as a candidate for listing under CESA. Movement within the project area is very important to the mountain lion population in the region, and, although the mountain lion was not a candidate for listing under CESA at the time the WCA was prepared, the WCA included an analysis of movement effects on mountain lion as a focal species (the single member of the “high openness and high mobility” species movement guild). As described in detail in the WCA, existing information on mountain lion movement was considered and incorporated into the assessment. Extensive information was used in the development of the WCA; major sources of information included:</p>

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				<p>term survival of local pumas and other biodiversity.</p>	<ul style="list-style-type: none"> <li>• <i>Bay Area and Beyond Critical Linkages report</i> (Penrod et al. 2013)</li> <li>• <i>Safe Passage for Coyote Valley report</i> (Phillips et al. 2012)</li> <li>• <i>Coyote Valley Linkage Assessment Study</i> (Diamond and Snyder 2016).</li> <li>• <i>The Nature Conservancy’s Pajaro Study 2012–2013</i> (Diamond and Snyder 2013)</li> <li>• <i>Wildlife Permeability and Hazards across Highway 152 Pacheco Pass: Establishing a Baseline to Inform Infrastructure and Restoration</i> (Pathways for Wildlife 2020)</li> <li>• <i>The Effects of Spatial and Temporal Scale on Conservation Planning and Ecological Networks in the Central Valley, California</i>; Ph.D. dissertation by Patrick Huber (2008)</li> <li>• Tule elk radio collar data from CDFW (Hobbs 2017)</li> <li>• <i>Where the Tule Elk Roam: Home Range, Movement Barriers, and Wildlife Overcrossing Placement</i> (Dziegiel 2021)</li> <li>• <i>California Wildlife Barriers 2020</i> (CDFW 2020a)</li> <li>• <i>Pathways for Wildlife Pacheco Pass Monitoring June 2021 Update</i> (Diamond 2021)</li> <li>• Mountain lion GPS collar tracking data (Wilmers 2017)</li> <li>• Wildlife–vehicle collision records (CROS 2017; Road Ecology Center 2017; Diamond 2017; Hobbs 2017; Constable et al. 2009)</li> </ul> <p>The WCA synthesized existing information, and quantitative GIS-based modeling methods were used to evaluate the changes in wildlife movement that would result from project construction. The methods used were adapted from similar analytic efforts conducted by other wildlife movement experts in the region (i.e., Penrod et al. 2013). The quantitative results of the analysis were evaluated using criteria to discern where permeability reductions</p>

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					<p>would be likely to have an effect on the movement of focal species. Where moderate or high potential effects were identified, recommendations to facilitate wildlife movement were made in the WCA and were subsequently incorporated into the proposed project to the extent feasible.</p> <p>Recommendations included minimum and recommended crossing dimensions for mountain lion (and other species), as well as recommended design features and other measures to facilitate use by focal species. In summary, impacts to wildlife movement were closely evaluated for all focal species, including the mountain lion. Of the 11 Crossing structures in Coyote Valley, seven meet the minimum width and height, and maximum length recommendations, for a large mammal underpass as presented in Clevenger and Huijser (2011, pg. 125) and Ruediger and DiGiorgio (2007, pg. 18). Of those seven, four also meet the 2.0 openness recommendation (with two more just below the 2.0 recommendation at 1.97). It is important to note that Clevenger and Huijser (2011) discuss openness as a metric that has been difficult to use as there has never been a critical evaluation of the measure for designing underpasses and it is for this reason that Clevenger and Huijser (2011) and Ruediger and DiGiorgio do not recommend a lion-specific openness factor, though Ruediger and DiGiorgio do mention that a general openness factor of 2.0 has been recommended for large carnivores.</p>
45.4	Tiffany, J.P.	Yap, Rose	Center for Biological Diversity	<p>Commenter is concerned regarding the Authority's purported duty to mitigate impacts on mountain lion consistent with the California Endangered Species Act (CESA). The comment asserts that CHSRA has an obligation to protect species that are listed or provisionally listed under the California Endangered Species Act ("CESA"), may not approve projects that could jeopardize the continued existence of</p>	<p>Commenter states that the Authority has obligations to conserve mountain lion under CESA.</p> <p>As noted in Table 2-18 of the Final EIR/EIS, a CESA Section 2081 incidental take permit application is anticipated for this project section and Section 2081 permits have been obtained for other project sections. At the time a section 2081 permit application is developed, if the mountain lion is a listed species or candidate for listing</p>

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				these populations or result in destruction of essential habitat, must require that appropriate mitigation measures be implemented for projects that could destroy mountain lion habitat or impair connectivity and must proactively work to restore habitat and linkages needed for listed species to contribute to the conservation of listed species.	the Authority will work closely with CDFW to address all requirements under CESA.
45.5	Tiffany, J.P.	Yap, Rose	Center for Biological Diversity	<p>Commenter states that the Final EIR/EIS downplays existing conditions and impacts on Tule elk, stating “despite documented roadkill elk on SR 152 (Pathways for Wildlife, 2020b) and iNaturalist observations to both the north and the south of SR 152, the Final EIR states that “there is no evidence that Tule elk are successfully moving back and forth across SR 152 with any frequency such that the herd could take advantage of resources north of SR 152.”</p>	<p>The Final EIR/EIS thoroughly evaluates impacts to wildlife movement. The Final EIR/EIS accurately notes that existing conditions for wildlife movement are degraded and that the SR 152 represents a substantial barrier to movement and a source of road mortality for large animals attempting to cross. Despite the degraded baseline conditions, the Final EIR/IES concludes that the project would result in significant impacts to wildlife movement prior to mitigation. The mitigation measures will facilitate wildlife movement across the project and improve baseline conditions for all focal animal species, including Tule elk.</p> <p>Commenter commends the Authority for refining MM#78 to increase the use of viaduct in the western Pacheco Pass if geotechnical investigations indicate it is safe, but states that “strengthening existing barriers without implementing adequate wildlife crossing infrastructure in and near the Project area will significantly impact wildlife movement for elk and numerous other species in the region.”</p> <p>Commenter fails to note that the Authority has committed to MM#79(b), which would address infrastructure near the project and greatly improve existing conditions for wildlife movement. As noted above, SCVHA has referred to this wildlife overcrossing as the “crown jewel” of the project’s mitigation.</p> <p>Commenter asserts that crossings should be designed to accommodate species that may be present, or present in greater numbers in the future.</p> <p>The Authority has designed mitigation commensurate with their impacts and has committed to working with stakeholders to optimize crossing design in the design process. This comment does not present any new information that changes the validity of the impact</p>

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					conclusions or the Authority's compliance with CEQA or NEPA.
45.6	Tiffany, J.P.	Yap, Rose	Center for Biological Diversity	Commenter states that the proposed crossings in Coyote Valley are inadequate because they are not designed to meet specifications for larger animals like mountain lion.	The Authority disagrees. The Final EIR indicates that seven of the eleven proposed crossings in Coyote Valley meet the minimum requirements for width and height, and the maximum requirement for length, for a large mammal underpass (which includes elk) per Clevenger and Huijser (2011, pg. 125). Also, as noted above, many of the undercrossings are intended to address the movement guild for which the mountain lion is the focal species.
45.7	Tiffany, J.P.	Yap, Rose	Center for Biological Diversity	<p>Commenter provided comments on specific crossings in Coyote Valley.</p> <p>The comment states that the proposed wildlife undercrossing at Metcalf Road-Tulare Hill (B690-00) lacks adequate dimensions to facilitate wildlife movement and that given this location's documented importance for wildlife connectivity and protected land on either side of the highway, it is uniquely suited for a large wildlife undercrossing with dimensions of 15' height and 150' width.</p> <p>The comment states that the proposed wildlife undercrossing at Fisher Creek (B705+00) has design deficiencies that will limit its use by wildlife due to a jog/bend approximately halfway through the structure and the proposed design might actually reduce this location's use by wildlife. The comment suggests an open-span bridge instead, but if a culvert is placed in this location, there should be a break in the middle to encourage use by mule deer and other species.</p>	<p>Commenters provided feedback on the proposed wildlife undercrossing at Metcalf Road-Tulare Hill (B690-00), asserting that the length of the proposed structure (175-200') is too long to have an adequate lateral openness ratio to support passage of large animals. The commenter asserts that because of this location's documented importance for wildlife connectivity and protected land on either side of the highway, it is uniquely suited for a large wildlife undercrossing with dimensions of 15' height and 150' width (Santa Clara County Wildlife Corridor Technical Working Group Coyote Valley Subcommittee, 2019).</p> <p>The crossings will improve permeability above the existing or baseline condition for all focal species. The primary reason the crossing design is challenging in the Coyote valley area is because the undercrossings must pass under the Union Pacific Railroad and Monterey Road. That is, the existing degraded condition complicates wildlife crossing design in this location regardless of the presence of High-Speed Rail. To further improve crossing conditions in this less-than-ideal setting, the Authority has committed to several crossing design measures that will improve light conditions; reduce the length and maximize the width and height to the maximum extent practicable; minimize slopes at the exits and entrances to improve line of sight; provide cover for smaller animals; and coordinate with local stakeholders to site and design the crossings to maximize</p>

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					use for all focal species. The Authority’s design improves the baseline condition and addresses the Authority’s impact on wildlife movement in this segment of the project.
45.8	Tiffany, J.P.	Yap, Rose	Center for Biological Diversity	Stakeholder referenced a number of publications or reports in the comment letter. The publications and reports mentioned are cited in the response.	<p>The Authority reviewed each document to determine if the findings would change assumptions that inform the existing condition, impact analysis, or findings and concluded that they would not. Each document is briefly reviewed and discussed below.</p> <p>Benson, J. F., Mahoney, P. J., Vickers, T. W., Sikich, J. A., Beier, P., Riley, S. P. D., Ernest, H. B., &amp; Boyce, W. M. (2019). Extinction vortex dynamics of top predators isolated by urbanization. <i>Ecological Applications</i>, 29(3), e01868.</p> <p>This analysis was heavily cited in the petition to list the mountain lion. And while the EIR/EIS did not cite this document specifically, it did cite the petition to list as the primary source for much of our assumptions about mountain lions, particularly in the existing condition. This document makes clear some of the primary relationships between genetics and isolation/habitat fragmentation, all of which is captured in existing condition assumptions. The EIR/EIS assumes that mountain lion genetic diversity is at risk locally in the northern central coast population due to the existing, fragmented landscape.</p> <p>Statements made in the Petition to List supported by this document and for which the EIR/EIS is in general agreement.</p> <ul style="list-style-type: none"> <li>• Most of the populations comprising the ESU have low genetic diversity and effective population sizes, which puts them at increased risk of extinction</li> <li>• Several characteristics of these mountain lion populations, including small census population size, low density, female-biased sex ratios, and skewed male reproductive success, reduce effective population size, which suggests that these populations have an increased risk of inbreeding depression and extinction</li> </ul>

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					<ul style="list-style-type: none"> <li>Whether the 50/500 or 100/1,000 rule is considered, it is clear that Central Coast and Southern California mountain lion populations are genetically imperiled and face extinction in both the short- and long-term. Five of the six populations have effective population sizes well below 50 (from lowest to highest, according to Gustafson et al. 2018: CC-S, SGSB, SAM, CCN, EPR), and the remaining population (CC-C) is just barely above that threshold at <math>N_e = 56.6</math></li> <li>Habitat loss and fragmentation due to roads and development have led to extreme levels of isolation in these populations, which have lowered their effective population sizes and, ultimately, their ability to survive and reproduce with a diverse gene pool (</li> <li>The CC-S mountain lion population has been found to exhibit a prior genetic bottleneck, with low genetic diversity and an extremely low effective population size</li> </ul> <p>As demonstrated in the previous sections, Central Coast and Southern California mountain lions are at risk of extirpation under current conditions. Roads and development have fractured connectivity, which has led to the separation of at least six isolated, genetically distinct populations in the CC-N, CC-C, CC-S, SAM, SGSB, and EPR</p> <p>Gustafson, K. D., Gagne, R. B., Buchalski, M. R., Vickers, T. W., Riley, S. P. D., Sikich, J. A., Rudd, J. L., Dellinger, J. A., LaCava, M. E. F., &amp; Ernest, H. B. (2021). Multi-population puma connectivity could restore genomic diversity to at-risk coastal populations in California. <i>Evolutionary Applications</i>.</p> <p>This analysis identifies the genetic benefit of improving movement within local or regionally isolated populations. This premise is well established in the petition to list document which is referenced heavily in the EIR/EIS. The EIR/EIS assumes that mountain lion genetic diversity is at risk locally in the northern central coast population due to</p>

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					<p>the existing, fragmented landscape. It is for this reason that cumulative effects in the Pacheco Pass were evaluated very carefully and why a wildlife overpass was proposed a possible mitigation action.</p> <p>Gustafson, K. D., Vickers, T. W., Boyce, W. M., &amp; Ernest, H. B. (2017). A single migrant enhances the genetic diversity of an inbred puma population. <i>Royal Society Open Science</i>, 4(5).</p> <ul style="list-style-type: none"> <li>This analysis identifies the genetic benefit of just one migrant into an existing, but isolated, breeding population in the Southern CA population. While not necessarily directly related to the northern central coast populations, it shows that even small improvements in connectivity can have significant population/genetic benefits. The HSR EIR/EIS analysis is consistent with this finding.</li> </ul> <p>Huffmeyer, A. A., Sikich, J. A., Vickers, T. W., Riley, S. P. D., &amp; Wayne, R. K. (2021). First reproductive signs of inbreeding depression in Southern California male mountain lions (<i>Puma concolor</i>). <i>Theriogenology</i>, 177, 157–164.</p> <ul style="list-style-type: none"> <li>This analysis identifies physical evidence of inbreeding in the Southern CA population. While not necessarily directly related to the northern central coast populations, it shows that genetic isolation can lead to inbreeding depression (which is a fate that is possible for the northern coastal California populations).</li> </ul> <p>Labarge, L. R., Planck, M., Behavior, A., &amp; Elbroch, L. M. (2022). Pumas <i>Puma concolor</i> as ecological brokers: a review of their biotic relationships. <i>Mammal Review</i>.</p> <ul style="list-style-type: none"> <li>This is a relatively new document, so is not mentioned in the EIR/EIS. However, because the EIR/EIS analysis accepts the well-established premise that mountain lions are an important species at the top of the trophic system, including this work would not have changed the analysis, findings or mitigation recommendations.</li> </ul>

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					<p>Pathways for Wildlife. (2020a). SR-152 Pacheco Pass Permeability &amp; Pacheco Creek Wildlife Connectivity Study: Mountain Lion Report 2018-2020 (Issue June).</p> <p>While this document may not be cited in the EIR, we did look closely at this data and several important items stood out:</p> <ul style="list-style-type: none"> <li>• No evidence of mountain lions using underpasses or culverts in the existing condition.</li> <li>• No mountain lion or elk roadkill reported during the two-year study.</li> <li>• Tule elk and mountain lion are present in the western portion of Pacheco Pass at Pacheco Creek Reserve where there will be a mile-long at-grade section of rail that will further minimize connectivity in the region. This report was one of the primary data points used to rationalize potentially cumulative impacts to mountain lions and to support the need for a wildlife overpass over SR 152.</li> </ul> <p>Rottenborn, S. C., Wilkinson, J., &amp; Childs, M. (2020). Coyote Valley Reptile and Amphibian Linkage Study Findings and Recommendations.</p> <ul style="list-style-type: none"> <li>• This analysis came out after much of the wildlife connectivity work had been finalized. When this study was released, it was reviewed. There was no information in this report that would have changed a finding or mitigation action in the EIR/EIS. The least cost pathways for CTS, CRLF, and WPT generally matched up with the proposed locations of wildlife crossings.</li> </ul> <p>Ruediger, B., &amp; DiGiorgio, M. (2007). Safe Passage: A user's guide to developing effective highway crossings for carnivores and other wildlife.</p> <ul style="list-style-type: none"> <li>• Clevenger and Huijser (2011) was the primary source for wildlife crossing design including fencing, jump outs, wing walls, etc. The Ruediger and DiGiorgio (2007)</li> </ul>

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					<p>document is generally in agreement with Clevenger and Huijser (2011). It is important to note that there are engineering constraints—perched groundwater table and weight of the overlying soil—that limit design dimensions. The Authority has optimized design to the maximum extent practicable given the percent design. The Authority has committed to continuing to work with the engineers and stakeholders, through the 75-90% design phase, to continue to find ways to maximize crossing height and width, minimize length, of the wildlife crossings.</p> <p>Santa Clara County Wildlife Corridor Technical Working Group Coyote Valley Subcommittee. (2019). Recommendations to reduce wildlife-vehicle collisions on the Monterey Road corridor in Coyote Valley, Santa Clara County.</p> <ul style="list-style-type: none"> <li>This material was reviewed although it came out after much of the wildlife crossing analysis had been performed. The EIR/EIS was not amended based on this report as it did not contain information that would change the analysis or the conclusions. It is good to note that the mitigation plan for HSR included three of the four primary recommendations made in this document: modifications of the median barrier, improvement of the Fisher Creek Culvert, and creation of wildlife crossing infrastructure. The median barrier would be modified under Alternatives 1 and 3 because those alternatives would require changes be made to Monterey Road (and thus present an opportunity to improve the road). The Fisher Creek culvert would be improved under all four alternatives and the creation of wildlife crossing infrastructure would occur under Alternatives 2 and 4.</li> </ul>
46.1	Noelle, Andrea,	Chambers, MacKenzie,	Peninsula Open Space Trust (POST), Peninsula Open Space	Our agencies request a written agreement to memorialize the commitments the Authority has made to mitigate its impacts on wildlife movement in the Coyote Valley region. The	The mitigation measures are adequate to ensure impacts are mitigated. The Authority is committed, as set forth in the mitigation measures, to working closely with local stakeholders at later design stages to ensure that impacts

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	Abigail, Edmund	Ramsden, Sullivan	Authority (OSA), Santa Clara Valley Habitat Agency (SCVHA), The Nature Conservancy (TNC)	written agreement should clarify the respective roles of our agencies and the process for working together to ensure the mitigation measures included in the Final EIR are effective in achieving their desired outcomes.	to wildlife movement are minimized. The Authority is willing to collaborate on a written agreement that sets out a process for such engagement and the Authority looks forward to collaborating on such an agreement.
46.2	Noelle, Andrea, Abigail, Edmund	Chambers, MacKenzie, Ramsden, Sullivan	POST, OSA, SCVHA, TNC	The written agreement should memorialize mitigation measures and the preferred rail alignment to ensure their implementation and accommodate existing conservation planning efforts.	The scope and content of an agreement should be developed through joint meetings. Please note that the Final EIR/EIS identifies the preferred alignment and all mitigation measures are set forth in the MMEP.
46.3	Noelle, Andrea, Abigail, Edmund	Chambers, MacKenzie, Ramsden, Sullivan	POST, OSA, SCVHA, TNC	The written agreement should memorialize the Authority's commitment to work with our agencies and other wildlife stakeholders on wildlife crossing structure design optimization, locational adjustments, and early implementation. The proposed wildlife crossing structures require adjustments to their design and location in order to ensure their effectiveness in moving focal species. Several of the proposed wildlife crossings do not have adequate structure dimensions and other features (e.g., adequate light, moisture) necessary to ensure their use by focal species, requiring further design optimization and consideration of design alternatives (e.g., open-span bridge rather than culvert at Fisher Creek).	The Authority agrees that an agreement regarding engagement on wildlife movement would be worthwhile. The scope and content of the agreement should be developed through joint meetings. Note that the Authority has committed to collaborating on wildlife crossing design and location in BIO-MM#77a: <i>Design Wildlife Crossings to Facilitate Wildlife Movement</i> .  In coordination with Peninsula Open Space Trust and other stakeholders, the Authority studied the permeability of the existing landscape and the impacts of the preferred alternative in detail. The Authority developed 11 undercrossings to mitigate impacts on wildlife movement. While the Authority recognizes there are challenges for the proposed wildlife crossing dimensions to be optimal for all focal species, the crossings will improve permeability above the existing or baseline condition for all focal species. The primary reason that optimizing the crossing designs in this area is challenging is because the undercrossings must pass under the Union Pacific Railroad and Monterey Road. That is, the existing degraded condition complicates wildlife crossing design in this location regardless of the presence of High-Speed Rail. To further improve crossing conditions in this less-than-ideal setting, the Authority has committed to several crossing

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					design measures that will improve light conditions; reduce the length and maximize the width and height to the maximum extent practicable; minimize slopes at the exits and entrances to improve line of sight; provide cover for smaller animals; and coordinate with local stakeholders to site and design the crossings to maximize use for all focal species. The Authority's design improves the baseline condition and addresses the Authority's impact on permeability in this segment of the project.
46.4	Noelle, Andrea, Abigail, Edmund	Chambers, MacKenzie, Ramsden, Sullivan	POST, OSA, SCVHA, TNC	The written agreement should acknowledge ongoing conservation and planning efforts in the Project Area and ensure that the Project is compatible and coordinated with these efforts.	The Final EIR/EIS thoroughly evaluated conservation planning efforts in the Coyote Valley area, including the Coyote Valley Linkage, to ensure coordination with those efforts. The Authority is willing to include a coordination process for future planning efforts in an agreement.
46.5	Noelle, Andrea, Abigail, Edmund	Chambers, MacKenzie, Ramsden, Sullivan	POST, OSA, SCVHA, TNC	The written agreement should ensure coordination between our agencies around the mitigation process for land protection and connectivity improvements beyond wildlife crossing structures.	The Authority has committed that it will plan and prioritize species and wetland and natural community mitigation land acquisition, in coordination with the agencies and stakeholders, at or near wildlife crossing entrances to minimize future development and maintain the natural and rural land cover types surrounding wildlife crossing entrances and exits.  The Authority committed to collaborating with stakeholders on land acquisition in the Soap Lake floodplain as part of BIO-MM#79a: <i>Provide Wildlife Movement between the Santa Cruz Mountains and Diablo Range</i> as well.
047	Scott	Knies	San Jose Downtown Association	The commenter supports Alternative #4 as best fitting their vision of downtown San Jose and noted their support for planning in the area, including DISC, DSAP, Downtown West, and the greater downtown.	The comment is noted
048	Dina	Tawansey	Caltrans	The commenter supports the wildlife overcrossing of SR 152 included as mitigation for the project. The commenter notes that most of the overcrossing would be in Caltrans right of way and that Caltrans looks forward to	The commenter's support is noted.

#	First Name	Last Name	Business/ Organization	Summary of Stakeholder Comments/Issues	Response/Status Update
				providing oversight and collaborating with the Authority, the Santa Clara Valley Habitat Agency, CDFW, Pathways for Wildlife and other partners in the delivery of this overcrossing.	
049	Donald	Larkin	Morgan Hill	<p>The letter includes the following comments:</p> <ul style="list-style-type: none"> <li>• City comments on the Draft EIR stressed the Safety impacts an at-grade crossing only rail system through Morgan Hill would have on our community. We don't believe those comments have been adequately addressed.</li> <li>• As stated within the study provided to the Authority during the comment period of the Draft EIR, the City is already approximately 2 ½ minutes over in First Due Travel Time to arrive and 1 ½ minutes over in Call to Arrival Performance. It is conclusive that any additional delay in emergency response times would be a significant impact to our community. The Final EIR does not account for the updated 2019 response time information that was provided.</li> <li>• We also disagree with the position that “if cities choose not to implement and operate emergency vehicle priority treatments using construction funds provided by the Authority, impacts will be considered significant and unavoidable.” Impacts to public safety response times can effectively be mitigated by creating grade separations.</li> <li>• While the City disagrees with both the significance standards and the adequacy of proposed mitigation measures, the City looks forward in working with the Authority on an Agreement that will present ways to</li> </ul>	<p>The following responses are provided:</p> <ul style="list-style-type: none"> <li>• All City comments were fully responded to in the Final EIR/EIS.</li> <li>• The Authority is aware of and has reviewed the 2019 study submitted by the City. As explained in Standard Response SJM-Response-SS-2: Emergency Vehicle Response Times, the rationale for the 30-second delay significance threshold for emergency vehicle response analysis is discussed in Draft EIR/EIS Section 3.11.4.5, Method for Determining Significance under CEQA (specifically, footnote 9 on page 3.11-16 of the Draft EIR/EIS). For the purposes of the analysis, inadequate emergency access was defined as either a substantial blockage of physical access for emergency response purposes or a substantial increase in emergency response times (defined as greater than 30 seconds). While there are local standards for emergency vehicle response time, there are no established state or federal emergency vehicle response time standards, and analysts were not able to identify specific thresholds previously used under CEQA to evaluate this effect. The 30-second criterion was selected on the basis of several considerations: (1) analysts reviewed local emergency management agency standards for response times (as discussed in Section 3.11 of the Draft EIR/EIS), of which the shortest times were around 5 minutes. Thirty seconds—or 10 percent of 5 minutes (300 seconds)—was considered to represent a substantial delay in emergency response time; and (2) NEPA effects are identified in Section 3.2 of the Draft EIR/EIS for signalized intersections with congested conditions (defined as LOS E or F) where the project</li> </ul>

#	First Name	Last Name	Business/ Organization	Summary of Stakeholder Comments/Issues	Response/Status Update
				<p>further enhance the project by collaborating on the incorporation of grade separations at the time of construction for the rail project. We appreciate the Authorities willingness to discuss these issues and explore an agreement that may minimizing impacts on the communities that will have to co-exist with the operating rail system long-term.</p>	<p>would result in 4 seconds of additional delay. Because an emergency vehicle route across the railroad is likely to encounter anywhere from two to six intersections affected by gate-down time, a 30-second delay would include the collective effects of up to seven intersections (7 intersections times 4 seconds = 28 seconds).</p> <ul style="list-style-type: none"> <li>• The City's advocacy for what could be understood as a "zero threshold" is noted. However, the City offers no evidence of other instances of CEQA documents applying such a threshold before. The 2019 study submitted by the City is not evidence in support of using such a threshold. (Memo to Stanich, April 27, 2022.) Many land use projects, including in Morgan Hill, contribute to traffic that can affect emergency response time and yet individual land use projects are routinely not identified as significant impacts on emergency response. The threshold used in the EIR/EIS is appropriate and has consistency with the common evaluation of traffic delay.</li> <li>• Further, the 2019 study submitted by the City does not undermine the analysis in Section 3.11 of the emergency vehicle response time impacts. Mitigation will be required when that future monitoring or forecasting indicates that the HSR project would result in a delay in emergency vehicle response by 30 seconds or more. Because the trigger for mitigation is the conditions that would actually be affected by the HSR project operations, and not the conditions as they might be today, the information in the 2019 study does not change what the ultimate impact will be or the mitigation that may be necessary. (Memo to Stanich, April 27, 2022.)</li> <li>• The language in Section 3.11, Safety &amp; Security, describing that "if cities choose not to implement and operate emergency vehicle priority treatments using construction funds provided by the Authority, impacts</li> </ul>

#	First Name	Last Name	Business/ Organization	Summary of Stakeholder Comments/Issues	Response/Status Update
					<p>will be considered significant and unavoidable,” is based on Mitigation Measure SS-MM#4, which includes some measures that would require the authorization and agreement of local jurisdictions, such as a new fire station. The Authority cannot force local jurisdictions to accept emergency vehicle response improvements pursuant to SS-MM#4, and this language acknowledges the limitations on the Authority’s jurisdiction in this matter. Regarding grade separations, as explained in Standard Response SJM-Response-GS-1: Requests for Grade Separations, grade separations are considered an infeasible mitigation due to both the substantial environmental/community disruption involved and due to the substantial increase in cost associated with adding grade separations at at-grade crossings in the project section.</p> <ul style="list-style-type: none"> <li>The Authority looks forward to continued collaboration with the City and appreciates the City’s willingness to discuss these issues and explore an agreement addressing issues of concern to both parties.</li> </ul>

Authority = California High-Speed Rail Authority; Final EIR/EIS = San Jose to Merced Project Section Final Environmental Impact Report/Final Impact Statement.

## APPENDIX I: ERRATA TO THE FINAL EIR/EIS



California High-Speed Rail Authority

# *San Jose to Merced* *Project Section*

**Final Environmental Impact Report/  
Environmental Impact Statement**

**Errata**

**April 2022**



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

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## ACRONYMS AND ABBREVIATIONS

APE	area of potential effects
BETP	built environment treatment plan
CEQA	California Environmental Quality Act
CRHR	California Register of Historical Resources
DDV	Diridon design variant
EIR	environmental impact report
EIS	environmental impact statement
HASR	<i>San Jose to Merced Project Section Historic Architectural Survey Report</i>
HSR	high-speed rail
IAMF	impact avoidance and minimization feature
NEPA	National Environmental Policy Act
NRHP	National Register of Historic Places
OWJ	official with jurisdiction
PA	Programmatic Agreement
SHPO	State Historic Preservation Officer
TDV	tunnel design variant
UPRR	Union Pacific Railroad



## ERRATA SHEET

The following items are clarified and corrected (note revised text in underline and strikethrough). Clarifications and corrections requiring underline and strikethrough text are indicated with a vertical line in the margin of this errata document. The Authority has considered whether any of these clarifications/corrections require supplementation/recirculation and has determined they do not.

*\*Italics:* Italics are used in the table below to describe text in the Final EIR/EIS that is not able to be included as verbatim language; such as content within tables.

**Table 1 Errata in the Final EIR/EIS**

Number	Reference	Published Final EIR/EIS Text	Clarification of or Correction to Final EIR/EIS	Reason for Clarification or Correction
1	Summary Page S-34	Page S-34: Section S.8.3.4 Under Alternative 4, approximately 196 residential units, 69 commercial or industrial businesses, 40 agricultural properties, and 1 community and public facility would be displaced.	<b>Clarification:</b> The following text edits were made: Under Alternative 4, approximately <del>68</del> <u>66</u> residential units, <del>69</del> <u>66 (67 with the DDV)</u> commercial or industrial businesses, 40 agricultural properties, and 1 community and public facility would be displaced.	Clarification for consistency with text in Section 3.12.6.4, Impact SOCIO#6.
2	Summary Page S-57	Page S-57: Table S-3, Impact SOCIO#7, Alternative 4 Construction of the project would displace 66 businesses. With the DDV, there would be partial acquisition of one additional commercial parcel and displacement of one additional commercial building.	<b>Clarification:</b> The following text edits were made: Construction of the project would displace 66 businesses. With the DDV, there would be partial acquisition of one additional commercial parcel and displacement of one additional commercial building, <u>totaling 67 businesses</u> .	Clarification that the total number of business displacements for Alternative 4 (with the DDV) is 67, for consistency with Section 3.12.6.4, Impact SOCIO#7.
3	Summary Page S-110	Page S-110: Table S-6 Alternative 4: 10	<b>Clarification:</b> The following text edits were made: Alternative 4: <del>40</del> <u>11</u>	Clarification that the total number of Significant and Unavoidable Impacts after mitigation for Alternative 4 is 11.
4	Chapter 2 Alternatives Page 2-2	Page 2-2 Table 2-17 was revised to reflect the correct jurisdiction for the staging area east of Lafayette Street, the location for two 1.7-acre, one 2.3-acre, and one 1.8-acre sites was corrected to Blossom Hill Road, and references to Church Avenue were corrected to Church Street.	<b>Correction:</b> The following text edits were made: Table 2-17 was revised to <u>remove</u> <del>reflect the correct</del> <u>jurisdiction</u> for the staging area east of Lafayette Street, the location for two 1.7-acre, one 2.3-acre, and one 1.8-acre sites was corrected to Blossom Hill Road, and references to Church Avenue were corrected to Church Street.	Correction to reflect the correction made in this Errata to Table 2-17.

