

California High-Speed Rail Authority

San Jose to Merced Project Section

Final
Environmental Impact Report/
Environmental Impact Statement

Final CEQA Findings of Fact and
Statement of Overriding
Considerations

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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Attachments

Attachment A: Mitigation Measures – Extract of Mitigation Monitoring and Enforcement Plan (MMEP)

ACRONYMS AND ABBREVIATIONS

Acronym	Definition
AB	Assembly Bill
ACE	Altamont Corridor Express
ALAN	artificial light at night
APE	area of potential effects
APLIC	Avian Power Line Interaction Committee
ATP	archaeological treatment plan
Authority	California High-Speed Rail Authority
BAAQMD	Bay Area Air Quality Management District
BMP	best management practice
BRMP	biological resources management plan
CAAQS	California ambient air quality standards
Caltrans	California Department of Transportation
CARB	California Air Resources Board
CC-C	central coast central
CCC	Central California coast
CC-N	central coast north
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
C.F.R.	Code of Federal Regulations
CGP	construction general permit
CMP	construction management plan
CP	control point
CRHR	California Register of Historical Resources
CTP	construction transportation plan
CO	carbon monoxide
CO ₂	carbon dioxide
CO _{2e}	carbon dioxide equivalent
CWA	Clean Water Act
dB	decibel
dBA	A-weighted decibel
DDV	Diridon design variant
Draft EIR/EIS	<i>San Jose to Merced Project Section Draft Environmental Impact Report/Environmental Impact Statement</i>
EFH	essential fish habitat

Acronym	Definition
EIR	environmental impact report
EIS	environmental impact statement
ESA	environmentally sensitive area
FESA	federal Endangered Species Act
Final EIR/EIS	<i>San Jose to Merced Project Section Final Environmental Impact Report/Environmental Impact Statement</i>
FRA	Federal Railroad Administration
GAMMP	Groundwater Adaptive Management and Monitoring Program
GEA	Grasslands Ecological Area
GHG	greenhouse gas
GIS	geographic information system
HCP	habitat conservation plan
HMP	habitat management plan
HSR	high-speed rail
HUC	hydrologic unit code
I-	Interstate
IAMF	impact avoidance and minimization feature
IBA	Important Bird Area
LEDPA	least environmentally damaging practicable alternative
L _{eq}	equivalent sound level
LID	low-impact development
LMF	light maintenance facility
LOS	level of service
MMBtu	million British thermal units
MOU	memorandum of understanding
MOWF	maintenance of way facility
MOWS	maintenance of way siding
mph	miles per hour
MT	mainline track
MTC	Metropolitan Transportation Commission
NAAQS	national ambient air quality standards
NEPA	National Environmental Policy Act
NO ₂	nitrogen dioxide
NO _x	nitrogen oxide
NRHP	National Register of Historic Places
NZE	near-zero emission
O ₃	ozone
OCS	overhead contact system

Acronym	Definition
O&M	operations and maintenance
OSHA	Occupational Safety and Health Administration
PAA	<i>San Jose to Merced Preliminary Alternatives Analysis Report</i>
PG&E	Pacific Gas & Electric
PM	particulate matter
project or project extent	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>
ROG	reactive organic gas
RRP	restoration and revegetation plan
RSA	resource study area
RTP	Regional Transportation Plan
RWQCB	regional water quality control board
SAA	San Jose to Merced Supplemental Alternatives Analysis report
SB	Senate Bill
SCCC	south-central California coast
SCVHA	Santa Clara Valley Habitat Agency
SCVHP	Santa Clara Valley Habitat Plan
SFBAAB	San Francisco Bay Area Air Basin
SIL	significant impact level
SJVAB	San Joaquin Valley Air Basin
SJVAPCD	San Joaquin Valley Air Pollution Control District
SLCP	short-lived climate pollutant
SOI	Secretary of Interior
SR	State Route
SWPPP	stormwater pollution prevention plan
SWRCB	State Water Resources Control Board
TAMC	Transportation Agency for Monterey County
TBM	tunnel boring machine
TCE	temporary construction easement
TDV	tunnel design variant
TPF	traction power facility
TPSS	traction power substations
UPR	Upper Pajaro River
UPRR	Union Pacific Railroad
US	U.S. Highway
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency

Acronym	Definition
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
Valley-to-Valley	Central Valley to Silicon Valley
VCP	vegetation control plan
VdB	vibration decibel
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
ZE	zero emission

1 INTRODUCTION

The California Environmental Quality Act (CEQA) Findings of Fact and Statement of Overriding Considerations are intended to fulfill the responsibilities of the California High-Speed Rail Authority (Authority) under CEQA for its approval for the San Jose to Central Valley Wye Project Extent (project or project extent), part of the California High-Speed Rail (HSR) System. CEQA provides that no public agency shall approve a project or program, as proposed, if it would result in significant environmental effects, as identified in an environmental impact report (EIR), unless it adopts and incorporates feasible mitigation to avoid and reduce such effects and adopts appropriate findings.

Section 15091 of the CEQA Guidelines provides as follows:

- a) No public agency shall approve or carry out a project for which an EIR has been certified which identifies one or more significant environmental effects of the project unless the public agency makes one or more written findings for each of those significant effects, accompanied by a brief explanation of the rationale for each finding. The possible findings are:
 - 1) Changes or alterations have been required in, or incorporated into, the project, which avoid or substantially lessen the significant environmental effect as identified in the final EIR.
 - 2) Such changes or alterations are within the responsibility and jurisdiction of another public agency and not the agency making the finding. Such changes have been adopted by such other agency or can and should be adopted by such other agency.
 - 3) Specific economic, legal, social, technological, or other considerations, including provision of employment opportunities for highly trained workers, make infeasible the mitigation measures or project alternatives identified in the final EIR.

CEQA Guidelines Section 15093 further provides:

- a) CEQA requires the decision-making agency to balance, as applicable, the economic, legal, social, technological, or other benefits, including region-wide or statewide environmental benefits, of a proposed project against its unavoidable environmental risks when determining whether to approve the project. If the specific economic, legal, social, technological, or other benefits, including region-wide or statewide environmental benefits, of a proposed project outweigh the unavoidable adverse environmental effects, the adverse environmental effects may be considered “acceptable.”

These findings include a description of the Preferred Alternative (Alternative 4 with a San Jose Diridon Station, a Downtown Gilroy Station, a maintenance of way facility [MOWF] south of Gilroy, and as further detailed in the Final EIR/EIS Executive Summary) for the portion of the project extent that runs from Scott Boulevard, just north of San Jose Diridon Station, to Carlucci Road near Los Banos in Merced County. The Preferred Alternative is approximately 90 miles in length. The findings described herein concern potentially significant environmental impacts and mitigation to address such impacts, a discussion of cumulative and growth-inducing impacts, and a Statement of Overriding Considerations.

The custodian of the documents and other materials that constitute the record of proceedings upon which these CEQA Findings of Fact and Statement of Overriding Considerations are based is the California High Speed Rail Authority, Director of Environmental Services, 770 L Street, Suite 620 MS-1, Sacramento, California 95814, (916) 324-1541.

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2 PROJECT DESCRIPTION

2.1 Background—Description of Statewide High-Speed Rail System

The Authority, a state governing board formed in 1996, is responsible for planning, designing, constructing, and operating the California HSR System. Its 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 tracks 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 Authority and the Federal Railroad Administration (FRA) prepared two first-tier EIR/environmental impact statement (EIS) documents to select preferred alignments and station locations to advance for more detailed study in second-tier EIRs/EISs. Figure 1 shows the general corridors and station locations of the statewide HSR system that the Authority and FRA selected following the first-tier EIRs/EISs. The California HSR System will use state-of-the-art, electrically powered, high-speed, steel-wheel-on-steel-rail technology, including contemporary safety, signaling, and automated train control systems, with trains capable of operating up to 220 miles per hour (mph) over a fully grade-separated, dedicated track alignment. Following completion of the first-tier, programmatic environmental review and decisions, the Authority and FRA divided the statewide HSR system into individual project sections for second-tier environmental review (Authority 2009a). One of these sections is the San Jose to Merced Project Section.¹

¹ Second-tier planning and environmental review for the HSR system has resulted in some sections being blended with conventional passenger rail, rather than having dedicated track. The Preferred Alternative for the San Jose to Merced Project Section discussed in these findings is a combination of a blended system from San Jose to Gilroy and a dedicated system south of Gilroy.



Figure 1 California High-Speed Rail Statewide System

2.2 Description of the Preferred Alternative—Scott Boulevard to Carlucci Road

Development of the Preferred Alternative was intended to extend blended electric-powered passenger railroad infrastructure from the southern limit of Caltrain's Peninsula Corridor Electrification Project through Gilroy. The Preferred Alternative would be a blended, at-grade alignment that would operate on two electrified passenger tracks and one conventional freight track predominantly within the existing Caltrain and Union Pacific Railroad (UPRR) rights-of-way to Gilroy. As a result, it includes numerous at-grade crossings that would require four-quadrant gates between Santa Clara and Gilroy.

The Preferred Alternative (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) would begin at Scott Boulevard in blended service with Caltrain on an at-grade profile following Caltrain mainline track (MT) 2 and MT3 south along the east side of the existing Caltrain corridor. The existing Lafayette Street pedestrian overpass would remain in place, as would the De La Cruz Boulevard and West Hedding Street roadway overpasses. New UPRR track east of Caltrain MT1 would start just south of Emory Street to maintain freight movement capacity north of San Jose Diridon Station. The existing Santa Clara Station would remain, and the existing College Park Caltrain Station would be reconstructed. A new bridge would be built over Taylor Street for UPRR to tie into the Lenzen Wye.

The blended at-grade alignment would continue along MT2 and MT3 to enter new dedicated HSR platforms at grade at the center of San Jose Diridon Station (Final EIR/EIS: Figure 2-66). Continuing south, the blended at-grade three-track alignment would 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 would remain in place. Four-quadrant gates with channelization would be built at Auzerais Avenue and West Virginia Street. A new bridge for the blended HSR/MT3 track over Interstate (I-) 280 would be constructed. The existing underpasses at Bird Avenue and Delmas Avenue would be reconstructed, as would the rail bridge overpasses. New standalone rail bridges over Prevost Street, State Route (SR) 87, the Guadalupe River, and Willow Street would be built for MT3. MT1 and MT2 would remain on the existing structures. The existing Tamien Caltrain Station would remain in place.

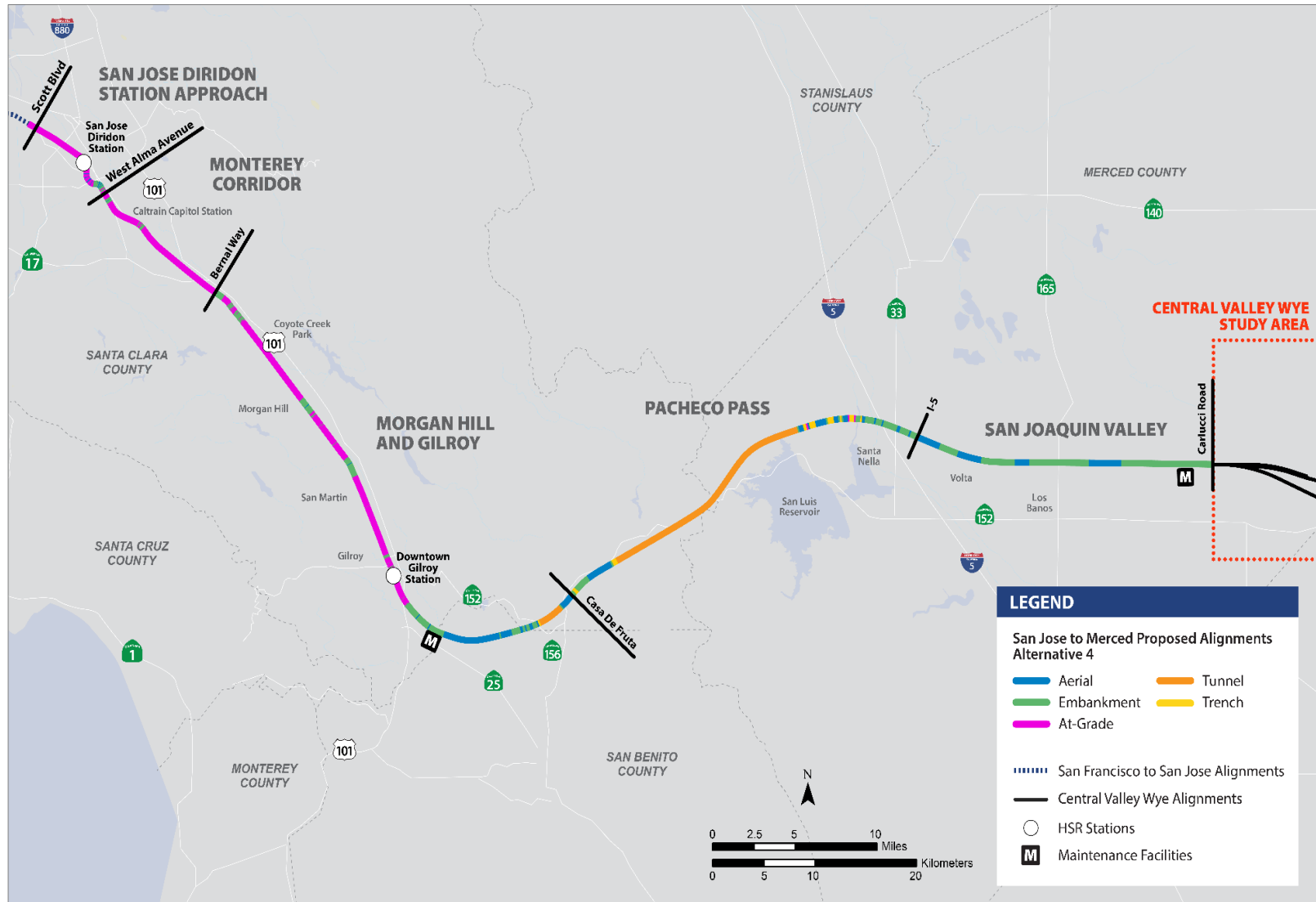
From Bernal Way in South San Jose, the alignment would extend through Morgan Hill and San Martin to the Downtown Gilroy Station, then curve generally east across the Pajaro River floodplain and through a portion of northern San Benito County before entering Tunnel 1 at the base of the Diablo Range. In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

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

The Downtown Gilroy Station approach would be at grade with dedicated HSR tracks to the west of UPRR between Old Gilroy Street/7th Street and 9th Street (Final EIR/EIS: Figure 2-68). A new HSR station would be built south of the existing Caltrain station. The Preferred Alternative would include a 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 there, the Pacheco Pass Subsection is approximately 25 miles long. The alignment would 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 would entail 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 continues 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, UPRR, 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.

Figure 2 shows the Preferred Alternative for the San Jose to Merced Project Section.



Source: Authority 2019a

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 Preferred Alternative for the San Jose to Merced Project Section

2.2.1 Impact Avoidance and Minimization Features

The Authority has committed to implementing programmatic impact avoidance and minimization features (IAMF) consistent with the: (1) 2005 Statewide Program EIR/EIS (Authority and FRA 2005), (2) 2008 Bay Area to Central Valley Program EIR/EIS (Authority and FRA 2008), and (3) 2012 Partially Revised Final Program EIR (Authority 2012a) into the HSR project. The Authority, in consultation with federal and state agencies, has developed a set of standardized IAMFs that it is applying to the statewide HSR system, including the San Jose to Merced Project Section. The IAMFs represent practices that are standard or best practices in the construction industry and are incorporated into the project definition. The Authority will implement these IAMFs during project design, construction, operation, and maintenance of the San Jose to Merced Project Section.

The Preferred Alternative incorporates IAMFs as identified and discussed in the *San Jose to Merced Project Section Final Environmental Impact Report/Environmental Impact Statement* (Final EIR/EIS) (Authority 2022a) and described in detail in Appendix 2-E, Project Impact Avoidance and Minimization Features, of the Final EIR/EIS. The Preferred Alternative's compliance with regulatory requirements, including permitting and coordination with regulatory agencies for many project-related activities, provide additional assurance that certain potential adverse environmental impacts will be avoided, or at least minimized.

The applicable regulatory requirements and IAMFs that are part of the Preferred Alternative are described for the following issue areas in more detail in the corresponding chapters of the Final EIR/EIS and are also listed in Table S-2 of the Final EIR/EIS:

- Transportation – Sections 3.2.2 and 3.2.4.2
- Air Quality and Greenhouse Gases – Sections 3.3.2 and 3.3.4.2
- Noise and Vibration – Sections 3.4.2 and 3.4.4.3
- Electromagnetic Interference and Electromagnetic Fields – Sections 3.5.2 and 3.5.4.2
- Public Utilities and Energy – Sections 3.6.2 and 3.6.4.2
- Biological and Aquatic Resources – Sections 3.7.2 and 3.7.4.2
- Hydrology and Water Resources – Sections 3.8.2 and 3.8.4.2
- Geology, Soils, Seismicity, and Paleontological Resources – Sections 3.9.2 and 3.9.4.2
- Hazardous Materials and Waste – Sections 3.10.2 and 3.10.4.2
- Safety and Security – Sections 3.11.2 and 3.11.3.2
- Socioeconomics and Communities – Sections 3.12.2 and 3.12.4.2
- Station Planning, Land Use, and Development – Sections 3.13.2 and 3.13.4.2
- Agricultural Farmland – Sections 3.14.2 and 3.14.4.2
- Parks, Recreation, and Open Space – Sections 3.15.2 and 3.15.4.2
- Aesthetics and Visual Quality – Sections 3.16.2 and 3.16.4.2
- Cultural Resources – Sections 3.17.2 and 3.17.5.3
- Regional Growth – Section 3.18.2
- Cumulative Impacts – Section 3.19.2

These IAMFs are an enforceable component of the Preferred Alternative and are identified in the Mitigation Monitoring and Enforcement Plan. Their implementation will be monitored along with other elements of the project in the Mitigation Monitoring and Enforcement Plan.

3 FINDINGS REGARDING THE NEED FOR FURTHER RECIRCULATION

Public Resources Code Section 21092.1 and CEQA Guidelines Section 15088.5 provide that a lead agency is required to recirculate an EIR when “significant new information” is added to the EIR after circulation of a Draft EIR for comment, and prior to certification. As used in Guidelines Section 15088.5, “information” can include changes to a proposed project or its environmental setting as well as the addition of data or other information. Section 15088.5 also provides that new information added to an EIR is not “significant” unless the EIR is changed in a way that deprives the public of a meaningful opportunity to comment upon a substantial adverse environmental effect of the project or a feasible way to mitigate or avoid such an effect that the project’s proponent has declined to implement.

The Authority makes the following findings of fact related to the need for further recirculation:

- The Final EIR/EIS includes changes to the environmental impacts analysis in Chapters 3 through 5 in response to public comments on the *San Jose to Merced Project Section Draft Environmental Impact Report/Environmental Impact Statement (Draft EIR/EIS) (Authority 2020b)* and 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 2021a)*.
- The Final EIR/EIS also includes new and revised mitigation measures in Chapters 3 and 5 in response to public comments on the Draft EIR/EIS and on the Revised/Supplemental Draft EIR/EIS, as well as continued environmental justice engagement with communities along the corridor after publication of the Draft EIR/EIS and Revised/Supplemental Draft EIR/EIS. These measures include site-specific traffic mitigation, offsetting mitigation for environmental justice communities, and wildlife connectivity mitigation. The Final EIR/EIS analyzes the secondary effects of implementing these measures and did not conclude that there would be new significant impacts resulting from implementation that have not already been evaluated and addressed in other sections of the Final EIR/EIS.
- The new information included in the Final EIR/EIS is adequately and transparently summarized in the Summary and described in more detail in each individual section/chapter of the Final EIR/EIS.
- Although the Final EIR/EIS includes updates to impact data and calculations, the overall analysis, conclusions, and CEQA significance determinations have not changed from those presented in the Draft EIR/EIS and Revised/Supplemental Draft EIR/EIS in a manner that would qualify as “significant” within the meaning of Guidelines Section 15088.5.

Based on these facts, the Authority finds that the new information included in the Final EIR/EIS and changes to impacts analysis based on public comments do not require further recirculation for additional public review and comment.

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4 FINDINGS ON SPECIFIC IMPACTS AND MITIGATION MEASURES

The environmental effects of the Preferred Alternative that would be potentially significant are described in Chapter 3, Affected Environment, Environmental Consequences, and Mitigation Measures, of Volume 1 of the Final EIR/EIS. These impacts are set forth and summarized below for the Preferred Alternative, along with mitigation measures the Authority adopts that will avoid or substantially lessen those potentially significant or significant impacts. The impact and mitigation measure findings below depend upon and therefore incorporate by reference the full analysis and conclusions contained within the Final EIR/EIS.

These findings also set forth those impacts that the Authority finds cannot with certainty be avoided or reduced to a less-than-significant level even with the adoption of all feasible mitigation measures identified in the Final EIR/EIS. In adopting these findings and mitigation measures, the Authority also adopts a Statement of Overriding Considerations. The Statement of Overriding Considerations describes the economic, social, and other benefits of the Preferred Alternative that will render these significant unavoidable environmental impacts acceptable.

The Authority is not required to make findings or adopt mitigation measures or policies as part of this decision for impacts that are less than significant and require no mitigation.

All resource areas include one or more less-than-significant impacts without mitigation or beneficial impacts, as listed below:

- Transportation
- Air Quality and Greenhouse Gases (GHGs)
- Noise and Vibration
- Electromagnetic Fields and Electromagnetic Interference*
- Public Utilities and Energy*
- Biological and Aquatic Resources
- Hydrology and Water Resources
- Geology, Soils, Seismicity, and Paleontological Resources*
- Hazardous Materials and Waste
- Safety and Security
- Socioeconomics and Communities*
- Station Planning, Land Use, and Development*
- Agricultural Farmland
- Parks, Recreation, and Open Space
- Aesthetics and Visual Quality
- Cultural Resources
- Regional Growth*

Resource areas for which all impacts in the Final EIR/EIS were identified as less than significant without mitigation measures or beneficial are designated by an asterisk (*) in the list above and are not discussed further in this document. Impacts within a resource area which were identified as less than significant without mitigation measures are also generally not discussed further in this document.

4.1 Transportation (Section 3.2 of the Final EIR/EIS)

Construction of the Preferred Alternative would result in potentially significant temporary impacts on bus transit, passenger rail operations, and freight rail operations and permanent impacts on bus transit. Operation of the Preferred Alternative would result in continuous permanent impacts on bus services. All potentially significant impacts under the Preferred Alternative would be mitigated to less than significant.

4.1.1 Impact TR#10: Temporary Impacts on Bus Transit

Project-related construction staging and traffic would interfere with bus transit at the existing San Jose Diridon and Downtown Gilroy Stations only. The construction of the HSR stations, platforms,

and track alignment would require temporary construction easements (TCEs). The TCEs would require the temporary closure of parking areas, bus stops, transit stations, or roadway travel lanes. Any closure of bus stops, transit stations, roadways, or transit lines during construction would be temporary.

There is the potential for interference with bus transit because construction vehicles or temporary roadway closures would interfere with bus routes and bus stops, which, in turn, would materially decrease the performance of certain bus routes. Changes to bus routes and bus stops will be managed through development and implementation of a project-specific construction transportation plan (CTP) (TR-IAMF#2) and construction management plan (CMP) to maintain transit access (TR-IAMF#11), but material decreases in certain bus routes will still occur. The CTP and CMP will include methods to maintain bus transit operations and access including traffic control methods, safe alternate access locations, restrictions on construction hours, designated truck routes, and construction vehicle parking to minimize operations hazards and interference with the local roadway network. Decreases to the performance of bus transit facilities would be minimized through implementation of plans to control and manage construction vehicle traffic; however, material decreases in the performance of certain bus routes would still occur.

However, even with these IAMFs, there is a potential for the Preferred Alternative to impact the performance of certain bus routes. This impact is significant under CEQA (Final EIR/EIS: page 3.2-85).

Implementation of the following measure mitigates this impact: TR-MM#2: Install Transit Signal Priority. Because of length, mitigation measure text is presented separately in Attachment A, Mitigation Measures, of these CEQA Findings.

Mitigation Measure TR-MM#2 will prioritize bus transit by installing transit signal priority at key intersections in the San Jose Diridon Station and the Gilroy Station areas prior to construction. This mitigation measure will be effective in improving the speed and reliability of bus routes affected by project construction by identifying targeted improvements to enhance operations.

Implementing TR-MM#2 would not result in secondary impacts because operations improvements will be targeted and coordinated with local authorities to benefit users of bus transit services, while not adversely affecting other modes of travel.

The Authority finds that Mitigation Measure TR-MM#2 is required under the Preferred Alternative and that implementation of this mitigation measure will reduce impacts on bus transit to a less-than-significant level.

4.1.2 Impact TR#11: Temporary Impacts on Passenger Rail Operations

Project-related construction, staging, and traffic would contribute to temporary interference with passenger rail transit. The construction of the HSR stations, platforms, and track alignment would require TCEs. The TCE may require the temporary closure of transit stations, passenger rail platforms, and passenger rail track for other operators where the systems interface. Any closure of passenger rail stations, platforms, and track during construction would be temporary (on the scale of hours or days except as related to the Caltrain College Park Station). Where passenger rail stations are closed (other than College Park), temporary stations would be established to avoid cessation of service at that station.

The contractor would attempt to minimize disruption to passenger rail facilities or shorten the length of time that these facilities would be inoperable. To minimize conflicts with passenger rail transit caused by construction, the contractor would repair any damaged sections to the equivalent of their original structural condition or better and would implement scheduling and the use of existing alternative tracks where available.

The following IAMFs will be included as part of the project to minimize interference with passenger rail transit.

Contractors will construct a shoofly track, a temporary track that allows trains to bypass construction sites (TR-IAMF#9) for the temporary relocation of the College Park, Caltrain Capitol,

Morgan Hill, San Martin, and Gilroy Stations. When connecting existing tracks to shoofly tracks, there may be a temporary period of service disruption. The temporary disruption will occur over several hours to several days. Where feasible, the contractor will schedule cessation of passenger rail service during the night or on weekends to minimize disruption of passenger rail service. Upon completion, HSR contractors will open and repair tracks or construct new mainline track and remove the temporary shoofly track.

The contractor will identify specific measures in the CMP (TR-IAMF#11) to maintain transit access and safe and adequate access for transit users during construction activities. In addition, the CTP will include methods to minimize construction traffic. A traffic control plan developed as part of the CTP will include provisions for maintaining traffic flow and access and minimizing operations hazards through alternative access and detour provisions, routes for construction traffic, and scheduled transit access. The contractor will establish construction truck routes, restrictions on construction hours, and construction parking as part of the CTP. While implementation of the CMP will control passenger rail operations and minimize disruption, there will still be residual disruptions to passenger rail operation at times.

However, even with these IAMFs, there is a potential for the Preferred Alternative to impact the passenger rail operations. This impact is significant under CEQA (Final EIR/EIS: page 3.2-88).

Implementation of the following measure mitigates this impact: TR-MM#3: Railway Disruption Control Plan. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

Mitigation Measure TR-MM#3 will minimize the duration of construction in areas that require temporary closures, limit construction hours, and plan for coordination between the construction contractor and passenger rail service providers so that disruptions will be limited to a maximum of several hours or several days. 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 level of service (LOS), while allowing for an expeditious completion of construction. The construction contractor will coordinate with passenger rail providers (Caltrain, Altamont Corridor Express [ACE], Capitol Corridor, Transportation Agency for Monterey County [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. 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. This mitigation measure will be effective in minimizing the disruption of passenger rail operations.

Implementing TR-MM#3 would not result in secondary impacts because it is anticipated that all identified improvements will occur in the existing rights-of-way or in the project footprint of the Preferred Alternative.

The Authority finds that Mitigation Measure TR-MM#3 is required under the Preferred Alternative and that implementation of this mitigation measure will reduce impacts on passenger rail to a less-than-significant level.

4.1.3 Impact TR#12: Permanent Impacts on Bus Transit

Project construction would require modifications and closures throughout the roadway network to accommodate the stations, platforms, track alignment, and MOWF. In the Downtown Gilroy Station area, the Preferred Alternative would affect high-frequency Santa Clara Valley Transportation Authority (VTA) bus route 68 through project-related roadway closures.

The Preferred Alternative would have a permanent impact on bus transit. This impact is significant under CEQA (Final EIR/EIS: page 3.2-89).

Implementation of the following measure mitigates this impact: TR-MM#2: Install Transit Signal Priority. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

Mitigation Measure TR-MM#2 will prioritize bus transit by installing transit signal priority at key intersections, including the Gilroy Station area, prior to project operations. This mitigation measure will be effective in improving the speed and reliability of bus routes affected by project-related trips by identifying targeted improvements to enhance operations.

Implementing TR-MM#2 would not result in secondary impacts because operations improvements will be targeted and coordinated with local authorities to benefit users of bus transit services, while not adversely affecting other modes of travel.

The Authority finds that Mitigation Measure TR-MM#2 is required under the Preferred Alternative and that implementation of this mitigation measure will reduce permanent impacts on bus transit to a less-than-significant level.

4.1.4 Impact TR#13: Continuous Permanent Impacts on Bus Services

Vehicle trips around the stations would increase when the project becomes fully operational because of the addition of HSR passengers and workers traveling to and from station areas. This added traffic would lead to increased volumes, congestion, and delays around San Jose Diridon Station and the Gilroy station. As population and employment would continue to increase between 2029 and 2040, the 2029 No Project conditions would have lower traffic volumes and shorter delays than in 2040. Gate-down time at the at-grade crossings under the Preferred Alternative would increase delay on routes that travel through at-grade crossings. Twenty-seven intersections would operate at LOS E or F in the Monterey Corridor Subsection in the 2029 Plus Project conditions versus 31 in the 2040 Plus Project conditions.

The increased congestion and delay would occur along high-frequency VTA bus routes (routes with service every 15 minutes or less), contributing to bus performance delay for VTA's services. The addition of project-related vehicle trips would affect bus on-time performance and operating speeds. The Preferred Alternative would add project-related trips affecting 10 high-frequency bus routes near San Jose Diridon Station, Monterey Road, and the Gilroy station. It would also add gate-down time, further affecting one high-frequency bus route in the Monterey Corridor Subsection.

The Preferred Alternative would have a permanent impact on bus services. This impact is significant under CEQA (Final EIR/EIS: page 3.2-90).

Implementation of the following measure mitigates this impact: TR-MM#2: Install Transit Signal Priority. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

Mitigation Measure TR-MM#2 will improve bus transit operations on Monterey Road and in the San Jose Diridon Station and the Gilroy station areas by installing transit signal priority at key intersections. This mitigation measure will be effective in improving the speed and reliability of bus routes affected by project-related trips by identifying targeted improvements to enhance operations.

Implementing TR-MM#2 would not result in secondary impacts because operations improvements will be targeted and coordinated with local authorities to benefit users of bus transit services, while not adversely affecting other modes of travel.

The Authority finds that Mitigation Measure TR-MM#2 is required under the Preferred Alternative and that implementation of this mitigation measure will reduce permanent impacts on bus services to a less-than-significant level.

4.1.5 Impact TR#20: Temporary Impacts on Freight Rail Operations

The construction of the HSR stations, platforms, and track alignment would require building in certain areas currently used for freight service. Construction may require the temporary closure of tracks presently used by freight north of Control Point (CP) Coast. Under the Preferred Alternative, HSR would have dedicated tracks from Gilroy to Carlucci Road in Merced County. From San Jose to Gilroy, the Preferred Alternative would operate on dedicated tracks for Caltrain

and HSR, which would be separate from a third track that would be used for freight and other passenger rail operations (Amtrak Starlight and the TAMC service to Salinas). Between San Jose and Gilroy, there would remain adequate separate rail line capacity for potential freight growth, as described in Table 3.2-22 of the Final EIR/EIS. From San Jose Diridon to CP Coast, HSR would share track with Caltrain on MT-2 and MT-3, while freight would operate on MT-1; the project would have no impact on freight rail operations or access to the Newhall Yard. From Scott Boulevard to CP Coast, HSR and freight would both share MT-1 and MT-2, with potential freight timing and capacity conflicts.

The following IAMF will be implemented as part of the project to minimize temporary disruption of freight rail operations.

Per TR-IAMF#9, the project contractor will 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, a shoofly track will be built to allow existing train lines to bypass any areas closed for construction activities where feasible. Upon completion, tracks will be opened and repaired or new mainline track will be built, and the temporary shoofly track will be removed. Shoofly tracks are only feasible in areas with unconstrained right-of-way with adequate space and may not be feasible in constrained areas. Where shoofly tracks are not feasible, there could be temporary delays on the order of hours or at most a few days, and the closures would usually occur at nights and on weekends and holidays to minimize disruption. Based on dispatch data, the Mission Bay freight service should be able to complete normal round-trip service most of the time. At times, freight operators may not be able to complete round-trip service in a single night using a single train. In this case, trips may need to be staggered over several nights, as is currently done on the South City Local between South San Francisco and San Francisco. Alternatively, freight operators could employ additional trains operating in each direction (one-way transit per night) or longer trains in order to maintain the same LOS as a round trip that they would otherwise complete in a single night.

Constraining freight to periods outside of peak passenger service hours would require a change in current practices and would require changes in freight operations practices north of CP Coast. However, through use of longer consists or staggering over several nights, the compression of freight service hours would not result in a diversion of freight hauling from freight trains to trucks or other modes and, thus, would not result in any potential secondary impacts related to air quality, GHG emissions, noise, or traffic congestion.

However, even with this IAMF, there is a potential for the Preferred Alternative to impact freight rail operations. This impact is significant under CEQA (Final EIR/EIS: page 3.2-102).

Implementation of the following measure mitigates this impact: TR-MM#3: Railway Disruption Control Plan. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

Mitigation Measure TR-MM#3 will minimize the duration of construction in areas that require temporary closures, limit construction hours, and plan for coordination between the construction contractor and passenger rail service providers so that disruptions will be limited to a maximum of several hours or several days. 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. 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.

This mitigation measure will be effective in minimizing the disruption of passenger rail operations.

Implementing TR-MM#3 would not result in secondary impacts because it is anticipated that all identified improvements will occur in the existing rights-of-way or in the footprint of the Preferred Alternative.

The Authority finds that Mitigation Measure TR-MM#3 is required under the Preferred Alternative and that implementation of this mitigation measure will reduce impacts on freight rail operations to a less-than-significant level.

4.2 Air Quality and Greenhouse Gases (Section 3.3 in the Final EIR/EIS)

Once operational, the Preferred Alternative would have a beneficial effect on air quality and GHG emissions (see Impacts AQ#8 and AQ#9 in Section 3.3, Air Quality and Greenhouse Gases, of the Final EIR/EIS). Although construction of the Preferred Alternative would result in regional air quality impacts with IAMFs, with implementation of the mitigation measures required for the Preferred Alternative, temporary impacts on regional air quality within the San Francisco Bay Area Air Basin (SFBAAB) and San Joaquin Valley Air Basin (SJVAB) from the generation of ozone (O₃) precursors (reactive organic gas [ROG] and nitrogen oxide [NO_x]) will be reduced to a less-than-significant level. Temporary construction emissions of carbon monoxide (CO) will remain significant and unavoidable after mitigation in the SJVAB because emission offsets cannot be used to mitigate CO impacts.

Localized concentrations of CO, nitrogen dioxide (NO₂), and particulate matter (PM) generated by project construction would exceed the ambient air quality standards and significant impact levels (SIL) at certain locations. The mitigation measures recommended to reduce regional air quality impacts will reduce CO, NO₂, and PM emissions; these reductions will be achieved by regional offsets that may not contribute to enough localized reductions to avoid a project-level violation of the ambient air quality standards or SIL. Accordingly, the impact would remain significant and unavoidable.

4.2.1 Impact AQ#1: Temporary Direct and Indirect Impacts on Air Quality within the SFBAAB

The predominant pollutants associated with project construction are fugitive dust (PM₁₀ and PM_{2.5}) from earthmoving activities and combustion pollutants, particularly O₃ precursors (NO_x and volatile organic compound [VOC]) and CO from heavy equipment and trucks. VOCs would also be generated from paints and other coatings used during construction activities. Final EIR/EIS Table 3.3-12 presents construction emissions from the Preferred Alternative in the SFBAAB in tons per year and pounds per day. The table reflects the impact of the SAFE Vehicle Rule (CARB 2019). Exceedances of Bay Area Air Quality Management District (BAAQMD) CEQA thresholds are shown in bolded underline with an asterisk (*).

The following IAMFs will be incorporated in the Preferred Alternative. AQ-IAMF#1 will minimize fugitive dust emissions through the implementation of a dust control plan. The fugitive dust control plan will outline measures such as washing vehicles before exiting the construction site, watering unpaved surfaces, limiting vehicle travel speed, and suspending dust-generating activities during high wind events. AQ-IAMF#2 will minimize off-gassing emissions of VOCs that will occur from paints and other coatings by requiring the use of low-VOC paint and super-compliant or Clean Air paint that has a lower VOC content than that required by air district rules. AQ-IAMF#3 will minimize exhaust emissions from off-road equipment with renewable diesel. Renewable diesel is produced from non-petroleum renewable resources and waste products and generates substantially fewer emissions than traditional diesel per gallon combusted. AQ-IAMF#4 will minimize exhaust emissions from off-road equipment by requiring all heavy-duty equipment used during the construction phase to meet Tier 4 engine requirements. Tier 4 engine requirements are currently the strictest emissions standards adopted by the California Air Resources Board (CARB) and U.S. Environmental Protection Agency (USEPA). AQ-IAMF#5 will minimize exhaust emissions from on-road trucks by requiring all trucks used to haul construction materials to operate a model year 2010 engine or newer. AQ-IAMF#6 will minimize fugitive dust emissions from concrete batching through implementation of typical control measures, such as water sprays, enclosures, hoods, and other suitable technology. However, even with incorporation of

these IAMFs, the project will result in a temporary impact on regional air quality during construction because increased VOC and NO_x emissions will exceed the BAAQMD's CEQA thresholds. This impact is significant under CEQA (Final EIR/EIS: page 3.3-57).

Implementation of the following measures lessens this impact: AQ-MM#1: Implement Additional On-Site Emissions Controls to Reduce Fugitive Dust; AQ-MM#2: Construction Emissions Reductions – Requirements for use of Zero Emission (ZE) and/or Near Zero Emission (NZE) Vehicles and Off-Road Equipment; and AQ-MM#3: Offset Project Construction Emissions in the San Francisco Bay Area Air Basin. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

Mitigation Measure AQ-MM#1 requires additional best management practices (BMPs) for reducing on-site emissions beyond the IAMFs, consistent with BAAQMD guidance.

The Authority will implement Mitigation Measure AQ-MM#2 to reduce vehicle and off-road equipment emissions. AQ-MM#2 requires that a minimum of 25 percent of all light-duty on-road vehicles use zero emission (ZE) or near-zero emission (NZE) technology. The measure also includes ZE and NZE goals for heavy-duty on-road trucks and off-road equipment. This mitigation measure will reduce the impact of construction emissions from project-related on-road vehicles and off-road equipment. Because the commercial availability of future electric equipment and vehicles is unknown, emissions reductions achieved by this measure cannot currently be quantified. All remaining emissions after implementation of this measure will be offset with emission credits required under Mitigation Measure AQ-MM#3.

Mitigation Measure AQ-MM#3 will require that the Authority enter into an agreement with BAAQMD to offset remaining VOC and NO_x emissions to below BAAQMD's CEQA thresholds. 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 achieve actual emission reductions.

These mitigation measures will be effective in minimizing the project's impact on regional air quality in the SFBAAB during construction.

The Authority finds that Mitigation Measures AQ-MM#1, AQ-MM#2, and AQ-MM#3 are required under the Preferred Alternative and that implementation of these mitigation measures will reduce impacts on regional air quality in the SFBAAB to a less-than-significant level.

4.2.2 Impact AQ#3: Temporary Direct and Indirect Impacts on Air Quality within the SJVAB

The Preferred Alternative's construction emissions of NO_x, CO, and PM₁₀, as shown in Final EIR/EIS Table 3.3-14, would exceed the San Joaquin Valley Air Pollution Control District's (SJVAPCD) CEQA thresholds.

The following IAMFs will be incorporated in the Preferred Alternative.

Implementation of a dust control plan (AQ-IAMF#1) and BMPs at new concrete batch plants (AQ-IAMF#6) will minimize impacts associated with fugitive dust emissions. The contractor will use low-VOC paints to limit the emissions of VOCs, which contribute to O₃ formation (AQ-IAMF#2). Exhaust-related pollutants will be reduced through use of renewable diesel, Tier 4 off-road engines, and model year 2010 or newer on-road engines, as required by AQ-IAMF#3 through AQ-IAMF#5. These project features will minimize air quality impacts and associated public health consequences through application of best available on-site controls to reduce construction emissions. However, even with these measures, exceedances of air district thresholds will still occur and would be considered a significant impact under CEQA (Final EIR/EIS: page 3.3-67).

Implementation of the following measures lessens this impact: AQ-MM#1: Implement Additional On-Site Emissions Controls to Reduce Fugitive Dust; AQ-MM#2: Construction Emissions Reductions – Requirements for Use of Zero Emission (ZE) and/or Near Zero Emission (NZE) Vehicles and Off-Road Equipment; and AQ-MM#4: Offset Project Construction Emissions in the

San Joaquin Valley Air Basin. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

Mitigation Measure AQ-MM#1 requires additional BMPs for reducing on-site emissions of fugitive dust. Mitigation Measure AQ-MM#2 will also reduce on-site emissions. Because the commercial availability of future electric equipment and vehicles is unknown, emissions reductions achieved by this measure cannot currently be quantified.

The Authority will implement Mitigation Measure AQ-MM#4 to fully offset (i.e., to net zero) all remaining emissions of VOC, NO_x, and PM within the SJVAPCD, pursuant to the Authority's memorandum of understanding (MOU) with the air district for the entire HSR project within the SJVAB. Offsetting VOC, NO_x, and PM₁₀ emissions to net zero would avoid potential conflicts with the ambient air quality plans and would ensure that project construction would not contribute a net increase in emissions or degraded regional air quality.

Pursuant to SJVAPCD's *Guidance for Assessing and Mitigating Air Quality Impacts* (SJVAPCD 2015), emissions offsets procured through AQ-MM#4 could not be used to mitigate CO impacts. While CO has more direct and localized impacts than regional pollutants like VOC and NO_x, SJVAPCD has adopted a threshold that considers basin-wide effects of CO emissions with respect to attainment of the ambient air quality standards. The ability of a region to attain and subsequently maintain the ambient air quality standards is based on cumulative emissions contributions for sources throughout the air basin. Translating project-generated CO emissions to the resultant number of basin-wide days of attainment or nonattainment cannot be estimated using available models with a high degree of accuracy. However, as discussed under Impact AQ#5, dispersion modeling conducted for the project demonstrates that construction-generated CO concentrations would not cause new localized violations of the CO California ambient air quality standards (CAAQS) or national ambient air quality standards (NAAQS). While the project-level dispersion modeling indicates that project construction in the SJVAB would not lead to violations of the ambient air quality standards, because mass emissions would exceed SJVAPCD's threshold, this impact is conservatively concluded significant and unavoidable.

The Authority finds that Mitigation Measures AQ-MM#1, AQ-MM#2, and AQ-MM#4 are required under the Preferred Alternative and that they will mitigate or avoid the project's impact on regional air quality in the SJVAB to below the CEQA level of significance for NO_x and PM₁₀; however, the CEQA impact for CO would remain significant and unavoidable. The Authority finds that there are no other feasible mitigation measures or alternatives that could be adopted to reduce this remaining impact to less-than-significant levels. The Authority finds that despite this otherwise significant and unavoidable impact, specific economic, social, and other considerations identified in the Statement of Overriding Considerations (Chapter 8 of this document) support certification of the Final EIR/EIS and approval of the project.

4.2.3 Impact AQ#4: Temporary Direct Impacts on Implementation of an Applicable Air Quality Plan

Emissions from project construction would be temporary, occurring for approximately 7 years from 2022 through 2028. Once construction is complete, air quality in the SFBAAB and SJVAB is expected to improve. However, during the construction period, construction activities could cause air quality impacts that exceed air district thresholds, which support implementation of air quality plans. The BAAQMD and SJVAPCD have also developed project-level thresholds. These thresholds prevent new projects from contributing to CAAQS or NAAQS violations, which supports implementation of regional air quality plans to attain federal and state ambient air quality standards. Construction emissions from the Preferred Alternative would exceed the BAAQMD's CEQA thresholds for VOC and NO_x, as well as SJVAPCD's CEQA thresholds for NO_x and PM₁₀. Exceedances of adopted thresholds could conflict with applicable air quality plans. The Preferred Alternative will incorporate stringent on-site emissions controls, including implementation of fugitive dust control practices (AQ-IAMF#1 and AQ-IAMF#6), use of low-VOC paints (AQ-IAMF#2), use of renewable diesel (AQ-IAMF#3), use of Tier 4 off-road engines (AQ-IAMF#4), and use of model year 2010 or newer on-road engines (AQ-IAMF#5). However, even with these

measures, exceedances of adopted thresholds will still occur and would be considered a significant impact under CEQA (Final EIR/EIS: page 3.3-67).

Implementation of the following measures mitigates this impact: Mitigation Measures AQ-MM#1: Implement Additional On-Site Emissions Controls to Reduce Fugitive Dust; AQ-MM#2: Construction Emissions Reductions – Requirements for Use of Zero Emission (ZE) and/or Near Zero Emission (NZE) Vehicles and Off-Road Equipment; AQ-MM#3: Offset Project Construction Emissions in the San Francisco Bay Area Air Basin; and AQ-MM#4: Offset Project Construction Emissions in the San Joaquin Valley Air Basin. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

Mitigation Measure AQ-MM#1 requires additional BMPs, beyond those included in the IAMFs, for reducing on-site emissions, as described under Impact AQ#1. The measure includes additional strategies to reduce fugitive dust, consistent with BAAQMD (2017) guidance. Mitigation Measure AQ-MM#2 will also reduce on-site emissions by prioritizing the use of electric-powered equipment and vehicles as they become available.

Mitigation Measure AQ-MM#3 requires the offset of project construction emissions in the SFBAAB, as described under Impact AQ#1. The Authority will implement AQ-MM#3 to offset remaining VOC and NO_x emissions to below BAAQMD's CEQA thresholds. Because BAAQMD's thresholds were established to prevent emissions from new projects in the SFBAAB from contributing to CAAQS or NAAQS violations, offsetting emissions below the threshold levels would avoid potential conflicts with the ambient air quality plans and would ensure that project construction would not contribute a significant level of air pollution such that regional air quality within the SFBAAB would be degraded.

The Authority will implement Mitigation Measure AQ-MM#4 to fully offset (i.e., to net zero) all remaining emissions of VOC, NO_x, and PM within the SJVAPCD, pursuant to the Authority's MOU with the air district for the entire HSR project within the SJVAB. Offsetting VOC, NO_x, and PM₁₀ emissions to net zero would avoid potential conflicts with the ambient air quality plans and would ensure that project construction would not contribute a net increase in emissions or degraded regional air quality.

Pursuant to SJVAPCD's *Guidance for Assessing and Mitigating Air Quality Impacts* (SJVAPCD 2015), emissions offsets procured through AQ-MM#4 could not be used to mitigate CO impacts. While CO has more direct and localized impacts than regional pollutants like VOC and NO_x, SJVAPCD has adopted a threshold that considers basin-wide effects of CO emissions with respect to attainment of the ambient air quality standards. The ability of a region to attain and subsequently maintain the ambient air quality standards is based on cumulative emissions contributions for sources throughout the air basin. Translating project-generated CO emissions to the resultant number of basin-wide days of attainment or nonattainment cannot be estimated using available models with a high degree of accuracy. However, as discussed under Impact AQ#5, dispersion modeling conducted for the project demonstrates that construction-generated CO concentrations would not cause new localized violations of the CO CAAQS or NAAQS.

These mitigation measures will be effective in minimizing the project's impact on applicable air quality plans.

The Authority finds that Mitigation Measures AQ-MM#1, AQ-MM#2, AQ-MM#3, and AQ-MM#4 are required under the Preferred Alternative and that implementation of these mitigation measures will reduce impacts on applicable air quality plans to a less-than-significant level.

4.2.4 Impact AQ#5: Temporary Direct Impacts on Localized Air Quality— Criteria Pollutants

Construction of the Preferred Alternative would lead to new violations of the PM₁₀ and PM_{2.5} CAAQS and NAAQS, as well as potentially contribute to existing PM₁₀ and PM_{2.5} violations through exceedances of the SIL. The Preferred Alternative would also violate the 1-hour NO₂ NAAQS and CAAQS. Project IAMFs will minimize air quality impacts (AQ-IAMF#1 through AQ-IAMF#6); these project features represent best available on-site controls to reduce construction

emissions. However, even with these measures, emissions concentrations will still violate the ambient air quality standards and exceed the SIL, which would be considered a significant impact under CEQA (Final EIR/EIS: page 3.3-78).

Implementation of the following measures lessens this impact: AQ-MM#1: Implement Additional On-Site Emissions Controls to Reduce Fugitive Dust; and AQ-MM#2: Construction Emissions Reductions – Requirements for Use of Zero Emission (ZE) and/or Near Zero Emission (NZE) Vehicles and Off-Road Equipment. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

Mitigation Measure AQ-MM#1 will require additional BMPs to reduce fugitive dust, consistent with BAAQMD (2017) guidance. AQ-MM#2 is a commitment to prioritize the use of electric-powered equipment and vehicles as they become available.

The Authority finds that Mitigation Measures AQ-MM#1 and AQ-MM#2 are required under the Preferred Alternative and that they will lessen the project's impact on localized air quality during construction; however, the CEQA impact would remain significant and unavoidable. The Authority finds that there are no other feasible mitigation measures or alternatives that could be adopted to reduce this remaining impact to less-than-significant levels. Use of electrical-powered equipment is limited by lack of availability (i.e., contractor cannot secure an electric model within 200 miles of the construction site), limited commercialization (i.e., electric models have not been developed), or prohibitive costs (i.e., electric models are more than 100% the cost of diesel counterparts). The Authority finds that despite this otherwise significant and unavoidable impact, specific economic, social, and other considerations identified in the Statement of Overriding Considerations (Chapter 8 of this document) support certification of the Final EIR/EIS and approval of the project.

4.3 Noise and Vibration (Section 3.4 in the Final EIR/EIS)

The Preferred Alternative would result in potentially significant impacts related to temporary exposure of sensitive receptors to construction noise. In addition, the Preferred Alternative would result in intermittent permanent exposure of sensitive receptors to noise from train operations and from onset of passing HSR trains, and permanent exposure of sensitive receptors to vehicular traffic noise increases and traction power facility (TPF) noise. The Preferred Alternative would also result in potentially significant impacts related to temporary exposure of sensitive receptors and buildings to construction vibration and intermittent permanent exposure of sensitive receptors to vibration from operations.

The potentially significant impact from intermittent permanent human annoyance from onset of passing HSR trains, permanent exposure of sensitive receptors to TPF noise, and temporary exposure of sensitive receptors and buildings to construction vibration would be mitigated to less than significant. However, the potentially significant impact from temporary exposure of sensitive receptors to construction noise, intermittent permanent exposure of sensitive receptors to noise from train operations, permanent exposure of sensitive receptors to vehicular traffic noise increases, and intermittent permanent exposure of sensitive receptors to vibration from operations would remain significant and unavoidable even with implementation of mitigation.

4.3.1 Impact NV#1: Temporary Exposure of Sensitive Receptors to Construction Noise

Construction activities associated with the Preferred Alternative would affect sensitive receptors by temporarily and periodically substantially increasing ambient noise levels in the project vicinity. Temporary noise impacts would result from activities associated with construction, modification, and relocation of existing tracks, stations, and platforms; modification of existing roadways and structures; construction of the MOWF; construction of new tracks and viaduct installation of four-quadrant gates at the at-grade crossings and perimeter fencing at the edge of the right-of-way; utility relocation; site preparation including demolition, excavation, and grading; and installation of systems components. The Preferred Alternative would incorporate NV-IAMF#1 to minimize noise impacts by requiring compliance with FRA guidelines for minimizing construction noise and vibration impacts when work is conducted within 1,000 feet of sensitive receptors. However, even

with NV-IAMF#1, some sensitive receptors will be exposed to construction noise that exceeds FRA guidelines; this is considered a significant impact under CEQA (Final EIR/EIS: page 3.4-42).

Implementation of the following measure lessens this impact: NV-MM#1: Construction Noise Mitigation Measures. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

The Authority will implement NV-MM#1 to reduce the potential for construction noise impacts. This mitigation measure will require the contractor to prepare a noise-monitoring program and noise control plan prior to construction to comply with the FRA construction noise limits wherever feasible. The monitoring program will describe the actions the contractor will use to reduce noise, such as installing temporary noise barriers, avoiding nighttime construction near residential areas, and using low-noise emission equipment. Implementation of this mitigation measure will reduce construction noise levels but not always below the FRA noise standards, particularly at night and during pile driving.

Mitigation Measure NV-MM#1 would have limited to no secondary environmental impacts because the temporary measures are limited to the construction zone itself and will not exacerbate any other environmental impacts of construction.

The Authority finds that Mitigation Measure NV-MM#1 is required under the Preferred Alternative and that it will lessen the project's construction noise impact; however, the CEQA impact would remain significant and unavoidable. The Authority finds that there are no other feasible mitigation measures or alternatives that could be adopted to reduce this remaining impact to less-than-significant levels. The Authority finds that despite this otherwise significant and unavoidable impact, specific economic, social, and other considerations identified in the Statement of Overriding Considerations (Chapter 8 of this document) support certification of the Final EIR/EIS and approval of the project.