Number	Reference	Published Final EIR/EIS Text	Clarification of or Correction to Final EIR/EIS	Reason for Clarification or Correction
5	Chapter 2 Alternatives Page 2-149	Page 2-149: Table 2-17 <i>*Table 2-17 presents two rows under San Jose Diridon Station Subsection.</i>	<b>Correction:</b> <i>*In Table 2-17, the row for the 8.4-acre staging area in Santa Clara east of Lafayette St under Alternative 4 has been deleted.</i>	Correction to reflect that the construction staging area east of Lafayette Street would no longer be required for Alternative 4, as reflected in the analysis of impacts to Reed and Grant Street Sports Park in Section 3.15 and Chapter 4.
6	Section 3.7 Biological Resources Page 3.7-197	Page 3.7-179: BIO-MM#77b Monitoring will start no less than 2 years following construction (to allow time for habituation) and total initial monitoring period will not exceed 5 years following construction.	<b>Correction:</b> The following text edits were made: Monitoring <del>will</del> <u>would</u> start <del>no less than 2 years</del> following construction ( <del>to allow time for habituation</del> ) and total initial monitoring period will not exceed 5 years following construction.	Correction to clarify mitigation measure as discussed in response to submission SJM-2131, comment 6265 in Volume 4.
7	Section 3.7 Biological Resources Page 3.7-240	Page 3.7-240: Impact BIO#11 BIO-MM#31 and BIO-MM#33 inadvertently left out of list of mitigation measures.	<b>Correction:</b> The following text edits were made: BIO-MM#13: Implement Work Stoppage BIO-MM#31: <u>Provide Compensatory Mitigation for Impacts on California Tiger Salamander Habitat</u> BIO-MM#33: <u>Provide Compensatory Mitigation for Impacts on California Red-Legged Frog Habitat.</u> BIO-MM#36: Conduct Pre-Construction Surveys for Special-Status Reptiles and Amphibians	Text correction. BIO-MM#31 and BIO-MM#33 were inadvertently omitted from Table 3.7-27 for Impact BIO#11.
8	Section 3.7 Biological Resources Page 3.7-242	Page 3.7-242: Impact BIO#15 BIO-MM#16, BIO-MM#31, BIO-MM#61 inadvertently left out of list of mitigation measures.	<b>Correction:</b> The following text edits were made: BIO-MM#13: Implement Work Stoppage BIO-MM#16: <u>Provide Compensatory Mitigation for Impacts on Bay Checkerspot Butterfly Habitat</u> BIO-MM#31: <u>Provide Compensatory Mitigation for Impacts on California Tiger Salamander Habitat</u> BIO-MM#43: Conduct Pre-Construction Surveys and Delineate Active Nest Buffers for Breeding Birds BIO-MM#61: <u>Provide Compensatory Mitigation for Impacts on San Joaquin Kit Fox Habitat.</u>	Text correction. BIO-MM#16, BIO-MM#31, and BIO-MM#61 were inadvertently omitted from Table 3.7-27 for Impact BIO#15.

Number	Reference	Published Final EIR/EIS Text	Clarification of or Correction to Final EIR/EIS	Reason for Clarification or Correction
9	Section 3.7 Biological Resources Page 3.7-245	Page 3.7-245: Impact BIO#24 BIO-MM#74 inadvertently left out of list of mitigation measures.	<b>Correction:</b> The following text edits were made: BIO-MM#57: Provide Compensatory Mitigation for Impacts on Tricolored Blackbird Habitat <u>BIO-MM#74: Prepare and Implement a Compensatory Mitigation Plan for Impacts on Aquatic Resources</u>	Text correction. BIO-MM#74 was inadvertently omitted from Table 3.7-27 for Impact BIO#24.
10	Section 3.7 Biological Resources Page 3.7-250	Page 3.7-250: Impact BIO#34 BIO-MM#P1 inadvertently left out of list of mitigation measures for Impact BIO#34.	<b>Correction:</b> The following text edits were made: BIO-MM#58: Provide Compensatory Mitigation for Impacts on Waterfowl, Shorebird, and Sandhill Crane Habitat <u>BIO-MM#P1: Provide Compensatory Mitigation for Impacts on the Grasslands Ecological Area</u>	Text correction. BIO-MM#P1 was inadvertently omitted from Table 3.7-27 for Impact BIO#34.
11	Section 3.7 Biological Resources Page 3.7-254	Page 3.7-250: Impact BIO#44 BIO-MM#P1 inadvertently left out of list of mitigation measures for Impact BIO#44.	<b>Correction:</b> The following text edits were made: BIO-MM#80: Minimize Permanent Intermittent Noise, Visual, and Train Strike Impacts on Wildlife Movement <u>BIO-MM#P1: Provide Compensatory Mitigation for Impacts on the Grasslands Ecological Area</u>	Text correction. BIO-MM#P1 was inadvertently omitted from Table 3.7-27 for Impact BIO#44.
12	Section 3.7 Biological Resources Page 3.7-276	Page 3.7-276: Impact BIO#42 BIO-MM#79a inadvertently left out of narrative for Impact BIO#42.	<b>Clarification:</b> The following text edits were made: BIO-MM#76b will require the Authority to facilitate wildlife movement around project construction activities, minimizing the temporary disruption of wildlife movement in the western Pacheco Pass region. <u>BIO-MM#79a will partially compensate for temporary impacts on wildlife movement by requiring the Authority to protect lands in perpetuity within the Santa Cruz to Gabilan Wildlife Linkage or Soap Lake floodplain.</u> These measures will minimize direct and indirect impacts on wildlife moving near or across the project footprint during construction. Therefore, the impact would be less than significant.	Text clarification. BIO-MM#79a was inadvertently omitted from the narrative for Impact BIO#42.
13	Section 3.7 Biological Resources Page 3.7-276 to 3.7-277	Page 3.7-276 to 3.7-277: Impact BIO#43 BIO-MM#79b inadvertently included in narrative for Impact BIO#43.	<b>Clarification:</b> The following text edits were made: <del>BIO-MM#79b will require the Authority to work with stakeholders and wildlife agencies to implement an overcrossing to facilitate movement between the Diablo Range and the Inner Coast Range.</del> These measures are expected to minimize and compensate for direct and indirect	Text clarification. BIO-MM#79b was inadvertently included in the narrative for Impact BIO#43.

Number	Reference	Published Final EIR/EIS Text	Clarification of or Correction to Final EIR/EIS	Reason for Clarification or Correction
			impacts on wildlife corridor connectivity and individuals moving near or across the rail alignment.	
14	Section 3.15 Parks, Recreation, and Open Space Page 3.15-126	Page 3.15-126: PR-MM#1 Upon approval by the Authority, the contractor will implement the activities identified in the technical memorandum. The activities will be incorporated into the design specifications and will be a pre-condition requirement.	<b>Clarification:</b> The following text edits were made: Upon approval by the Authority, the contractor will implement the activities identified in the technical memorandum. <u>These technical memoranda would be provided to the OWJ to demonstrate how access would be maintained.</u> The activities will be incorporated into the design specifications and will be a pre-condition requirement.	Clarification for consistency with text included throughout Section 4.6.1.
15	Section 3.15 Parks, Recreation, and Open Space Page 3.15-126	Page 3.15-126: PR-MM#2 Upon approval by the Authority, the contractor will implement the activities identified in the technical memorandum. The activities will be incorporated into the design specifications and will be a pre-condition requirement.	<b>Clarification:</b> The following text edits were made: Upon approval by the Authority, the contractor will implement the activities identified in the technical memorandum. <u>These technical memoranda would be provided to the OWJ to demonstrate how access would be maintained.</u> The activities will be incorporated into the design specifications and will be a pre-condition requirement.	Clarification for consistency with text included throughout Section 4.6.1.
16	Section 3.15 Parks, Recreation, and Open Space Page 3.15-126	Page 3.15-126: PR-MM#3 Upon approval by the Authority, the contractor will implement the activities identified in the technical memorandum. The activities will be incorporated into the design specifications and will be a pre-condition requirement.	<b>Clarification:</b> The following text edits were made: Upon approval by the Authority, the contractor will implement the activities identified in the technical memorandum. <u>These technical memoranda would be provided to the OWJ to demonstrate how access would be maintained.</u> The activities will be incorporated into the design specifications and will be a pre-condition requirement.	Clarification for consistency with text included throughout Section 4.6.1.
17	Section 3.17 Cultural Resources Page 3.17-50	Page 3.17-50: Impact CUL#2 Text regarding the DDV was added to the incorrect location and does not apply to CA-SCL-30.	<b>Correction:</b> The following text edits were made: <b>San Jose Diridon Station Approach Subsection CA-SCL-30 (P-43-000050)</b> Alternatives 1 and 4, which would be at-grade at this resource, would incorporate about 10 feet on the north edge of the site within the permanent blended Caltrain-HSR right-of-way, and an area extending about 50 feet south of that would be included within the existing Caltrain right-of-way. The DDV (which applies to Alternative 4 only) would remove up to 7 feet and add up to 10 feet of infill to the platforms between tracks 6 and 7 and between tracks 8 and 9 in a 117-foot section on the north end of the station to accommodate	Text correction.

Number	Reference	Published Final EIR/EIS Text	Clarification of or Correction to Final EIR/EIS	Reason for Clarification or Correction
			track shifts. The DDV would add up to 4 feet of infill to the platforms between tracks 6 and 7 and between tracks 8 and 9 in a 92-foot section on the south end of the station to accommodate track shifts. The DDV would also add 2 feet of infill on the west side of the platform between tracks 4 and 5. Alternatives 2 and 3, which would be built on viaduct here, would incorporate about 60 feet of the north edge of the site within the Caltrain right-of-way. Construction activities such as grading or excavation could result in damage or destruction of the site or portions of the site.	
18	Chapter 4 Section 4(f)/6(f) Evaluations Page 4-145 to 4-146	Page 4-145 to 4-146: Section 4.6.2 <ul style="list-style-type: none"> <li>If physical impacts result in a finding of adverse effects, then there is a Section 4(f) use.</li> <li>If the effects do not substantially impair the attributes such that the property is going to be permanently incorporated, then there is no use under Section 4(f).</li> <li>If physical impacts result in a finding of no effect or no adverse effect, then there is a de minimis impact.</li> </ul>	<b>Clarification:</b> The following text edits were made: <ul style="list-style-type: none"> <li>If the property is permanently incorporated or temporarily used physical impacts result in a finding of adverse effects, then there is a Section 4(f) use.</li> <li>If the project is outside of the historic property boundary but the proximity the effects do not substantially impair the activities, features, or attributes that qualify the property for protection under Section 4(f) such that the property is going to be permanently incorporated, then there is no use under a Section 4(f) constructive use.</li> <li>If the property is permanently incorporated or temporarily used and there is physical impacts result in a finding of no effect or no adverse effect, then the use would be there is a de minimis impact (if SHPO concurs).</li> </ul>	Clarification to more clearly describe the standards for analyzing properties that qualify for protection under Section 4(f).
19	Chapter 5 Environmental Justice Page 5-88	Page 5-88: Table 5-19, Alternative 4 Commercial and Industrial Businesses: 66 (68) Total Displacements: 175 (177)	<b>Clarification:</b> The following text edits were made: Commercial and Industrial Businesses: 66 ( <del>67</del> 68) Total Displacements: 175 ( <del>176</del> 177)	Clarification for consistency with Section 3.12.6.4, Impact SOCIO#7.
20	Chapter 5 Environmental Justice Page 5-89	Page 5-89: Table 5-20, Alternative 4 Bus. San Jose Diridon Station Approach: 19 (21) San Jose: 19 (21) Environmental Justice Resource Study Area Total: 106 (108)	<b>Clarification:</b> The following text edits were made: San Jose Diridon Station Approach: 19 ( <del>20</del> 21) San Jose: 19 ( <del>20</del> 21) Environmental Justice Resource Study Area Total: 106 ( <del>107</del> 108)	Clarification for consistency with Section 3.12.6.4, Impact SOCIO#7.

Number	Reference	Published Final EIR/EIS Text	Clarification of or Correction to Final EIR/EIS	Reason for Clarification or Correction
21	Chapter 8 Preferred Alternative Page 8-13	Page 8-13: Table 8-1, Alternative 4 Commercial displacements: 66 (68)	<b>Clarification:</b> The following text edits were made: Commercial displacements: 66 ( <del>67</del> 68)	Clarification for consistency with Section 3.12.6.4, Impact SOCIO#7.
22	Chapter 9 Public and Agency Involvement Page 9-12	Table 9-4 is missing meetings that occurred between March 2016 and March 2022.	<b>Correction:</b> The following text edits were made: Public and Agency Meetings Summary, March 2016- <del>September 2024</del> <u>March 2022</u> <i>*Please see Attachment A for corrections.</i>	Text correction.
23	Volume 4 Chapter 24 Local Agency Comments Page 24-469 Submission 1678, Comment 2180	Page 24-469: Submission 1678, Comment 2180 Correction to the response regarding the selection of facility locations.	<b>Correction:</b> The following text edits were made: <del>The selection of one of the alternate locations will take place during Detailed Design Post ROD.</del> The Authority has disclosed the preferred locations of these sites in Table 8-3 in Chapter 8 of the Draft EIR/EIS.	Response correction.
24	Volume 4 Chapter 27 Individual Comments Page 27-38 Submission 1652, Comment 3020	A comparison table that was intended to be included as a response to Submission 1652, Comment 3020 was inadvertently omitted.	<b>Clarification:</b> <i>*Please see Attachment B for the attachment referenced in the response to Submission 1652, Comment 3020.</i>	Response clarification.
25	Appendix 3.1-A Parcels within the HSR Project Footprint Page 174	Parcels 224-02-002, 224-02-003, 224-02-013, 224-02-014, 224-02-020, 224-02-022, and 224-02-023 were incorrectly listed as being in the <i>HSR Right-of-Way (blue)</i> . These parcels are no longer in the HSR right-of-way due to the removal of the staging area at Lafayette Street under Alternative 4.	<b>Correction:</b> <i>*Please see Attachment C. The following parcel ID numbers have been removed from HSR Right-of-Way: 224-02-002, 224-02-003, 224-02-013, 224-02-014, 224-02-020, 224-02-022, 224-02-023.</i>	Text correction
26	Appendix 3.1-A Parcels within the HSR Project Footprint Page 175	Parcel 259-27-011 was inadvertently not listed. Displacement of this parcel was captured in the analysis associated with the DDV in Alternative 4 in the Final EIR/EIS but was missing from the map in this Appendix.	<b>Correction:</b> <i>*Please see Attachment C. Parcel ID number 259-27-011 has been added to this appendix.</i>	Text correction.
27	Appendix 3.17-B	Page 3.17-B-1:	<b>Correction:</b> The following text edits were made:	Text correction.

Number	Reference	Published Final EIR/EIS Text	Clarification of or Correction to Final EIR/EIS	Reason for Clarification or Correction
	Cultural Resources – San Jose to Merced Project Section Tribal Outreach and Consultation Efforts 2009-2021 Page 3.17-B-1	<ul style="list-style-type: none"> <li>Text was added to reflect the addition of the Tamien Nation as a Section 106 consulting party.</li> </ul> List of tribal governments and individuals contacted for the San Jose to Central Valley Wye Alternatives 2009 – 2018.	<ul style="list-style-type: none"> <li>Text was added to reflect the addition of the Tamien Nation as a Section 106 consulting party.</li> <li><u>Date was changed to 2021 and additional outreach and consultation efforts between 2018 and 2021 were added to this list.</u></li> </ul> List of tribal governments and individuals contacted for the San Jose to Central Valley Wye Alternatives 2009 – <del>2018</del> <u>2021</u> .	
28	Appendix 3.17-B Cultural Resources – San Jose to Merced Project Section Tribal Outreach and Consultation Efforts 2009-2021 Page 3.17-B-27 to Page 3.17-B-28	<i>*The table presenting tribal outreach and consultation inadvertently omitted several meetings and outreach and consultation efforts between 2018 and 2021.</i>	<b>Correction:</b> <i>*Please see Attachment D for additional rows added to the end of the tribal outreach and consultation table.</i>	Text correction.
29	Appendix 9-A Public and Agency Meeting List	The meeting log inadvertently omitted some meetings that occurred between March 2016 and March 2022.	<b>Correction:</b> <i>*Please see Attachment A for corrections.</i>	Text correction.

Number	Reference	Published Final EIR/EIS Text	Clarification of or Correction to Final EIR/EIS	Reason for Clarification or Correction
30	Chapter 6 Project Costs Page 6-4	Page 6-4: Table 6-1 <i>*Table 6-1 included a typographical error</i>	<b>Correction:</b> <i>*In Table 6-1, the value for Alternative 4 in the row titled 50 Communications and signaling has been corrected to \$383.</i>	Text correction.

## **ATTACHMENT A: TABLE 9-4 AND APPENDIX 9-A MEETING LOG UPDATES**

**Deletions from Table 9-4 Public and Agency Meetings Summary, March 2016–March 2022**

<b>Organization/Individual</b>	<b>(Deletions) Number of Meetings Held</b>	<b>Meeting Dates</b>
Caltrain	1	9/17/2021
City of San Mateo	1	9/17/2021
San Francisco International Airport	1	7/19/2021
San Mateo County Economic Development Association	1	3/9/2021
Stanford University	1	10/14/2020

<b>Additions to Table 9 4 Public and Agency Meetings Summary, March 2016–March 2022</b>		
<b>Organization/Individual</b>	<b>(New additions) Number of Meetings Held</b>	<b>Meeting Dates</b>
Caltrain	4	5/4/2021, 12/23/2021, 1/10/2022, 2/8/2022
Center for Biological Diversity	1	2/9/2022
City of Gilroy	1	1/26/2022
City of Morgan Hill	2	1/25/2022, 2/17/2022
City of San Jose	3	12/15/2021, 1/20/2022, 2/7/2022
City of Santa Clara	1	1/21/2022
Congressman Jim Costa	1	1/31/2022
Congresswoman Zoe Lofgren	2	1/5/2022, 2/14/2022
CSCG	2	10/20/2021, 2/16/2022
CWG Meetings	3	10/25/2021, 3/9/2022, 3/10/2022
Diridon JPAB Presentation	1	2/25/2022
Gavilan College	1	2/20/2022
Gilroy Mayor Marie Blankley	1	2/16/2022
Gilroy Unified School District	1	1/24/2022
Grasslands Water District	2	9/15/2021, 3/22/2022
Los Banos Downtown Fall Street Faire	1	10/2/2021
LPMG	4	10/28/2021, 11/18/2021, 1/27/2022, 2/24/2022
MTC Staff	1	1/24/2022
Morgan Hill Farmers Market	1	2/12/2022
Morgan Hill Mayor Rich Constantine	1	1/12/2022
NorCal Resource Agency Coordination	6	10/27/2021, 11/17/2021, 11/17/2021, 12/22/2021, 1/26/2022, 2/23/2022,
POST/OSA Discussion	1	1/7/2022
Q1 Legislative Briefing	1	1/26/2022
San Joaquin Valley Wildlife Stakeholders	1	1/26/2022
San Jose Brown Act Group	1	1/24/2022
San Jose Chamber of Commerce	1	10/7/2021
San Jose City Council	1	3/1/2022
San Jose City Council Member David Cohen	1	12/21/2021
San Jose City Council Member Dev Davis	1	2/17/2022
San Jose City Council Member Maya Esparza's staff	2	2/14/2022, 3/3/2022
San Jose City Council Member Raul Peralez	1	2/23/2022
San Jose City Council Member Sergio Jimenez	1	2/16/2022
San Jose Mayor Sam Liccardo	1	2/10/2022
San Jose to Merced Coyote Valley Crossing Designs	1	3/1/2022
Santa Clara County Parks	1	1/7/2022
Santa Clara Valley Transportation Authority	1	1/31/2022
Santa Clara County	1	2/1/2022
Santa Clara Valley Open Space Authority Meeting	1	3/1/2022
Santa Clara Valley Wildlife Stakeholders	1	1/11/2022
SAP Center Meeting	1	3/2/2022
Senator Anna Caballero	1	2/15/2022
Senator Dave Cortese staff	1	3/7/2022
TWG	2	10/20/2021, 3/3/2022
Union Pacific Railroad	1	2/14/2022
Urban Catalyst	1	12/22/2021
Valley Water	1	10/25/2021
	<b>67</b>	

<b>Deletions from Appendix 9-A: Public and Agency Meeting List</b>		
<b>Date</b>	<b>Organization/Individual</b>	<b>Topic</b>
10/14/2020	Stanford University	Class lecture on key decisions taken over last 30 years with California HSR, challenges, and what comes next
3/9/2021	San Mateo County Economic Development Association HLUT Committee	Revised Draft 2020 Business Plan
7/19/2021	San Francisco International Airport	Project briefing with Christopher DiPrima
9/17/2021	Caltrain and City of San Mateo	25th Ave Grade Separation Project Ribbon Cutting Event

<b>Additions to Appendix 9 A: Public and Agency Meeting List</b>		
<b>Date</b>	<b>Organization/Individual</b>	<b>Topic</b>
9/15/2021	Grasslands Water District	Grasslands Water District staff hosted site walk for California High-Speed Rail Authority staff
10/2/2021	Los Banos Downtown Fall Street Faire	Tabling event to inform the public regarding the identification of the State's Preferred Alternative and respond to associated questions
10/7/2021	San Jose Chamber of Commerce, CEO Briefing	New CWG member briefing, project update and project section overview
10/20/2021	CSCG	Statewide Updates (includes B to P, Federal/State Funding, Construction), Sustainability Report, NorCal updates (includes prep for final EIR/EIS, Outreach and post-ROD)
10/20/2021	TWG	Presented Statewide updates, 2021 sustainability report, NorCal updates, and partned update with Caltrain
10/25/2021	Gilroy/Morgan Hill and San Jose (combined) CWG	Presented Statewide updates, 2021 sustainability report, NorCal updates, and partned update with Caltrain
10/25/2021	Valley Water Meeting	Status of proposed Valley Water projects in the San Jose to Gilroy corridor
10/27/2021	NorCal Resource Agency Coordination Meeting	FJ/JM section updates, overview of agency review of JM Administrative Final EIR/EIS Chapter 5 (Environmental Justice)
10/28/2021	LPMG	Statewide Updates (includes B to P, Federal/State Funding, Construction), Sustainability Report, NorCal Updates (includes prep for final EIR/EIS, Outreach and post-ROD)
11/17/2021	NorCal Resource Agency Coordination Meeting	Overview of Cooperating and Responsible Agency Review of San Francisco-San Jose Administrative Final EIR/EIS, Overview of Agency and Community Feedback on San Jose-Merced Environmental Justice Content
11/18/2021	LPMG	Overview of the The Bipartisan Infrastructure Deal and Burbank to Los Angeles Final EIR/EIS, and announcement of the Community Working Groups Meeting.
12/4/2021	DISC	Access working group
12/15/2021	San Jose Staff Mitigations	Mitigation measures and San Jose/HSR MOU
12/21/2021	San Jose Councilmember David Cohen	Briefing with San Jose Councilmember David Cohen (D4)
12/22/2021	NorCal Resource Agency Coordination Meeting	FJ/JM section updates
12/22/2021	Urban Catalyst	Present impacts of proposed 32 Stockton & 60 Stockton, San Jose
12/23/2021	Caltrans District 4	Wildlife Overcrossing
1/5/2022	Congresswoman Zoe Lofgren Meeting Pre-Final Briefing	Presented updates made on the Final EIR/EIS from the DEIR/EIS. Informed them about California High-Speed Rail Board Meeting and ROD process.
1/7/2022	POST/OSA Discussion	Wildlife Crossings in Coyote Valley
1/7/2022	Santa Clara County Parks	Presented updates made on the Final EIR/EIS from the DEIR/EIS. Informed about California High-Speed Rail Board Meeting and ROD process.
1/10/2022	Caltrain Pre-Final Briefing	Presented updates made on the Final EIR/EIS from the DEIR/EIS. Informed them about California High-Speed Rail Board Meeting and ROD process.
1/11/2022	Santa Clara Valley Wildlife Stakeholders Pre-Final Briefing	Presented updates made on the Final EIR/EIS from the DEIR/EIS. Informed them about California High-Speed Rail Board Meeting and ROD process.
1/12/2022	Morgan Hill Mayor Rich Constantine Pre-Final Briefing	Presented updates made on the Final EIR/EIS from the DEIR/EIS. Informed them about California High-Speed Rail Board Meeting and ROD process.
1/20/2022	San Jose Staff Pre-Final Briefing	Presented updates made on the Final EIR/EIS from the DEIR/EIS. Informed them about California High-Speed Rail Board Meeting and ROD process.
1/21/2022	Santa Clara, City of, Pre-Final Briefing	Presented updates made on the Final EIR/EIS from the DEIR/EIS. Informed them about California High-Speed Rail Board Meeting and ROD process.
1/24/2022	Gilroy Unified School District Pre-Final Briefing	Presented updates made on the Final EIR/EIS from the DEIR/EIS. Informed them about California High-Speed Rail Board Meeting and ROD process.
1/24/2022	Metropolitan Transportation Commission Staff Pre-Final Briefing	Presented updates made on the Final EIR/EIS from the DEIR/EIS. Informed them about California High-Speed Rail Board Meeting and ROD process.

<b>Additions to Appendix 9 A: Public and Agency Meeting List</b>		
<b>Date</b>	<b>Organization/Individual</b>	<b>Topic</b>
1/24/2022	San Jose Brown Act Group Pre-Final Briefing	Presented updates made on the Final EIR/EIS from the DEIR/EIS. Informed them about California High-Speed Rail Board Meeting and ROD process.
1/25/2022	Morgan Hill Staff Pre-Final Briefing	Presented updates made on the Final EIR/EIS from the DEIR/EIS. Informed them about California High-Speed Rail Board Meeting and ROD process.
1/26/2022	California Q1 Legislative Briefing	Update on Draft Business Plan, and updates on the Final EIR/EIS process.
1/26/2022	Gilroy Staff Pre-Final Briefing	Presented updates made on the Final EIR/EIS from the DEIR/EIS. Informed them about California High-Speed Rail Board Meeting and ROD process.
1/26/2022	NorCal Resource Agency Coordination Meeting	Present summary of agency comments on the San Francisco-San Jose Administrative Final EIR/EIS
1/26/2022	San Joaquin Valley Wildlife Stakeholders Pre-Final Briefing	Presented updates made on the Final EIR/EIS from the DEIR/EIS. Informed them about California High-Speed Rail Board Meeting and ROD process.
1/27/2022	LPMG	Business Plan update, overview of the Governor Newsom's budget. Announcement of the release of the Final EIR/EIS and the Community Working Groups Meeting.
1/31/2022	Congressman Jim Costa Pre-Final Briefing	Presented updates made on the Final EIR/EIS from the DEIR/EIS. Informed them about California High-Speed Rail Board Meeting and ROD process.
1/31/2022	Santa Clara Valley Transportation Authority Pre-Final Briefing	Presented updates made on the Final EIR/EIS from the DEIR/EIS. Informed them about California High-Speed Rail Board Meeting and ROD process.
2/1/2022	Santa Clara County Pre-Final Briefing	Presented updates made on the Final EIR/EIS from the DEIR/EIS. Informed them about California High-Speed Rail Board Meeting and ROD process.
2/7/2022	San Jose Transportation and Environment Committee	Presented updates made on the Final EIR/EIS from the DEIR/EIS. Informed them about California High-Speed Rail Board Meeting and ROD process.
2/8/2022	Caltrans	Northern California Rail Working Group: Presentation
2/9/2022	Center for Biological Diversity Pre-Final Briefing	Presented updates made on the Final EIR/EIS from the DEIR/EIS. Informed them about California High-Speed Rail Board Meeting and ROD process.
2/10/2022	San Jose Mayor Sam Liccardo Pre-Final Briefing	Presented updates made on the Final EIR/EIS from the DEIR/EIS. Informed about California High-Speed Rail Board Meeting and ROD process.
2/12/2022	Morgan Hill Farmers Market	Tabling event to inform the public regarding the identification of the State's Preferred Alternative and respond to associated questions
2/14/2022	Congresswoman Zoe Lofgren Pre-Final Briefing follow-up	Presented updates made on the Final EIR/EIS from the DEIR/EIS. Informed them about California High-Speed Rail Board Meeting and ROD process.
2/14/2022	San Jose Councilmember Maya Esparza (staff) Pre-Final Briefing	Presented updates made on the Final EIR/EIS from the DEIR/EIS. Informed them about California High-Speed Rail Board Meeting and ROD process.
2/14/2022	Union Pacific Railroad	Review of alignment from San Jose (CP Coast) to Gilroy
2/15/2022	California Senator Anna Caballero Pre-Final Briefing	Presented updates made on the Final EIR/EIS from the DEIR/EIS. Informed them about California High-Speed Rail Board Meeting and ROD process.
2/16/2022	CSCG	Business Plan update
2/16/2022	Gilroy Mayor Marie Blankley Pre-Final Briefing	Presented updates made on the Final EIR/EIS from the DEIR/EIS. Informed them about California High-Speed Rail Board Meeting and ROD process.
2/16/2022	San Jose City Council Member Sergio Jimenez Pre-Final Briefing	Presented updates made on the Final EIR/EIS from the DEIR/EIS. Informed them about California High-Speed Rail Board Meeting and ROD process.
2/17/2022	Morgan Hill Staff Pre-Final Follow Up	Traffic Analysis
2/17/2022	San Jose City Council Member Dev Davis Pre-Final Briefing	Presented updates made on the Final EIR/EIS from the DEIR/EIS. Informed them about California High-Speed Rail Board Meeting and ROD process.
2/20/2022	Gavilan College	Workforce Development
2/23/2022	NorCal Resource Agency Coordination Meeting	Present update on Draft 2022 Business Plan and public release of the San Jose-Merced Final EIR/EIS.
2/23/2022	San Jose Council Member Raul Peralez Pre-Final Briefing	Presented updates made on the Final EIR/EIS from the DEIR/EIS. Informed them about California High-Speed Rail Board Meeting and ROD process.
2/24/2022	LPMG	Updates on the Business Plan, Final EIR/EIS release, and outreach activities.

<b>Additions to Appendix 9 A: Public and Agency Meeting List</b>		
<b>Date</b>	<b>Organization/Individual</b>	<b>Topic</b>
2/25/2022	Diridon JPAB Presentation	Presented updates made on the Final EIR/EIS from the DEIR/EIS. Informed them about California High-Speed Rail Board Meeting and ROD process.
3/1/2022	San Jose City Council	HSR MOU
3/1/2022	San Jose to Merced Coyote Valley Crossing Designs	Presented updates made on the Final EIR/EIS from the DEIR/EIS. Informed about California High-Speed Rail Board Meeting and ROD process.
3/1/2022	Santa Clara Valley Open Space Authority Meeting	Presented updates made on the Final EIR/EIS from the DEIR/EIS. Informed about California High-Speed Rail Board Meeting and ROD process.
3/2/2022	SAP Center Meeting	Presented updates made on the Final EIR/EIS from the DEIR/EIS. Informed about California High-Speed Rail Board Meeting and ROD process.
3/3/2022	San Jose Councilmember Maya Esparza Quarterly Check-in	Presented updates made on the Final EIR/EIS from the DEIR/EIS. Informed about California High-Speed Rail Board Meeting and ROD process.
3/3/2022	TWG	Overview of the Draft Business Plan, San Jose to Merced Final EIR/EIS, and Community Improvements Planning Process
3/7/2022	California Senator Dave Cortese staff Pre-Final Briefing	Presented updates made on the Final EIR/EIS from the DEIR/EIS. Informed them about California High-Speed Rail Board Meeting and ROD process.
3/9/2022	San Jose CWG	Overview of the Draft Business Plan, San Jose to Merced Final EIR/EIS
3/10/2022	Gilroy/Morgan Hill CWG	Overview of the Draft Business Plan, San Jose to Merced Final EIR/EIS
3/22/2022	Grasslands Water District	Discussed Final EIR/EIS and GEA mitigations.
3/23/2022	NorCal Resource Agency Coordination Meeting	FJ/JM section updates

## **ATTACHMENT B: RESPONSE TO COMMENT 3020**



**Additional Response to Submission SJM-1652, Comment 3020**

**General Comparison of the Environmental Effects of JM preferred alignment vs. Alternative Pacheco Pass Crossing**

NOTE: Analysis area is from edge of Gilroy urban area to confluence of options at Henry Miller Road

Subject	Unit	Preferred HSR Alignment	Alternative Option 1	Alternative Option 2	Relative difference	Notes
Length	Miles	49.6	49.6	53.0	Same with Option 1; longer with options 2	Distance from Gilroy to Henry Miller Road. Length comparison in the comment does not have clear basis.
Tunnel	Miles	13.0	8.0	8.5	Shorter tunnel with alternative	Tunnel lengths not clear, the comment indicates a range of lengths.
Viaduct/Embankment	Miles	36.6	41.6	44.5	More embankment/viaduct with alternative	Very tall viaducts (> 200 ft) are required for several miles along comment options posing significant cost and risk increases which have not been analyzed.
Farmland	Miles	19.2	18.4	19.5	Similar amount of farmland effects	Includes areas east and west of Pacheco Pass
Streams crossed at surface	#	Pajaro River + 19 streams	Pajaro River + 16 streams	Pajaro River + 21 streams	Similar number of stream crossings	Would likely require additional crossings for construction road access.
Tunnel Geologic Conditions	Narrative	Majority of tunnel is in Franciscan Complex	Surface geologic maps indicate majority of tunnel would be in Quien Sabe Volcanics, however this may not be true at tunnel depth.	Surface geologic maps indicate majority of tunnel would be in Quien Sabe Volcanics, however this may not be true at tunnel depth.	No track record of tunnel construction in Quien Sabe Volcanics, but several tunnels have been successfully constructed in the Franciscan Complex.	Franciscan complex is challenging formation for tunnel construction, however several previous tunnels have been successfully completed in this formation including USBR's Pacheco Water Tunnel 2.
Seismic Hazards- Active Faults	Narrative	Crosses Ortigalita Fault	Crosses Quien Sabe and Ortigalita Faults, although Ortigalita Fault crossing may be crossed in viaduct.	Crosses Quien Sabe and Ortigalita Faults, although Ortigalita Fault crossing may be crossed in viaduct.	Activity, location and design fault displacement of the fault crossings for Alternatives Option 1 and Option 2 are unknown.	Quien Sabe fault dies out to the north and does not cross current HSR alignment.
Biological habitat in Pacheco Pass and San Joaquin Valley crossed at surface	Miles	9.0 miles of alignment; 4 portals in habitat	15.7 miles of alignment; 2 portals in habitat	15.7 miles of alignment; 2 portals in habitat	Likely greater amount habitat disturbed with alternative due to greater length of alignment.	Habitat along Alternative route contains same T & E species along preferred HSR alignment including habitat for California tiger salamander, California red-legged frog, San Joaquin kit fox, Mountain Lion, and many other T & E species, but habitat along Alternative route is much more remote from other development and thus is less affected by adjacent development or roadways (minimally used ranch roads vs. SR 152) compared to the HSR preferred alignment.
Operational wildlife impact	Narrative	Less surficial crossing = less light, noise, and wildlife movement effects in aerial/embankment areas	More surficial crossing = more light, noise, and wildlife movement effects in aerial/embankment areas	More surficial crossing = more light, noise, and wildlife movement effects in aerial/embankment areas	Greater habitat disturbed with alternative due to 5 additional miles of operation at surface in Pacheco Pass habitat areas.	
Parks	Narrative	No surficial crossing of Cottonwood Creek Wildlife Area or. San Luis Reservoir	No parks along corridor	No parks along corridor	No difference in effect on parks.	Although the alternative alignments do not cross any park land, this does not mean there are no environmentally sensitive or protected areas along this alignment.
Conservation Easements		Romero Ranch, Pacheco Creek Reserve, Pajaro River Agricultural Preserve, Soap Lake Properties (TNC)	Crossing of Halperin conservation area (CDFW) in Soap Lake	Crossing of Silicon Valley Land Conservancy conservation easements (Taylor Ranch, Carnadero Preserve, and Mission Organics Home Ranch), and Valley Water Conservation Area	Alternative options would cross less known conservation easements than HSR Preferred Alternative (see notes)	Evaluation of alternatives not comprehensive; only reviewed CCED and CPAD. Possible there are other conservation areas not included in CCED or CPAD.
Transportation corridor	Narrative	Parallel to SR 152	No existing corridor	No existing corridor	New transportation corridor created with alternative	A minimum of 17 miles of heavy duty construction access roads would be required to support the alternative options.
Right of Way	Narrative	Extents of ROW needs are well documented, would require more State/Federal easements	ROW needs would require more property from private land owners	ROW needs would require more property from private land owners	ROW acquisition for alternative alignments has not been determined with any accuracy.	State and Federal ROW needs are well documented and likely easier to acquire than private property takes.

## Additional Response to Submission SJM-1652, Comment 3020

### General Comparison of the Environmental Effects of JM preferred alignment vs. Alternative Pacheco Pass Crossing

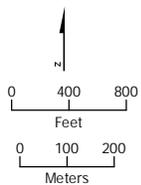
NOTE: Analysis area is from edge of Gilroy urban area to confluence of options at Henry Miller Road

Subject	Unit	Preferred HSR Alignment	Alternative Option 1	Alternative Option 2	Relative difference	Notes
Construction access	Narrative	Some access improvements from SR 152 to portals, but short distance from SR 152 distance than alternatives	Much longer access roads to east portal (14 to 17 miles) than any of the 4 project portals; dirt ranch roads may need improvements to handle heavy construction traffic (including 11 to 13 stream crossings on access options); more access TCE required.	Much longer access roads to east portal (14 to 17 miles) than any of the 4 project portals; dirt ranch roads may need improvements to handle heavy construction traffic (including 11 to 13 stream crossings on access options); more access TCE required.	More construction access improvements/TCE acquisition, the length, location and footprint of access roads have not been determined.	Current alignment is much more accessible and the impacts of access road construction have been minimized.
Tunnel/GW management	Narrative	Tunnel in areas close to prior Pacheco and Santa Clara water tunnels; construction methods and impact avoidance measures expected to control groundwater effects. Max. hydraulic head approx. 550 feet. Would cross Ortigalita Fault in tunnel	Unknown subsurface groundwater conditions; Max. hydraulic head approx. 1,500 feet. Would not cross Ortigalita Fault in tunnel	Unknown subsurface groundwater conditions; Max. hydraulic head > 1,500 feet (terrain is 500 to 600' higher than Option 1), Would not cross Ortigalita Fault in tunnel.	No comparison made as subsurface groundwater conditions have not been evaluated for the options. Alternative does have advantage of not crossing the Ortigalita Fault in tunnel as the fault may produce substantial amounts of groundwater (although the potential is not well understood).	Groundwater levels along current alignment range from about 700 to 1100 ft. Unknown conditions along alternative alignments.
Landslides	Narrative	Landslide and stability concerns associated with Franciscan Complex, mainly at one of the portal areas for Tunnel 2, addressed through IAMFs.	Less concerns due to Quien Sabe Volcanics, but requires further analysis.	Less concerns due to Quien Sabe Volcanics, but requires further analysis.	Existing landslides and slope stability concerns along alternative alignments have not been determined.	
San Luis Reservoir	Narrative	Passes north of reservoir (i.e. upstream).	Passes south and downstream of reservoir.	Passes south and downstream of reservoir.	Alternative alignments are exposed to flooding hazard in the event of a San Luis Reservoir failure.	
Utilities	Narrative	Requires the relocation of High Voltage PG&E transmission lines and Pacheco Water Conduit.	Avoids the relocation of PG&E transmission lines and Pacheco Water Conduit. Requires extensive water and power line construction for tunnel construction and tunnel operations.	Avoids the relocation of PG&E transmission lines and Pacheco Water Conduit. Requires extensive water and power line construction for tunnel construction and tunnel operations.	Extent of water and electric power line construction required for construction and operations for the alternative options have not been studied and are unknown.	There is an opportunity to reduce or eliminate the Pacheco Water Conduit relocation identified in the preferred alternative.
Gilroy MOWF	Narrative	Currently designed south of Gilroy.	Could likely use current location.	Would likely require a new location and design to be defined.	Extent of impacts due to a relocated MOWF for Alternative 2 have not been studied.	
Soap Lake floodplain encroachment	Flooding	Crosses Soap Lake Floodplain; project will not result in flooding with IAMFs and mitigation	Crosses Soap Lake Floodplain; project will not result in flooding with IAMFs and mitigation	Crosses Soap Lake Floodplain; project will not result in flooding with IAMFs and mitigation	The alternative options would have less construction in the Soap Lake Floodplain than the Preferred HSR Alignment.	
Land use consistency	Narrative	Would affect isolated rural residences and Casa de Fruta, but no rural community areas.	Crosses through 1.8 miles of rural residential community east of Fairview Road; likely acquisition/displacement of dozens of residential properties. Crosses through commercial/industrial area along Bolsa Road and San Felipe Road south of Hollister Airport.	Crosses through 0.9 miles of rural residential area east of Fairview Road; likely acquisition/displacement of dozens of residential properties.	Current alignment does not impact Hollister and surrounding community. Impacts to those communities would need to be determined to detail the overall impact of the alternatives.	

## **ATTACHMENT C: ERRATA PAGES FOR APPENDIX 3.1-A: PARCELS WITHIN THE HSR PROJECT FOOTPRINT**



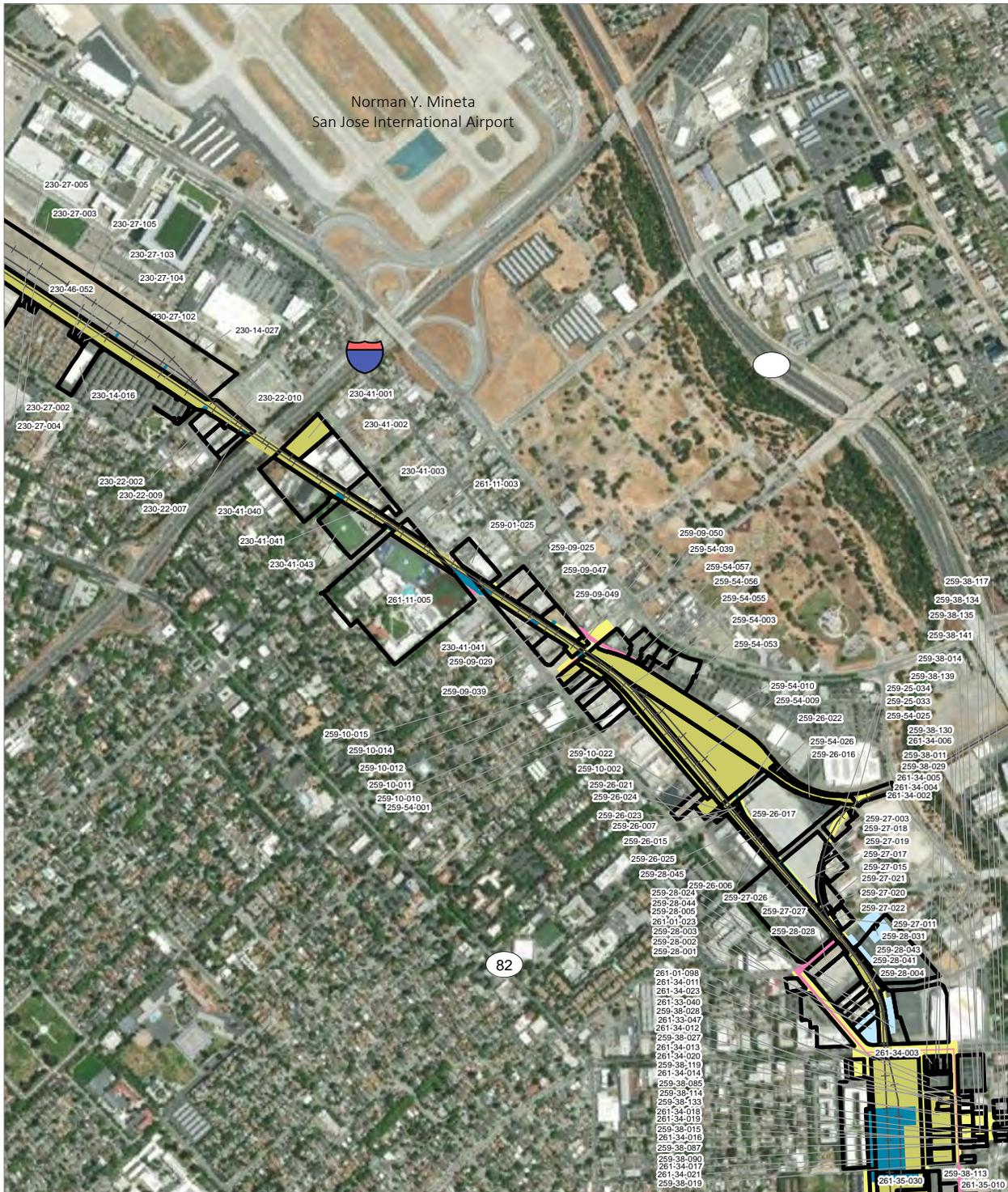
PRELIMINARY DRAFT/SUBJECT TO CHANGE - HSR ALIGNMENT IS NOT DETERMINED  
 SOURCE: ESRI, 2019; Santa Clara County, 2016; San Mateo County, 2016, San Francisco County, 2016



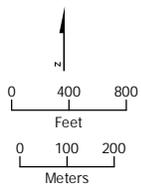
- HSR Right-of-Way
- Temporary Construction Easement
- HSR Permanent Easement
- Parcel (APN Displayed)

**Alternative 4**





PRELIMINARY DRAFT/SUBJECT TO CHANGE - HSR ALIGNMENT IS NOT DETERMINED  
 SOURCE: ESRI, 2019; Santa Clara County, 2016; San Mateo County, 2016, San Francisco County, 2016



- HSR Right-of-Way
- Other Right-of-Way
- Roadway Right-of-Way
- Rail Right-of-Way
- HSR Permanent Easement
- Permanent Utility Easement
- Temporary Construction Easement
- Temporary Utility Easement
- Parcel (APN Displayed)

**Alternative 4 (with DDV)**



**ATTACHMENT D: ERRATA PAGES FOR APPENDIX 3.17-B: CULTURAL  
RESOURCES - SAN JOSE TO MERCED PROJECT SECTION TRIBAL  
OUTREACH AND CONSULTATION EFFORTS 2009–2021**

Action	Date	Tribal Representative	Summary
Letter	6/18/2019	North Valley Yokuts – Katherine Erolinda Perez	Authority responded to Tribe’s post- 5/7/2019 meeting comment letter that was received on 5/10/2019. No response to this letter was received.
Email and Letter	7/17/2019	Amah Mutsun Tribal Band - Valentin Lopez; Amah Mutsun Tribal Band - Edward Ketchum	Authority’s engineering team analyzes and formally responded to Mr. Ketchum’s proposed alternative. No response was received.
Email	7/22/2019	Amah Mutsun Tribal Band of Mission San Juan Bautista - Irenne Zwierlein; Indian Canyon Mutsun Band of Costanoan - Ann-Marie Sayers & Kanyon Sayers-Roods; North Valley Yokuts Tribe - Katherine E. Perez; Ohlone Indian Tribe - Andrew Galvan	Invitation to FJ and JM Community Open Houses. Meeting to be held in Gilroy was rescheduled.
Email	8/1/2019	Amah Mutsun Tribal Band of Mission San Juan Bautista – Irenne Zwierlein; Indian Canyon Mutsun Band of Costanoan – Ann-Marie Sayers & Kanyon Sayers-Roods; North Valley Yokuts Tribe – Katherine E. Perez; Ohlone Indian Tribe – Andrew Galvan	Notification to Tribes of Authority’s participation in FRA’s NEPA Assignment Program. On July 23, 2019 Governor Newsom signed and made effective the final MOU. Response received from Fernandefo Tataviam (8/5/2019).
Email	8/2/2019	Amah Mutsun Tribal Band - Valentin Lopez; Amah Mutsun Tribal Band of Mission San Juan Bautista - Irenne Zwierlein; Indian Canyon Mutsun Band of Costanoan - Ann-Marie Sayers & Kanyon Sayers-Roods; North Valley Yokuts Tribe - Katherine E. Perez	Final JM ASR transmitted to tribal consulting parties.
Meeting	8/22/2019	Amah Mutsun Tribal Band - Edward Ketchum	Mr. Ketchum attended meeting and offered verbal comments expressing concern about HSR being constructed on Sacred Property
Email	2/20/2020	North Valley Yokuts – Katherine Erolinda Perez	Ms. Perez asked a question about HR 5805, proposed legislation “HSR Corridor Development Act of 2020”, HSR responds on 2/21/2020 that this legislation is proposed and no new funding for FJ or JM has been received.
Email	2/27/2020	Amah Mutsun Tribal Band - Valentin Lopez; Amah Mutsun Tribal Band of Mission San Juan Bautista - Irenne Zwierlein; Indian Canyon Mutsun Band of Costanoan - Ann-Marie Sayers & Kanyon Sayers-Roods; North Valley Yokuts Tribe - Katherine E. Perez	JM FOE to SHPO and consulting parties for review and comment. Kathy Perez, NVT, commented on 3/24/2020. No other comments were received. SHPO concurrence 3/27/2020.

Action	Date	Tribal Representative	Summary
Letter; email	3/24/2020	North Valley Yokuts – Katherine Erolinda Perez	Ms. Perez submits comment letter in response to receiving the JM FOE. Authority responds to comments on 4/1/2020.
Letter; email	3/27/2020	SHPO	SHPO concurs on findings in the JM FOE (Feb 2020).
Letter; email	4/1/2020	North Valley Yokuts – Katherine Erolinda Perez	Authority responds to Ms. Perez's comment letter dated 3/20/2020 received in response to the JM FOE.
Email	4/18/2020	Indian Canyon Mutsun Band of Costanoan - Kanyon Sayers-Roods	Ms. Sayers-Roods responds to draft JM FOE, stating that tribe has concerns about project. Authority responded 4/20/2020 stating tribe will be informed as project moves forward.
Email	5/22/2020	Amah Mutsun Tribal Band - Valentin Lopez; Amah Mutsun Tribal Band of Mission San Juan Bautista - Irenne Zwierein; Indian Canyon Mutsun Band of Costanoan - Ann-Marie Sayers & Kanyon Sayers-Roods; North Valley Yokuts Tribe - Katherine E. Perez	Notification of extended comment period to close on 6/23/2020 and invitation to JM EIR/EIS virtual Public Open House to be held on 5/27/2020.
Phone call	6/23/2020	Amah Mutsun Tribal Band - Valentin Lopez	Mr. Lopez called to discuss process for submitting comments on the JM Draft EIR/EIS.
Email	6/24/2020	Amah Mutsun Tribal Band - Valentin Lopez	Mr. Rushing acknowledges receipt of the corrected final comment letter.
Phone call	7/21/2020	Wuksache Indian Tribe/Eshom Valley Band - Kenneth Woodrow	Mr. Woodrow inquired regarding monitoring in Northern California - specifically San Francisco to San Jose.
Email	8/6/2020	Amah Mutsun Tribal Band - Valentin Lopez	Mr. Lopez requests meeting with HSR and proposes dates. Ms. MacKinnon responds same day and leaves voicemail.
Email; Phone call	8/12/2020	Amah Mutsun Tribal Band - Valentin Lopez	Ms. MacKinnon left voicemail and additional follow-up email re Mr. Lopez's request for a meeting.
Phone call	8/24/2020	Amah Mutsun Tribal Band - Valentin Lopez	Mr. Lopez calls Ms. MacKinnon to request information regarding the JM preferred alternative. Ms. MacKinnon follows-up with email.
Email	9/9/2020	Amah Mutsun Tribal Band - Valentin Lopez	Ms. MacKinnon provides information regarding the selection process for the JM preferred alternative and suggests some possible meeting dates and times.

Action	Date	Tribal Representative	Summary
Email	9/13/2020	Amah Mutsun Tribal Band - Valentin Lopez	Mr. Lopez requests meeting and requests specific agenda items. Authority responded 9/14/2020 with some suggested dates and times. Additional meeting coordination 9/19 & 9/21. Meeting set for 9/29/2020.
Meeting	9/29/2020	Amah Mutsun Tribal Band - Valentin Lopez, Edward Ketchum, Lisa Carrier, & Rob Cuthrell, Ph.D.	Meeting held per tribe's request to discuss AMTB's comment letter on the draft JM EIR/EIS, future JM MOA, and alignment alternatives. See also 10/6/2020 for meeting minutes and re-sending of 7/17/2019 email.
Email	10/6/2020	Amah Mutsun Tribal Band - Valentin Lopez, Edward Ketchum, Lisa Carrier, & Rob Cuthrell, Ph.D.	Per Tribe's request during meeting on 9/29/2020, Authority re-sent email and letter originally sent 7/17/2019. In a separate email, Authority sends draft Meeting Minutes for Tribe's review along with the 2011 PA. No response was received.
Letter; Email	3/25/2021	Tamien Nation of the Greater Santa Clara County – Quirina Luna Geary	Tribe formally requests notification of the agency's proposed projects, in accordance with Public Resources Code Section 21080.3.1. Authority formally responds on 3/25/2021.
Meeting	3/29/2021	Tamien Nation of the Greater Santa Clara County - Quirina Luna Geary	Telemeeting with Tamien Nation; discussed HSR project, FJ and JM project schedules. Tribe requests to consult.
Letter and Participation Form	3/29/2021	Tamien Nation of the Greater Santa Clara County – Quirina Luna Geary	Section 106 consulting party participation form signed by Quirina Luna Geary as the Chairperson of the Tamien Nation.
Email	4/27/2021	Tamien Nation of the Greater Santa Clara County – Quirina Luna Geary	Notification to Tamien Nation regarding the JM RDEIR-SDEIS per our earlier phone conversation.
Email	6/2/2021	Amah Mutsun Tribal Band - Valentin Lopez, Lisa Carrier, Rob Cuthrell, Ph.D.; Edward Ketchum; Amah Mutsun Tribal Band of Mission San Juan Bautista - Irenne Zwierlein; North Valley Yokuts Tribe - Katherine E. Perez; Indian Canyon Mutsun Band of Costanoan - Ann-Marie Sayers & Kanyon Sayers-Roods; Tamien Nation of the Greater Santa Clara County - Quirina Luna Geary & Johnathan Costillas	Draft JM MOA and ATP to tribal consulting parties for review and comment (re-sent to Indian Canyon on 6/3/2021).
Email	6/9/2021	Indian Canyon Mutsun Band of Costanoan - Kanyon Sayers-Roods and Ann-Marie Sayers	Comments on the JM MOA/ATP received from Ms. Sayers-Roods, Authority responded same day (6/9/2021).

Action	Date	Tribal Representative	Summary
Email	6/12/2021	Amah Mutsun Tribal Band - Valentin Lopez	Mr. Lopez submits comments on the JM MOA to SHPO and cc's Authority.
Email	6/18/2021	Amah Mutsun Tribal Band of Mission San Juan Bautista - Irenne Zwierlein; North Valley Yokuts Tribe - Katherine E. Perez; Tamien Nation of the Greater Santa Clara County - Quirina Luna Geary	Reminder for comments on the draft JM MOA and ATP.
Email	7/1/2021	Tamien Nation of the Greater Santa Clara County - Quirina Luna Geary	Tamien Nation comments on the JM MOA and ATP.
Email	7/6/2021	Tamien Nation of the Greater Santa Clara County - Quirina Luna Geary	Authority responds to Tamien Nation's comments on the draft JM MOA/ATP.
Email	7/29/2021	Amah Mutsun Tribal Band - Valentin Lopez	Reminder to send comments to the Authority regarding the JM MOA.
Email	8/6/2021	Amah Mutsun Tribal Band - Valentin Lopez	Mr. Lopez intends to comment on JM MOA, comment period extended.
Email	8/9/2021	Amah Mutsun Tribal Band - Valentin Lopez	Mr. Lopez comments on the JM MOA.
Email	8/27/2021	Amah Mutsun Tribal Band - Valentin Lopez	Authority submits formal response regarding AMTB's comments on the draft JM MOA.
Email	8/27/2021	SHPO	Authority submits final draft JM MOA to SHPO.
Email	9/1/2021	Indian Canyon Mutsun Band of Costanoan - Kanyon Sayers-Roods	In response to receiving the final draft JM MOA on 8/27/2021, Indian Canyon inquires if tribal monitor designation forms need to be updated. Forms sent. No additional response received.
Email; Letter	10/25/2021	Amah Mutsun Tribal Band - Valentin Lopez	Mr. Lopez sends a letter regarding the JM MOA and ATP.
Email	10/29/2021	Amah Mutsun Tribal Band - Valentin Lopez	Authority responded to Mr. Lopez's letter.

## **APPENDIX J: FINAL INDIVIDUAL SECTION 4(F) EVALUATION OF TWO PARKS IN SANTA CLARA COUNTY**

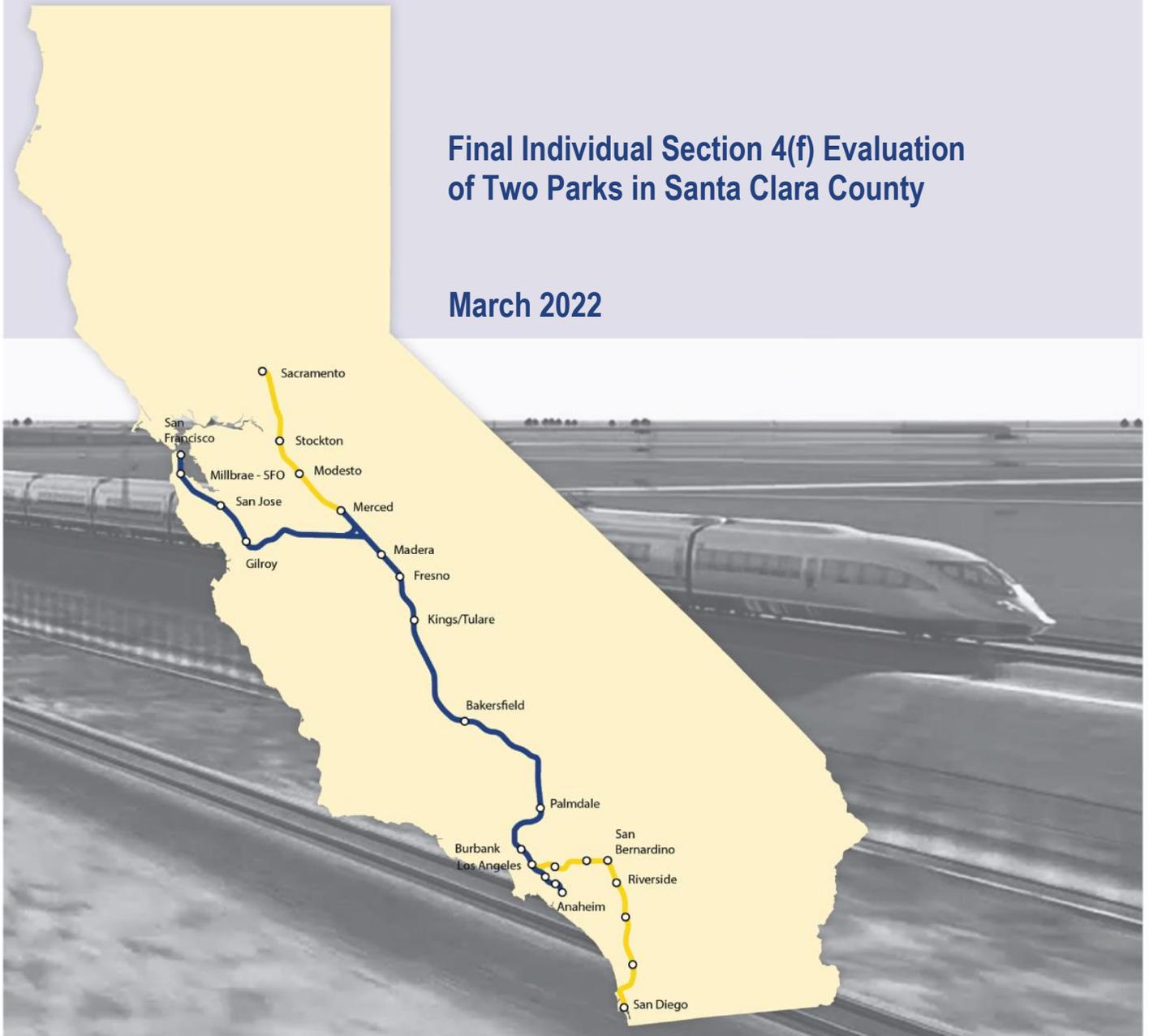


California High-Speed Rail Authority

# San Jose to Merced Project Section

Final Individual Section 4(f) Evaluation  
of Two Parks in Santa Clara County

March 2022



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



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## ACRONYMS AND ABBREVIATIONS

APE	area of potential effect
Authority	California High-Speed Rail Authority
BART	Bay Area Rapid Transit
C.F.R.	Code of Federal Regulations
DDV	Diridon design variant
Draft EIR/EIS	<i>San Jose to Merced Project Section Draft Environmental Impact Report/Environmental Impact Statement</i>
EIR	environmental impact report
EIS	environmental impact statement
Fed. Reg.	<i>Federal Register</i>
Final EIR/EIS	<i>San Jose to Merced Project Section Final Environmental Impact Report/Environmental Impact Statement</i>
FHWA	Federal Highway Administration
FRA	Federal Railroad Administration
HSR	high-speed rail
HST	high-speed train
I-	Interstate
IAMF	impact avoidance and minimization feature
IOOF	Independent Order of Odd Fellows
MOU	memorandum of understanding
MOWF	maintenance of way facility
MOWS	maintenance of way siding
mph	miles per hour
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NOA	Notice of Availability
NRHP	National Register of Historic Places
OCS	overhead contact system
OWJ	official with jurisdiction
PA	Programmatic Agreement among the Federal Railroad Administration, the Advisory Council on Historic Preservation, the California State Historic Preservation Officer, and the California High-Speed Rail Authority Regarding Compliance with Section 106 of the National Historic Preservation Act, as it Pertains to the California High-Speed Train Project
PG&E	Pacific Gas and Electric Company
project	San Jose to Central Valley Wye Project Extent

Revised/Supplemental Draft EIR/EIS	<i>San Jose to Merced Project Section Revised Draft Environmental Impact Report/Supplemental Draft Environmental Impact Statement, Biological Resources Analysis</i>
RSA	resource study area
SHPO	State Historic Preservation Officer
SR	State Route
TCE	temporary construction easement
TDV	tunnel design variant
UPRR	Union Pacific Railroad
US	U.S. Highway
U.S.C.	United States Code
USEPA	U.S. Environmental Protection Agency
VTA	(Santa Clara) Valley Transportation Authority



## 1 INTRODUCTION

This report provides the analysis to support the California High-Speed Rail Authority's (Authority) determinations to comply with the provisions of 49 United States Code (U.S.C.) Section 303 (hereinafter referred to as Section 4(f)) regarding two park units under the jurisdiction of the Santa Clara County Parks and Recreation Department (Department or official with jurisdiction).