4.3.2 Impact NV#2: Intermittent Permanent Exposure of Sensitive Receptors to Noise from Train Operations

Project operations would increase noise levels above existing ambient levels and in exceedance of FRA criteria, causing severe noise impacts at sensitive receptors. The Preferred Alternative would be at grade at the same locations as the existing Caltrain and other passenger and freight operations. As a result, HSR trains under Preferred Alternative would regularly sound warning horns at all at-grade crossings and Caltrain passenger stations. The number of severe noise impacts for the Preferred Alternative is summarized in Final EIR/EIS Table 3.4-17²; this is considered a significant impact under CEQA (Final EIR/EIS: page 3.4-87). Some of these impacts may be able to be reduced with noise barrier mitigation.

Implementation of the following measures lessens this impact: NV-MM#3: Implement Proposed California High-Speed Rail Project Noise Mitigation Guidelines; NV-MM#4: Support Potential Implementation of Quiet Zones by Local Jurisdictions; NV-MM#5: Vehicle Noise Specification; NV-MM#6: Special Trackwork at Crossovers, Turnouts, and Insulated Joints; NV-MM#7: Additional Noise Analysis during Final Design; and BIO-MM#80: Minimize Permanent Intermittent Noise, Visual, and Train Strike Impacts on Wildlife Movement. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

As part of NV-MM#3, the Authority will consider constructing noise barriers, supporting implementation of Quiet Zones where cities decide to implement them, installing sound insulation, or acquiring easements on properties severely affected by noise, based on criteria in the Authority's Noise and Vibration Mitigation Guidelines (Volume 2, Appendix 3.4-B of the Final EIR/EIS). As part of NV-MM#4, the Authority will assist local communities in establishing Quiet Zones to reduce noise impacts from train warning horns. NV-MM#5 will require HSR vehicles to meet federal regulations for noise (40 Code of Federal Regulations [C.F.R.] § 201.12) at the time

² The column showing Alternative 4 with the DDV/TDV reflects the Preferred Alternative.

of procurement. Mitigation Measure NV-MM#5 would have no secondary environmental impacts. NV-MM#6 will require the contractor to document how they minimized or eliminated rail gaps related to special trackwork, which can be a major source of noise during operations. As part of NV-MM#7, if any changes to final design or vehicle specifications change any assumptions underlying the noise analysis, the Authority will prepare the necessary environmental documentation as required by CEQA to reassess potential impacts and mitigation. In addition, Mitigation Measure BIO-MM#80 will be implemented, requiring construction of a noise barrier in the Upper Pajaro River (UPR) Important Bird Area (IBA) and an enclosure in the GEA IBA.

These mitigation measures will all be effective at reducing the number of severe noise impacts in the resource study area (RSA); however, they will not mitigate all noise impacts. Table 3.4-26 of the Final EIR/EIS summarizes the noise impacts that could be mitigated with noise barriers only, and Final EIR/EIS Table 3.4-27 summarizes the noise impacts that could be mitigated with a combination of noise barriers and Quiet Zones. As specified in the noise mitigation guidelines (See Volume 2, Appendix 3.4-B of the Final EIR/EIS), noise barriers should be approved by 75 percent of the affected parties in a community; if they do not approve, then noise barriers may not be installed at certain locations. Quiet zones cannot be implemented by the Authority or any rail operators (like California Department of Transportation [Caltrans]); they can only be established at the initiative of a local jurisdiction. Thus, quiet zones may not be adopted where local jurisdictions do not want them to be established.

For the TPF, noise barriers will be considered as part of NV-MM#3, and equipment selection and site design will be considered as part of NV-MM#7 to reduce noise from transformers and other sources within the TPFs.

Because severe noise impacts will remain following mitigation and/or noise barriers or quiet zones would not be implemented due to the constraints noted above, the impact would be significant and unavoidable under CEQA.

Noise barriers constructed under Mitigation Measure NV-MM#3 could have secondary impacts on visual aesthetics and require tree or vegetation removal. Depending on their design, height, and location, noise barriers can become visually intrusive, blocking views or creating places for unwanted graffiti. Providing sound insulation will involve modest building retrofit activity similar to routine residential or commercial window modifications or insulation replacement and would not result in significant secondary effects.

It is premature to assess the specific potential secondary impacts of final design measures under Mitigation Measure NV-MM#7. Measures adopted as a result of implementation of Mitigation Measure NV-MM#7, additional noise analysis during final design, are likely to be similar to the other noise measures identified. Thus, they would likely result in similar secondary environmental impacts during their construction that may be significant.

Implementation of Mitigation Measure BIO-MM#80, which involves construction of noise/visual barriers, could result in secondary impacts on visual resources.

The Authority finds that Mitigation Measures NV-MM#3, NV-MM#4, NV-MM#5, NV-MM#6, NV-MM#7, and BIO-MM#80 are required under the Preferred Alternative and that they will lessen the project's operational noise impacts; however, the CEQA impact would remain significant and unavoidable. The Authority finds that there are no other feasible mitigation measures or alternatives that could be adopted to reduce this remaining impact to less-than-significant levels. The Authority finds that despite this otherwise significant and unavoidable impact, specific economic, social, and other considerations identified in the Statement of Overriding Considerations (Chapter 8 of this document) support certification of the Final EIR/EIS and approval of the project.

4.3.3 Impact NV#5: Intermittent Permanent Human Annoyance from Onset of Passing HSR Trains

The Preferred Alternative would have an impact related to startle at one residential location in Morgan Hill where the residence is within 23 feet of the proposed track alignment. This is considered a significant impact under CEQA (Final EIR/EIS: page 3.4-89).

Implementation of the following measures mitigates this impact: NV-MM#3: Implement Proposed California High-Speed Rail Project Noise Mitigation Guidelines and NV-MM#7: Additional Noise Analysis during Final Design. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

Under NV-MM#3, the Authority will consider constructing noise barriers, installing sound insulation, or acquiring easements on properties severely affected by noise, based on criteria in the Authority's Noise and Vibration Mitigation Guidelines (Volume 2, Appendix 3.4-B of the Final EIR/EIS). Noise barriers constructed under Mitigation Measure NV-MM#3 could have secondary impacts on visual aesthetics and require tree or vegetation removal. Depending on their design, height, and location, noise barriers can become visually intrusive, blocking views or creating places for unwanted graffiti. Providing sound insulation will involve modest building retrofit activity similar to routine residential or commercial window modifications or insulation replacement and would not result in significant secondary effects.

As part of NV-MM#7, additional noise analysis during final design can refine or reduce the impact by incorporating more detailed train speed, track design, and actual vehicle noise characteristics. These mitigation measures will lower the amount of resultant train noise, which will also address the severity of rapid onset of noise at the one identified significant location where one sensitive noise receptor was identified less than 23 feet from the nearest track.

These mitigation measures will be effective in minimizing the project's impact on human annoyance from onset of passing trains.

It is premature to assess the specific potential secondary impacts of final design measures under Mitigation Measure NV-MM#7. Measures adopted as a result of implementation of Mitigation Measure NV-MM#7, additional noise analysis during final design, are likely to be similar to the other noise measures identified. Thus, they would likely result in similar secondary environmental impacts during their construction that may be significant.

The Authority finds that Mitigation Measures NV-MM#3 and NV-MM#7 are required under the Preferred Alternative and that implementation of these mitigation measures will reduce impacts on human annoyance from onset of passing trains to a less-than-significant level.

4.3.4 Impact NV#6: Permanent Exposure of Sensitive Receptors to Vehicular Traffic Noise Increases

Six roadway segments would have the potential for noise level increases greater than or equal to 3 decibels (dB) compared to existing noise conditions in 2029 under the Preferred Alternative. By 2040, 12 roadway segments would have the potential for noise level increases greater than or equal to 3 dB. This is considered a significant impact under CEQA (Final EIR/EIS: page 3.4-91).

Implementation of the following measures lessens this impact: NV-MM#3: Implement Proposed California High-Speed Rail Project Noise Mitigation Guidelines and NV-MM#7: Additional Noise Analysis during Final Design. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

Under NV-MM#3, the Authority will investigate the traffic noise impacts and ways to mitigate them by means such as noise barriers. Noise barriers constructed under Mitigation Measure NV-MM#3 could have secondary impacts on visual aesthetics and require tree or vegetation removal. Depending on their design, height, and location, noise barriers can become visually intrusive, blocking views or creating places for unwanted graffiti. Providing sound insulation will involve modest building retrofit activity similar to routine residential or commercial window modifications or insulation replacement and would not result in significant secondary effects.

Pursuant to NV-MM#7, if any changes to final design or vehicle specifications change any assumptions underlying the noise analysis, the Authority will prepare the necessary environmental documentation as required by CEQA to reassess impacts and mitigation. It is premature to assess the specific potential secondary impacts of final design measures under Mitigation Measure NV-MM#7. Measures adopted as a result of implementation of Mitigation Measure NV-MM#7, additional noise analysis during final design, are likely to be similar to the other noise measures identified. Thus, they would likely result in similar secondary environmental impacts during their construction that may be significant.

The Authority finds that Mitigation Measures NV-MM#3 and NV-MM#7 are required under the Preferred Alternative and that they will lessen the project's vehicular traffic noise impacts; however, the CEQA impact would remain significant and unavoidable. The Authority finds that there are no other feasible mitigation measures or alternatives that could be adopted to reduce this remaining impact to less-than-significant levels. The Authority finds that despite this otherwise significant and unavoidable impact, specific economic, social, and other considerations identified in the Statement of Overriding Considerations (Chapter 8 of this document) support certification of the Final EIR/EIS and approval of the project.

4.3.5 Impact NV#8: Permanent Exposure of Sensitive Receptors to Traction Power Facility Noise

Under the Preferred Alternative, 30 residences in a San Jose multifamily building would be exposed to a noise increase that exceeds the 2.9 A-weighted decibel (dBA) threshold for the TPF and the HSR trains; in Gilroy, the 3.6 dBA threshold would increase at 2 homes and the 2.8 dBA threshold would increase at 1 home. This is considered a significant impact under CEQA (Final EIR/EIS: page 3.4-94).

Implementation of the following measures mitigates this impact: NV-MM#3: Implement Proposed California High-Speed Rail Project Noise Mitigation Guidelines and NV-MM#7: Additional Noise Analysis during Final Design. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

As part of NV-MM#3, the Authority will investigate the TPF noise impacts and ways to mitigate them by means such as noise barriers around the facility. As part of NV-MM#7, additional design considerations such as equipment selection and siting will be evaluated during final design if needed to mitigate the noise. These mitigation measures will be effective in minimizing the project's TPF noise impacts.

Noise barriers constructed under Mitigation Measure NV-MM#3 could have secondary impacts on visual aesthetics and require tree or vegetation removal. Depending on their design, height, and location, noise barriers can become visually intrusive, blocking views or creating places for unwanted graffiti. Providing sound insulation will involve modest building retrofit activity similar to routine residential or commercial window modifications or insulation replacement and would not result in significant secondary effects.

It is premature to assess the specific potential secondary impacts of final design measures under Mitigation Measure NV-MM#7. Measures adopted as a result of implementation of Mitigation Measure NV-MM#7, additional noise analysis during final design, are likely to be similar to the other noise measures identified. Thus, they would likely result in similar secondary environmental impacts during their construction that may be significant.

The Authority finds that Mitigation Measures NV-MM#3 and NV-MM#7 are required under the Preferred Alternative and that implementation of these mitigation measures will reduce impacts on exposure of sensitive receptors to TPF noise to a less-than-significant level.

4.3.6 Impact NV#9: Temporary Exposure of Sensitive Receptors and Buildings to Construction Vibration

Construction activities would expose persons and could expose buildings to excessive ground-borne vibration from pile driving and possibly other construction activities such as vibratory

compaction. Incorporation of NV-IAMF#1 will minimize construction vibration and its potential to cause damage to buildings and human annoyance. However, even with NV-IAMF#1, some sensitive receptors will be exposed to ground-borne vibration that will result in annoyance, and buildings could be exposed to vibration that exceeds the FRA vibration damage criteria. This is considered a significant impact under CEQA (Final EIR/EIS: page 3.4-96).

Implementation of the following measure mitigates this impact: NV-MM#2: Construction Vibration Mitigation Measures. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

The Authority will implement NV-MM#2 (Construction Vibration Mitigation Measures) to minimize vibration impacts from construction. As part of this mitigation measure, the contractor will develop and implement vibration reduction methods whenever impact pile driving or other high-vibration-producing activity will occur within 50 feet of any building to meet the FRA criteria. Prior to starting pile driving and other high-vibration activity, the contractor will conduct pre-construction surveys within 50 feet of the activity 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. These measures will avoid or offset vibration impacts from construction. Therefore, the impact would be less than significant for the Preferred Alternative.

This mitigation measure will be effective in minimizing the project's temporary construction vibration impacts.

The Authority finds that Mitigation Measure NV-MM#2 is required under the Preferred Alternative and that implementation of this mitigation measure will reduce the project's temporary construction vibration impacts to a less-than-significant level.

4.3.7 Impact NV#10: Intermittent Permanent Exposure of Sensitive Receptors to Vibration from Operations

Project operations would generate excessive ground-borne vibration impacts at sensitive receptors in the San Jose Diridon Station Approach and Monterey Corridor Subsections. The Preferred Alternative would result in 1,203 vibration impacts. There would be no building damage impacts from project operations. NV-IAMF#1 will be included as a project feature. However, even with the inclusion of NV-IAMF#1, this is considered a significant impact under CEQA (Final EIR/EIS: page 3.4-110).

Implementation of the following measure mitigates this impact: NV-MM#8: Project Vibration Mitigation Measures. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

The Authority will implement NV-MM#8 (Project Vibration Mitigation Measures) to minimize vibration impacts from operations. While the precise evaluation of the effectiveness of NV-MM#8 requires detailed designs and consideration of site-specific conditions, vibration mitigation has the potential to reduce the vibration levels by up to 10 dB.

It is premature to assess the specific potential secondary impacts of Mitigation Measure NV-MM#8 (Project Vibration Mitigation Measures). Special trackwork, building modifications, or other approaches adopted pursuant to this measure are likely to be similar to the other vibration-reducing measures identified. Thus, they would likely result in similar secondary environmental impacts during their construction that may be significant.

The Authority finds that Mitigation Measure NV-MM#8 is required under the Preferred Alternative and that it will lessen the project's operational vibration impacts; however, the CEQA impact would remain significant and unavoidable. The Authority finds that there are no other feasible mitigation measures or alternatives that could be adopted to reduce this remaining impact to less-than-significant levels. The Authority finds that despite this otherwise significant and unavoidable impact, specific economic, social, and other considerations identified in the Statement of

Overriding Considerations (Chapter 8 of this document) support certification of the Final EIR/EIS and approval of the project.

4.4 Biological and Aquatic Resources (Section 3.7 in the Final EIR/EIS)

The Preferred Alternative would result in potentially significant impacts on special-status plant habitat and special-status plant communities; permanent conversion or degradation of habitat for and mortality of multiple wildlife, bird, and fish species; permanent conversion or degradation of aquatic resources; removal or mortality of protected trees; mortality resulting from train and power line strike; permanent conversion or degradation of conservation areas; and conflict with existing plans. All potentially significant impacts would be mitigated to less than significant with implementation of mitigation measures.

4.4.1 Impact BIO#1: Permanent Conversion or Degradation of Habitat for Special-Status Plant Species

Effects Other than Potential Tunnel Construction Groundwater Reduction: Construction of the HSR track and systems in all subsections would take place in land cover types that could support special-status plant species, including species listed under the federal Endangered Species Act (FESA) and California Endangered Species Act (CESA) (with the exception of the San Jose Diridon Station Approach Subsection, which only supports habitat for nonlisted special-status species). Such activities would convert and disturb habitat and could result in the removal of special-status plant occurrences. The areal extent of direct permanent and temporary impacts (conversion and disturbance of habitat, habitat fragmentation, introduction and spread of invasive plants, hydrologic changes, and introduction of hazardous materials) on habitat for both listed and nonlisted special-status plant species is shown in Table 3.7-12 of the Final EIR/EIS. While pre-construction and construction actions to protect habitat for special-status plants are part of the project, these actions would not prevent the permanent conversion of habitat and temporary disturbance of other habitat in the project footprint. Work to construct Tunnels 1 and 2 would affect the greatest area of special-status plant habitat because of the extent of undeveloped native plant communities at the portal sites (e.g., chaparral, oak woodland, California sycamore woodland). Construction activities would result in the temporary disturbance of habitat during construction and reduced habitat value for some period of time after construction is completed.

The Authority has incorporated IAMFs into the project design to avoid and minimize project effects. The IAMFs applicable to special-status plants will also pertain to most other biological and aquatic resources. The Authority will submit to the appropriate wildlife agencies the names 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 (BIO-IAMF#1). The project biologist will prepare a biological resources management plan (BRMP) consolidating permit conditions and an array of other requirements relevant to protection of sensitive biological resources (BIO-IAMF#5), including special-status species habitat. Workers will be provided with worker environmental awareness program (WEAP) training to help them understand their responsibilities in following procedures to reduce impacts and to increase their capability to identify and avoid special-status species and their habitat in the work area (BIO-IAMF#3). Staging areas will be sited away from sensitive resources (BIO-IAMF#8). The Authority will develop a BMP field manual that will address proper waste management and storage, nonstormwater management, and other general site cleanliness measures to avoid spills of hazardous materials, reducing degradation of suitable habitat (BIO-IAMF#11).

Excavated soils or waste materials unsuitable for treatment or reuse will be disposed at an off-site location (BIO-IAMF#9), avoiding degradation of habitat. Construction equipment will be cleaned before entering work areas to minimize opportunities for weeds and invasive species to enter the project footprint (BIO-IAMF#10).

Effects Related to Potential Tunnel Construction Groundwater Reduction: The Authority has incorporated HYD-IAMF#5 into the design and construction methods for Tunnels 1 (Morgan Hill and Gilroy Subsection) and 2 (Pacheco Pass Subsection) to avoid or minimize groundwater

inflows into and around tunnels during and after construction. As discussed in Impact HYD#10 in Section 3.8, Hydrology and Water Resources, of the Final EIR/EIS, although HYD-IAMF#5 will reduce the amount of potential groundwater depletion due to tunnel construction, based on the available information and based on prior tunnel construction experience in the Pacheco Pass and elsewhere, some groundwater inflow into and around the tunnel would occur during construction. This groundwater flow could result in localized depletion of groundwater that could have temporary indirect effects on the hydrology of groundwater-dependent surface water features, including streams, creeks, springs, ponds and wetlands that provide habitat for special-status plants. Within the tunnel groundwater study area, groundwater-dependent surface water features that provide habitat for special-status plants could also be affected. In addition, upland trees with deep roots that can reach to groundwater (such as oaks) could also be affected.

Surface water resources within 1 mile of the proposed tunnel alignments include the following: 132 streams and creeks; 42 wetlands, ponds, and reservoirs; and 11 seeps and springs. However, not all of these resources are expected to be affected by tunnel construction because of the following: (1) many of the streams and creeks are likely not supported by groundwater flow; (2) most of the tunnel alignment is in areas of low groundwater conductivity where groundwater flows are expected to be limited and the implementation of HYD-IAMF#5 will lower the potential for large-scale effects to reach every feature within the RSA; and (3) prior tunneling experience has indicated that the bulk of the effects on water resources would occur on resources located over the tunnel alignment or much closer to the alignment than 1 mile.

However, even with the implementation of these IAMFs that minimize the potential for direct impacts on special-status plants and to minimize the loss of habitat, the project will result in loss and degradation of habitat and could result in the loss of special-status plant occurrences, either associated with tunnel construction or not, which is considered a significant impact under CEQA (Final EIR/EIS: page 3.7-63). Impacts would eliminate or reduce the viability of local occurrences and contribute to rangewide or statewide declines of these species without mitigation measures.

Implementation of the following measures mitigates this impact: BIO-MM#1: Prepare and Implement a Restoration and Revegetation Plan, BIO-MM#2: Prepare and Implement a Weed Control Plan, BIO-MM#3: Establish Environmentally Sensitive Areas and Nondisturbance Zones, BIO-MM#4: Conduct Monitoring of Construction Activities, BIO-MM#6: Establish and Implement a Compliance Reporting Program, BIO-MM#5: Limit Vehicle Traffic and Construction Site Speeds, BIO-MM#7: Conduct Botanical Surveys for Special-Status Plant Species and Special-Status Plant Communities, BIO-MM#8: Prepare and Implement Plan for Salvage, Relocation, and/or Propagation of Special-Status Plant Species, BIO-MM#9: Prepare and Implement a Groundwater Adaptive Management and Monitoring Plan, BIO-MM#10: Prepare and Implement a Habitat Mitigation Plan for Species and Species Habitat, BIO-MM#11: Implement Measures to Minimize Impacts during Off-Site Habitat Restoration, or Enhancement, or Creation on Mitigation Sites, and BIO-MM#12: Provide Compensatory Mitigation for Impacts on Listed Plant Species. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

The Authority will implement mitigation measures to reduce the impacts on special-status plants. BIO-MM#1 will involve preparation of a restoration and revegetation plan (RRP) that will identify and describe procedures for restoring temporarily disturbed habitat to its former state. BIO-MM#2 will require the project biologist to develop a weed control plan (WCP) prior to ground-disturbing activity to minimize and avoid the spread of invasive weeds into the project footprint and adjacent areas. BIO-MM#3 will require the project biologist to establish environmentally sensitive areas (ESAs) and nondisturbance zones (including wildlife exclusion fencing [WEF], where applicable) that support special-status species or aquatic resources and are subject to seasonal restrictions or other avoidance and minimization measures prior to ground-disturbing activity. BIO-MM#4 and BIO-MM#6 will require the project biologist to monitor construction activities for compliance with avoidance and minimization measures and established ESAs and nondisturbance zones and to document such monitoring through a compliance reporting program, respectively. BIO-MM#5 will require the project biologist to establish vehicle speed limits within the project footprint; restrict vehicle traffic to established roads, construction areas, and other permissible areas; and direct that routes be marked to prevent off-road traffic prior to ground-disturbing activity. BIO-MM#7 will

require the project biologist to conduct presence/absence surveys for special-status plant species and special-status plant communities within the project footprint to be avoided during construction prior to any ground-disturbing activity. If required and consistent with authorizations issued under FESA and/or CESA, BIO-MM#8 will require preparation of a plan for the salvage and relocation of any special-status plant species found during presence/absence surveys prior to ground-disturbing activity. BIO-MM#9 will involve preparation and implementation of a groundwater adaptive management and monitoring program (GAMMP) that will require monitoring of groundwater-dependent surface water resources (including those providing habitat for special-status plants) within the tunnel groundwater study area, providing supplemental water where needed, and remediating or compensating for any adverse effects identified during monitoring. BIO-MM#10 will involve preparation and implementation of a habitat management plan (HMP) that will require creating, preserving, restoring, or enhancing habitat for special-status species in the regional RSA to compensate for permanent and temporary impacts on species habitat; BIO-MM#11 will minimize impacts associated with mitigation efforts; and BIO-MM#12 will require compensatory mitigation for special-status plants at a 1:1 ratio. These measures will minimize direct and indirect impacts on habitat for special-status plants, provide for the avoidance or salvage and relocation of special-status plant occurrences in the project footprint, and compensate for impacts on habitat and any relocated plants. Therefore, these mitigation measures will be effective in minimizing the project's impacts associated with habitat conversion on special-status plants.

Some of the activities and actions that will be implemented under BIO-MM#10, especially those involving ground disturbance, could result in impacts similar to those described in Section 3.7.7, Environmental Consequences, of the Final EIR/EIS. Specifically, direct and indirect impacts on special-status plant and wildlife species (e.g., California tiger salamander, red-legged frog, and foothill yellow-legged frog), special-status plant communities, and aquatic resources could occur where such resources are present on the mitigation sites. BIO-MM#11, which requires a site assessment and appropriate regulatory authorizations, will be implemented at compensatory mitigation sites to reduce or avoid impacts on these resources.

Restoration and enhancement of aquatic resources that will be implemented under BIO-MM#10 may result in the permanent conversion of grassland to wetland or riparian habitat. While such activities will be beneficial for special-status vernal pool or riparian species (for example), they would result in a small but measurable loss of upland habitat that could support denning, foraging, or movement by San Joaquin kit fox; nesting and foraging by burrowing owl, short-eared owl, grasshopper sparrow, and northern harrier; and foraging by golden eagle and white-tailed kite.

The HMP that will be implemented under BIO-MM#10 will be designed, implemented, and monitored consistent with the terms and conditions of the U.S. Army Corps of Engineers (USACE) Section 404 Permit, State Water Resources Control Board (SWRCB) Section 401 water quality certification, Cal. Fish and Game Code Section 1600 et seq. streambed alteration agreement, and FESA and CESA as they apply to their jurisdiction and resources on site. Potential impacts on site-specific hydrology and the downstream resources will be evaluated as a result of implementation of the restoration-related activity. Site-specific BMPs and a stormwater pollution prevention plan (SWPPP) will be implemented as appropriate.

Environmental impacts that would result from implementation of BIO-MM#10 on other resource categories (beyond biological resources) could result from implementing restoration activities at mitigation sites. These impacts would result from transportation to and from the mitigation sites and from ground-disturbing activities on these sites to create habitat. These impacts include:

- Air quality and GHGs. Construction vehicle exhaust and vehicle trips during management activities would contribute to diesel particulate emissions. Earthmoving, grading, and vegetation removal activities on the mitigation sites would result in fugitive dust during construction. Habitat restoration and revegetation would be undertaken on off-site mitigation sites in rural areas, and potential receptors sensitive to localized air impacts are anticipated to be distant. The establishment and management of these mitigation sites do not involve any

materials or activities that may subject receptors to objectionable odors. Vehicle trips and the use of mowers and other machinery associated with the establishment and management of the mitigation sites would contribute to GHG emissions. However, these activities would be short term during construction and intermittent afterward.

- Agricultural farmland. The partial or complete conversion of these mitigation sites to biological habitat could result in the loss of existing farmland or rangeland, including designated Important Farmland. In the event that Important Farmland is converted for mitigating impacts on biological resources, the Authority will implement AG-MM#1: Conserve Important Farmland to mitigate for the converted agricultural farmland. It is not anticipated that there would be any required changes to Williamson Act contracts because the preservation of the land through the use of conservation easements and acquisition of the property would not threaten or violate the terms of most of the Williamson Act contracts.
- Cultural resources. Ground-disturbing activities associated with the restoration of mitigation sites could result in impacts on known and previously unknown archaeological deposits, if such resources were demolished or altered. Such resources may be eligible for listing in the California Register of Historic Resources (CRHR) or the National Register of Historic Places (NRHP). The eligibility of historic architectural resources on these mitigation sites has not yet been evaluated and would take place prior to construction. Existing structures including agricultural outbuildings and irrigation infrastructure could be found to be eligible for listing in the CRHR or the NRHP. Existing project features and legal requirements will prevent the destruction or unauthorized alteration of any such architectural resources.

The Authority finds that Mitigation Measures BIO-MM#1, BIO-MM#2, BIO-MM#3, BIO-MM#4, BIO-MM#6, BIO-MM#5, BIO-MM#7, BIO-MM#8, BIO-MM#9, BIO-MM#10, BIO-MM#11, and BIO-MM#12 are required under the Preferred Alternative and that implementation of these mitigation measures will reduce the project's impacts on habitat conversion or degradation to special-status plants to a less-than-significant level.

4.4.2 Impact BIO #2a: Permanent Conversion or Degradation of Habitat for and Mortality of Bay Checkerspot Butterfly

Construction of the HSR track and systems in the Monterey Corridor and Morgan Hill and Gilroy Subsections would take place in suitable grassland habitat (including designated critical habitat in the Morgan Hill and Gilroy Subsection) for Bay checkerspot butterfly, a species listed as threatened under FESA. Construction activities would convert and destroy grassland habitat and could result in individual fatalities; presence of HSR components could interfere with necessary life cycle behaviors. The Authority has incorporated BIO-IAMF#1 (Project Biologist), BIO-IAMF#3 (Construction Period WEAP Training), BIO-IAMF#5 (Prepare and Implement a Biological Resources Management Plan), BIO-IAMF#8 (Delineate Equipment Staging Areas and Traffic Routes), BIO-IAMF#9 (Dispose of Construction Spoils and Waste), BIO-IAMF#10 (Clean Construction Equipment), and BIO-IAMF#11 (Maintain Construction Sites) into project design to avoid and minimize impacts on Bay checkerspot butterfly.

The areal extent of direct permanent and temporary impacts (conversion and disturbance of habitat) on habitat for the species is shown in Final EIR/EIS Table 3.7-13. Impacts on critical habitat are shown in Table 3.7-14 of the Final EIR/EIS. As shown, even with the implementation of these IAMFs, the project could result in habitat conversion or degradation or individual fatalities for Bay checkerspot butterfly, which is considered a significant impact under CEQA (Final EIR/EIS: page 3.7-82).

Implementation of the following measures mitigates this impact: BIO-MM#1: Prepare and Implement a Restoration and Revegetation Plan, BIO-MM#2: Prepare and Implement a Weed Control Plan, BIO-MM#3: Establish Environmentally Sensitive Areas and Nondisturbance Zones, BIO-MM#4: Conduct Monitoring of Construction Activities, BIO-MM#6: Establish and Implement a Compliance Reporting Program, BIO-MM#5: Limit Vehicle Traffic and Construction Site Speeds, BIO-MM#13: Implement Work Stoppage, BIO-MM#14: Avoid Direct Impacts on Bay Checkerspot and Monarch Butterfly Host Plants, BIO-MM#15: Prepare and Implement Bay Checkerspot Butterfly Protection Plan, BIO-MM#16: Provide Compensatory Mitigation for Impacts on Bay

Checkerspot Butterfly Habitat, and BIO-MM#10: Prepare and Implement a Habitat Mitigation Plan for Species and Species Habitat. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

The Authority will implement mitigation measures to reduce the impacts on Bay checkerspot butterfly. BIO-MM#1 will involve preparation of an RRP that will identify and describe procedures for restoring temporarily disturbed habitat to its former state. BIO-MM#2 will require the project biologist to develop a WCP prior to ground-disturbing activity to minimize and avoid the spread of invasive weeds into the project footprint and adjacent areas. BIO-MM#3 will require the project biologist to establish ESAs and nondisturbance zones (including WEF, where applicable) that support special-status species or aquatic resources and are subject to seasonal restrictions or other avoidance and minimization measures prior to ground-disturbing activity. BIO-MM#4 and BIO-MM#6 will require the project biologist to monitor construction activities for compliance with avoidance and minimization measures and established ESAs and nondisturbance zones and to document such monitoring through a compliance reporting program, respectively. BIO-MM#5 will require the project biologist to establish vehicle speed limits within the project footprint; restrict vehicle traffic to established roads, construction areas, and other permissible areas; and direct that routes be marked to prevent off-road traffic prior to ground-disturbing activity. BIO-MM#13 will give the project biologist authority to halt any construction activities that could injure or kill special-status species. BIO-MM#14 requires identification and avoidance of Bay checkerspot butterfly host plants prior to and during construction, helping to avoid impacts on individuals. BIO-MM#15 will require preparation and implementation of a Bay Checkerspot Butterfly Protection Plan that contains measures to maintain and improve habitat connectivity for butterflies between Coyote Ridge and Tulare Hill. BIO-MM#16 identifies minimum compensatory mitigation requirements for Bay checkerspot butterfly that will be included in the HMP developed under BIO-MM#10. These measures are expected to minimize direct and indirect impacts on Bay checkerspot butterfly habitat and individuals and will provide habitat of comparable quality to offset habitat loss. Therefore, these mitigation measures will be effective in minimizing the project's impacts associated with habitat loss or mortality to Bay checkerspot butterfly.

Compensatory mitigation implemented under Mitigation Measure BIO-MM#16 could involve some secondary impacts; however, these impacts would be beneficial, and the measures set forth in BIO-MM#11 will be implemented to minimize any adverse impacts.

Some of the activities and actions that will be implemented under BIO-MM#10, especially those involving ground disturbance, could result in impacts similar to those described in Section 3.7.7 of the Final EIR/EIS. Specifically, direct and indirect impacts on special-status plant and wildlife species (e.g., California tiger salamander, red-legged frog, and foothill yellow-legged frog), special-status plant communities, and aquatic resources could occur where such resources are present on the mitigation sites. BIO-MM#11, which requires a site assessment and appropriate regulatory authorizations, will be implemented at compensatory mitigation sites to reduce or avoid impacts on these resources.

Environmental impacts that would result from implementation of BIO-MM#10 on other resource categories could result from implementing restoration activities at mitigation sites. Refer to Section 4.4.1 of this document for a description of these potential secondary impacts of BIO-MM#10.

The Authority finds that Mitigation Measures BIO-MM#1, BIO-MM#2, BIO-MM#3, BIO-MM#4, BIO-MM#6, BIO-MM#5, BIO-MM#13, BIO-MM#14, BIO-MM#15, BIO-MM#16, and BIO-MM#10 are required under the Preferred Alternative and that implementation of these mitigation measures will reduce the project's impacts on habitat loss or mortality to Bay checkerspot butterfly to a less-than-significant level.

4.4.3 Impact BIO #2b: Permanent Conversion or Degradation of Habitat for and Mortality of Monarch Butterfly

Construction of the HSR track and systems in all subsections would take place in suitable habitat (which could support breeding host plants [milkweed plants], or other nectar sources [a variety of

flowering plants]) for monarch butterfly, a species that became a candidate for listing under FESA on December 15, 2020. Construction activities would convert and destroy suitable habitat and could result in individual fatalities of monarch butterflies if they are present at the time of construction. Additionally, fugitive dust during construction could affect monarch butterflies if they are near the construction area at the time construction occurs. Furthermore, fugitive dust could temporarily affect host or nectar plants by covering leaves and reducing the vigor of plants. The Authority has incorporated BIO-IAMF#1, BIO-IAMF#3, BIO-IAMF#5, BIO-IAMF#8, BIO-IAMF#9, BIO-IAMF#10, and BIO-IAMF#11 (these measures and how they will avoid and minimize potential effects are described in Impact BIO#1) into the project design to avoid and minimize impacts on wildlife and plants from construction. The areal extent of direct permanent and temporary impacts (conversion and disturbance of habitat) on habitat for the species is shown in Final EIR/EIS Table 3.7-13.

As shown, even with the implementation of these IAMFs, the project could result in habitat conversion or degradation or individual fatalities for monarch butterfly, which is considered a significant impact under CEQA (Final EIR/EIS: page 3.7-84).

Implementation of the following measures mitigates this impact: BIO-MM#1: Prepare and Implement a Restoration and Revegetation Plan, BIO-MM#2: Prepare and Implement a Weed Control Plan, BIO-MM#3: Establish Environmentally Sensitive Areas and Nondisturbance Zones, BIO-MM#4: Conduct Monitoring of Construction Activities, BIO-MM#6: Establish and Implement a Compliance Reporting Program, BIO-MM#5: Limit Vehicle Traffic and Construction Site Speeds, BIO-MM#9: Prepare and Implement a Groundwater Adaptive Management and Monitoring Plan, BIO-MM#13: Implement Work Stoppage, BIO-MM#14: Avoid Direct Impacts on Bay Checkerspot and Monarch Butterfly Host Plants, BIO-MM#86: Provide Compensatory Mitigation for Impacts on Monarch Butterfly Habitat, and BIO-MM#10: Prepare and Implement a Habitat Mitigation Plan for Species and Species Habitat. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

The Authority will implement mitigation measures to reduce the impacts on monarch butterfly. BIO-MM#1 will involve preparation of an RRP that will identify and describe procedures for restoring temporarily disturbed habitat to its former state. BIO-MM#2 will require the project biologist to develop a WCP prior to ground-disturbing activity to minimize and avoid the spread of invasive weeds into the project footprint and adjacent areas. BIO-MM#3 will require the project biologist to establish ESAs and nondisturbance zones (including WEF, where applicable) that support special-status species or aquatic resources and are subject to seasonal restrictions or other avoidance and minimization measures prior to ground-disturbing activity. BIO-MM#4 and BIO-MM#6 will require the project biologist to monitor construction activities for compliance with avoidance and minimization measures and established ESAs and nondisturbance zones and to document such monitoring through a compliance reporting program, respectively. BIO-MM#5 will require the project biologist to establish vehicle speed limits within the project footprint; restrict vehicle traffic to established roads, construction areas, and other permissible areas; and direct that routes be marked to prevent off-road traffic prior to ground-disturbing activity. BIO-MM#9 will involve preparation and implementation of a GAMMP that will require monitoring of groundwater-dependent surface water resources (including those providing nectar habitat for monarchs) within the tunnel groundwater study area, providing supplemental water where needed, and remediating or compensating for any adverse effects identified during monitoring. BIO-MM#13 will give the project biologist authority to halt any construction activities that could injure or kill individuals belonging to special-status species. BIO-MM#14 requires identification and avoidance of Bay checkerspot and monarch butterfly host plants prior to and during construction, helping to avoid impacts on individuals. BIO-MM#86 identifies minimum compensatory mitigation requirements for monarch butterfly that will be included in the HMP developed under BIO-MM#10. These measures are expected to minimize direct and indirect impacts on monarch butterfly habitat and individuals and will provide habitat of comparable quality to offset habitat loss. Therefore, these mitigation measures will be effective in minimizing the project's impacts associated with habitat loss or mortality to monarch butterfly.

Compensatory mitigation implemented under Mitigation Measure BIO-MM#86 could result in secondary impacts; however, these impacts would be beneficial, and the measures set forth in BIO-MM#11 will be implemented to minimize any adverse impacts.

Some of the activities and actions that will be implemented under BIO-MM#10, especially those involving ground disturbance, could result in impacts similar to those described in Section 3.7.7 of the Final EIR/EIS. Specifically, direct and indirect impacts on special-status plant and wildlife species (e.g., California tiger salamander, red-legged frog, and foothill yellow-legged frog), special-status plant communities, and aquatic resources could occur where such resources are present on the mitigation sites. BIO-MM#11, which requires a site assessment and appropriate regulatory authorizations, will be implemented at compensatory mitigation sites to reduce or avoid impacts on these resources.

Environmental impacts that would result from implementation of BIO-MM#10 on other resource categories could result from implementing restoration activities at mitigation sites. Refer to Section 4.4.1 of this document for a description of these potential secondary impacts of BIO-MM#10.

The Authority finds that Mitigation Measures BIO-MM#1, BIO-MM#2, BIO-MM#3, BIO-MM#4, BIO-MM#6, BIO-MM#5, BIO-MM#9, BIO-MM#13, BIO-MM#14, BIO-MM#86, and BIO-MM#10 are required under the Preferred Alternative and that implementation of these mitigation measures will reduce the project's impacts on habitat loss or mortality to monarch butterfly to a less-than-significant level.

4.4.4 Impact BIO#3: Permanent Conversion or Degradation of Habitat for and Mortality of Vernal Pool Crustaceans

Construction of the HSR track and systems in the San Joaquin Valley Subsection would take place in suitable habitat for four federally listed vernal pool crustaceans: Conservancy fairy shrimp, longhorn fairy shrimp, and vernal pool tadpole shrimp, all listed as endangered under FESA; and vernal pool fairy shrimp, listed as threatened. Construction in the Morgan Hill and Gilroy and Pacheco Pass Subsections would take place in suitable habitat for vernal pool tadpole shrimp. Construction activities would convert habitat and could result in the mortality of individual crustaceans or their cysts, as well as degrading habitat that is not directly affected. The Authority has incorporated BIO-IAMF#1, BIO-IAMF#3, BIO-IAMF#5, BIO-IAMF#8, BIO-IAMF#9, BIO-IAMF#10, and BIO-IAMF#11 into project design to avoid and minimize impacts on vernal pool crustaceans.

Because of the limited extent and fragility of vernal pool habitat for these species, all impacts are considered permanent. The areal extent of direct permanent impacts (conversion and disturbance of habitat, mortality of individuals and cysts) on suitable habitat for the species is shown in Table 3.7-13 of the Final EIR/EIS. The U.S. Fish and Wildlife Service (USFWS) has designated critical habitat for vernal pool ecosystems as well as for all four crustacean species; the project would not intersect or affect any critical habitat units.

While pre-construction and construction actions to protect habitat for listed vernal pool crustaceans are part of the project, these actions would not prevent the conversion and disturbance of habitat in and near the project footprint. If construction in the project footprint alters a hydrologic regime that supplies water to vernal pools within 250 feet of the footprint, such hydrological modifications could indirectly affect habitat by altering the pools' ponding duration and causing pools to evaporate before vernal pool crustaceans complete their life cycles. Similarly, ground-disturbing activities that result in perforation or fracture of the water-restricting layer that allows vernal pools to pond could, even outside the project footprint, lead to the loss of suitable habitat.

Therefore, even with the implementation of these IAMFs, the project could result in habitat conversion or degradation or individual fatalities for vernal pool crustaceans, which is considered a significant impact under CEQA (Final EIR/EIS: page 3.7-85).

Implementation of the following measures mitigates this impact: BIO-MM#1: Prepare and Implement a Restoration and Revegetation Plan, BIO-MM#2: Prepare and Implement a Weed Control Plan, BIO-MM#3: Establish Environmentally Sensitive Areas and Nondisturbance Zones, BIO-MM#4: Conduct Monitoring of Construction Activities, BIO-MM#6: Establish and Implement a Compliance Reporting Program, BIO-MM#5: Limit Vehicle Traffic and Construction Site Speeds, BIO-MM#13: Implement Work Stoppage, BIO-MM#17: Conduct Pre-Construction Surveys for Vernal Pool Wildlife Species, BIO-MM#18: Implement Seasonal Vernal Pool Work Restriction, BIO-MM#19: Implement and Monitor Vernal Pool Avoidance and Minimization Measures within Temporary Impact Areas, BIO-MM#20: Provide Compensatory Mitigation for Impacts on Vernal Pool Fairy Shrimp and Vernal Pool Tadpole Shrimp Habitat, and BIO-MM#10: Prepare and Implement a Habitat Mitigation Plan for Species and Species Habitat. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

The Authority will implement mitigation measures to reduce the impacts on vernal pool crustaceans. The Authority will implement mitigation measures to reduce the impacts on special-status plants. BIO-MM#1 will involve preparation of an RRP that will identify and describe procedures for restoring temporarily disturbed habitat to its former state. BIO-MM#2 will require the project biologist to develop a WCP prior to ground-disturbing activity to minimize and avoid the spread of invasive weeds into the project footprint and adjacent areas. BIO-MM#3 will require the project biologist to establish ESAs and nondisturbance zones (including WEF, where applicable) that support special-status species or aquatic resources and are subject to seasonal restrictions or other avoidance and minimization measures prior to ground-disturbing activity. BIO-MM#4 and BIO-MM#6 will require the project biologist to monitor construction activities for compliance with avoidance and minimization measures and established ESAs and nondisturbance zones and to document such monitoring through a compliance reporting program, respectively. BIO-MM#5 will require the project biologist to establish vehicle speed limits within the project footprint; restrict vehicle traffic to established roads, construction areas, and other permissible areas; and direct that routes be marked to prevent off-road traffic prior to ground-disturbing activity. BIO-MM#13 will give the project biologist authority to halt any construction activities that could injure or kill individuals belonging to special-status species. Prior to construction, the Authority will conduct pre-construction sampling for federally listed vernal pool crustaceans consistent with USFWS survey protocols under BIO-MM#17. To avoid indirect impacts from ground-disturbing activities, the Authority will restrict activities within 250 feet of vernal pools and suitable seasonal wetlands between October 15 and April 15 as outlined in BIO-MM#18. The Authority will avoid and minimize impacts on vernal pool crustaceans within temporary impact areas as outlined in BIO-MM#19. BIO-MM#20 will require the Authority to compensate for direct and indirect (within 250 feet) impacts on vernal pool crustacean habitat at a 1:1 ratio through the HMP developed under BIO-MM#10. These measures are expected to minimize direct and indirect impacts on federally listed vernal pool crustacean habitat and individuals and to offset the loss of habitat. Therefore, these mitigation measures will be effective in minimizing the project's impacts associated with habitat loss or mortality to vernal pool crustaceans.

Compensatory mitigation under Mitigation Measure BIO-MM#20 could involve some secondary impacts; however, these impacts would be beneficial, and the measures set forth in BIO-MM#11 will be implemented to minimize any adverse impacts.

Some of the activities and actions that will be implemented under BIO-MM#10, especially those involving ground disturbance, could result in impacts similar to those described in Section 3.7.7 of the Final EIR/EIS. Specifically, direct and indirect impacts on special-status plant and wildlife species (e.g., California tiger salamander, red-legged frog, and foothill yellow-legged frog), special-status plant communities, and aquatic resources could occur where such resources are present on the mitigation sites. BIO-MM#11, which requires a site assessment and appropriate regulatory authorizations, will be implemented at compensatory mitigation sites to reduce or avoid impacts on these resources.

Environmental impacts that would result from implementation of BIO-MM#10 on other resource categories could result from implementing restoration activities at mitigation sites. Refer to

Section 4.4.1 of this document for a description of these potential secondary impacts of BIO-MM#10.

The Authority finds that Mitigation Measures BIO-MM#1, BIO-MM#2, BIO-MM#3, BIO-MM#4, BIO-MM#6, BIO-MM#5, BIO-MM#13, BIO-MM#17, BIO-MM#18, BIO-MM#19, BIO-MM#20, and BIO-MM#10 are required under the Preferred Alternative and that implementation of these mitigation measures will reduce the project's impacts on habitat loss or mortality to vernal pool crustaceans to a less-than-significant level.

4.4.5 Impact BIO#4: Removal or Pruning of Elderberry Plants Potentially Supporting Valley Elderberry Longhorn Beetle

Construction of the HSR track and systems in the San Joaquin Valley Subsection would take place in habitat for valley elderberry longhorn beetle, a species listed as threatened under FESA. Construction could necessitate the removal of red or blue elderberry—the obligatory host species for the beetle. The Authority has incorporated BIO-IAMF#1, BIO-IAMF#3, BIO-IAMF#5, BIO-IAMF#8, BIO-IAMF#9, BIO-IAMF#10, and BIO-IAMF#11 into project design to avoid and minimize impacts on valley elderberry longhorn beetle. The areal extent of direct permanent impacts (conversion and disturbance of habitat, mortality of individuals) on riparian and other habitat for the species is shown in Final EIR/EIS Table 3.7-13. The USFWS has designated critical habitat for valley elderberry longhorn beetle; the project would not intersect any critical habitat units.

While pre-construction and construction actions to protect habitat for valley elderberry longhorn beetle are part of the project, these actions would not prevent the loss of habitat in the project footprint. Because of the dependence of this species on host plants, loss of occupied host plants would result in mortality of individual beetles.

Therefore, even with the implementation of these IAMFs, the project could result in direct mortality and habitat modification for valley elderberry longhorn beetle, which is considered a significant impact under CEQA (Final EIR/EIS: page 3.7-86).

Implementation of the following measures mitigates this impact: BIO-MM#1: Prepare and Implement a Restoration and Revegetation Plan, BIO-MM#2: Prepare and Implement a Weed Control Plan, BIO-MM#3: Establish Environmentally Sensitive Areas and Nondisturbance Zones, BIO-MM#4: Conduct Monitoring of Construction Activities, BIO-MM#6: Establish and Implement a Compliance Reporting Program, BIO-MM#5: Limit Vehicle Traffic and Construction Site Speeds, BIO-MM#13: Implement Work Stoppage, BIO-MM#21: Implement Avoidance Measures for Elderberry Shrubs outside Permanent Impact Areas, BIO-MM#22: Provide Compensatory Mitigation for Impacts on Valley Elderberry Longhorn Beetle Habitat, BIO-MM#10: Prepare and Implement a Habitat Mitigation Plan for Species and Species Habitat, and BIO-MM#11: Implement Measures to Minimize Impacts during Off-Site Habitat Restoration, or Enhancement, or Creation on Mitigation Sites. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

The Authority will implement mitigation measures to reduce the impacts on federally listed valley elderberry longhorn beetle. The Authority will implement mitigation measures to reduce the impacts on special-status plants. BIO-MM#1 will involve preparation of an RRP that will identify and describe procedures for restoring temporarily disturbed habitat to its former state. BIO-MM#2 will require the project biologist to develop a WCP prior to ground-disturbing activity to minimize and avoid the spread of invasive weeds into the project footprint and adjacent areas. BIO-MM#3 will require the project biologist to establish ESAs and nondisturbance zones (including WEF, where applicable) that support special-status species or aquatic resources and are subject to seasonal restrictions or other avoidance and minimization measures prior to ground-disturbing activity. BIO-MM#4 and BIO-MM#6 will require the project biologist to monitor construction activities for compliance with avoidance and minimization measures and established ESAs and nondisturbance zones and to document such monitoring through a compliance reporting program, respectively. BIO-MM#5 will require the project biologist to establish vehicle speed limits within the project footprint; restrict vehicle traffic to established roads, construction areas, and other

permissible areas; and direct that routes be marked to prevent off-road traffic prior to ground-disturbing activity. BIO-MM#13 will give the project biologist authority to halt any construction activities that could injure or kill individuals belonging to special-status species. BIO-MM#21 will avoid direct impacts on shrubs potentially occupied by valley elderberry longhorn beetle outside permanent impact areas. BIO-MM#22 identifies minimum compensatory mitigation requirements for valley elderberry longhorn beetle that will be included in the HMP developed under BIO-MM#10. BIO-MM#11 will minimize impacts associated with mitigation efforts. These measures will minimize direct and indirect impacts on valley elderberry longhorn beetle habitat and individuals within the project footprint and compensate for loss of habitat. Therefore, these mitigation measures will be effective in minimizing the project's impacts on valley elderberry longhorn beetles.

Compensatory mitigation under Mitigation Measure BIO-MM#22 could involve some secondary impacts; however, these impacts would be beneficial, and the measures set forth in BIO-MM#11 will be implemented to minimize any adverse impacts.

Some of the activities and actions that will be implemented under BIO-MM#10, especially those involving ground disturbance, could result in impacts similar to those described in Section 3.7.7 of the Final EIR/EIS. Specifically, direct and indirect impacts on special-status plant and wildlife species (e.g., California tiger salamander, red-legged frog, and foothill yellow-legged frog), special-status plant communities, and aquatic resources could occur where such resources are present on the mitigation sites. BIO-MM#11, which requires a site assessment and appropriate regulatory authorizations, will be implemented at compensatory mitigation sites to reduce or avoid impacts on these resources.

Environmental impacts that would result from implementation of BIO-MM#10 on other resource categories could result from implementing restoration activities at mitigation sites. Refer to Section 4.4.1 of this document for a description of these potential secondary impacts of BIO-MM#10.

The Authority finds that Mitigation Measures BIO-MM#1, BIO-MM#2, BIO-MM#3, BIO-MM#4, BIO-MM#6, BIO-MM#5, BIO-MM#13, BIO-MM#21, BIO-MM#22, BIO-MM#10, and BIO-MM#11 are required under the Preferred Alternative and that implementation of these mitigation measures will reduce the project's impacts on valley elderberry longhorn beetle to a less-than-significant level.

4.4.6 Impact BIO#5: Permanent Conversion or Degradation of Habitat for and Mortality of Crotch Bumble Bee

Construction of the HSR track and systems in all subsections would take place in suitable habitat for the Crotch bumble bee, a candidate for listing as endangered under CESA. Construction activities would convert and disturb habitat and could result in the mortality of individual bees if underground nest colonies or overwintering queens are present in the project footprint at the time of construction. The Authority has incorporated BIO-IAMF#1, BIO-IAMF#3, BIO-IAMF#5, BIO-IAMF#8, BIO-IAMF#9, BIO-IAMF#10, and BIO-IAMF#11 into project design to avoid and minimize impacts on Crotch bumble bee. While pre-construction and construction actions to protect habitat for the Crotch bumble bee are part of the project, these actions would not prevent the conversion and disturbance of habitat in and near the project footprint. Ground disturbance could crush or excavate underground burrows supporting active nest colonies or soils or leaf litter supporting overwintering queens.

The areal extent of direct permanent and temporary impacts (conversion and disturbance of habitat) on habitat for the species is shown in Final EIR/EIS Table 3.7-13.

Therefore, even with the implementation of these IAMFs, the project could result in habitat conversion or degradation, or individual fatalities for Crotch bumble bee, which is considered a significant impact under CEQA (Final EIR/EIS: page 3.7-86).

Implementation of the following measures mitigates this impact: BIO-MM#1: Prepare and Implement a Restoration and Revegetation Plan, BIO-MM#2: Prepare and Implement a Weed

Control Plan, BIO-MM#3: Establish Environmentally Sensitive Areas and Nondisturbance Zones, BIO-MM#4: Conduct Monitoring of Construction Activities, BIO-MM#6: Establish and Implement a Compliance Reporting Program, BIO-MM#5: Limit Vehicle Traffic and Construction Site Speeds, BIO-MM#12: Provide Compensatory Mitigation for Impacts on Listed Plant Species, BIO-MM#23: Conduct Surveys and Implement Avoidance Measures for Crotch Bumble Bee, and BIO-MM#24: Provide Compensatory Mitigation for Impacts on Crotch Bumble Bee. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

The Authority will implement mitigation measures to reduce the impacts on Crotch bumble bee. BIO-MM#1 will involve preparation of an RRP that will identify and describe procedures for restoring temporarily disturbed habitat to its former condition. BIO-MM#2 will require the project biologist to develop a WCP prior to ground-disturbing activity to minimize and avoid the spread of invasive weeds into the project footprint and adjacent areas. BIO-MM#3 will require the project biologist to establish ESAs and nondisturbance zones (including WEF, where applicable) that support special-status species or aquatic resources and are subject to seasonal restrictions or other avoidance and minimization measures prior to ground-disturbing activity. BIO-MM#4 and BIO-MM#6 will require the project biologist to monitor construction activities for compliance with avoidance and minimization measures and established ESAs and nondisturbance zones and to document such monitoring through a compliance reporting program, respectively. BIO-MM#5 will require the project biologist to establish vehicle speed limits within the project footprint; restrict vehicle traffic to established roads, construction areas, and other permissible areas; and direct that routes be marked to prevent off-road traffic prior to ground-disturbing activity. BIO-MM#12 will give the project biologist authority to halt any construction activities that could injure or kill individuals belonging to species listed under the FESA or CESA. BIO-MM#23 requires sampling surveys for Crotch bumble bee in the project footprint within 1 year of construction, helping to define areas for additional pre-construction surveys. If sampling identifies occupied Crotch bumble bee habitat within the project footprint, BIO-MM#23 also requires the project biologist to conduct pre-construction surveys of such habitat for active bee nest colonies just prior to construction so that they can be considered for avoidance through the use of no-work buffers. These measures are expected to minimize direct and indirect impacts on Crotch bumble bee habitat and individuals. BIO-MM#24 will provide habitat of comparable quality to offset habitat loss. Therefore, these mitigation measures will be effective in minimizing the project's impacts associated with habitat loss or mortality to Crotch bumble bee.