Under Section 4(f), an operating administration of the U.S. Department of Transportation may not approve a transportation project that uses protected properties unless there are no prudent or feasible alternatives to such use and the project includes all possible planning to minimize harm to such properties or if the use would have a *de minimis* impact on the property. Section 4(f) protected properties are publicly owned lands of a park, recreation area, or wildlife and waterfowl refuge or a historical site, publicly or privately owned, that is listed or determined eligible for listing in the National Register of Historic Places (NRHP). To demonstrate compliance with Section 4(f), this chapter:

- Describes the statutory requirements associated with Section 4(f)
- Identifies the properties protected by Section 4(f) in the resource study area (RSA)
- Determines whether the San Jose to Central Valley Wye Project Extent (project) would result in the use of those properties
- Identifies feasible and prudent alternatives, to the extent any exist, that would avoid or minimize use of the properties
- Identifies measures to minimize harm
- Provides a least overall harm analysis for project alternatives that would result in the use of Section 4(f) properties

The *San Jose to Merced Project Section Final Environmental Impact Report/Environmental Impact Statement* (Final EIR/EIS) (Project) (Authority 2022) evaluated resources within the RSA for Section 4(f) applicability and use. The Final EIR/EIS found that most uses of parks, recreation facilities, and wildlife and waterfowl refuges would result in a *de minimis* impact. With a *de minimis* impact determination, individual resource avoidance assessments are not required. This report provides individual resource avoidance assessments for Section 4(f) uses of one park resource that did not receive the official with jurisdiction's (OWJ) concurrence for a *de minimis* impact, Coyote Creek Parkway County Park, and two park resources, Field Sports County Park and Coyote Creek Parkway County Park, that did not receive OWJ concurrence for a temporary occupancy exception. The Authority has previously consulted with the OWJ, which is the Santa Clara County Parks and Recreation Department, for these two park units. The Department did not concur with the Authority's preliminary Section 4(f) *de minimis* determination for Coyote Creek Parkway County Park and temporary occupancy exemption for temporary use of Coyote Creek Parkway County Park and Field Sports County Park. Therefore, the Authority has determined that the Project would result in a permanent use and temporary occupancy of a portion of Coyote Creek Parkway County Park, and a temporary occupancy of a portion of the Field Sports County Park. The Authority provided an individual Section 4(f) evaluation for Coyote Creek Parkway County Park and Field Sports County Park to the Santa Clara County Parks and Recreation Department on January 7, 2022, and the Department provided comments in a letter dated February 2, 2022 and received by the Authority on February 22, 2022.

This comment letter is provided as Attachment A to this report. Several minor revisions were made to this Section 4(f) evaluation as a result of the Department's comments, but no major revisions were required.

Additional information on publicly owned parks, recreation lands, wildlife and waterfowl refuges, and historic sites is provided in Final EIR/EIS Section 3.7, Biological and Aquatic Resources; Section 3.15, Parks, Recreation, and Open Space; Section 3.17, Cultural Resources, and the *San Jose to Merced Project Section Historic Architectural Survey Report* (Authority 2019a).

## 1.1 Laws, Regulations, and Orders

### 1.1.1 Federal Railroad Administration, Procedures for Considering Environmental Impacts (64 Federal Register 28545)

On May 26, 1999, the Federal Railroad Administration (FRA) released *Procedures for Considering Environmental Impacts* (64 Federal Register [Fed. Reg.] 28545–28556). These FRA procedures supplement the Council on Environmental Quality Regulations (40 Code of Federal Regulations (C.F.R.) Part 1500 et seq.) and describe the FRA’s process for assessing the environmental impacts of actions and legislation proposed by the agency and for the preparation of associated documents (42 U.S.C. § 4321 et seq.).<sup>1,2</sup> The FRA *Procedures for Considering Environmental Impacts* states that “the EIS should identify any significant changes likely to occur in the natural environment and in the developed environment. The EIS should also discuss the consideration given to design quality, art, and architecture in project planning and development as required by U.S. Department of Transportation Order 5610.4.” These FRA procedures state that an EIS should consider possible impacts on Section 4(f) resources.

### 1.1.2 U.S. Department of Transportation Act (23 U.S.C. § 138 and 49 U.S.C. § 303(c))

Projects undertaken by an operating administration of the U.S. Department of Transportation or that may receive federal funding or discretionary approvals from an operating administration of U.S. Department of Transportation must demonstrate compliance with Section 4(f). Section 4(f) protects publicly owned parks, recreational areas, and wildlife and waterfowl refuges. Section 4(f) also protects historic sites of national, state, or local significance on public or private land that are listed on or eligible for listing on the NRHP. As of November 28, 2018, the FRA adopted the regulations in 23 C.F.R. Part 774 as FRA’s Section 4(f) implementing regulations. The FRA also considers the interpretations provided in the Federal Highway Administration’s (FHWA) *Section 4(f) Policy Paper* (FHWA 2012) when implementing these regulations. Pursuant to 23 U.S.C. Section 237, under the National Environmental Policy Act (NEPA) Assignment Memorandum of Understanding (MOU) between FRA and the State of California, effective July 23, 2019, the Authority is the federal lead agency and is responsible for compliance with NEPA and other federal environmental laws, including Section 4(f) (49 U.S.C. § 303) and related U.S. Department of Transportation orders and guidance.

The Authority may not approve the use of a Section 4(f) property, as described in 49 U.S.C. Section 303(c), unless it determines that there is no feasible and prudent alternative to avoid the use of the property and the action includes all possible planning to minimize harm resulting from such use, or the project has a *de minimis* impact consistent with the requirements of 49 U.S.C. Section 303(d).

An alternative is not feasible if it cannot be built as a matter of sound engineering judgment. In determining whether an alternative is prudent, the Authority may consider if the alternative would result in any of the following:

- The alternative does not meet the Project’s stated Purpose and Need
- The alternative would entail unacceptable safety or operational problems
- After reasonable mitigation, the alternative would result in severe social, economic, or environmental impacts; severe disruption to established communities; severe

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<sup>1</sup> While the EIR/EIS was being prepared, FRA adopted new NEPA compliance regulations (23 C.F.R. Part 771). Those regulations only apply to actions initiated after November 28, 2018. See 23 C.F.R. Section 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.

<sup>2</sup> The Council on Environmental Quality issued new regulations on July 14, 2020, effective September 14, 2020, updating the NEPA implementing procedures at 40 C.F.R. Parts 1500–1508. However, this project initiated NEPA before the effective date and is not subject to the new regulations, relying on the 1978 regulations as they existed prior to September 14, 2020. All subsequent citations to Council on Environmental Quality 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.

disproportionate impacts on minority populations or low-income populations; or severe impacts on environmental resources protected under other federal statutes

- The alternative would require additional construction, maintenance, or operational costs of an extraordinary magnitude.
- The alternative would pose other unique problems or unusual factors.
- The project would entail multiple factors that, while individually minor, would cumulatively cause unique problems or impacts of extraordinary magnitude.

If the Authority determines both that there is the use of a Section 4(f) property and that there is no prudent and feasible alternative to the use of the resource, the Authority must require that the project employ all possible planning (including coordination and concurrence of the OWJs over the property) to minimize harm to the property, including all reasonable measures to minimize harm or mitigate impacts (49 U.S.C. § 303(c)(2)). OWJs are defined in 23 C.F.R. Section 774.17.

After making a Section 4(f) determination and identifying the reasonable measures to minimize harm, if there is more than one alternative that results in the use of a Section 4(f) property, the Authority must also compare the project alternatives to determine which project alternative has the potential to cause the least overall harm in light of the purpose of the statute. The least overall harm may be determined by balancing the following factors:

- The ability to mitigate adverse impacts on each Section 4(f) property (including any measures that result in benefits to the property)
- The relative severity of the remaining harm—after mitigation—to the protected activities, attributes, or features that qualify each Section 4(f) property for protection
- The relative significance of each Section 4(f) property
- The views of the OWJ(s) over each Section 4(f) property
- The degree to which each alternative meets the project Purpose and Need
- After reasonable mitigation, the magnitude of any adverse impacts on resources not protected by Section 4(f)
- Substantial differences in costs among the project alternatives

## 1.2 Resource Study Area

The RSA was established, as defined below, to identify the Section 4(f) properties to be considered for evaluation. Figure 4-1 in Chapter 4 illustrates the alignments, stations, and any associated high-speed rail (HSR) system facilities site alternatives for the project.

### 1.2.1 Public Park and Recreation Lands, and Wildlife and Waterfowl Refuges

The boundaries of the RSA for parks, recreation facilities, and wildlife and waterfowl refuges generally extend beyond the project footprint. For parks, recreation, and wildlife and waterfowl refuges, the RSA is the project footprint, as described in Chapter 2, Alternatives, in the Final EIR/EIS<sup>3</sup>, plus at least 1,000 feet from the edge of the project footprint, including stations, maintenance facilities, and any road construction. For temporary laydown areas, utility relocations, or any other land used temporarily to implement the HSR system that would be returned to its original condition, the RSA for 4(f) use is the area of direct impact unless the temporary use prevents access to a potential 4(f) protected property. Figure 4 2 through Figure 4 9 in Section 4.5.1, Parks, Recreation, and Wildlife and Waterfowl Refuges, of the Final EIR/EIS illustrate the parks, recreation, and open-space resources within the RSA.

<sup>3</sup> Available: <https://hsr.ca.gov/programs/environmental-planning/project-section-environmental-documents-tier-2/san-jose-to-merced-project-section-draft-environmental-impact-report-environmental-impact-statement/>

## 1.2.2 Historic Properties

As described in Section 1.3, Section 4(f) Applicability, historic properties listed or eligible for listing in the NRHP may qualify for protections under Section 4(f). Because the HSR project is a federal undertaking, it must comply with the National Historic Preservation Act (NHPA). The First Amendment to the Programmatic Agreement among the Federal Railroad Administration, the Advisory Council on Historic Preservation, the California State Historic Preservation Officer, and the California High-Speed Rail Authority Regarding Compliance with Section 106 of the National Historic Preservation Act, as it Pertains to the California High-Speed Train Project (PA) amended July 21, 2021, outlines an approach for compliance with Section 106 of the NHPA for the HSR program. The Section 106 implementing regulations at 36 C.F.R. Section 800.4(a)(1) require the establishment of an area of potential effect (APE). For Section 106 compliance, the APE is used for the technical reports that document the identification of historic properties and the assessment of effects. The APE is the geographic area or areas within which an undertaking may directly or indirectly alter the character or use of historic properties, if any such properties exist. Therefore, the APE serves as the RSA for Section 4(f) historic properties that are listed or eligible for listing in the NRHP. See Appendix B, Area of Potential Effects Map, of the *San Jose to Merced Project Section Historic Architectural Survey Report* (Authority 2019a), and Appendix A of the *San Jose to Merced Project Section Archaeological Survey Report* (Authority 2019b) for maps showing the APE.

The APE for archaeological and architectural resources are described in the following subsections.

### Archaeological APE

The archaeological APE includes the area of ground to be disturbed before, during, and after project construction as well as during operations. This includes excavation for the vertical and horizontal profiles of the alignment, station location footprints, geotechnical drilling, grading, cut and fill, easements, staging/laydown areas, utility relocation, borrow sites, spoils areas, temporary or permanent road construction, grade separations features, infrastructure demolition, biological mitigation areas, and all permanent rights-of-way (i.e., the project footprint). The archaeological APE also includes a vertical component in the area of Tunnel 1 and Tunnel 2, with the APE extending to the ground surface above the area where project activities would take place below grade.

### Built Resources APE

The methodology for establishing the historic built resources APE follows standard practices for the discipline, Attachment B of the Section 106 PA, and the Authority's *Cultural Resources Technical Guidance Memorandum #1* (Authority 2013), and is detailed in the project Historic Architectural Survey Report (Authority 2019a). The historic built resources APE includes all legal parcels<sup>4</sup> intersected by the HSR right-of-way for all project alternatives, including ancillary features such as grade separations, stations, maintenance facilities, utilities, and construction staging areas. The APE includes properties where historic materials or associated landscape features would be demolished, moved, or altered by construction. The types of resources encountered in the project vicinity and the project construction activities guided the delineation of the APE.

The historic built resources APE is larger than the project footprint. It is delineated to take into consideration effects, such as visual, audible, or atmospheric intrusions onto a property, the potential for vibration-induced damage, demolition of resources located on the surface above

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<sup>4</sup> A *legal parcel* is a parcel that was created in accordance with state and local subdivision laws in effect at the time of its creation. Determination of the legal status of a parcel created prior to the California Subdivision Map Act is made by the city or county in which the parcel in question is located under authority granted by the Subdivision Map Act. Assignment of an Assessor's Parcel Number does not create a legal parcel, nor does recordation of a deed that fails to comply with the California Subdivision Map Act.

tunnels, or isolation of a property from its setting. Visual and audible changes have the potential to affect character-defining features of some historic built resources.

### 1.3 Section 4(f) Applicability

A park or recreational area qualifies for protection under Section 4(f) if it is:

- Publicly owned at the time at which the use occurs
- Open to the general public
- Being used for recreation
- Considered significant by the OWJ
- A publicly owned recreation property designated in a formal plan
- A public school with a joint use agreement for public recreation use of the school grounds/recreation facilities
- Private schools with a joint use agreement for public recreation use of the school grounds/recreation facilities

Section 4(f) does not apply in the following circumstances:

1. Publicly owned facilities whose major purpose is for commercial reasons, such as professional sport or music venues, rather than for park or recreation purposes
2. Land that is privately owned, even if it is designated in a formal plan
3. Where no joint use agreement for use of public or private school recreational facilities exists
4. Publicly owned facilities, where park, recreational, or refuge activities would be incidental, secondary, occasional, or dispersed
5. Publicly owned land or facilities whose major purpose, as described by the agency with jurisdiction, is transportation, even when recreational activities may occur within the facility
6. Privately owned golf course
7. Planned facilities that are not publicly owned by the entity

A wildlife or waterfowl refuge qualifies for protection under Section 4(f) if it (1) is publicly owned at the time at which the use occurs, (2) the land has been officially designated as a wildlife and/or waterfowl refuge by a federal, state, or local agency, (3) its primary designated purpose is consistent with its primary function and how it is intended to be managed, and (4) is considered significant by the OWJ. Coordination with the OWJ and examination of the land management plan for the area will be necessary to determine if Section 4(f) should apply to an area that would be used by a transportation project.

For publicly owned multiuse land holdings, Section 4(f) applies only to those portions of a property that are designated by statute or identified in an official management plan of the administering agency as being primarily for public park, recreation, or wildlife and waterfowl refuge purposes, and are determined to be significant for such purposes.

Historic sites listed or eligible for listing in the NRHP are protected under Section 4(f). Although the statutory requirements of Section 106 and Section 4(f) are similar, if a proposed action results in an “adverse effect” under Section 106, there is not automatically a Section 4(f) use. To determine whether a use of an NRHP-protected property would occur, the Authority completes a separate Section 4(f) analysis and determination, in addition to those completed in compliance with the Section 106 process.

For a property to be eligible for listing in the NRHP, it must meet at least one of the four NRHP criteria (i.e., Criteria A–D) described in this section. The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and meet one or more of the following criteria:

- Criterion A—Properties that are associated with events that have made a significant contribution to the broad patterns of our history
- Criterion B—Properties that are associated with the lives of persons significant in our past
- Criterion C—Properties that embody distinctive characteristics of a type, period, or method of construction; or that represent the work of a master; or that possess high artistic values; or that represent a significant and distinguishable entity whose components may lack individual distinction
- Criterion D—Properties that have yielded, or may be likely to yield, information important in prehistory or history

An archaeological resource that is eligible only under NRHP Criterion D is considered valuable primarily in terms of the data that can be recovered from it. For such resources (such as pottery scatters and refuse deposits), it is generally assumed that there is minimal value attributed to preserving such resources in place. Conversely, resources eligible under Criterion A, B, or C are considered to have value intrinsic to the resource's location. In other words, Section 4(f) does not apply to a site if it is important chiefly because of what can be learned by data recovery and has minimal value for preservation in place.

## 1.4 Section 4(f) Use Definition

### 1.4.1 Permanent Use

A permanent use of a Section 4(f) resource occurs when land is permanently incorporated into a proposed transportation facility. This might result from partial or full acquisition, permanent easements, or temporary easements that exceed limits for temporary occupancy as defined in the next section.

### 1.4.2 Temporary Occupancy/Temporary Use

A temporary construction use of a Section 4(f) property results in a “temporary occupancy” of a Section 4(f) resource when a Section 4(f) property is required for construction-related activities and meets specific conditions of use. If the activity does not meet the temporary occupancy conditions, even if the property is not permanently incorporated into a transportation facility, the temporary construction use would be considered a Section 4(f) use. Such use may be found to be *de minimis*. Temporary occupancy of property does not constitute a use of a Section 4(f) resource when the following conditions are satisfied:

- The occupancy must be of temporary duration (e.g., shorter than the period of construction) and must not involve a change in ownership of the property.
- The scope of use must be minor, with only minimal changes to the protected resource.
- There must be no permanent adverse physical impacts to the protected resource or temporary or permanent interference with activities or purpose of the resource.
- The property being used must be fully restored to a condition that is at least as good as existed before project construction.
- There must be documented agreement of the appropriate officials having jurisdiction over the resource regarding the foregoing requirements.

### 1.4.3 Constructive Use

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

occurs only if the protected activities, features, or attributes of the resource are substantially diminished. This determination is made after taking the following steps:

- Identifying the current activities, features, or attributes of the resource that may be sensitive to proximity impacts
- Analyzing the potential proximity impacts on the resource
- Consulting with the appropriate officials having jurisdiction over the resource

It is important to note that erecting a structure over a Section 4(f) property, and thus requiring an air lease, does not, by itself, constitute a use, unless the effect constitutes a constructive use. Further, an adverse effect under Section 106 of the NHPA to a historic property does not in and of itself result in a constructive use. Pursuant to 23 U.S.C. Section 327, under the NEPA Assignment MOU between the FRA and the State of California, effective July 23, 2019, the Authority can make the determination that there is no constructive use. The Authority cannot make any determination that an action constitutes a constructive use of a publicly owned park, public recreation area, wildlife refuge, waterfowl refuge, or historic site under Section 4(f) without first consulting with FRA and obtaining FRA’s views on such determination.

#### 1.4.4 *De minimis* Impact

According to 49 U.S.C. Section 303(d), the following criteria must be met to reach a *de minimis* impact determination:

- For parks, recreation areas, and wildlife and waterfowl refuges, a *de minimis* impact determination may be made if the Authority concludes that the transportation project would not adversely affect the activities, features, and attributes qualifying the property for protection under Section 4(f) after mitigation. In addition, to make a *de minimis* impact determination:
  - The OWJ over the property must be informed regarding the intent to make a *de minimis* impact determination, after which, public notice and opportunity for public review and comment must be provided.
  - After consideration of comments, if the OWJ over the property concurs in writing that the project would not adversely affect the activities, features, or attributes that make the property eligible for Section 4(f) protection, then the Authority may finalize the finding of a *de minimis* impact.
- For a historic site, a *de minimis* impact determination may be made only if, in accordance with the Section 106 process, the Authority determines that the transportation program or project would have no effect or no adverse effect on historic properties, has received written concurrence from the OWJ over the property (e.g., the State Historic Preservation Officer [SHPO]), and has taken into account the views of consulting parties to the Section 106 process as required by 36 C.F.R. Part 800.

While *de minimis* is generally applied where there is a permanent conversion of land, if a temporary use of a 4(f)-protected property during construction does not meet the conditions required for the temporary occupancy exception under Section 774.13(d), it may be possible to make a *de minimis* impact determination.

Prior to making *de minimis* impact determinations, the following coordination must be undertaken:

1. For parks, recreation areas, and wildlife and waterfowl refuges:
  - i. Public notice and an opportunity for public review and comment concerning the effects on the protected activities, features, or attributes of the property must be provided. This requirement can be satisfied in conjunction with other public involvement procedures, such as a comment period provided on a NEPA document.
  - ii. The Administration shall inform the OWJ(s) of its intent to make a *de minimis* impact finding. Following an opportunity for public review and comment as described in 23 C.F.R. Section 774.5(b)(2)(i), the OWJ(s) over the Section 4(f) resource must concur in

writing that the project would not adversely affect the activities, features, or attributes that make the property eligible for Section 4(f) protection. This concurrence may be combined with other comments on the project provided by the official(s).

2. For historic properties:

- i. The Administration must receive written concurrence from the pertinent SHPO or Tribal Historic Preservation Officer and from the Advisory Council on Historic Preservation if participating in the consultation process, in a finding of “no adverse effect” in accordance with 36 C.F.R. Part 800. The Administration shall inform these officials of its intent to make a *de minimis* impact determination based on their concurrence in the finding of “no adverse effect”.
- ii. Public notice and comment, beyond that required by 36 C.F.R. Part 800, is not required.

## 2 COORDINATION

49 U.S.C. Section 303(b) requires cooperation and consultation with the Secretary of the Interior (and the Secretaries of Housing and Urban Development and Agriculture, if appropriate) and with the state in developing transportation plans and programs that include measures to maintain or enhance the natural beauty of lands crossed by transportation activities or facilities. Throughout the EIR/EIS process, the Authority consulted with the SHPO, local jurisdictions, the California Department of Fish and Wildlife, the Native American Heritage Commission and interested Tribes, and the National Park Service. Section 4(f) requires consultation with the SHPO, pursuant to 36 C.F.R. Part 800, and agencies of jurisdiction in identifying Section 4(f) properties and assessing impacts on the properties. Letters of initial consultation and requests for additional information were sent to the agencies and jurisdictions that have potential Section 4(f) resources within the RSA.

### 2.1 Coordination with Officials with Jurisdiction

The OWJ for both the Coyote Creek Parkway County Park and the Field Sports County Park is Santa Clara County Parks and Recreation Department. The Authority has continued to consult with this OWJ regarding the effects of the project on the features and attributes of the Section 4(f) properties. The Authority’s Section 4(f) determinations will be made as part of the Record of Decision for this project.

Table 2-1 shows the coordination to date with the Santa Clara County Parks and Recreation Department and related agencies.

**Table 2-1 Section 4(f) Evaluation Consultation Summary**

Date	Form	Participants	General Topic(s)
Received by Authority on February 22, 2022	Comment Letter	Santa Clara County Parks and Recreation Department	Comments from Department on Draft Individual Section 4(f) Evaluation requested minor revisions in the report and requested consultation with the Department during subsequent design and construction phases concerning protections of park resources.
January 7, 2022	Draft Report	Santa Clara County Parks and Recreation Department	Authority provided Draft Individual Section 4(f) Evaluation to Department
December 16, 2021	Email	Santa Clara County Parks and Recreation Department	Department identified that preparation of an Individual Section 4(f) Evaluation is the recommended approach.
December 10, 2021	Meeting	Santa Clara County Parks and Recreation Department	Discussion about the plan for pursuing an Individual Section 4(f) Evaluation with a 45-day OWJ review period.
December 8, 2021	Meeting	Santa Clara County Parks and Recreation Department	Discussion about next steps for securing OWJ concurrence at Board of Supervisors meeting.
November 22, 2021	Meeting	Santa Clara County Parks and Recreation Department and Planning Department	Review of Section 4(f) impacts on Santa Clara County parks and next steps for OWJ concurrence.

Date	Form	Participants	General Topic(s)
September 14, 2021	Meeting	Santa Clara County Parks and Recreation Department	Update on process for OWJ concurrence.
August 25, 2021	Meeting	Santa Clara County Parks and Recreation Department	Update on process to route OWJ concurrence to Board of Supervisors for approval.
June 26, 2021	Letter	Santa Clara County Parks and Recreation Department	Request for concurrence on Section 4(f) determinations for Coyote Creek Parkway County Park ( <i>de minimis</i> impact) and Field Sports County Park (temporary occupancy exception)
May 27, 2021	Meeting	Santa Clara County Parks and Recreation Department	Discussion of Section 4(f) <i>de minimis</i> impacts and temporary occupancy exceptions on Santa Clara County parks
July 23, 2020	Meeting	Santa Clara County Parks and Recreation Department	Discussion of community enhancement concepts and evaluation
March 2, 2020	Meeting	Santa Clara County Parks and Recreation Department	Design coordination including Creek Trail Network Master Plan
January 23, 2020	Meeting	Santa Clara County Parks and Recreation Department	Follow up to Technical Working Group meeting, discussion of Environmental Justice enhancements.
February 9, 2017	Meeting	Santa Clara County Staff, including Roads, Parks, Planning, and Airport Departments	Impact of project on County facilities
January 31, 2017	Letter	Several agencies, including Santa Clara County Parks and Recreation Department	Initiating consultation, providing project background, and requesting information confirmation
September 9, 2010	Meeting	Santa Clara County Parks and Recreation Department	Coyote Creek Parkway County Park and Trail Section 4(f) impacts
December 10, 2010	Meeting	Santa Clara County Parks and Recreation Department	Discussion of Supplemental Alternatives Analysis - UPRR alignment alternative, US 101–Downtown Gilroy alignment alternative, countywide trails
August 30, 2010	Letter	Several agencies, including Santa Clara County Parks and Recreation Department and Santa Clara County Open Space Authority	Initiating consultation, providing project background, and describing study area
January 29, 2009	Telephone	Santa Clara County Parks and Recreation Department	Coyote Creek Parkway County Park and Trail and County plans and policies

OWJ = official with jurisdiction; UPRR = Union Pacific Railroad; US = U.S. Highway.

On February 22, 2022, the Santa Clara County Parks and Recreation Department provided comments on the Draft Individual Section 4(f) Evaluation (Attachment A) in a letter dated February 2, 2022. These comments are summarized and responded to in Table 2-2 below.

**Table 2-2 Santa Clara County Parks and Recreation Department Comments on Draft Individual Section 4(f) Evaluation**

Topic	Summary of Comment	Authority Consideration of Comment
Section 1.1, Laws, Regulations, and Orders,	The report should add the Public Park Preservation Act of 1971	Comment noted. The Section 4(f) analysis in this report follows the requirements of 23 U.S.C. § 138, 49 U.S.C. § 303, and 23 C.F.R. Part 774, which require federal transportation projects to avoid or, where avoidance is not feasible and prudent, minimize harm to public parks, recreation areas, wildlife and waterfowl refuges, and historic sites. State laws are not factors that are considered when determining a Section 4(f) use under 23 U.S.C. § 138, 49 U.S.C. § 303, and 23 C.F.R. Part 774.
Section 1.1, Laws, Regulations, and Orders,	The report should add Section 604 of the Santa Clara County Charter regarding need for consistency with Park Charter Fund.	Comment noted. Since an agency of the State of California is the project proponent, the project is not subject to local government general plan policies, zoning regulations, or local land use controls.
Section 5, Section 4(f) Applicability Analysis,	The Department concurs with the Authority's conclusion that Coyote Creek Parkway County Park and Field Sports County Park are Section 4(f) resources and contribute significantly to unique recreational opportunities in Santa Clara County.	Comment is noted.
Section 5, Section 4(f) Applicability Analysis,	The Department's preference is that the Authority select the alternative that minimizes temporary and permanent impacts to Coyote Creek Parkway County Park and temporary impacts to Field Sports County Park.	As shown in the analysis in this evaluation, the Preferred Alternative (Alternative 4 with the Diridon Design Variant and the Tunnel Design Variant) is the alternative that causes least overall harm to the two park units.

Topic	Summary of Comment	Authority Consideration of Comment
Section 6.2, Individual Section 4(f) Evaluation,	The Department requests active participation in the preparation of any technical memorandum or architectural designs (Per Impact Avoidance and Minimization Measure PK-IAMF#1) to ensure recreational access is not altered because of the permanent occupancy of the 0.31 acre of Coyote Creek Parkway County Park....Coordination with the Department will ensure that any permanent improvements associated with the High-Speed Rail will not restrict or prohibit current or future recreational use of a parcel, which would likely be considered significant harm to a Section 4(f) resource like Coyote Creek Parkway County Park. In addition, coordination will ensure that proposed permanent improvements (e.g., wildlife undercrossings to reduce impacts on wildlife) will be compatible with current and anticipated public recreational access.	The Authority will consult with the Department and provide a Draft of any technical memorandum or designs prepared per PK-IAMF#1 for Coyote Creek Parkway County Park to the County for review and input prior to finalization. This commitment is identified as mitigation measure 4F-MM#1 in the Mitigation Monitoring and Enforcement Plan.
Section 6.2, Individual Section 4(f) Evaluation,	The Department requests that the Authority consult with the Department prior to approval of any technical memorandums (per Mitigation Measure PR-MM#2) to ensure that access for recreation is maintained during the temporary occupancy. Any temporary occupancy of either of these two County parks must be coordinated with the Department to minimize disruption to all public recreational uses. Consultation with the Department will ensure that High-Speed Rail has minimized harm to both County parks.	The Authority will consult with the Department and provide a Draft of any technical memorandum or designs prepared per Mitigation Measure PR-MM#2 for Coyote Creek Parkway County Park and Field Sports County Park to the County for review and input prior to finalization. This commitment is identified as mitigation measure 4F-MM#1 in the Mitigation Monitoring and Enforcement Plan (MMEP).
Section 8, Measures to Minimize Harm,	In accordance with the California Public Park Preservation Act, any temporary or permanent acquisition by the Authority of County parkland, even when the authority is exercising eminent domain, will require sufficient compensation to the County, consistent with Public Resources Code Section 5404 and Section 5405, for the loss of, or impact to, parklands and recreational opportunities.	Comment noted.

## 2.2 Public Review and Comment

In April 2020, public notice regarding the availability and the circulation of the Draft EIR/EIS (Authority 2020) was provided pursuant to California Environmental Quality Act and NEPA requirements, and text of the public notice was prepared in English, Spanish, Mandarin, and Vietnamese. Notice included publication of an announcement in newspapers with general circulation in areas potentially affected by the proposed project. The advertisement indicated that the Draft EIR/EIS was available on the Authority's website for review. It also noted the dates, times, and locations of community open houses and the public hearing, locations where the document could be viewed, and the period during which public comments would be received. The announcement was advertised in the following newspapers:

- Bay Area News Group
- Gilroy Dispatch
- Merced Sun-Star/Los Banos Enterprise
- Morgan Hill Times
- El Observador (Spanish language newspaper)
- Sing Tao (Mandarin language newspaper)
- Vietnam Daily News (Vietnamese language newspaper)

A letter and Notice of Availability (NOA) were provided in English, with brief summary statements and contact information translated into Spanish, Mandarin, and Vietnamese. These were distributed by direct mail to elected officials; local, regional, state, and federal agencies; school districts with facilities within 0.25 mile of the project footprint; schools located within 0.5 mile of the project footprint; and members of the public who subscribed to the project mailing list, had attended project events (e.g., scoping, public meetings), or had sent comments or questions via email or the Authority's website. In addition, notice was sent to property owners adjacent to the four project alignment alternatives. In addition, this information was distributed through the Authority's social media accounts. Emails were also sent to stakeholders who had previously registered to receive information via email about the Draft EIR/EIS.

On April 24, 2020, the U.S. Environmental Protection Agency (USEPA) published the NOA for the Draft EIR/EIS in the *Federal Register*, indicating a 45-day public review period ending on June 8, 2020. On May 15, 2020, the Authority notified USEPA that the review and comment period was being extended to end on June 23, 2020, and the USEPA published the revised notice in the *Federal Register* on May 22, 2020. The NOA included dates, times, and locations for three community open houses and a public hearing, planned to occur in May 2020. However, due to public health and safety requirements related to COVID-19, limited access in compliance with Governor Newsom's executive shelter-in-place order (Executive Order N-33-20), and applicable County Health Officer directives, the community open houses and public hearing were held as online teleconference meetings. Public meeting and hearing dates and locations were also posted on the Authority's website.

The USEPA published the NOA for the *San Jose to Merced Project Section Revised Draft Environmental Impact Report/Supplemental Draft Environmental Impact Statement, Biological Resources Analysis* (Revised/Supplemental Draft EIR/EIS) (Authority 2021) in the *Federal Register* on April 23, 2021, for a 45-day public review period ending on June 9, 2021. No community open houses or public hearings were held for the Revised/Supplemental Draft EIR/EIS. Advertisements were placed in the same newspapers and materials were distributed in the same manner as was done for the Draft EIR/EIS.

Additional notices for both the Draft EIR/EIS and Revised/Supplemental Draft EIR/EIS publications included the following:

- Notices of Completion indicating the availability of both documents were filed with the State Clearinghouse and printed and electronic copies were sent to state agencies.
- The NOAs were filed electronically with the county clerk offices in Santa Clara, San Benito, and Merced Counties.

The entire Draft EIR/EIS and Revised/Supplemental Draft EIR/EIS were available on the Authority's website ([www.hsr.ca.gov/](http://www.hsr.ca.gov/)), and electronic copies of these documents and associated technical reports were available upon request by phone or email from the Authority.

The Authority identified 11 repository locations, including public libraries, county clerk offices, and Authority offices, where printed and electronic versions of the Draft EIR/EIS and Revised/Supplemental Draft EIR/EIS would be made available to the public during the review and comment periods. However, because of public health and safety requirements related to the COVID-19 pandemic, hardcopy materials were not distributed to the libraries or county clerk offices, given they were closed or operating with limited access in compliance with state and local COVID-19 directives. As a result, printed and electronic versions of the Draft EIR/EIS were only

available at the Authority's Headquarters at 700 L Street, Suite 620, Sacramento, CA 95814, and Northern California Regional Office at 100 Paseo de San Antonio, Suite 300, San Jose, CA 95113. Due to continued closures and limited operating hours, printed and electronic copies of the Revised/Supplemental Draft EIR/EIS were only available to the public at the Authority's Sacramento and San Jose offices as well as the Gilroy Library, Merced County Library, Los Banos Branch Library, and Morgan Hill Library. The rest of the repository locations remained closed or did not have the capacity to receive and maintain the distribution materials for public review.

During the public review period on the Draft EIR/EIS, the Authority received a total of 747 comment submissions through a combination of letters, emails, comment cards, and oral comments provided at the public hearing. The 747 submissions yielded a total of 4,889 discrete comments. During the public review period for the Revised/Supplemental Draft EIR/EIS, the Authority received a total of 16 comment submissions through a combination of letters and emails. These 16 submissions yielded a total of 226 discrete comments.

### 3 PURPOSE AND NEED

The purpose of the California HSR System is to provide a reliable electric-powered HSR system that links the major metropolitan areas of the state and delivers predictable and consistent travel times. An additional objective is to provide an interface with commercial airports, mass transit, and the highway network, and to relieve capacity constraints of the existing transportation system as California intercity travel demand increases, in a manner sensitive to and protective of California's unique natural resources (Authority and FRA 2005).

The purpose of this project is to implement the San Jose to Merced section of the California high-speed train (HST) system: to provide the public with electric-powered HSR service that provides predictable and consistent travel times between major urban centers and connectivity to airports, mass transit systems, and the highway network in the south San Francisco Bay Area and Central Valley; and to connect the Northern and Southern portions of the statewide HST system.

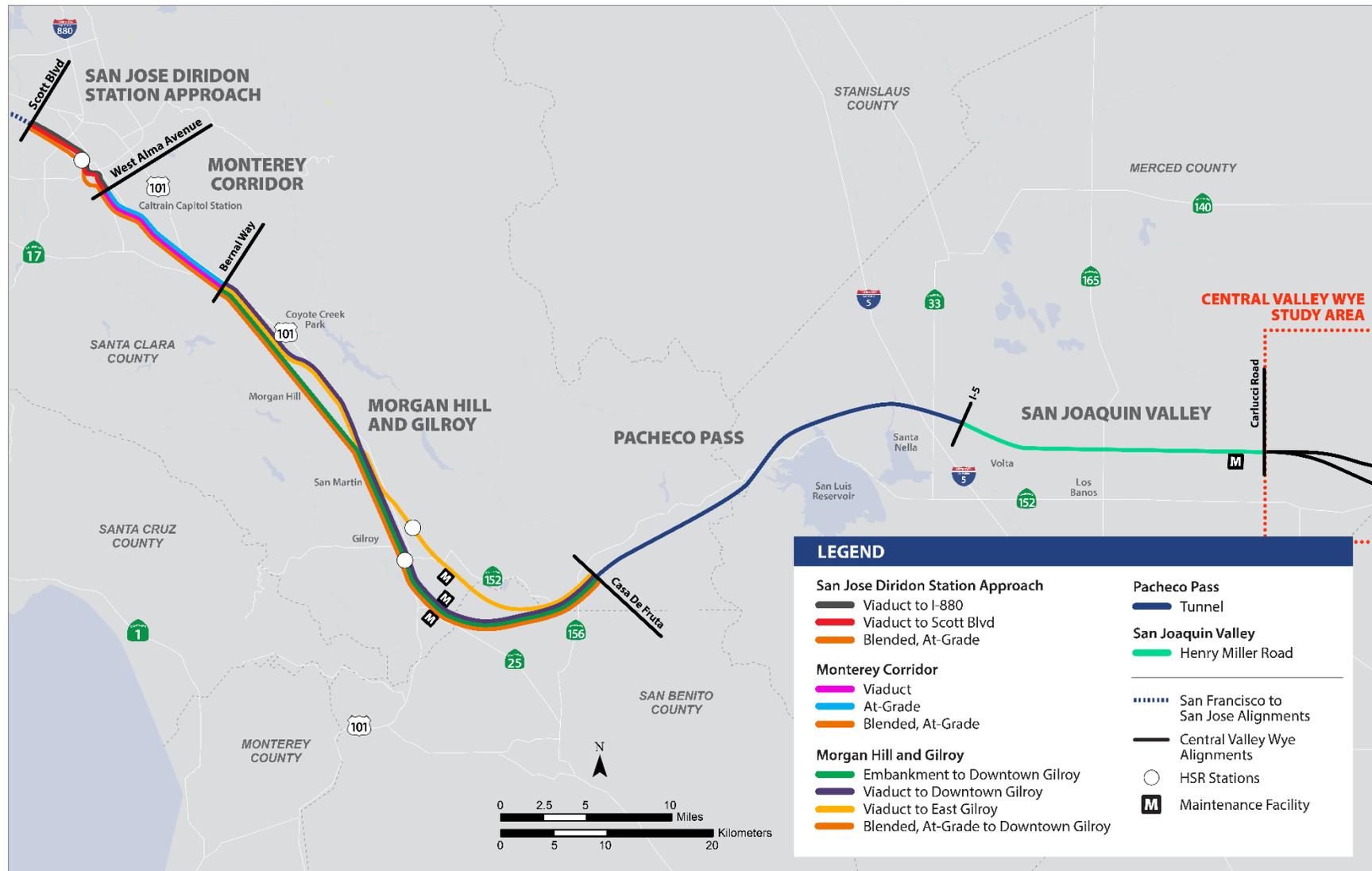
For more information on the project objectives and the need for the HSR system in California and in the San Jose to Merced region, refer to Chapter 1, Project Purpose, Need, and Objectives, of the Final EIR/EIS.



## 4 ALTERNATIVES

This section summarizes the No Project Alternative and the project alternatives, which are described in detail in Chapter 2 of the Final EIR/EIS. The project extends from Scott Boulevard in Santa Clara County to Carlucci Road in Merced County. The project alternatives most closely follow the preferred alignment identified in the Record of Decision for the *Final Program EIR/ EIS for the Proposed California High-Speed Train System* (Authority and FRA 2005). Stations would be built in the San Jose, Gilroy, and Merced areas; station alternatives related to the corresponding project alternatives are discussed in this section. Additionally, a maintenance of way facility (MOWF) in the Gilroy area and a maintenance of way siding (MOWS) west of Turner Island Road in the San Joaquin Valley Subsection are proposed. The project alternatives are described in more detail in Chapter 2 of the Final EIR/EIS, are briefly summarized in this chapter, and are illustrated on Figure 4-1. The project comprises the following five subsections:

- **San Jose Diridon Station Approach**—Extends approximately 6 miles north of San Jose Diridon Station at Scott Boulevard in Santa Clara to West Alma Avenue in San Jose. This subsection includes the San Jose Diridon Station and overlaps the southern portion of the San Francisco to San Jose Project Section.
- **Monterey Corridor**—Extends approximately 9 miles from West Alma Avenue to Bernal Way in the community of South San Jose. This subsection is entirely within the city of San Jose.
- **Morgan Hill and Gilroy**—Extends approximately 30–32 miles from Bernal Way in the community of South San Jose to Casa de Fruta Parkway/State Route (SR) 152 in the community of Casa de Fruta in Santa Clara County.
- **Pacheco Pass**—Extends approximately 25 miles from Casa de Fruta Parkway/SR 152 to Interstate (I-) 5 in Merced County.
- **San Joaquin Valley**: Extends approximately 18 miles from I-5 to Carlucci Road (the western limit of the Central Valley Wye) in unincorporated Merced County.



Note: The San Jose to Merced alternatives are described in Chapter 2, Alternatives, of the Final EIR/EIS.  
 Source: Authority 2020

NOVEMBER 2018

Figure 4-1 HSR Alternatives by Subsection

The Authority has developed four end-to-end alternatives for the project: Alternative 1, Alternative 2, Alternative 3, and Alternative 4. Table 4-1 shows the design options for each alternative by subsection. Please refer to Chapter 2, Alternatives, of the Final EIR/EIS for a description of two design variants, the Diridon design variant (DDV) and the tunnel design variant (TDV), that were considered in the analysis.

**Table 4-1 San Jose to Central Valley Wye Design Options by Subsection**

Subsection/Design Options	Alternative 1	Alternative 2	Alternative 3	Alternative 4
<b>San Jose Diridon Station Approach</b>				
Viaduct to Scott Blvd	–	X	X	–
Viaduct to I-880	X	–	–	–
Blended, at grade	–	–	–	X
<b>Monterey Corridor</b>				
Viaduct	X	–	X	–
At grade	–	X	–	–
Blended, at grade	–	–	–	X
<b>Morgan Hill and Gilroy</b>				
Embankment to Downtown Gilroy	–	X	–	–
Viaduct to Downtown Gilroy	X	–	–	–
Viaduct to East Gilroy	–	–	X	
Blended, at grade to downtown Gilroy	–	–	–	X
<b>Pacheco Pass</b>				
Tunnel	X	X	X	X
<b>San Joaquin Valley</b>				
Henry Miller Road	X	X	X	X

Source: Authority 2020  
 X = present; – = absent  
 I-880 = Interstate 880

## 4.1 No Project Alternative

Evaluation of the No Project Alternative considers the effects of growth planned for the region as well as existing and planned improvements to the highway, aviation, conventional passenger rail, and freight rail systems in the project extent study area through 2040 for the environmental analysis. It does not include construction of the HSR or any associated facilities and would thus have no impact on any Section 4(f) resources. Also, the No Project Alternative would not address the Purpose and Need for the project. This alternative is insufficient to meet existing and future travel demand; current and projected future congestion of the transportation system would continue to result in deteriorating air quality, reduced reliability, and increased travel times. Because the No Project Alternative does not meet the project Purpose and Need, it is neither feasible nor prudent as an avoidance alternative for any Section 4(f) resources.

## 4.2 Alternative 1

Development of Alternative 1 was intended to minimize the project footprint, minimize ground disturbance, minimize continuous surface features, and decrease necessary right-of-way acquisition through extensive use of viaduct structures. It would minimize land use displacements and conversion by staying predominantly within the existing transportation corridor right-of-way, thereby minimizing impacts of the HSR infrastructure footprint on local communities and environmental resources. The vertical footprint would be increased to minimize ground intrusion. Alternative 1 would include the short viaduct option, operating in blended service between Scott Boulevard and I-880 before transitioning to viaduct through most of the San Jose Diridon Station Approach Subsection. Alternative 1 would continue predominantly on viaduct through the Monterey Corridor and Morgan Hill and Gilroy Subsections. This alternative is distinguished by an alignment around downtown Morgan Hill and a low viaduct approach to an aerial downtown Gilroy station. Alternative 1 would include a MOWF south of Gilroy. The alignment would continue predominantly on viaduct and embankment across the Soap Lake floodplain before entering a short tunnel west of Casa de Fruta. The alignment and guideway in the Pacheco Pass Subsection would be the same for all four project alternatives, entailing a long tunnel around the northern arm of the San Luis Reservoir and viaducts over the California Aqueduct, Delta-Mendota Canal, and I-5. The alignment and guideway in the San Joaquin Valley Subsection would similarly be common to all four project alternatives. East of the I-5 overcrossing, the guideway would be predominantly on embankment along the south side of Henry Miller Road to Carlucci Road, traveling on viaduct over major watercourses and through the Grasslands Ecological Area. Several local roadways would be relocated on bridges over the HSR embankment. A MOWS would be located near Turner Island Road in the San Joaquin Valley Subsection.

Overall, the HSR guideway under this project alternative would comprise two tunnels totaling 15 miles, 45.4 miles of viaduct, 21.9 miles of embankment, and 2.3 miles at grade in an excavated hillside cut.

## 4.3 Alternative 2

Alternative 2 is the alternative that most closely approximates the alignment and structure types identified in the prior program-level documents. The alignment closely follows the existing Union Pacific Railroad (UPRR) and Monterey Road transportation corridor. The San Jose Diridon Station Approach Subsection under Alternative 2 would be on a viaduct, ascending to aerial structure near Scott Boulevard. Blended service with Caltrain would occur north of Scott Boulevard. The alignment would be at grade through the Monterey Corridor Subsection and through Morgan Hill, and on embankment on approach to and through Gilroy, maintaining a lower profile than the viaduct structures under Alternatives 1 and 3 through these areas.

Alternative 2 would operate on a dedicated viaduct from Scott Boulevard through the San Jose Diridon Station Approach Subsection. The alternative would be predominantly at grade east of the UPRR alignment through the Monterey Corridor Subsection, continuing at grade east of UPRR through Morgan Hill to an embankment approach to the Downtown Gilroy Station through the Morgan Hill and Gilroy Subsection. Like Alternative 1, Alternative 2 would include a South Gilroy MOWF, continuing on predominantly viaduct and embankment across the Soap Lake floodplain before entering a short tunnel west of Casa de Fruta. The alignment and guideway in the Pacheco Pass Subsection are the same for all four project alternatives, including a long tunnel around the northern arm of the San Luis Reservoir and viaducts over the California Aqueduct, Delta-Mendota Canal, and I-5. The alignment and guideway in the San Joaquin Valley Subsection are also common to all four project alternatives. Eastward from the I-5 overcrossing, the guideway would be predominantly on embankment along the south side of Henry Miller Road to Carlucci Road and on viaduct over major watercourses and across the Grasslands Ecological Area. Several local roadways are relocated on bridges over the HSR embankment. A MOWS would be located near Turner Island Road in the San Joaquin Valley Subsection.

Overall, this project alternative would comprise two tunnels with a combined length of 15 miles, 20.9 miles on viaduct, 41 miles on embankment, and 3.2 miles at grade in excavated hillside cut.

#### 4.4 Alternative 3

Alternative 3 was designed to minimize the project footprint through the use of viaduct and by circumventing downtown Morgan Hill, as is proposed in Alternative 1. Alternative 3 would bypass downtown Gilroy to an East Gilroy Station, further minimizing interface with the UPRR corridor in comparison to Alternative 1. Like Alternative 2, Alternative 3 would include a viaduct to Scott Boulevard. Alternative 3 would incorporate the same alignment and profile as Alternative 1 in the Monterey Corridor, Pacheco Pass, and San Joaquin Valley Subsections, and the same alignment and profile as Alternative 2 in the San Jose Diridon Station Approach Subsection. The MOWS near Carlucci Road would be the same as under Alternatives 1 and 2.

Alternative 3 would operate in a dedicated viaduct from Scott Boulevard through the San Jose Diridon Station Approach Subsection. The alternative would continue predominantly on viaduct through the Monterey Corridor and Morgan Hill and Gilroy Subsections on an alignment around downtown Morgan Hill to an embankment approach to the East Gilroy Station. Alternative 3 would include an MOWF and would continue predominantly on viaduct and embankment across the Soap Lake floodplain before entering a short tunnel west of Casa de Fruta. The alignment and guideway in the Pacheco Pass Subsection would be the same for all four project alternatives, entailing a long tunnel around the northern arm of the San Luis Reservoir and viaducts over the California Aqueduct, Delta-Mendota Canal, and I-5. The alignment and guideway in the San Joaquin Valley Subsection would also be common to all four project alternatives. East from the I-5 overcrossing, the guideway would be predominantly on embankment along the south side of Henry Miller Road to Carlucci Road, and on viaduct over major watercourses and across the Grasslands Ecological Area. Several local roadways would be relocated on bridges over the HSR embankment. A MOWS would be located near Turner Island Road in the San Joaquin Valley Subsection.

Overall, this project alternative would comprise two tunnels with a combined length of 15 miles, 43.2 miles of the alignment on viaduct, and 24.9 miles on embankment.

#### 4.5 Alternative 4

Development of Alternative 4 was intended to minimize the project footprint and decrease non-transportation right-of-way acquisition by staying at grade within the existing Caltrain and UPRR right-of-way between Scott Boulevard in Santa Clara and Gilroy. It would minimize land use displacements and conversion by staying predominantly within the existing transportation corridor right-of-way, thereby minimizing impacts of the HSR footprint on local communities and environmental resources. The project alternative is distinguished by a blended at-grade alignment with Caltrain at a 110 miles per hour (mph) maximum operating speed. The Authority has developed the DDV, which would allow for higher speeds in the approaches and through San Jose Diridon Station than the preliminary design for Alternative 4 would provide. The rationale for the Alternative 4 preliminary design without the DDV was to bring HSR service to San Jose Diridon Station with minimum changes to the Peninsula Corridor Electrification Project infrastructure, where track geometry restricts speeds approaching and through the station to 15 mph. The Authority has developed the DDV to provide design speeds of 40 mph to, from, and through San Jose Diridon Station, comparable to the design speeds provided by Alternatives 1, 2, and 3.

Alternative 4 would begin at Scott Boulevard in blended service with Caltrain on an at-grade profile. The blended at-grade alignment would continue to enter new dedicated HSR platforms at grade at the center of San Jose Diridon Station. Continuing south, the blended at-grade three-track alignment remains in the Caltrain right-of-way through the Gardner neighborhood. In the Monterey Corridor Subsection, unlike Alternatives 1, 2, and 3, Alternative 4 would be in blended service with Caltrain on an at-grade profile within the Peninsula Corridor Joint Powers Board and UPRR right-of-way. In the Morgan Hill and Gilroy Subsection, Alternative 4 would be blended service with Caltrain on an at-grade profile within the Peninsula Corridor Joint Powers Board and UPRR right-of-way with an at-grade Downtown Gilroy Station. Past the Gilroy station, HSR would enter the fully grade-separated, dedicated track needed to operate HSR trains at speeds above 125 mph. The alignment and guideway in the Pacheco Pass Subsection would be the same for

all four project alternatives, entailing a long tunnel around the northern arm of the San Luis Reservoir and viaducts over the California Aqueduct, Delta-Mendota Canal, and I-5. The alignment and guideway in the San Joaquin Valley Subsection would also be common to all four project alternatives. East from the I-5 overcrossing, the guideway would be predominantly on embankment along the south side of Henry Miller Road to Carlucci Road, and on viaduct over major watercourses and across the Grasslands Ecological Area. Several local roadways would be relocated on bridges over the HSR embankment. A MOWS would be located near Turner Island Road in the San Joaquin Valley Subsection.

Overall, this project alternative would comprise 15.2 miles on viaduct, 30.3 miles at grade, 25.9 miles on embankment, 2.3 miles in trench, and 2 tunnels with a combined length of 15 miles.

## 5 SECTION 4(f) APPLICABILITY ANALYSIS

This chapter provides a description of two park units that are affected by the HSR project, qualify for a use, and are under the jurisdiction of the Santa Clara County Parks and Recreation Department. Table 5-1 summarizes the features of these resources.

**Table 5-1 Two Parks and Recreation Areas Subject to Section 4(f) Use**

Name	Description	Distance to Nearest Project Feature <sup>1</sup>
Coyote Creek Parkway County Park	<p><b>Location:</b> Coyote Ranch Rd, San Jose</p> <p><b>Size:</b> 1,414 acres/15 miles</p> <p><b>Features:</b> Biking, equestrian, hiking, fishing, historic site, picnic areas, trails</p> <p><b>Agency with Jurisdiction:</b> Santa Clara County Parks and Recreation Department</p> <p><b>Section 4(f) Applicability:</b> Publicly owned park</p>	Alternatives 1–4: 0 feet (within footprint)
Field Sports County Park	<p><b>Location:</b> 9580 Malech Rd, San Jose</p> <p><b>Size:</b> 102 acres</p> <p><b>Features:</b> Firing range, picnicking, league activities, and special events</p> <p><b>Agency with Jurisdiction:</b> Santa Clara County Parks and Recreation Department</p> <p><b>Section 4(f) Applicability:</b> Publicly owned park</p>	Alternatives 1–4: 0 feet (within TCE)

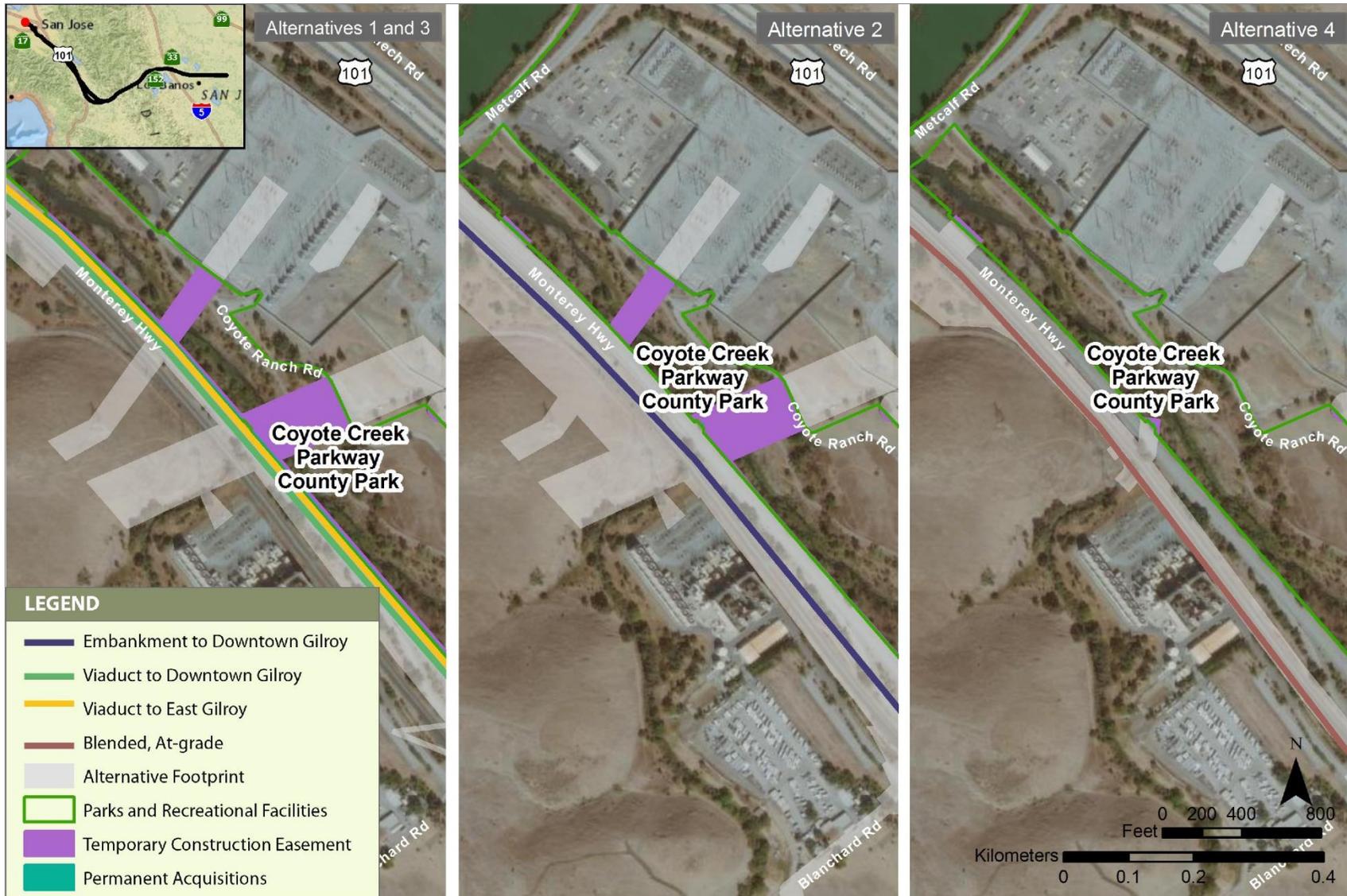
<sup>1</sup>The nearest project feature could be a TCE or part of the project footprint (e.g., permanent right-of-way, easement)  
TCE = temporary construction easement

Figures 5-1 through 5-7 show these two locations and the different project alternative alignments. Alternative 1 is the Viaduct to Downtown Gilroy alignment. Alternative 2 is the embankment to downtown Gilroy alignment. Alternative 3 is the Viaduct to East Gilroy alignment. The Preferred Alternative, Alternative 4, is the blended, at-Grade alignment.



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**Figure 5-1 Coyote Creek Parkway County Park (Part A)**



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Figure 5-2 Coyote Creek Parkway County Park (Part B)



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**Figure 5-3 Coyote Creek Parkway County Park (Part C)**



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Figure 5-4 Coyote Creek Parkway County Park (Part D)



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Figure 5-5 Coyote Creek Parkway County Park (Part E)



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Figure 5-6 Coyote Creek Parkway County Park (Part F)



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Figure 5-7 Field Sports County Park

## 6 SECTION 4(f) USE ANALYSIS

### 6.1 Section 4(f)

Impacts on the two Section 4(f) properties discussed in this report were assessed by reviewing the project alternatives' construction limits and considering projected right-of-way and temporary construction easement (TCE) needs compared to the locations of the properties.

#### 6.1.1 No Build Alternative

Evaluation of the No Project Alternative considers the effects of growth planned for the region as well as existing and planned improvements to the highway, aviation, conventional passenger rail, and freight rail systems in the project extent study area through 2040 for the environmental analysis. It does not include construction of the HSR or any associated facilities and would thus have no impact on any Section 4(f) resources.

#### 6.1.2 Build Alternatives—Operations (Permanent Use)

A permanent use of a Section 4(f) resource occurs when land is permanently incorporated into a proposed transportation facility. This might result from partial or full acquisition, permanent easements, or temporary easements that exceed limits for temporary occupancy as defined in Section 6.1.4, Build Alternatives—Construction (Temporary Occupancy). As assessed in Section 6.2.1, Coyote Creek Parkway County Park, the project alternatives would result in the permanent use of one park resource: Coyote Creek Parkway County Park.

#### 6.1.3 Build Alternatives—Operations (Constructive Use)

None of the project alternatives would result in a constructive use of Section 4(f) eligible resources.

#### 6.1.4 Build Alternatives—Construction (Temporary Occupancy)

A temporary construction use of a Section 4(f) property results in a temporary occupancy of a Section 4(f) resource when a Section 4(f) property is required for construction-related activities and meets specific conditions of use. If the activity does not meet the temporary occupancy conditions, even if the property is not permanently incorporated into a transportation facility, the temporary construction use would be considered a Section 4(f) use. Such use may be found to be a *de minimis* impact. Temporary occupancy of property does not constitute a use of a Section 4(f) resource when the following conditions are satisfied:

- The occupancy must be of temporary duration (e.g., shorter than the period of construction) and must not involve a change in ownership of the property.
- The scope of use must be minor, with only minimal changes to the protected resource.
- There must be no permanent adverse physical impacts on the protected resource or temporary or permanent interference with activities or purpose of the resource.
- The property being used must be fully restored to a condition that is at least as good as existed before project construction.
- There must be documented agreement of the appropriate OWJs over the resource regarding the foregoing requirements.

As assessed in Sections 6.2.1 and 6.2.2, Field Sports County Park, the project alternatives would result in the temporary occupancy of two park resources: Coyote Creek Parkway County Park and Field Sports County Park. These resources meet all the above conditions for a *de minimis* impact except for the documented agreement of the OWJ.

## 6.2 Individual Section 4(f) Evaluation

This chapter presents the use assessments for the two park resources under the jurisdiction of the Santa Clara County Parks and Recreation Department in the RSA that have permanent or

temporary uses. Impacts and use assessments for the Coyote Creek Parkway County Park and Field Sports County Park are summarized in Table 6-1, and detailed use assessments are included in Section 6.2.1 and Section 6.2.2, respectively. Subsequent chapters provide an assessment of avoidance alternatives (Chapter 7), measures to minimize harm (Chapter 8), and a least harm analysis (Chapter 9).

**Table 6-1 Parks and Recreation Areas Subject to Section 4(f) Use**

Build Alternative	Distance to Nearest Project Feature <sup>1</sup>	Construction Impact	Operations Impact
<b>Coyote Creek Parkway County Park</b>			
Alternative 1	0 feet (within footprint)	Permanent use of 2.42 acres (0.17%) of the parkway; temporary use of 9.62 acres of the parkway. TCEs at one of many access points northeast of Monterey Rd would diminish but not eliminate access. Incorporation of project features and mitigation measures will maintain access to the parkway.	Discussion of proximity impacts is not required because a permanent use has been established.
Alternative 2	0 feet (within footprint)	Permanent use of 3.34 acres (0.24%) of the parkway; temporary use of 11.21 acres of the parkway. Access impacts would be slightly less than under Alternative 1.	Same as Alternative 1.
Alternative 3	0 feet (within footprint)	Permanent use of 2.42 acres (0.17%) of the parkway; temporary use of 9.62 acres of the parkway. TCEs at one of many access points northeast of Monterey Rd would diminish but not eliminate access. Incorporation of project features and mitigation measures will maintain access to the parkway.	Same as Alternative 1.
Alternative 4	0 feet (within footprint of parkway); 19.4 feet from trail	Permanent use of 0.31 acre (0.02%) of the parkway; temporary use of 3.52 acres of the parkway. Access impacts would be slightly less than under Alternative 1. Incorporation of project features and mitigation measures will maintain access to the parkway.	Same as Alternative 1.
<b>Field Sports County Park</b>			
All Project Alternatives	0 feet (within TCE)	No permanent use; temporary occupancy of 2.04 acres. No changes in access would occur.	Minor proximity impacts from changes in noise and in the visual environment. Noise and visual impacts would not be of a severity that the protected activities, features, or attributes that qualify Field Sports County Park for protection under Section 4(f) would be substantially impaired, and no constructive use would result.

<sup>1</sup>The nearest project feature could be a TCE or part of the project footprint (e.g., permanent right-of-way, easement).

TCE = temporary construction easement

For full text of impact avoidance and minimization features (IAMFs) referenced in the analysis below, please refer to the Final EIR/EIS, Appendix 2-E, Project Impact Avoidance and Minimization Features. For the full text of mitigation measures referenced in the analysis below, please refer to the Mitigation Monitoring and Enforcement Plan (MMEP). Some are also further described in the Final EIR/EIS Section 3.7.8, Mitigation Measures (Biological and Aquatic Resources), Section 3.8.7, Mitigation Measures (Hydrology and Water Resources), and Section 3.15.7, Mitigation Measures (Parks, Recreation, and Open Space).

### 6.2.1 Coyote Creek Parkway County Park

Coyote Creek Parkway County Park is a 15-mile-long County Park that begins just south of Hellyer Avenue in the north and continues south along Coyote Creek to Cochrane Road, east of U.S. Highway (US) 101. The park features a network of paved walking/bicycle trails and unpaved equestrian trails, providing a popular bicycle route along the scenic Coyote Creek. The park also features several picnic areas and recreation fishing areas. In 2007, the Santa Clara County Board of Supervisors approved the *Integrated Master Plan for the Coyote Creek Parkway County Park*, responding to recent regional changes, such as growth, water distribution, riparian resource management, and development in integrated public and private lands. The park is operated by the Santa Clara County Parks and Recreation Department.