The Authority finds that Mitigation Measures BIO-MM#1, BIO-MM#2, BIO-MM#3, BIO-MM#4, BIO-MM#6, BIO-MM#5, BIO-MM#12, BIO-MM#23, and BIO-MM#24 are required under the Preferred Alternative and that implementation of these mitigation measures will reduce the project's impacts on habitat loss or mortality to Crotch bumble bee to a less-than-significant level.

4.4.7 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

Construction of HSR track and systems in all subsections except the San Joaquin Valley Subsection would take place in habitat for steelhead and Pacific lamprey and designated freshwater essential fish habitat (EFH) for Pacific Coast salmon (collectively referred to as special-status fish). Central California coast (CCC) and south-central California coast (SCCC) steelhead are both federally listed as threatened under FESA, Pacific lamprey is a federal species of concern and a California Department of Fish and Wildlife (CDFW) species of special concern, and the project intersects designated EFH for Chinook and coho salmon. Construction activities would result in permanent conversion of some habitat to transportation uses and could cause injury and mortality to individual fish that are present in work areas. Because such activities could adversely affect EFH for Pacific Coast salmon by altering the physical, chemical, or biological conditions of affected streams, consultation with National Marine Fisheries Service is required and effects are described in the Biological Assessment.

The Authority has incorporated BIO-IAMF#1, BIO-IAMF#3, BIO-IAMF#5, BIO-IAMF#8, BIO-IAMF#9, BIO-IAMF#10, and BIO-IAMF#11 into project design to avoid and minimize impacts on

steelhead, Pacific lamprey, and EFH. In addition, the Authority will require preparation of other plans to guide project activities: preparation and implementation of a SWPPP and plans governing the handling and management of hazardous materials (HMW-IAMF#3 and HMW-IAMF#6, respectively, as described in Section 3.10, Hazardous Materials and Waste, of the Final EIR/EIS) will minimize the risk of contaminants discharging into waterbodies. Tunnels will be designed and constructed to avoid or minimize groundwater inflows into tunnels during construction that may affect surface water resources, including Pacheco Creek (HYD-IAMF#5).

The areal extent of direct permanent and temporary impacts (conversion and temporary dewatering of habitat, injury or mortality resulting from pile-driving activities) on habitat for the species is shown in Final EIR/EIS Table 3.7-13. The project would also intersect designated critical habitat for CCC and SCCC steelhead as shown in Final EIR/EIS Table 3.7-14.

Floodplain habitats used by steelhead would be affected by the Preferred Alternative, though impacts will be minimized through a variety of project design and construction features (HYD-IAMF#2). At the Guadalupe River and Llagas Creek crossings, bridge abutments or pile bents would be placed in the floodplain; there would be minimal physical barriers which would not impede fish movement in the floodplain in these areas. In the Soap Lake floodplain, the project would be constructed as viaduct; viaduct columns would not obstruct flow or steelhead movement in the floodplain, but MOWF construction would place fill in the floodplain west of the Pajaro River crossing. The project would maintain circulation of flood flows around and past the MOWF. Moreover, the MOWF is located high in the floodplain, and would not obstruct most flood flows (i.e., the 10-year or more frequent flood). In upper Pacheco Creek, the alignment in the vicinity of the floodplain would be viaduct, with columns placed in the floodplain. The columns would not obstruct flood flows or steelhead movement. However, local small areas of fill would be placed in the floodplain along its southern edge. Design in accordance with HYD-IAMF#2 will minimize the hydraulic effects of fill.

As discussed in Impact BIO#1 in the Final EIR/EIS, construction of Tunnels 1 and 2 could have temporary indirect impacts on the hydrology of groundwater-dependent surface waters, including habitat and designated critical habitat for SCCC steelhead in Pacheco Creek near Casa de Fruta (i.e., northeast of Tunnel 1 and northwest of Tunnel 2). A drop in groundwater inflow to Pacheco Creek (directly or via upstream tributaries) could alter instream habitat conditions and fish movement potential. As discussed in Impact HYD-10 in Section 3.8 of the Final EIR/EIS, the duration of this impact would depend on the hydrologic conditions, subsurface conditions, and the amount of lowering of groundwater tables or tunnel dewatering discharge, none of which can be estimated at this time.

In addition, if tunnel dewatering discharges at the Tunnel 2 west portal were to be routed to Pacheco Creek, such discharges could affect fish movement through the scour of creeks or banks that could alter channel conditions, as well as through the introduction of abnormally warm water that could be a thermal barrier to safe fish passage. As discussed in Final EIR/EIS Section 3.8, 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 would be beneficially reused or discharged into receiving waterbodies. The application of regulatory discharge controls would avoid water quality effects related to fish habitat conditions and fish movement.

While pre-construction and construction actions to protect habitat for special-status fish species are part of the project, these actions would not prevent the conversion and disturbance of aquatic habitat where work must be conducted. In addition to habitat loss and temporary disturbance, construction activities could temporarily limit fish access to seasonal floodplain habitats; temporarily remove riparian vegetation, resulting in decreased stream shading; ground-disturbing activities could result in increased sediment discharge; and dewatering could result in stranding and death of individual fish.

Therefore, even with the implementation of these IAMFs, the project could result in habitat conversion or degradation, or individual fatalities, for steelhead and Pacific lamprey, or

permanent conversion of EFH, which is considered a significant impact under CEQA (Final EIR/EIS: page 3.7-87).

Implementation of the following measures mitigates this impact: BIO-MM#1: Prepare and Implement a Restoration and Revegetation Plan, BIO-MM#3: Establish Environmentally Sensitive Areas and Nondisturbance Zones, BIO-MM#4: Conduct Monitoring of Construction Activities, BIO-MM#6: Establish and Implement a Compliance Reporting Program, BIO-MM#9: Prepare and Implement a Groundwater Adaptive Management and Monitoring Plan, BIO-MM#13: Implement Work Stoppage, BIO-MM#25: Prepare Plan for Dewatering and Water Diversions, BIO-MM#26: Prepare and Implement a Fish Rescue Plan, BIO-MM#27a: Implement General Protection Measures for Fish, BIO-MM#27b: Work Windows for Fish, BIO-MM#27c: Prepare and Implement an Underwater Sound Control Plan, BIO-MM#28: Provide Compensatory Mitigation for Permanent Impacts on Steelhead Habitat and Essential Fish Habitat for Pacific Coast Salmon, and BIO-MM#10: Prepare and Implement a Habitat Mitigation Plan for Species and Species Habitat. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

The Authority will implement mitigation measures to reduce the impacts on special-status fish. BIO-MM#1 will involve preparation of an RRP that will identify and describe procedures for restoring temporarily disturbed habitat to its former state. BIO-MM#3 will require the project biologist to establish ESAs and nondisturbance zones (including WEF, where applicable) that support special-status species or aquatic resources and are subject to seasonal restrictions or other avoidance and minimization measures prior to ground-disturbing activity. BIO-MM#4 and BIO-MM#6 will require the project biologist to monitor construction activities for compliance with avoidance and minimization measures and established ESAs and nondisturbance zones, and to document such monitoring through a compliance reporting program, respectively. BIO-MM#9 will involve preparation and implementation of a GAMMP that will require monitoring of groundwater-dependent surface water resources (including those providing habitat for fish) within the tunnel groundwater study area, providing supplemental water where needed, and remediating or compensating for any adverse effects identified during monitoring. BIO-MM#13 will give the project biologist authority to halt any construction activities that could injure or kill individuals belonging to special-status species. BIO-MM#25 will require the preparation of a dewatering plan prior to construction in flowing water and monitoring of dewatering during construction. BIO-MM#26 will minimize direct impacts on individual special-status fish during construction by establishing procedures for rescuing stranded fish during stream dewatering. BIO-MM#27a will implement several general protection measures for fish, which will help avoid and minimize potential effects through design considerations and restoration requirements. BIO-MM#27b will minimize adverse impacts on fish by establishing work windows during sensitive periods for fish. BIO-MM#27c will help control and manage underwater sound to minimize adverse impacts from in-water pile driving. BIO-MM#28 identifies minimum compensatory mitigation requirements for steelhead that will be included in the HMP developed under BIO-MM#10; such requirements will also be expected to benefit Pacific lamprey and EFH. These measures are expected to minimize direct and indirect impacts on special-status fish habitat and individuals and to offset the loss of habitat. Therefore, these mitigation measures will be effective in minimizing the project's impacts associated with habitat conversion or degradation, or individual fatalities, for steelhead and Pacific lamprey, or permanent conversion of EFH.

Compensatory mitigation under Mitigation Measure BIO-MM#28 could involve some secondary impacts; however, these impacts would be beneficial, and the measures set forth in BIO-MM#10 will be implemented to minimize any adverse impacts.

Some of the activities and actions that will be implemented under BIO-MM#10, especially those involving ground disturbance, could result in impacts similar to those described in Section 3.7.7 of the Final EIR/EIS. Specifically, direct and indirect impacts on special-status plant and wildlife species (e.g., California tiger salamander, red-legged frog, and foothill yellow-legged frog), special-status plant communities, and aquatic resources could occur where such resources are present on the mitigation sites. BIO-MM#11, which requires a site assessment and appropriate

regulatory authorizations, will be implemented at compensatory mitigation sites to reduce or avoid impacts on these resources.

Environmental impacts that would result from implementation of BIO-MM#10 on other resource categories could result from implementing restoration activities at mitigation sites. Refer to Section 4.4.1 of this document for a description of these potential secondary impacts of BIO-MM#10.

The Authority finds that Mitigation Measures BIO-MM#1, BIO-MM#3, BIO-MM#4, BIO-MM#6, BIO-MM#9, BIO-MM#13, BIO-MM#25, BIO-MM#26, BIO-MM#27, BIO-MM#28, and BIO-MM#10 are required under the Preferred Alternative and that implementation of these mitigation measures will reduce the project's impacts on steelhead, Pacific lamprey, and EFH for Pacific Coast Salmon to a less-than-significant level.

4.4.8 Impact BIO#7: Permanent Conversion or Degradation of Habitat for and Direct Mortality of California Tiger Salamander

Construction of the HSR track and systems in all subsections would take place in suitable habitat for the California tiger salamander, a species listed as threatened under the FESA and CESA. Such activities would convert suitable habitat and reduce the quality of the remaining suitable habitat, and could result in the injury or mortality of individual California tiger salamanders.

The Authority has incorporated BIO-IAMF#1, BIO-IAMF#3, BIO-IAMF#5, BIO-IAMF#8, BIO-IAMF#9, BIO-IAMF#10, and BIO-IAMF#11 into project design to avoid and minimize impacts on California tiger salamander. In addition, erosion control materials that could entrap salamanders will be prohibited (BIO-IAMF#6) to prevent mortality and harm associated with inadvertent entrapment. Covering trenches, pits, and other excavations when not in use and inspecting them regularly (BIO-IAMF#7) will prevent salamanders from falling into these areas and being trapped there. Tunnels will be designed and constructed to avoid or minimize groundwater inflows into the tunnel during construction that may affect surface water resources in areas overlying the tunnel alignment (HYD-IAMF#5), including those that provide aquatic habitat for California tiger salamander. The areal extent of direct permanent and temporary impacts (conversion and disturbance of habitat) on aquatic and upland (both agricultural and nonagricultural) habitat for the species is shown in Final EIR/EIS Table 3.7-13.

While suitable habitat is present in all five subsections, the greatest amount is in the Pacheco Pass and San Joaquin Valley Subsections. The most extensive impacts on suitable habitat would result from work on the portals for Tunnel 1 in the Pacheco Pass Subsection, requiring large areas of grading and earthmoving for slope stabilization. Additionally, as shown in Table 3.7-14 of the Final EIR/EIS, the project would have impacts on two units of designated critical habitat. The impacts associated with work on Tunnel 1 would take place in the San Felipe Unit (Unit 12). Primarily temporary impacts would result from Pacific Gas and Electric Company (PG&E) work to upgrade the electrical network in the Lion's Peak Units (10A and 10B), but these impacts would not be extensive.

Construction of Tunnels 1 and 2 could have temporary indirect impacts on the hydrology of groundwater-dependent surface waters, including ponds that provide aquatic breeding habitat for California tiger salamander. The majority of the area subject to potential temporary indirect effects is within the range and has the correct general habitat attributes to be suitable aquatic and upland habitat for California tiger salamander and thus would likely support breeding, foraging, and refugia of the species. Because hydroperiod and the amount of emergent wetland vegetation are two of the most important factors influencing suitability of a given pond for California tiger salamander (Ford et al. 2013: page 11), any reductions in groundwater supply to occupied ponds could reduce reproductive success of salamanders breeding in such ponds.

While pre-construction and construction actions to protect the tiger salamander are part of the project, these actions would not prevent the conversion of habitat and temporary disturbance of other habitat in the project footprint. Because the salamanders are small and can be distributed throughout suitable habitats, their exclusion from construction areas cannot be guaranteed.

Earthmoving, excavation, and vehicle operation during construction could crush, entomb, or physically disturb the salamanders. Ground disturbance, noise, and vibration associated with these activities could disrupt the activities of individual salamanders and may impair normal life cycle behaviors. The use of chemicals and hazardous substances during construction (e.g., oils, gasoline) may also cause salamander mortality if individuals enter aquatic habitat that has been contaminated by accidental spills or other vehicle and equipment leaks. If construction in the project footprint alters a hydrologic regime that supplies water to vernal pools (suitable breeding habitat for the species) within 250 feet of the footprint, such hydrological modifications could indirectly affect habitat by altering the pools' ponding duration and rendering aquatic habitat unsuitable to support breeding behavior and the development of eggs and larvae. The introduction of nonnative plant species to upland habitat could reduce California tiger salamander dispersal to nonbreeding sites (i.e., burrows) because dense herbaceous vegetation could impede movement. While many protections would be implemented, the potential for physical harm and mortality of individuals would not be eliminated without mitigation measures.

Therefore, even with the implementation of these IAMFs, the project could result in habitat conversion or degradation, or individual fatalities, for California tiger salamander, which is considered a significant impact under CEQA (Final EIR/EIS: page 3.7-89).

Implementation of the following measures mitigates this impact: BIO-MM#1: Prepare and Implement a Restoration and Revegetation Plan, BIO-MM#2: Prepare and Implement a Weed Control Plan, BIO-MM#3: Establish Environmentally Sensitive Areas and Nondisturbance Zones, BIO-MM#4: Conduct Monitoring of Construction Activities, BIO-MM#6: Establish and Implement a Compliance Reporting Program, BIO-MM#5: Limit Vehicle Traffic and Construction Site Speeds, BIO-MM#9: Prepare and Implement a Groundwater Adaptive Management and Monitoring Plan, BIO-MM#13: Implement Work Stoppage, BIO-MM#29: Conduct Pre-Construction Surveys for California Tiger Salamander, BIO-MM#30: Implement Avoidance and Minimization Measures for California Tiger Salamander, BIO-MM#31: Provide Compensatory Mitigation for Impacts on California Tiger Salamander Habitat, and BIO-MM#10: Prepare and Implement a Habitat Mitigation Plan for Species and Species Habitat. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

The Authority will implement mitigation measures to reduce the impacts on California tiger salamander. BIO-MM#1 will involve preparation of an RRP that will identify and describe procedures for restoring temporarily disturbed habitat to its former state. BIO-MM#2 will require the project biologist to develop a WCP prior to ground-disturbing activity to minimize and avoid the spread of invasive weeds into the project footprint and adjacent areas. BIO-MM#3 will require the project biologist to establish ESAs and nondisturbance zones (including WEF, where applicable) that support special-status species or aquatic resources and are subject to seasonal restrictions or other avoidance and minimization measures prior to ground-disturbing activity. BIO-MM#4 and BIO-MM#6 will require the project biologist to monitor construction activities for compliance with avoidance and minimization measures and established ESAs and nondisturbance zones and to document such monitoring through a compliance reporting program, respectively. BIO-MM#5 will require the project biologist to establish vehicle speed limits within the project footprint; restrict vehicle traffic to established roads, construction areas, and other permissible areas; and direct that routes be marked to prevent off-road traffic prior to ground-disturbing activity. BIO-MM#9 will involve preparation and implementation of a GAMMP that will require monitoring of groundwater-dependent surface water resources (including those providing habitat for California tiger salamander) within the tunnel groundwater study area, providing supplemental water where needed, and remediating or compensating for any adverse effects identified during monitoring. BIO-MM#13 will give the project biologist authority to halt any construction activities that could injure or kill individuals belonging to special-status species. BIO-MM#29 will minimize direct impacts on individual California tiger salamanders during construction by requiring pre-construction surveys of habitat within the project footprint. BIO-MM#30 will also minimize direct impacts on individuals by requiring WEF along the perimeter of the project footprint in suitable habitat to prevent individual salamanders from entering the work area and relocating salamanders from permanent impact areas to agency-approved habitat outside the

project footprint. BIO-MM#31 identifies minimum compensatory mitigation requirements for California tiger salamander that will be included in the HMP developed under BIO-MM#10. These measures will minimize direct and indirect impacts on California tiger salamander habitat (including critical habitat) and individuals and will compensate for habitat loss. Therefore, these mitigation measures will be effective in minimizing the project's impacts associated with habitat conversion or degradation, or individual fatalities, for California tiger salamander.

Compensatory mitigation under Mitigation Measure BIO-MM#31 could involve some secondary impacts; however, these impacts would be beneficial, and the measures set forth in BIO-MM#10 will be implemented to minimize any adverse impacts.

Some of the activities and actions that will be implemented under BIO-MM#10, especially those involving ground disturbance, could result in impacts similar to those described in Section 3.7.7 of the Final EIR/EIS. Specifically, direct and indirect impacts on special-status plant and wildlife species (e.g., California tiger salamander, red-legged frog, and foothill yellow-legged frog), special-status plant communities, and aquatic resources could occur where such resources are present on the mitigation sites. BIO-MM#11, which requires a site assessment and appropriate regulatory authorizations, will be implemented at compensatory mitigation sites to reduce or avoid impacts on these resources.

Environmental impacts that would result from implementation of BIO-MM#10 on other resource categories could result from implementing restoration activities at mitigation sites. Refer to Section 4.4.1 of this document for a description of these potential secondary impacts of BIO-MM#10.

The Authority finds that Mitigation Measures BIO-MM#1, BIO-MM#2, BIO-MM#3, BIO-MM#4, BIO-MM#6, BIO-MM#5, BIO-MM#9, BIO-MM#13, BIO-MM#29, BIO-MM#30, BIO-MM#31, and BIO-MM#10 are required under the Preferred Alternative and that implementation of these mitigation measures will reduce the project's impacts on California tiger salamander to a less-than-significant level.

4.4.9 Impact BIO#8: Permanent Conversion or Degradation of Habitat for and Direct Mortality of California Red-Legged Frog

Construction of the HSR track and systems in all subsections except the San Joaquin Valley Subsection would take place in suitable habitat for the California red-legged frog, a species listed as threatened under the FESA and a CDFW species of special concern. Such activities would convert habitat and reduce the quality of the remaining suitable habitat, and could result in the injury or mortality of individual red-legged frogs.

The Authority has incorporated BIO-IAMF#1, BIO-IAMF#3, BIO-IAMF#5, BIO-IAMF#6, BIO-IAMF#7, BIO-IAMF#8, BIO-IAMF#9, BIO-IAMF#10, and BIO-IAMF#11 into project design to avoid and minimize impacts on California red-legged frog. Tunnels will be designed and constructed to avoid or minimize groundwater inflow into tunnels during construction that may affect surface water resources overlying the tunnel alignment (HYD-IAMF#5), including those that provide aquatic habitat for California red-legged frog. The areal extent of direct permanent and temporary impacts (conversion and disturbance of habitat, injury and mortality of individuals) on breeding and nonbreeding habitat for the species is shown in Final EIR/EIS Table 3.7-13.

Construction of Tunnels 1 and 2 could have temporary indirect impacts on the hydrology of groundwater-dependent surface water features, including ponds, wetlands, streams, and riparian vegetation that provide habitat for California red-legged frog. Because California red-legged frog breeding sites must be inundated long enough to allow for tadpole development and metamorphosis (Ford et al. 2013: page 5), any reductions in groundwater supply to occupied ponds, streams, or wetlands could reduce reproductive success of the affected population. Reductions in groundwater supply to riparian vegetation could result in the desiccation of vegetation and degradation of foraging/refugia and movement habitat.

While pre-construction and construction actions to protect the California red-legged frog are part of the project, these actions would not prevent the conversion of habitat and temporary

disturbance of other habitat in the project footprint. Because frogs can be distributed throughout suitable habitats, their exclusion from construction areas cannot be guaranteed. Earthmoving, excavation, and vehicle operation during construction could crush, entomb, or physically disturb individual frogs. Ground disturbance, noise, and vibration associated with these activities could disrupt the activities of individual frogs and may impair normal life cycle behaviors. If construction in the project footprint alters a hydrologic regime that supplies water to aquatic habitat features within 250 feet of the footprint, such hydrological modifications could indirectly affect habitat by altering the pools' ponding duration and rendering aquatic habitat unsuitable to support breeding behavior and the development of eggs and larvae. The use of chemicals and hazardous substances during construction (e.g., oils, gasoline) may cause mortality if individuals enter aquatic habitat that has been contaminated by accidental spills or other vehicle and equipment leaks.

Therefore, even with the implementation of these IAMFs, the project could result in habitat conversion or degradation, or individual fatalities, for California red-legged frog, which is considered a significant impact under CEQA (Final EIR/EIS: page 3.7-91).

Implementation of the following measures mitigates this impact: BIO-MM#1: Prepare and Implement a Restoration and Revegetation Plan, BIO-MM#2: Prepare and Implement a Weed Control Plan, BIO-MM#3: Establish Environmentally Sensitive Areas and Nondisturbance Zones, BIO-MM#4: Conduct Monitoring of Construction Activities, BIO-MM#6: Establish and Implement a Compliance Reporting Program, BIO-MM#5: Limit Vehicle Traffic and Construction Site Speeds, BIO-MM#9: Prepare and Implement a Groundwater Adaptive Management and Monitoring Plan, BIO-MM#13: Implement Work Stoppage, BIO-MM#32: Conduct Pre-Construction Surveys and Implement Avoidance and Minimization Measures for California Red-Legged Frog, BIO-MM#33: Provide Compensatory Mitigation for Impacts on California Red-Legged Frog Habitat, and BIO-MM#10: Prepare and Implement a Habitat Mitigation Plan for Species and Species Habitat. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

The Authority will implement mitigation measures to reduce the impacts on California red-legged frog. BIO-MM#1 will involve preparation of an RRP that will identify and describe procedures for restoring temporarily disturbed habitat to its former state. BIO-MM#2 will require the project biologist to develop a WCP prior to ground-disturbing activity to minimize and avoid the spread of invasive weeds into the project footprint and adjacent areas. BIO-MM#3 will require the project biologist to establish ESAs and nondisturbance zones (including WEF, where applicable) that support special-status species or aquatic resources and are subject to seasonal restrictions or other avoidance and minimization measures prior to ground-disturbing activity. BIO-MM#4 and BIO-MM#6 will require the project biologist to monitor construction activities for compliance with avoidance and minimization measures and established ESAs and nondisturbance zones and to document such monitoring through a compliance reporting program, respectively. BIO-MM#5 will require the project biologist to establish vehicle speed limits within the project footprint; restrict vehicle traffic to established roads, construction areas, and other permissible areas; and direct that routes be marked to prevent off-road traffic prior to ground-disturbing activity. BIO-MM#9 will involve preparation and implementation of a GAMMP that will require monitoring of groundwater-dependent surface water resources (including those providing habitat for California red-legged frog) within the tunnel groundwater study area, providing supplemental water where needed, and remediating or compensating for any adverse effects identified during monitoring. BIO-MM#13 will give the project biologist authority to halt any construction activities that could injure or kill individuals belonging to special-status species. BIO-MM#32 will minimize direct impacts on individual California red-legged frogs during construction by requiring pre-construction surveys of modeled habitat within the project footprint and implementing additional avoidance and minimization measures (e.g., relocating frogs from permanent impact areas to agency-approved habitat outside the project footprint). BIO-MM#33 identifies minimum compensatory mitigation requirements for California red-legged frog that will be included in the HMP developed under BIO-MM#10. These measures will minimize direct and indirect impacts on California red-legged frog habitat (including critical habitat) and individuals and will compensate for habitat loss. Therefore,

these mitigation measures will be effective in minimizing the project's impacts associated with habitat conversion or degradation, or individual fatalities, for California red-legged frog.

Compensatory mitigation under Mitigation Measure BIO-MM#33 could involve some secondary impacts; however, these impacts would be beneficial, and the measures set forth in BIO-MM#10 will be implemented to minimize any adverse impacts.

Some of the activities and actions that will be implemented under BIO-MM#10, especially those involving ground disturbance, could result in impacts similar to those described in Section 3.7.7 of the Final EIR/EIS. Specifically, direct and indirect impacts on special-status plant and wildlife species (e.g., California tiger salamander, red-legged frog, and foothill yellow-legged frog), special-status plant communities, and aquatic resources could occur where such resources are present on the mitigation sites. BIO-MM#11, which requires a site assessment and appropriate regulatory authorizations, will be implemented at compensatory mitigation sites to reduce or avoid impacts on these resources.

Environmental impacts that would result from implementation of BIO-MM#10 on other resource categories could result from implementing restoration activities at mitigation sites. Refer to Section 4.4.1 of this document for a description of these potential secondary impacts of BIO-MM#10.

The Authority finds that Mitigation Measures BIO-MM#1, BIO-MM#2, BIO-MM#3, BIO-MM#4, BIO-MM#6, BIO-MM#5, BIO-MM#9, BIO-MM#13, BIO-MM#32, BIO-MM#33, and BIO-MM#10 are required under the Preferred Alternative and that implementation of these mitigation measures will reduce the project's impacts on California red-legged frog to a less-than-significant level.

4.4.10 Impact BIO#9: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Foothill Yellow-Legged Frog

Construction of the HSR track and systems in the Monterey Corridor, Morgan Hill and Gilroy, and Pacheco Pass Subsections would take place in suitable habitat for the foothill yellow-legged frog, a CDFW species of special concern, a candidate for state listing as threatened under CESA, and a species under review for federal listing under FESA. Such activities would convert habitat and reduce the quality of the remaining suitable habitat, and could result in the injury or mortality of individual yellow-legged frogs. The Authority has incorporated BIO-IAMF#1, BIO-IAMF#3, BIO-IAMF#5, BIO-IAMF#6, BIO-IAMF#7, BIO-IAMF#8, BIO-IAMF#9, BIO-IAMF#10, and BIO-IAMF#11 (described in Impact BIO#1 and Impact BIO#6) into project design to avoid and minimize impacts on foothill yellow-legged frog. Tunnels will be designed and constructed to avoid or minimize groundwater inflow into tunnels during construction that may affect surface water resources overlying the tunnel alignment (HYD-IAMF#5), including those that provide aquatic habitat for foothill yellow-legged frog.

The areal extent of direct permanent and temporary impacts (conversion and disturbance of habitat, injury and mortality of individuals) on breeding and foraging habitat for the species is shown in Final EIR/EIS Table 3.7-13. Work to construct Tunnels 1 and 2 (in the Morgan Hill and Gilroy and the Pacheco Pass Subsections, respectively) would have the greatest amount of impact on aquatic and upland habitat.

Construction of Tunnels 1 and 2 could have temporary indirect impacts on the hydrology of groundwater-dependent surface waters, including streams that provide aquatic habitat for foothill yellow-legged frog. Because foothill yellow-legged frogs require gently flowing water for breeding (Hayes et al. 2016: page 5–6), any reductions in groundwater supply to occupied streams could result in mortality of eggs or larvae. If occupied streams become dry, juvenile and adult frogs would have to seek other aquatic habitat and individuals could be injured or killed during movement. Conversely, sudden discharges of groundwater inflows to occupied streams could remove egg masses attached to cobbles and boulders. Both impacts would reduce the reproductive success of the affected population.

While pre-construction and construction actions to protect the foothill yellow-legged frog are part of the project, these actions would not prevent the conversion of habitat and temporary

disturbance of other habitat in the project footprint. Because frogs can be distributed throughout suitable habitats, their exclusion from construction areas cannot be guaranteed. Earthmoving, excavation, and vehicle operation during construction could crush, entomb, or physically disturb individual frogs. Ground disturbance, noise, and vibration associated with these activities could disrupt the activities of individual frogs and may impair normal life cycle behaviors. If construction in the project footprint alters a hydrologic regime, such hydrological modifications could indirectly affect habitat by altering the stream's flow regime and rendering aquatic habitat unsuitable to support breeding behavior and the development of eggs and larvae. The use of chemicals and hazardous substances during construction (e.g., oils, gasoline) may cause mortality if individuals enter aquatic habitat that has been contaminated by accidental spills or other vehicle and equipment leaks. While many protections would be implemented, the potential for physical harm and mortality of individuals would not be eliminated without mitigation measures.

Therefore, even with the implementation of these IAMFs, the project could result in habitat conversion or degradation, or individual fatalities, for foothill yellow-legged frog, which is considered a significant impact under CEQA (Final EIR/EIS: page 3.7-92).

Implementation of the following measures mitigates this impact: BIO-MM#1: Prepare and Implement a Restoration and Revegetation Plan, BIO-MM#2: Prepare and Implement a Weed Control Plan, BIO-MM#3: Establish Environmentally Sensitive Areas and Nondisturbance Zones, BIO-MM#4: Conduct Monitoring of Construction Activities, BIO-MM#6: Establish and Implement a Compliance Reporting Program, BIO-MM#5: Limit Vehicle Traffic and Construction Site Speeds, BIO-MM#9: Prepare and Implement a Groundwater Adaptive Management and Monitoring Plan, BIO-MM#13: Implement Work Stoppage, BIO-MM#34: Conduct Pre-Construction Surveys and Implement Avoidance and Minimization Measures for Foothill Yellow-Legged Frog, BIO-MM#35: Provide Compensatory Mitigation for Impacts on Foothill Yellow-Legged Frog Habitat, and BIO-MM#10: Prepare and Implement a Habitat Mitigation Plan for Species and Species Habitat. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

The Authority will implement mitigation measures to reduce the impacts on foothill yellow-legged frog. BIO-MM#1 will involve preparation of an RRP that will identify and describe procedures for restoring temporarily disturbed habitat to its former state. BIO-MM#2 will require the project biologist to develop a WCP prior to ground-disturbing activity to minimize and avoid the spread of invasive weeds into the project footprint and adjacent areas. BIO-MM#3 will require the project biologist to establish ESAs and nondisturbance zones (including WEF, where applicable) that support special-status species or aquatic resources and are subject to seasonal restrictions or other avoidance and minimization measures prior to ground-disturbing activity. BIO-MM#4 and BIO-MM#6 will require the project biologist to monitor construction activities for compliance with avoidance and minimization measures and established ESAs and nondisturbance zones and to document such monitoring through a compliance reporting program, respectively. BIO-MM#5 will require the project biologist to establish vehicle speed limits within the project footprint; restrict vehicle traffic to established roads, construction areas, and other permissible areas; and direct that routes be marked to prevent off-road traffic prior to ground-disturbing activity. BIO-MM#9 will involve preparation and implementation of a GAMMP that will require monitoring of groundwater-dependent surface water resources (including those providing habitat for foothill yellow-legged frog) within the tunnel groundwater study area, providing supplemental water where needed, and remediating or compensating for any adverse effects identified during monitoring. BIO-MM#13 will give the project biologist authority to halt any construction activities that could injure or kill individuals belonging to special-status species. BIO-MM#34 will minimize direct impacts on individual foothill yellow-legged frogs during construction by requiring pre-construction surveys of modeled habitat within the project footprint and implementing additional avoidance and minimization measures (e.g., relocating frogs from permanent impact areas to agency-approved habitat outside the project footprint). BIO-MM#35 identifies minimum compensatory mitigation requirements for impacts on foothill yellow-legged frog that will be included in the HMP developed under BIO-MM#10. These measures will minimize direct and indirect impacts on foothill yellow-legged frog habitat and individuals and will compensate for habitat loss. Therefore, these

mitigation measures will be effective in minimizing the project's impacts associated with habitat conversion or degradation, or individual fatalities, for foothill yellow-legged frog.

Compensatory mitigation under Mitigation Measure BIO-MM#35 could involve some secondary impacts; however, these impacts would be beneficial, and the measures set forth in BIO-MM#10 will be implemented to minimize any adverse impacts.

Some of the activities and actions that will be implemented under BIO-MM#10, especially those involving ground disturbance, could result in impacts similar to those described in Section 3.7.7 of the Final EIR/EIS. Specifically, direct and indirect impacts on special-status plant and wildlife species (e.g., California tiger salamander, red-legged frog, and foothill yellow-legged frog), special-status plant communities, and aquatic resources could occur where such resources are present on the mitigation sites. BIO-MM#11, which requires a site assessment and appropriate regulatory authorizations, will be implemented at compensatory mitigation sites to reduce or avoid impacts on these resources.

Environmental impacts that would result from implementation of BIO-MM#10 on other resource categories could result from implementing restoration activities at mitigation sites. Refer to Section 4.4.1 of this document for a description of these potential secondary impacts of BIO-MM#10.

The Authority finds that Mitigation Measures BIO-MM#1, BIO-MM#2, BIO-MM#3, BIO-MM#4, BIO-MM#6, BIO-MM#5, BIO-MM#9, BIO-MM#13, BIO-MM#34, BIO-MM#35, and BIO-MM#10 are required under the Preferred Alternative and that implementation of these mitigation measures will reduce the project's impacts on foothill yellow-legged frog to a less-than-significant level.

4.4.11 Impact BIO#10: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Western Spadefoot

Construction of the HSR track and systems in the Morgan Hill and Gilroy, Pacheco Pass, and San Joaquin Valley Subsections would take place in suitable habitat for the western spadefoot, a CDFW species of special concern. Construction activities would convert suitable habitat and reduce the quality of the remaining suitable habitat, and could result in the injury or mortality of spadefoot individuals. The Authority has incorporated BIO-IAMF#1, BIO-IAMF#3, BIO-IAMF#5, BIO-IAMF#6, BIO-IAMF#7, BIO-IAMF#8, BIO-IAMF#9, BIO-IAMF#10, and BIO-IAMF#11 into the project design to avoid and minimize impacts on western spadefoot.

The areal extent of direct permanent and temporary impacts (conversion and disturbance of habitat, injury and mortality of individuals) in breeding and nonbreeding habitat for the species is shown in Final EIR/EIS Table 3.7-13. The magnitude of indirect impacts (e.g., hydrologic modification, introduction of contaminants into watercourses, introduction of invasive nonnative plant species), while not quantified through the modeling effort, would be generally proportional to the quantity of direct impacts.

While pre-construction and construction actions to protect the western spadefoot are part of the project, these actions would not prevent the conversion of habitat and temporary disturbance of other habitat in the project footprint. Because spadefoots can be distributed throughout suitable habitats, their exclusion from construction areas cannot be guaranteed. Earthmoving, excavation, and vehicle operation during construction could crush, entomb, or physically disturb individual spadefoots. Ground disturbance, noise, and vibration associated with these activities could disrupt the activities of individuals and may impair normal life cycle behaviors. If construction in the project footprint alters a hydrologic regime, such hydrological modifications could indirectly affect habitat by altering the stream's flow regime or vernal pool's ponding duration and rendering aquatic habitat unsuitable to support breeding behavior and the development of eggs and larvae. The use of chemicals and hazardous substances during construction (e.g., oils, gasoline) may cause mortality if individuals enter aquatic habitat that has been contaminated by accidental spills or other vehicle and equipment leaks. While many protections would be implemented, the potential for physical harm and mortality of individuals would not be eliminated without mitigation measures.

Therefore, even with the implementation of these IAMFs, the project could result in habitat conversion or degradation, or individual fatalities, for western spadefoot, which is considered a significant impact under CEQA (Final EIR/EIS: page 3.7-93).

Implementation of the following measures mitigates this impact: BIO-MM#1: Prepare and Implement a Restoration and Revegetation Plan, BIO-MM#2: Prepare and Implement a Weed Control Plan, BIO-MM#3: Establish Environmentally Sensitive Areas and Nondisturbance Zones, BIO-MM#4: Conduct Monitoring of Construction Activities, BIO-MM#6: Establish and Implement a Compliance Reporting Program, BIO-MM#5: Limit Vehicle Traffic and Construction Site Speeds, BIO-MM#9: Prepare and Implement a Groundwater Management Adaptive Management and Monitoring Plan, BIO-MM#13: Implement Work Stoppage, BIO-MM#36: Conduct Pre-Construction Surveys for Special-Status Reptiles and Amphibians, BIO-MM#37: Implement Avoidance and Minimization Measures for Special-Status Reptiles and Amphibians, and BIO-MM#74: Prepare and Implement a Compensatory Mitigation Plan for Impacts on Aquatic Resources. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

The Authority will implement mitigation measures to minimize impacts on western spadefoot and other nonlisted special-status reptiles and amphibians. BIO-MM#1 will involve preparation of an RRP that will identify and describe procedures for restoring temporarily disturbed habitat to its former state. BIO-MM#2 will require the project biologist to develop a WCP prior to ground-disturbing activity to minimize and avoid the spread of invasive weeds into the project footprint and adjacent areas. BIO-MM#3 will require the project biologist to establish ESAs and nondisturbance zones (including WEF, where applicable) that support special-status species or aquatic resources and are subject to seasonal restrictions or other avoidance and minimization measures prior to ground-disturbing activity. BIO-MM#4 and BIO-MM#6 will require the project biologist to monitor construction activities for compliance with avoidance and minimization measures and established ESAs and nondisturbance zones and to document such monitoring through a compliance reporting program, respectively. BIO-MM#5 will require the project biologist to establish vehicle speed limits within the project footprint; restrict vehicle traffic to established roads, construction areas, and other permissible areas; and direct that routes be marked to prevent off-road traffic prior to ground-disturbing activity. BIO-MM#13 (Implement Work Stoppage) will give the project biologist authority to halt any construction activities that could injure or kill individuals belonging to special-status species. BIO-MM#36 and BIO-MM#37 will minimize direct impacts on individual western spadefoot and other nonlisted special-status reptiles and amphibians during construction by requiring pre-construction surveys of modeled habitat and avoidance or relocation and subsequent monitoring of observed individuals. Compensatory mitigation for impacts on aquatic resources (BIO-MM#74) is also expected to benefit western spadefoot because it breeds in vernal pools and seasonal wetlands. These measures will minimize direct and indirect impacts on western spadefoot habitat and direct impacts on individuals and will compensate for habitat loss. Therefore, these mitigation measures will be effective in minimizing the project's impacts associated with habitat conversion or degradation, or individual fatalities, for western spadefoot.

Compensatory mitigation under Mitigation Measure BIO-MM#74 could involve some secondary impacts; however, these impacts would be beneficial, and the measures set forth in BIO-MM#11 will be implemented to minimize any adverse impacts.

The Authority finds that Mitigation Measures BIO-MM#1, BIO-MM#2, BIO-MM#3, BIO-MM#4, BIO-MM#6, BIO-MM#5, BIO-MM#9, BIO-MM#13, BIO-MM#36, BIO-MM#37, and BIO-MM#74 are required under the Preferred Alternative and that implementation of these mitigation measures will reduce the project's impacts on western spadefoot to a less-than-significant level.

4.4.12 Impact BIO#11: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Western Pond Turtle

Construction of the HSR track and systems would take place in suitable habitat for the western pond turtle, a CDFW species of special concern. While suitable habitat is present in all five subsections, most of it occurs in the Morgan Hill and Gilroy, Pacheco Pass, and San Joaquin

Valley Subsections. Construction activities would convert suitable habitat and reduce the quality of the remaining suitable habitat, and could result in the injury or mortality of individual pond turtles. The Authority has incorporated BIO-IAMF#1, BIO-IAMF#3, BIO-IAMF#5, BIO-IAMF#6, BIO-IAMF#7, BIO-IAMF#8, BIO-IAMF#9, BIO-IAMF#10, and BIO-IAMF#11 into project design to avoid and minimize impacts on western pond turtle. Tunnels will be designed and constructed to avoid or minimize groundwater inflows during construction that may affect surface water resources overlying the tunnel alignment (HYD-IAMF#5), including those that provide aquatic habitat for western pond turtle.

The areal extent of direct permanent and temporary impacts (conversion and disturbance of habitat, injury and mortality of individuals) in habitat for the species is shown in Final EIR/EIS Table 3.7-13. The magnitude of indirect impacts (e.g., hydrologic modification, introduction of contaminants into watercourses), while not quantified through the modeling effort, would be generally proportional to the quantity of direct impacts.

As discussed in Impact BIO#1, construction of Tunnels 1 and 2 could have temporary indirect impacts on the hydrology of groundwater-dependent surface waters, including those that provide aquatic habitat for western pond turtle. Because western pond turtles are associated with ponds or streams that hold water year-round, any reductions in groundwater supply to occupied ponds and streams could reduce the availability of foraging and basking habitat for the affected population. Sudden decreases in water levels could strand basking individuals, forcing them to move to other aquatic habitat, if any is available nearby.

While pre-construction and construction actions to protect the western pond turtle are part of the project, these actions would not prevent the conversion and temporary disturbance of suitable habitat in the project footprint. Because pond turtles can be distributed throughout suitable habitats and can aestivate in underground refugia, their exclusion from construction areas cannot be guaranteed. Earthmoving, excavation, and vehicle operation during construction could crush, entomb, or physically disturb individual turtles. Ground disturbance, noise, and vibration associated with these activities could disrupt the activities of individuals and may impair normal life cycle behaviors. If construction in the project footprint alters a hydrologic regime, such hydrological modifications could indirectly affect habitat by rendering aquatic habitat unsuitable to support pond turtle populations. The use of chemicals and hazardous substances during construction (e.g., oils, gasoline) may cause mortality if individuals enter aquatic habitat that has been contaminated by spills or other vehicle and equipment leaks. While many protections would be implemented, the potential for physical harm and mortality of individuals would not be eliminated without mitigation measures.

Therefore, even with the implementation of these IAMFs, the project could result in habitat conversion or degradation, or individual fatalities, for western pond turtle, which is considered a significant impact under CEQA (Final EIR/EIS: page 3.7-94).

Implementation of the following measures mitigates this impact: BIO-MM#1: Prepare and Implement a Restoration and Revegetation Plan, BIO-MM#2: Prepare and Implement a Weed Control Plan, BIO-MM#3: Establish Environmentally Sensitive Areas and Nondisturbance Zones, BIO-MM#4: Conduct Monitoring of Construction Activities, BIO-MM#6: Establish and Implement a Compliance Reporting Program, BIO-MM#5: Limit Vehicle Traffic and Construction Site Speeds, BIO-MM#9: Prepare and Implement a Groundwater Adaptive Management and Monitoring Plan, BIO-MM#13: Implement Work Stoppage, BIO-MM#36: Conduct Pre-Construction Surveys for Special-Status Reptiles and Amphibian, BIO-MM#37: Implement Avoidance and Minimization Measures for Special-Status Reptiles and Amphibians, BIO-MM#31: Provide Compensatory Mitigation for Impacts on California Tiger Salamander Habitat, and BIO-MM#33: Provide Compensatory Mitigation for Impacts on California Red-Legged Frog Habitat. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

The Authority will implement mitigation measures to minimize impacts on western pond turtle and other nonlisted special-status reptiles and amphibians. BIO-MM#1 will involve preparation of an RRP that will identify and describe procedures for restoring temporarily disturbed habitat to its former state. BIO-MM#2 will require the project biologist to develop a WCP prior to ground-

disturbing activity to minimize and avoid the spread of invasive weeds into the project footprint and adjacent areas. BIO-MM#3 will require the project biologist to establish ESAs and nondisturbance zones (including WEF, where applicable) that support special-status species or aquatic resources and are subject to seasonal restrictions or other avoidance and minimization measures prior to ground-disturbing activity. BIO-MM#4 and BIO-MM#6 will require the project biologist to monitor construction activities for compliance with avoidance and minimization measures and established ESAs and nondisturbance zones and to document such monitoring through a compliance reporting program, respectively. BIO-MM#5 will require the project biologist to establish vehicle speed limits within the project footprint; restrict vehicle traffic to established roads, construction areas, and other permissible areas; and direct that routes be marked to prevent off-road traffic prior to ground-disturbing activity. BIO-MM#9 will involve preparation and implementation of a GAMMP that will require monitoring of groundwater-dependent surface water resources (including those providing habitat for western pond turtle) within the tunnel groundwater study area, providing supplemental water where needed, and remediating or compensating for any adverse effects identified during monitoring. BIO-MM#13 will give the project biologist authority to halt any construction activities that could injure or kill individuals belonging to special-status species. BIO-MM#36 and BIO-MM#37 will minimize direct impacts on individual western pond turtles and other nonlisted special-status reptiles and amphibians during construction by requiring pre-construction surveys of modeled habitat and avoidance or relocation and subsequent monitoring of observed individuals. Compensatory mitigation for California tiger salamander (BIO-MM#31) and California red-legged frog (BIO-MM#33) is also expected to benefit western pond turtles because these species use very similar pond habitat, often co-occurring in the same ponds (pond turtles also occur in many of the same stream systems as California red-legged frogs). These measures will minimize direct and indirect impacts on western pond turtle habitat and direct impacts on individuals and will compensate for habitat loss. Therefore, these mitigation measures will be effective in minimizing the project's impacts associated with habitat conversion or degradation, or individual fatalities, for western pond turtle.

Compensatory mitigation under Mitigation Measures BIO-MM#31 and BIO-MM#33 could involve some secondary impacts; however, these impacts would be beneficial, and the measures set forth in BIO-MM#11 will be implemented to minimize any adverse impacts.

The Authority finds that Mitigation Measures BIO-MM#1, BIO-MM#2, BIO-MM#3, BIO-MM#4, BIO-MM#6, BIO-MM#5, BIO-MM#9, BIO-MM#13, BIO-MM#36, BIO-MM#37, BIO-MM#31, and BIO-MM#33 are required under the Preferred Alternative and that implementation of these mitigation measures will reduce the project's impacts on western pond turtle to a less-than-significant level.

4.4.13 Impact BIO#12: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Blunt-Nosed Leopard Lizard

Construction of the HSR track and systems in the eastern portion of the Pacheco Pass Subsection would take place in suitable habitat for blunt-nosed leopard lizard, a species listed as endangered under both FESA and CESA. Construction activities would convert habitat and reduce the quality of the remaining suitable habitat and could result in the injury or mortality of individual leopard lizards. The Authority has incorporated BIO-IAMF#1, BIO-IAMF#3, BIO-IAMF#5, BIO-IAMF#6, BIO-IAMF#7, BIO-IAMF#8, BIO-IAMF#9, BIO-IAMF#10, and BIO-IAMF#11 into project design to avoid and minimize impacts on blunt-nosed leopard lizard.

The areal extent of direct permanent and temporary impacts (conversion and disturbance of habitat, injury and mortality of individuals) in suitable habitat for the species is shown in Final EIR/EIS Table 3.7-13. Because the only suitable habitat for this species occurs in the Pacheco Pass and San Joaquin Valley Subsections, the impacts would be concentrated in the area east of Tunnel 2. The magnitude of indirect impacts (e.g., topographic modification, introduction of contaminants into habitat, introduction of nonnative plant species), while not quantified through the modeling effort, would be generally proportional to the quantity of direct impacts.

While pre-construction and construction actions to protect the blunt-nosed leopard lizard are part of the project, these actions would not prevent the conversion and temporary disturbance of

suitable habitat in the project footprint. Because leopard lizards can be distributed throughout suitable habitats and primarily occur underground, their exclusion from work areas cannot be guaranteed. Grading, excavation, and vehicle movement could kill individuals on the surface and could crush adults or eggs in underground refugia. Lizards that fall into uncovered trenches, pits, or other excavations could die from desiccation, entombment, or starvation. Lizards that enter habitat where toxic substances have been accidentally discharged could be poisoned either directly or through eating contaminated prey. The introduction of nonnative plants could render habitat less suitable for leopard lizard occupancy. While some protections would be implemented, the potential for physical harm and mortality of individuals would not be eliminated without mitigation measures.

Therefore, even with the implementation of these IAMFs, the project could result in habitat conversion or degradation, or individual fatalities, for blunt-nosed leopard lizard, which is considered a significant impact under CEQA (Final EIR/EIS: page 3.7-95).

Implementation of the following measures mitigates this impact: BIO-MM#1: Prepare and Implement a Restoration and Revegetation Plan, BIO-MM#2: Prepare and Implement a Weed Control Plan, BIO-MM#3: Establish Environmentally Sensitive Areas and Nondisturbance Zones, BIO-MM#4: Conduct Monitoring of Construction Activities, BIO-MM#6: Establish and Implement a Compliance Reporting Program, BIO-MM#5: Limit Vehicle Traffic and Construction Site Speeds, BIO-MM#13: Implement Work Stoppage, BIO-MM#38: Conduct Surveys for Blunt-Nosed Leopard Lizard, BIO-MM#39: Implement Avoidance Measures for Blunt-Nosed Leopard Lizard, BIO-MM#40: Provide Compensatory Mitigation for Impacts on Blunt-Nosed Leopard Lizard Habitat, and BIO-MM#10: Prepare and Implement a Habitat Mitigation Plan for Species and Species Habitat. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

The Authority will implement mitigation measures to reduce the impacts on blunt-nosed leopard lizard. BIO-MM#1 will involve preparation of an RRP that will identify and describe procedures for restoring temporarily disturbed habitat to its former state. BIO-MM#2 will require the project biologist to develop a WCP prior to ground-disturbing activity to minimize and avoid the spread of invasive weeds into the project footprint and adjacent areas. BIO-MM#3 will require the project biologist to establish ESAs and nondisturbance zones (including WEF, where applicable) that support special-status species or aquatic resources and are subject to seasonal restrictions or other avoidance and minimization measures prior to ground-disturbing activity. BIO-MM#4 and BIO-MM#6 will require the project biologist to monitor construction activities for compliance with avoidance and minimization measures and established ESAs and nondisturbance zones and to document such monitoring through a compliance reporting program, respectively. BIO-MM#5 will require the project biologist to establish vehicle speed limits within the project footprint; restrict vehicle traffic to established roads, construction areas, and other permissible areas; and direct that routes be marked to prevent off-road traffic prior to ground-disturbing activity. BIO-MM#13 will give the project biologist authority to halt any construction activities that could injure or kill individuals belonging to special-status species. BIO-MM#38 and BIO-MM#39 will minimize direct impacts on individual blunt-nosed leopard lizards during construction by requiring protocol-level surveys of suitable habitat to identify lizard presence within the project footprint and requiring avoidance of occupied habitat during construction. BIO-MM#40 identifies minimum compensatory mitigation requirements for blunt-nosed leopard lizard that will be included in the HMP developed under BIO-MM#10. These measures will avoid direct and indirect impacts on blunt-nosed leopard lizard individuals, will minimize loss of habitat, and will compensate for habitat loss. Therefore, these mitigation measures will be effective in minimizing the project's impacts associated with habitat conversion or degradation, or individual fatalities, for blunt-nosed leopard lizard.

Compensatory mitigation implemented under Mitigation Measure BIO-MM#40 could involve some secondary impacts; however, these impacts would be beneficial, and the measures set forth in BIO-MM#11 will be implemented to minimize any adverse impacts.

Some of the activities and actions that will be implemented under BIO-MM#10, especially those involving ground disturbance, could result in impacts similar to those described in Section 3.7.7 of

the Final EIR/EIS. Specifically, direct and indirect impacts on special-status plant and wildlife species (e.g., California tiger salamander, red-legged frog, and foothill yellow-legged frog), special-status plant communities, and aquatic resources could occur where such resources are present on the mitigation sites. BIO-MM#11, which requires a site assessment and appropriate regulatory authorizations, will be implemented at compensatory mitigation sites to reduce or avoid impacts on these resources.

Environmental impacts that would result from implementation of BIO-MM#10 on other resource categories could result from implementing restoration activities at mitigation sites. Refer to Section 4.4.1 of this document for a description of these potential secondary impacts of BIO-MM#10.

The Authority finds that Mitigation Measures BIO-MM#1, BIO-MM#2, BIO-MM#3, BIO-MM#4, BIO-MM#6, BIO-MM#5, BIO-MM#13, BIO-MM#38, BIO-MM#39, BIO-MM#40, and BIO-MM#10 are required under the Preferred Alternative and that implementation of these mitigation measures will reduce the project's impacts on blunt-nosed leopard lizard to a less-than-significant level.

4.4.14 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

Construction of the HSR track and systems in the eastern portion of the Morgan Hill and Gilroy Subsection and throughout the Pacheco Pass Subsection would take place in suitable habitat for San Joaquin coachwhip, northern California legless lizard, and coast horned lizard, all of which are CDFW species of special concern. Construction activities would convert suitable habitat and reduce the quality of the remaining habitat, and could result in the injury or mortality of individuals of all three species. The Authority has incorporated BIO-IAMF#1, BIO-IAMF#3, BIO-IAMF#5, BIO-IAMF#6, BIO-IAMF#7, BIO-IAMF#8, BIO-IAMF#9, BIO-IAMF#10, and BIO-IAMF#11 into project design to avoid and minimize impacts on San Joaquin coachwhip, northern California legless lizard, and coast horned lizard.