All four project alternatives would require permanent use of land from the parkway. In total, Alternatives 1 and 3 would result in the permanent use of 2.42 acres of the parkway (0.17 percent of the total area of the parkway). Alternative 2 would require the permanent use of 3.34 acres of the parkway (0.24 percent of the total area of the parkway). Alternative 4 would require permanent use of 0.31 acre (0.02 percent of the total area of the parkway). Alternatives 1 and 3 also would temporarily require use of 9.62 acres of parkland during construction, Alternative 2 would temporarily require use of 11.21 acres of parkland, and Alternative 4 would temporarily require use of 3.52 acres of parkland. The permanent encroachments are primarily due to existing wildlife crossings within the park. For all alternatives, the temporary and permanent uses of Coyote Creek Parkway County Park are alongside Monterey Highway, within utility easements, and adjacent to interior roadways.

For Alternatives 1, 2, and 3, one area of the affected parkland—south of Forsum Road, between Monterey Road and the lake within the parkway—is near the western edge of the park. TCEs within this area on the western edge of the park will include staging areas, temporary roadways for construction crews to access construction sites, and utility relocations would be necessary during construction. TCEs northeast of Monterey Road would diminish access at one access point under all project alternatives; however, access would be maintained at many other access points. Permanent use would be required for a possible location of a radio site and conversion of an existing driveway entrance to a parking lot into a roadway for realigning Monterey Road. Alternatives 1–3 would leave most of the park intact and contiguous for continued use of the park during construction and operation, because the areas of permanent incorporation would be around the edges and periphery of the parkway and would not affect any of the primary areas of the parkway that people use. In two areas, between Bailey Avenue and Tom’s Trail and at Laguna Avenue, Alternative 4 would use park property for wildlife crossings. These permanent uses would adversely affect the protected activities, features, or attributes that qualify the park for protection under Section 4(f).

Project features (PK-IAMF#1) will maintain access to park and recreation facilities because the contractor will prepare and submit to the Authority a technical memorandum that identifies project design features to be implemented to minimize impacts on parks and recreation facilities, such as providing safe and attractive access for existing travel modes (e.g., motorists, bicyclists, pedestrians) to existing park and recreation facilities. At the request of the Santa Clara County Parks and Recreation Department, the Authority has further committed to seeking the County’s input prior to Authority approval of any technical memorandum produced pursuant to PK-IAMF#1 for Coyote Creek Parkway County Park. This commitment is further described in the MMEP (4F-

MM#1). Upon approval by the Authority, the contractor will implement the project design features identified in the technical memorandum and they will be incorporated into the design specifications and will be a pre-condition requirement (PR-MM#4). Additionally, mitigation measures (PR-MM#1) will provide alternative access via a temporary detour to park resources using existing roadways or other public rights-of-way, and prior to construction, the contractor will prepare a technical memorandum for the Authority documenting how the contractor will maintain connections to the unaffected park portions or nearby roadways during construction (PR-MM#2). The technical memorandum would be submitted to the Authority for review and approval. At the request of the Santa Clara County Parks and Recreation Department, the Authority has further committed to seeking the County's input prior to Authority approval of any technical memorandum produced pursuant to PR-MM#2 for Coyote Creek Parkway County Park. This commitment is further described in the MMEP (4F-MM#1). Upon approval by the Authority, the contractor would implement the activities identified in the technical memorandum. In addition, temporary construction impacts on access and traffic, such as road closures and other disruptions, will be minimized by providing detours and signage so that motorists and pedestrians will continue to have access to parks, recreation, open space resources, and school district play areas (TR-IAMF#2, TR-IAMF#4, TR-IAMF#5, and TR-IAMF#7). IAMFs would be incorporated into the design specifications and would be a pre-construction requirement. These technical memoranda would be provided to the OWJ to demonstrate how access would be maintained.

This temporary construction use would meet most, but not all, of the conditions for the Temporary Occupancy exception (23 C.F.R. § 774.13(d)) because it would be of shorter duration than construction; there would be no change in ownership of the land; the scope of the work would be minor; there would be no temporary or permanent adverse changes to the activities, features, or attributes of the property; and the property would be fully restored to a condition at least as good as it was prior to the project. However, there is no documented agreement from the OWJ over the property (Santa Clara County Parks and Recreation Department) that the temporary occupancy meets the conditions for a temporary occupancy exception under Section 4(f), and thus this construction use is considered a temporary occupancy.

While the IAMFs above will minimize the four project alternatives' effects on the park, the permanent use would be of a severity that the protected activities, features, or attributes that qualify the parkway for protection under Section 4(f) would be adversely affected. Therefore, the Authority has determined that Alternatives 1, 2, 3, and 4 would result in a permanent use of this resource. In addition, since the OWJ has not concurred with the use of a temporary occupancy exception, the project alternatives would also result in a temporary occupancy.

### **6.2.2 Field Sports County Park**

Field Sports County Park is located at 9580 Malech Road in San Jose. It is 102 acres and contains a firing range, picnicking areas, and league activities, and it can host special events.

No land from Field Sports County Park would be permanently incorporated into the project under any project alternative; therefore, no permanent use would result. However, 2.04 acres would be used during construction, resulting in temporary occupancy of the park under all alternatives. Land in the southwestern half of the park would be used for Pacific Gas and Electric Company (PG&E) network upgrades to support the project alternatives. These portions of the park are currently vegetated and open space. The PG&E network upgrades would not affect any of the primary features of the park, such as the buildings, firing range, parking lots, or roadways, leaving the park intact and contiguous for continued use during construction and operations. However, any trees or vegetation located within the PG&E network upgrade boundary would be removed during construction. Prior to any ground-disturbing activities at the park, the contractor will prepare a restoration plan addressing specific actions, sequence of implementation, parties responsible for implementation, and successful achievement of restoration of temporary impacts, such as replanting trees and vegetation that will be removed (LU-IAMF#3). Before beginning construction use of land, the contractor would submit the restoration plan to the Authority for review and obtain Authority approval. Additionally, the contractor will prepare a technical memorandum for the Authority documenting how the contractor will maintain connections to the

unaffected park portions or nearby roadways during construction (PR-MM#2). The technical memorandum would be submitted to the Authority for review and approval. At the request of the Santa Clara County Parks and Recreation Department, the Authority has further committed to seeking the County's input prior to Authority approval of any technical memorandum produced pursuant to PR-MM#2 for Coyote Creek Parkway County Park. This commitment is further described in the MMEP (4F-MM#1).

The Authority has determined that this temporary construction use would constitute a use because it does not meet all of the conditions for temporary occupancy exception under Section 4(f). While this temporary occupancy would be of shorter duration than overall construction, there would be no change in ownership of the land, the scope of the work would be minor, and there would be no temporary or permanent adverse changes to the activities, features, or attributes of the property, and the property would be fully restored to a condition at least as good as it was prior to the project, there is no documented agreement from the OWJ (Santa Clara County Parks and Recreation Department) that the temporary occupancy meets the conditions for a temporary occupancy exception under Section 4(f). Consequently, the temporary occupancy during construction is considered a use under Section 4(f).

Proximity impacts on Field Sports County Park associated with HSR operations under the project alternatives would not occur because Field Sports County Park is located over 2,000 feet from the centerline of any of the project alternatives. Accordingly, operational visual and noise impacts would not be of a severity that the protected activities, features, or attributes that qualify Field Sports County Park for protection under Section 4(f) would be substantially impaired, and no constructive use would result under any alternative.



## 7 AVOIDANCE ALTERNATIVES

Section 4(f) requires the selection of an alternative that avoids the use of Section 4(f) properties if that alternative is deemed feasible and prudent. The Purpose and Need statement presented in Chapter 1 of the Final EIR/EIS tiers off the approved program EIR/EIS documents (Authority and FRA 2005). The project alternatives evaluation process conducted as part of the concluded that there was no feasible and prudent HSR alternative within the study area that did not result in a use of a Section 4(f) resource (Authority and FRA 2010, 2011a, 2011b). Although the project alternatives analysis process considered multiple criteria, the screening emphasized the project objective to maximize the use of existing transportation corridors and available rights-of-way to the extent feasible; the result of this effort was the carrying forward of the north-south alignment alternatives that follow the existing Caltrain and UPRR rail corridor. The project alternatives evaluation process resulted in the conclusion that, in accordance with 49 U.S.C. Section 303(c), there was no feasible and prudent HSR alternative within the study area.

The reason for this finding is as follows:

- All HSR alternatives were designed to follow existing railroad corridors to the extent allowed by design speeds. Locating the HSR alignment along these corridors is an objective of the project intended to minimize impacts on the natural and human environment. Any alternative that did not follow these or other transportation corridors would substantially increase the number of displacements, overall community disruption, adverse impacts on natural environment resources, and adverse social and economic impacts.
- Any alternative that did not follow these or other transportation corridors would not meet the Purpose and Need of the project because such an alternative would fail to link the major metropolitan areas of the state, deliver predictable and consistent travel times, and relieve capacity constraints of the existing transportation system as intercity travel demand in California increases, in a manner sensitive to and protective of California's unique natural resources.

The Authority and the FRA solicited input from the public and agencies through the project-level environmental review process from commencement in 2009 through 2017. The development of initial project-level alternatives in 2009 followed the process described in *Alternatives Analysis Methods for Project Level EIR/EIS, Version 2* (Authority 2009). The Authority evaluated potential alternatives against HSR system performance criteria. The project alternatives screening process and evaluation criteria are discussed in detail in Section 2.5, Alternative Consideration Process and in Appendix 2-I, Alternative Screening, of the Final EIR/EIS. Each alternative was evaluated to isolate concerns and to screen and refine the overall alternative to avoid key environmental issues or improve performance.

Each alternative was evaluated to isolate concerns and to screen and refine the overall alternative to avoid key environmental issues or improve performance. For example, all four project alternatives would avoid a Section 4(f) use of the Cottonwood Creek Wildlife Area through the tunnel design modification that was incorporated into the project alternatives. The North Pacheco Pass deep tunnel, Tunnel 2, which was designed in 2016 to minimize impacts on the wildlife area, would entail construction of tunnels below portions of the Cottonwood Creek Wildlife Area under all project alternatives. The tunnels would be at a depth of at least twice the diameter of the tunnel below the ground surface of the wildlife management area. At such a depth, surface disruptions related to construction and operation of the tunnel are not anticipated at the wildlife management area, and no harm to the purposes of this area would result. Under Section 4(f), tunneling is a means by which to avoid a Section 4(f) use. Therefore, the determination is that the four project alternatives would not result in a Section 4(f) use of the wildlife area. Because these design modifications have been incorporated into the project alternatives, a Section 4(f) use has been avoided and an individual resource avoidance assessment is not required. The project alternatives not carried forward had greater direct and indirect environmental impacts, were impracticable, or failed to meet the Purpose and Need for the project.

The No Project Alternative, which includes improvements that would be implemented independent of the project and is fully described in Chapter 2 of the Final EIR/EIS would not

include the construction of the HSR project or any associated facilities and would thus have no impact on any Section 4(f) resources associated with the construction and operations of the HSR system. However, there could be impacts on Section 4(f) resources as a result of the existing and planned improvements associated with the No Project Alternative. This alternative would not address the state's Purpose and Need for the project. This alternative is insufficient to meet existing and future travel demand; current and projected future congestion of the transportation system would continue to result in deteriorating air quality, reduced reliability, and increased travel times. Because the No Project Alternative does not meet the project Purpose and Need, it is not prudent and is not discussed further as an avoidance alternative for any Section 4(f) resources.

Greater detail on alternatives considered but dismissed is provided in Section 2.4, HSR System Infrastructure, of the Final EIR/EIS and in the *Final Program EIR/EIS for the Proposed California High-Speed Train System* (Authority and FRA 2005), the *Alternatives Analysis Methods for Project EIR/EIS, Version 2* (Authority 2009), *San Jose to Merced Preliminary Alternatives Analysis Report* (Authority and FRA 2010), and two San Jose to Merced Supplemental Alternatives Analysis reports (Authority and FRA 2011a, 2011b).

There would be no use of parks, recreation facilities, and wildlife and waterfowl refuges or a *de minimis* impact, with two exceptions. With a *de minimis* impact determination, individual resource avoidance assessments are not required. The following section provides individual resource avoidance assessments for Section 4(f) uses of the two park resources (Coyote Creek Parkway County Park and Field Sports County Park) and nine cultural resources. Cultural resources with only a *de minimis* or temporary occupancy determinations are also not included in the following section.

## 7.1 Individual Resource Avoidance Assessments—Park Resources

### 7.1.1 Coyote Creek Parkway County Park

Coyote Creek Parkway County Park is a 15-mile-long county park that traverses from San Jose just south of Hellyer Avenue through areas of unincorporated Santa Clara County to Cochrane Road east of US 101. The park features a network of paved walking/bicycle trails and unpaved equestrian trails, as well as picnic areas and recreation fishing areas. For the purposes of Section 4(f), it is considered to be a resource of high value.

All four project alternatives would require permanent use of land from the parkway. In total, Alternatives 1 and 3 would result in the permanent use of 2.42 acres, Alternative 2 would require the permanent use of 3.34 acres, and Alternative 4 would require permanent use of 0.31 acre of the parkway. Alternatives 1 and 3 also would temporarily require 9.62 acres of parkland during construction, Alternative 2 would temporarily require 11.21 acres of parkland, and Alternative 4 would temporarily require 3.52 acres of parkland. The permanent encroachments are primarily due to existing wildlife crossings within the park. Because construction of Alternatives 1, 2, 3, and 4 would change the character of the park, the four project alternatives would result in a Section 4(f) permanent use of Coyote Creek Parkway County Park.

The design team evaluated multiple design modifications for Alternatives 1, 2, 3, and 4 to determine if the resource could be avoided. Due to the park's position west of US 101 and east of Monterey Road, altering the track alignment east or west would have the following issues:

- An alternative alignment to the east of US 101 would cause more severe impacts on farmland and biological resources. Additionally, given the topography east of US 101, this alternative would require more excavation and grading and would have much greater temporary and permanent effects to Field Sports County Park.
- Shifting Alternative 4 west of Monterey Road to avoid Coyote Creek Parkway while staying at grade would abandon the existing UPRR right-of-way, would not parallel Monterey Road, and would result in an increased impact on farmland and biological resources. Shifting Alternatives 1, 2, and 3 west of Monterey Road would also increase impacts on farmland and

biological resources. For all four alternatives, not following existing transportation corridors would have much greater impacts on farmland and biological resources.

- An alignment within US 101 was considered, but the highway alignment is designed for much slower speeds than required for the HSR service. Additionally, connections to and from a US 101 alignment would result in greater displacements of land uses than the current alternatives.
- Underground alignments were also considered but are cost prohibitive (and thus would not be a reasonable public expenditure), as underground alignments are much costlier than at-grade, embankment, and aerial alignments.

Because Alternatives 1, 2, and 3 have more impacts on the parkway than Alternative 4, Alternative 4, the Preferred Alternative, is most reasonable. Therefore, given the physical constraints on the resource, the severe impacts to biological resources, farmland, and displacements associated with aboveground alternatives, the inability of a US 101 alternative to meet the project’s requirements, and the extraordinary magnitude of the costs of an underground alternative, it would not be prudent to avoid the resource under Alternatives 1, 2, 3, and 4. There are no reasonable and prudent alternatives to the Section 4(f) permanent use.

### 7.1.2 Field Sports County Park

Field Sports County Park is in San Jose. It encompasses 102 acres and contains a firing range, picnicking area, league activities, and area to host special events. For the purposes of Section 4(f), it is considered to be a resource of high value.

Under all four project alternatives, 2.04 acres of the park would be used during construction, resulting in temporary use of the park. Land in the southwestern half of the park would be used for PG&E network upgrades to support the project alternatives. These portions of the park are currently vegetated and open space. Any trees or vegetation located within the PG&E network upgrade boundary would be removed during construction. These changes would temporarily affect the character of the park, but these areas would be restored following construction.

The temporary construction use would meet most, but not all, of the conditions for the Temporary Occupancy exception (23 C.F.R. § 774.13(d)) because it would be of shorter duration than construction; there would be no change in ownership of the land; the scope of the work would be minor; there would be no temporary or permanent adverse changes to the activities, features, or attributes of the property; and the property would be fully restored to a condition at least as good as it was prior to the project. However, there is no documented agreement from the OWJ over the property (Santa Clara County Parks and Recreation Department) that the temporary occupancy meets the conditions for a temporary occupancy exception under Section 4(f), and thus this construction use is considered a temporary occupancy.

The design team evaluated design modifications for Alternatives 1, 2, 3, and 4 to determine if the resource could be avoided. However, this would be infeasible because there are no alternatives to the method and location of upgrading the PG&E network within this area that are feasible or less impactful than what is proposed under the project alternatives. Building new power transmission lines outside the park’s boundaries could incur biological and land use impacts or additional project costs compared to the proposed upgrading of existing power transmission lines.

Therefore, given the physical constraints on the resource, the severe increase in impacts to biological resources and other land use impacts due to construction of new power transmission lines, and due to extraordinary increase in cost of constructing new power transmission lines compared to using existing power transmission lines, it would not be prudent to avoid the resource under Alternatives 1, 2, 3, and 4. There are no reasonable and prudent alternatives to the Section 4(f) temporary occupancy.

## 7.2 Individual Resource Avoidance Assessments—Cultural Resources

While the following cultural resources are not under the jurisdiction of Santa Clara Parks and Recreation Department, an assessment of avoidance alternatives relative to these cultural

resources that would have a use by one or more of the project alternatives is provided in this report in order to have a complete assessment of avoidance alternatives relative to Section 4(f) resources. Descriptions of project effects on these cultural resources, which are considered Section 4(f) resources, are provided in Chapter 4 in the Final EIR/EIS.

### **7.2.1 Southern Pacific Depot (Diridon Station/Hiram Cahill Depot)**

The Southern Pacific Depot (Diridon Station/Hiram Cahill Depot) is in downtown San Jose. The depot was restored to Secretary of the Interior standards in 1994, and continues to function as a rail station as it did historically, serving Amtrak, Caltrain, Altamont Corridor Express, and (Santa Clara) Valley Transportation Authority (VTA) light rail. Additionally, multiple bus lines are serviced from the depot, retaining and expanding its function as a transportation hub. The depot remains an important resource and landmark in San Jose, and is considered a high value resource.

All four project alternatives would result in a Section 4(f) use of Southern Pacific Depot (Diridon Station/Hiram Cahill Depot) because all entail the construction of a modern multistory station infrastructure to the north, south, and west of the existing Diridon Station/Hiram Cahill Depot. In addition, the demolition or destruction of character-defining features would occur during construction. The design team evaluated design modifications to determine if the use of the resource could be avoided. Changes to the vertical profile of the project alternatives could involve underground, tunnel, or at-grade options. However, an underground alternative would conflict with the future Bay Area Rapid Transit (BART) station at Diridon. The tunnel option was eliminated from consideration because of the level of the water table. At-grade alternatives would require additional right-of-way, would be constrained by existing VTA tracks on the west side of the station as well as existing residential buildings and Cahill Park, which is also a Section 4(f) resource. The SAP Center at San Jose and associated features are to the east of the station. Therefore, these vertical profile changes are either not feasible because of engineering constraints or not prudent because of existing physical constraints, cost, displacements, and the potential for use at Cahill Park.

Horizontal alignment changes were also evaluated. Shifting the station location to avoid the resource would require shifting the track and station away from existing transportation corridors, which would deviate from a requirement of Prop 1A. Also, having HSR at Diridon Station is an essential component of the HSR system and having a San Jose station located elsewhere to avoid the Section 4(f) resource would not meet the purpose of the project. Additionally, there are existing VTA tracks on the west side of the station as well as existing residential buildings and Cahill Park, while the SAP Center at San Jose and associated features are to the east of the station. Therefore, these horizontal profile changes are not prudent because of existing constraints, project objectives, displacements, the potential for use at Cahill Park, and cost.

One other potential design modification could include moving the bents to avoid the historic fence, which would require increasing the height of the viaduct to accommodate longer spans. This would be an expensive design modification, and it would not ultimately avoid the use of the property.

Therefore, avoidance of this resource is not possible because Diridon Station/Hiram Cahill Depot is an integral part of the HSR system and modifications to the resource are necessary to accommodate HSR service. Additionally, the relative value of this resource to the community would remain intact because it would still function as a transportation hub. Therefore, there is no prudent avoidance alternative.

### **7.2.2 Sunlite Baking Company**

The Sunlite Baking Company is south of and adjacent to the existing Diridon Station. Prior to 2016, AT&T operated out of the building, but in late 2016 an investment firm, Rhyolite Enterprises LLC, bought the parcel, likely to develop the area to complement San Jose's real estate boom. It is unclear what the property is used for currently, but it is likely vacant or being rented for industrial purposes, inconsistent with its historic use. Considering there are additions outside the

period of the significance and the property is in fair condition, it is considered a moderate-value resource.

Alternatives 1, 2, and 3 would result in a Section 4(f) use of the Sunlite Baking Company because a portion of the resource is in the path of the new HSR right-of-way, with track on viaduct, and a new permanent roadway right-of-way with bike lane. Alternatives 1, 2, and 3 would also entail construction of a new HSR station parking lot in the western half of the parcel, and drop-off and pick-up areas in the center of the parcel. These facilities would result in demolition of the building.

The design team evaluated design modifications to determine if the use of the resource could be avoided. Changes to the vertical profile of Alternatives 1, 2, and 3 could involve underground, tunnel, or at-grade options. However, an underground alternative would conflict with the future BART station at Diridon. The tunnel option was eliminated from consideration because of the level of the water table. At-grade alternatives would require additional right-of-way, would be constrained by existing VTA tracks on the west side of the station as well as existing residential buildings and Cahill Park, which is also a Section 4(f) resource. The SAP Center at San Jose and associated features are to the east of the station. Therefore, these vertical profile changes are either not feasible because of engineering constraints or not prudent because of existing physical constraints, cost, displacements, and the potential for use at Cahill Park.

The design team also evaluated horizontal alignment changes. Shifting the station location to avoid the resource would require shifting the track and station away from existing transportation corridors (Prop 1A states that the HSR system be designed to follow existing transportation and utility corridors to the extent feasible and functionally viable), and would require substantial right-of-way acquisition elsewhere as well as result in conflicts with city zoning and the general plan. Also, having HSR at Diridon Station is an essential component of the HSR system and having a San Jose station located elsewhere to avoid the Section 4(f) resource would not meet the purpose of the project. Because the Sunlite Baking Company building is adjacent to Diridon Station, it cannot be avoided. Additionally, there are existing VTA tracks on the west side of the station as well as existing residential buildings and Cahill Park, while the SAP Center at San Jose and associated features are to the east of the station. Therefore, these horizontal profile changes are not prudent because of existing constraints, project objectives, displacements, the potential for use at Cahill Park, and cost.

Therefore, avoidance of this resource is not possible under Alternatives 1, 2, and 3 because Diridon Station/Hiram Cahill Depot is an integral part of the HSR system and modifications to the resource are necessary to accommodate HSR service. Additionally, the relative value of Sunlite Baking Company to the community is moderate, the resource is currently vacant, and it is not providing significant value to the community. It would not be prudent to expend the resources necessary to avoid this resource. Therefore, because of the extensive cost, right-of-way, and displacements that would be required to avoid this resource, and the relative value of this resource, there is no prudent avoidance alternative under Alternatives 1, 2, and 3. The use of Sunlite Baking Company could be avoided by selecting Alternative 4, which would avoid the resource. Alternative 4 is the feasible and prudent alternative to the Section 4(f) use that would result from Alternatives 1, 2, and 3.

### **7.2.3 Stevens/Fisher House**

The Stevens/Fisher House is on Monterey Road in Morgan Hill. There has been some infill of modern structures. Additionally, the property has been subdivided over the years, and is now adjacent to large, modern residential properties that detract from the historic feeling and setting. For the purposes of Section 4(f), it is considered to be a resource of moderate value.

Under Alternative 2, the Monterey Road right-of-way would be shifted to the east and would encroach within the western half of the parcel that contains the Stevens/Fisher House. New telecommunications and electrical utilities would be placed adjacent to the road right-of-way on the current location of the Stevens/Fisher House. The road right-of-way and utilities would demolish the residence, the Stevens/Fisher House. These project activities would result in a Section 4(f) use of the property.

The design team evaluated design modifications for Alternative 2 to see if the resource could be avoided. The design team evaluated a tunnel option, but this would cause significant disturbance during construction to both this property and to 586 Monterey Road because the tunnel would need to span both of these properties, in addition to being significantly more expensive. Cut-and-cover construction would be an expensive undertaking that would cause significant disturbance to the residence, requiring the residence to be temporarily relocated, stored, and protected during construction. Changing the horizontal alignment to the west is not feasible because of the UPRR right-of-way. Therefore, given the physical constraints on the resource and the cost, and given the relative value of the resource, it would not be prudent to avoid the resource under Alternative 2.

The use of Stevens/Fisher House under Alternative 2 could be avoided by selecting either Alternative 1 or Alternative 3, which would result in a *de minimis* impact, or Alternative 4, which would result in no impact. Under Alternatives 1 and 3, the relocated Monterey Road would encroach into the historic property boundary, resulting in a permanent use of the property. The existing roadway is currently 42 feet from the residence's primary (west) façade. The road right-of-way would pass approximately 20 feet in front of the residence's primary façade. Although Alternatives 1 and 3 would alter the character-defining features of the property and its historic setting, the project alternatives would not change the ultimate use of the property. Therefore, this encroachment and permanent use would not adversely affect the activities, features, and attributes that qualify the resource for protection under Section 4(f) and the impact would be *de minimis*. Additionally, Alternative 4 would result in no use of the resource because it would be approximately 90 feet southwest of the Stevens/Fisher House. Therefore, Alternatives 1, 3, and 4 are the feasible and prudent alternatives to the Section 4(f) use that would result from Alternative 2.

#### 7.2.4 Barnhart House

The Barnhart House is adjacent to Monterey Road in Morgan Hill. One modern structure as well as a modern vineyard, paved driveway, and nonhistoric landscape features are deviations from its historic configuration. However, its setting remains rural, and the property is still in use as a residence. For the purposes of Section 4(f), it is considered to be a resource of moderate value.

Under Alternative 2, the Barnhart House would be in the path of a new permanent roadway right-of-way, electrical and telecommunications utilities, and TCE. The resource and adjacent outbuildings would be demolished as a result of construction. Because construction of Alternative 2 would require the demolition of the resource and would materially alter its physical characteristics such that the qualities that qualify it for listing would be destroyed, Alternative 2 would result in a Section 4(f) use of the Barnhart House.

The design team evaluated design modifications for Alternative 2 to see if the resource could be avoided. A viaduct structure would avoid the resource, which is the design for Alternatives 1 and 3. The design team evaluated a tunnel option, but this would cause significant disturbance to this property, in addition to being significantly more expensive. Cut-and-cover construction would be an expensive undertaking that would cause significant disturbance to the residence, requiring the residence to be temporarily relocated, stored, and protected during construction. Changing the horizontal alignment to the west is not feasible because of the UPRR right-of-way.

The design team also evaluated other structural design changes. Retaining walls could be installed for a grade separation, but this would still result in demolition of the property. Increasing the span of the grade separation to avoid footings in the property would require a 1,100-foot span over the UPRR tracks, Monterey Road, the HSR right-of-way, and the Barnhart property. Under this option, the jug handle would have to be extended farther east, which would then result in impacts on Coyote Creek Parkway County Park, another Section 4(f) resource, and would be expensive. The jug handle is needed to provide connection between Palm Avenue and Monterey Road with the new grade separation that is required to cross HSR.

Therefore, given the physical constraints on the resource and the cost, and given the relative value of the resource, it would not be prudent to avoid the resource under Alternative 2. The use

of Barnhart House could be avoided by selecting either Alternative 1, 3, or 4, all of which would avoid the resource. Alternatives 1, 3, and 4 are the feasible and prudent alternatives to the Section 4(f) use that would result from Alternative 2.

### 7.2.5 Madrone Underpass

Madrone Underpass is an underpass along Monterey Road in Morgan Hill. The setting of the underpass has experienced low-density residential development since the property was constructed in 1933, but the girder bridge, abutments, and pedestrian passage have not been visibly altered. Additionally, the property has been in consistent use as a railroad underpass since its construction, making this a moderate-value resource.

Under Alternative 4, the HSR right-of-way would be placed on approximately 15-foot-high ballasted fill within the existing Caltrain right-of-way, which passes over the Madrone Underpass. To accommodate the new HSR right-of-way in this location, the Madrone Underpass would be demolished and replaced by a new box girder overpass structure, resulting in a Section 4(f) use because the Madrone Underpass cannot support the new HSR tracks in its existing condition.

The design team evaluated design modifications for Alternative 4 to see if the resource could be avoided. It was determined that the tracks could not be shifted to the north because there is an existing wetland area that would be affected, and the tracks could not be shifted to the south because the El Toro Fire Station would then be affected and displaced. The design team also evaluated a tunnel option, but this would cause significant disturbance to the surrounding area, in addition to being significantly more expensive.

Therefore, given the physical constraints on the resource, additional displacements, and transportation and community impacts, it would not be prudent to avoid the resource under Alternative 4. Madrone Underpass could be avoided by selecting Alternatives 1, 2, or 3, which would avoid the resource. Alternative 1, 2, or 3 is a feasible and prudent alternative to the Section 4(f) use that would result from Alternative 4.

### 7.2.6 San Martin Winery

San Martin Winery is in San Martin adjacent to the existing UPRR tracks. While the site has experienced some infill with modern buildings not related to its period of significance, it is still an active expression of wine making in the Santa Clara Valley, and has been in consistent use as a winery since 1933. For the purposes of Section 4(f), it is considered to be a resource of moderate value.

Under Alternatives 1 and 3, new HSR tracks on viaduct (35-foot-high structure plus additional 27-foot overhead contact system [OCS] poles) would be constructed on the current site of the historic building cluster and tree-lined drive, which are along the western edge of the historic property adjacent to the UPRR tracks and Monterey Road. Construction of the HSR viaduct would require demolition of the resource. Under Alternative 2, new HSR tracks on an at-grade ballasted track on retained fill would be constructed on the current site of the historic building cluster and would also require demolition of the resource. Alternatives 1, 2, and 3 would result in a Section 4(f) use.

The design team evaluated design modifications for Alternatives 1, 2, and 3 to see if the resource could be avoided. Under Alternatives 1 and 3, which are on viaduct, avoiding the property would require a 1,280-foot clear span, as well as increasing the height of the viaduct substantially. This would cause additional visual impacts in the area and would greatly increase the construction cost. In addition, this option would still affect the property because the viaduct would be directly over the property and could result in a constructive use due to the amount of the viaduct that would span the property and the scale of it. The design team evaluated a tunnel option, but this would cause significant disturbance to this property, in addition to being significantly more expensive. Cut-and-cover construction would be an expensive undertaking that would cause significant disturbance to the resource, requiring the residence to be temporarily relocated, stored, and protected during construction. The resource is also constructed of masonry materials,

which are heavy and not easily moved or transported without sustaining damage, which would add more challenges to moving the resource.

A horizontal alignment shift of 800 feet to the east would also be required to completely avoid the property. Shifting the alignment to avoid the resource would require shifting the track away from existing transportation corridors (Prop 1A states that the HSR system be designed to follow existing transportation and utility corridors to the extent feasible and functionally viable), and would require substantial right-of-way acquisition elsewhere as well as result in conflicts with city zoning and the general plan. This shift would also cause additional impacts on creeks, water quality, biological resources, and agricultural property acquisitions. Additionally, the straddle bents under Alternatives 1 and 3 cannot be shifted to completely avoid the resource because the span between bents would be too large. Changing the horizontal alignment to the west is not feasible because of the UPRR right-of-way.

Therefore, given the physical constraints on the resource and the cost, it would not be prudent to avoid the resource under Alternatives 1, 2, and 3, despite the relatively high value of the resource. However, the use of San Martin Winery under Alternatives 1, 2, and 3 could be avoided by selecting Alternative 4, which would result in a *de minimis* impact. Under Alternative 4, a retaining wall would be constructed along the HSR right-of-way, approximately 10 feet inside the historic property boundary, resulting in a permanent use of the property. However, the retaining wall would remain below eye level, and the security fencing would be visually permeable, such that these new elements would not separate the resource from the adjacent railroad right-of-way. Although Alternative 4 would result in a permanent use, it would not materially impair the characteristics that qualify it for listing, or change the property's use. Therefore, this encroachment and permanent use would not adversely affect the activities, features, and attributes that qualify the resource for protection under Section 4(f) and the impact would be *de minimis*. Therefore, Alternative 4 is the feasible and prudent alternative to the Section 4(f) use that would result from Alternatives 1, 2, and 3.

### 7.2.7 IOOF Orphanage

Independent Order of Odd Fellows (IOOF) Orphanage is located at 290 IOOF Avenue in Gilroy. The site has experienced some expansion and infill not related to its period of significance, but it has operated continuously as an orphanage and foster care center since it was opened. It remains the last operating Odd Fellow children's home in the United States and is the last active expression of the IOOF child care programs of the late 19th and early 20th centuries. For the purposes of Section 4(f), it is considered to be a resource of high value.

Under Alternative 2, a Section 4(f) use would result because the footprint of the new parking lot and turnaround would overlap the current parking lot and adjacent cluster of trees in this location and would encroach approximately 20 feet into the historic property boundary and replace a portion of the lawn that makes up the western portion of the IOOF Orphanage Home. In addition, it would indirectly impair the historic setting and feeling.

The design team evaluated design modifications for Alternative 2 to see if the resource could be avoided. The alignment could not be shifted east, as that would result in greater impacts on the resource; nor could it be shifted farther west, as that would disrupt Monterey Road and lead to additional displacements and community impacts. The impacts on the west side of the resource result from the need to realign Millers Slough, which necessitates the IOOF Orphanage Home parking lot to be moved farther into the grassy area. It is not possible to move this parking lot to another location without causing additional impacts on the resource.

There is also an impact from a new drainage pump station, whose purpose is to keep the IOOF Avenue undercrossing dry. The design team determined that the drainage pump station could be moved from within the IOOF Orphanage Home to an area between the UPRR tracks and Monterey Road. This design change would reduce the overall impact on the resource, but it would not completely eliminate it because impacts from the relocated parking lot would still occur.

Therefore, given the physical constraints on the resource, additional displacements, and transportation and community impacts, it would not be prudent to avoid the resource under

Alternative 2. IOOF Orphanage Home could be avoided by selecting Alternatives 1, 3, or 4, which would avoid the resource, or in the case of Alternative 1, would require a temporary occupancy, but would not result in a use. Alternative 1, 3, or 4 is a feasible and prudent alternative to the Section 4(f) use that would result from Alternative 2.

### 7.2.8 Live Oak Creamery

The Live Oak Creamery is adjacent to the existing Caltrain right-of-way. It is vacant and has not been used as a dairy or creamery (as it had been historically) since the 1940s; it appears to have been vacant since the 1970s. While character-defining features such as the brick-bond walls and flat roof remain intact, the creamery is extremely deteriorated, and no attempt appears to have been made to maintain or restore the property. The southern addition has been demolished. It is considered a low-value resource for the purposes of Section 4(f).

Under Alternatives 1, 2, and 4, the resource would be demolished because it is in the path of the HSR right-of-way, resulting in a Section 4(f) use. The design team evaluated design modifications for Alternatives 1, 2, and 4 to see if the resource could be avoided. The viaduct height could be increased so that it could clear the top of the building, but a footing would still be present within the property boundary, resulting in structure demolition. The design team evaluated a tunnel option, but this would cause significant disturbance to this property, in addition to being significantly more expensive. Cut-and-cover construction would be an expensive undertaking that would cause significant disturbance to the resource, requiring the residence to be temporarily relocated, stored, and protected during construction.

The horizontal alignment could be shifted to the east, but this could cause additional impacts on the IOOF Orphanage Home and Japanese School, other Section 4(f) resources, which are resources of higher value. Changing the horizontal alignment to the west is not feasible because of the UPRR right-of-way. Additionally, shifting the alignment west would cause the acquisition and demolition of many other buildings in downtown Gilroy that are adjacent to the right-of-way, including portions of the Monterey Street Downtown District.

Therefore, because of engineering constraints, cost, additional displacements, and additional impacts on other Section 4(f) resources, avoidance of this resource is not prudent under Alternatives 1, 2, and 4. In addition, the relative value of this resource to the community is low because of its current state of disrepair. It would not be prudent to expend the resources necessary to avoid this resource. Live Oak Creamery could be avoided by selecting Alternative 3, which would be approximately 742 feet from the resource. Alternative 3 is a feasible and prudent alternative to the Section 4(f) use that would result from Alternatives 1, 2, and 4.

### 7.2.9 Cozzi Family Property

The Cozzi Family Property is south of Henry Miller Road. One modern structure not related to the historic residence, as well as a new metal fencing system, is present; however, the property retains its rural feeling and character-defining features, and is therefore considered a moderate-value resource for the purposes of Section 4(f).

Under all four project alternatives, new HSR tracks on viaduct—a 40-foot-high structure plus 27-foot OCS poles—would pass through the parcel that contains the Cozzi Family Property and would be constructed directly over the resource. All project alternatives would therefore require demolition of the resource, resulting in a Section 4(f) use. The design team evaluated design modifications for all project alternatives to see if the resource could be avoided. For the viaduct to clear the buildings, the track profile would need to be increased to above 40 feet, which would require additional viaduct structures and additional bents. The additional straddle bents would still be within the property boundary. The design team evaluated a tunnel option, but this would cause significant disturbance to this property, in addition to being significantly more expensive. Cut-and-cover construction would be an expensive undertaking that would cause significant disturbance to the residence, requiring the residence to be temporarily relocated, stored, and protected during construction, and would affect Los Banos Creek. Because of engineering constraints and cost, these options would not be prudent.

A horizontal alignment shift of 240 feet north would be required to avoid the property, but this would require permanent incorporations of other Section 4(f) resources, such as Negra Ranch and Los Banos Wildlife Area, and would disrupt agricultural businesses, potentially resulting in severe disruption of existing farm operations (e.g., through severance of a parcel by the project footprint). Shifting the alignment to the south by 500 feet would result in similar impacts on existing farm operations. Such a modification would have both cost and schedule implications.

Therefore, because of engineering constraints, cost, additional displacements, and additional impacts on other Section 4(f) resources and other agricultural resources, avoidance of this resource is not feasible or prudent. In addition, the relative value of the Cozzi Family Property to the community is moderate; it would not be prudent to expend the resources necessary to avoid this resource. In view of these factors, there is no feasible and prudent avoidance alternative.

### 7.3 Summary of Avoidance Alternatives

Table 7-1 shows a summary of which alternatives could be used as an avoidance alternative for the resources that incur a Section 4(f) use.

**Table 7-1 Summary of Section 4(f) Avoidance Alternatives**

Resource	Alternative 1	Alternative 2	Alternative 3	Alternative 4	No Avoidance Alternative
<b>San Jose Diridon Station Approach Subsection</b>					
Southern Pacific Depot (Diridon Station/Hiram Cahill Depot)					X
Sunlite Baking Company				X	
<b>Monterey Corridor Subsection</b>					
None					
<b>Morgan Hill and Gilroy Subsection</b>					
Coyote Creek Parkway County Park					X
Field Sports County Park					X
Stevens/Fisher House	X		X	X	
Barnhart House	X		X	X	
Madrone Underpass	X	X	X		
San Martin Winery				X	
IOOF Orphanage Home	X		X	X	
Live Oak Creamery			X		
<b>Pacheco Pass Subsection</b>					
None					
<b>San Joaquin Valley Subsection</b>					
Cozzi Family Property					X

IOOF = Independent Order of Odd Fellows

## 8 MEASURES TO MINIMIZE HARM

Measures to minimize harm include IAMFs that are incorporated into the project design to avoid or minimize impacts. The application of IAMFs does not imply there is use of Section 4(f)–protected properties. Mitigation and enhancement measures to compensate for unavoidable project impacts mitigate project impacts that cannot be avoided or minimized with the incorporation of IAMFs; Section 4(f)–protected properties for which impacts are mitigated may therefore be subject to a Section 4(f) use, including temporary occupancy determinations. Each applicable IAMF and mitigation measure is described in Table 8-1, as applicable to each Section 4(f)–protected property, as required by 49 U.S.C. Section 303(c)(2). Additionally, avoidance alternatives have been developed to avoid uses of Section 4(f) properties where possible, as described in Chapter 7, Avoidance Alternatives, and will be coordinated with the OWJs over the resource. The Authority is continuing ongoing coordination, as appropriate, with these officials. During the Authority’s consideration of its decision and during final design, additional measures may be identified to further reduce potential impacts on Section 4(f) properties.

**Table 8-1 Measures to Minimize Harm**

Impact	Measures to Minimize Harm <sup>1</sup>
<ul style="list-style-type: none"> <li>▪ Acquisition of land from park</li> <li>▪ Temporary construction activities in the park</li> <li>▪ Temporary changes in access</li> </ul>	<ul style="list-style-type: none"> <li>▪ Final design will continue to minimize right-of-way impacts on Coyote Creek Parkway County Park and Field Sports County Park. Acquisition of land will be pursuant to California Code of Civil Procedure Section 1240 for the permanent use of land in each park.</li> <li>▪ The Authority will continue to work with the agencies with jurisdiction on the establishment of appropriate compensation in terms of allowance or additional property to accommodate displaced park use during construction. Options could include preparing a plan for alternative public recreation resources during the period of closure and preparing signs and newsletters describing the project, its schedule, and alternative public recreational opportunities.</li> <li>▪ The Authority will coordinate public involvement efforts prior to construction activities to notify the public about any changes to park access.</li> <li>▪ The Authority will maintain access to park and recreation facilities to the greatest extent practicable.</li> <li>▪ Prior to construction-related ground-disturbing activities affecting trails, the contractor will prepare a technical memorandum documenting how connections to the unaffected portions of trails and nearby roadways will be maintained during construction. The contractor will provide alternative access via a temporary trail detour using existing roadways or other public rights-of-way. The contractor will provide detour signage and lighting and alternative routes that meet public safety requirements. Upon approval by the Authority, the contractor will implement the activities identified in the technical memorandum. The activities will be incorporated into the design specifications and will be a pre-condition requirement.</li> <li>▪ Prior to construction-related ground-disturbing activities affecting park access, the contractor will prepare a technical memorandum documenting how connections to the unaffected park portions or nearby roadways will be maintained during construction. Upon approval by the Authority, the contractor will implement the activities identified in the technical memorandum. The activities will be incorporated into the design specifications and will be a pre-condition requirement.</li> <li>▪ During the design phase, the contractor will prepare a technical memorandum documenting how access to parks will be maintained or established following completion of construction activities. The technical memorandum will be submitted to the Authority for review and approval.</li> <li>▪ Upon approval by the Authority, the contractor will implement the project design features identified in the technical memorandum prepared as part of PK-IAMF#1: Parks,</li> </ul>

Impact	Measures to Minimize Harm <sup>1</sup>
	<p>Recreation, and Open Space. The project design features will be incorporated into the design specifications and will be a pre-condition requirement.</p> <ul style="list-style-type: none"> <li>▪ To minimize potential impacts on public and private water supplies derived from groundwater resources, including water supply wells, springs, and seeps, as well as from surface water resources supported by groundwater, the Authority proposes to implement a long-term Groundwater Adaptive Management and Monitoring Program (GAMMP), which will include ongoing monitoring, management, and reporting activities to detect, address, and remedy groundwater and hydrology impacts that may arise during and after tunneling in a timely manner. See HYD-MM#1: Prepare and Implement a Groundwater Adaptive Management and Monitoring Program in Section 3.8, Hydrology and Water Resources, of the Final EIR/EIS for more details.</li> <li>▪ To avoid, minimize, and mitigate for potential impacts on wetlands, creeks, ponds, springs, riparian vegetation, special-status plant and wildlife species, and protected trees, the Authority will prepare and implement a GAMMP prior to, during, and after tunnel construction to implement the requirements described under HYD-MM#1 and as described below concerning biological resources as described under BIO-MM#9. Prior to construction, the GAMMP will be submitted to the USFWS, CDFW, SWRCB, and RWQCB for review (and approval where applicable). See BIO-MM#9: Prepare and Implement a Groundwater Adaptive Management and Monitoring Plan in Section 3.7 of the Final EIR/EIS for more details.</li> </ul>

<sup>1</sup> For full text of impact avoidance and minimization features (IAMFs) referenced in the analysis below please refer to the Final EIR/EIS, Appendix 2-E, Project Impact Avoidance and Minimization Features. For the full text of mitigation measures referenced in the analysis below, please refer to Section 3.7.8, Mitigation Measures (Biological and Aquatic Resources), Section 3.8.7, Mitigation Measures (Hydrology and Water Resources), and Section 3.15.7, Mitigation Measures (Parks, Recreation, and Open Space).

CDFW = California Department of Fish and Wildlife; EIR/EIS = environmental impact report/environmental impact statement; GAMMP = groundwater adaptive management and monitoring plan; RWQCB = Regional Water Quality Control Board; SWRCB = State Water Resources Control Board; USFWS = U.S. Fish and Wildlife Service

## 9 SECTION 4(f) LEAST HARM ANALYSIS

When there is no feasible and prudent avoidance alternative to using Section 4(f) resources, the Authority must approve the alternative that causes the least overall harm to Section 4(f) resources, taking into consideration the preservation purpose of the statute. To ascertain which alternative that uses Section 4(f) properties would cause the overall least harm, the Authority considers the following seven factors:

- Ability to mitigate adverse impacts on each Section 4(f) property (including any measures that result in benefits to the property)
- Relative severity of the remaining harm, after mitigation, to the protected activities, attributes, or features that qualify each Section 4(f) property for protection
- Relative significance of each Section 4(f) property
- Views of the OWJ(s) over each Section 4(f) property
- Degree to which each alternative meets the Purpose and Need for the project
- After reasonable mitigation, the magnitude of any adverse impacts on resources not protected by Section 4(f)
- Substantial differences in costs among the project alternatives

The first four factors relate to the net harm that each project alternative would cause to the Section 4(f) property, and the remaining three factors consider concerns with the project alternatives that are not specific to Section 4(f).

Based on the identification of the project's use of Section 4(f) properties and the alternatives assessment, there is no feasible and prudent avoidance alternative to the use of these Section 4(f) properties, regardless of which project alternative is selected.

The following discussion demonstrates that Alternative 4 (which is the Preferred Alternative) is overall the least harm alternative for impacts in the project footprint.

### 9.1 Least Harm Analysis for Coyote Creek Parkway County Park and Field Sports County Park

The Authority has completed the following least harm analysis for the project. Table 9-1 characterizes each alternative using the seven least harm analysis factors (23 C.F.R. § 774.3(c)).

**Table 9-1 Least Harm Analysis for Coyote Creek Parkway County Park and Field Sports County Park**

Least Harm Factor	Alternative 1	Alternative 2	Alternative 3	Alternative 4
<p>Section 4(f) property incurring a use</p>	<p>Use or <i>de minimis</i> impact finding for 11 resources:</p> <ul style="list-style-type: none"> <li>▪ Los Gatos Creek Trail and Park</li> <li>▪ Guadalupe River Trail, Reach 6</li> <li>▪ Southern Pacific Depot (Diridon Station/Hiram Cahill Depot)</li> <li>▪ Sunlite Baking Company</li> <li>▪ Coyote Creek Trail</li> <li>▪ Coyote Creek Parkway County Park</li> <li>▪ Field Sports County Park</li> <li>▪ Stevens/Fisher House</li> <li>▪ San Martin Winery</li> <li>▪ Live Oak Creamery</li> <li>▪ Cozzi Family Property</li> </ul>	<p>Use or <i>de minimis</i> impact finding for 16 resources:</p> <ul style="list-style-type: none"> <li>▪ Reed Street Dog Park</li> <li>▪ Reed and Grant Streets Sports Park</li> <li>▪ Los Gatos Creek Trail and Park</li> <li>▪ Guadalupe River Trail, Reach 6</li> <li>▪ Southern Pacific Depot (Diridon Station/Hiram Cahill Depot)</li> <li>▪ Sunlite Baking Company</li> <li>▪ Coyote Creek Trail</li> <li>▪ Coyote Creek Parkway County Park</li> <li>▪ Field Sports County Park</li> <li>▪ Stevens/Fisher House</li> <li>▪ Barnhart House</li> <li>▪ Morgan Hill Community and Cultural Center</li> <li>▪ San Martin Winery</li> <li>▪ IOOF Orphanage Home</li> <li>▪ Live Oak Creamery</li> <li>▪ Cozzi Family Property</li> </ul>	<p>Use or <i>de minimis</i> impact finding for 12 resources:</p> <ul style="list-style-type: none"> <li>▪ Reed Street Dog Park</li> <li>▪ Reed and Grant Streets Sports Park</li> <li>▪ Los Gatos Creek Trail and Park</li> <li>▪ Guadalupe River Trail, Reach 6</li> <li>▪ Southern Pacific Depot (Diridon Station/Hiram Cahill Depot)</li> <li>▪ Sunlite Baking Company</li> <li>▪ Coyote Creek Trail</li> <li>▪ Coyote Creek Parkway County Park</li> <li>▪ Field Sports County Park</li> <li>▪ Stevens/Fisher House</li> <li>▪ San Martin Winery</li> <li>▪ Cozzi Family Property</li> </ul>	<p>Use or <i>de minimis</i> impact finding for 8 resources:</p> <ul style="list-style-type: none"> <li>▪ Southern Pacific Depot (Diridon Station/Hiram Cahill Depot)</li> <li>▪ Fuller Park</li> <li>▪ Coyote Creek Parkway County Park</li> <li>▪ Field Sports County Park</li> <li>▪ Madrone Underpass</li> <li>▪ San Martin Winery</li> <li>▪ Live Oak Creamery</li> <li>▪ Cozzi Family Property</li> </ul>
<p>Factor 1: The ability to mitigate adverse impacts on each Section 4(f) property (including any measures that result in benefits to the property)</p>	<p>Los Gatos Creek Trail, Guadalupe River Trail (Reach 6), and Coyote Creek Trail: A <i>de minimis</i> impact is anticipated; measures to minimize harm will maintain access to the trails and parks.</p> <p>Coyote Creek Parkway County Park: Project features and mitigation can reduce adverse impacts but would not avoid temporary occupancy or permanent use.</p> <p>Field Sports County Park: Project features and mitigation can reduce adverse impacts but would not avoid temporary occupancy.</p> <p>Southern Pacific Depot (Diridon Station/Hiram Cahill Depot), Sunlite Baking Company, San Martin Winery, Live Oak Creamery, and Cozzi Family Property: Impacts for structure demolition or demolition of contributing features cannot be mitigated.</p> <p>Stevens/Fisher House: A <i>de minimis</i> impact is anticipated and therefore no mitigation is proposed.</p>	<p>Alternative 2 would affect the same resources in the same manner as described for Alternative 1, with the following additional resources affected.</p> <p>Reed Street Dog Park: A <i>de minimis</i> impact is anticipated; measures to minimize harm will maintain access to the park.</p> <p>Reed and Grant Streets Sports Park: Impacts of reducing the size of 3 of the 5 soccer fields can be mitigated through reconfiguration of the fields to maintain usability.</p> <p>Morgan Hill Community and Cultural Center: A <i>de minimis</i> impact is anticipated; measures to minimize harm will reduce construction noise impacts and maintain access.</p> <p>Stevens/Fisher House, and Barnhart House: Impacts of structure demolition cannot be mitigated.</p> <p>IOOF Orphanage Home: Impact from changes to historic setting and feeling cannot be mitigated.</p>	<p>Alternative 3 would affect the same resources in the same manner as described for Alternative 1, except Live Oak Creamery would not be affected under Alternative 3, and with the following additional resource affected.</p> <p>Reed Street Dog Park: A <i>de minimis</i> impact is anticipated; measures to minimize harm will maintain access to the park.</p> <p>Reed and Grant Streets Sports Park: Impacts of reducing the size of 3 of the 5 soccer fields can be mitigated through reconfiguration of the fields to maintain usability.</p>	<p>Fuller Park: A <i>de minimis</i> impact is anticipated; measures to minimize harm will maintain access to the park.</p> <p>Coyote Creek Parkway County Park: Project features and mitigation can reduce adverse impacts but would not avoid temporary occupancy or permanent use.</p> <p>Field Sports County Park: Project features and mitigation can reduce adverse impacts but would not avoid temporary occupancy.</p> <p>Southern Pacific Depot (Diridon Station/Hiram Cahill Depot), Madrone Underpass, Live Oak Creamery, and Cozzi Family Property: Impacts for structure demolition or demolition of contributing features cannot be mitigated.</p> <p>San Martin Winery: A <i>de minimis</i> impact is anticipated and therefore no mitigation is proposed.</p>

Least Harm Factor	Alternative 1	Alternative 2	Alternative 3	Alternative 4
<p>Factor 2: The relative severity of the remaining harm, after mitigation, to the protected activities, attributes, or features that qualify each Section 4(f) property for protection</p>	<p>Los Gatos Creek Trail and Park and Guadalupe River Trail, Reach 6, and Coyote Creek Trail: The relative severity of harm would be similar under Alternatives 1, 2, and 3 but Alternative 4 would not result in use of these three trail/park units.</p> <p>Southern Pacific Depot (Diridon Station/Hiram Cahill Depot), Sunlite Baking Company, San Martin Winery, Live Oak Creamery, and Cozzi Family Property: Mitigation will not reduce overall harm to the structure or contributing features because part of it will be demolished.</p> <p>Coyote Creek Parkway County Park: Impacts would be slightly more under Alternatives 1, 2, and 3 than under Alternative 4 and would interfere with the protected activities, attributes, or features of the park. Mitigation would not eliminate adverse effects on the protected features, attributes, or activities, after considering any avoidance, minimization, mitigation, or enhancement measures.</p> <p>Field Sports County Park: Mitigation would not eliminate temporary adverse effects on the protected features, attributes, or activities, after considering any avoidance, minimization, mitigation, or enhancement measures.</p> <p>Stevens/Fisher House: A <i>de minimis</i> impact would not result in the loss of integrity that qualifies the resources for protection.</p>	<p>Alternative 2 would affect the same resources in the same manner as described for Alternative 1, with the following additional resources affected.</p> <p>Reed Street Dog Park and Reed and Grant Streets Sports Park: The relative severity of harm would be the same for Alternatives 2 and 3; therefore, severity is not a differentiating factor related to these parks.</p> <p>Stevens/Fisher House and Barnhart House: Mitigation will not reduce overall harm to the structure because part of it will be demolished.</p> <p>Morgan Hill Community and Cultural Center: Only Alternative 2 would affect this resource; therefore, severity is not a differentiating factor related to this resource.</p> <p>IOOF Orphanage Home: Only Alternative 2 would affect this resource; therefore, severity is not a differentiating factor related to this resource.</p>	<p>Alternative 3 would affect the same resources in the same manner as described for Alternative 1, except Live Oak Creamery would not be affected under Alternative 3, and with the following additional resources affected.</p> <p>Reed Street Dog Park and Reed and Grant Streets Sports Park: The relative severity of harm would be the same for Alternatives 2 and 3; therefore, severity is not a differentiating factor related to these parks.</p>	<p>Fuller Park: A <i>de minimis</i> impact is anticipated. Only Alternative 4 would affect this resource, so severity is not a differentiating factor related to this resource.</p> <p>Coyote Creek Parkway County Park: Impacts would be less under Alternative 4 than under Alternatives 1, 2, and 3 but Alternative 4 would still interfere with the protected activities, attributes, or features of the park. Mitigation would not eliminate adverse effects on the protected features, attributes, or activities, after considering any avoidance, minimization, mitigation, or enhancement measures.</p> <p>Field Sports County Park: Mitigation would not eliminate adverse temporary effects on the protected features, attributes, or activities, after considering any avoidance, minimization, mitigation, or enhancement measures. The relative severity of harm would be the same under all project alternatives; therefore, severity is not a differentiating factor related to this park.</p> <p>Southern Pacific Depot (Diridon Station/Hiram Cahill Depot), Live Oak Creamery, and Cozzi Family Property: Impacts for structure demolition or demolition of contributing features cannot be mitigated. The relative severity of harm would be the same under Alternatives 1, 2, and 4, but Alternative 3 would not affect the Live Oak Creamery.</p> <p>Madrone Underpass: Impacts for structure demolition or demolition of contributing features cannot be mitigated. Only Alternative 4 would affect this resource.</p> <p>San Martin Winery: A <i>de minimis</i> impact is anticipated with Alternative 4, which would have a lower impact than Alternatives 1, 2, and 3.</p>
<p>Factor 3: The relative significance of each Section 4(f) property</p>	<p>Los Gatos Creek Trail and Park and Guadalupe River Trail, Reach 6: Significant recreational resource to the City of San Jose. They are considered high-value resources for the purposes of Section 4(f).</p> <p>Southern Pacific Depot (Diridon Station/Hiram Cahill Depot): The Southern Pacific Depot, also known as Diridon Station, is listed on the NRHP and is a City of San Jose landmark. The site has six extant contributing features. The depot was restored to SOI's standards in 1994, and continues to function as a rail station as it did historically, serving Amtrak, Caltrain, ACE, and VTA light rail. Additionally, multiple bus lines are serviced from the depot, retaining and expanding its function as a transportation hub. The depot remains an important resource and landmark in San Jose and is considered a high-value resource for the purposes of Section 4(f).</p> <p>Sunlite Baking Company: The Sunlite Baking Company is eligible for listing on the NRHP as a distinctive example of Art Moderne architecture interpreted for an industrial production facility. Prior to 2016, AT&amp;T operated out of the building, but in late 2016 an investment firm, Rhyolite Enterprises LLC, bought the parcel, likely to develop the area to complement San Jose's real estate boom. It is unclear what the property is</p>	<p>Alternative 2 would affect the same resources in the same manner as described for Alternative 1, with the following additional resources affected.</p> <p>Reed Street Dog Park: Recreational resource in Santa Clara. The affected portion is less significant than other portions of the park because it is on the periphery. It is considered a high-value resource for the purposes of Section 4(f).</p> <p>Reed and Grant Streets Sports Park: Recreational resource in Santa Clara. It is one of the few sports parks in the area. It is considered a high-value resource for the purposes of Section 4(f).</p> <p>Barnhart House: The Barnhart House is a privately owned residential property. It was determined eligible for the NRHP for its intact display of the Craftsman, Prairie, and Colonial Revival architecture. One modern structure as well as a modern vineyard, paved driveway and nonhistoric landscape features are deviations from its historic configuration. However, its setting remains rural, and the property is still in use as a residence. For the purposes of Section 4(f), it is considered to be a resource of moderate value.</p> <p>Morgan Hill Community and Cultural Center: Recreational and community resource in Morgan Hill. The affected portion</p>	<p>Alternative 3 would affect the same resources in the same manner as described for Alternative 1, except Live Oak Creamery would not be affected under Alternative 3, and with the following additional resources affected.</p> <p>Reed Street Dog Park: Recreational resource in Santa Clara. The affected portion is less significant than other portions of the park because it is on the periphery. It is considered a high-value resource for the purposes of Section 4(f).</p> <p>Reed and Grant Streets Sports Park: Recreational resource in Santa Clara. It is one of the few sports parks in the area. It is considered a high-value resource for the purposes of Section 4(f).</p>	<p>Southern Pacific Depot (Diridon Station/Hiram Cahill Depot): The Southern Pacific Depot, also known as Diridon Station, is listed on the NRHP and is a City of San Jose landmark. The site has six extant contributing features. The depot was restored to SOI's standards in 1994, and continues to function as a rail station as it did historically, serving Amtrak, Caltrain, ACE, and VTA light rail. Additionally, multiple bus lines are serviced from the depot, retaining and expanding its function as a transportation hub. The depot remains an important resource and landmark in San Jose and is considered a high-value resource for the purposes of Section 4(f).</p> <p>Fuller Park: Recreational resource in San Jose. The affected portion is less significant than other portions of the park because it is on the periphery and currently contains a train control site. It is considered a moderate-value resource for the purposes of Section 4(f).</p> <p>Coyote Creek Parkway County Park : Significant recreational resource to the County of Santa Clara. It is considered a high-value resource for the purposes of Section 4(f). The affected portion is less significant than other sections of the park because it is on the periphery</p>

Least Harm Factor	Alternative 1	Alternative 2	Alternative 3	Alternative 4
	<p>used for currently, but it is likely vacant or being rented for industrial purposes, inconsistent with its historic use. Considering there are additions outside the period of the significance and the property is in fair condition, it is considered a moderate-value resource for the purposes of Section 4(f).</p> <p>Coyote Creek Parkway County Park and Coyote Creek Trail: Significant recreational resource to the County of Santa Clara. It is considered a high-value resource for the purposes of Section 4(f). The affected portion is less significant than other sections of the park because it is on the periphery.</p> <p>Field Sports County Park: Significant recreational resource to the County of Santa Clara. It is considered a high-value resource for the purposes of Section 4(f). The affected area would not be in the active sports area used for archery; the affected area would be in an area not used actively for any recreational activity where the project would temporarily encroach to upgrade an existing power transmission line.</p> <p>Stevens/Fisher House: The Stevens/Fisher House is a privately owned Queen Anne-style residence. It was determined eligible for the NRHP for its association with the early settlement of the Coyote Valley. There has been some infill of modern structures. Additionally, the property has been subdivided over the years, and is now adjacent to large, modern residential properties that detract from the historic feeling and setting. For the purposes of Section 4(f), it is considered to be a resource of moderate value.</p> <p>San Martin Winery: The San Martin Winery is an active winery and is currently owned by ASV Wines, Inc. It is eligible for listing on the NRHP for its association with the re-establishment of the post-Prohibition wine industry in California, and for the main building's intact Spanish Eclectic architecture as applied to an industrial building. While the site has experienced some infill with modern buildings and vineyards not related to its period of significance, it is still an active expression of wine making in the Santa Clara Valley, and has been in consistent use as a winery as it was historically since 1933. For the purposes of Section 4(f), it is considered to be a resource of moderate value.</p> <p>Live Oak Creamery: The Live Oak Creamery is individually listed on the NRHP. It was found to be significant for its association with early industry in Gilroy. It is vacant and has not been used as a dairy or creamery as it had been historically since the 1940s. It appears to have been vacant since the 1970s. While character-defining features such as the brick-bond walls and flat roof remain intact, the creamery is extremely deteriorated, and no attempt appears to have been made to maintain or restore the property. The southern addition has been demolished. It is considered a low-value resource for the purposes of Section 4(f).</p> <p>Cozzi Family Property: The Cozzi Family Property is a privately owned rural residence that is eligible for listing in the NRHP for its Queen Anne and Folk Victorian-style</p>	<p>is less significant than other portions of the center because it is on the periphery. For the purposes of Section 4(f), it is considered to be a resource of high value.</p> <p>IOOF Orphanage Home: The IOOF Orphanage Home was found eligible for listing on the NRHP as a prominent example of the work of the IOOF, and as a distinctive example of Spanish Revival-style architecture. The subject property is currently operated by Rebekah Children's Services, a nonprofit organization that provides foster care and adoption services, mental health resources, and other programs for at-risk children. The site has experienced some expansion and infill not related to its period of significance, but it has operated continuously as an orphanage and foster care center since it was opened. It remains the last operating Odd Fellows children's home in the United States and is the last active expression of the IOOF child care programs of the early 19th century. For the purposes of Section 4(f), it is considered to be a resource of high value.</p>		<p>Field Sports County Park: Significant recreational resource to the County of Santa Clara. It is considered a high-value resource for the purposes of Section 4(f). The affected area would not be in the active sports area used for archery; the affected area would be in an area not used actively for any recreational activity where the project would temporarily encroach to upgrade an existing power transmission line.</p> <p>Madrone Underpass: The Madrone Underpass is an active railroad underpass that supports the operations of Caltrain and the UPRR. It is eligible for listing on the NRHP for its association with the earliest railroad and highway traffic safety programs implemented in Santa Clara County in the 20th century. The setting of the underpass has experienced low-density residential development since the property was constructed in 1933, but the girder bridge, abutments, and pedestrian passage have not been visibly altered. Additionally, the property has been in consistent use as a railroad underpass since its construction. For the purposes of 4(f), it is considered to be a resource of moderate value.</p> <p>San Martin Winery: The San Martin Winery is an active winery and is currently owned by ASV Wines, Inc. It is eligible for listing on the NRHP for its association with the re-establishment of the post-Prohibition wine industry in California, and for the main building's intact Spanish Eclectic architecture as applied to an industrial building. While the site has experienced some infill with modern buildings and vineyards not related to its period of significance, it is still an active expression of wine making in the Santa Clara Valley, and has been in consistent use as a winery as it was historically since 1933. For the purposes of Section 4(f), it is considered to be a resource of moderate value.</p> <p>Live Oak Creamery: The Live Oak Creamery is individually listed on the NRHP. It was found to be significant for its association with early industry in Gilroy. It is vacant and has not been used as a dairy or creamery as it had been historically since the 1940s. It appears to have been vacant since the 1970s. While character-defining features such as the brick-bond walls and flat roof remain intact, the creamery is extremely deteriorated, and no attempt appears to have been made to maintain or restore the property. The southern addition has been demolished. It is considered a low-value resource for the purposes of Section 4(f).</p> <p>Cozzi Family Property: The Cozzi Family property is a privately owned rural residence that is eligible for listing in the NRHP for its Queen Anne and Folk Victorian-style architecture. One modern structure not related to the historic residence, as well as a new metal fencing system, is present. However, the property retains its rural feeling and character-defining features, and is therefore considered a moderate-value resource for the purposes of Section 4(f).</p>