The areal extent of direct permanent and temporary impacts (conversion and disturbance of habitat, injury and mortality of individuals) on suitable habitat for these species is shown in Final EIR/EIS Table 3.7-13. The magnitude of indirect impacts (e.g., topographic modification, introduction of contaminants into habitat, introduction of nonnative plant species), while not quantified through the modeling effort, would be generally proportional to the quantity of direct impacts.

Work to construct Tunnels 1 and 2 (in the Morgan Hill and Gilroy and the Pacheco Pass Subsections, respectively) would have the greatest amount of impact on suitable habitat for San Joaquin coachwhip and coast horned lizard; work to construct Tunnel 1 and the western portal for Tunnel 2 would have the greatest amount of impact on suitable habitat for northern California legless lizard.

While pre-construction and construction actions to protect special-status reptiles are part of the project, these actions would not prevent the conversion and temporary disturbance of suitable habitat in the project footprint. Because coachwhips and horned lizards can move through small openings and can take refuge in burrows and under surface objects, and because legless lizards are primarily subterranean, their exclusion from work areas cannot be guaranteed. Grading, excavation, and vehicle movement could kill individuals on the surface and could crush adults or eggs in underground refugia. Reptiles that fall into uncovered trenches, pits, or other excavations could die from desiccation, entombment, or starvation. Reptiles that enter habitat where toxic substances have been accidentally discharged could be poisoned either directly or through eating contaminated prey. The introduction of nonnative plants could render habitat less suitable for occupancy. While many protections would be implemented, the potential for physical harm and mortality of individuals would not be eliminated without mitigation measures.

Therefore, even with the implementation of these IAMFs, the project could result in habitat conversion or degradation, or individual fatalities, for San Joaquin coachwhip, northern California legless lizard, and coast horned lizard, which is considered a significant impact under CEQA (Final EIR/EIS: page 3.7-96).

Implementation of the following measures mitigates this impact: BIO-MM#1: Prepare and Implement a Restoration and Revegetation Plan, BIO-MM#2: Prepare and Implement a Weed Control Plan, BIO-MM#3: Establish Environmentally Sensitive Areas and Nondisturbance Zones, BIO-MM#4: Conduct Monitoring of Construction Activities, BIO-MM#6: Establish and Implement a Compliance Reporting Program, BIO-MM#5: Limit Vehicle Traffic and Construction Site Speeds, BIO-MM#13: Implement Work Stoppage, BIO-MM#36: Conduct Pre-Construction Surveys for Special-Status Reptiles and Amphibians, and BIO-MM#37: Implement Avoidance and Minimization Measures for Special-Status Reptiles and Amphibians. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

The Authority will implement mitigation measures to minimize impacts on these and other nonlisted special-status reptiles and amphibians. BIO-MM#1 will involve preparation of an RRP that will identify and describe procedures for restoring temporarily disturbed habitat to its former state. BIO-MM#2 will require the project biologist to develop a WCP prior to ground-disturbing activity to minimize and avoid the spread of invasive weeds into the project footprint and adjacent areas. BIO-MM#3 will require the project biologist to establish ESAs and nondisturbance zones (including WEF, where applicable) that support special-status species or aquatic resources and are subject to seasonal restrictions or other avoidance and minimization measures prior to ground-disturbing activity. BIO-MM#4 and BIO-MM#6 will require the project biologist to monitor construction activities for compliance with avoidance and minimization measures and established ESAs and nondisturbance zones and to document such monitoring through a compliance reporting program, respectively. BIO-MM#5 will require the project biologist to establish vehicle speed limits within the project footprint; restrict vehicle traffic to established roads, construction areas, and other permissible areas; and direct that routes be marked to prevent off-road traffic prior to ground-disturbing activity. BIO-MM#13 will give the project biologist authority to halt any construction activities that could injure or kill individuals belonging to special-status species. BIO-MM#36 and BIO-MM#37 will minimize direct impacts on individuals of these species during construction by requiring pre-construction surveys of modeled habitat and avoidance or relocation and subsequent monitoring of observed individuals. These measures will minimize direct impacts on individual San Joaquin coachwhips, northern California legless lizards, and coast horned lizards. Therefore, these mitigation measures will be effective in minimizing the project's impacts associated with habitat conversion or degradation, or individual fatalities, for San Joaquin coachwhip, northern California legless lizard, and coast horned lizard.

The Authority finds that Mitigation Measures BIO-MM#1, BIO-MM#2, BIO-MM#3, BIO-MM#4, BIO-MM#6, BIO-MM#5, BIO-MM#13, BIO-MM#36, and BIO-MM#37 are required under the Preferred Alternative and that implementation of these mitigation measures will reduce the project's impacts on San Joaquin coachwhip, northern California legless lizard, and coast horned lizard to a less-than-significant level.

4.4.15 Impact BIO#14: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Giant Garter Snake

Construction of the HSR track and systems in the eastern portion of the Pacheco Pass and the San Joaquin Valley Subsections would take place in suitable habitat for the giant garter snake, a species listed as threatened under both FESA and CESA. Construction activities would convert and disturb suitable habitat and could reduce the quality of remaining suitable habitat, and could result in the injury or mortality of individual giant garter snakes. The Authority has incorporated BIO-IAMF#1, BIO-IAMF#3, BIO-IAMF#5, BIO-IAMF#6, BIO-IAMF#7, BIO-IAMF#8, and BIO-IAMF#11 into project design to avoid and minimize impacts on giant garter snake.

The areal extent of direct permanent and temporary impacts (conversion and disturbance of aquatic and upland habitat, injury and mortality of individuals) in habitat for giant garter snake is shown in Final EIR/EIS Table 3.7-13. The magnitude of indirect impacts (e.g., hydrologic

modification, downstream impacts of dewatering or diversion, introduction of contaminants into habitat), while not quantified through the modeling effort, would be generally proportional to the quantity of direct impacts.

While pre-construction and construction actions to protect giant garter snakes are part of the project, these actions would not prevent the conversion and temporary disturbance of suitable habitat in the project footprint. Most impacts would occur in upland habitat, which is more abundant in the project footprint than aquatic habitat. Most impacts on aquatic habitat would be associated with construction of stream crossings. Because garter snakes can move through small openings and take refuge in burrows, their exclusion from work areas cannot be guaranteed. Grading, excavation, and vehicle movement could kill individuals on the surface and could crush snakes in underground refugia. Garter snakes that fall into uncovered trenches, pits, or other excavations could die from entombment or starvation. Snakes that enter habitat where toxic substances have been accidentally discharged could be poisoned either directly or through eating contaminated prey. Dewatering or diversion of waterbodies could reduce availability and quality of habitat both where work is underway and downstream.

Therefore, even with the implementation of these IAMFs, the project could result in habitat conversion or degradation, or individual fatalities, for giant garter snake, which is considered a significant impact under CEQA (Final EIR/EIS: page 3.7-97).

Implementation of the following measures mitigates this impact: BIO-MM#1: Prepare and Implement a Restoration and Revegetation Plan, BIO-MM#2: Prepare and Implement a Weed Control Plan, BIO-MM#3: Establish Environmentally Sensitive Areas and Nondisturbance Zones, BIO-MM#4: Conduct Monitoring of Construction Activities, BIO-MM#6: Establish and Implement a Compliance Reporting Program, BIO-MM#5: Limit Vehicle Traffic and Construction Site Speeds, BIO-MM#13: Implement Work Stoppage, BIO-MM#41: Conduct Pre-Construction Surveys and Implement Avoidance and Minimization Measures for Giant Garter Snake, BIO-MM#42: Provide Compensatory Mitigation for Impacts on Giant Garter Snake Habitat, and BIO-MM#10: Prepare and Implement a Habitat Mitigation Plan for Species and Species Habitat. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

The Authority will implement mitigation measures to reduce the impacts on giant garter snake. BIO-MM#1 will involve preparation of an RRP that will identify and describe procedures for restoring temporarily disturbed habitat to its former state. BIO-MM#2 will require the project biologist to develop a WCP prior to ground-disturbing activity to minimize and avoid the spread of invasive weeds into the project footprint and adjacent areas. BIO-MM#3 will require the project biologist to establish ESAs and nondisturbance zones (including WEF, where applicable) that support special-status species or aquatic resources and are subject to seasonal restrictions or other avoidance and minimization measures prior to ground-disturbing activity. BIO-MM#4 and BIO-MM#6 will require the project biologist to monitor construction activities for compliance with avoidance and minimization measures and established ESAs and nondisturbance zones and to document such monitoring through a compliance reporting program, respectively. BIO-MM#5 will require the project biologist to establish vehicle speed limits within the project footprint; restrict vehicle traffic to established roads, construction areas, and other permissible areas; and direct that routes be marked to prevent off-road traffic prior to ground-disturbing activity. BIO-MM#13 will give the project biologist authority to halt any construction activities that could injure or kill individuals belonging to special-status species. BIO-MM#41 will minimize direct impacts on individual giant garter snakes during construction by requiring avoidance of modeled aquatic habitat outside permanent impact areas, conducting work during the active season (May 1 to September 30) when snakes are expected to actively avoid danger, and conducting pre-construction surveys and monitoring prior to any work within 200 feet of aquatic habitat. BIO-MM#42 identifies minimum compensatory mitigation requirements for giant garter snake that will be included in the HMP developed under BIO-MM#10. These measures will minimize direct and indirect impacts on giant garter snake habitat and individuals and will compensate for habitat loss.

Therefore, these mitigation measures will be effective in minimizing the project's impacts associated with habitat conversion or degradation, or individual fatalities, for giant garter snake.

Compensatory mitigation implemented under Mitigation Measure BIO-MM#42 could involve some secondary impacts; however, these impacts would be beneficial, and the measures set forth in BIO-MM#11 will be implemented to minimize any adverse impacts.

Some of the activities and actions that will be implemented under BIO-MM#10, especially those involving ground disturbance, could result in impacts similar to those described in Section 3.7.7 of the Final EIR/EIS. Specifically, direct and indirect impacts on special-status plant and wildlife species (e.g., California tiger salamander, red-legged frog, and foothill yellow-legged frog), special-status plant communities, and aquatic resources could occur where such resources are present on the mitigation sites. BIO-MM#11, which requires a site assessment and appropriate regulatory authorizations, will be implemented at compensatory mitigation sites to reduce or avoid impacts on these resources.

Environmental impacts that would result from implementation of BIO-MM#10 on other resource categories could result from implementing restoration activities at mitigation sites. Refer to Section 4.4.1 of this document for a description of these potential secondary impacts of BIO-MM#10.

The Authority finds that Mitigation Measures BIO-MM#1, BIO-MM#2, BIO-MM#3, BIO-MM#4, BIO-MM#6, BIO-MM#5, BIO-MM#13, BIO-MM#41, BIO-MM#42, and BIO-MM#10 are required under the Preferred Alternative and that implementation of these mitigation measures will reduce the project's impacts on giant garter snake to a less-than-significant level.

4.4.16 Impact BIO#15: Permanent Conversion or Degradation of Habitat for and Direct Mortality or Disturbance of Short-Eared Owl and Grasshopper Sparrow

Construction of the HSR track and systems in the Pacheco Pass and San Joaquin Valley Subsections would take place in suitable habitat for short-eared owl and grasshopper sparrow, both of which are CDFW species of special concern. Habitat for grasshopper sparrow also occurs in the eastern portion of the Morgan Hill and Gilroy Subsection. Construction activities would convert and temporarily disturb suitable habitat and could result in injury and mortality of individual birds and eggs, as well as nest abandonment. Temporarily disturbed areas may be susceptible to increased cover of tall invasive weeds with thick stems and dense growth (e.g., thistles, mustard, perennial pepperweed), which would reduce the herbaceous ground cover preferred for nesting by these species.

The Authority has incorporated BIO-IAMF#1, BIO-IAMF#3, BIO-IAMF#5, BIO-IAMF#8, BIO-IAMF#10, and BIO-IAMF#11 into the project design to avoid and minimize impacts on short-eared owl and grasshopper sparrow. The areal extent of direct permanent and temporary impacts (conversion and disturbance of habitat, injury and mortality of individuals) on habitat for these two ground-nesting species is shown in Final EIR/EIS Table 3.7-13. The magnitude of indirect impacts (e.g., introduction of invasive nonnative plant species), while not quantified through the modeling effort, would be generally proportional to the quantity of direct impacts.

While pre-construction and construction actions to minimize impacts on short-eared owl and grasshopper sparrow habitat are part of the project, these actions would not prevent the conversion and temporary disturbance of suitable habitat in the project footprint, nor would they eliminate the risk of injury, mortality, and disturbance of individual birds. Ground disturbance (e.g., grubbing during site preparation) in suitable nesting habitat for these species could crush eggs or kill nestlings in active nests. Construction-generated noise and vibration near active nests could cause adults to abandon eggs or recently hatched young if they perceive such disturbances as a threat. Artificial lighting of nighttime construction activities near active nests could also potentially cause nest abandonment. Cleaning of construction equipment may not entirely prevent invasive plants from spreading into the habitat study area.

Therefore, even with the implementation of these IAMFs, the project could result in habitat conversion or degradation or individual fatalities for short-eared owl and grasshopper sparrow, which is considered a significant impact under CEQA (Final EIR/EIS: page 3.7-98).

Implementation of the following measures mitigates this impact: BIO-MM#1: Prepare and Implement a Restoration and Revegetation Plan, BIO-MM#2: Prepare and Implement a Weed Control Plan, BIO-MM#3: Establish Environmentally Sensitive Areas and Nondisturbance Zones, BIO-MM#4: Conduct Monitoring of Construction Activities, BIO-MM#6: Establish and Implement a Compliance Reporting Program, BIO-MM#5: Limit Vehicle Traffic and Construction Site Speeds, BIO-MM#13: Implement Work Stoppage, BIO-MM#43: Conduct Pre-Construction Surveys and Delineate Active Nest Buffers for Breeding Birds, BIO-MM#16: Provide Compensatory Mitigation for Impacts on Bay Checkerspot Butterfly Habitat, BIO-MM#31: Provide Compensatory Mitigation for Impacts on California Tiger Salamander Habitat, and BIO-MM#61: Provide Compensatory Mitigation for Impacts on San Joaquin Kit Fox Habitat. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

The Authority will implement mitigation measures to minimize impacts on these and other nonlisted special-status birds. BIO-MM#1 will involve preparation of an RRP that will identify and describe procedures for restoring temporarily disturbed habitat to its former state. BIO-MM#2 will require the project biologist to develop a WCP prior to ground-disturbing activity to minimize and avoid the spread of invasive weeds into the project footprint and adjacent areas. BIO-MM#3 will require the project biologist to establish ESAs and nondisturbance zones (including WEF, where applicable) that support special-status species or aquatic resources and are subject to seasonal restrictions or other avoidance and minimization measures prior to ground-disturbing activity. BIO-MM#4 and BIO-MM#6 will require the project biologist to monitor construction activities for compliance with avoidance and minimization measures and established ESAs and nondisturbance zones and to document such monitoring through a compliance reporting program, respectively. BIO-MM#5 will require the project biologist to establish vehicle speed limits within the project footprint; restrict vehicle traffic to established roads, construction areas, and other permissible areas; and direct that routes be marked to prevent off-road traffic prior to ground-disturbing activity. BIO-MM#13 will give the project biologist authority to halt any construction activities that could injure or kill individuals belonging to special-status species. BIO-MM#43 will require the project biologist to conduct pre-construction surveys for nesting non-raptor bird species within the project footprint and delineate no-work buffers around active nests. Compensatory mitigation for Bay checkerspot butterfly (BIO-MM#16), California tiger salamander upland habitat (BIO-MM#31), and San Joaquin kit fox (BIO-MM#61) is also expected to benefit short-eared owl and grasshopper sparrow because these species use very similar grassland habitat. These measures will minimize direct and indirect impacts on short-eared owl and grasshopper sparrow habitat and direct impacts on individuals and will compensate for habitat loss.

Therefore, these mitigation measures will be effective in minimizing the project's impacts associated with habitat conversion or degradation, or individual fatalities, for short-eared owl and grasshopper sparrow.

Compensatory mitigation implemented under Mitigation Measures BIO-MM#16, BIO-MM#31, and BIO-MM#61 could involve some secondary impacts; however, these impacts would be beneficial, and the measures set forth in BIO-MM#11 will be implemented to minimize any adverse impacts.

The Authority finds that Mitigation Measures BIO-MM#1, BIO-MM#2, BIO-MM#3, BIO-MM#4, BIO-MM#6, BIO-MM#5, BIO-MM#13, BIO-MM#43, BIO-MM#16, BIO-MM#31, and BIO-MM#61 are required under the Preferred Alternative and that implementation of these mitigation measures will reduce the project's impacts on short-eared owl and grasshopper sparrow to a less-than-significant level.

4.4.17 Impact BIO#16: Permanent Conversion or Degradation of Habitat for and Direct Mortality or Disturbance of Mountain Plover and Western Snowy Plover (Interior Population)

Construction of the HSR track and systems in the San Joaquin Valley Subsection would take place in suitable habitat for mountain plover and western snowy plover (interior population), both of which are CDFW species of special concern. Suitable habitat for mountain plover also occurs

at the eastern end of the Pacheco Pass Subsection. Construction activities would convert and temporarily disturb habitat and could result in injury and mortality of individual western snowy plovers and their eggs, as well as nest abandonment. Mountain plovers do not breed in California; they occur September to mid-March (with peak numbers from December through February). Construction activities could result in loss or conversion of mountain plover habitat, as well as disturbance of wintering individuals. Increased cover of invasive weeds would degrade habitat for both species because both prefer areas with short, sparse, or no vegetation.

The Authority has incorporated BIO-IAMF#1, BIO-IAMF#3, BIO-IAMF#5, BIO-IAMF#8, BIO-IAMF#10, and BIO-IAMF#11 into project design to avoid and minimize impacts on mountain plover and western snowy plover (interior population). The areal extent of direct permanent and temporary impacts (conversion and disturbance of habitat; disturbance, injury, and mortality of individuals) on habitat for these two species is shown in Final EIR/EIS Table 3.7-13. The magnitude of indirect impacts (introduction of invasive nonnative plant species that would degrade habitat), while not quantified through the modeling effort, would be generally proportional to the quantity of direct impacts.

While pre-construction and construction actions to minimize impacts on mountain plover and western snowy plover habitat are part of the project, these actions would not prevent the conversion and temporary disturbance of suitable habitat in the project footprint, nor would they eliminate the risk of disturbance of individual birds. Construction activities in the San Joaquin Valley Subsection and at the eastern end of the Pacheco Pass Subsection from September to mid-March could cause mountain plovers resting or foraging in affected agricultural and grassland habitat to flee if they perceive such activities as a threat. Artificial lighting of nighttime construction activities could also disturb roosting plovers. While such disturbance would not kill or injure the birds, they would consume more energy flying and searching for food than they would in the absence of such disturbance. Construction-generated noise and vibration near active western snowy plover nests could cause nest abandonment; which could reduce breeding success of the local population of western snowy plover. Artificial lighting of nighttime construction activities near active nests could also potentially cause nest abandonment. Cleaning of construction equipment may not entirely prevent invasive plants from spreading into the habitat study area.

Therefore, even with the implementation of these IAMFs, the project could result in habitat conversion or degradation, or individual fatalities, for mountain plover and western snowy plover (interior population), which is considered a significant impact under CEQA (Final EIR/EIS: page 3.7-99).

Implementation of the following measures mitigates this impact: BIO-MM#1: Prepare and Implement a Restoration and Revegetation Plan, BIO-MM#2: Prepare and Implement a Weed Control Plan, BIO-MM#3: Establish Environmentally Sensitive Areas and Nondisturbance Zones, BIO-MM#4: Conduct Monitoring of Construction Activities, BIO-MM#6: Establish and Implement a Compliance Reporting Program, BIO-MM#5: Limit Vehicle Traffic and Construction Site Speeds, BIO-MM#13: Implement Work Stoppage, BIO-MM#43: Conduct Pre-Construction Surveys and Delineate Active Nest Buffers for Breeding Birds, and BIO-MM#44: Implement Avoidance and Minimization Measures for Mountain Plover and Sandhill Crane. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

The Authority will implement mitigation measures to minimize impacts on mountain plover and western snowy plover. BIO-MM#1 will involve preparation of an RRP that will identify and describe procedures for restoring temporarily disturbed habitat to its former state. BIO-MM#2 will require the project biologist to develop a WCP prior to ground-disturbing activity to minimize and avoid the spread of invasive weeds into the project footprint and adjacent areas. BIO-MM#3 will require the project biologist to establish ESAs and nondisturbance zones (including WEF, where applicable) that support special-status species or aquatic resources and are subject to seasonal restrictions or other avoidance and minimization measures prior to ground-disturbing activity. BIO-MM#4 and BIO-MM#6 will require the project biologist to monitor construction activities for compliance with avoidance and minimization measures and established ESAs and nondisturbance zones and to document such monitoring through a compliance reporting program,

respectively. BIO-MM#5 will require the project biologist to establish vehicle speed limits within the project footprint; restrict vehicle traffic to established roads, construction areas, and other permissible areas; and direct that routes be marked to prevent off-road traffic prior to ground-disturbing activity. BIO-MM#13 will give the project biologist authority to halt any construction activities that could injure or kill individuals belonging to special-status species. BIO-MM#43 will require the project biologist to conduct pre-construction surveys for nesting non-raptor bird species within the project footprint and delineate no-work buffers around active nests. BIO-MM#44 will avoid disturbance of wintering mountain plovers by requiring the Authority to identify wintering sites from October 1 to December 31 and maintaining a 250-foot buffer from such sites from January 1 to March 15 (alternatively, the Authority may prohibit all construction within 250 feet of modeled habitat from October 1 to March 15). These measures will minimize direct and indirect impacts on mountain plover and western snowy plover habitat and will avoid direct impacts on western snowy plover individuals.

Therefore, these mitigation measures will be effective in minimizing the project's impacts associated with habitat conversion or degradation, or individual fatalities, for mountain plover and western snowy plover (interior population).

The Authority finds that Mitigation Measures BIO-MM#1, BIO-MM#2, BIO-MM#3, BIO-MM#4, BIO-MM#6, BIO-MM#5, BIO-MM#13, BIO-MM#43, and BIO-MM#44 are required under the Preferred Alternative and that implementation of these mitigation measures will reduce the project's impacts on mountain plover and western snowy plover (interior population) to a less-than-significant level.

4.4.18 Impact BIO#17: Permanent Conversion or Degradation of Habitat for and Direct Mortality or Disturbance of Burrowing Owl

Construction of the HSR track and systems in all five subsections would take place in suitable habitat for the burrowing owl, a CDFW species of special concern. Most impacts would occur in the Morgan Hill and Gilroy, Pacheco Pass, and San Joaquin Valley Subsections. Construction activities would convert and temporarily disturb habitat and could result in injury and mortality of individual owls and eggs, as well as nest abandonment. Ground disturbance and vehicle traffic could injure or kill burrowing owls by crushing occupied burrows or collapsing burrow entrances, trapping any owls inside. Although some burrowing owls in urban and agricultural landscapes appear relatively tolerant of human disturbance (Poulin et al. 2011), it is difficult to predict how and at what distance a given nesting pair would react to noise and vibration. Consequently, it is possible that construction-generated noise and vibration near nest burrows could cause adult owls to abandon eggs or recently hatched young. Artificial lighting of nighttime construction activities near active nest burrows could also potentially cause nest abandonment. Increased cover of invasive weeds could reduce habitat suitability for burrowing owls because they prefer areas with short, sparse vegetation (CDFG 2012).

The Authority has incorporated BIO-IAMF#1, BIO-IAMF#3, BIO-IAMF#5, BIO-IAMF#8, BIO-IAMF#10, and BIO-IAMF#11 into the project design to avoid and minimize impacts on burrowing owl. The areal extent of direct permanent and temporary impacts (conversion and disturbance of habitat; disturbance, injury, and mortality of individuals) on breeding and foraging habitat for burrowing owl is shown in Final EIR/EIS Table 3.7-13. The magnitude of indirect impacts (introduction of invasive nonnative plant species), while not quantified through the modeling effort, would be generally proportional to the quantity of direct impacts.

While pre-construction and construction actions to minimize impacts on burrowing owl habitat are part of the project, these actions would not prevent the conversion and temporary disturbance of suitable habitat in the project footprint, nor would they eliminate the risk of injury, mortality, and disturbance of individual owls without mitigation measures.

Therefore, even with the implementation of these IAMFs, the project could result in habitat conversion or degradation, or individual fatalities, for burrowing owl, which is considered a significant impact under CEQA (Final EIR/EIS: page 3.7-100).

Implementation of the following measures mitigates this impact: BIO-MM#1: Prepare and Implement a Restoration and Revegetation Plan, BIO-MM#2: Prepare and Implement a Weed Control Plan, BIO-MM#3: Establish Environmentally Sensitive Areas and Nondisturbance Zones, BIO-MM#4: Conduct Monitoring of Construction Activities, BIO-MM#6: Establish and Implement a Compliance Reporting Program, BIO-MM#5: Limit Vehicle Traffic and Construction Site Speeds, BIO-MM#13: Implement Work Stoppage, BIO-MM#45: Conduct Surveys for Burrowing Owl, BIO-MM#46: Implement Avoidance and Minimization Measures for Burrowing Owl, BIO-MM#47: Provide Compensatory Mitigation for Loss of Active Burrowing Owl Burrows and Habitat, and BIO-MM#10: Prepare and Implement a Habitat Mitigation Plan for Species and Species Habitat. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

The Authority will implement mitigation measures to minimize impacts on burrowing owl. BIO-MM#1 will involve preparation of an RRP that will identify and describe procedures for restoring temporarily disturbed habitat to its former state. BIO-MM#2 will require the project biologist to develop a WCP prior to ground-disturbing activity to minimize and avoid the spread of invasive weeds into the project footprint and adjacent areas. BIO-MM#3 will require the project biologist to establish ESAs and nondisturbance zones (including WEF, where applicable) that support special-status species or aquatic resources and are subject to seasonal restrictions or other avoidance and minimization measures prior to ground-disturbing activity. BIO-MM#4 and BIO-MM#6 will require the project biologist to monitor construction activities for compliance with avoidance and minimization measures and established ESAs and nondisturbance zones and to document such monitoring through a compliance reporting program, respectively. BIO-MM#5 will require the project biologist to establish vehicle speed limits within the project footprint; restrict vehicle traffic to established roads, construction areas, and other permissible areas; and direct that routes be marked to prevent off-road traffic prior to ground-disturbing activity. BIO-MM#13 will give the project biologist authority to halt any construction activities that could injure or kill individuals belonging to species listed under the FESA or CESA. BIO-MM#45 and BIO-MM#46 will require habitat surveys of modeled habitat to confirm presence/absence of suitable burrows in the project footprint and subsequent pre-construction surveys for and avoidance of occupied burrows during construction. BIO-MM#47 identifies compensatory mitigation requirements for occupied breeding habitat that will be included in the HMP developed under BIO-MM#10. These measures will minimize direct and indirect impacts on burrowing owl habitat and individuals and will compensate for habitat loss.

Therefore, these mitigation measures will be effective in minimizing the project's impacts associated with habitat conversion or degradation, or individual fatalities, for burrowing owl.

Compensatory mitigation implemented under Mitigation Measure BIO-MM#47 could involve some secondary impacts; however, these impacts would be beneficial, and the measures set forth in BIO-MM#11 will be implemented to minimize any adverse impacts.

Some of the activities and actions that will be implemented under BIO-MM#10, especially those involving ground disturbance, could result in impacts similar to those described in Section 3.7.7 of the Final EIR/EIS. Specifically, direct and indirect impacts on special-status plant and wildlife species (e.g., California tiger salamander, red-legged frog, and foothill yellow-legged frog), special-status plant communities, and aquatic resources could occur where such resources are present on the mitigation sites. BIO-MM#11, which requires a site assessment and appropriate regulatory authorizations, will be implemented at compensatory mitigation sites to reduce or avoid impacts on these resources.

Environmental impacts that would result from implementation of BIO-MM#10 on other resource categories could result from implementing restoration activities at mitigation sites. Refer to Section 4.4.1 of this document for a description of these potential secondary impacts of BIO-MM#10.

The Authority finds that Mitigation Measures BIO-MM#1, BIO-MM#2, BIO-MM#3, BIO-MM#4, BIO-MM#6, BIO-MM#5, BIO-MM#13, BIO-MM#45, BIO-MM#46, BIO-MM#47, and BIO-MM#10

are required under the Preferred Alternative and that implementation of these mitigation measures will reduce the project's impacts on burrowing owl to a less-than-significant level.

4.4.19 Impact BIO#18: Permanent Conversion or Degradation of Habitat for and Direct Mortality or Disturbance of Golden Eagle and Bald Eagle

Construction of the HSR track and systems in all five subsections would take place in suitable habitat for both bald and golden eagles. The bald eagle is listed as endangered under CESA; both species are fully protected under Cal. Fish and Game Code and both are protected under the Bald and Golden Eagle Protection Act. Construction activities would convert and temporarily disturb habitat and could result in disturbance, injury, or mortality of nesting eagles if any are present in the vicinity.

The Authority has incorporated BIO-IAMF#1, BIO-IAMF#3, BIO-IAMF#5, and BIO-IAMF#8 into project design to avoid and minimize impacts on bald and golden eagles. The areal extent of direct permanent and temporary impacts (conversion and disturbance of habitat, disturbance of individuals) on nesting and foraging habitat for both species is shown in Final EIR/EIS Table 3.7-13.

While pre-construction actions to minimize impacts on bald and golden eagles and their habitat are part of the project, these actions would not prevent the conversion and temporary disturbance of habitat in the project footprint, nor would they eliminate the risk of removing active eagle nests or disturbing nesting eagles in the vicinity if any are present in sight or hearing range of construction activities. Although there were no known eagle nests in the habitat study area at the time this analysis was conducted, construction would take place in nesting habitat for both species. There is wide variation in reported distances at which raptors are disturbed by human activities (PG&E 2016: page 4-4), so making broad generalizations about disturbance distances is difficult. For the purpose of this analysis and based on previous buffers for these species recommended by the USFWS (2007, 2013), any bald or golden eagles nesting within 0.5 mile of the project footprint (generally, topography that blocks line of sight could shorten this typical distance) could be disturbed by construction noise or vibration, potentially causing nest abandonment. Artificial lighting of nighttime construction activities near active nests could also potentially cause nest abandonment.

Therefore, even with the implementation of these IAMFs, the project could result in habitat conversion or degradation, or individual fatalities, for golden eagle and bald eagle, which is considered a significant impact under CEQA (Final EIR/EIS: page 3.7-101).

Implementation of the following measures mitigates this impact: BIO-MM#3: Establish Environmentally Sensitive Areas and Nondisturbance Zones, BIO-MM#4: Conduct Monitoring of Construction Activities, BIO-MM#6: Conduct Monitoring of Construction Activities, BIO-MM#5: Limit Vehicle Traffic and Construction Site Speeds, BIO-MM#13: Implement Work Stoppage, BIO-MM#48: Conduct Pre-Construction Surveys for Eagles, BIO-MM#49: Implement Avoidance Measures for Active Eagle Nests, and BIO-MM#50: Provide Compensatory Mitigation for Loss of Eagle Nests. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

The Authority will implement mitigation measures to reduce the impacts on habitat for golden eagle and bald eagle and avoid direct impacts on individuals. BIO-MM#3 will require the project biologist to establish ESAs and nondisturbance zones (including WEF, where applicable) that support special-status species or aquatic resources and are subject to seasonal restrictions or other avoidance and minimization measures prior to ground-disturbing activity. BIO-MM#4 and BIO-MM#6 will require the project biologist to monitor construction activities for compliance with avoidance and minimization measures and established ESAs and nondisturbance zones and to document such monitoring through a compliance reporting program, respectively. BIO-MM#5 will require the project biologist to establish vehicle speed limits within the project footprint; restrict vehicle traffic to establish roads, construction areas, and other permissible areas; and direct that routes be marked to prevent off-road traffic prior to ground-disturbing activity. BIO-MM#13 will give the project biologist authority to halt any construction activities that could injure or kill

individuals belonging to special-status species. BIO-MM#48 and BIO-MM#49 will prevent destruction and disturbance of active nests during construction by requiring pre-construction surveys of modeled nesting habitat within the project footprint and establishing exclusion zones around active nests. BIO-MM#50 will compensate for the removal of any nests (if necessary) by requiring the preparation and implementation of a nest relocation or replacement plan for affected eagle pairs in consultation with the USFWS and local eagle experts. These measures will avoid direct and indirect impacts on golden eagle and bald eagle habitat and direct impacts on individuals.

Therefore, these mitigation measures will be effective in minimizing the project's impacts associated with habitat conversion or degradation, or individual fatalities, for golden eagle and bald eagle.

The Authority finds that Mitigation Measures BIO-MM#3, BIO-MM#4, BIO-MM#6, BIO-MM#5, BIO-MM#13, BIO-MM#48, BIO-MM#49, and BIO-MM#50 are required under the Preferred Alternative and that implementation of these mitigation measures will reduce the project's impacts on golden eagle and bald eagle to a less-than-significant level.

4.4.20 Impact BIO#19: Injury or Disturbance of California Condor

Construction of the HSR track and systems at the eastern end of the Morgan Hill and Gilroy Subsection and in the Pacheco Pass Subsection would take place within the range of California condor (USFWS 2019). Construction activities could result in injury or disturbance of condors if any are present in the vicinity.

The Authority has incorporated BIO-IAMF#1, BIO-IAMF#3, BIO-IAMF#5, and BIO-IAMF#8 into the project design to avoid and minimize impacts on California condor. Habitat was not modeled for this species because any natural cover types in the Diablo Range could theoretically be used for foraging.

While pre-construction actions to minimize impacts on special-status species and their habitat are part of the project, these actions would not eliminate the risk of injuring or disturbing condors in the vicinity if any are foraging over or roosting in sight or hearing range of construction activities. Although there were no known condor roosts in the habitat study area at the time this analysis was conducted, construction would take place near suitable roosting habitat (e.g., Lover's Leap south of SR 152). For the purpose of this analysis, it is assumed that any condors roosting within 0.5 mile of the project footprint (topography that blocks line of sight could shorten this distance) could be disturbed by construction noise or vibration, potentially causing roost abandonment. Artificial lighting of nighttime construction activities near active roost sites could also potentially cause roost abandonment. Construction materials (i.e., ropes and cables) as well as permanent wires associated with the overhead contact system (OCS) and new power lines, would pose a hazard to any foraging condors because they could become entangled in the wires. If left untended on the landscape, "microtrash" (e.g., broken glass, bottle caps, can tabs, nuts, bolts, screws) generated during construction could be ingested by adult condors or carried to distant nest sites by adults and fed to chicks. Such microtrash could get stuck in the gastrointestinal tract of condors and cause impaction, resulting in starvation and death (USFWS 2016).

However, even with the implementation of these IAMFs, the project could result in the potential for injury or disturbance to California condors, which is considered a significant impact under CEQA (Final EIR/EIS: page 3.7-102).

Implementation of the following measures mitigates this impact: BIO-MM#6: Establish and Implement a Compliance Reporting Program, BIO-MM#5: Limit Vehicle Traffic and Construction Site Speeds, BIO-MM#13: Implement Work Stoppage, and BIO-MM#51: Implement Avoidance Measures for California Condor. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

The Authority will implement mitigation measures to reduce the impacts on California condor. BIO-MM#5 will require the project biologist to restrict vehicle traffic to established roads, construction areas, and other permissible areas, and direct that routes be marked to prevent off-

road traffic prior to ground-disturbing activity. BIO-MM#6 will require the project biologist to document compliance with all IAMFs and mitigation measures through a compliance reporting program. BIO-MM#13 will give the project biologist authority to halt any construction activities that could injure or kill individuals belonging to special-status species. BIO-MM#51 will implement an array of avoidance and minimization measures during construction to prevent disturbance, injury, and mortality of condors. These measures will avoid direct and indirect impacts on California condor individuals.

Therefore, these mitigation measures will be effective in minimizing the project's impacts associated with injury or disturbance to California condor.

The Authority finds that Mitigation Measures BIO-MM#6, BIO-MM#5, BIO-MM#13, and BIO-MM#51 are required under the Preferred Alternative and that implementation of these mitigation measures will reduce the project's impacts on California condor to a less-than-significant level.

4.4.21 Impact BIO#20: Permanent Conversion or Degradation of Habitat for and Direct Mortality or Disturbance of Special-Status Raptors (American Peregrine Falcon, Northern Harrier, White-Tailed Kite) and Other Raptors

Construction of the HSR track and systems in all five subsections would take place in suitable habitat for three special-status raptor species: American peregrine falcon, northern harrier, and white-tailed kite. Peregrine falcon and white-tailed kite are California fully protected species, and northern harrier is a California species of special concern. Moreover, the same habitat is also suitable to support other raptors (e.g., red-tailed hawk and Cooper's hawk), collectively referred to as "raptors." Construction activities would convert and temporarily disturb suitable habitat and could result in disturbance, injury, or mortality of nesting raptors if any are present in the vicinity.

The Authority has incorporated BIO-IAMF#1, BIO-IAMF#3, BIO-IAMF#5, and BIO-IAMF#8 into project design to avoid and minimize impacts on special-status and other raptors. The areal extent of direct permanent and temporary impacts (conversion and disturbance of habitat, disturbance of individuals) on habitat for the three special-status raptors is shown in Final EIR/EIS Table 3.7-13.

While pre-construction actions to minimize impacts on special-status raptors and their habitat are part of the project, these actions would not prevent the conversion and temporary disturbance of habitat in the project footprint, nor would they necessarily eliminate the risk of removing active raptor nests or disturbing nesting raptors in the vicinity if any are present in sight or hearing range of construction activities. There is wide variation in reported distances at which raptors are disturbed by human activities (PG&E 2016: page 4-4), making broad generalizations about disturbance distances difficult. For the purpose of this analysis and based on typical guidance on disturbance distances from CDFW, any raptors nesting within 500 feet of the project footprint (i.e., habitat study area) could potentially be disturbed by construction noise or vibration, potentially causing nest abandonment. Artificial lighting of nighttime construction activities near active nests could also potentially cause nest abandonment.

Therefore, even with the implementation of these IAMFs, the project could result in habitat conversion or degradation, or individual fatalities, for special-status raptors (American peregrine falcon, northern harrier, white-tailed kite) and other raptors, which is considered a significant impact under CEQA (Final EIR/EIS: page 3.7-103).

Implementation of the following measures mitigates this impact: BIO-MM#3: Establish Environmentally Sensitive Areas and Nondisturbance Zones, BIO-MM#4: Conduct Monitoring of Construction Activities, BIO-MM#6: Establish and Implement a Compliance Reporting Program, BIO-MM#5: Limit Vehicle Traffic and Construction Site Speeds, BIO-MM#13: Implement Work Stoppage, and BIO-MM#52: Conduct Pre-Construction Surveys and Monitoring for Raptors. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

The Authority will implement mitigation measures to reduce the impacts on special-status raptors. BIO-MM#3 will require the project biologist to establish ESAs and nondisturbance zones

(including WEF, where applicable) that support special-status species or aquatic resources and are subject to seasonal restrictions or other avoidance and minimization measures prior to ground-disturbing activity. BIO-MM#4 and BIO-MM#6 will require the project biologist to monitor construction activities for compliance with avoidance and minimization measures and established ESAs and nondisturbance zones and to document such monitoring through a compliance reporting program, respectively. BIO-MM#5 will require the project biologist to establish vehicle speed limits within the project footprint; restrict vehicle traffic to establish roads, construction areas, and other permissible areas; and direct that routes be marked to prevent off-road traffic prior to ground-disturbing activity. BIO-MM#13 will give the project biologist authority to halt any construction activities that could injure or kill individuals belonging to special-status species. BIO-MM#52 will prevent destruction and disturbance of active nests during construction by requiring pre-construction surveys of modeled nesting habitat within the project footprint and establishing exclusion zones around active nests. This measure will minimize direct impacts on individuals.

Therefore, these mitigation measures will be effective in minimizing the project's impacts associated with habitat conversion or degradation, or individual fatalities, for special-status raptors (American peregrine falcon, northern harrier, white-tailed kite) and other raptors.

The Authority finds that Mitigation Measures BIO-MM#3, BIO-MM#4, BIO-MM#6, BIO-MM#5, BIO-MM#13, and BIO-MM#52 are required under the Preferred Alternative and that implementation of these mitigation measures will reduce the project's impacts on special-status raptors (American peregrine falcon, northern harrier, white-tailed kite) and other raptors to a less-than-significant level.

4.4.22 Impact BIO#21: Permanent Conversion or Degradation of Habitat for and Direct Mortality or Disturbance of Swainson's Hawks

Construction of the HSR track and systems in all subsections except the San Jose Diridon Station Approach Subsection would take place in suitable habitat for the Swainson's hawk, a species listed as threatened under CESA. Construction activities would convert and temporarily disturb habitat and could result in disturbance, injury, or mortality of nesting Swainson's hawks if any are present in the vicinity.

The Authority has incorporated BIO-IAMF#1, BIO-IAMF#3, BIO-IAMF#5, and BIO-IAMF#8 into project design to avoid and minimize impacts on Swainson's hawk. The areal extent of direct permanent and temporary impacts (conversion and disturbance of habitat, disturbance of individuals) on nesting and foraging habitat for Swainson's hawk is shown Final EIR/EIS in Table 3.7-13. Most of the active nesting habitat in the habitat study area is in the San Joaquin Valley Subsection, including several nests along Henry Miller Road.

While pre-construction actions to minimize impacts on Swainson's hawks and their habitat are part of the project, these actions would not prevent the conversion and temporary disturbance of suitable habitat in the project footprint, nor would they eliminate the risk of removing active Swainson's hawk nests or disturbing nesting Swainson's hawks in the vicinity if any are present in sight or hearing range of construction activities. For the purpose of this analysis, any Swainson's hawks nesting within 0.5 mile of the project footprint (i.e., habitat study area) could potentially be disturbed by construction noise or vibration, potentially causing nest abandonment. Artificial lighting of nighttime construction activities near active nests could also potentially cause nest abandonment.

Therefore, even with the implementation of these IAMFs, the project could result in habitat conversion or degradation, or individual fatalities, for Swainson's hawks, which is considered a significant impact under CEQA (Final EIR/EIS: page 3.7-104).

Implementation of the following measures mitigates this impact: BIO-MM#3: Establish Environmentally Sensitive Areas and Nondisturbance Zones, BIO-MM#4: Conduct Monitoring of Construction Activities, BIO-MM#6: Establish and Implement a Compliance Reporting Program, BIO-MM#5: Limit Vehicle Traffic and Construction Site Speeds, BIO-MM#13: Implement Work Stoppage, BIO-MM#53: Conduct Surveys for Swainson's Hawk Nests, BIO-MM#54: Implement

Avoidance and Minimization Measures for Swainson's Hawk Nests, BIO-MM#55: Provide Compensatory Mitigation for Loss of Swainson's Hawk Nesting Trees and Habitat, and BIO-MM#10: Prepare and Implement a Habitat Mitigation Plan for Species and Species Habitat. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

The Authority will implement mitigation measures to reduce the impacts on Swainson's hawk. BIO-MM#3 will require the project biologist to establish ESAs and nondisturbance zones (including WEF, where applicable) that support special-status species or aquatic resources and are subject to seasonal restrictions or other avoidance and minimization measures prior to ground-disturbing activity. BIO-MM#4 and BIO-MM#6 will require the project biologist to monitor construction activities for compliance with avoidance and minimization measures and established ESAs and nondisturbance zones and to document such monitoring through a compliance reporting program, respectively. BIO-MM#5 will require the project biologist to establish vehicle speed limits within the project footprint; restrict vehicle traffic to established roads, construction areas, and other permissible areas; and direct that routes be marked to prevent off-road traffic prior to ground-disturbing activity. BIO-MM#13 will give the project biologist authority to halt any construction activities that could injure or kill individuals belonging to special-status species. BIO-MM#53 and BIO-MM#54 will prevent destruction and disturbance of active nests during construction by requiring pre-construction surveys of modeled nesting habitat in and within 0.5 mile of the project footprint and establishing exclusion zones around and monitoring of active nests. BIO-MM#55 identifies minimum compensatory mitigation requirements for Swainson's hawk that will be included in the HMP developed under BIO-MM#10. These measures will minimize direct and indirect impacts on Swainson's hawk suitable habitat and direct impacts on individuals and will compensate for habitat loss.

Therefore, these mitigation measures will be effective in minimizing the project's impacts associated with habitat conversion or degradation, or individual fatalities, for Swainson's hawks.

Compensatory mitigation implemented under Mitigation Measure BIO-MM#55 could involve some secondary impacts; however, these impacts would be beneficial, and the measures set forth in BIO-MM#11 will be implemented to minimize any adverse impacts.

Some of the activities and actions that will be implemented under BIO-MM#10, especially those involving ground disturbance, could result in impacts similar to those described in Section 3.7.7 of the Final EIR/EIS. Specifically, direct and indirect impacts on special-status plant and wildlife species (e.g., California tiger salamander, red-legged frog, and foothill yellow-legged frog), special-status plant communities, and aquatic resources could occur where such resources are present on the mitigation sites. BIO-MM#11, which requires a site assessment and appropriate regulatory authorizations, will be implemented at compensatory mitigation sites to reduce or avoid impacts on these resources.

Environmental impacts that would result from implementation of BIO-MM#10 on other resource categories could result from implementing restoration activities at mitigation sites. Refer to Section 4.4.1 of this document for a description of these potential secondary impacts of BIO-MM#10.

The Authority finds that Mitigation Measures BIO-MM#3, BIO-MM#4, BIO-MM#6, BIO-MM#5, BIO-MM#13, BIO-MM#53, BIO-MM#54, BIO-MM#55, and BIO-MM#10 are required under the Preferred Alternative and that implementation of these mitigation measures will reduce the project's impacts on Swainson's hawks to a less-than-significant level.

4.4.23 Impact BIO#22: Permanent Conversion or Degradation of Habitat for and Direct Mortality or Disturbance of Purple Martin, Olive-Sided Flycatcher, and Loggerhead Shrike

Construction of the HSR track and systems in all five subsections would take place in suitable habitat for three special-status tree-nesting species: purple martin, olive-sided flycatcher, and loggerhead shrike, all of which are CDFW species of special concern. Nesting habitat for purple

martin and olive-sided flycatcher is limited to the Pacheco Pass Subsection. Construction activities would convert and temporarily disturb suitable habitat and could result in disturbance, injury, or mortality of nesting birds and the destruction of eggs and nests.

The Authority has incorporated BIO-IAMF#1, BIO-IAMF#3, BIO-IAMF#5, and BIO-IAMF#8 into the project design to avoid and minimize impacts on purple martin, olive-sided flycatcher, and loggerhead shrike. The areal extent of direct permanent and temporary impacts (conversion and disturbance of habitat, disturbance of individuals) in habitat for these species is shown in Final EIR/EIS Table 3.7-13. Habitat for purple martin and olive-sided flycatcher is present mostly in the Pacheco Pass Subsection, with a small amount of habitat at the extreme southeastern edge of the Morgan Hill and Gilroy Subsection.

While pre-construction actions to minimize impacts on purple martin, olive-sided flycatcher, and loggerhead shrike and their habitat are part of the project, these actions would not prevent the conversion and temporary disturbance of suitable habitat in the project footprint, nor would they eliminate the risk of injury, mortality, and disturbance of nesting birds. Ground-disturbing activities (e.g., grubbing and vegetation removal during site preparation) in suitable nesting habitat could crush eggs or kill nestlings in active nests. Construction-generated noise and vibration near active nests could cause nest abandonment. Artificial lighting of nighttime construction activities near active nests could also potentially cause nest abandonment.

Therefore, even with the implementation of these IAMFs, the project could result in habitat conversion or degradation, or individual fatalities, for purple martin, olive-sided flycatcher, and loggerhead shrike, which is considered a significant impact under CEQA (Final EIR/EIS: page 3.7-105).

Implementation of the following measures mitigates this impact: BIO-MM#3: Establish Environmentally Sensitive Areas and Nondisturbance Zones, BIO-MM#4: Conduct Monitoring of Construction Activities, BIO-MM#6: Establish and Implement a Compliance Reporting Program, BIO-MM#5: Limit Vehicle Traffic and Construction Site Speeds, BIO-MM#13: Implement Work Stoppage, and BIO-MM#43: Conduct Pre-Construction Surveys and Delineate Active Nest Buffers for Breeding Birds. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

The Authority will implement mitigation measures to minimize impacts on these and other nonlisted special-status birds. BIO-MM#3 will require the project biologist to establish ESAs and nondisturbance zones (including WEF, where applicable) that support special-status species or aquatic resources and are subject to seasonal restrictions or other avoidance and minimization measures prior to ground-disturbing activity. BIO-MM#4 and BIO-MM#6 will require the project biologist to monitor construction activities for compliance with avoidance and minimization measures and established ESAs and nondisturbance zones and to document such monitoring through a compliance reporting program, respectively. BIO-MM#5 will require the project biologist to establish vehicle speed limits within the project footprint; restrict vehicle traffic to established roads, construction areas, and other permissible areas; and direct that routes be marked to prevent off-road traffic prior to ground-disturbing activity. BIO-MM#13 will give the project biologist authority to halt any construction activities that could injure or kill individuals belonging to special-status species. BIO-MM#43 will require the project biologist to conduct pre-construction surveys for nesting non-raptor bird species within the project footprint and delineate no-work buffers around active nests. This measure will minimize or avoid direct impacts on individuals.

Therefore, these mitigation measures will be effective in minimizing the project's impacts associated with habitat conversion or degradation, or individual fatalities, for purple martin, olive-sided flycatcher, and loggerhead shrike.

The Authority finds that Mitigation Measures BIO-MM#3, BIO-MM#4, BIO-MM#6, BIO-MM#5, BIO-MM#13, and BIO-MM#43 are required under the Preferred Alternative and that implementation of these mitigation measures will reduce the project's impacts on purple martin, olive-sided flycatcher, and loggerhead shrike to a less-than-significant level.

4.4.24 Impact BIO#23: Permanent Conversion or Degradation of Habitat for and Direct Mortality or Disturbance of Least Bell's Vireo, Yellow Warbler, and Yellow-Breasted Chat

Construction of the HSR track and systems would take place in suitable habitat for three special-status riparian species: least Bell's vireo, yellow warbler, and yellow-breasted chat. Least Bell's vireo is listed as endangered under the FESA and CESA; yellow warbler and yellow-breasted chat are CDFW species of special concern. Although habitat is present in all five subsections, the highest quality habitat occurs in the Morgan Hill and Gilroy and Pacheco Pass Subsections. Construction activities would convert and temporarily disturb suitable habitat and could result in disturbance, injury, or mortality of nesting birds and the destruction of eggs and nests. Ground disturbance and vegetation removal in riparian habitat would 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 would degrade riparian habitat for least Bell's vireos and other riparian birds by outcompeting willows and other native plants that provide nest sites.

The Authority has incorporated BIO-IAMF#1, BIO-IAMF#3, BIO-IAMF#5, BIO-IAMF#8, BIO-IAMF#10, and BIO-IAMF#11 into project design to avoid and minimize impacts on least Bell's vireo, yellow warbler, and yellow-breasted chat. The areal extent of direct permanent and temporary impacts (conversion and disturbance of habitat; disturbance, injury, and mortality of individuals) in habitat for the three special-status riparian birds is shown in Final EIR/EIS Table 3.7-13. Tunnels will be designed and constructed to avoid or minimize groundwater inflow into tunnels during construction that may affect surface water resources overlying or near the tunnel alignment (HYD-IAMF#5), including riparian habitat for least Bell's vireo and other riparian birds.

As discussed in Impact BIO#1, construction of Tunnels 1 and 2 could have temporary indirect impacts on the hydrology of groundwater-dependent surface water features, including riparian vegetation along Pacheco Creek that provides habitat for least Bell's vireo and other riparian birds. Reductions in groundwater supply to riparian vegetation could result in the desiccation of vegetation and degradation of habitat for these species.

While pre-construction and construction actions to minimize impacts on least Bell's vireo, yellow warbler, and yellow-breasted chat and their habitat are part of the project, these actions would not prevent the conversion and temporary disturbance of suitable habitat in the project footprint, nor would they eliminate the risk of injury, mortality, and disturbance of nesting birds. Ground-disturbing activities (e.g., grubbing and vegetation removal during site preparation) in suitable nesting habitat could crush eggs or kill nestlings in active nests if not found during pre-construction surveys. Construction-generated noise and vibration near active nests could cause nest abandonment. Artificial lighting of nighttime construction activities near active nests could also potentially cause nest abandonment. Cleaning of construction equipment may not entirely eliminate invasive plants from the habitat study area without mitigation measures.

Therefore, even with the implementation of these IAMFs, the project could result in habitat conversion or degradation, or individual fatalities, for least Bell's vireo, yellow warbler, and yellow-breasted chat, which is considered a significant impact under CEQA (Final EIR/EIS: page 3.7-106).

Implementation of the following measures mitigates this impact: BIO-MM#1: Prepare and Implement a Restoration and Revegetation Plan, BIO-MM#2: Prepare and Implement a Weed Control Plan, BIO-MM#3: Establish Environmentally Sensitive Areas and Nondisturbance Zones, BIO-MM#4: Conduct Monitoring of Construction Activities), BIO-MM#6: Establish and Implement a Compliance Reporting Program, BIO-MM#5: Limit Vehicle Traffic and Construction Site Speeds, BIO-MM#9: Prepare and Implement a Groundwater Adaptive Management and Monitoring Plan, BIO-MM#13: Implement Work Stoppage, BIO-MM#43: Conduct Pre-Construction Surveys and Delineate Active Nest Buffers for Breeding Birds, and BIO-MM#72: Provide Compensatory Mitigation for Permanent Impacts on Riparian Habitat. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

The Authority will implement mitigation measures to minimize impacts on these species. BIO-MM#1 will involve preparation of an RRP that will identify and describe procedures for restoring temporarily disturbed habitat to its former state. BIO-MM#2 will require the project biologist to develop a WCP prior to ground-disturbing activity to minimize and avoid the spread of invasive weeds into the project footprint and adjacent areas. BIO-MM#3 will require the project biologist to establish ESAs and nondisturbance zones (including WEF, where applicable) that support special-status species or aquatic resources and are subject to seasonal restrictions or other avoidance and minimization measures prior to ground-disturbing activity. BIO-MM#4 and BIO-MM#6 will require the project biologist to monitor construction activities for compliance with avoidance and minimization measures and established ESAs and nondisturbance zones and to document such monitoring through a compliance reporting program, respectively. BIO-MM#5 will require the project biologist to establish vehicle speed limits within the project footprint; restrict vehicle traffic to established roads, construction areas, and other permissible areas; and direct that routes be marked to prevent off-road traffic prior to ground-disturbing activity. BIO-MM#9 will involve preparation and implementation of a GAMMP that will require monitoring of groundwater-dependent surface water resources (including riparian habitat) within the tunnel groundwater study area, providing supplemental water where needed, and remediating or compensating for any adverse effects identified during monitoring. BIO-MM#13 will give the project biologist authority to halt any construction activities that could injure or kill individuals belonging to special-status species. BIO-MM#43 will require the project biologist to conduct pre-construction surveys for nesting non-raptor bird species within the project footprint and delineate no-work buffers around active nests. Compensatory mitigation for riparian habitat (BIO-MM#72) will benefit these species because it will require creating, preserving, restoring, or enhancing riparian plant communities in which they nest. These measures will minimize direct and indirect impacts on suitable habitat for these species and direct impacts on individuals.

Therefore, these mitigation measures will be effective in minimizing the project's impacts associated with habitat conversion or degradation, or individual fatalities, for least Bell's vireo, yellow warbler, and yellow-breasted chat.

Compensatory mitigation implemented under Mitigation Measure BIO-MM#72 could involve some secondary impacts; however, these impacts would be beneficial, and the measures set forth in BIO-MM#11 will be implemented to minimize any adverse impacts.

The Authority finds that Mitigation Measures BIO-MM#1, BIO-MM#2, BIO-MM#3, BIO-MM#4, BIO-MM#6, BIO-MM#5, BIO-MM#9, BIO-MM#13, BIO-MM#43, and BIO-MM#72 are required under the Preferred Alternative and that implementation of these mitigation measures will reduce the project's impacts on least Bell's vireo, yellow warbler, and yellow-breasted chat to a less-than-significant level.

4.4.25 Impact BIO#24: Permanent Conversion or Degradation of Habitat for and Direct Mortality or Disturbance of Tricolored Blackbird and Yellow-Headed Blackbird

Construction of the HSR track and systems in all five subsections would take place in suitable habitat for two special-status marsh birds: tricolored blackbird and yellow-headed blackbird. Nesting habitat for yellow-headed blackbird is limited to the San Joaquin Valley Subsection. Construction activities would convert and temporarily disturb habitat and could result in disturbance, injury, or mortality of nesting birds and the destruction of eggs and nests.

The Authority has incorporated BIO-IAMF#1, BIO-IAMF#3, BIO-IAMF#5, BIO-IAMF#8, BIO-IAMF#10, and BIO-IAMF#11 into project design to avoid and minimize impacts on tricolored blackbird and yellow-headed blackbird. Tunnels will be designed and constructed to avoid or minimize groundwater inflows into tunnel during construction that may affect surface water resources overlying the tunnel alignment (HYD-IAMF#5), including those that provide nesting habitat for tricolored blackbird.

The areal extent of direct permanent and temporary impacts (conversion and disturbance of habitat, disturbance of individuals) in habitat for the two special-status marsh birds is shown in

Final EIR/EIS Table 3.7-13. The magnitude of indirect impacts (introduction of invasive nonnative plant species), while not quantified through the modeling effort, would be generally proportional to the quantity of direct impacts.

As discussed in Impact BIO#1, construction of Tunnels 1 and 2 could have temporary indirect impacts on the hydrology of groundwater-dependent surface waters, including ponds and wetlands that may support freshwater emergent vegetation suitable for nesting by tricolored blackbirds. Any reductions in groundwater supply to such ponds and wetlands could result in the gradual desiccation of emergent vegetation, reducing or eliminating suitable nesting habitat in subsequent nesting seasons.

While pre-construction and construction actions to protect special-status marsh birds are part of the project, these actions would not prevent the conversion and temporary disturbance of suitable habitat in the project footprint, nor would they necessarily eliminate the risk of injury, mortality, and disturbance of nesting birds. Ground-disturbing activities (e.g., grubbing and vegetation removal during site preparation) in suitable nesting habitat could crush eggs or kill nestlings in active nests. Construction-generated noise and vibration near active nests could cause nest abandonment. Artificial lighting of nighttime construction activities near active nests could also potentially cause nest abandonment. Additionally, increased cover of invasive weeds (e.g., perennial pepperweed) in wetlands could reduce emergent wetland vegetation that provides cover for nesting by these species.

Therefore, even with the implementation of these IAMFs, the project could result in habitat conversion or degradation, or individual fatalities, for tricolored blackbird and yellow-headed blackbird, which is considered a significant impact under CEQA (Final EIR/EIS: page 3.7-107).

Implementation of the following measures mitigates this impact: BIO-MM#1: Prepare and Implement a Restoration and Revegetation Plan, BIO-MM#2: Prepare and Implement a Weed Control Plan, BIO-MM#3: Establish Environmentally Sensitive Areas and Nondisturbance Zones, BIO-MM#4: Conduct Monitoring of Construction Activities, BIO-MM#6: Establish and Implement a Compliance Reporting Program, BIO-MM#5: Limit Vehicle Traffic and Construction Site Speeds, BIO-MM#9: Prepare and Implement a Groundwater Adaptive Management and Monitoring Plan, BIO-MM#13: Implement Work Stoppage, BIO-MM#56: Conduct Surveys and Implement Avoidance Measures for Active Tricolored Blackbird Nest Colonies, BIO-MM#57: Provide Compensatory Mitigation for Impacts on Tricolored Blackbird Habitat, BIO-MM#10: Prepare and Implement a Habitat Mitigation Plan for Species and Species Habitat, and BIO-MM#74: Prepare and Implement a Compensatory Mitigation Plan for Impacts on Aquatic Resources. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

The Authority will implement mitigation measures to minimize impacts on these species. BIO-MM#1 will involve preparation of an RRP that will identify and describe procedures for restoring temporarily disturbed habitat to its former state. BIO-MM#2 will require the project biologist to develop a WCP prior to ground-disturbing activity to minimize and avoid the spread of invasive weeds into the project footprint and adjacent areas. BIO-MM#3 will require the project biologist to establish ESAs and nondisturbance zones (including WEF, where applicable) that support special-status species or aquatic resources and are subject to seasonal restrictions or other avoidance and minimization measures prior to ground-disturbing activity. BIO-MM#4 and BIO-MM#6 will require the project biologist to monitor construction activities for compliance with avoidance and minimization measures and established ESAs and nondisturbance zones and to document such monitoring through a compliance reporting program, respectively. BIO-MM#5 will require the project biologist to establish vehicle speed limits within the project footprint; restrict vehicle traffic to established roads, construction areas, and other permissible areas; and direct that routes be marked to prevent off-road traffic prior to ground-disturbing activity. BIO-MM#9 will involve preparation and implementation of a GAMMP that will require monitoring of groundwater-dependent surface water resources (including those providing habitat for tricolored blackbird and yellow-headed blackbird) within the tunnel groundwater study area, providing supplemental water where needed, and remediating or compensating for any adverse effects identified during monitoring. BIO-MM#13 will give the project biologist authority to halt any construction activities

that could injure or kill individuals belonging to special-status species. BIO-MM#56 will avoid direct impacts on nesting tricolored blackbirds during construction by requiring pre-construction surveys for and avoidance of nest colonies within 300 feet of work areas. BIO-MM#57 identifies minimum compensatory mitigation requirements for tricolored blackbird that will be included in the HMP developed under BIO-MM#10. Compensatory mitigation for aquatic resources (BIO-MM#74) is also expected to benefit these species because it will require creating, preserving, restoring, or enhancing freshwater marsh habitat in which they nest. These measures will minimize direct and indirect impacts on suitable habitat for these species and direct impacts on individuals and will compensate for habitat loss.

Therefore, these mitigation measures will be effective in minimizing the project's impacts associated with habitat conversion or degradation, or individual fatalities, for tricolored blackbird and yellow-headed blackbird.

Compensatory mitigation implemented under Mitigation Measures BIO-MM#57 and BIO-MM#74 could involve some secondary impacts; however, these impacts would be beneficial, and the measures set forth in BIO-MM#11 will be implemented to minimize any adverse impacts.

Some of the activities and actions that will be implemented under BIO-MM#10, especially those involving ground disturbance, could result in impacts similar to those described in Section 3.7.7 of the Final EIR/EIS. Specifically, direct and indirect impacts on special-status plant and wildlife species (e.g., California tiger salamander, red-legged frog, and foothill yellow-legged frog), special-status plant communities, and aquatic resources could occur where such resources are present on the mitigation sites. BIO-MM#11, which requires a site assessment and appropriate regulatory authorizations, will be implemented at compensatory mitigation sites to reduce or avoid impacts on these resources.

Environmental impacts that would result from implementation of BIO-MM#10 on other resource categories could result from implementing restoration activities at mitigation sites. Refer to Section 4.4.1 of this document for a description of these potential secondary impacts of BIO-MM#10.

The Authority finds that Mitigation Measures BIO-MM#1, BIO-MM#2, BIO-MM#3, BIO-MM#4, BIO-MM#6, BIO-MM#5, BIO-MM#9, BIO-MM#13, BIO-MM#56, BIO-MM#57, BIO-MM#10, and BIO-MM#74 are required under the Preferred Alternative and that implementation of these mitigation measures will reduce the project's impacts on tricolored blackbird and yellow-headed blackbird to a less-than-significant level.

4.4.26 Impact BIO#25: Permanent Conversion or Degradation of Habitat for and Disturbance of Sandhill Crane

Construction of the HSR track and systems in the San Joaquin Valley Subsection would take place in suitable habitat for sandhill crane. The greater subspecies is listed as endangered under CESA and is fully protected under the Cal. Fish and Game Code; the lesser subspecies is a CDFW species of special concern. Construction activities would convert and temporarily disturb habitat and could result in disturbance of roosting and foraging cranes.

The Authority has incorporated BIO-IAMF#1, BIO-IAMF#3, BIO-IAMF#5, BIO-IAMF#8, BIO-IAMF#10, and BIO-IAMF#11 into project design to avoid and minimize impacts on sandhill crane. The areal extent of direct permanent and temporary impacts (conversion and disturbance of habitat, disturbance of individuals) in roosting and foraging habitat for sandhill crane is shown in Final EIR/EIS Table 3.7-13. The magnitude of indirect impacts (introduction of invasive nonnative plant species), while not quantified through the modeling effort, would be generally proportional to the quantity of direct impacts.

While pre-construction and construction actions to minimize impacts on sandhill cranes and their habitat are part of the project, these actions would not prevent the conversion and temporary disturbance of suitable habitat in the project footprint, nor would they necessarily eliminate the risk of disturbance of foraging and roosting cranes. Construction activities from October to mid-March could cause sandhill cranes resting or foraging in nearby agricultural and grassland habitat

to flee if they perceive such activities as a threat. Artificial lighting of nighttime construction activities could also disturb roosting plovers. While such disturbance would not kill or injure individual cranes, they would consume more energy flying and searching for food than they would in the absence of such disturbance. Additionally, increased cover of invasive weeds (e.g., thistles, mustard, perennial pepperweed) in grassland or wetlands would degrade habitat for the sandhill crane because invasive plants have been shown to adversely affect roosting habitat in other portions of its range (Kessler et al. 2011).

Therefore, even with the implementation of these IAMFs, the project could result in habitat conversion or degradation, or individual fatalities, for sandhill crane, which is considered a significant impact under CEQA (Final EIR/EIS: page 3.7-108).

Implementation of the following measures mitigates this impact: BIO-MM#1: Prepare and Implement a Restoration and Revegetation Plan, BIO-MM#2: Prepare and Implement a Weed Control Plan, BIO-MM#3: Establish Environmentally Sensitive Areas and Nondisturbance Zones, BIO-MM#4: Conduct Monitoring of Construction Activities, BIO-MM#6: Establish and Implement a Compliance Reporting Program, BIO-MM#5: Limit Vehicle Traffic and Construction Site Speeds, BIO-MM#13: Implement Work Stoppage, BIO-MM#44: Implement Avoidance and Minimization Measures for Mountain Plover and Sandhill Crane, BIO-MM#58: Provide Compensatory Mitigation for Impacts on Waterfowl, Shorebird, and Sandhill Crane Habitat, and BIO-MM#10: Prepare and Implement a Habitat Mitigation Plan for Species and Species Habitat. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

The Authority will implement mitigation measures to minimize impacts on sandhill crane. BIO-MM#1 will involve preparation of an RRP that will identify and describe procedures for restoring temporarily disturbed habitat to its former state. BIO-MM#2 will require the project biologist to develop a WCP prior to ground-disturbing activity to minimize and avoid the spread of invasive weeds into the project footprint and adjacent areas. BIO-MM#3 will require the project biologist to establish ESAs and nondisturbance zones (including WEF, where applicable) that support special-status species or aquatic resources and are subject to seasonal restrictions or other avoidance and minimization measures prior to ground-disturbing activity. BIO-MM#4 and BIO-MM#6 will require the project biologist to monitor construction activities for compliance with avoidance and minimization measures and established ESAs and nondisturbance zones and to document such monitoring through a compliance reporting program, respectively. BIO-MM#5 will require the project biologist to establish vehicle speed limits within the project footprint; restrict vehicle traffic to established roads, construction areas, and other permissible areas; and direct that routes be marked to prevent off-road traffic prior to ground-disturbing activity. BIO-MM#13 will give the project biologist authority to halt any construction activities that could injure or kill individuals belonging to special-status species. BIO-MM#44 will avoid disturbance of sandhill crane roosts by requiring the Authority to identify roost sites from October 1 to December 31 and maintain a 0.75-mile buffer from such sites in which no nighttime work will be conducted from January 1 to March 15 (alternatively, the Authority may prohibit all construction within 0.75 mile of modeled habitat from October 1 to March 15). BIO-MM#58 identifies minimum compensatory mitigation requirements for waterfowl, shorebird, and sandhill crane habitat that will be included in the HMP developed under BIO-MM#10. These measures will minimize direct disturbance impacts and avoid direct impacts on sandhill crane individuals and compensate for loss and degradation of roosting habitat.

Therefore, these mitigation measures will be effective in minimizing the project's impacts associated with habitat conversion or degradation, or individual fatalities, for sandhill crane.

Compensatory mitigation implemented under Mitigation Measure BIO-MM#58 could involve some secondary impacts; however, these impacts would be beneficial, and the measures set forth in BIO-MM#11 will be implemented to minimize any adverse impacts.

Some of the activities and actions that will be implemented under BIO-MM#10, especially those involving ground disturbance, could result in impacts similar to those described in Section 3.7.7 of the Final EIR/EIS. Specifically, direct and indirect impacts on special-status plant and wildlife species (e.g., California tiger salamander, red-legged frog, and foothill yellow-legged frog),

special-status plant communities, and aquatic resources could occur where such resources are present on the mitigation sites. BIO-MM#11, which requires a site assessment and appropriate regulatory authorizations, will be implemented at compensatory mitigation sites to reduce or avoid impacts on these resources.

Environmental impacts that would result from implementation of BIO-MM#10 on other resource categories could result from implementing restoration activities at mitigation sites. Refer to Section 4.4.1 of this document for a description of these potential secondary impacts of BIO-MM#10.

The Authority finds that Mitigation Measures BIO-MM#1, BIO-MM#2, BIO-MM#3, BIO-MM#4, BIO-MM#6, BIO-MM#5, BIO-MM#13, BIO-MM#44, BIO-MM#58, and BIO-MM#10 are required under the Preferred Alternative and that implementation of these mitigation measures will reduce the project's impacts on sandhill crane to a less-than-significant level.

4.4.27 Impact BIO#26a: Loss of Breeding, Foraging, and Dispersal Habitat for and Direct Mortality or Disturbance of Mountain Lion

Construction of the HSR track and systems in all subsections would take place in suitable habitat for mountain lion, a population of which is a candidate for listing under CESA (potential habitat for the population that is a candidate for listing only extends into the San Joaquin Valley Subsection as far as the eastern slope of the Diablo Range and excludes most of the San Joaquin Valley Subsection within the Central Valley). Construction activities would convert and temporarily disturb habitat and could result in the disturbance, injury, and mortality of individual mountain lions.

The Authority has incorporated BIO-IAMF#1, BIO-IAMF#3, BIO-IAMF#5, BIO-IAMF#7, BIO-IAMF#8, BIO-IAMF#9, BIO-IAMF#10, and BIO-IAMF#11 (described in Impact BIO#1 and Impact BIO#6) into project design to avoid and minimize impacts on wildlife and plants from construction. As these IAMFs are widely applicable to all species, they will also avoid and minimize impacts on mountain lion. The areal extent of direct permanent and temporary impacts (conversion and disturbance of habitat; disturbance, injury, and mortality of individuals) in habitat for mountain lion is shown in Final EIR/EIS Table 3.7-13. While the project would result in the loss or disturbance of foraging and dispersal habitat, mountain lion is a highly mobile species, and abundant foraging and dispersal habitat is present in the region. The primary habitat impact would be the loss or disturbance of breeding habitat, including the potential to kill cubs if they are present in the area at the time of construction. The majority of breeding habitat occurs in the Pacheco Pass Subsection. The magnitude of permanent impacts on breeding habitat would be 709.8 acres under the Preferred Alternative. The extent of temporary impacts would be 122.9 acres under the Preferred Alternative. The magnitude of indirect impacts (introduction of invasive nonnative plants), while not quantified through the modeling effort, would be generally proportional to the quantity of direct impacts (Final EIR/EIS: Table 3.7-13).

As discussed in Impact BIO#1, construction of Tunnels 1 and 2 could have temporary indirect impacts on the hydrology of groundwater-dependent surface waters and associated vegetation types. Potentially affected surface waters could serve as water sources for mountain lions, potentially temporarily reducing the availability of water.

While pre-construction and construction actions (IAMFs) that avoid and minimize impacts on plants and wildlife, including the mountain lion, are part of the project, these actions will not prevent the conversion and temporary disturbance of habitat in the project footprint, nor will they necessarily eliminate the risk of disturbance, injury, or mortality of individual mountain lions. Construction-related ground disturbance (e.g., grading, excavation) and vehicle traffic may injure or kill mountain lions, including cubs, by crushing occupied dens or colliding with moving lions. Although unlikely, mountain lions may become entrapped in excavated areas, pipes, or other equipment used for construction. Noise and vibration generated by construction activities may impair mountain lions' feeding, breeding, and sheltering behaviors. Potential hazardous material and pollutant releases and maintenance activities that involve pesticides or herbicides could degrade habitat or reduce prey species composition over the long term. Introduction of invasive

nonnative vegetation could alter the structure of the vegetation community, making it less suitable to support mountain lions and could adversely affect the productivity of the prey base.

Therefore, even with the implementation of these IAMFs, the project could result in habitat conversion or degradation, or individual fatalities, for mountain lion, which is considered a significant impact under CEQA (Final EIR/EIS: page 3.7-109).

Implementation of the following measures mitigates this impact: BIO-MM#1: Prepare and Implement a Restoration and Revegetation Plan, BIO-MM#2: Prepare and Implement a Weed Control Plan, BIO-MM#3: Establish Environmentally Sensitive Areas and Nondisturbance Zones, BIO-MM#4: Conduct Monitoring of Construction Activities, BIO-MM#6: Establish and Implement a Compliance Reporting Program, BIO-MM#5: Limit Vehicle Traffic and Construction Site Speeds, BIO-MM#13: Implement Work Stoppage, BIO-MM#87: Conduct Pre-Construction Surveys and Implement Avoidance and Minimization Measures for Mountain Lion Dens, BIO-MM#88: Provide Compensatory Mitigation for Impacts on Mountain Lion Habitat, and BIO-MM#10: Prepare and Implement a Habitat Mitigation Plan for Species and Species Habitat. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

The Authority will implement mitigation measures to reduce the impacts on mountain lion. BIO-MM#1 will involve preparation of an RRP that will identify and describe procedures for restoring temporarily disturbed habitat to its former state. BIO-MM#2 will require the project biologist to develop a WCP prior to ground-disturbing activity to minimize and avoid the spread of invasive weeds into the project footprint and adjacent areas. BIO-MM#3 will require the project biologist to establish ESAs and nondisturbance zones (including WEF, where applicable) that support special-status species or aquatic resources and are subject to seasonal restrictions or other avoidance and minimization measures prior to ground-disturbing activity. BIO-MM#4 and BIO-MM#6 will require the project biologist to monitor construction activities for compliance with avoidance and minimization measures and established ESAs and nondisturbance zones and to document such monitoring through a compliance reporting program, respectively. BIO-MM#5 will require the project biologist to establish vehicle speed limits within the project footprint; restrict vehicle traffic to established roads, construction areas, and other permissible areas; and direct that routes be marked to prevent off-road traffic prior to ground-disturbing activity. BIO-MM#13 will give the project biologist authority to halt any construction activities that could injure or kill individuals belonging to special-status species. BIO-MM#87 will minimize direct impacts on individual mountain lions during construction by identifying and avoiding occupied mountain lion dens within the project footprint and requiring contractors to inspect construction site materials for mountain lions before burying, capping, or moving them. BIO-MM#88 identifies minimum compensatory mitigation requirements for mountain lion that will be included in the HMP developed under BIO-MM#10. These measures will minimize direct and indirect impacts on mountain lion suitable habitat and individuals and will compensate for habitat loss.

Therefore, these mitigation measures will be effective in minimizing the project's impacts associated with habitat conversion or degradation, or individual fatalities, for mountain lion.

Compensatory mitigation implemented under Mitigation Measure BIO-MM#88 could involve some secondary impacts; however, these impacts would be beneficial, and the measures set forth in BIO-MM#11 will be implemented to minimize any adverse impacts.

Some of the activities and actions that will be implemented under BIO-MM#10, especially those involving ground disturbance, could result in impacts similar to those described in Section 3.7.7 of the Final EIR/EIS. Specifically, direct and indirect impacts on special-status plant and wildlife species (e.g., California tiger salamander, red-legged frog, and foothill yellow-legged frog), special-status plant communities, and aquatic resources could occur where such resources are present on the mitigation sites. BIO-MM#11, which requires a site assessment and appropriate regulatory authorizations, will be implemented at compensatory mitigation sites to reduce or avoid impacts on these resources.

Environmental impacts that would result from implementation of BIO-MM#10 on other resource categories could result from implementing restoration activities at mitigation sites. Refer to

Section 4.4.1 of this document for a description of these potential secondary impacts of BIO-MM#10.

The Authority finds that Mitigation Measures BIO-MM#1, BIO-MM#2, BIO-MM#3, BIO-MM#4, BIO-MM#6, BIO-MM#5, BIO-MM#13, BIO-MM#87, BIO-MM#88, and BIO-MM#10 are required under the Preferred Alternative and that implementation of these mitigation measures will reduce the project's impacts associated with habitat conversion or degradation, or individual fatalities, for mountain lion to a less-than-significant level.

4.4.28 Impact BIO#26b: Loss of Denning and Dispersal Habitat for and Direct Mortality or Disturbance of San Joaquin Kit Fox

Construction of the HSR track and systems in the eastern portion of the Morgan Hill and Gilroy Subsection and throughout the Pacheco Pass and San Joaquin Valley Subsections would take place in suitable habitat for San Joaquin kit fox, a species listed as endangered under FESA and threatened under CESA. Construction activities would convert and temporarily disturb habitat and could result in the disturbance, injury, and mortality of individual foxes.

The Authority has incorporated BIO-IAMF#1, BIO-IAMF#3, BIO-IAMF#5, BIO-IAMF#7, BIO-IAMF#8, BIO-IAMF#9, BIO-IAMF#10, and BIO-IAMF#11 into the project design to avoid and minimize impacts on San Joaquin kit fox. The areal extent of direct permanent and temporary impacts (conversion and disturbance of habitat; disturbance, injury, and mortality of individuals) in habitat for San Joaquin kit fox is shown in Final EIR/EIS Table 3.7-13. The magnitude of indirect impacts (introduction of invasive nonnative plants), while not quantified through the modeling effort, would be generally proportional to the quantity of direct impacts.

While pre-construction and construction actions to protect San Joaquin kit foxes are part of the project, these actions would not prevent the conversion and temporary disturbance of habitat in the project footprint, nor would they necessarily eliminate the risk of disturbance, injury, or mortality of individual foxes. Construction-related ground disturbance (e.g., grading, excavation) and vehicle traffic may injure or kill foxes by crushing occupied dens or colliding with moving foxes. Foxes may become entrapped in excavated areas, pipes, or other equipment used for construction. Noise and vibration generated by construction activities may impair fox breeding, feeding, and sheltering behaviors. Potential hazardous material and pollutant releases and maintenance activities that involve pesticides or herbicides could degrade habitat or reduce prey species composition over the long term. Introduction of invasive nonnative vegetation could alter the structure of the vegetation community, making it less suitable to support kit foxes, and could adversely affect the productivity of the prey base.

Therefore, even with the implementation of these IAMFs, the project could result in habitat conversion or degradation, or individual fatalities, for San Joaquin kit fox, which is considered a significant impact under CEQA (Final EIR/EIS: page 3.7-110).

Implementation of the following measures mitigates this impact: BIO-MM#1: Prepare and Implement a Restoration and Revegetation Plan, BIO-MM#2: Prepare and Implement a Weed Control Plan, BIO-MM#3: Establish Environmentally Sensitive Areas and Nondisturbance Zones, BIO-MM#4: Conduct Monitoring of Construction Activities, BIO-MM#6: Establish and Implement a Compliance Reporting Program, BIO-MM#5: Limit Vehicle Traffic and Construction Site Speeds, BIO-MM#13: Implement Work Stoppage, BIO-MM#59: Conduct Pre-Construction Surveys for San Joaquin Kit Fox, BIO-MM#60: Implement San Joaquin Kit Fox Avoidance and Minimization Measures, BIO-MM#61: Provide Compensatory Mitigation for Impacts on San Joaquin Kit Fox Habitat, and BIO-MM#10: Prepare and Implement a Habitat Mitigation Plan for Species and Species Habitat. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

The Authority will implement mitigation measures to reduce the impacts on San Joaquin kit fox. BIO-MM#1 will involve preparation of an RRP that will identify and describe procedures for restoring temporarily disturbed habitat to its former state. BIO-MM#2 will require the project biologist to develop a WCP prior to ground-disturbing activity to minimize and avoid the spread of

invasive weeds into the project footprint and adjacent areas. BIO-MM#3 will require the project biologist to establish ESAs and nondisturbance zones (including WEF, where applicable) that support special-status species or aquatic resources and are subject to seasonal restrictions or other avoidance and minimization measures prior to ground-disturbing activity. BIO-MM#4 and BIO-MM#6 will require the project biologist to monitor construction activities for compliance with avoidance and minimization measures and established ESAs and nondisturbance zones and to document such monitoring through a compliance reporting program, respectively. BIO-MM#5 will require the project biologist to establish vehicle speed limits within the project footprint; restrict vehicle traffic to established roads, construction areas, and other permissible areas; and direct that routes be marked to prevent off-road traffic prior to ground-disturbing activity. BIO-MM#13 will give the project biologist authority to halt any construction activities that could injure or kill individuals belonging to special-status species. BIO-MM#59 and BIO-MM#60 will minimize direct impacts on individual San Joaquin kit foxes during construction by identifying and avoiding occupied kit fox dens within the project footprint and requiring contractors to inspect construction site materials for kit foxes before burying, capping, or moving them. BIO-MM#61 identifies minimum compensatory mitigation requirements for San Joaquin kit fox that will be included in the HMP developed under BIO-MM#10. These measures will minimize direct and indirect impacts on San Joaquin kit fox suitable habitat and individuals and will compensate for habitat loss.

Therefore, these mitigation measures will be effective in minimizing the project's impacts associated with habitat conversion or degradation, or individual fatalities, for San Joaquin kit fox.

Compensatory mitigation implemented under Mitigation Measure BIO-MM#61 could involve some secondary impacts; however, these impacts would be beneficial, and the measures set forth in BIO-MM#11 will be implemented to minimize any adverse impacts.

Some of the activities and actions that will be implemented under BIO-MM#10, especially those involving ground disturbance, could result in impacts similar to those described in Section 3.7.7 of the Final EIR/EIS. Specifically, direct and indirect impacts on special-status plant and wildlife species (e.g., California tiger salamander, red-legged frog, and foothill yellow-legged frog), special-status plant communities, and aquatic resources could occur where such resources are present on the mitigation sites. BIO-MM#11, which requires a site assessment and appropriate regulatory authorizations, will be implemented at compensatory mitigation sites to reduce or avoid impacts on these resources.

Restoration and enhancement of aquatic resources that will be implemented under BIO-MM#10 may result in the permanent conversion of grassland to wetland or riparian habitat. While such activities will be beneficial for special-status vernal pool or riparian species (for example), they would result in a small but measurable loss of upland habitat that could support denning, foraging, or movement by San Joaquin kit fox; nesting and foraging by burrowing owl, short-eared owl, grasshopper sparrow, and northern harrier; and foraging by golden eagle and white-tailed kite.

Environmental impacts that would result from implementation of BIO-MM#10 on other resource categories could result from implementing restoration activities at mitigation sites. Refer to Section 4.4.1 of this document for a description of these potential secondary impacts of BIO-MM#10.

The Authority finds that Mitigation Measures BIO-MM#1, BIO-MM#2, BIO-MM#3, BIO-MM#4, BIO-MM#6, BIO-MM#5, BIO-MM#13, BIO-MM#59, BIO-MM#60, BIO-MM#61, and BIO-MM#10 are required under the Preferred Alternative and that implementation of these mitigation measures will reduce the project's impacts associated with habitat conversion or degradation, or individual fatalities, for San Joaquin kit fox to a less-than-significant level.

4.4.29 Impact BIO#27: Permanent Conversion or Degradation of Habitat for and Direct Mortality of Fresno Kangaroo Rat

Construction of the HSR track and systems in the San Joaquin Valley Subsection would take place in suitable habitat for Fresno kangaroo rat, a species listed as endangered under both

FESA and CESA. Although there are no known occurrences in the regional RSA, if any individuals are present, construction activities would convert and temporarily disturb habitat and could result in the disturbance, injury, and mortality of individual kangaroo rats.

The Authority has incorporated BIO-IAMF#1, BIO-IAMF#3, BIO-IAMF#5, BIO-IAMF#6, BIO-IAMF#7, BIO-IAMF#8, BIO-IAMF#9, BIO-IAMF#10, and BIO-IAMF#11 into the project design to avoid and minimize impacts on Fresno kangaroo rat. The areal extent of direct permanent and temporary impacts (conversion and disturbance of habitat; disturbance, injury, and mortality of individuals) in habitat for Fresno kangaroo rat is shown in Final EIR/EIS Table 3.7-13. The magnitude of indirect impacts (introduction of invasive nonnative plants), while not quantified through the modeling effort, would be generally proportional to the quantity of direct impacts.

While pre-construction and construction actions to protect Fresno kangaroo rats are part of the project, these actions would not prevent the conversion and temporary disturbance of suitable habitat in the project footprint, nor would they necessarily eliminate the risk of disturbance, injury, or mortality of individual kangaroo rats. Construction-related ground disturbance (e.g., grading, excavation) and vehicle traffic may injure or kill kangaroo rats by crushing occupied burrows or running over moving individuals. Kangaroo rats may become entrapped in excavated areas. Noise and vibration generated by construction activities may impair breeding, feeding, and sheltering behaviors. Potential hazardous material and pollutant releases and maintenance activities that involve pesticides or herbicides could degrade habitat over the long term. Introduction of invasive nonnative plants could alter the structure of vegetation, making it less suitable to support kangaroo rats and other small mammals.

Therefore, even with the implementation of these IAMFs, the project could result in habitat conversion or degradation, or individual fatalities, for Fresno kangaroo rat, which is considered a significant impact under CEQA (Final EIR/EIS: page 3.7-111).

Implementation of the following measures mitigates this impact: BIO-MM#1: Prepare and Implement a Restoration and Revegetation Plan, BIO-MM#2: Prepare and Implement a Weed Control Plan, BIO-MM#3: Establish Environmentally Sensitive Areas and Nondisturbance Zones, BIO-MM#4: Conduct Monitoring of Construction Activities, BIO-MM#6: Establish and Implement a Compliance Reporting Program, BIO-MM#5: Limit Vehicle Traffic and Construction Site Speeds, BIO-MM#13: Implement Work Stoppage, BIO-MM#62: Implement Avoidance and Minimization Measures for Fresno Kangaroo Rat, BIO-MM#63: Provide Compensatory Mitigation for Impacts on Fresno Kangaroo Rat Habitat, and BIO-MM#10: Prepare and Implement a Habitat Mitigation Plan for Species and Species Habitat. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

The Authority will implement mitigation measures to reduce the impacts on Fresno kangaroo rat. BIO-MM#1 will involve preparation of an RRP that will identify and describe procedures for restoring temporarily disturbed habitat to its former state. BIO-MM#2 will require the project biologist to develop a WCP prior to ground-disturbing activity to minimize and avoid the spread of invasive weeds into the project footprint and adjacent areas. BIO-MM#3 will require the project biologist to establish ESAs and nondisturbance zones (including WEF, where applicable) that support special-status species or aquatic resources and are subject to seasonal restrictions or other avoidance and minimization measures prior to ground-disturbing activity. BIO-MM#4 and BIO-MM#6 will require the project biologist to monitor construction activities for compliance with avoidance and minimization measures and established ESAs and nondisturbance zones and to document such monitoring through a compliance reporting program, respectively. BIO-MM#5 will require the project biologist to establish vehicle speed limits within the project footprint; restrict vehicle traffic to established roads, construction areas, and other permissible areas; and direct that routes be marked to prevent off-road traffic prior to ground-disturbing activity. BIO-MM#13 will give the project biologist authority to halt any construction activities that could injure or kill individuals belonging to special-status species. BIO-MM#62 will avoid direct impacts on individual Fresno kangaroo rats during construction by requiring surveys of modeled habitat to confirm presence/absence of suitable burrows in the project footprint and subsequent pre-construction surveys for and avoidance of occupied burrows. BIO-MM#63 identifies minimum compensatory

mitigation requirements for Fresno kangaroo rat that will be included in the HMP developed under BIO-MM#10. These measures will minimize direct and indirect impacts on Fresno kangaroo rat suitable habitat and direct impacts on individuals and will compensate for habitat loss.

Therefore, these mitigation measures will be effective in minimizing the project's impacts associated with habitat conversion or degradation, or individual fatalities, for Fresno kangaroo rat.

Compensatory mitigation implemented under Mitigation Measure BIO-MM#63 could involve some secondary impacts; however, these impacts would be beneficial, and the measures set forth in BIO-MM#11 will be implemented to minimize any adverse impacts.

Some of the activities and actions that will be implemented under BIO-MM#10, especially those involving ground disturbance, could result in impacts similar to those described in Section 3.7.7 of the Final EIR/EIS. Specifically, direct and indirect impacts on special-status plant and wildlife species (e.g., California tiger salamander, red-legged frog, and foothill yellow-legged frog), special-status plant communities, and aquatic resources could occur where such resources are present on the mitigation sites. BIO-MM#11, which requires a site assessment and appropriate regulatory authorizations, will be implemented at compensatory mitigation sites to reduce or avoid impacts on these resources.

Environmental impacts that would result from implementation of BIO-MM#10 on other resource categories could result from implementing restoration activities at mitigation sites. Refer to Section 4.4.1 of this document for a description of these potential secondary impacts of BIO-MM#10.

The Authority finds that Mitigation Measures BIO-MM#1, BIO-MM#2, BIO-MM#3, BIO-MM#4, BIO-MM#6, BIO-MM#5, BIO-MM#13, BIO-MM#62, BIO-MM#63, and BIO-MM#10 are required under the Preferred Alternative and that implementation of these mitigation measures will reduce the project's impacts associated with habitat conversion or degradation, or individual fatalities, for Fresno kangaroo rat to a less-than-significant level.

4.4.30 Impact BIO#28: Permanent Conversion or Degradation of Habitat for and Direct Mortality of American Badger

Construction of the HSR track and systems would take place in suitable habitat for American badger, a CDFW species of special concern. While habitat is present in all five subsections, the preponderance is in the Morgan Hill and Gilroy and Pacheco Pass Subsections because of the extensive and unfragmented grassland, chaparral, and scrub in these areas. Construction activities would convert and temporarily disturb habitat and could result in the disturbance, injury, and mortality of individual badgers.

The Authority has incorporated BIO-IAMF#1, BIO-IAMF#3, BIO-IAMF#5, BIO-IAMF#7, BIO-IAMF#8, BIO-IAMF#9, BIO-IAMF#10, and BIO-IAMF#11 into project design to avoid and minimize impacts on American badger. The areal extent of direct permanent and temporary impacts (conversion and disturbance of habitat; disturbance, injury, and mortality of individuals) in habitat for American badger is shown in Final EIR/EIS Table 3.7-13. Work on Tunnels 1 and 2 would result in the most extensive impacts. The magnitude of indirect impacts (introduction of invasive nonnative plants), while not quantified through the modeling effort, would be generally proportional to the quantity of direct impacts.

While pre-construction and construction actions to protect American badgers are part of the project, these actions would not prevent the conversion and temporary disturbance of suitable habitat in the project footprint, nor would they necessarily eliminate the risk of disturbance, injury, or mortality of individual badgers. Construction-related ground disturbance (e.g., grading, excavation) and vehicle traffic may injure or kill badgers by crushing occupied burrows or by vehicle strike. Badgers could become entrapped in excavated areas as well as in pipe and other construction materials and equipment. Noise and vibration generated by construction activities may impair breeding, feeding, and sheltering behaviors. Potential hazardous material and pollutant releases and maintenance activities that involve pesticides or herbicides could degrade habitat or reduce prey species composition over the long term. Introduction of invasive nonnative

vegetation could alter the structure of the vegetation community, making it less suitable to support badgers, and could adversely affect the productivity of the prey base.

Therefore, even with the implementation of these IAMFs, the project could result in habitat conversion or degradation, or individual fatalities, for American badger, which is considered a significant impact under CEQA (Final EIR/EIS: page 3.7-112).

Implementation of the following measures mitigates this impact: BIO-MM#1: Prepare and Implement a Restoration and Revegetation Plan, BIO-MM#2: Prepare and Implement a Weed Control Plan, BIO-MM#3: Establish Environmentally Sensitive Areas and Nondisturbance Zones, BIO-MM#4: Conduct Monitoring of Construction Activities, BIO-MM#6: Establish and Implement a Compliance Reporting Program, BIO-MM#5: Limit Vehicle Traffic and Construction Site Speeds, BIO-MM#13: Implement Work Stoppage, and BIO-MM#64: Conduct Pre-Construction Surveys for American Badger Den Sites and Implement Avoidance and Minimization Measures. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

The Authority will implement mitigation measures to reduce the impacts on American badger. BIO-MM#1 will involve preparation of an RRP that will identify and describe procedures for restoring temporarily disturbed habitat to its former state. BIO-MM#2 will require the project biologist to develop a WCP prior to ground-disturbing activity to minimize and avoid the spread of invasive weeds into the project footprint and adjacent areas. BIO-MM#3 will require the project biologist to establish ESAs and nondisturbance zones (including WEF, where applicable) that support special-status species or aquatic resources and are subject to seasonal restrictions or other avoidance and minimization measures prior to ground-disturbing activity. BIO-MM#4 and BIO-MM#6 will require the project biologist to monitor construction activities for compliance with avoidance and minimization measures and established ESAs and nondisturbance zones and to document such monitoring through a compliance reporting program, respectively. BIO-MM#5 will require the project biologist to establish vehicle speed limits within the project footprint; restrict vehicle traffic to established roads, construction areas, and other permissible areas; and direct that routes be marked to prevent off-road traffic prior to ground-disturbing activity. BIO-MM#13 will allow the Project Biologist to halt work if any badgers are encountered that could be injured or killed by project activities. BIO-MM#64 will avoid direct impacts on individual American badgers during construction by requiring pre-construction surveys for and avoidance of occupied dens. These measures are expected to avoid direct impacts on individual American badgers.

Therefore, these mitigation measures will be effective in minimizing the project's impacts associated with habitat conversion or degradation, or individual fatalities, for American badger.

The Authority finds that Mitigation Measures BIO-MM#1, BIO-MM#2, BIO-MM#3, BIO-MM#4, BIO-MM#6, BIO-MM#5, BIO-MM#13, and BIO-MM#64 are required under the Preferred Alternative and that implementation of these mitigation measures will reduce the project's impacts associated with habitat conversion or degradation, or individual fatalities, for American badger to a less-than-significant level.

4.4.31 Impact BIO#29: Permanent Conversion or Degradation of Habitat for and Direct Mortality of San Francisco Dusky-Footed Woodrat and Ringtail

Construction of the HSR track and systems in all subsections except the San Joaquin Valley Subsection would take place in suitable habitat for San Francisco dusky-footed woodrat, a CDFW species of special concern and ringtail, fully protected under the Cal. Fish and Game Code. Construction activities would convert and temporarily disturb habitat and could result in the disturbance, injury, and mortality of individual woodrats and ringtails.

The Authority has incorporated BIO-IAMF#1, BIO-IAMF#3, BIO-IAMF#5, BIO-IAMF#7, BIO-IAMF#8, BIO-IAMF#9, BIO-IAMF#10, and BIO-IAMF#11 into the project design to avoid and minimize impacts on San Francisco dusky-footed woodrat and ringtail. The areal extent of direct permanent and temporary impacts (conversion and disturbance of habitat; disturbance, injury, and mortality of individuals) in habitat for these two riparian mammals is shown in Final EIR/EIS Table 3.7-13.

While pre-construction and construction actions to protect San Francisco dusky-footed woodrats and ringtails are part of the project, these actions would not prevent the conversion and temporary disturbance of suitable habitat in the project footprint, nor would they necessarily eliminate the risk of disturbance, injury, or mortality of individual animals. Construction-related ground disturbance (e.g., grading, vegetation removal) and vehicle traffic may injure or kill woodrats or ringtails by destroying woodrat stick houses or ringtail nests or by vehicle strike. Animals could become entrapped in excavated areas as well as in pipe and other construction materials and equipment. Noise and vibration generated by construction activities may impair breeding, feeding, and sheltering behaviors or cause adults to abandon their young in areas subject to such disturbance. Potential hazardous material and pollutant releases and maintenance activities that involve pesticides or herbicides could degrade habitat or reduce prey species composition over the long term. Introduction of invasive nonnative vegetation could alter the structure of the vegetation community, making it less suitable to support woodrats and ringtails, and could adversely affect the productivity of the food web upon which these species depend without mitigation measures.

Therefore, even with the implementation of these IAMFs, the project could result in habitat conversion or degradation, or individual fatalities, for San Francisco dusky-footed woodrat and ringtail, which is considered a significant impact under CEQA (Final EIR/EIS: page 3.7-113).

Implementation of the following measures mitigates this impact: BIO-MM#1: Prepare and Implement a Restoration and Revegetation Plan, BIO-MM#2: Prepare and Implement a Weed Control Plan, BIO-MM#3: Establish Environmentally Sensitive Areas and Nondisturbance Zones, BIO-MM#4: Conduct Monitoring of Construction Activities, BIO-MM#6: Establish and Implement a Compliance Reporting Program, BIO-MM#5: Limit Vehicle Traffic and Construction Site Speeds, BIO-MM#13: Implement Work Stoppage, BIO-MM#65: Conduct Pre-Construction Surveys for Ringtail and Ringtail Den Sites and Implement Avoidance Measures, BIO-MM#66: Conduct Pre-Construction Surveys for Dusky-Footed Woodrat and Implement Avoidance Measures, and BIO-MM#72: Provide Compensatory Mitigation for Permanent Impacts on Riparian Habitat. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

The Authority will implement mitigation measures to reduce the impacts on these species. BIO-MM#1 will involve preparation of an RRP that will identify and describe procedures for restoring temporarily disturbed habitat to its former state. BIO-MM#2 will require the project biologist to develop a WCP prior to ground-disturbing activity to minimize and avoid the spread of invasive weeds into the project footprint and adjacent areas. BIO-MM#3 will require the project biologist to establish ESAs and nondisturbance zones (including WEF, where applicable) that support special-status species or aquatic resources and are subject to seasonal restrictions or other avoidance and minimization measures prior to ground-disturbing activity. BIO-MM#4 and BIO-MM#6 will require the project biologist to monitor construction activities for compliance with avoidance and minimization measures and established ESAs and nondisturbance zones and to document such monitoring through a compliance reporting program, respectively. BIO-MM#5 will require the project biologist to establish vehicle speed limits within the project footprint; restrict vehicle traffic to established roads, construction areas, and other permissible areas; and direct that routes be marked to prevent off-road traffic prior to ground-disturbing activity. BIO-MM#13 will allow the Project Biologist to halt work if any woodrats or ringtails are encountered that could be injured or killed by project activities. BIO-MM#65 and BIO-MM#66 will avoid direct impacts on individual ringtails and dusky-footed woodrats, respectively, by requiring pre-construction surveys for and avoidance of ringtail dens and dusky-footed woodrat stick houses where modeled habitat overlaps with the project footprint. Compensatory mitigation for riparian habitat (BIO-MM#72) will benefit these species because they both occur in riparian plant communities with dense understory. These measures are expected to avoid direct and indirect impacts on ringtail and San Francisco dusky-footed woodrat habitat and direct impacts on individuals and to compensate for habitat loss.

Therefore, these mitigation measures will be effective in minimizing the project's impacts associated with habitat conversion or degradation, or individual fatalities, for San Francisco dusky-footed woodrat and ringtail.

Compensatory mitigation implemented under Mitigation Measure BIO-MM#72 could involve some secondary impacts; however, these impacts would be beneficial, and the measures set forth in BIO-MM#11 will be implemented to minimize any adverse impacts.

Some of the activities and actions that will be implemented under BIO-MM#10, especially those involving ground disturbance, could result in impacts similar to those described in Section 3.7.7 of the Final EIR/EIS. Specifically, direct and indirect impacts on special-status plant and wildlife species (e.g., California tiger salamander, red-legged frog, and foothill yellow-legged frog), special-status plant communities, and aquatic resources could occur where such resources are present on the mitigation sites. BIO-MM#11, which requires a site assessment and appropriate regulatory authorizations, will be implemented at compensatory mitigation sites to reduce or avoid impacts on these resources.

Environmental impacts that would result from implementation of BIO-MM#10 on other resource categories could result from implementing restoration activities at mitigation sites. Refer to Section 4.4.1 of this document for a description of these potential secondary impacts of BIO-MM#10.

The Authority finds that Mitigation Measures BIO-MM#1, BIO-MM#2, BIO-MM#3, BIO-MM#4, BIO-MM#6, BIO-MM#5, BIO-MM#13, BIO-MM#65, BIO-MM#66, and BIO-MM#72 are required under the Preferred Alternative and that implementation of these mitigation measures will reduce the project's impacts associated with habitat conversion or degradation, or individual fatalities, for San Francisco dusky-footed woodrat and ringtail to a less-than-significant level.

4.4.32 Impact BIO#30: Loss of Roost Sites for and Direct Mortality or Disturbance of Special-Status Bats

Construction of the HSR track and systems in all subsections would take place in suitable habitat for pallid bat, Townsend's big-eared bat, western mastiff bat, and western red bat, all of which are CDFW species of special concern. Construction activities would convert and temporarily disturb habitat and could result in the disturbance, modification, or loss of both night and maternity roost sites, as well as associated injury and mortality of roosting individuals. Ground-disturbing activities (including tunnel boring), vegetation removal, and structure demolition (e.g., removal or modification of culverts, bridges, and old buildings) in suitable habitat for these species could destroy occupied roost sites, resulting in injury or mortality of adults and young. Construction-generated noise and vibration near potential roost sites, including caves or mines in or near the project footprint for Tunnels 1 and 2, could disturb maternity roosts and cause bats to abandon their young.

The Authority has incorporated BIO-IAMF#1, BIO-IAMF#3, BIO-IAMF#5, and BIO-IAMF#8 into project design to avoid and minimize impacts on special-status bats. The areal extent of direct permanent and temporary impacts (conversion and disturbance of habitat; disturbance, injury, and mortality of individuals and roost sites) in roosting and foraging habitat for special-status bats is shown in Final EIR/EIS Table 3.7-13.

While pre-construction actions to protect special-status species are part of the project, these actions would not prevent the conversion and temporary disturbance of suitable habitat for special-status bats in the project footprint, nor would they necessarily eliminate the risk of disturbance, injury, or mortality of individual bats or the disruption of roost sites without mitigation measures.

Therefore, even with the implementation of these IAMFs, the project could result in habitat conversion or degradation, or individual fatalities, for special-status bats, which is considered a significant impact under CEQA (Final EIR/EIS: page 3.7-114).

Implementation of the following measures mitigates this impact: BIO-MM#3: Establish Environmentally Sensitive Areas and Nondisturbance Zones, BIO-MM#4: Conduct Monitoring of Construction Activities, BIO-MM#6: Establish and Implement a Compliance Reporting Program, BIO-MM#5: Limit Vehicle Traffic and Construction Site Speeds, BIO-MM#13: Implement Work Stoppage, BIO-MM#56, BIO-MM#67: Conduct Pre-Construction Surveys for Special-Status Bat Species, BIO-MM#68, and BIO-MM#69: Implement Bat Exclusion and Deterrence Measures. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

The Authority will implement mitigation measures to reduce the impacts on special-status bats. BIO-MM#3 will require the project biologist to establish ESAs and nondisturbance zones (including WEF, where applicable) that support special-status species or aquatic resources and are subject to seasonal restrictions or other avoidance and minimization measures prior to ground-disturbing activity. BIO-MM#4 and BIO-MM#6 will require the project biologist to monitor construction activities for compliance with avoidance and minimization measures and established ESAs and nondisturbance zones, and to document such monitoring through a compliance reporting program, respectively. BIO-MM#5 will require the project biologist to establish vehicle speed limits within the project footprint; restrict vehicle traffic to establish roads, construction areas, and other permissible areas; and direct that routes be marked to prevent off-road traffic prior to ground-disturbing activity. BIO-MM#13 will allow the Project Biologist to halt work if any special-status bats are encountered that could be injured or killed or whose roosts could be disrupted by project activities. BIO-MM#67 to BIO-MM#69 will avoid direct impacts on individual special-status bats by requiring pre-construction surveys for and avoidance, exclusion, or relocation of active hibernacula, maternity roosts, or nurseries in or within 500 feet of the project footprint. These measures are expected to minimize or avoid direct impacts on individuals.

Therefore, these mitigation measures will be effective in minimizing the project's impacts associated with habitat conversion or degradation, or individual fatalities, for special-status bats.

The Authority finds that Mitigation Measures BIO-MM#3, BIO-MM#4, BIO-MM#6, BIO-MM#5, BIO-MM#13, BIO-MM#56, BIO-MM#67, BIO-MM#68, and BIO-MM#69 are required under the Preferred Alternative and that implementation of these mitigation measures will reduce the project's impacts associated with habitat conversion or degradation, or individual fatalities, for special-status bats to a less-than-significant level.

4.4.33 Impact BIO#31: Intermittent Disturbance or Degradation of Habitat for Special-Status Plants during Operations

Project operations would include inspection and maintenance activities along the HSR right-of-way.

Right-of-way maintenance activities would include minor grading, clearing, and excavation needed to maintain adequate drainage or repair infrastructure; vegetation management, including application of herbicide to invasive weeds growing within the right-of-way; and vehicle traffic along maintenance roads. These activities may cause reduced survival of special-status plants inside the right-of-way that were avoided during construction, as well as any occurring outside of but within 100 feet of the right-of-way (i.e., special-status plant study area). Minor ground disturbance within the right-of-way may result in minor direct (filling, sedimentation, inadvertent release of oils and chemicals from parked vehicles or equipment) or indirect (hydrological interruption, introduction of invasive species) effects on special-status plant habitat in and adjacent to the right-of-way. If applied during high winds, herbicides could drift onto and cause mortality of special-status plants. Dust generated from maintenance vehicles could settle on the leaves of special-status plants, increasing the rate of water loss (i.e., transpiration). Such direct and indirect effects would degrade special-status plant habitat within the special-status plant study area and could lead to the eventual extirpation of special-status plant occurrences without mitigation measures.

Prior to initiating operations and maintenance (O&M) activities, the Authority will require that all workers attend WEAP training about sensitive biological resources (BIO-IAMF#4). This training

will be provided to all employees prior to their involvement in any O&M activity and repeated on an annual basis. Training materials will identify and describe land cover types that may support special-status plants (e.g., vernal pools, freshwater emergent wetland) and their approximate locations within or adjacent to the right-of-way.

However, even with the implementation of this IAMF, operation of the project could result in disturbance or degradation of habitat for special-status plants, which is considered a significant impact under CEQA (Final EIR/EIS: page 3.7-115).

Implementation of the following measure mitigates this impact: BIO-MM#70: Prepare and Implement an Annual Vegetation Control Plan. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

The Authority will implement BIO-MM#70 to reduce the impact on special-status plant habitat during operations. This measure will require the Authority to prepare an annual vegetation control plan (VCP) to address vegetation removal for maintaining clear areas around facilities and controlling invasive weeds during the operational phase and will limit herbicide use to products approved by Caltrans. By establishing controls on the types of herbicides used for vegetation management and defining the situations in which herbicides are and are not an appropriate control method, VCPs are expected to minimize direct and indirect impacts on special-status plant habitat from herbicide drift.