Least Harm Factor	Alternative 1	Alternative 2	Alternative 3	Alternative 4
	<p>architecture. One modern structure not related to the historic residence, as well as a new metal fencing system, is present. However, the property retains its rural feeling and character-defining features, and is therefore considered a moderate-value resource for the purposes of Section 4(f).</p>			
<p>Factor 4: The views of the official(s) with jurisdiction over each Section 4(f) property</p>	<p>Los Gatos Creek Trail and Park: Coordination is ongoing with the Santa Clara County Parks and Los Gatos Parks and Public Works Department.</p> <p>Guadalupe River Trail, Reach 6: Coordination is ongoing with the City of San Jose Department of Parks, Recreation &amp; Neighborhood Services.</p> <p>Southern Pacific Depot (Diridon Station/Hiram Cahill Depot): The property is individually listed in the NRHP, NRHP Reference No. 93000274, certified on NRHP on April 1, 1993. Consultation with the SHPO is anticipated to yield a finding of adverse effect under Section 106.</p> <p>Sunlite Baking Company: The SHPO concurred with the NRHP eligibility of the property on July 12, 2019. Consultation with the SHPO is anticipated to yield a finding of adverse effect under Section 106.</p> <p>Coyote Creek Parkway County Park and Coyote Creek Trail: Coordination is ongoing with the Santa Clara County Department of Parks and Recreation.</p> <p>Field Sports County Park: Coordination is ongoing with the Santa Clara County Department of Parks and Recreation.</p> <p>Stevens/Fisher House: The SHPO concurred with the NRHP eligibility of the property on July 12, 2019. Consultation with the SHPO is anticipated to yield a finding of no adverse effect under Section 106.</p> <p>San Martin Winery: The SHPO concurred with the NRHP eligibility of the property on July 12, 2019. Consultation with the SHPO is anticipated to yield a finding of adverse effect under Section 106.</p> <p>Live Oak Creamery: The property is individually listed in the NRHP, NRHP Reference No. 82002263, certified on March 11, 1982. Consultation with the SHPO is anticipated to yield a finding of adverse effect under Section 106.</p> <p>Cozzi Family Property: The SHPO concurred with the NRHP eligibility of the property on July 12, 2019. Consultation with the SHPO is anticipated to yield a finding of adverse effect under Section 106.</p>	<p>Alternative 2 would affect the same resources in the same manner as described for Alternative 1, with the following additional resources affected.</p> <p>Reed Street Dog Park: Coordination is ongoing with the City of Santa Clara Parks and Recreation.</p> <p>Reed and Grant Streets Sports Park: Coordination is ongoing with the City of Santa Clara Parks and Recreation.</p> <p>Stevens/Fisher House: The SHPO concurred with the NRHP eligibility of the property on July 12, 2019. Consultation with the SHPO is anticipated to yield a finding of adverse effect under Section 106.</p> <p>Barnhart House: The SHPO concurred with the NRHP eligibility of the property on July 12, 2019. Consultation with the SHPO is anticipated to yield a finding of adverse effect under Section 106.</p> <p>Morgan Hill Community and Cultural Center: Coordination is ongoing with the City of Morgan Hill Recreation and Community Services Department.</p> <p>IOOF Orphanage Home: The SHPO concurred with the NRHP eligibility of the property on July 12, 2019. Consultation with the SHPO is anticipated to yield a finding of adverse effect under Section 106.</p>	<p>Alternative 3 would affect the same resources in the same manner as described for Alternative 1, except Live Oak Creamery would not be affected under Alternative 3, and with the following additional resources affected.</p> <p>Reed Street Dog Park: Coordination is ongoing with the City of Santa Clara Parks &amp; Recreation.</p> <p>Reed and Grant Streets Sports Park: Coordination is ongoing with the City of Santa Clara Parks and Recreation</p>	<p>Southern Pacific Depot (Diridon Station/Hiram Cahill Depot): The property is individually listed in the NRHP, NRHP Reference No. 93000274, certified on NRHP on April 1, 1993. Consultation with the SHPO is anticipated to yield a finding of adverse effect under Section 106.</p> <p>Fuller Park: The City of San Jose concurred with the determination of a <i>de minimis</i> impact to this resource.</p> <p>Coyote Creek Parkway County Park: Coordination is ongoing with the Santa Clara County Department of Parks and Recreation.</p> <p>Field Sports County Park: Coordination is ongoing with the Santa Clara County Department of Parks and Recreation.</p> <p>Madrone Underpass: The SHPO concurred with the NRHP eligibility of the property on July 12, 2019. Consultation with the SHPO is anticipated to yield a finding of adverse effect under Section 106.</p> <p>San Martin Winery: The SHPO concurred with the NRHP eligibility of the property on July 12, 2019. Consultation with the SHPO is anticipated to yield a finding of no adverse effect under Section 106.</p> <p>Live Oak Creamery: The property is individually listed in the NRHP, NRHP Reference No. 82002263, certified on March 11, 1982. Consultation with the SHPO is anticipated to yield a finding of adverse effect under Section 106.</p> <p>Cozzi Family Property: The SHPO concurred with the NRHP eligibility of the property on July 12, 2019. Consultation with the SHPO is anticipated to yield a finding of adverse effect under Section 106.</p>
<p>Factor 5: The degree to which each alternative meets the Purpose and Need for the project</p>	<p>Meets the project Purpose and Need. Minimizes the project footprint and decreases necessary right-of-way acquisition.</p>	<p>Meets the project Purpose and Need. Most closely approximates the alignment and structure types identified in the prior program-level documents.</p>	<p>Meets the project Purpose and Need. Minimizes the project footprint through the use of viaduct and would also minimize interface with the UPRR right-of-way.</p>	<p>Meets the project Purpose and Need. Minimizes the project footprint and decreases non-transportation right-of-way acquisition by staying at grade within the existing Caltrain and UPRR right-of-way between Scott Boulevard in Santa Clara and Gilroy.</p>

Least Harm Factor	Alternative 1	Alternative 2	Alternative 3	Alternative 4
<p>Factor 6: After reasonable mitigation, the magnitude of any adverse impacts on resources not protected by Section 4(f)</p>	<p>Third-most moderate (1,444) and severe (439) noise impacts at residential locations.</p> <p>Third-greatest number (90) of waterbodies realigned, modified, or otherwise affected.</p> <p>Third-greatest number of displacements: 147 residential, 217 commercial and industrial, 49 agricultural property, and 14 community and public facility displacements.</p> <p>Second-greatest conversion of Important Farmland (1,035.5 acres).</p> <p>Third-greatest impact on jurisdictional aquatic resources (236.6 acres).</p> <p>Second-greatest impact on habitat for special-status plants (nonoverlapping) (1,629.3 acres).</p>	<p>Second-most moderate (1,740) and severe (1,092) noise impacts at residential locations.</p> <p>Greatest number (96) of waterbodies realigned, modified, or otherwise affected.</p> <p>Greatest number of displacements: 603 residential, 348 commercial and industrial, 53 agricultural property, and 16 community and public facility displacements.</p> <p>Third-greatest conversion of Important Farmland (1,181.3 acres).</p> <p>Greatest impact on jurisdictional aquatic resources (249.5 acres).</p> <p>Greatest impact on habitat for special-status plants (nonoverlapping) (1,663.4 acres).</p>	<p>Fewest moderate (1,071) and severe (276) noise impacts at residential locations.</p> <p>Second-greatest number (88) of waterbodies realigned, modified, or otherwise affected.</p> <p>Second-greatest number of displacements: 157 residential, 157 commercial and industrial, 49 agricultural property, and 10 community and public facility displacements.</p> <p>Greatest conversion of Important Farmland (1,192.5 acres).</p> <p>Second-greatest impact on jurisdictional aquatic resources (230.0 acres).</p> <p>Third-greatest impact on habitat for special-status plants (nonoverlapping) (1,648.0 acres).</p>	<p>Most moderate (895) and severe (2,580) noise impacts at residential locations.</p> <p>Least number (81) of waterbodies realigned, modified, or otherwise affected.</p> <p>Least number of displacements: 68 residential, 66 commercial and industrial, 40 agricultural property, and 2 community and public facility displacements.</p> <p>Least conversion of Important Farmland (1,024.3 acres).</p> <p>Least impact on jurisdictional aquatic resources (203.7 acres).</p> <p>Least impact on habitat for special-status plants (nonoverlapping) (1,572.6 acres).</p>
<p>Factor 7: Substantial differences in costs among the project alternatives</p>	<p>Alternative 1 would have the third-highest capital costs: \$20.50 billion.</p>	<p>Alternative 2 would have the second-highest capital costs: \$17.74 billion.</p>	<p>Alternative 3 would have the highest capital costs: \$20.76 billion.</p>	<p>Alternative 4 would have the lowest capital costs: \$13.61 billion.</p>
<p>Summary</p>	<p>Alternative 1 would result in <i>de minimis</i> impacts on three park resources and one cultural resource and uses of two park resources and five cultural resources. Of the six permanent uses, two are high value (Coyote Creek Parkway County Park, and the Southern Pacific Depot), three are moderate value (Sunlite Baking Company, San Martin Winery, Cozzi Family Property), and one is low value (Live Oak Creamery).</p> <p>Alternative 1 would result in the second-greatest conversion of Important Farmland and impact on habitat for special-status species and the third-greatest noise impacts on residential locations, impacts on waterbodies, displacements, jurisdictional aquatic resources, and land cover types.</p> <p>Alternative 1 would also have the third-highest capital costs.</p>	<p>Alternative 2 would result in <i>de minimis</i> impacts on six park resources and uses of two park resources and eight cultural resources. Of the nine permanent uses, three are high value (Coyote Creek Parkway County Park, Southern Pacific Depot, and IOOF Orphanage Home), five are moderate value (Sunlite Baking Company, Stevens/Fisher House, Barnhart House, San Martin Winery, and Cozzi Family Property), and one is low value (Live Oak Creamery).</p> <p>Alternative 2 would result in the greatest impacts on waterbodies, displacements, jurisdictional aquatic resources, and habitat for special-status plants, but the second-greatest number of noise impacts on residential locations and the third-greatest conversion of Important Farmland. It would have the second-highest capital costs.</p>	<p>Alternative 3 would result in <i>de minimis</i> impacts on five park resources and one cultural resource and uses of two park resources and four cultural resources. Of the five permanent uses, two are high value (Coyote Creek Parkway County Park and the Southern Pacific Depot) and three are moderate value (Sunlite Baking Company, San Martin Winery, and Cozzi Family Property).</p> <p>Alternative 3 would result in the least number of noise impacts on residential locations, and second-greatest impacts on waterbodies, displacements, and impacts on jurisdictional aquatic resources. It would result in the third-greatest impact on habitat for special-status plants and the greatest conversion of Important Farmland. It would also have the highest capital costs.</p>	<p>Alternative 4 would result in <i>de minimis</i> impacts on one park resource and one cultural resource and uses of two park resources and four cultural resources. Of the five permanent uses, two are high value (Coyote Creek Parkway County Park and Southern Pacific Depot), two are moderate value (Madrone Underpass and Cozzi Family Property), and one is low value (Live Oak Creamery).</p> <p>Alternative 4 would result in the most noise impacts on residential locations, but the least impacts on waterbodies, displacements, Important Farmland, jurisdictional aquatic resources, and land cover types. It would also have the lowest capital costs.</p>

ACE = Altamont Corridor Express  
 IOOF = Independent Order of Odd Fellows  
 NRHP = National Register of Historic Places  
 SHPO = State Historic Preservation Officer  
 SOI = Secretary of the Interior  
 VTA = (Santa Clara) Valley Transportation Authority  
 UPRR = Union Pacific Railroad

## 9.2 Net Harm to Section 4(f) Property

Factors one through four in Table 9-1 consider the net harm that each alternative would cause to a Section 4(f) property.

Overall, Alternative 4 would affect the fewest Section 4(f) resources (8), compared to Alternative 1 (11), Alternative 3 (12), and Alternative 2 (16).

Alternative 4 would result in *de minimis* impacts, temporary occupancy, or permanent use of the fewest park, recreation, and open-space resources (three), compared to five resources under Alternative 1, eight resources under Alternative 2, and seven resources under Alternative 3. With all alternatives, there would be one permanent park use (Coyote Creek Parkway County Park) and two temporary park uses (Coyote Creek Parkway County Park, Field Sports County Park); the remaining impacts on park, recreation, and open-space resources would be *de minimis*.

Regarding historic properties, all four project alternatives would result in the permanent use and demolition of two resources or contributing features to these resources: Southern Pacific Depot (Diridon Station/Hiram Cahill Depot) and Cozzi Family Property. Impacts on these two properties are the same under all project alternatives and so are not differentiating factors among the project alternatives and are not discussed further. In addition to these two historic properties, each alternative would affect other Section 4(f) historic properties in which the relative value of each resource should be considered.

Alternative 1 would result in a permanent use of the Sunlite Baking Company, San Martin Winery, and Live Oak Creamery because of structure demolition, and *de minimis* impacts at Stevens/Fisher House because of minor property acquisitions. Live Oak Creamery is considered a low-value resource because it is currently unused and surrounded by chain-link fencing, has been neglected for many years, and is in an advanced state of disrepair. Sunlite Baking Company and Stevens/Fisher House are both resources of moderate value. Sunlite Baking Company was purchased in late 2016 by an investment firm, Rhyolite Enterprises LLC, likely in order to develop the area to complement San Jose's real estate boom. It is currently vacant or being rented for industrial purposes, inconsistent with its historic use, but the property is in fair condition. Stevens/Fisher House has experienced infill of modern structures, subdivision over the years, and is now adjacent to large, modern residential properties that detract from the historic feeling and setting. However, Alternative 1 would only result in *de minimis* impacts at Stevens/Fisher House because of minor property acquisitions, which would not result in the loss of the resources. San Martin Winery is also a resource of moderate value because it is still an active expression of wine making in the Santa Clara Valley and has been in consistent use as a winery as it was historically since 1933.

Alternative 2 would result in permanent uses at Sunlite Baking Company, Stevens/Fisher House, Barnhart House, San Martin Winery, IOOF Orphanage Home, and Live Oak Creamery because of structure demolition or property acquisitions. Live Oak Creamery is considered a low-value resource and was discussed in the preceding paragraph. Sunlite Baking Company, Stevens/Fisher House, Barnhart House, and San Martin Winery are moderate-value resources; Sunlite Baking Company, Stevens/Fisher House, and San Martin Winery were discussed in the preceding paragraph. Barnhart House is a moderate-value resource because there have been deviations from its historic configuration, but its setting remains rural, and the property is still in use as a residence. IOOF Orphanage Home is considered a high-value resource because it remains the last operating Odd Fellow children's home in the United States; however, Alternative 2 would not cause any structure demolition of any of the buildings on the property.

Alternative 3 would have the same 4(f) historic property impacts as Alternative 1, except Alternative 3 would not require demolition of Live Oak Creamery, a low-value resource.

Alternative 4 would result in permanent uses at Madrone Underpass and Live Oak Creamery, and *de minimis* impacts at San Martin Winery. Live Oak Creamery is a low-value resource discussed under Alternatives 1 and 2. San Martin Winery is a moderate-value resource discussed under Alternative 1; however, Alternative 4 would only result in *de minimis* impacts on the winery

because of minor property acquisitions, which would not result in the loss of the resource. Madrone Underpass is a moderate-value resource because the girder bridge, abutments, and pedestrian passage have not been visibly altered, and the property has been in consistent use as a railroad underpass since its construction.

In total, relative to Section 4(f) historic properties, Alternative 1 would affect one low-value resource, four moderate-value resources, and one high-value resource; Alternative 2 would affect one low-value resource, five moderate-value resources, and two high-value resources; Alternative 3 would affect four moderate-value resources and one high-value resource; and Alternative 4 would affect one low-value resource, three moderate-value resources, and one high-value resource. Therefore, after considering the relative value of these resources, Alternative 2 would have the greatest impacts on Section 4(f) historic property resources, and Alternative 4 would result in the least impacts on Section 4(f) historic property resources.<sup>5</sup>

As discussed in Chapter 7, Avoidance Alternatives, there are no feasible and prudent alternatives that would avoid the Section 4(f) uses identified for the project alternatives. Since Alternative 4 would result in the least impacts on Section 4(f) resources of the project alternatives, including the least impacts on park, recreation, and open-space resources and least impacts on historic property resources, Alternative 4 has the least overall harm.

### 9.3 Impacts on Environmental Resources Outside of Section 4(f) Uses

Factors five through seven in Table 9-1 show a comparison with non-Section 4(f) considerations and are helpful in determining overall least harm where the impacts on the Section 4(f) qualifying attributes of the resources do not provide a clear distinction. As shown in Table 9-1, while all four project alternatives are consistent with the project's Purpose and Need, each would result in different comparative impacts on the other resource areas. For example, Alternative 2 would result in the greatest number of displacements, impacts on habitat for special-status plants, jurisdictional aquatic resources, and waterbodies and the largest conversion of Important Farmland. Alternative 4 would have the lowest capital costs and would result in the least number of impacts on waterbodies, displacements, Important Farmland, jurisdictional aquatic resources, and land cover types. Impacts on jurisdictional aquatic resources and habitat for special-status plants are the primary considerations of the U.S. Army Corps of Engineers in its determination of the Least Environmentally Damaging Practicable Alternative. Alternative 1 would result in the second-greatest conversion of Important Farmland and impacts on habitat for special-status species and the third-greatest displacements, noise impacts on residential locations, impacts on waterbodies, jurisdictional aquatic resources, and land cover types. Alternative 1 would also have the third-highest capital costs. Alternative 3 would result in the second-greatest impacts on waterbodies, displacements, and impacts on jurisdictional aquatic resources. It would result in the third-greatest impact on habitat for special-status plants and the greatest conversion of Important Farmland. It would also have the highest capital costs.

Based on this information, while each of the project alternatives would cause impacts on resources not protected by Section 4(f), Alternative 4 would cause the least amount of impacts on non-Section 4(f) resources compared to Alternatives 1, 2, and 3.

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<sup>5</sup> Alternatives 3 and 4 would affect the same number of historic property 4(f) resources, but Alternative 3 would affect 4 moderate-value resources, while Alternative 4 would affect 1 low-value and 3 moderate-value resources, so Alternative 4 would have slightly less effects to historic property 4(f) resources.

## 10 FINAL SECTION 4(f) DETERMINATION

Based on the above considerations and consideration of the Santa Clara Parks and Recreation Department comments on the draft version of this evaluation, the Authority has determined that there is no prudent and feasible avoidance alternative to the use of the land from Coyote Creek Parkway County Park and Field County Sports Park and the proposed action includes all possible planning to minimize harm to Coyote Creek Parkway County Park and Field County Sports Park resulting from such use. The Authority's final determinations are as follows for the following properties:

- Coyote Creek Parkway County Park—Temporary occupancy and permanent use
- Field Sports County Park—Temporary occupancy

The Authority circulated a draft of this report to Santa Clara County, including the Parks and Recreation Department, for a 45-day comment period. The Authority received the Department's comments on February 22, 2022.



## 11 REFERENCES

- California High-Speed Rail Authority (Authority). 2009. *Alternatives Analysis Methods for Project Level EIR/EIS, Version 2*. Sacramento, CA.
- \_\_\_\_\_. 2013. *Cultural Resources Technical Guidance Memorandum #1: Setting the Area of Potential Effect Relative to Existing Rail Facilities*. March 26, 2013. Sacramento, CA.
- \_\_\_\_\_. 2019a. *San Jose to Merced Project Section Historic Architectural Survey Report*. June 2019.
- \_\_\_\_\_. 2019b. *San Jose to Merced Project Section Archaeological Survey Report*. July 2019.
- \_\_\_\_\_. 2020. *San Jose to Merced Project Section Draft Environmental Impact Report/Environmental Impact Statement*. April. Sacramento, CA.
- \_\_\_\_\_. 2021. *San Jose to Merced Project Section Revised Draft Environmental Impact Report/Supplemental Draft Environmental Impact Statement, Biological Resources Analysis*. April. Sacramento, CA.
- \_\_\_\_\_. 2022. *San Jose to Merced Project Section Final Environmental Impact Report/Supplemental Draft Environmental Impact Statement*. February. Sacramento, CA.
- California High-Speed Rail Authority (Authority) and Federal Railroad Administration (FRA). 2005. *Final Program Environmental Impact Report/Environmental Impact Statement (EIR/EIS) for the Proposed California High-Speed Train System*. August 2005. Sacramento, CA and Washington, DC.
- \_\_\_\_\_. 2010. *San Jose to Merced Preliminary Alternatives Analysis Report*. Prepared by Parsons. June 2010.
- \_\_\_\_\_. 2011a. *Executive Summary Supplemental San Jose to Merced Alternatives Analysis Report*. Prepared by Parsons. May 2011.
- \_\_\_\_\_. 2011b. *San Jose to Merced Section Supplemental Alternatives Analysis Report*. July 2011.
- Federal Highway Administration (FHWA). 2012. *Section 4(f) Policy Paper*. <https://www.environment.fhwa.dot.gov/legislation/section4f/4fpolicy.pdf> (accessed December 14, 2021).



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**Attachment A**  
**Santa Clara County Parks and Recreation Department**  
**Comments on Draft Individual Section 4(f) Report**



# County of Santa Clara

## Parks and Recreation Department

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Reservations (408) 355-2201

[www.parkhere.org](http://www.parkhere.org)



February 2, 2022

VIA EMAIL ONLY

California High-Speed Rail Authority  
Attn: Brett Rushing  
100 Paseo de San Antonio  
San Jose, CA 95113

**SUBJECT: Draft Individual Section 4(f) Evaluation of Two Parks in Santa Clara County for San Jose to Merced Project Section of the California High-Speed Rail System**

The County of Santa Clara ("County") received the Draft Individual Section 4(f) Evaluation of Two Parks in Santa Clara County ("Section 4(f) Evaluation" or "Evaluation") on January 7, 2022. The Evaluation is part of the California High-Speed Rail Authority ("Authority")'s California High-Speed Rail – San Jose to Merced Project Section ("Project Section") Draft Environmental Impact Report/Environmental Impact Statement (Draft EIR/EIS) in accordance with the California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA). The Authority has determined that the Coyote Creek Parkway County Park and the Field Sports County Park are Section 4(f) resources; are within the resource study area of the Project Section; and that the County has jurisdiction with respect to these resources.

Section 4(f) of the United States Department of Transportation Act of 1966, as amended, and codified in 49 United States Code (U.S.C.) Section 303, declares that "it is the policy of the United States Government that special effort should be made to preserve the natural beauty of the countryside and public park and recreation lands, wildlife and waterfowl refuges and historic sites." The Authority is responsible for Section 4(f) compliance for the High-Speed Rail Program pursuant to 23 U.S.C. Section 237. Under the NEPA Assignment Memorandum of Understanding between the Federal Railroad Administration and the State of California, effective July 23, 2019, the Authority is the federal lead agency and is responsible for compliance with NEPA and other federal environmental laws, including Section 4(f) and related U.S. Department of Transportation orders and guidance.

Board of Supervisors: Mike Wasserman, Cindy Chavez, Otto Lee, Susan Ellenberg, S. Joseph Simitian

County Executive: Jeffrey V. Smith



The County's Parks and Recreation Department (Department) operates and maintains recreational infrastructure, amenities, and opportunities on behalf of the County in Coyote Creek Parkway County Park and Field Sports County Park. The Department is responsible to provide, protect, and preserve regional parklands, including management of natural resources, protected species, and sensitive habitats. The Department has participated in numerous agency meetings held by the Authority, submitted several comment letters on the Project Section, including the Draft EIR/DEIS, and coordinated with the Authority on the Section 4(f) analysis.

As stated in the Evaluation and cover letter provided on January 7, 2022, "...the Authority has preliminarily determined that there is no prudent and feasible avoidance alternative to the use of the land from Coyote Creek Parkway County Park and Field County Sports Park and the proposed action includes all possible planning to minimize harm to Coyote Creek Parkway County Park and Field County Sports Park resulting from such use." These impacts include the temporary occupancy of 3.52 acres and permanent use of 0.31 acre of Coyote Creek Parkway County Park and temporary occupancy of 2.04 acres of Field Sports County Park.

The Department submits the following comments on the preliminary determination for impacts to Section 4(f) resources. The comments provided are solely based upon the Department's analysis of the Project Section and Section 4(f) Evaluation for impacts to County parklands. The comments are not based on the County's support for the Project Section or an alternative identified in the Draft EIR/EIS or Section 4(f) Evaluation.

- Section 1.1, *Laws, Regulations, and Orders*, identifies the applicable laws, regulations, and orders that apply to this Evaluation.

In addition to the regulations identified in the Evaluation, parklands in California are also protected under the Public Park Preservation Act of 1971 (commencing at California Public Resources Code section 5400 and following). This Act requires that any public agency that is acquiring public parkland for a non-park use must provide sufficient compensation, land, or both to enable the agency with jurisdiction to replace the parkland and recreational facilities.

The Department also has restrictions on the uses of County parkland under Section 604 of the County of Santa Clara Charter, which is approved by the voters of Santa Clara County and is referred to as the Park Charter Fund. The Park Charter Fund can only be used for the acquisition, development, operation, and maintenance of County parks. Any use of parklands that may be required for the Project Section must be consistent with the Park Charter Fund or may require transfer of property rights and compensation.

Board of Supervisors: Mike Wasserman, Cindy Chavez, Otto Lee, Susan Ellenberg, S. Joseph Simitian

County Executive: Jeffrey V. Smith



- Section 5, *Section 4(f) Applicability Analysis*, identifies two Parks and Recreation Areas that are subject to Section 4(f) use, Coyote Creek Parkway County Park and Field Sports County Park, that are under the jurisdiction of the Department.

The Department concurs with the Authority's conclusion that Coyote Creek Parkway County Park and Field Sports County Park are Section 4(f) resources and contribute significantly to unique recreational opportunities in Santa Clara County. Coyote Creek Parkway County Park includes a 15-mile segment of the Coyote Creek Trail, a heavily utilized (about 63,000 users in 2021) regional trail that is the backbone of the County's 880+ mile existing and planned countywide trail network. Field Sports County Park is the County's only publicly owned firing range and provides ranges for rifle/pistol and trap/skeet.

- Section 5, *Section 4(f) Applicability Analysis*, identifies the potential permanent acquisitions and temporary construction easements under each High-Speed Rail alternative.

The Department seeks to minimize all impacts to County parklands. For the purposes of this Evaluation, the Department's preference is that the Authority select the alternative that minimizes temporary and permanent impacts to Coyote Creek Parkway County Park and temporary impacts to Field Sports County Park.

- Section 6.2, *Individual Section 4(f) Evaluation*, states that for Coyote Creek County Park, "Project features (PK-IAMF#1) will maintain access to park and recreation facilities because the contractor will prepare and submit to the Authority a technical memorandum that identifies project design features to be implemented to minimize impacts on parks and recreation facilities, such as providing safe and attractive access for existing travel modes (e.g., motorists, bicyclists, pedestrians) to existing park and recreation facilities."

The Department requests active participation in the preparation of any technical memorandum or architectural designs to ensure recreational access is not altered because of the permanent occupancy of the 0.31 acre of Coyote Creek Parkway County Park. The Department has existing infrastructure and recreational amenities in Coyote Creek Parkway County Park, as well as planned improvements identified in the adopted Coyote Creek Parkway Integrated Natural Resources Management Plan and Master Plan (2007). Coordination with the Department will ensure that any permanent improvements associated with the High-Speed Rail will not restrict or prohibit current or future recreational use of a parcel, which would likely be considered significant harm to a Section 4(f) resource like Coyote Creek Parkway County Park. In addition, coordination will ensure that proposed permanent improvements (e.g., wildlife undercrossings to reduce impacts on wildlife) will be compatible with current and anticipated public recreational access.

Board of Supervisors: Mike Wasserman, Cindy Chavez, Otto Lee, Susan Ellenberg, S. Joseph Simitian

County Executive: Jeffrey V. Smith



- In addition, Section 6.2, *Individual Section 4(f) Evaluation*, states, "...the contractor will prepare a technical memorandum for the Authority documenting how the contractor will maintain connections to the unaffected park portions or nearby roadways during construction" (PR-MM#2 of the Draft EIR/EIS).

The Department requests that the Authority consult with the Department prior to approval of any technical memorandums to ensure that access for recreation is maintained during the temporary occupancy. Any temporary occupancy of either of these two County parks must be coordinated with the Department to minimize disruption to all public recreational uses. Consultation with the Department will ensure that High-Speed Rail has minimized harm to both County parks.

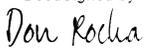
The Department will monitor construction of the High-Speed Rail to ensure that public recreation and transportation mitigation measures from the Draft EIR/EIS are implemented. These measures include providing alternative access via temporary detours to park resources (PR-MM#1) and providing adequate signage and advanced notification so that motorists and pedestrians will continue to have access to parks, recreation, and open space resources.

- Section 8, *Measures to Minimize Harm*, states "Final design will continue to minimize right-of-way impacts on Coyote Creek Parkway County Park and Field Sports County Park. Acquisition of land will be pursuant to California Code of Civil Procedure Section 1240 for the permanent use of land in each park."

In accordance with the California Public Park Preservation Act, any temporary or permanent acquisition by the Authority of County parkland, even when the Authority is exercising eminent domain, will require sufficient compensation to the County, consistent with Public Resources Code Section 5404 and Section 5405, for the loss of, or impact to, parklands and recreational opportunities.

The Department appreciates the opportunity to provide comments on the Draft Individual Section 4(f) Evaluation of Two Parks in Santa Clara County. If you have questions related to these comments, please contact me at (408) 355-2360 or e-mail at [Jeremy.Farr@prk.sccgov.org](mailto:Jeremy.Farr@prk.sccgov.org).

Sincerely,

DocuSigned by:  
  
80620979E487437  
Don Rocha, Director  
County of Santa Clara, Parks and Recreation Department

Board of Supervisors: Mike Wasserman, Cindy Chavez, Otto Lee, Susan Ellenberg, S. Joseph Simitian

County Executive: Jeffrey V. Smith