The Authority finds that Mitigation Measure BIO-MM#70 is required under the Preferred Alternative and that implementation of this mitigation measure will reduce the project's impacts on disturbance or degradation of habitat for special-status plants to a less-than-significant level.

4.4.34 Impact BIO#32: Intermittent Disturbance or Degradation of Habitat for Special-Status Wildlife during Operations

HSR operations would include inspection and maintenance activities along the HSR right-of-way. Right-of-way maintenance activities would include minor grading, clearing, and excavation needed to maintain adequate drainage or repair infrastructure; vegetation management, including application of herbicide to invasive weeds growing within the right-of-way; and vehicle traffic along maintenance roads. Because much of the right-of-way would already have been subjected to extensive ground disturbance and construction activities and converted to HSR track and systems, the areas within the right-of-way would provide limited habitat for most special-status wildlife. Nevertheless, these activities may further degrade habitat areas inside the right-of-way that were avoided during construction, as well as habitat outside of but within 250 feet of the right-of-way (i.e., core habitat study area). Minor ground disturbance within the right-of-way may result in minor direct (filling, sedimentation, inadvertent release of oils and chemicals from parked vehicles or equipment) or indirect (hydrological interruption, introduction of invasive species) impacts on special-status wildlife habitat in and adjacent to the right-of-way. If applied during high winds, herbicides could drift into and contaminate aquatic habitat features (e.g., ponds and wetlands). Such direct and indirect impacts would degrade special-status wildlife habitat in the habitat study area. Some habitat areas may be degraded to the extent that they no longer support the resources necessary for species survival and reproduction, and therefore cease to function as habitat for those species. Wind caused by train operations could occur, potentially affecting special-status insects flights, foraging, or dispersal. However, effects of induced wind during operations will be a matter of the wind speed generated. The Authority studied induced wind speed from train operations, and potential effects on pollination, in whitepapers in 2012 (Authority 2012b, 2012c), and found that wind speed is not likely to be excessive at the edge of the right-of-way, predicted to be less than 5 mph at a distance of 30 feet from a train going 220 mph. Consequently, wind speeds within proximity to trains are unlikely to substantially exceed normal wind speeds and are unlikely to affect flights, foraging, or dispersal.

Some special-status wildlife species may be able to access the right-of-way during operations, where they would be subject to train strike. Individual birds could be injured or killed through collision with HSR infrastructure such as traction power transmission facilities. Moreover, disturbance impacts (e.g., noise, visual stimuli) can alter movement patterns and degrade

conditions that support special-status wildlife species. Because operations would potentially affect a wide array of wildlife taxa and because such impacts are primarily associated with wildlife moving across or near the project footprint, these impacts are collectively addressed in Section 3.7.7.7, Wildlife Movement, of the Final EIR/EIS.

Prior to initiating O&M activities, the Authority will require that all workers attend WEAP training about sensitive biological resources (BIO-IAMF#4). This training will be provided to all employees prior to their involvement in any O&M activity and repeated on an annual basis. Training materials will identify and describe land cover types that may support special-status wildlife and their approximate locations within or adjacent to the right-of-way.

However, even with the implementation of this IAMF, operation of the project could result in disturbance or degradation of habitat for special-status wildlife, which is considered a significant impact under CEQA (Final EIR/EIS: page 3.7-116).

Implementation of the following measure mitigates this impact: BIO-MM#70: Prepare and Implement an Annual Vegetation Control Plan. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

The Authority will implement BIO-MM#70 to reduce the impact on special-status wildlife habitat during operations. This measure will require the Authority to prepare an annual VCP to address vegetation removal for maintaining clear areas around facilities and controlling invasive weeds during the operational phase and will limit herbicide use to products approved by Caltrans. By establishing controls on the types of herbicides used for vegetation management and defining the situations in which herbicides are and are not an appropriate control method, VCPs are expected to minimize direct and indirect impacts on special-status wildlife habitat from herbicide drift. Therefore, this mitigation measure, combined with the intermittent and widely dispersed nature of effects from inspection and maintenance activities, will be effective in minimizing the project's impacts associated with disturbance or degradation of habitat for special-status wildlife.

The Authority finds that Mitigation Measure BIO-MM#70 is required under the Preferred Alternative and that implementation of this mitigation measure will reduce the project's impacts associated with disturbance or degradation of habitat for special-status wildlife to a less-than-significant level.

4.4.35 Impact BIO#34: Removal or Degradation of Habitat for and Disturbance of Waterfowl and Shorebirds

Wetland and open-water habitat for waterfowl and shorebirds would be lost or disturbed as a result of HSR track and systems construction in all subsections. Disturbance of waterfowl and shorebirds would result from the noise, vibration, and visual disturbance associated with construction activities. The potential for impact would be greatest in the GEA and UPR IBAs.

The Authority has incorporated BIO-IAMF#1, BIO-IAMF#3, BIO-IAMF#5, BIO-IAMF#8, BIO-IAMF#9, and BIO-IAMF#10 into project design to avoid and minimize impacts on waterfowl and shorebirds. While no specific model was developed for waterfowl and shorebirds, their potential habitat (e.g., agriculture, grassland, wetland) was estimated within the IBA boundaries (except urban) to have potential to function as roosting or forage habitat. This is especially true in wet years when the wetted footprint within the IBA boundary is extensive.

The areal extent of direct permanent and temporary impacts (conversion and disturbance of habitat, disturbance of individuals) on habitat for waterfowl and shorebirds is shown in Final EIR/EIS Table 3.7-16. The magnitude of indirect impacts (introduction of invasive nonnative plant species), while not quantified through mapping efforts, would be generally proportional to the quantity of direct impacts.

While pre-construction and construction actions to protect waterfowl and shorebirds and their habitat are part of the project, these actions would not prevent the conversion and temporary disturbance of such habitat in the project footprint, nor would they eliminate the risk of disturbance of these species. Construction activities would convert suitable foraging and breeding

habitat to HSR track and systems and would entail infrastructure modifications and utility relocations, and could lead to the introduction and spread of invasive nonnative species. Disturbance associated with human activities and noise could drive birds from productive foraging and resting areas, resulting in an impaired energy budget and potentially in reduced reproductive success. Increased cover of invasive weeds (e.g., perennial pepperweed) in wetlands could reduce emergent wetland vegetation that provides cover for waterfowl and overgrow bare areas (e.g., seasonal wetland depressions that hold water in winter and become muddy in spring) that provide foraging habitat for shorebirds.

Some non-special-status wildlife species may be able to access the right-of-way during operations, where they would be subject to train strike. Individual birds could be injured or killed through collision with HSR infrastructure such as traction power transmission facilities. Moreover, disturbance impacts (e.g., noise, visual stimuli) can alter movement patterns and degrade conditions that support non-special-status wildlife species. Because operations would potentially affect a wide array of wildlife taxa and because such effects are primarily associated with wildlife moving across or near the project footprint, these effects are collectively addressed in Final EIR/EIS Section 3.7.7.7.

Therefore, even with the implementation of these IAMFs, the project could result in habitat removal or degradation for and disturbance of waterfowl and shorebirds, which is considered a significant impact under CEQA (Final EIR/EIS: page 3.7-118).

Implementation of the following measures mitigates this impact: BIO-MM#1: Prepare and Implement a Restoration and Revegetation Plan, BIO-MM#2: Prepare and Implement a Weed Control Plan, BIO-MM#3: Establish Environmentally Sensitive Areas and Nondisturbance Zones, BIO-MM#4: Conduct Monitoring of Construction Activities, BIO-MM#6: Establish and Implement a Compliance Reporting Program, BIO-MM#5: Limit Vehicle Traffic and Construction Site Speeds, BIO-MM#58: Provide Compensatory Mitigation for Impacts on Waterfowl, Shorebird, and Sandhill Crane Habitat, BIO-MM#10: Prepare and Implement a Habitat Mitigation Plan for Species and Species Habitat, and BIO-MM#P1: Provide Compensatory Mitigation for Impacts on the Grassland Ecological Area. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

The Authority will implement mitigation measures to reduce the impacts on waterfowl and shorebirds. BIO-MM#1 will involve preparation of an RRP that will identify and describe procedures for restoring temporarily disturbed habitat to its former state. BIO-MM#2 will require the project biologist to develop a WCP prior to ground-disturbing activity to minimize and avoid the spread of invasive weeds into the project footprint and adjacent areas. BIO-MM#3 will require the project biologist to establish ESAs and nondisturbance zones (including WEF, where applicable) that support special-status species or aquatic resources and are subject to seasonal restrictions or other avoidance and minimization measures prior to ground-disturbing activity. BIO-MM#4 and BIO-MM#6 will require the project biologist to monitor construction activities for compliance with avoidance and minimization measures and established ESAs and nondisturbance zones and to document such monitoring through a compliance reporting program, respectively. BIO-MM#5 will require the project biologist to establish vehicle speed limits within the project footprint; restrict vehicle traffic to established roads, construction areas, and other permissible areas; and direct that routes be marked to prevent off-road traffic prior to ground-disturbing activity. BIO-MM#58 identifies minimum compensatory mitigation requirements for waterfowl and shorebird habitat that will be included in HMPs developed under BIO-MM#10. These measures will minimize direct and indirect impacts on waterfowl and shorebird individuals and habitat and will compensate for habitat loss.

Therefore, these mitigation measures will be effective in minimizing the project's impacts associated with habitat removal or degradation for and disturbance of waterfowl and shorebirds.

Compensatory mitigation implemented under Mitigation Measure BIO-MM#58 could involve some secondary impacts; however, these impacts would be beneficial, and the measures set forth in BIO-MM#11 will be implemented to minimize any adverse impacts.

Some of the activities and actions that will be implemented under BIO-MM#10, especially those involving ground disturbance, could result in impacts similar to those described in Section 3.7.7 of the Final EIR/EIS. Specifically, direct and indirect impacts on special-status plant and wildlife species (e.g., California tiger salamander, red-legged frog, and foothill yellow-legged frog), special-status plant communities, and aquatic resources could occur where such resources are present on the mitigation sites. BIO-MM#11, which requires a site assessment and appropriate regulatory authorizations, will be implemented at compensatory mitigation sites to reduce or avoid impacts on these resources.

Environmental impacts that would result from implementation of BIO-MM#10 on other resource categories could result from implementing restoration activities at mitigation sites. Refer to Section 4.4.1 of this document for a description of these potential secondary impacts of BIO-MM#10.

The Authority finds that Mitigation Measures BIO-MM#1, BIO-MM#2, BIO-MM#3, BIO-MM#4, BIO-MM#6, BIO-MM#5, BIO-MM#58, and BIO-MM#10 are required under the Preferred Alternative and that implementation of these mitigation measures will reduce the project's impacts on habitat removal or degradation for and disturbance of waterfowl and shorebirds to a less-than-significant level.

4.4.36 Impact BIO#35: Permanent Conversion or Degradation of Special-Status Plant Communities

Construction of the HSR track and systems in all subsections would take place in habitat that supports special-status plant communities. Construction would result in the conversion and degradation of such communities. The Authority has incorporated BIO-IAMF#1, BIO-IAMF#3, BIO-IAMF#5, BIO-IAMF#8, BIO-IAMF#9, BIO-IAMF#10, and BIO-IAMF#11 into project design to avoid and minimize impacts on special-status plant communities. Tunnels will be designed and constructed to avoid or minimize groundwater inflows during or around tunnels during construction (HYD-IAMF#5).

The areal extent of direct permanent and temporary impacts (conversion and disturbance of habitat, habitat fragmentation, hydrologic changes, and introduction of hazardous materials) on special-status plant communities is shown in Final EIR/EIS Table 3.7-17.

As discussed in Impact BIO#1, construction of Tunnels 1 and 2 could have temporary indirect impacts on the hydrology of groundwater-dependent surface water features, including land cover types that qualify as special-status plant communities (e.g., California sycamore woodland) or that could contain unmapped occurrences of a special-status plant community (i.e., freshwater marsh, palustrine forested wetland, and seasonal wetland; see Final EIR/EIS Table 3.7-8). In addition, groundwater-depletion could affect deep-rooted oak trees outside of riparian zones, such as valley oaks in areas with relatively shallow groundwater tables. Any reductions in groundwater supply to such features could result in the desiccation of vegetation and eventual degradation of the affected community.

While pre-construction and construction actions to protect special-status plant communities are part of the project, these actions would not prevent the permanent conversion or temporary disturbance of such communities in and near the project footprint. Work to construct Tunnels 1 and 2 would affect the greatest area of special-status plant communities because of existing stands of California sycamore woodland, valley oak woodland, and purple needlegrass grassland, all of which would be permanently lost. Construction activities would also result in the temporary disturbance of special-status communities at these and other locations and reduced habitat value for some period of time after construction is completed.

Therefore, even with the implementation of these IAMFs, the project could result in conversion or degradation of special-status plant communities, which is considered a significant impact under CEQA (Final EIR/EIS: page 3.7-120).

Implementation of the following measures mitigates this impact: BIO-MM#1: Prepare and Implement a Restoration and Revegetation Plan, BIO-MM#2: Prepare and Implement a Weed

Control Plan, BIO-MM#3: Establish Environmentally Sensitive Areas and Nondisturbance Zones, BIO-MM#4: Conduct Monitoring of Construction Activities, BIO-MM#6: Establish and Implement a Compliance Reporting Program, BIO-MM#5: Limit Vehicle Traffic and Construction Site Speeds, BIO-MM#7: Conduct Botanical Surveys for Special-Status Plant Species and Special-Status Plant Communities, HYD-MM#1: Prepare and Implement a Groundwater Adaptive Management and Monitoring Program, BIO-MM#9: Prepare and Implement a Groundwater Adaptive Management and Monitoring Plan, BIO-MM#71: Restore Temporary Riparian Impacts, and BIO-MM#72: Provide Compensatory Mitigation for Permanent Impacts on Riparian Habitat. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

The Authority will implement mitigation measures to reduce the impacts on special-status plant communities. BIO-MM#1 will involve preparation of an RRP that will identify and describe procedures for restoring temporarily disturbed habitat to its former state. BIO-MM#2 will require the project biologist to develop a WCP prior to ground-disturbing activity to minimize and avoid the spread of invasive weeds into the project footprint and adjacent areas. BIO-MM#3 will require the project biologist to establish ESAs and nondisturbance zones (including WEF, where applicable) that support special-status species or aquatic resources and are subject to seasonal restrictions or other avoidance and minimization measures prior to ground-disturbing activity. BIO-MM#4 and BIO-MM#6 will require the project biologist to monitor construction activities for compliance with avoidance and minimization measures and established ESAs and nondisturbance zones and to document such monitoring through a compliance reporting program, respectively. BIO-MM#5 will require the project biologist to establish vehicle speed limits within the project footprint; restrict vehicle traffic to established roads, construction areas, and other permissible areas; and direct that routes be marked to prevent off-road traffic prior to ground-disturbing activity. BIO-MM#7 will require the project biologist to conduct presence/absence surveys for special-status plant species and special-status plant communities within the project footprint to be avoided during construction prior to any ground-disturbing activity. HYD-MM#1 will reduce groundwater flows associated with tunnel construction. BIO-MM#9 will involve preparation and implementation of a GAMMP that will require monitoring of groundwater-dependent surface water resources (including those providing habitat for special-status plant communities) within the tunnel groundwater study area, providing supplemental water where needed, and remediating or compensating for any adverse effects identified during monitoring. Under BIO-MM#71, the RRP will require contractors to begin revegetation of temporarily affected riparian areas within 90 days of construction completion. BIO-MM#72 identifies minimum compensatory mitigation requirements for riparian habitat. These measures are expected to minimize temporary impacts and compensate for permanent impacts on special-status plant communities by restoring, preserving, creating, or enhancing riparian communities of equivalent or greater ecological integrity than those affected. Therefore, these mitigation measures will be effective in minimizing the project's impacts associated with conversion or degradation of special-status plant communities.

Compensatory mitigation implemented under Mitigation Measure BIO-MM#72 could involve some secondary impacts; however, these impacts would be beneficial, and the measures set forth in BIO-MM#11 will be implemented to minimize any adverse impacts.

Mitigation Measure HYD-MM#1 is not expected to have a significant secondary impact on water quality and biological resources through implementing monitoring requirements of the GAMMP, beneficial reuse of treated groundwater inflows, providing supplemental water supply infrastructure on properties with the potential to have their water supply impacted by tunnel construction, and installation of additional groundwater monitoring wells specific to implementing the monitoring requirements of the GAMMP.

The Authority finds that Mitigation Measures BIO-MM#1, BIO-MM#2, BIO-MM#3, BIO-MM#4, BIO-MM#6, BIO-MM#5, BIO-MM#7, HYD-MM#1, BIO-MM#9, BIO-MM#71, and BIO-MM#72 are required under the Preferred Alternative and that implementation of these mitigation measures will reduce the project's impacts on conversion or degradation of special-status plant communities to a less-than-significant level.

4.4.37 Impact BIO#36: Intermittent Disturbance or Degradation of Special-Status Plant Communities during Operations

Project operations would include inspection and maintenance activities along the HSR right-of-way. Right-of-way maintenance activities would include minor grading, clearing, and excavation needed to maintain adequate drainage or repair infrastructure; vegetation management, including potential trimming of trees within special-status communities (e.g., riparian) growing adjacent to the right-of-way and application of herbicide to invasive weeds within the right-of-way; and vehicle traffic along maintenance roads. Permanently affected stands of special-status plant communities in the project footprint would have been eliminated during construction, and therefore would not be affected further. However, special-status plant communities inside the right-of-way that were avoided during construction and outside but within 100 feet of the right-of-way (i.e., special-status plant study area) could potentially be affected by these activities. Minor ground disturbance within the right-of-way may result in minor direct (filling, sedimentation, inadvertent release of oils and chemicals from parked vehicles or equipment) or indirect (hydrological interruption, introduction of invasive species) effects on special-status plant communities in and adjacent to the right-of-way. Occasional trimming of riparian tree branches overhanging the right-of-way is not expected to substantially degrade special-status plant communities because the branches of such trees are typically fast growing. If applied during high winds, herbicides could drift onto and cause mortality of plants growing in special-status plant communities. Dust generated by maintenance vehicles could settle on the leaves of plants in nearby special-status communities, increasing the rate of water loss (i.e., transpiration). Such effects would degrade special-status plant communities within the special-status plant study area.

Prior to initiating O&M activities, the Authority will require that all workers attend WEAP training about sensitive biological resources (BIO-IAMF#4). This training will be provided to all employees prior to their involvement in any O&M activity and repeated on an annual basis. Training materials will identify and describe land cover types that may support special-status plants (e.g., vernal pools, freshwater emergent wetland) and their approximate locations within or adjacent to the right-of-way.

However, even with the implementation of this IAMF, operation of the project could result in intermittent disturbance or degradation of special-status plant communities, which is considered a significant impact under CEQA (Final EIR/EIS: page 3.7-122).

Implementation of the following measure mitigates this impact: BIO-MM#70: Prepare and Implement an Annual Vegetation Control Plan. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

The Authority will implement BIO-MM#70 to reduce the impact on special-status plant communities during operations. This measure will require the Authority to prepare an annual VCP to address vegetation removal for maintaining clear areas around facilities and controlling invasive weeds during the operational phase and will limit herbicide use to products approved by Caltrans. By establishing controls on the types of herbicides used for vegetation management and defining the situations in which herbicides are and are not an appropriate control method, VCPs are expected to minimize direct and indirect impacts on special-status plant communities from herbicide drift.

The Authority finds that Mitigation Measure BIO-MM#70 is required under the Preferred Alternative and that implementation of this mitigation measure will reduce the project's impacts associated with intermittent disturbance or degradation of special-status plant communities to a less-than-significant level.

4.4.38 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

Construction of the HSR track and systems in all subsections would take place in areas that support aquatic resources considered jurisdictional under Section 404 of the Clean Water Act

(CWA), and areas regulated by the SWRCB, including state and federally protected wetlands. Construction would result in the conversion and degradation of such aquatic resources through direct removal, filling, and hydrological interruption.

The Authority has incorporated BIO-IAMF#1, BIO-IAMF#3, BIO-IAMF#5, BIO-IAMF#8, BIO-IAMF#9, and BIO-IAMF#10 into the project design to avoid and minimize impacts on aquatic resources. Tunnels will be designed and constructed to avoid or minimize groundwater inflows into tunnels during construction that may affect surface water resources overlying the tunnel alignment (HYD-IAMF#5), including aquatic resources considered jurisdictional under Section 404 of the CWA.

The areal extent of direct permanent and temporary impacts (Final EIR/EIS, Section 3.7.5.3, Methods for Impact Analysis) on aquatic resources considered jurisdictional under Section 404 of the CWA and as waters of the state is shown in Final EIR/EIS Table 3.7-18. As discussed in Impact BIO#1, construction of Tunnels 1 and 2 could have temporary indirect impacts on the hydrology of groundwater-dependent surface waters, including aquatic resources considered jurisdictional under Section 404 of the CWA. Any reductions in groundwater supply to such features could temporarily reduce their habitat value and function.

While pre-construction and construction actions to protect aquatic resources are part of the project, these actions would not prevent the permanent conversion or degradation of aquatic resources in the project footprint without mitigation measures. Work to construct embankment sections in the San Joaquin Valley Subsection and work in the Morgan Hill and Gilroy Subsection (primarily in the Soap Lake floodplain) would affect the greatest area of aquatic resources because of the extent of managed and natural wetland resources in those areas. Construction activities would result in the temporary disturbance of aquatic resources during construction and reduced value for some period of time after construction is completed as aquatic resources are restored and recover.

Therefore, even with the implementation of these IAMFs, the project could result in permanent conversion or degradation of jurisdictional aquatic resources, which is considered a significant impact under CEQA (Final EIR/EIS: page 3.7-123).

Implementation of the following measures mitigates this impact: BIO-MM#1: Prepare and Implement a Restoration and Revegetation Plan, BIO-MM#2: Prepare and Implement a Weed Control Plan, BIO-MM#3: Establish Environmentally Sensitive Areas and Nondisturbance Zones, BIO-MM#4: Conduct Monitoring of Construction Activities, BIO-MM#6: Establish and Implement a Compliance Reporting Program, BIO-MM#5: Limit Vehicle Traffic and Construction Site Speeds, BIO-MM#9: Prepare and Implement a Groundwater Adaptive Management and Monitoring Plan, BIO-MM#71: Restore Temporary Riparian Impacts, BIO-MM#72: Provide Compensatory Mitigation for Permanent Impacts on Riparian Habitat, BIO-MM#73: Restore Aquatic Resources Subject to Temporary Impacts, BIO-MM#25: Prepare Plan for Dewatering and Water Diversions, and BIO-MM#74: Prepare and Implement a Compensatory Mitigation Plan for Impacts on Aquatic Resources. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

The Authority will implement a range of mitigation measures to reduce the impacts on aquatic resources. BIO-MM#1 will involve preparation of an RRP that will identify and describe procedures for restoring temporarily disturbed habitat to its former state. BIO-MM#2 will require the project biologist to develop a WCP prior to ground-disturbing activity to minimize and avoid the spread of invasive weeds into the project footprint and adjacent areas. BIO-MM#3 will require the project biologist to establish ESAs and nondisturbance zones (including WEF, where applicable) that support special-status species or aquatic resources and are subject to seasonal restrictions or other avoidance and minimization measures prior to ground-disturbing activity. BIO-MM#4 and BIO-MM#6 will require the project biologist to monitor construction activities for compliance with avoidance and minimization measures and established ESAs and nondisturbance zones and to document such monitoring through a compliance reporting program, respectively. BIO-MM#5 will require the project biologist to establish vehicle speed limits within the project footprint; restrict vehicle traffic to established roads, construction areas, and other

permissible areas; and direct that routes be marked to prevent off-road traffic prior to ground-disturbing activity. BIO-MM#9 will involve preparation and implementation of a GAMMP that will require monitoring of groundwater-dependent surface water resources within the tunnel groundwater study area, providing supplemental water where needed, and remediating or compensating for any adverse effects identified during monitoring. Under BIO-MM#71, the RRP will require contractors to begin revegetation of temporarily affected riparian areas within 90 days of construction completion. BIO-MM#72 identifies minimum compensatory mitigation requirements for riparian habitat. BIO-MM#73 will minimize temporary impacts on aquatic resources by requiring contractors to begin restoration of temporarily disturbed features within 90 days of completing construction. BIO-MM#25 will require the Authority to prepare a dewatering plan that incorporates measures to minimize turbidity and siltation of downstream waters. BIO-MM#74 requires preparation and implementation of a compensatory mitigation plan for impacts on aquatic resources under CWA Section 404 jurisdiction.

Therefore, these mitigation measures will be effective in minimizing the project's impacts associated with permanent conversion or degradation of jurisdictional aquatic resources and compensate for permanent impacts on aquatic resources.

Compensatory mitigation implemented under Mitigation Measures BIO-MM#72 and BIO-MM#74 could involve some secondary impacts; however, these impacts would be beneficial, and the measures set forth in BIO-MM#11 will be implemented to minimize any adverse impacts.

The Authority finds that Mitigation Measures BIO-MM#1, BIO-MM#2, BIO-MM#3, BIO-MM#4, BIO-MM#6, BIO-MM#5, BIO-MM#9, BIO-MM#71, BIO-MM#72, BIO-MM#73, BIO-MM#25, and BIO-MM#74 are required under the Preferred Alternative and that implementation of these mitigation measures will reduce the project's impacts on conversion or degradation of jurisdictional aquatic resources to a less-than-significant level.

4.4.39 Impact BIO#38: Permanent Conversion or Degradation of Resources Regulated under California Fish and Game Code Section 1600 et seq.

Construction of the HSR track and systems in all subsections would take place in areas that support aquatic and other related resources regulated under Cal. Fish and Game Code Section 1600 et seq., including riparian habitats. Construction would result in the conversion and degradation of such aquatic and other related resources through direct removal and degradation.

The Authority has incorporated BIO-IAMF#1, BIO-IAMF#3, BIO-IAMF#5, BIO-IAMF#6, BIO-IAMF#7, BIO-IAMF#8, BIO-IAMF#9, BIO-IAMF#10, and BIO-IAMF#11 into project design to avoid and minimize impacts on fish and wildlife resources protected under Section 1600 et seq. Tunnels will be designed and constructed to avoid or groundwater inflows into tunnels during construction that may affect fish and wildlife resources dependent on rivers, streams or lakes overlying the tunnel alignment (HYD-IAMF#5), which are regulated under California Fish and Game Code Section 1600 et seq.

The areal extent of direct permanent and temporary impacts (direct removal or degradation) on aquatic and other related resources regulated under Cal. Fish and Game Code Section 1600 et seq. is shown in Final EIR/EIS Table 3.7-19. Indirect impacts (modification of hydrology, introduction of invasive nonnative species) were not quantified for this analysis but would be roughly proportional to direct impacts.

As discussed in Impact BIO#1, construction of Tunnels 1 and 2 could have temporary indirect impacts on the hydrology of groundwater-dependent surface waters, including rivers, streams and lakes regulated under Cal. Fish and Game Code Section 1600 et seq. Any reductions in groundwater supply to such features could temporarily reduce their habitat value and function.

While pre-construction and construction actions to protect aquatic and other related resources are part of the project, these actions would not prevent the permanent conversion or degradation of aquatic or other related resources in the project footprint. Work to construct the Pacheco Pass and the San Joaquin Valley Subsections would affect the greatest area of riparian habitats (California sycamore woodland and mixed riparian, respectively) because of the extent of those

habitats in those subsections. Construction activities would result in the temporary disturbance of aquatic and other related resources during construction and reduced value for some period after construction is completed as aquatic and other related resources are restored and recover.

Therefore, even with the implementation of these IAMFs, the project could result in permanent conversion or degradation of resources regulated under California Fish and Game Code Section 1600 et seq., which is considered a significant impact under CEQA (Final EIR/EIS: page 3.7-122).

Implementation of the following measures mitigates this impact: BIO-MM#1: Prepare and Implement a Restoration and Revegetation Plan, BIO-MM#2: Prepare and Implement a Weed Control Plan, BIO-MM#3: Establish Environmentally Sensitive Areas and Nondisturbance Zones, BIO-MM#4: Conduct Monitoring of Construction Activities, BIO-MM#6: Establish and Implement a Compliance Reporting Program, BIO-MM#5: Limit Vehicle Traffic and Construction Site Speeds, BIO-MM#9: Prepare and Implement a Groundwater Adaptive Management and Monitoring Plan, BIO-MM#71: Restore Temporary Riparian Impacts, BIO-MM#72: Provide Compensatory Mitigation for Permanent Impacts on Riparian Habitat, BIO-MM#73: Restore Aquatic Resources Subject to Temporary Impacts, BIO-MM#25: Prepare Plan for Dewatering and Water Diversions, and BIO-MM#74: Prepare and Implement a Compensatory Mitigation Plan for Impacts on Aquatic Resources. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

The Authority will implement a range of mitigation measures to reduce the impacts on fish and wildlife resources protected under Section 1600 et seq. BIO-MM#1 will involve preparation of an RRP that will identify and describe procedures for restoring temporarily disturbed habitat to its former state. BIO-MM#2 will require the project biologist to develop a WCP prior to ground-disturbing activity to minimize and avoid the spread of invasive weeds into the project footprint and adjacent areas. BIO-MM#3 will require the project biologist to establish ESAs and nondisturbance zones (including WEF, where applicable) that support special-status species or aquatic resources and are subject to seasonal restrictions or other avoidance and minimization measures prior to ground-disturbing activity. BIO-MM#4 and BIO-MM#6 will require the project biologist to monitor construction activities for compliance with avoidance and minimization measures and established ESAs and nondisturbance zones and to document such monitoring through a compliance reporting program, respectively. BIO-MM#5 will require the project biologist to establish vehicle speed limits within the project footprint; restrict vehicle traffic to established roads, construction areas, and other permissible areas; and direct that routes be marked to prevent off-road traffic prior to ground-disturbing activity. BIO-MM#9 will involve preparation and implementation of a GAMMP that will require monitoring of groundwater-dependent surface water resources within the tunnel groundwater study area, providing supplemental water where needed, and remediating or compensating for any adverse effects identified during monitoring. Under BIO-MM#71, the RRP will require contractors to begin revegetation of temporarily affected riparian areas within 90 days of construction completion. BIO-MM#72 identifies minimum compensatory mitigation requirements for riparian habitat. BIO-MM#73 will minimize temporary impacts on aquatic resources by requiring contractors to begin restoration of temporarily disturbed features within 90 days of completing construction. BIO-MM#25 will require the Authority to prepare a dewatering plan that incorporates measures to minimize turbidity and siltation of downstream waters. BIO-MM#74 requires preparation and implementation of a compensatory mitigation plan for impacts on aquatic resources under CWA Section 404 jurisdiction, which will also benefit fish and wildlife resources under Cal. Fish and Game Code Section 1600 et seq. where they overlap with CWA Section 404 resources and waters of the state.

Therefore, these mitigation measures will be effective in minimizing the project's impacts associated with permanent conversion or degradation of resources regulated under California Fish and Game Code Section 1600 et seq. and compensate for permanent impacts on aquatic resources.

Compensatory mitigation implemented under Mitigation Measures BIO-MM#72 and BIO-MM#74 could involve some secondary impacts; however, these impacts would be beneficial, and the measures set forth in BIO-MM#11 will be implemented to minimize any adverse impacts.

The Authority finds that Mitigation Measures BIO-MM#1, BIO-MM#2, BIO-MM#3, BIO-MM#4, BIO-MM#6, BIO-MM#5, BIO-MM#9, BIO-MM#71, BIO-MM#72, BIO-MM#73, BIO-MM#25, and BIO-MM#74 are required under the Preferred Alternative and that implementation of these mitigation measures will reduce the project's impacts associated with permanent conversion or degradation of resources regulated under California Fish and Game Code Section 1600 et seq. to a less-than-significant level.

4.4.40 Impact BIO#39: Intermittent Disturbance or Degradation of Aquatic and Other Related Resources during Operations

Project operations would include inspection and maintenance activities along the HSR right-of-way. Right-of-way maintenance activities would include minor grading, clearing, and excavation needed to maintain adequate drainage or repair infrastructure; vegetation management, including potential trimming of riparian trees growing adjacent to the right-of-way and application of herbicide to invasive weeds within the right-of-way; and vehicle traffic along maintenance roads. Permanently affected aquatic and other related features in the project footprint would have been eliminated during construction, and therefore would not be affected further. Aquatic resources inside the project footprint that were avoided during construction (e.g., natural watercourses spanned by viaduct) and outside but adjacent to the project footprint would remain and could potentially be affected by these activities. Construction would result in the creation of new aquatic resources (e.g., constructed basins and watercourses for drainage) in some portions of the project footprint, and these features could also be affected. Minor ground disturbance within the right-of-way may result in minor direct (filling, sedimentation, inadvertent release of oils and chemicals from parked vehicles or equipment) or indirect (hydrological interruption, introduction of invasive species) impacts on aquatic resources in and adjacent to the right-of-way. Occasional trimming of riparian tree branches overhanging the right-of-way is not expected to substantially degrade riparian aquatic resources because the branches of such trees are typically fast growing. If applied during high winds, herbicides could drift into aquatic resources in and beyond the right-of-way, degrading water quality and causing mortality of wetland vegetation. Dust generated by maintenance vehicles could settle on the leaves of wetland plants in and adjacent to the right-of-way, increasing the rate of water loss (i.e., transpiration). Such impacts would degrade aquatic resources remaining in the right-of-way after construction as well as those outside but within 250 feet (i.e., aquatic RSA) of the right-of-way without mitigation measures.

The Authority has incorporated BIO-IAMF#4 in project specifications to address disturbance or degradation of aquatic and other related resources associated with such activities.

However, even with the implementation of this IAMF, operations of the project could result in conversion or degradation of aquatic or other related resources, which is considered a significant impact under CEQA (Final EIR/EIS: page 3.7-126).

Implementation of the following measure mitigates this impact: BIO-MM#70: Prepare and Implement an Annual Vegetation Control Plan. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

The Authority will implement BIO-MM#70 to reduce the impact on aquatic resources during operations. This measure will require the Authority to prepare an annual VCP to address vegetation removal for maintaining clear areas around facilities and controlling invasive weeds during the operational phase and will limit herbicide use to products approved by Caltrans. By establishing controls on the types of herbicides used for vegetation management and defining the situations in which herbicides are and are not an appropriate control method, VCPs are expected to minimize direct and indirect impacts on aquatic resources from herbicide drift.

Therefore, this mitigation measure, combined with the intermittent and widely dispersed nature of effects from inspection and maintenance activities, will be effective in minimizing the project's impacts associated with conversion or degradation of aquatic or other related resources.

The Authority finds that Mitigation Measure BIO-MM#70 is required under the Preferred Alternative and that implementation of this mitigation measure will reduce the project’s impacts on conversion or degradation of aquatic or other related resources to a less-than-significant level.

4.4.41 Impact BIO#40: Removal or Mortality of Trees Protected under Municipal Tree Policies or Ordinances

Ground disturbance and vegetation removal activities associated with project construction could result in removal or trimming of protected trees. Direct impacts on protected trees would be permanent if such trees are removed during construction; impacts would be considered temporary if trees are partially removed (trimmed). The primary direct permanent impact would be the removal of protected trees for HSR track and systems. The primary direct temporary impact would be minor trimming or root disruption during construction. Potential indirect impacts include injury or mortality of protected trees due to reduced soil aeration and water availability from changes in topography and hydrology. Impacts are likeliest to occur in the developed portions of the San Jose Diridon Station, Monterey Corridor, and Morgan Hill and Gilroy Subsections that are subject to municipal tree policies or ordinances.

The Authority has incorporated BIO-IAMF#1, BIO-IAMF#3, BIO-IAMF#5, and BIO-IAMF#8 into the project design to avoid and minimize impacts on protected trees. The areal extent of permanent and temporary direct impacts (removal and trimming of protected trees) on land cover types suitable to support protected trees is shown in Final EIR/EIS Table 3.7-20. The magnitude of indirect impacts, while not quantified through the mapping effort, would be generally proportional to the quantity of direct impacts.

While pre-construction and construction actions to preserve protected trees are part of the project, these actions would not entirely preclude impacts on protected trees. Some trees would be removed and others would be trimmed to facilitate project construction. Reduced soil aeration and water availability for protected trees’ root systems could occur both inside and outside the project footprint and could reduce the long-term viability of protected trees. Natural land cover types that support protected trees adjacent to the project footprint could be invaded by nonnative plants that become established during construction or that spread from existing stands as a result of soil disturbance.

In addition to direct effects, there is also the potential for indirect effects on protected oak trees along the tunnel alignments due to potential groundwater depletion during tunnel construction. This would only occur where tree roots are particularly deep and groundwater is relatively shallow (such that tree roots can reach groundwater). As discussed in Final EIR/EIS Section 3.8, despite implementation of HYD-IAMF#5, the project could still lower groundwater levels in discrete portions of the tunnel alignment (depletion is not expected along the entire length of the tunnel alignments due to limited groundwater resources along most of the tunnel alignment). Groundwater levels in these discrete areas could be lowered for up to several years after construction until they recover with infiltration of precipitation. Oak trees in these discrete areas could be affected if the groundwater-lowering extends below their roots and the trees were to become dependent on precipitation only until the aquifer recovers. This could result in impaired tree health or mortality.

Therefore, even with the implementation of these IAMFs, operations of the project could result in removal or mortality of trees protected under municipal tree policies or ordinances, which is considered a significant impact under CEQA (Final EIR/EIS: page 3.7-128).

Implementation of the following measures mitigates this impact: BIO-MM#9: Prepare and Implement a Groundwater Adaptive Management and Monitoring Plan and BIO-MM#75: Implement Transplantation and Compensatory Mitigation for Protected Trees. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

The Authority will implement mitigation measures to reduce the impacts on protected trees. BIO-MM#75 will avoid or minimize direct and indirect impacts on protected trees during construction by requiring the identification and avoidance of protected trees in and adjacent to the project

footprint prior to construction. This measure will also compensate for removal of protected trees by requiring the Authority to prepare and implement a transplanted tree monitoring and maintenance plan. BIO-MM#9 will involve preparation and implementation of a GAMMP that will require monitoring of groundwater-dependent surface water resources within the tunnel groundwater study area, providing supplemental water where needed, and remediating or compensating for any adverse effects identified during monitoring. These measures will minimize and compensate for impacts on protected trees.

The Authority finds that Mitigation Measures BIO-MM#9 and BIO-MM#75 are required under the Preferred Alternative and that implementation of these mitigation measures will reduce the project's impacts associated with removal or mortality of trees protected under municipal tree policies or ordinances to a less-than-significant level.

4.4.42 Impact BIO#42: Temporary Disruption of Wildlife Movement

Construction of the HSR track and systems in all subsections would temporarily affect wildlife movement in several ways. Construction fencing and dewatering would create temporary barriers to movement, precluding the normal movement of animals. Noise, vibration and visual disturbance from construction vehicles and pile driving may alter or delay movement of individuals as they attempt to avoid the construction area. Nighttime construction or security lighting producing artificial light at nighttime (ALAN) could cause animals to delay or alter movement patterns because they may avoid lit areas.

ALAN during construction could potentially occur throughout the hours of darkness but would only occur in Coyote Valley and at tunnel portals, locations with low levels of existing ALAN. Construction within the GEA would not occur at night. Lighting during construction would be relatively low intensity and would be designed to meet Occupational Safety and Health Administration (OSHA) standards for general construction, 5 foot-candles (54 lux; 29 C.F.R. § 1926.56), at the limits of the construction area. Light would be directed on site but would be visible to wildlife outside the project footprint. Construction vehicle lighting (i.e., vehicles going to and coming from the project site or vehicles operating within the project footprint) may briefly direct headlights toward areas outside the project footprint. Though of short duration and limited spatial scope, lights of this intensity could influence wildlife behavior or physiology (see Section 1.3.2 in Volume 2, Appendix 3.7-F, Supplemental Artificial Light Analysis on Terrestrial Wildlife Species, of the Final EIR/EIS for additional information and discussion of intermittent lighting effects).

The Authority has incorporated BIO-IAMF#1, BIO-IAMF#3, BIO-IAMF#5, and BIO-IAMF#8 (described in Impact BIO#1) into project design to avoid and minimize impacts on wildlife movement. In addition, during construction, the contractor will minimize noise disturbance of wildlife by implementing such measures as construction of noise barriers, careful routing of truck traffic, construction of walled enclosures, scheduling noisy operations into the same period, and phased construction (NV-IAMF#1).

While pre-construction and construction actions to minimize impacts on wildlife movement are part of the project, these actions would not entirely preclude impediments to wildlife movement through and across the project extent. Temporary construction fencing and dewatering activities would impede terrestrial and aquatic wildlife movement. Construction noise, vibration, visual disturbance, and ALAN could discourage individuals from following normal movement pathways.

With respect to mountain lion, recently considered a candidate for listing under CESA, project construction would occur generally at the boundary between the central coast central (CC-C) and central coast north (CC-N) subpopulations. As described in the affected environment in Section 3.7.6.2, Biological Conditions, of the Final EIR/EIS, gene flow between subpopulations has been identified as a major factor affecting the long-term persistence of mountain lion populations. Although the extent of active gene flow between the subpopulations (i.e., number of breeding mountain lions moving between subpopulations) is not known, movement of mountain lions across SR 152 in the Pacheco Pass region, as well as within Coyote Valley, has been documented both by camera stations and as evidenced through mountain lions killed by vehicle

collisions in the region, and thus at least some gene flow is likely occurring. Mountain lions are sensitive to human activity, and they would be likely to avoid active construction areas. Consequently, construction activities are likely to temporarily limit the movement of mountain lions during the construction period or cause them to alter their behavior, including taking longer routes to avoid active construction areas. Such avoidance behaviors can be expected to result in additional stressors, including changes in breeding activity, as well as overall disruption of gene flow between subpopulations.

Therefore, even with the implementation of these IAMFs, operations of the project could result in temporary disruption of wildlife movement, which is considered a significant impact under CEQA (Final EIR/EIS: page 3.7-131).

Implementation of the following measures mitigates this impact: BIO-MM#3: Prepare and Implement a Weed Control Plan, BIO-MM#25: Prepare Plan for Dewatering and Water Diversions, BIO-MM#76a: Minimize Impacts on Wildlife Movement during Construction, BIO-MM#76b: Minimize Impacts on Wildlife Movement in the Western Pacheco Pass Region, BIO-MM#79a: Provide Wildlife Movement between the Santa Cruz Mountains and Diablo Range. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

The Authority will implement mitigation measures to reduce temporary impacts on wildlife movement during construction. BIO-MM#3 will require the project biologist to establish ESAs and nondisturbance zones (including WEF, where applicable) that support special-status species or aquatic resources and are subject to seasonal restrictions or other avoidance and minimization measures prior to ground-disturbing activity. BIO-MM#25 will require the Project Biologist to conduct pre-activity surveys for and relocate (consistent with regulatory authorizations) any special-status wildlife occurring in waterbodies affected by dewatering or water diversion activities. BIO-MM#76a and BIO-MM#76b will require the Authority to avoid placing temporary fencing within known wildlife corridors in portions of the project footprint where the tracks are elevated and will require the design to consider methods that will facilitate wildlife use of crossings. BIO-MM#79a will require the Authority to avoid placing temporary fencing within known wildlife corridors in portions of the project footprint where the tracks are elevated and will require the design to consider methods that will facilitate wildlife use of crossings. These measures will also minimize the effects of noise, light, and vibration on individuals moving through or near the project footprint and will minimize direct and indirect impacts on wildlife moving near or across the project footprint during construction.

Therefore, these mitigation measures will be effective in minimizing the project's impacts associated with temporary disruption of wildlife movement.

The Authority finds that Mitigation Measures BIO-MM#3, BIO-MM#25, BIO-MM#76a, BIO-MM#76b and BIO-MM#79a, are required under the Preferred Alternative and that implementation of these mitigation measures will reduce the project's impacts associated with temporary disruption of wildlife movement to a less-than-significant level.

4.4.43 Impact BIO#43: Permanent Impacts on Wildlife Movement

Construction of the project would permanently affect regional and local wildlife movement patterns by creating new barriers to local and regional wildlife movement and fragmenting habitat. Terrestrial species are most vulnerable to permanent movement impacts. Birds and bats are able to move over patches of unsuitable habitat. As described in the Wildlife Corridor Assessment (WCA) (Authority 2020c: Appendix C), wildlife movement impacts on a variety of species movement guilds (represented by focal species) were assessed and form the basis for the summary of impacts described here. In general, terrestrial species are more vulnerable to permanent movement impacts. The WCA included an assessment of impacts on movement of mountain lion, a species recently considered as a candidate for listing under CESA, as a focal species representing a "high openness/high mobility movement guild". Consequently, potential impacts on mountain lion were considered along with all other focal species. The inclusion of viaduct sections and dedicated wildlife crossings as part of the project design would provide for

wildlife movement across the alignment in Coyote Valley, the Soap Lake floodplain, most of Pacheco Pass, and the Central Valley; however, barriers to movement would remain on the west slope of Pacheco Pass where the rail alignment parallel to Pacheco Creek would be placed on a series of continuous cut-and-fill slopes. Barriers to movement and habitat fragmentation reduce resource availability and isolate breeding groups; both conditions can ultimately lead to reduced reproductive success and inbreeding depression. This can be particularly true for mountain lion, as isolation of populations due to habitat loss and fragmentation of habitat has been identified as a significant threat to genetic health (Center for Biological Diversity 2019). The project would occur generally at the boundary between the mountain lion CC-C and CC-N subpopulations, and gene flow between these subpopulations has been identified as a significant issue to the long-term persistence of mountain lion populations in the region. Birds and bats are able to move over patches of unsuitable habitat and are thus not likely to be vulnerable to movement impacts.

The Preferred Alternative would include wildlife undercrossings in locations known to be important for wildlife movement in Coyote Valley, eastern Pacheco Pass, and the Central Valley. However, these facilities would not entirely preclude interference with existing wildlife movement across the alignment. This is particularly true in the locations between wildlife undercrossings of fenced at-grade and embankment portions of the rail where permeability would be further reduced below existing constrained conditions.

Therefore, operations of the project could result in permanent impacts on wildlife movement, which is considered a significant impact under CEQA (Final EIR/EIS: page 3.7-133).

Implementation of the following measures mitigates this impact: BIO-MM#78: Establish Wildlife Crossings at Embankment in West Slope of Pacheco Pass, BIO-MM#77a: Design Wildlife Crossings to Facilitate Wildlife Movement, BIO-MM#77b: Monitoring and Adaptive Management of Wildlife Crossings, and BIO-MM#79a: Provide Wildlife Movement between the Santa Cruz Mountains and Diablo Range. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

The Authority will implement mitigation measures to reduce permanent impacts on wildlife movement. BIO-MM#78 will require the Authority to create dedicated wildlife crossing structures in portions of the project footprint where wildlife movement will be significantly reduced. BIO-MM#77a and BIO-MM#77b will also provide for extended viaducts for wildlife movement and dedicated wildlife underpasses that meet design specifications for the species affected. BIO-MM#79a will partially compensate for permanent 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. These measures are expected to minimize and compensate for direct and indirect impacts on wildlife corridor connectivity and individuals moving near or across the rail alignment. Mitigation Measure BIO-MM#78, which will change the design from embankment to open-span bridges or viaducts (if determined to be feasible), could result in some secondary impacts on visual resources, hydrology, or biological resources; however, these impacts would generally be less than those required to construct a large embankment.

Compensatory mitigation implemented under Mitigation Measure BIO-MM#79a could involve some secondary impacts; however, these impacts would be beneficial, and the measures set forth in BIO-MM#11 will be implemented to minimize any adverse impacts.

The Authority finds that Mitigation Measures BIO-MM#78, BIO-MM#77a, BIO-MM#77b, and BIO-MM#79a are required under the Preferred Alternative and that implementation of these mitigation measures will reduce the project's permanent impacts on wildlife movement to a less-than-significant level.

4.4.44 Impact BIO#44: Intermittent Noise Disturbance of Wildlife Using Corridors during Operations

The Preferred Alternative would result in noise from O&M. Because of the frequency and speed of trains, noise created by train operations has the potential to affect wildlife movement.

Maintenance activities are expected to be dispersed over time and location and are not expected to be of an intensity or duration to result in substantial impacts on wildlife movement.

The response of terrestrial wildlife to noise depends on the timing, intensity, and frequency of the sound, as well as the species' tolerance to noise. In general, species' response to noise may result in behavioral changes (e.g., fleeing or hiding), interference with auditory cues (e.g., interference with mate attraction), or physiological responses (e.g., stress), each of which can result in broader impacts on movement, foraging efficiency, reproductive success, and survival (Francis and Barber 2013).

Impacts of operational noise are considered permanent and direct, though intermittent. As outlined in *San Jose to Merced Project Section: Noise and Vibration Technical Report* (Authority 2019b), noise generated by train operation falls into three distinct sound categories based on source location, strength, frequency content, directivity, and speed.

- Propulsion or machinery noise
- Mechanical noise resulting from wheel-rail interactions or guideway vibrations
- Aerodynamic noise resulting from airflow moving past the train, including the pantograph (FRA 2012).

The following analysis considers noise impacts on mammals and on birds. Although reptiles and amphibians are also subject to noise impacts, they have substantially greater vulnerability to vibration impacts, which are discussed in Impact BIO#45.

Mammalian Species

The Preferred Alternative would not create noise at magnitudes that could cause traumatic effects such as temporary or permanent loss of hearing. Exposure to noise may result in behavioral changes (e.g., fleeing or hiding), interference with auditory cues (e.g., interference with mate attraction), or physiological responses (e.g., stress or impaired bioenergetics), each of which can result in broader impacts on movement, foraging efficiency, reproductive success, and survival (Francis and Barber 2013).

Due to masking by urban areas, noise impacts would mainly occur in the Soap Lake region, in the area from south of Gilroy to the west portal of the Pacheco Pass tunnel, and in the area from the east portal of that tunnel to the eastern limit of the project. In each of these areas, mammalian wildlife would be affected.

Other mammalian wildlife potentially affected by noise include the special-status species tule elk, badger, dusky-footed woodrat, ringtail, Townsend's big-eared bat, western mastiff bat, pallid bat, and western red bat, as well as a wide variety of non-special-status mammals. Of these special-status species, the tule elk, badger, dusky-footed woodrat, ringtail, and bats are nocturnal, with peak activities during times of low or no train activity. Bats are unlikely to be substantially affected by HSR train noise because they primarily hear at frequencies higher than those dominating the acoustic spectrum of HSR train noise, and the HSR train noise would be present only briefly and intermittently.

Bird Species

As discussed in the WCA, project-related noise added to ambient noise may affect bird species through several mechanisms: permanent hearing damage, temporary hearing damage, arousal, and masking (the mechanism of introduced noise interfering with birds' ability to hear sounds that are necessary for normal behavioral functions, such as courtship, territorial interaction, detection of predators, and movement associated with foraging and migration) (Authority 2020c: Appendix C). The WCA determined that for birds and bats, three aerial species focal groups—waterfowl, shorebirds, and wading birds (collectively waterbirds)—were vulnerable to noise and were present in populations and concentrations substantial enough to be adversely affected. In the regional RSA, these focal groups are known to congregate in two primary locations: the UPR and GEA IBAs (National Audubon Society 2017a, 2017b). Numerous sensitive species are known to

nest, forage, and congregate in large numbers (e.g., sandhill crane in the GEA) at these locations.

The WCA established quantitative noise thresholds for each of the mechanisms:

- Permanent hearing damage: 140 dBA
- Temporary hearing damage: above 93 but less than 140 dBA
- Masking: 84 dBA
- Arousal: 77 dBA

To determine the areal extent of each noise impact, a geographic information system (GIS)-based sound model was intersected with all land cover types (except urban or developed types) within the GEA and UPR IBAs. Final EIR/EIS Table 3.7-21 summarizes the acreage impacts for each noise mechanism.

There is also the potential for noise to impact bird overflights; this could affect migratory birds in any part of the alignment in the Grasslands and UPR IBAs, which are within the Pacific Flyway, a major migratory route for many bird species. Noise effect thresholds would be as stated above, except that, since areas at high elevation above ground have very low background noise levels, the masking threshold drops to 34 dBA in the absence of ambient noise sources. Birds flying at distances of less than 50 feet above a train moving at a speed of 220 mph would potentially be at risk of temporary hearing damage; it is however unlikely that birds engaged in migratory flight would be present at such a low altitude, except near times of take-off and landing. Birds in flight are fully active and aware, thus arousal is not a potential impact. Birds in flight do commonly communicate through flight calls, thus masking effects from train passage could disturb such communications. Birds flying at distances of less than 14,500 feet from a train moving at 220 mph would be subject to masking. The effect would be minimized by two considerations; first, the threshold for masking effects is conservatively set at 34 dBA; any background noise the bird might hear, such as the sound of rushing wind, would effectively raise that threshold. Second, masking would only occur during the time that the bird was within 14,500 feet of the moving train. For a bird flying at 13,500 feet above the train, that duration is about 35 seconds, increasing to 100 seconds for a bird 500 feet above the train.

Therefore, operations of the project could result in intermittent noise disturbance of wildlife using corridors during operations, which is considered a significant impact under CEQA (Final EIR/EIS: page 3.7-134).

Implementation of the following measures mitigates this impact: BIO-MM#10: Prepare and Implement a Habitat Mitigation Plan for Species and Species Habitat, BIO-MM#58: Provide Compensatory Mitigation for Impacts on Waterfowl, Shorebird, and Sandhill Crane Habitat, BIO-MM#80: Minimize Permanent Intermittent Noise, Visual, and Train Strike Impacts on Wildlife Movement, and BIO-MM#P1: Provide Compensatory Mitigation for Impacts on the Grasslands Ecological Area. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

The Authority will implement BIO-MM#58 to compensate for noise impacts on shorebirds and wintering waterbirds, BIO-MM#80 to avoid and minimize impacts from noise, or some combination of the two measures if necessary and identifies minimum compensatory mitigation requirements for wildlife using corridors during operations that will be included in the HMP developed under BIO-MM#10. These measures will avoid or minimize noise impacts on habitat or provide for the preservation and enhancement of waterbird habitat in the GEA and UPR IBAs to compensate for the reduction in caloric uptake experienced in habitat close to the railroad. These measures are expected to reduce or eliminate effects on wildlife using corridors. Additionally, BIO-MM#P1 will further compensate for the effects by requiring the Authority to conserve lands in and adjacent to the GEA.

Compensatory mitigation implemented under Mitigation Measure BIO-MM#58 could involve some secondary impacts; however, these impacts would be beneficial, and the measures set forth in BIO-MM#11 will be implemented to minimize any adverse impacts.

The construction of noise/visual barriers under Mitigation Measure BIO-MM#80 could result in secondary impacts on visual resources.

Some of the activities and actions that will be implemented under BIO-MM#10, especially those involving ground disturbance, could result in impacts similar to those described in Section 3.7.7 of the Final EIR/EIS. Specifically, direct and indirect impacts on special-status plant and wildlife species (e.g., California tiger salamander, red-legged frog, and foothill yellow-legged frog), special-status plant communities, and aquatic resources could occur where such resources are present on the mitigation sites. BIO-MM#11, which requires a site assessment and appropriate regulatory authorizations, will be implemented at compensatory mitigation sites to reduce or avoid impacts on these resources.

Environmental impacts that would result from implementation of BIO-MM#10 on other resource categories could result from implementing restoration activities at mitigation sites. Refer to Section 4.4.1 of this document for a description of these potential secondary impacts of BIO-MM#10.

The Authority finds that Mitigation Measures BIO-MM#10, BIO-MM#58, and BIO-MM#80 are required under the Preferred Alternative and that implementation of these mitigation measures will reduce the project's impacts on intermittent noise disturbance of wildlife using corridors during operations to a less-than-significant level.

4.4.45 Impact BIO#46: Intermittent Visual Disturbance of Wildlife Using Corridors during Operations

The Preferred Alternative would result in intermittent visual disturbance to wildlife during operations. Mammalian and bird species may be affected as described further below.

Mammalian Species

Movement patterns of mammalian species may be altered by visual stimuli associated with passing trains or maintenance activities at rail facilities. Mammals such as mountain lions are known to avoid human-occupied locations (Center for Biological Diversity 2019), and therefore the presence of humans during maintenance activities could be expected to potentially change movement patterns, including avoidance of an area. Moving trains may also cause visual cues, which cause animals to temporarily or permanently avoid an area.

Bird Species

The presence of a moving train on the landscape has the potential to produce a variety of behavioral responses in birds, including heightened alertness (a stress response that can have adverse bioenergetics and other physiological consequences) and flight (a similar but stronger response that may also expose birds to predation). The WCA (Authority 2020c: Appendix C) determined that raptors and waterbirds were vulnerable to visual stimuli within the GEA IBA and Soap Lake 10-year floodplain. The literature identifies two distances at which response to visual stimuli occurs for waterfowl: flight initiation distance (average 269 feet) and minimum approach distance (average 404 feet) (Livezey et al. 2016). The flight initiation distance is assumed to have potential for the greatest impact and was applied as a threshold to determine acres of affected habitat. For raptors, the flight initiation distance from motor vehicles is 262 feet on average (Livezey et al. 2016). If a raptor nest is within this distance of the rail alignment, there is potential for train operations to cause nest abandonment.

Therefore, operations of the project could result in intermittent visual disturbance of wildlife using corridors during operations, which is considered a significant impact under CEQA (Final EIR/EIS: page 3.7-139).

Implementation of the following measures mitigates this impact: BIO-MM#58: Provide Compensatory Mitigation for Impacts on Waterfowl, Shorebird, and Sandhill Crane Habitat and BIO-MM#80: Minimize Permanent Intermittent Noise, Visual, and Train Strike Impacts on Wildlife Movement. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

The Authority will implement mitigation measures to compensate for visual disturbance impacts on wintering waterbirds and some species of nesting raptors. BIO-MM#58 will provide for the preservation and enhancement of waterbird habitat in the GEA and UPR IBAs to compensate for the reduction in caloric uptake experienced in habitat close to the railroad, although this measure will not eliminate disturbance of wintering waterbirds in the GEA or UPR IBAs. BIO-MM#80 will require construction of a noise barrier in the UPR IBA and an enclosure in the GEA IBA. These measures are expected to reduce or eliminate effects on wildlife using corridors.

Compensatory mitigation implemented under Mitigation Measure BIO-MM#58 could involve some secondary impacts; however, these impacts would be beneficial, and the measures set forth in BIO-MM#11 will be implemented to minimize any adverse impacts.

The construction of noise/visual barriers under Mitigation Measure BIO-MM#80 could result in secondary impacts on visual resources.

The Authority finds that Mitigation Measures BIO-MM#58 and BIO-MM#80 are required under the Preferred Alternative and that implementation of these mitigation measures will reduce the project's impacts on intermittent visual disturbance of wildlife using corridors during operations to a less-than-significant level.

4.4.46 Impact BIO#47: Intermittent and Permanent Lighting Disturbance of Wildlife and Wildlife Using Corridors during Operations

The Preferred Alternative would result in intermittent and permanent disturbance to wildlife caused by lighting during operations. Terrestrial and aerial species may be affected as described further below.

Terrestrial Species

ALAN has the potential to affect wildlife movement for most terrestrial species, including the mountain lion, a recent candidate for listing under CESA, in large part because a preponderance of wildlife movement occurs at night (Beier 2006; FHWA 2011). Operational light sources include passing trains and associated rail infrastructure, such as the MOWF and stations. Nighttime lighting is not expected to affect wildlife movement in urban or developed settings (such as near San Jose and Gilroy) where train and facility lighting would not significantly increase baseline light levels, particularly where these locations do not overlap with known movement corridors. Conversely, nighttime lighting impacts are expected to be greatest in natural settings, where baseline light levels are low, and in locations where wildlife is known to move. In addition, light impacts from trains are expected to be greatest where the rail is at grade and where there are low existing levels of ALAN. However, the impacts on movement from train light are likely to be less than those from noise and vibration because noise and vibration travel farther from the centerline than light (which is directed in front of the train). Lighting impacts from trains are expected to be greatest where the rail is at grade. The Authority has incorporated BIO-IAMF#12 into project design to avoid and minimize impacts from operational lighting sources by several methods, including using appropriate shielding to reduce horizontal or skyward illumination and avoiding the use of high-intensity lights (e.g., sodium vapor, quartz, and halogen). Additionally, BIO-IAMF#12 specifies that no lighting be installed under viaduct and bridge structures in riparian habitat areas.

Continuous sources of operations lighting would have little potential to affect wildlife, including mountain lion, because lighting would be directed toward the site and is predominantly of a fairly low intensity (approximately 5 lux for security lighting and approximately 20 to 50 lux at stations and the MOWF). Intermittent sources of operations lighting would at times be directed toward wildlife habitat; however, operations lighting from train headlights would mostly be directed ahead and within the fenced area along the alignment. Exposures would be brief but could potentially last for periods of minutes in the case of operations lighting from maintenance activities and up to 10 seconds in the case of operational train lighting. Exposure to intermittent light has been found to potentially affect melatonin metabolism and to elicit avoidance responses. Although no literature addresses intermittent light effects on mountain lion, or any large mammals, there is a

potential for adverse behavioral and physiological effects on terrestrial wildlife resulting from intermittent light exposure from operations sources.

Aerial Species

Operations activities have the potential to generate light. HSR facilities with security lighting and train headlights produce light that could result in altered movement or foraging patterns in aerial species, particularly in birds. As discussed in the WCA (Authority 2020c: Appendix C), few quantitative studies are available to determine the distance at which this impact may occur; however, published analyses confirm some potential for impact. For example, hunting owls may perch on OCS structures and become disoriented by the headlight of the approaching train, resulting in train strike (Santos et al. 2017). Also, Longcore and Rich (2004) note that birds may become “trapped” by a cone of light, unwilling to exit into darkness. This behavior may elevate train strike risk for birds lit by the headlight of an approaching train.

ALAN has also been observed to cause altered melatonin metabolism in a wide variety of species, including birds and bats; such changes can affect circadian rhythms, reproductive timing, and many other aspects of physiology and behavior (Gaston and Holt 2018). Although these effects would be minimized as described above for terrestrial species, substantial exposure may occur for both bats and birds if they forage on insects attracted to ALAN sources; this is a particularly common behavior in bats and in the aerialist songbirds, such as swallows and swifts. Although improved access to this food source (flying insects) would be beneficial to many birds and bats, it could confer a competitive benefit on those animals relative to other birds and bats that actively avoid ALAN sources. Overall, headlight effects are brief and facility lighting effects are localized; thus, these ALAN sources are not expected to result in a substantial impact on birds or bats, and moreover most bird species are diurnal and would not be exposed to ALAN.

Therefore, even with the implementation of these IAMFs, operations of the project could result in intermittent and permanent lighting disturbance of wildlife and wildlife using corridors during operations, which is considered a significant impact under CEQA (Final EIR/EIS: page 3.7-140).

Implementation of the following measures mitigates this impact: BIO-MM#80: Minimize Permanent Intermittent Noise, Visual, and Train Strike Impacts on Wildlife Movement and BIO-MM#89: Minimize the Impacts of Operational Lighting on Wildlife Species. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

The Authority will implement mitigation measures to compensate for visual disturbance impacts on intermittent and permanent lighting disturbance of wildlife and wildlife using corridors during operations. BIO-MM#80 will provide for the preservation and enhancement of waterbird habitat in the GEA and UPR IBAs to compensate for the reduction in caloric uptake experienced in habitat close to the railroad, although this measure will not eliminate disturbance of wintering waterbirds in the GEA or UPR IBAs. BIO-MM#89 will require construction of a noise barrier in the UPR IBA and an enclosure in the GEA IBA. These measures are expected to reduce or eliminate effects on wildlife using corridors.

The construction of noise/visual barriers under Mitigation Measure BIO-MM#80 could result in secondary impacts on visual resources.

The Authority finds that Mitigation Measures BIO-MM#80 and BIO-MM#89 are required under the Preferred Alternative and that implementation of these mitigation measures will reduce the project’s impacts on intermittent visual disturbance of wildlife using corridors during operations to a less-than-significant level.

4.4.47 Impact BIO#48: Mortality Resulting from Train Strike during Operations

Although the entire track alignment would be fenced with an 8-foot chain-link fence except where there are breaks in the fencing for road crossings, it is possible that terrestrial species could enter the alignment and be struck by a moving train. The terrestrial wildlife species most likely to enter the alignment are small species such as mice and ground squirrels. Digging species (e.g., ground squirrels) are of particular concern because once a hole is dug under the fence, other species

(e.g., badger, San Joaquin kit fox) may take advantage of it and enter the right-of-way. Also, animals are known to jump (e.g., deer, elk), climb (e.g., mountain lion), or push fences (e.g., elk).

Because terrestrial species are not expected to gain access to elevated sections, it is only at-grade sections that present risk of train strike. Fencing design criteria to limit terrestrial species from gaining access onto the trackway are described in Chapter 7 of the WCA (Authority 2020c: Appendix C).

Train operations pose the risk of injury and mortality to aerial species by striking birds or bats flying in the path of passing trains. See Impact BIO#2a for a discussion of Bay checkerspot butterfly and potential impacts on movement; monarch movement is not expected to be affected by the rail per discussions in Impact BIO#2b. The WCA (Authority 2020c) determined that all aerial species, including bats, would be vulnerable to train strike. Raptors and carrion feeders are vulnerable because of their potential to forage on carrion on or near the tracks. Blackbirds and other perching birds are vulnerable because they may perch on train infrastructure and be struck when attempting to fly away from passing trains. Aerial foragers and raptors are vulnerable while foraging close to the ground. Waterfowl, shorebirds, and wading birds are vulnerable to strike where their primary habitat is close to the rail because of their long, low take-off trajectories. Bees (e.g., honeybees), as well as other native and nonnative pollinators, could be struck and killed by moving trains, although this effect is expected to be minimal and similar to normal background impacts from passenger cars and trucks on roads. Additionally, wind caused by train operations could occur, potentially affecting bee and other pollinator flights, foraging, or dispersal. The Authority studied induced wind speed from train operations and potential effects on pollination in white papers in 2012 (Authority 2012b, 2012c) and found that wind speed at the edge of the right-of-way is predicted to be less than 5 mph at a distance of 30 feet from a train going 220 mph. Consequently, wind speeds within proximity to trains are unlikely to substantially exceed normal wind speeds and are unlikely to affect flights, foraging, or dispersal of bees and other pollinators. Finally, bats may roost in train infrastructure such as viaducts or tunnel entrances, increasing the potential for train strike.

Nevertheless, quantifying the severity of the impact is difficult. For special-status species with low reproductive rates such as the California condor, Swainson's hawk, sandhill crane, and golden eagle, the loss of one individual would be a substantial impact. For more common species, the injury or mortality of a small portion of the local or regional population is not likely to be a substantial impact.

Within the GEA IBA specifically, waterfowl, shorebirds, and wading birds are known to congregate in relatively large numbers, and intermittent strike of these special-status species could affect the abundance and local or regional populations of these species over time. While condor numbers are very low in the region, and there is no evidence of nesting, train strike has potential to affect the distribution and abundance of local or regional populations of the species. U.S. Geological Survey (USGS) tracking data confirm condor flights over the proposed rail alignment in western Pacheco Pass near Casa de Fruta; consequently, there is potential for individuals to be struck by the train while attempting to forage on carrion on or near the alignment.

Therefore, operations of the project could result in mortality resulting from train strike during operations, which is considered a significant impact under CEQA (Final EIR/EIS: page 3.7-141).

Implementation of the following measures mitigates this impact: BIO-MM#77a: Design Wildlife Crossings to Facilitate Wildlife Movement, BIO-MM#80: Minimize Permanent Intermittent Noise, Visual, and Train Strike Impacts on Wildlife Movement, BIO-MM#81: Minimize Permanent Intermittent Impacts on Terrestrial Species Wildlife Movement, BIO-MM#82: Minimize Permanent Intermittent Impacts on Aerial Species Wildlife Movement, and BIO-MM#83: Implement Removal of Carrion that May Attract Condors and Eagles. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

The Authority will implement mitigation measures to reduce mortality of wildlife using corridors. BIO-MM#77a will require implementation of an array of design features pertaining to wildlife crossings to minimize mortality of terrestrial wildlife. BIO-MM#80 will require the implementation

of a noise barrier within the UPR IBA and an enclosure within the GEA IBA. These measures will substantially reduce the potential for train strike within the UPR IBA, and will eliminate the risk of train strike within the GEA IBA. BIO-MM#81 will require the installation of a barrier (e.g., flashing, fine-mesh fencing, slats, or other feature buried at least 12 inches below-ground and 12 inches aboveground) along portions of the permanent security fencing adjacent to natural habitats to prevent reptiles, amphibians, and mammals from moving through or underneath the fencing to access the right-of-way where they could be killed by moving trains. BIO-MM#82 will implement features to minimize or avoid mortality of birds and bats. BIO-MM#83 will involve carcass removal from the guideway to reduce risk of attracting eagles and condors. These measures are expected to minimize or avoid direct impacts on wildlife movement during project operations.

The construction of noise/visual barriers under Mitigation Measure BIO-MM#80 could result in secondary impacts on visual resources.

The Authority finds that Mitigation Measures BIO-MM#77a, BIO-MM#80, BIO-MM#81, BIO-MM#82, and BIO-MM#83 are required under the Preferred Alternative and that implementation of these mitigation measures will reduce the project's impacts on mortality resulting from train strike during operations to a less-than-significant level.

4.4.48 Impact BIO#49: Injury and Mortality Resulting from Power Line Strike during Operations

Collisions with power lines, OCS, traction power station strain gantry, or other TPFs, or wireless communications facilities pose the risk of injury and mortality to aerial species. The WCA (Authority 2020c: Appendix C) concluded that all aerial species except bats would be vulnerable to collision with power lines. No studies have been found addressing the risk of electric line strike in bats, but it is presumed to be low because bats possess excellent echolocation abilities that should allow them to detect and evade wires.

Prior to construction, the Authority will design the OCS and other structures (e.g., fencing) to be bird- and raptor-safe in accordance with applicable Avian Power Line Interaction Committee (APLIC) recommendations (APLIC 2006, 2012) (BIO-IAMF#12). Design modifications will include installation of line marking devices on existing or new power lines in and near the project footprint. Such modifications will help to minimize collisions between birds that fly away from approaching trains and power lines. These modifications, in concert with the distance between OCS lines and grounds, will also minimize the risk of electrocution. As discussed for train strike, HSR infrastructure could influence behavior by introducing features and substrates that could attract aerial species to the guideway, thus putting them at risk of electric line strike. Most raptors possess keen vision and high flight maneuverability that likely helps to reduce risks of electric line strike, but they could still be vulnerable during times of limited visibility. Carrion-feeding birds, if foraging along the guideway, could be at increased risk of electric line strike. BIO-IAMF#12 will require that the OCS, fencing, and power lines be designed to be bird and raptor safe in accordance with APLIC guidance.

Locations known to support large concentrations of waterfowl, shorebirds, and wading birds, such as the GEA IBA, would present a higher risk of injuries or fatalities from power line strike than other locations. The UPR IBA is important for all focal groups, and because of its abundant aquatic habitats it is particularly important to waterbirds. The Preferred Alternative would traverse 8.3 miles of the UPR IBA.

Therefore, even with the implementation of this IAMF, operations of the project could result in injury and mortality resulting from power line strike during operations, which is considered a significant impact under CEQA (Final EIR/EIS: page 3.7-143).

Implementation of the following measures mitigates this impact: BIO-MM#80: Minimize Permanent Intermittent Noise, Visual, and Train Strike Impacts on Wildlife Movement and BIO-MM#82: Minimize Permanent Intermittent Impacts on Aerial Species Wildlife Movement. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

The Authority will implement mitigation measures to reduce mortality of wildlife using corridors. BIO-MM#80 will require installation of an enclosure in the GEA IBA and installation of noise barriers in the UPR IBA to reduce or avoid the potential for power line strike during operations. BIO-MM#82 will also specify design features for the OCS that will minimize or avoid power line strike during operations. These measures are expected to minimize direct impacts on wildlife movement during project operations. The construction of noise/visual barriers under Mitigation Measure BIO-MM#80 could result in secondary impacts on visual resources.

The Authority finds that Mitigation Measures BIO-MM#80 and BIO-MM#82 are required under the Preferred Alternative and that implementation of these mitigation measures will reduce the project's impacts on injury and mortality resulting from power line strike during operations to a less-than-significant level.

4.4.49 Impact BIO#51: Permanent Conversion or Degradation of Conservation Areas

Construction of the HSR track and systems in all subsections except the Monterey Corridor Subsection would have direct and indirect impacts on conservation areas. Construction activities would permanently convert or fragment and temporarily disturb conservation lands in the project footprint. Construction activities also have potential to alter management and affect existing infrastructure on conservation lands.

The Authority has incorporated BIO-IAMF#1, BIO-IAMF#3, BIO-IAMF#5, BIO-IAMF#8, BIO-IAMF#9, BIO-IAMF#10, and BIO-IAMF#11 into project design to avoid and minimize impacts on conservation areas. Tunnels will be designed and constructed to avoid or minimize groundwater inflows into tunnels during construction that may affect surface water resources overlying the tunnel alignment (HYD-IAMF#5), including those within conservation areas.

The areal extent of conversion and disturbance of conservation areas as a result of construction is shown in Final EIR/EIS Table 3.7-22. The preponderance of direct impacts would be on the Soap Lake Properties, the Pacheco Creek Preserve, and the Romero Ranch Conservation Easement in the Morgan Hill and Gilroy and Pacheco Pass Subsections, respectively.

As discussed in Impact BIO#1, construction of Tunnel 2 could have temporary indirect impacts on the hydrology of groundwater-dependent surface water features, including those within the Pacheco Creek Reserve (Pacheco Creek and associated riparian vegetation), Cottonwood Creek Wildlife Area (ponds, streams, and wetlands), and Romero Ranch Conservation Easement (ponds, streams, and wetlands). Any reductions in groundwater supply to such features could temporarily reduce their habitat value and function.

While pre-construction and construction actions to protect conservation areas are part of the project, these actions would not prevent the conversion and temporary disturbance of such areas in the project footprint, nor would they completely eliminate the risk of long-term degradation of such lands outside the project footprint. Construction could result in the fragmentation or modification of a conservation area such that its purpose is no longer viable (e.g., an easement established to preserve a wildlife corridor may become ineffective if it is fragmented or bisected by HSR track and systems). Accidental discharge of hazardous substances (e.g., oil, gasoline) could degrade habitat that supports sensitive species. The introduction of invasive nonnative plants could alter the species composition of conservation lands, rendering them less able to support the sensitive communities.

Therefore, even with the implementation of these IAMFs, operations of the project could result in permanent conversion or degradation of conservation areas, which is considered a significant impact under CEQA (Final EIR/EIS: page 3.7-145).

Implementation of the following measures mitigates this impact: BIO-MM#9: Prepare and Implement a Groundwater Adaptive Management and Monitoring Plan, BIO-MM#84a: Provide Compensatory Mitigation for Impacts on Conservation Areas, BIO-MM#84b: Provide Compensatory Mitigation for Impacts on Conservation Areas, BIO-MM#79a: Provide Wildlife Movement between the Santa Cruz Mountains and Diablo Range, and BIO-MM#10: Prepare and

Implement a Habitat Mitigation Plan for Species and Species Habitat. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

BIO-MM#9 will involve preparation and implementation of a GAMMP that will require monitoring of groundwater-dependent surface water resources (including those providing habitat) within the tunnel groundwater study area, providing supplemental water where needed, and remediating or compensating for any adverse effects identified during monitoring. BIO-MM#84a and BIO-MM#84b will include measures that will be included in the habitat mitigation plan developed under BIO-MM#10. BIO-MM#79a will partially compensate for permanent 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. These measures are expected to compensate for the potential conflict at the Pacheco Creek Reserve by replacing habitat lost at the reserve with habitat in an appropriate similarly sized patch. The Authority will implement mitigation measures to reduce mortality of wildlife using corridors.

Compensatory mitigation implemented under Mitigation Measures BIO-MM#79a and BIO-MM#84b could involve some secondary impacts; however, these impacts would be beneficial, and the measures set forth in BIO-MM#11 will be implemented to minimize any adverse impacts.

Some of the activities and actions that will be implemented under BIO-MM#10, especially those involving ground disturbance, could result in impacts similar to those described in Section 3.7.7 of the Final EIR/EIS. Specifically, direct and indirect impacts on special-status plant and wildlife species (e.g., California tiger salamander, red-legged frog, and foothill yellow-legged frog), special-status plant communities, and aquatic resources could occur where such resources are present on the mitigation sites. BIO-MM#11, which requires a site assessment and appropriate regulatory authorizations, will be implemented at compensatory mitigation sites to reduce or avoid impacts on these resources.

Environmental impacts that would result from implementation of BIO-MM#10 on other resource categories could result from implementing restoration activities at mitigation sites. Refer to Section 4.4.1 of this document for a description of these potential secondary impacts of BIO-MM#10.

The Authority finds that Mitigation Measures BIO-MM#9, BIO-MM#84a, BIO-MM#84b, BIO-MM#79a, and BIO-MM#10 are required under the Preferred Alternative and that implementation of these mitigation measures will reduce the project's impacts associated with permanent conversion or degradation of conservation areas to a less-than-significant level.

4.4.50 Impact BIO#53: Conflict with Santa Clara Valley Habitat Plan

As shown in Table I-1 in Appendix I of the *Biological and Aquatic Resources Technical Report* (Authority 2020c), the project has potential to conflict with three actions required by the Santa Clara Valley Habitat Plan (SCVHP). No other potential conflicts with the SCVHP are anticipated:

- Action LAND-L4 requires the acquisition and enhancement of natural and semi-natural landscapes between the Santa Teresa Hills and Metcalf Canyon to the south that will contribute to providing connectivity between the Santa Cruz Mountains and Diablo Range to promote the movement of covered and other native species at many spatial scales.
- Action LAND-WP7 requires the acquisition of habitat near Santa Teresa Hills and Tulare Hill to provide connectivity between populations in the Diablo Range and the Santa Cruz foothills.
- Action LAND-R3 requires the acquisition in fee title of or obtaining conservation easements on lands that protect at least 40 acres of existing California sycamore woodland (i.e., sycamore alluvial woodland) to preserve this rare land cover type in the SCVHP Plan Area. The biological objective that includes this action (Objective 9.2) further specifies that acquired stands should be at least 10 acres in size and contiguous.

The project would affect connectivity between the Diablo Range and the Santa Cruz foothills, creating a potential conflict with Actions LAND-L4 and LAND-WP7 of the SCVHP. Impacts on

connectivity between the Diablo Range and the Santa Cruz Mountains are discussed in more detail in the WCA (Authority 2020c: Appendix C).

There are two potential conflicts with Action LAND-R3 of the SCVHP: impacts on the Pacheco Creek Reserve, a property owned and managed by the Santa Clara Valley Habitat Agency (SCVHA); and a lack of available acres of California sycamore woodland to meet the combined preservation and restoration needs of the SCVHA and the Authority. The SCVHA acquired the 55.4-acre Pacheco Creek Reserve in 2017 because the property would address goals and objectives of the SCVHP, including Action Land-R3 (under Objective 9.2 in the SCVHP) (SCVHA 2019), which commits to the acquisition of at least 40 acres of large (at least 10 acres), contiguous stands of California sycamore woodland (County of Santa Clara et al. 2012). The reserve includes an 8.2-acre contiguous stand of sycamore alluvial woodlands, of which the project would affect 2.7 acres (0.4 acre permanent, 2.3 acres temporary). An impact on an existing reserve owned and managed by the SCVHA for the purposes of meeting the requirements under the SCVHP would be a potential conflict.

California sycamore alluvial woodland is a rare natural community type. Consequently, opportunities to preserve and restore or enhance sycamore alluvial woodland may be limited, posing a potential conflict between the Authority and the SCVHA. The SCVHP will need to preserve 54 acres of sycamore alluvial woodland if all impacts described in the SCVHP are incurred (County of Santa Clara et al. 2012). Because the Pacheco Creek Reserve includes 8.2 acres of sycamore alluvial woodland, the remaining need is 45.9 acres. However, because the project would permanently affect 0.4 acre, the remaining acquisition needed to achieve the goal and objectives of the SCVHP (if all impacts are incurred) is 45.5 acres.

The Authority will need to acquire 37.2 acres of California sycamore woodland to mitigate project impacts. Therefore, the combined acquisition need for the project and the habitat conservation plan (HCP) is 82.7 acres. Based on mapping by H.T. Harvey (SFEI and H. T. Harvey 2017) and the Authority (2016a), it is estimated that there are 2,544 acres of available (unprotected) lands with opportunity for California sycamore woodland preservation and enhancement, 1,814 acres of which are in the Pajaro River hydrologic unit code (HUC)-8 watershed (where the impact would occur) and 730 acres of which are in the nearby Coyote Creek HUC-8 watershed. The combined mitigation need for the SCVHP and HSR of 82.7 acres totals 3.3 percent of the estimated available lands. Consequently, meeting the combined mitigation needs for the SCVHP and HSR is feasible and there is no conflict between the SCVHA and the Authority in terms of the limited availability of California sycamore woodland for preservation.

Therefore, operations of the project could result in conflict with SCVHP, which is considered a significant impact under CEQA (Final EIR/EIS: page 3.7-149).

Implementation of the following measures mitigates this impact: BIO-MM#85: Provide Compensatory Mitigation for Impacts on California Sycamore Woodland at the Pacheco Creek Open Space Regional Reserve, BIO-MM#10: Prepare and Implement a Habitat Mitigation Plan for Species and Species Habitat, BIO-MM#84a: Avoid and Minimize Impacts on Conservation Areas, BIO-MM#84b: Provide Compensatory Mitigation for Impacts on Conservation Areas, and BIO-MM#79a: Provide Wildlife Movement between the Santa Cruz Mountains and Diablo Range. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

The Authority will implement BIO-MM#85 to reduce impacts on the SCVHP. This measure will require the Authority to partner with the SCVHA to identify and conserve the additional acres of central California sycamore woodland necessary to meet the goals of the SCVHP when developing the HMP under BIO-MM#10 and to address the impacts on the Pacheco Creek Reserve. BIO-MM#84a, BIO-MM#84b, and BIO-MM#79a will partially compensate for permanent impacts on wildlife movement by requiring the Authority to protect lands in perpetuity within the Santa Cruz to Gabilan Wildlife Linkage. These measures are expected to compensate for the potential conflict at the Pacheco Creek Reserve by replacing habitat lost at the reserve with habitat in an appropriate similarly sized patch size.

Compensatory mitigation implemented under Mitigation Measures BIO-MM#79a, BIO-MM#84b, and BIO-MM#85 could involve some secondary impacts; however, these impacts would be beneficial, and the measures set forth in BIO-MM#11 will be implemented to minimize any adverse impacts.

Some of the activities and actions that will be implemented under BIO-MM#10, especially those involving ground disturbance, could result in impacts similar to those described in Section 3.7.7 of the Final EIR/EIS. Specifically, direct and indirect impacts on special-status plant and wildlife species (e.g., California tiger salamander, red-legged frog, and foothill yellow-legged frog), special-status plant communities, and aquatic resources could occur where such resources are present on the mitigation sites. BIO-MM#11, which requires a site assessment and appropriate regulatory authorizations, will be implemented at compensatory mitigation sites to reduce or avoid impacts on these resources.

Environmental impacts that would result from implementation of BIO-MM#10 on other resource categories could result from implementing restoration activities at mitigation sites. Refer to Section 4.4.1 of this document for a description of these potential secondary impacts of BIO-MM#10.

The Authority finds that Mitigation Measures BIO-MM#85, BIO-MM#10, BIO-MM#84a, BIO-MM#84b, and BIO-MM#79a are required under the Preferred Alternative and that implementation of these mitigation measures will reduce the project's impacts associated with conflict with SCVHP to a less-than-significant level.

4.4.51 Impact BIO#55: Conflict with Coyote Valley Linkage

As shown in Table I-3 in Appendix I of the *Biological and Aquatic Resources Technical Report* (Authority 2020c), the construction of the Preferred Alternative would result in potential conflicts with recommended wildlife crossing modifications proposed under the Coyote Valley Linkage. The Coyote Valley Linkage identified 24 wildlife crossing modifications, of which 11 would be potentially affected by the Preferred Alternative (Final EIR/EIS: Table 3.7-23).

Therefore, operations of the project could result in conflict with Coyote Valley Linkage, which is considered a significant impact under CEQA (Final EIR/EIS: page 3.7-151).

Implementation of the following measures mitigates this impact: BIO-MM#77a: Design Wildlife Crossings to Facilitate Wildlife Movement, BIO-MM#77b: Monitoring and Adaptive Management of Wildlife Crossings, and BIO-MM#79a: Provide Wildlife Movement between the Santa Cruz Mountains and Diablo Range. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

The Authority will implement BIO-MM#77a and BIO-MM#77b which will provide for extended viaducts for wildlife movement and dedicated wildlife underpasses that meet design specifications for the species affected. BIO-MM#79a will partially compensate for permanent impacts on wildlife movement by requiring the Authority to protect lands in perpetuity within the Santa Cruz to Gabilan Wildlife Linkage. These measures are expected to minimize and compensate for direct and indirect impacts on wildlife corridor connectivity and individuals moving near or across the rail alignment.

Compensatory mitigation implemented under Mitigation Measure BIO-MM#79a could involve some secondary impacts; however, these impacts would be beneficial, and the measures set forth in BIO-MM#11 will be implemented to minimize any adverse impacts.

The Authority finds that Mitigation Measures BIO-MM#77a, BIO-MM#77b, and BIO-MM#79a are required under the Preferred Alternative and that implementation of these mitigation measures will reduce the project's impacts associated with conflict with Coyote Valley Linkage to a less-than-significant level.

4.5 Hydrology and Water Resources (Section 3.8 in the Final EIR/EIS)

The Preferred Alternative would result in potentially significant temporary and permanent impacts on surface water quality during construction and temporary impacts on groundwater and surface water hydrology during tunnel construction. All potentially significant impacts would be mitigated to less than significant.

4.5.1 Impact HYD#4: Temporary Impacts on Surface Water Quality during Construction

The Preferred Alternative would disturb more than 1 acre of soil and will therefore need to comply with the construction general permit (CGP) (HYD-IAMF#3). Potential temporary impacts on water quality from soil disturbance and in-water and over-water construction activities, as well as the use, storage, and disposal of construction materials and wastes will be avoided or minimized by implementing a SWPPP and standard BMPs recommended for a particular construction activity.

Implementation of IAMFs will also minimize areas of disturbed soil, especially in waterbodies and erosive soils, only disturbing areas that may be stabilized before the onset of winter rains, not performing grading or earthwork during the wet months or storm events, and protecting disturbed soil areas with temporary erosion and sediment control BMPs (GEO-IAMF#1 and GEO-IAMF#10).

Temporary erosion and sediment control measures will be applied to all inactive disturbed soil areas during construction. Other methods of minimizing erosion include preserving existing vegetation and avoiding sensitive wetland and riparian habitats to the extent feasible, which will be documented in a BRMP (BIO-IAMF#5: Prepare and Implement a Biological Resources Management Plan). Additionally, the SWPPP will specify the installation of replacement plantings or application of a seed mix to assist in permanently stabilizing exposed soils. Wind erosion resulting in fugitive dust emissions will be avoided or minimized through standard construction site BMPs, such as construction roadway speed limits, halting activities during windy conditions, and dust suppression by wetting disturbed soil areas (AQ-IAMF#1).

Use of an environmental management system to replace hazardous materials with nonhazardous alternatives to the extent possible will manage hazardous substances required for construction (HMW-IAMF#9). Alternative materials would be evaluated on an annual basis. Any hazardous materials used during construction will be stored according to state and federal regulations (HMW-IAMF#10). BMPs to minimize the potential for accidental spills and procedures to mitigate spills will be documented in the spill prevention, control, and countermeasure plans (HMW-IAMF#6) that will be implemented at all project facilities. The construction contractor will prepare a hazardous materials and waste plan that describes responsible parties and procedures for managing hazardous waste and transporting hazardous materials on public roadways (HMW-IAMF#7).

Proposed concrete batch plants at Tunnel 1 (western portal) and Tunnel 2 (western and eastern portals) and pre-casting sites in southern San Jose and Gilroy would use concrete to manufacture viaduct sections; these activities would need to be controlled to prevent substantial changes in the alkalinity (i.e., increase in pH) of stormwater runoff and the receiving waters, Guadalupe River, Coyote Creek, and Llagas Creek. Non-stormwater and waste management BMPs, good housekeeping practices, and adhering to CGP conditions for the storage of hazardous materials will avoid or minimize the potential for discharging construction materials and wastes into receiving waters (HMW-IAMF#8).

As described in Impact HYD#10, groundwater is expected to be encountered during construction of the tunnels. Project features will reduce the amount of groundwater seepage into the advancing tunnel excavation through the use of grouting, installation of watertight tunnel lining systems, and other methods (HYD-IAMF#5). Where larger quantities of groundwater are expected, increased quantities of cementitious grout will be used to minimize groundwater inflows into the interior of the tunnel (HYD-IAMF#5). Because substantial quantities of groundwater may be encountered during tunneling, substantial quantities of cement grout may be necessary to

control and minimize groundwater inflows. Therefore, it is expected that water generated during tunneling activities would have high pH resulting from exposure to cement, potentially rendering adequate treatment prior to discharge technically challenging.

Additionally, the Authority would use a portion of the tunnel spoils to build the proposed railbed embankments if this material meets the requirements for reuse within a public right-of-way. Prior to reuse, tunnel spoils would be stockpiled in staging areas. Stockpiles will be managed in accordance with the SWPPP and CGP (HYD-IAMF#3) to minimize the potential for contaminated spoils to erode by wind or water or otherwise be discharged into a receiving waterbody. The protocols for stockpiling, screening, sampling, testing, storing, labelling, and disposing will be documented in a CMP prepared by the Authority's design-build contractor (HMW-IAMF#4).

In addition to non-stormwater BMPs, other project features will reduce the potential for encountering materials that would negatively affect water quality. Hazardous material studies and remediation will occur prior to construction (HMW-IAMF#1), minimizing the potential for dewatering subsurface contamination to a surface waterbody. If undocumented contamination is discovered during construction, dewatering activities will cease and remedial activities will be developed in consultation with the regional water quality control boards (RWQCBs) or California Department of Toxic Substances Control and the property owner (HMW-IAMF#4).

Project construction would require work in waterbodies to build new bridges, culverts, and viaduct piers and to realign and relocate waterbodies (Final EIR/EIS: Table 3.8-16 and Table 3.8-18). Work in waterbodies would result in temporary disturbance of the beds and banks of waterbodies, leading to increased erosion and sedimentation and the exposure of construction materials, equipment, and wastes to receiving waterbodies. Work in perennial waterbodies would require temporary stream diversion and channel dewatering to allow work on a dry ground surface. Intermittent or ephemeral waterbodies would not likely contain flowing or standing water during summer when construction in waterbodies is anticipated to occur and would not require temporary stream diversion and dewatering. Erosion and sedimentation would occur in all waterbodies directly disturbed by construction activities when flows occur during winter. Construction activities within waterbodies could elevate sediment concentrations and turbidity beyond water quality standards at each location where such work is required.

However, even with incorporation of these IAMFs, project construction will result in temporary impacts on surface water quality. This impact is significant under CEQA (Final EIR/EIS: page 3.8-66).

Implementation of the following measures mitigate this impact: BIO-MM#1: Prepare and Implement a Restoration and Revegetation Plan, BIO-MM#3: Establish Environmentally Sensitive Areas and Non-Disturbance Zones, BIO-MM#4: Conduct Monitoring of Construction Activities, BIO-MM#25: Prepare Plan for Dewatering and Water Diversions, BIO-MM#71: Restore Temporary Riparian Habitat Impacts, BIO-MM#73: Restore Aquatic Resources Subject to Temporary Impacts, and BIO-MM#74: Prepare and Implement a Compensatory Mitigation Plan for Impacts to Aquatic Resources. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

The Authority will implement mitigation measures to reduce temporary impacts on water quality resulting from erosion and sedimentation in waterbodies as well as potential increases in water temperature and decreases in dissolved oxygen.

BIO-MM#1 will involve preparation of an RRP that will identify and describe procedures for restoring temporarily disturbed habitat to its former state.

BIO-MM#3 will require the project biologist to establish ESAs and nondisturbance zones that contain aquatic resources to reduce impacts on water quality prior to ground-disturbing activity.

BIO-MM#4 will require the project biologist to monitor construction activities that occur within or adjacent to aquatic resources and document compliance with applicable avoidance and minimization measures, including measures set forth in regulatory authorizations issued under the CWA or Porter-Cologne.

BIO-MM#25 will require the Authority to prepare a dewatering plan that incorporates measures to minimize turbidity and siltation of downstream waters.

BIO-MM#71 will require contractors to begin revegetation of temporarily affected riparian areas within 90 days of completing construction.

BIO-MM#73 will minimize temporary impacts on aquatic resources by requiring contractors to begin restoration of temporarily disturbed features within 90 days of completing construction.

BIO-MM#74 will require preparation and implementation of a compensatory mitigation plan for impacts on waters of the United States regulated under the federal CWA and waters of the state under the Porter-Cologne Act.

These measures are expected to avoid or minimize temporary impacts on receiving water quality resulting from the conversion or loss of aquatic resources and riparian habitat.

These mitigation measures will be effective in minimizing construction impacts on surface water quality.

Compensatory mitigation as implemented under Mitigation Measure BIO-MM#74 could involve some secondary impacts; however, these impacts would be beneficial.

The Authority finds that Mitigation Measures BIO-MM#1, BIO-MM#3, BIO-MM#4, BIO-MM#25, BIO-MM#71, BIO-MM#73, and BIO-MM#74 are required under the Preferred Alternative and that implementation of these mitigation measures will reduce impacts on surface water quality to a less-than-significant level.

4.5.2 Impact HYD#5: Permanent Impacts on Surface Water Quality during Construction

Project construction would convert land uses, add impervious surfaces, and relocate or fill waterbodies, which may require removal of riparian vegetation in the RSA. Prior to construction, the contractor would prepare a stormwater management and treatment plan, which would include permanent stormwater treatment BMPs to reduce the quantity and improve the quality of runoff. However, permanent impacts on water quality would result from the removal of riparian vegetation and the loss of aquatic resources from conversion to transportation land use.

The contractor will prepare a stormwater management and treatment plan for Authority review and approval prior to construction (HYD-IAMF#1). The plan will include permanent stormwater BMPs to minimize the exposure of contaminants to stormwater runoff (site design and source control measures), reduce the quantity and improve the quality of stormwater runoff (treatment and low-impact development [LID] measures), and retain flows to prevent increases in flow rates and durations above pre-project conditions (hydromodification management). BMPs will be sized to manage the expected runoff from impervious surfaces. The stormwater management and treatment plan will specify site design, source control, LID design standards, stormwater treatment, and hydromodification management BMPs to be implemented in the HSR right-of-way according to the Phase II MS4 permit. The Authority will coordinate with local agencies regarding the design, construction, and long-term maintenance of permanent stormwater treatment BMPs that would be constructed within their jurisdiction. In addition, the Authority will be required to inspect and maintain these permanent stormwater treatment BMPs as a condition of the Phase II MS4 permit. Additionally, the Authority will develop a long-term plan for conducting regular maintenance of permanent stormwater treatment BMPs within HSR right-of-way; this plan will be required to specify the frequency of maintenance to ensure continued effectiveness.

With implementation of a stormwater management and treatment plan (HYD-IAMF#1) and long-term maintenance plan for permanent stormwater treatment BMPs, stormwater runoff from new and replaced impervious surfaces, including those in areas with converted land uses, will be collected and discharged in a manner that will not produce excessive erosion.

The MOWF would be built in a large floodplain area known as the Soap Lake floodplain. Flood control systems proposed for the MOWF would comprise ditches, equalizer culverts, and flood

control basins to minimize flood risk and impacts on the Soap Lake floodplain. These flood control systems would avoid the potential for pollutants to be discharged into receiving waters during floods and the risk of equipment and materials being carried away by floodwaters. With the flood control systems in place, the MOWF would not be considered a substantial source of additional polluted runoff, nor would they release pollutants during floods. In accordance with HYD-IAMF#2, materials storage areas at MOWF, MOWS, TPFs, and stations will be located above the 100-year water surface elevation if they are situated within a floodplain, including those at the South or East Gilroy MOWF.

The project would require the permanent modification of waterbodies. Modifying waterbodies would include adjusting the existing banks and bed of the waterbody, relocating the waterbody nearby, or converting the waterbody to a transportation land use by placing fill material, such as rock and soil, in the waterbody to construct project improvements. Realigning, modifying, and partially or completely filling a waterbody would result in the degradation or loss of beneficial uses. Although some waterbodies would be realigned, the realigned waterbody may not support the same quantity or quality of beneficial uses. Some waterbodies that would be permanently affected by the Preferred Alternative are listed on the CWA Section 303(d) list for a water quality impairment. However, new and reconstructed bridges and culverts would not substantially contribute to increased turbidity or sediment loads, because the design of these structures would be optimized to minimize erosion and scour, and all cut-and-fill slopes and other disturbed soil areas would be permanently stabilized with erosion control BMPs. Additionally, stormwater treatment BMPs, as discussed above, would reduce the quantity and improve the quality of runoff from impervious surfaces associated with the project, reducing pollutant loading in impaired receiving waters following best industry practices. Permanent adverse impacts on other listed impairments are not anticipated because the physical presence of the project, including the railbed, MOWF, and stations, is not expected to otherwise affect water quality.

However, even with incorporation of these IAMFs, project construction will result in permanent impacts on surface water quality. This impact is significant under CEQA (Final EIR/EIS: page 3.8-69).

Implementation of the following measures mitigates this impact: BIO-MM#72: Provide Compensatory Mitigation for Permanent Impacts on Riparian Habitat and BIO-MM#74: Prepare and Implement a Compensatory Mitigation Plan for Impacts on Aquatic Resources. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

The Authority will implement mitigation measures to reduce permanent impacts on water quality resulting from the realignment, filling, or modification of waterbodies as well as the removal of riparian vegetation. BIO-MM#72 identifies minimum compensatory mitigation requirements for riparian habitat. BIO-MM#74 requires preparation and implementation of a compensatory mitigation plan for both temporary and permanent impacts on aquatic resources. Together, these measures are expected to compensate for permanent impacts on receiving water quality resulting from the conversion or loss of aquatic resources. These mitigation measures will be effective in minimizing permanent construction impacts on surface water quality.

Compensatory mitigation as implemented under Mitigation Measures BIO-MM#72 and BIO-MM#74 could involve some secondary impacts; however, these impacts would be beneficial.

The Authority finds that Mitigation Measures BIO-MM#72 and BIO-MM#74 are required under the Preferred Alternative and that implementation of these mitigation measures will reduce impacts on surface water quality to a less-than-significant level.

4.5.3 Impact HYD#10: Temporary Impacts on Groundwater and Surface Water Hydrology during Tunnel Construction

The Preferred Alternative would construct two tunnels: Tunnel 1 in the Morgan Hill and Gilroy Subsection and Tunnel 2 in the Pacheco Pass Subsection. Tunneling would provide a conduit for groundwater to seep into the excavation as the advancing tunnel intersects subsurface fractures and faults that contain water. Where groundwater is present in the subsurface, groundwater is

expected to leak from the rock mass into the tunnels through the cutterhead of the tunnel boring machine (TBM), conventionally mined tunnel walls, or first pass tunnel lining segments. In such cases, groundwater inflows or seepage may temporarily affect the hydrology of seeps, springs, water supply wells, creeks, streams, and other waterbodies. Effects associated with changes in groundwater contribution to hydrology include both the potential for a localized reduction in well productivity and spring and seep flows, resulting in partial or complete degradation of aquatic habitat, and the potential for aggregated downstream changes to habitats. Modifications to seep and spring flow could affect downstream or downslope receiving streams and aquifers by reducing groundwater infiltration and altering flow levels as well as the extent and quality of aquatic habitats that support fish, wildlife, and plant species. A localized lowering of the groundwater table could occur as water seeps into the tunnel, and this effect is expected to persist until the aquifers naturally refill with rainfall. Hydrology effects associated with tunneling could occur simultaneously with inflows into the tunnel, or they could begin weeks to months after the advancing tunnel excavation has passed near the well, seep, spring, or waterbody, depending on subsurface rock permeability. Based on information gained from tunneling projects conducted by others, including the New Irvington Tunnel and the Arrowhead Tunnel (SFPUC 2009; Berg 2012), any such effects are expected to persist for months to several years following completion of tunneling and installation of the watertight tunnel liner.

Based on the information gained from construction of the Irvington Tunnels and the Arrowhead Tunnels, it is expected that the proposed HSR tunnel construction is likely to affect groundwater and surface water resources within a maximum distance of approximately 1 mile from the tunnel alignments. However, it is expected that only a subset of the resources within 1 mile would be affected, with most effects occurring within 0.25 to 0.5 mile of the tunnel alignments and many resources within 1 mile of the tunnel alignments having no effects or limited effects. The groundwater and surface water resources that directly overlie or are in proximity to the proposed tunnel alignments are anticipated to have the highest potential to be affected by tunneling. These effects are expected to be temporary, lasting months to years after the tunnels become watertight.

In accordance with HYD-IAMF#5, tunnels will be designed to be watertight, smooth, durable, and low maintenance to maintain existing groundwater levels over the tunnel structures throughout the tunnel design service life. Tunnel lining would consist of one- or two-pass lining systems to meet HSR design criteria requirements. The specific tunnel lining type would be determined during final design, informed by Phase 2 geotechnical investigations proximate to the tunnel alignment. The contractor would use tunnel design and construction methods to avoid or minimize groundwater reduction to the maximum extent practicable.

In accordance with HYD-IAMF#5, TBM requirements will include the following:

- 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.
- 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.
- Check-grouting through dedicated sockets in precast segmental liner to completely fill the annular opening created by TBM over-excavation, between the segments and the ground.

Per the requirements of HYD-IAMF#5, 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 this assessment, the contractor will identify the preferred methods (described in HYD-IAMF#5) to minimize

construction effects on the existing groundwater regime and tunnel excavation methods and design to minimize or eliminate the risk and likelihood of effects on groundwater.

The highest potential for groundwater and hydrology effects is near the Ortigalita fault zone. While groundwater conditions in the Ortigalita fault zone (segment D of Tunnel 2) have not been defined through subsurface investigations, the fault has the potential to contain large quantities of groundwater (Authority 2017). The potential to encounter large quantities of groundwater at this fault is supported by observations made during construction of the New Irvington Tunnel, where the greatest intensity of groundwater effects was predicted to occur along fault zones due to high rates of water transmission through fractures and shear zones in the subsurface (SFPUC 2009). Although Cottonwood Creek tributary 9 crosses almost directly over where Tunnel 2 intersects the Ortigalita fault zone, surface flows within this creek are not expected to be substantially affected by tunneling because its stream flows are driven by rainfall. Additionally, no public or privately owned water supply wells or seeps and springs have been identified in this area (USGS 2007–2014; SWRCB 2016; DWR 2019). Therefore, while tunneling through the fault zone has a high potential to affect groundwater resources and surface hydrology, no groundwater resources or groundwater-dependent streams have been identified in close proximity to the fault zone at this time.

However, even with incorporation of these IAMFs, tunnel construction will result in impacts on groundwater and surface water hydrology. This impact is significant under CEQA (Final EIR/EIS: page 3.8-104).

Implementation of the following measure mitigates this impact: HYD-MM#1: Prepare and Implement a Groundwater Adaptive Management and Monitoring Program. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

The Authority will implement mitigation to reduce potential impacts on public and private water supplies derived from groundwater resources, including water supply wells, springs, and seeps, during construction of tunnels in the Morgan Hill and Gilroy and Pacheco Pass Subsections. HYD-MM#1 will require the preparation and implementation of a GAMMP prior to, during, and after construction of tunnels. The GAMMP will specify requirements for baseline data collection, groundwater modeling, monitoring during and after construction, adaptive management triggers and required remedial actions, and communication and reporting requirements. Mitigation will reduce impacts on groundwater and surface water resources and provide supplemental water to landowners and public water agencies if tunneling disrupts water supplies. 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 Santa Clara Valley Water District, San Benito County, and Merced County for review (and approval as applicable).

This mitigation measure will be effective in minimizing impacts on groundwater and surface water hydrology from tunnel construction.

Mitigation Measure HYD-MM#1 is not expected to have a significant secondary impact on water quality and biological resources through implementing monitoring requirements of the GAMMP, beneficial reuse of treated groundwater inflows, providing supplemental water supply infrastructure on properties with the potential to have their water supply impacted by tunnel construction, and installation of additional groundwater monitoring wells specific to implementing the monitoring requirements of the GAMMP.

The Authority finds that Mitigation Measure HYD-MM#1 is required under the Preferred Alternative and that implementation of this mitigation measure will reduce impacts on groundwater and surface water hydrology from tunnel construction to a less-than-significant level (Final EIR/EIS: page 3.8-125).

4.6 Hazardous Materials and Waste (Section 3.10 of the Final EIR/EIS)

The Preferred Alternative would result in potentially significant intermittent impacts from hazardous materials and wastes activities near schools during construction. This potentially significant impact would be mitigated to less than significant.

4.6.1 Impact HMW#12: Intermittent Impacts from Hazardous Materials and Wastes Activities near Schools during Construction

Construction of the project may involve the use of hazardous materials and wastes near schools, which could result in exposure of students and school faculty to hazardous materials or wastes through skin contact, ingestion, or inhalation and environmental impacts on school grounds through contact with released hazardous materials or wastes.

Materials are anticipated to be used in a manner consistent with typical construction procedures and are not anticipated to leave the project footprint. Project design features also include management plans to transport and prevent spills of hazardous materials associated with project construction. During project construction, hazardous materials will be transported in accordance with regulations regarding the transport, use, and storage of hazardous materials (HMW-IAMF#7). During project construction, the potential for a release of hazardous materials will be managed (HMW-IAMF#6) and, accordingly, the associated potential impacts on schools. A Hazardous Materials Monitoring Plan (HMW-IAMF#10) and a Spill Prevention Control Countermeasures plan or a Spill Prevention Response plan (HMW-IAMF#6) will be prepared to promote safe storage of hazardous materials and manage any spill of stored materials.

However, even with these IAMFs, the intermittent impacts from hazardous materials and wastes activities will not eliminate the possibility of a release of hazardous materials in quantities greater than the state threshold quantity given in subdivision (l) of Section 25532 of the Health and Safety Code near schools within 0.25 mile of the project footprint. This impact is significant under CEQA (Final EIR/EIS: page 3.10-40).

Implementation of the following measure mitigates this impact: HMW-MM#1: Limit Use of Extremely Hazardous Materials Near Schools During Construction. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

Mitigation Measure HMW-MM#1 requires that 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 would be required to monitor all use of extremely hazardous substances. The mitigation measure is consistent with California Public Resources Code Section 21151.4, and will be effective in reducing the impact to a less than significant level. The memorandum will be submitted to the Authority prior to any construction involving an extremely hazardous substance.

This mitigation measure will be effective because it will reduce the quantities of extremely hazardous materials used near schools during project construction to below the state threshold quantity given in subdivision (l) of Section 25532 of the Health and Safety Code.

No secondary impacts would result from implementation of Mitigation Measure HMW-MM#1.

The Authority finds that Mitigation Measure HMW-MM#1 is required under the Preferred Alternative and that implementation of this mitigation measure will reduce impacts from hazardous wastes and materials near schools to a less-than-significant level.

4.7 Safety and Security (Section 3.11 in the Final EIR/EIS)

The Preferred Alternative would result in potentially significant temporary impacts on emergency access and response times from temporary roadway and highway closures, relocations, and modifications and continuous permanent impacts on emergency access and response times. The potentially significant impact from temporary roadway and highway impacts would be mitigated to less than significant. However, the potentially significant impact on emergency access and response times would remain significant and unavoidable even with implementation of mitigation.

4.7.1 Impact S&S#1: Temporary Impacts on Emergency Access and Response Times from Temporary Roadway and Highway Closures, Relocations, and Modifications

Construction activities associated with the Preferred Alternative would include temporary road closures, relocations, and modifications associated with construction, along with relocations or reconstructions, including lane reductions of portions of the Monterey Road, which would result in emergency access delays and inadequate response times.

Prior to construction, a construction safety transportation management plan will be prepared by the contractor that includes the contractor's coordination efforts with local jurisdictions for maintaining emergency vehicle access during construction (SS-IAMF#1). A CTP will also be prepared that will identify when and where temporary closures and detours will occur, with the goal of maintaining traffic flow, especially during peak travel periods (TR-IAMF#2).

However, even with these measures, temporary impacts on emergency access and response times will still occur. This impact is considered significant under CEQA (Final EIR/EIS: page 3.11-48).

Implementation of the following measure mitigates this impact: SS-MM#3: Install Emergency Vehicle Detection. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

The Authority will implement SS-MM#3 during the course of construction. This measure will reduce emergency vehicle response times by providing signal priority when emergency vehicle detection is activated on Monterey Road.

This mitigation measure, which will be implemented prior to and during construction, will be effective in minimizing temporary impacts on emergency access and response times.

Implementing Mitigation Measure SS-MM#3 would not result in secondary impacts because the addition of vehicle detection equipment will occur during construction and will not disrupt new areas during operations.

The Authority finds that Mitigation Measure SS-MM#3 is required under the Preferred Alternative and that implementation of this mitigation measure will reduce impacts on emergency access and response times to a less-than-significant level.

4.7.2 Impact S&S#4: Continuous Permanent Impacts on Emergency Access and Response Times

Operation of the Preferred Alternative would result in increased travel time for emergency response vehicles because of increased gate down events caused by HSR trains. In the Monterey Corridor Subsection, areas served by the fire station at 4430 Monterey Road would be affected. In the Morgan Hill and Gilroy Subsection, areas served by the fire stations at 15670 Monterey Road, 10810 No Name Uno, 880 Sunrise Drive, 8383 Wren Avenue, and 7070 Chestnut Street would be affected.

This increased travel time for emergency response vehicles would be considered a significant impact under CEQA (Final EIR/EIS: page 3.11-61).

Implementation of the following measures lessens this impact: SS-MM#4: Install Emergency Vehicle Response Improvements and traffic delay/congestion Mitigation Measures TR-MM#1e:

Monterey Road/Chynoweth Avenue-Roeder Road—Widen and Reconfigure, TR-MM#1t: Monterey Road/San Martin Avenue—Restripe Southbound Approach, TR-MM#1u: Monterey Road/IOOF Avenue—Widen and Reconfigure Southbound Approach, TR-MM#1w: Chestnut Street/Luchessa Street—Reconfigure Southbound Approach, TR-MM#1x.6: East Main Avenue/Depot Street—Install Traffic Signal, TR-MM#1x.8: Llagas Road/San Martin Avenue—Install Traffic Signal, TR-MM#1x.9: School Access/IOOF Avenue—Install Traffic Signal, and TR-MM#1x.10: SR 25/Bloomfield—Install Traffic Signal. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

The Authority will implement SS-MM#4; TR-MM#1e: Monterey Road/Chynoweth Avenue-Roeder Road—Widen and Reconfigure; TR-MM#1t: Monterey Road/San Martin Avenue—Restripe Southbound Approach; TR-MM#1u: Monterey Road/IOOF Avenue—Widen and Reconfigure Southbound Approach; TR-MM#1w: Chestnut Street/Luchessa Street—Reconfigure Southbound Approach; TR-MM#1x.6: East Main Avenue/Depot Street—Install Traffic Signal; TR-MM#1x.8: Llagas Road/San Martin Avenue—Install Traffic Signal; TR-MM#1x.9: School Access/IOOF Avenue—Install Traffic Signal; and TR-MM#1x.10: SR 25/Bloomfield—Install Traffic Signal prior to operations. These mitigation measures will reduce emergency vehicle response times by monitoring at-grade crossing conditions and providing a fair share contribution to emergency vehicle response improvements on key routes that serve affected fire stations/first responders as needed. These mitigation measures will fully mitigate the project's impacts on emergency vehicle response if implemented. Although the Authority can provide funding for the construction of emergency vehicle response improvements, it cannot compel the City of San Jose, Santa Clara County, or the City of Gilroy to construct and operate the improvements.

Implementing SS-MM#4 may result in secondary impacts. Specifically, building new fire stations or other emergency vehicle priority improvements may result in secondary impacts depending on their locations, which are presently not known; if the local agencies choose to implement and operate emergency vehicle priority treatments with funding provided by the Authority, they may need to conduct environmental analysis prior to construction. Providing additional contracted emergency first responder ambulance services may result in secondary impacts depending on whether contracted ambulance services will require construction of new deployment facilities or whether their operations will only include deployment of additional ambulances on call in the affected areas; local agencies may need to conduct environmental analysis prior to construction. If the Authority and a local agency mutually agree for payment of an in-lieu fee used for other infrastructure projects, including grade-separation projects, the local agency may need to conduct environmental analysis prior to construction.

Implementing TR-MM#1e would result in secondary impacts. TR-MM#1e will require acquisition of additional right-of-way from the northeast and southeast corners of the Monterey Road/Chynoweth Avenue—Roeder Road intersection and would therefore result in secondary impacts. 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. As a result, while there would be some secondary effects, with standard relocation assistance, unmitigable secondary effects would not result.

Implementing TR-MM#1u would result in secondary impacts consisting of the removal of parking on the west side of Monterey Road; however, the removal of parking on the approach is not considered to result in significant secondary effects on the environment.

Implementing TR-MM#1w and TR-MM#1x would not result in secondary impacts because all improvements will be within the existing roadway right-of-way.

The Authority finds that Mitigation Measures SS-MM#4, 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 are required under the Preferred Alternative and that these measures will lessen the project's impacts on emergency access and response time; however, because the Authority cannot compel the construction and operation of the improvements as discussed above, the CEQA impact on emergency vehicle response time would remain significant and unavoidable. The Authority finds that there are no

other feasible mitigation measures or alternatives that could be adopted to reduce this remaining impact to less-than-significant levels. The Authority finds that despite this otherwise significant and unavoidable impact, specific economic, social, and other considerations identified in the Statement of Overriding Considerations (Chapter 8 of this document) support certification of the Final EIR/EIS and approval of the project.

4.8 Agricultural Farmland (Section 3.14 of the Final EIR/EIS)

The Preferred Alternative would result in potentially significant impacts on Important Farmland as a result of permanent direct conversion to nonagricultural uses, permanent indirect conversion from creation of remnant parcels, and temporary and permanent disruption of agricultural infrastructure. The potentially significant impacts from temporary and permanent disruption of agricultural infrastructure would be mitigated to less than significant. However, the potentially significant impacts on Important Farmland from direct and indirect conversion would remain significant and unavoidable even with implementation of mitigation.

4.8.1 Impact AG#2: Permanent Conversion of Important Farmland to Nonagricultural Use

The Preferred Alternative would have a significant direct impact on Important Farmland as a result of permanent conversion of Important Farmland to nonagricultural use caused by direct use of the land. Construction of the project, including acquisition of land for the construction of the HSR right-of-way, access easement, stations, and maintenance facilities, would require the long-term use of Important Farmland, resulting in direct permanent impacts or the conversion of Important Farmland to a nonagricultural use.

This agricultural land conversion would be considered a significant impact under CEQA (Final EIR/EIS: page 3.14-45).

Implementation of the following measures lessens this impact:

AG-MM#1: Conserve Important Farmland (Prime Farmland, Farmland of Statewide Importance, Farmland of Local Importance, and Unique Farmland) and 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. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

AG-MM#1 will identify suitable agricultural land for mitigation of impacts and 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 mitigation measure will minimize the overall impact of permanent conversion of Important Farmland to a nonagricultural use because it will preserve Important Farmland in an amount commensurate with the quantity and quality of the converted farmlands, in the same agricultural regions as the impacts occur. There would be no secondary impacts as a result of implementing AG-MM#1.

In addition, AG-MM#2 will restrict the project footprint to the minimum dimensions and area required to operate and maintain the aerial guideway, thus minimizing the area of Important Farmland near aerial guideways that will be converted from agricultural to nonagricultural uses. The permanent right-of-way 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 the permanent right-of-way must be 45 feet on either side of the track centerline. While this mitigation measure will minimize the area of Important Farmland near aerial guideways that will be converted, it will not avoid all conversion. No land uses will be changed by the mitigation; therefore, there would be no secondary impacts. Further, because all work would remain within the existing footprint, any impacts associated with construction (e.g., air quality, biological resources) have been accounted for with existing environmental analysis. There would be no secondary impacts as a result of implementing AG-MM#2.

These mitigation measures will preserve some Important Farmland and minimize the impacts; however, there will still be a net loss of Important Farmland. While these mitigation measures will provide for preservation of agricultural land in agricultural conservation easements and minimize the area of Important Farmland near aerial guideways that will be converted, they will not avoid all conversion.

The Authority finds that Mitigation Measures AG-MM#1 and AG-MM#2 are required under the Preferred Alternative and that these measures will lessen the project's conversion of farmland; however, because there will still be a net loss of Important Farmland, the CEQA impact from agricultural conversion would remain significant and unavoidable. The Authority finds that there are no other feasible mitigation measures or alternatives that could be adopted to reduce this remaining impact to less-than-significant levels. The Authority finds that despite this otherwise significant and unavoidable impact, specific economic, social, and other considerations identified in the Statement of Overriding Considerations (Chapter 8 of this document) support certification of the Final EIR/EIS and approval of the project.

4.8.2 Impact AG#3: Permanent Creation of Remnant Parcels of Important Farmland

The Preferred Alternative would have an indirect impact on Important Farmland as a result of the creation of remnant parcels through parcel severance. Remnant parcels would be severed from a larger parcel either because the guideway alignment would bisect the parcel or because roadway access to these parcels would be restricted or eliminated. Some remnant parcels would remain in agricultural use because of their adjacency to another field with access, large size, or farmable shape. However, remnant parcels of 20 acres or less have the potential to become nonviable because of lack of access, size, shape, location, or other hardship.

The Farmland Consolidation Program (AG-IAMF#3), which is administered by the Authority, will provide for continued agricultural use on the maximum feasible amount of remnant parcels by facilitating the sale of remnant parcels to neighboring landowners for consolidation with adjacent farmland properties. Remnant parcels that are considered viable candidates for consolidation with adjoining agricultural properties through the Farmland Consolidation Program are anticipated to remain in agricultural use. Remnant parcels that are not considered viable to continue in agricultural use are considered to be indirectly converted as a result of parcel severance.

However, even with this IAMF, creation of remnant parcels of Important Farmland leading to indirect conversion of agricultural land will still occur and would be considered a significant impact under CEQA (Final EIR/EIS: page 3.14-46).

Implementation of the following measures lessens this impact: AG-MM#1: Conserve Important Farmland (Prime Farmland, Farmland of Statewide Importance, Farmland of Local Importance, and Unique Farmland), 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, and AG-MM#3: Evaluate Modified Access to Remnant Parcels with Landowner Input. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

AG-MM#1 will identify suitable agricultural land for mitigation of impacts and fund the purchase of agricultural conservation easements from willing sellers at a replacement ratio of 0.5:1 for lands that are permanently converted to nonagricultural use by the project as a result of creation of remnant parcels. Final EIR/EIS Figure 3.14-5 illustrates how the ratios will be applied to parcels of Important Farmland affected by the project. Final EIR/EIS Table 3.14-16 shows the acreage of Important Farmland subject to mitigation at the two ratios. There would be no secondary impacts as a result of implementing AG-MM#1.

In addition, AG-MM#2 will restrict the project footprint to the minimum dimensions and area required to operate and maintain the aerial guideway, thus minimizing the area of Important Farmland near aerial guideways that will be converted from agricultural to nonagricultural uses. No land uses will be changed by Mitigation Measure AG-MM#2; therefore, there would be no

secondary impacts. Further, because all work will remain within the existing footprint, any impacts associated with construction (e.g., air quality, biological resources) have been accounted for with existing environmental analysis.

Further, AG-MM#3 will provide for evaluation of the potential for modified access for remnant parcels with property owner input. In cases where such modified access is possible, continued agricultural activities will be feasible, resulting in less conversion of Important Farmland to nonagricultural uses. Any impacts associated with construction (e.g., air quality, biological resources) have been accounted for with existing environmental analysis.

These mitigation measures will preserve some Important Farmland and minimize the impacts; however, there will still be a net loss of Important Farmland. While these mitigation measures will provide for preservation of agricultural land in agricultural conservation easements, minimize the area of Important Farmland near aerial guideways that will be converted, and provide for continued access to severed parcels, they will not avoid all conversion.

Because there will be new roadway and/or roadway crossing construction as a result of implementing AG-MM#3, there could be secondary impacts on air quality, noise, and biological resources. Impacts on air quality and noise would be minimal relative to the scale of air quality and noise impacts analyzed for the project as a whole. In addition, construction of the roadway and/or roadway crossings would be subject to applicable IAMFs and mitigation measures. Additionally, any new road and/or roadway crossing that may be introduced will be subject to mitigation measures that minimize impacts on wildlife movement.

The Authority finds that Mitigation Measures AG-MM#1, AG-MM#2, and AG-MM#3 are required under the Preferred Alternative and that these measures will lessen the project's conversion of farmland from creation of remnant parcels of Important Farmland; however, because there will still be a net loss of Important Farmland, the CEQA impact on the creation of remnant parcels of Important Farmland would remain significant and unavoidable. The Authority finds that there are no other feasible mitigation measures or alternatives that could be adopted to reduce this remaining impact to less-than-significant levels. The Authority finds that despite this otherwise significant and unavoidable impact, specific economic, social, and other considerations identified in the Statement of Overriding Considerations (Chapter 8 of this document) support certification of the Final EIR/EIS and approval of the project.

4.8.3 Impact AG#4: Temporary Disruption of Agricultural Infrastructure Serving Important Farmland

The Preferred Alternative would indirectly impact Important Farmland as a result of temporary disruption of agricultural infrastructure serving Important Farmland. Construction in the right-of-way would require the temporary shutdown or interruption of utility services to agricultural customers, among others. Construction of the project could disrupt agricultural operations through temporary disruption of utilities, power supply infrastructure, and irrigation and drainage infrastructure.

Coordination with service providers will occur to minimize or avoid temporary disruption of utilities or irrigation infrastructure that will affect agricultural operations (PUE-IAMF#4). Temporary disruption of irrigation infrastructure will be avoided by installing new facilities before disconnecting existing facilities (PUE-IAMF#2). Furthermore, the public will be notified of service disruptions in advance through a coordinated outreach campaign (PUE-IAMF#3). Temporary roadway closures, including those associated with network upgrades will also be managed (TR-IAMF#2).

In addition, the project will provide temporary livestock and equipment crossings to minimize delays and limited access to agricultural infrastructure caused by temporary road closures (AG-IAMF#5). To provide agricultural property owners or leaseholders sufficient lead time to make any changes to their operations in response to project construction, the Authority will provide written notification to agricultural property owners or leaseholders immediately adjacent to the area of disturbance (AG-IAMF#4).

While IAMFs will avoid an impact related to disruption to or relocations of utilities, irrigation, and road infrastructure, disruption to or relocation of agricultural drainage infrastructure could result in increased nutrient retention in soil, higher soil salinity, and standing water as a result of perched groundwater that could damage root systems. IAMFs HYD-IAMF#1, HYD-IAMF#3, and HYD-IAMF#4 will reduce impacts on water quality by requiring development of a storm water management and treatment plan (HYD-IAMF#1), Construction SWPPP (HYD-IAMF#3), and Industrial SWPPP (HYD-IAMF#4). These IAMFs will ensure that runoff does not degrade water quality.

However, even with these IAMFs, temporary disruption of infrastructure that indirectly leads to agricultural conversion will still occur and would be considered a significant impact under CEQA (Final EIR/EIS: page 3.14-49).

Implementation of the following measure mitigates this impact: AG-MM#4: Relocate and Reconnect Drainage Facilities before Disconnecting Original Facilities. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

Mitigation Measure AG-MM#4 will require new facilities to be installed and operational before use of existing facilities is disrupted. Any impacts associated with construction (e.g., air quality, biological resources, hydrology) have been accounted for with existing environmental analysis. With respect to hydrology, the project would maintain existing flow patterns, so new drainage facilities would result in only minor changes in flow routing. Change in drainage would not result in changes in groundwater.

Because there will be new construction of drainage facilities as a result of implementing AG-MM#4, there could be secondary impacts on air quality and noise. However, these impacts would be minimal relative to the scale of air quality and noise impacts analyzed for the project as a whole. In addition, construction of the drainage facilities will be subject to applicable IAMFs and mitigation measures.

The Authority finds that Mitigation Measure AG-MM#4 is required under the Preferred Alternative and that implementation of this mitigation measure will reduce impacts on agricultural conversion indirectly caused by temporary infrastructure disruption to a less-than-significant level.

4.8.4 Impact AG#5: Permanent Disruption of Agricultural Infrastructure Serving Important Farmland

The Preferred Alternative would indirectly impact Important Farmland as a result of permanent disruption of agricultural infrastructure serving Important Farmland. Construction of the project could permanently relocate some irrigation facilities, relocate agricultural drainage facilities, and close some roads. The loss of access to irrigation would result in the indirect conversion of Important Farmland because of potential crop damage and a corresponding decrease in agricultural productivity. Construction activities could limit equipment access to fields, disrupting basic agricultural activities, and road closures could also eliminate access to irrigation ditches.

Where irrigation facilities need to be relocated, new irrigation facilities will be installed and operational before existing facilities will be disconnected (PUE-IAMF#2), where feasible. Project construction would result in the permanent closure of some public and private roadways on agricultural farmland, severing Important Farmland. The project will provide equipment crossings at road closures (AG-IAMF#6), minimizing the impact of road closures on agricultural operations. Furthermore, road crossings in rural areas will be provided approximately every 1 to 2 miles (TR-IAMF#2).

IAMFs HYD-IAMF#1, HYD-IAMF#3, and HYD-IAMF#4 will reduce impacts on water quality by requiring development of a storm water management and treatment plan (HYD-IAMF#1), Construction SWPPP (HYD-IAMF#3), and Industrial SWPPP (HYD-IAMF#4). These IAMFs will ensure that runoff does not degrade water quality. While IAMFs will avoid an impact related to disruption to or relocations of utilities, roads, and irrigation infrastructure, except for irrigation infrastructure at a site near Casa de Fruta (from Station 3148+60 to Station 3154), disruption to or relocation of agricultural drainage infrastructure could result in increased nutrient retention in

soil, higher soil salinity, and standing water as a result of perched groundwater that could damage root systems.

However, even with these measures, permanent disruption of infrastructure that indirectly leads to agricultural conversion will still occur and would be considered a significant impact under CEQA (Final EIR/EIS: page 3.14-51).

Implementation of the following measures mitigates this impact: AG-MM#4: Relocate and Reconnect Drainage Facilities before Disconnecting Original Facilities and AG-MM#5: Avoid Infrastructure Serving Important Farmland from Station 3148+60 to Station 3154 (near Casa de Fruta). Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

Mitigation Measure AG-MM#4 will require new facilities to be installed and operational before use of existing facilities is disrupted. Any impacts associated with construction (e.g., air quality, biological resources, hydrology) have been accounted for with existing environmental analysis. With respect to hydrology, the project would maintain existing flow patterns, so new drainage facilities would result in only minor changes in flow routing. Change in drainage would not result in changes in groundwater. With implementation of AG-MM#4, access to agricultural drainage infrastructure will be continuous, and the impact would be less than significant.

In addition, near Casa de Fruta (from Station 3148+60 to Station 3154) project design involves an embankment, which could result in parcel-specific permanent disruption of irrigation infrastructure on Important Farmland under the Preferred Alternative. AG-MM#5 will revise the project design between these locations, Station 3148+60 to Station 3154 as indicated on design plans) from embankment to viaduct, thus avoiding impacts on irrigation infrastructure. Any impacts associated with construction (e.g., air quality, biological resources) have been accounted for with existing environmental analysis. With implementation of AG-MM#5, agricultural irrigation infrastructure will not be disrupted at this location beyond the ability of IAMFs to avoid impacts, and the impact would be less than significant.

Because there will be new construction of drainage facilities as a result of implementing AG-MM#4, there could be secondary impacts on air quality and noise. However, these impacts would be minimal relative to the scale of air quality and noise impacts analyzed for the project as a whole. In addition, construction of the drainage facilities will be subject to applicable IAMFs and mitigation measures.

Although the alignment will remain within the existing project footprint if the revised design of AG-MM#5 is implemented, there could be secondary impacts on air quality, noise, and aesthetics as a result of the construction methods employed to construct the viaduct and the vertical profile that differ from construction methods and profile analyzed before implementation of AG-MM#5. However, air quality and noise impacts would be minimal relative to the scale of air quality and noise impacts analyzed for the project as a whole. In addition, construction of the drainage facilities will be subject to applicable IAMFs and mitigation measures. In contrast, secondary effects of mitigation on aesthetics would be greater at this location with implementation of AG-MM#5 because a viaduct will be constructed rather than an embankment in this area. The HSR viaduct would contrast with the existing agricultural and natural landscape. However, construction of the viaduct would be subject to applicable IAMFs and mitigation measures.

The Authority finds that Mitigation Measures AG-MM#4 and AG-MM#5 are required under the Preferred Alternative and that implementation of these mitigation measures will reduce impacts on agricultural conversion indirectly caused by permanent infrastructure disruption to a less-than-significant level.

4.9 Parks, Recreation, and Open Space (Section 3.15 in the Final EIR/EIS)

The Preferred Alternative would result in potentially significant impacts on parks, recreation, and open space resources as a result of temporary changes from noise, vibration, and air emissions on use and user experience of parks, recreational facilities, and open space resources; temporary

changes to access or use of parks; permanent changes affecting access to or circulation in parks, recreational facilities, and open space resources; permanent acquisition of parks, recreation, and open space resources; permanent changes from noise and vibration on parks, recreation, and open space resource character and use; and permanent changes from noise and vibration on school district play area character and use. These potentially significant impacts would be mitigated to less than significant.

4.9.1 Impact PK#1: Temporary Changes from Noise, Vibration and Air Emissions on Use and User Experience of Parks, Recreational Facilities, and Open Space Resources

Construction of the Preferred Alternative would create temporary changes caused by noise, vibration, and air emissions on use and user experience of parks, recreational facilities, and open space resources. Construction of the project would impair use of the gardens at Villa Mira Monte and the amphitheater at the Morgan Hill Community and Cultural Center during one phase of construction (track installation), even with project actions to minimize noise and vibration impacts. Track installation activities would last approximately 6 months in the vicinity of these resources. Use of the gardens at Villa Mira Monte and the amphitheater at Morgan Hill Community and Cultural Center would be impaired by indirect construction impacts. This construction activity would only occur for approximately 6 months, and construction would not be directly in front of the Villa Mira Monte or the community center during the entire 6 months; it would be more spread out in the general vicinity of these resources. This would mean that construction noise levels would not be constantly above the noise threshold, but could still disrupt special events.

The project will comply with Federal Transit Administration (FTA) and FRA noise requirements and implement emission controlling practices for sensitive land uses, which include the noise sensitive parks and open space facilities (AQ-IAMF#1, AQ-IAMF#4, AQ-IAMF#5, and NV-IAMF#1).

However, even with these IAMFs, the impairment of the use and user experience of parks, recreational facilities, and open space resources will still occur and would be considered a significant impact under CEQA (Final EIR/EIS: page 3.15-55).

Implementation of the following measures mitigates this impact: NV-MM#1: Construction Noise Mitigation Measures, NV-MM#2: Construction Vibration Mitigation Measures, and PR-MM#6: Minimize Construction Noise Impacts During Noise Sensitive Special Events. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

The Authority will implement mitigation measures to minimize project construction noise and vibration impacts at Villa Mira Monte and Morgan Hill Community and Cultural Center. NV-MM#1 involves compliance with the noise limits (an 8-hour equivalent sound level [L_{eq}], dBA of 80 during the day and 70 at night for residential land use, 85 for both day and night for commercial land use, and 90 for both day and night for industrial land use) where a noise-sensitive receptor is present. The contractor will be given the flexibility to meet the FRA construction noise limits in the most efficient and cost-effective manner.

NV-MM#2 involves compliance with the vibration reduction methods. 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 vibration 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.

Additionally, PR-MM#6 will minimize construction noise impacts during noise sensitive special events. The contractor will be required to coordinate with representatives from Morgan Hill Community and Cultural Center and Villa Mira Monte to modify construction as necessary (which may include scheduling modifications) to avoid construction noise disruption of noise sensitive outdoor events (such as concerts and weddings).

These mitigation measures will be effective because construction will be modified to enable special events to occur at these two locations.

Mitigation Measure NV-MM#1 would have limited to no secondary environmental impacts because the temporary measures are limited to the construction zone itself and will not exacerbate any other environmental impacts of construction.

The Authority finds that Mitigation Measures NV-MM#1, NV-MM#2, and PR-MM#6 are required under the Preferred Alternative and that implementation of these mitigation measures will reduce impacts on the use and user experience of parks, recreation facilities, and open space to a less-than-significant level.

4.9.2 Impact PK#2: Temporary Changes to Access or Use of Parks

Access to some parks and other recreational resources would be limited during project construction because of the installation of TCEs and equipment. Connectivity of trail segments within Guadalupe River Trail, Highway 87 Bikeway, Three Creeks Trail (Planned), and Fisher Creek Trail (Planned), cannot be guaranteed during project construction. In addition, portions of Highway 87 Bikeway North would be closed during construction, for approximately 6 months.

The project design will provide safe and attractive access to parks and maintain sufficient separation of HSR guideway systems from existing parks and recreation facilities (PK-IAMF#1). 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, and open space resources (TR-IAMF#2, TR-IAMF#4, TR-IAMF#5, and TR-IAMF#7).

However, even with these IAMFs, the temporary impacts on access and use of parks will still occur. This would be considered a significant impact under CEQA (Final EIR/EIS: page 3.15-66).

Implementation of the following measures mitigates this impact: PR-MM#1: Provide Access to Trails during Construction, PR-MM#2: Provide Temporary Park Access, and PR-MM#4: Implement Project Design Features. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

The Authority will implement mitigation measures to minimize impacts on access or use of parks. PR-MM#1 involves alternative access via a temporary detour of the trail using existing roadways or other public rights-of-way, which will include a detour for Highway 87 Bikeway North.

Additionally, PR-MM#2 involves maintaining connections to unaffected park portions or nearby roadways during construction.

PR-MM#4 will make certain the project design features from the technical memorandums are implemented. These actions will be documented in technical memorandums prepared by the Contractor that 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 memorandums. The activities will be incorporated into the design specifications and will be a pre-condition requirement.

The mitigation measures will be effective because the contractor will be required to maintain access during construction, allowing the resources to remain usable during project construction.

Implementation of Mitigation Measure PR-MM#1 would not trigger significant secondary environmental impacts because it will not change the scope, scale, or location of construction activities beyond those that have been described as part of the project.

Although there is potential for human annoyance to occur from delayed access to these resources, overall, implementing PR-MM#2 and PR-MM#4 would not result in secondary impacts.

The Authority finds that Mitigation Measures PR-MM#1, PR-MM#2, and PR-MM#4 are required under the Preferred Alternative and that implementation of these mitigation measures will reduce temporary impacts on access or use of parks, recreation facilities, and open space to a less-than-significant level.

4.9.3 Impact PK#4: Permanent Changes Affecting Access to or Circulation in Parks, Recreational Facilities, and Open Space Resources

Construction of the Preferred Alternative would result in permanent changes affecting access to or circulation in resources. There would be an impact for Highway 87 Bikeway North and Fisher Creek Trail (Planned) because there would be permanent changes in access to or circulation at these resources that would prevent the use of the resources if not realigned. Under the Preferred Alternative, permanent realignment to the west will be required at Almaden Expressway due to track shifts (PK-IAMF#1). Access to Fisher Creek Trail (Planned) from Monterey Road would also be affected if Fisher Creek Trail is completed prior to the initiation of construction of the HSR in the vicinity. The trail will be redesigned prior to project construction and implementation, avoiding an impact (PK-IAMF#1). If Fisher Creek Trail is constructed prior to HSR construction in the vicinity, it would be realigned.

However, even with these IAMFs, the permanent impacts on access to or circulation in parks, recreation facilities, and open space will still occur and would be considered a significant impact under CEQA (Final EIR/EIS: page 3.15-68).

Implementation of the following measure mitigates this impact: PR-MM#3: Provide Permanent Park Access. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

The Authority will implement mitigation measures to minimize impacts from permanent change in access or circulation. PR-MM#3 will require the contractor to prepare a technical memorandum documenting how access to and use of disrupted trails will be maintained. 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. Through these actions, the contractor will be required to realign the resources prior to the start of construction activities, which will maintain access and use during construction and operation.

The mitigation measure will be effective because the contractor will be required to realign the affected portions of the resources, allowing the resources to remain usable during operation.

Overall, implementing PR-MM#3 would not result in secondary impacts.

The Authority finds that Mitigation Measure PR-MM#3 is required under the Preferred Alternative and that implementation of this mitigation measure will reduce permanent impacts on access to or circulation in parks, recreation facilities, and open space to a less-than-significant level.

4.9.4 Impact PK#6: Permanent Acquisition of Parks, Recreation, and Open Space Resources

Construction of the Preferred Alternative would result in the permanent acquisition of parks, recreation, and open space resources. Specifically, the project would result in permanent acquisition of portions of Highway 87 Bikeway North (55 percent) because the land that would be acquired would result in a diminished capacity to use the resource. In addition, this permanent acquisition would require that the Highway 87 Bikeway North trail be permanently realigned in order to maintain access and use.

At Highway 87 Bikeway North, a portion of the trail alignment would be acquired at its intersection with SR 87 and at its planned intersection with Monterey Road. Under the Preferred Alternative, permanent realignment to the west would be required at Almaden Expressway due to track shifts. The project includes project features to maintain access to trails 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 trails, such as providing safe and attractive access for existing travel modes (e.g., bicyclists) to trails (PK-IAMF#1).

However, even with this IAMF, the permanent impacts on access to or circulation in parks, recreation facilities, and open space will still occur and would be considered a significant impact under CEQA (Final EIR/EIS: page 3.15-110).

Implementation of the following measures mitigates this impact: PR-MM#3: Provide Permanent Park Access and PR-MM#5: Implement Measures to Reduce Impacts Associated with the Relocation of Important Facilities. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

The Authority will implement mitigation measures to minimize impacts from permanent acquisition. PR-MM#3 will require the contractor to prepare a technical memorandum documenting how access to parks and use of disrupted trails will be maintained. 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. Through these actions, the contractor will be required to realign the bikeway during construction, which will maintain access and use during operation. Under the Preferred Alternative, permanent realignment to the west would be required at Almaden Expressway due to track shifts. Overall, implementing PR-MM#3 would not result in secondary impacts.

PR-MM#5 involves consultation with the appropriate parties before land acquisition to assess potential opportunities to reconfigure land use 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 mitigation measures will be effective because the contractor will be required to realign the affected portions of the bikeway during construction, allowing the bikeway to remain usable during project operation, and the Authority will consult with appropriate parties before land acquisition.

Overall, implementing PR-MM#5 would not result in secondary impacts.

The Authority finds that Mitigation Measures PR-MM#3 and PR-MM#5 are required under the Preferred Alternative and that implementation of these mitigation measures will reduce impacts from acquisition of parks, recreation facilities, and open space to a less-than-significant level.

4.9.5 Impact PK#7: Permanent Changes from Noise and Vibration on Parks, Recreation, and Open Space Resource Character and Use

Operation of the Preferred Alternative would affect the user experience at Los Banos Wildlife Area, in the parking area for the Volta Wildlife Area, and the user experience at Highway 87 Bikeway North, Edenvale Gardens Regional Park, and Morgan Hill Community and Cultural Center, because the new source of noise resulting from project operations, including train operation and maintenance activities, could interfere with use of the outdoor amphitheater at the Morgan Hill Community and Cultural Center and degrade the user experience in the park resources. In addition, vibration impacts would occur at Highway 87 Bikeway.

This would be considered a significant impact under CEQA (Final EIR/EIS: page 3.15-111).

Implementation of the following measures mitigates this impact: NV-MM#3: Implement Proposed California High-Speed Rail Project Noise Mitigation Guidelines, NV-MM#4: Support Potential Implementation of Quiet Zones by Local Jurisdictions, NV-MM#8: Project Vibration Mitigation Measures, and BIO-MM#80: Minimize Permanent Intermittent Noise, Visual, and Train Strike Impacts on Wildlife Movement. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

The Authority will implement mitigation measures to minimize noise and vibration impacts at each of the affected park resources. NV-MM#3 involves the installation of sound barriers that can achieve between a 5- and 15-dB reduction in noise, depending on their height and location relative to the tracks.

NV-MM#4 involves assisting local communities in establishing Quiet Zones, which will eliminate the requirement for all trains to routinely sound their warning horns when approaching at-grade highway/rail crossings. The Authority will assist local communities with this process through the installation of four-quad gates and channelization at all at-grade crossings without them presently

on the Project Section, which will help cities to implement quiet zones, should they choose to do so.

NV-MM#8 will include a variety of potential vibration procedures, including changing the location and design of special trackwork, vehicle suspension, special track support systems, trenches, or buffer zones.

The Authority will further implement BIO-MM#80: Minimize Permanent Intermittent Noise, Visual, and Train Strike Impacts on Wildlife Movement, which will require construction of a noise barrier in the UPR IBA and an enclosure in the GEA IBA and will accordingly reduce noise impacts on wildlife (and thus reduce impacts on the user experience) at Los Banos Wildlife Area and in the parking area for the Volta Wildlife Area.

The mitigation measures will be effective because of the installation of sound walls, implementation of vibration-reducing procedures, and the option to establish Quiet Zones to minimize impacts on the extent that the user experience will not be substantially affected, and effects on wildlife will be minimized, maintaining the user experience.

Noise barriers constructed under Mitigation Measure NV-MM#3 could have secondary impacts on visual aesthetics and require tree or vegetation removal. Depending on their design, height, and location, noise barriers can become visually intrusive, blocking views or creating places for unwanted graffiti. Providing sound insulation will involve modest building retrofit activity similar to routine residential or commercial window modifications or insulation replacement and would not result in significant secondary effects.

It is premature to assess the specific potential secondary impacts of Mitigation Measure NV-MM#8 (project vibration mitigation measures). Special trackwork, building modifications, or other approaches adopted pursuant to this measure are likely to be similar to the other vibration-reducing measures identified. Thus, they would likely result in similar secondary environmental impacts during their construction that may be significant.

Implementation of Mitigation Measure BIO-MM#80, which involves construction of noise/visual barriers, could result in secondary impacts on visual resources.

The Authority finds that Mitigation Measures NV-MM#3, NV-MM#4, NV-MM#8, and BIO-MM#80 are required under the Preferred Alternative and that implementation of these mitigation measures will reduce impacts from noise and vibration on the character and use of parks, recreation facilities, and open space to a less-than-significant level.

4.9.6 Impact PK#15: Permanent Changes from Noise and Vibration on School District Play Area Character and Use

Operation of the Preferred Alternative would impact Gilroy Prep School because the new source of noise resulting from project operations, including train operation and maintenance activities, could interfere with use of the school play areas and degrade the user experience in the play areas.

This would be considered a significant impact under CEQA (Final EIR/EIS: page 3.15-133).

Implementation of the following measures mitigates this impact: NV-MM#3: Implement Proposed California High-Speed Rail Project Noise Mitigation Guidelines and NV-MM#4: Support Potential Implementation of Quiet Zones by Local Jurisdictions. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

The Authority will implement mitigation measures to minimize noise impacts at each of the affected park resources. NV-MM#3 involves the installation of sound barriers that can achieve between a 5- and 15-dB reduction in noise, depending on their height and location relative to the tracks. The mitigation measure will be effective because of the installation of sound walls to minimize impacts to a degree that the user experience will not be substantially affected.

NV-MM#4 involves assisting local communities in establishing Quiet Zones, which will eliminate the requirement for all trains to routinely sound their warning horns when approaching at-grade

highway/rail crossings. The Authority will assist local communities with this process through the installation of four-quad gates and channelization at all at-grade crossings without them presently, which will help cities to implement quiet zones, should they choose to do so.

Noise barriers constructed under Mitigation Measure NV-MM#3 could have secondary impacts on visual aesthetics and require tree or vegetation removal. Depending on their design, height, and location, noise barriers can become visually intrusive, blocking views or creating places for unwanted graffiti. Providing sound insulation will involve modest building retrofit activity similar to routine residential or commercial window modifications or insulation replacement and would not result in significant secondary effects.

The Authority finds that Mitigation Measures NV-MM#3 and NV-MM#4 are required under the Preferred Alternative and that implementation of these mitigation measures will reduce impacts from permanent changes caused by noise and vibration to the character and use of school district play areas to a less-than-significant level.

4.10 Aesthetics and Visual Quality (Section 3.16 of the Final EIR/EIS)

The Preferred Alternative would result in potentially significant impacts associated with temporary impacts on visual quality and scenic vistas, temporary impacts on nighttime light levels, and permanent impacts on nighttime light levels at fixed locations. While impacts on visual quality and scenic vistas and temporary impacts on nighttime light levels would be mitigated to less than significant, permanent impacts on nighttime light levels at fixed locations would remain significant and unavoidable after implementation of mitigation.

4.10.1 Impact AVQ#1: Temporary Direct Impacts on Visual Quality and Scenic Vistas

Construction activities and equipment associated with construction of the Preferred Alternative would substantially degrade the existing quality of multiple sites and their surroundings. Construction equipment, stockpiles, and activities would contrast with the established character of views in highly sensitive residential areas and would alter the existing visual quality of residential areas and historic properties, reducing their cultural order to affect visual quality. While the project design will reduce dust, screen and site activities away from sensitive viewers (AQ-IAMF#1), and restore temporary construction sites to their pre-construction condition, some large-scale activities, such as viaduct construction or tunnel portal sites could not be screened, substantially degrading visual resources. In addition, the project includes visual protection measures designed to minimize impacts on residents and businesses (SOCIO-IAMF#1). Where construction degrades the views of highly sensitive residential and recreational viewers, visual resources would be substantially degraded by causing a decline in both the cultural order and natural harmony, affecting a decrease in visual quality.

However, even with these IAMFs, the temporary impacts on visual quality and scenic vistas will still occur and would be considered a significant impact under CEQA (Final EIR/EIS: page 3.16-87).

Implementation of the following measures mitigates this impact: AVQ-MM#1: Minimize Visual Disruption from Construction Activities and AVQ-MM#2: Minimize Light Disturbance during Construction. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

The Authority will implement mitigation measures to minimize the area, scale, and exposure of visual impacts on residential views. Mitigation Measures AVQ-MM#1 and AVQ-MM#2 will require construction contractors to preserve existing vegetation to screen views, locate construction staging sites 500 feet from residential areas, and shield nighttime construction lighting, thereby minimizing changes to the existing visual quality.

No additional impacts would result from implementing Mitigation Measure AVQ-MM#1. Implementation of Mitigation Measure AVQ-MM#2 would not result in secondary impacts because

it will not change the scope, scale, or location of construction activities beyond those that have been described as part of the project.

The Authority finds that Mitigation Measures AVQ-MM#1 and AVQ-MM#2 are required under the Preferred Alternative and that implementation of these mitigation measures will reduce impacts on visual quality and scenic vistas to a less-than-significant level.

4.10.2 Impact AVQ#18: Temporary Impacts on Nighttime Light Levels

During construction of the Preferred 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. Contractors will prepare a CMP to reduce potential impacts on neighborhoods and communities (SOCIO-IAMF#1). It will include measures that minimize impacts on community residents and businesses, including temporary nighttime lighting. This project feature will minimize impacts from lighting at locations where construction activities do not occur at night. However, where temporary construction lighting is required at night and occurs near sensitive viewers, such as travelers with a moderately high viewer sensitivity along SR 152 in the Pacheco Creek Valley, adverse impacts could occur. The tunnel portal construction sites in Pacheco Creek Valley and Romero Valley would be lit throughout the night for the duration of tunnel construction activities. Introducing lighting to these locations with no existing lighting would alter their visual quality, reducing it by two levels.

Although construction would not occur at night at all times or in other locations, lighting associated with construction may be an annoyance to viewers, especially in rural areas. Lighting would reduce visual quality by one level, where viewer sensitivity would often be moderate or, in some cases, high. While the project features will reduce impacts through visually sensitive lighting design, the 24-hour operation of the facilities requires a minimum level of lighting for work safety and security. Project features cannot eliminate the presence of nighttime light where none existed.

Accordingly, temporary impacts on nighttime light levels would be considered a significant impact under CEQA (Final EIR/EIS: page 3.16-156).

Implementation of the following measures mitigates this impact: AVQ-MM#1: Minimize Visual Disruption from Construction Activities and AVQ-MM#2: Minimize Light Disturbance during Construction. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

The Authority will implement mitigation measures to minimize the impacts on travelers' views. Mitigation Measures AVQ-MM#1 and AVQ-MM#2 will require construction contractors to employ measures, such as preserving existing vegetation to screen views, to minimize visual disturbance and shield nighttime construction lighting, thereby maintaining existing visual quality as much as possible. Mitigation measures will reduce the area, scale, and exposure to adverse visual impacts. This would reduce light spillover from HSR buildings and facilities.

No additional impacts would result from implementing Mitigation Measure AVQ-MM#1. Implementation of Mitigation Measure AVQ-MM#2 would not result in secondary impacts because it will not change the scope, scale, or location of construction activities beyond those that have been described as part of the project.

The Authority finds that Mitigation Measures AVQ-MM#1 and AVQ-MM#2 are required under the Preferred Alternative and that implementation of these mitigation measures will reduce temporary impacts on nighttime light levels to a less-than-significant level.

4.10.3 Impact AVQ#19: Permanent Impacts on Nighttime Light Levels at Fixed Locations

Operation of the Preferred Alternative would involve various HSR buildings and facilities being lit throughout the night, which would create a new source of light that would adversely affect nighttime views. Fixed lighting sources at proposed HSR facilities, including stations, traction

power substation (TPSS), and maintenance facilities, would be designed to direct lighting downward.

Permanent construction would result in new sources of permanent lighting. The project features will provide minimum design standards, including design intended to limit light spillover, but the 24-hour operation of the facilities require a minimum level of lighting for work safety and security. Therefore, the project features will reduce but not avoid the potential impacts on aesthetics and visual quality.

Accordingly, operations impacts on nighttime light levels would be considered a significant impact under CEQA (Final EIR/EIS: page 3.16-157).

Implementation of the following measures lessens this impact: AVQ-MM#6: Screen Traction Power Distribution Stations and Radio Communication Towers and AVQ-MM#4: Provide Vegetation Screening along At-Grade and Elevated Guideways Adjacent to Residential Areas. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

The Authority will implement mitigation measures to reduce adverse impacts; however, where the scale of HSR infrastructure would not be screened or views would not be restored through mitigation, significant impacts would remain. As part of AVQ-MM#4, the Authority or its contractors, prior to the commencement of HSR operations, will provide landscape screening to obscure HSR infrastructure from residential and other sensitive viewers.

As part of AVQ-MM#6, the Authority or its contractors, prior to the commencement of HSR operations, will screen TPSS and radio communication towers, concealing fixed lighting from buildings and activities at grade. This will reduce light spillover from HSR buildings and facilities.

Impacts from implementing Mitigation Measure AVQ-MM#4 would be blocked views where screening is placed in locations where views were previously available to residents and other sensitive viewers. The screening would provide viewers with views toward trees and other flora that would mask the HSR infrastructure, reducing the contrast and impact on sensitive viewers.

Implementation of Mitigation Measure AVQ-MM#6 is expected not to result in secondary impacts.

The Authority finds that Mitigation Measures AVQ-MM#6 and AVQ-MM#4 are required under the Preferred Alternative; however, the CEQA impact on nighttime light levels would remain significant and unavoidable. The Authority finds that there are no other feasible mitigation measures or alternatives that could be adopted to reduce this remaining impact to less-than-significant levels. The Authority finds that despite this otherwise significant and unavoidable impact, specific economic, social, and other considerations identified in the Statement of Overriding Considerations (Chapter 8 of this document) support certification of the Final EIR/EIS and approval of the project.

4.11 Cultural Resources (Section 3.17 of the Final EIR/EIS)

The Preferred Alternative would result in potentially significant impacts associated with permanent disturbance of both known and unknown archaeological sites and permanent demolition, destruction, relocation, or alteration of built resources. While impacts on known and unknown archaeological sites would be mitigated to less than significant, permanent impacts on built resources would remain significant and unavoidable after implementation of mitigation.

4.11.1 Impact CUL#1: Permanent Disturbance of Unknown Archaeological Sites

Construction of the Preferred Alternative has the potential to encounter and damage as-yet-unknown archaeological sites. Archaeological sites could be identified within the area of potential effects (APE) during survey, or previously unidentified buried archaeological sites could be found during construction. Construction staff will be trained in identifying cultural resources (CUL-IAMF#2). Pre-construction phased identification surveys will take place as parcel access is acquired (CUL-IAMF#3). Damaging or destroying an archaeological site reduces the site's integrity and reduces or eliminates the site's ability to provide important scientific information, which diminishes the site's integrity. Accordingly, impacts associated with disturbance of

unknown archaeological sites would be considered a significant impact under CEQA (Final EIR/EIS: page 3.17-51).

Implementation of the following measures mitigates this impact: 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 Built Resources in the PA and MOA; 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; and CUL-MM#3: Other Mitigation for Effects on Pre-Contact Archaeological Sites. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

The Authority will implement mitigation measures to minimize the impacts on unknown archaeological resources. CUL-MM#1 will require mitigation of significant impacts on sites found during these surveys, including site avoidance if feasible, evaluation, and data recovery if necessary. CUL-MM#2 specifies procedures and protocols to be followed in the event of unanticipated discoveries during construction, including stopping work, preservation of the discovery until evaluated by a qualified archaeologist, and treatment of human remains as required by law. CUL-MM#3 will require consultation efforts to develop meaningful mitigation measures for impacts on as-yet-unidentified Native American archaeological resources that cannot be avoided to be negotiated with the tribal consulting parties. Implementation of these mitigation measures will reduce the impacts on unknown archaeological resources during project construction.

Mitigation Measure CUL-MM#1 will not trigger additional ground-disturbing activities outside of the project footprint and will not change the character or significantly increase the overall amount of construction activity. Therefore, it is anticipated that the secondary effects of implementing this mitigation measure would be less than significant under CEQA.

No ground-disturbing activities or property acquisition will be necessary to comply with Mitigation Measure CUL-MM#2 if the site can be preserved in place. If intentional burial is required, the new burial site would be selected in consultation with the most likely descendant and surveyed by qualified archaeologists prior to excavation. A site would be selected that would not result in impacts on any other resource types, such as biological resources. Therefore, it is anticipated that the secondary effects of implementing this mitigation, should intentional burial be necessary, would be less than significant under CEQA.

If intentional burial is required through implementation of Mitigation Measure CUL-MM#3, a new burial site would be selected that would not result in impacts on any other resource types, such as biological resources. Therefore, it is anticipated that the impacts of implementing this part of this mitigation measure, should intentional burial be necessary, would be less than significant under CEQA. Should sites be procured for plant gathering or ceremonial activities, or if a cultural center is developed, locations would be selected that would not affect other resource types. Therefore, there would be no secondary effects on other resources as a result of implementing these aspects of this mitigation measure.

The Authority finds that Mitigation Measures CUL-MM#1, CUL-MM#2, and CUL-MM#3 are required under the Preferred Alternative and that implementation of these mitigation measures will reduce impacts associated with disturbance of unknown archaeological sites to a less-than-significant level.

4.11.2 Impact CUL#2: Permanent Disturbance of Known Archaeological Sites

Thirty-five archaeological resources are known to exist in the APE, although the continued presence of these resources in the APE has not been field verified or evaluated for significance. Of the 35 archaeological resources, the Preferred Alternative would affect 24 archaeological sites. Grading or excavation for construction could damage or destroy these archaeological sites, eliminating the site's ability to provide important scientific information, which diminishes the site's integrity. Project features will help reduce this impact through archeological resource mapping of known sites, allowing their avoidance; preconstruction surveys; training of workers to identify

cultural resources and avoid damaging them; and implementing the Archaeological Monitoring Plan (CUL-IAMF#1, CUL-IAMF#2, CUL-IAMF#3, and CUL-IAMF#5).

However, even with these IAMFs, permanent disturbance of known archaeological sites will still occur and would be considered a significant impact under CEQA (Final EIR/EIS: pages 3.17-51 to 3.17-65).

Implementation of the following measures mitigates this impact: 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 Built Resources in the PA and MOA; 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; and CUL-MM#3: Other Mitigation for Effects on Pre-Contact Archaeological Sites. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

The Authority will survey areas prior to work (CUL-MM#1) and implement the archaeological treatment plan (ATP) (CUL-MM#2), which provides specific performance standards so that each impact will be avoided, minimized, or mitigated to the extent possible and provide enforceable performance standards to follow the NRHP and the Secretary of Interior's (SOI) standards when implementing the mitigation measures. Specifically, the ATP will focus on the treatment of known and unknown archaeological resources, and will require the phased identification, evaluation, and mitigation of archaeological resources determined eligible and located in the APE.

Implementation of the ATP will reduce or eliminate impacts on known archaeological resources. In addition, the Authority will implement CUL-MM#3: Other Mitigation for Effects on Pre-Contact Archaeological Sites.

Mitigation Measure CUL-MM#1 will not trigger additional ground-disturbing activities outside of the project footprint and will not change the character or significantly increase the overall amount of construction activity. Therefore, it is anticipated that the secondary effects of implementing this mitigation measure would be less than significant under CEQA. No ground-disturbing activities or property acquisition will be necessary to comply with Mitigation Measure CUL-MM#2 if the site can be preserved in place. If intentional burial is required, the new burial site would be selected in consultation with the most likely descendant and surveyed by qualified archaeologists prior to excavation. A site would be selected that would not result in impacts on any other resource types, such as biological resources. Therefore, it is anticipated that the secondary effects of implementing this mitigation, should intentional burial be necessary, would be less than significant under CEQA.

If intentional burial is required through implementation of Mitigation Measure CUL-MM#3, a new burial site would be selected that would not result in impacts on any other resource types, such as biological resources. Therefore, it is anticipated that the impacts of implementing this part of this mitigation measure, should intentional burial be necessary, would be less than significant under CEQA. Should sites be procured for plant gathering or ceremonial activities, or if a cultural center is developed, locations would be selected that would not affect other resource types. Therefore, there would be no secondary effects on other resources as a result of implementing these aspects of this mitigation measure.

The Authority finds that Mitigation Measures CUL-MM#1, CUL-MM#2, and CUL-MM#3 are required under the Preferred Alternative and that implementation of these mitigation measures will reduce impacts associated with permanent disturbance of known archaeological sites to a less-than-significant level.

4.11.3 Impact CUL#4: Permanent Demolition, Destruction, Relocation, or Alteration of Built Resources or Setting

Construction activities would materially impair multiple historic built resources, their settings, or both through the introduction of a new rail corridor, new roads, and the expansion of existing rail tracks and roads. The Authority conducted historic architectural surveys that identified 35 historic built resources listed or eligible for listing in the NRHP/CRHR within the APE, and an additional

13 properties considered to be CEQA-only properties. The relative significance of the NRHP-listed and -eligible resources is discussed in Final EIR/EIS Chapter 3.17, Cultural Resources. The built historic resources that would be affected include single-family residences, agricultural farm or ranch properties, historic train depot complexes, and commercial or institutional properties. It is possible that additional properties surveyed and evaluated as NRHP-eligible during phased identification may also experience demolition, destruction, relocation, or alteration to the property or its setting due to design changes as the design progresses during the design-build project phase (CUL-IAMF#6).

Project features will minimize temporary construction impacts resulting from construction activities; however, impacts from permanent construction would occur from introduction of new HSR right-of-way, roadway right-of-way, and development of new stations. Therefore, even with these IAMFs, the Preferred Alternative will result in significant impacts under CEQA on five built resources. Of these, construction of the project would demolish or substantially alter four built resources; introduction of the HSR right-of-way in the resource's historic setting would affect one resource. Because the historic setting of these resources is considered a character-defining feature, the change in setting would be a significant impact. This would be considered a significant impact under CEQA (Final EIR/EIS: pages 3.17-69 to 3.17-118).

Implementation of the following measures lessens this impact: CUL-MM#4: Relocate Historic Buildings and Structures, CUL-MM#6: Prepare and Submit Additional Recordation and Documentation, CUL-MM#7: Prepare Interpretive or Educational Materials, and CUL-MM#10: Station Design Consistent with the Secretary of the Interior's Standards for the Treatment of Historic Properties. Because of length, mitigation measure text is presented separately in Attachment A of these CEQA Findings.

The Authority will implement mitigation measures to minimize impacts on cultural resources. CUL-MM#4 will require a relocation plan to be prepared and implemented for resources that the Preferred Alternative will demolish. CUL-MM#4 will be applied to resources where it appears that the resource could feasibly be relocated without degradation of its integrity of setting, design, materials, workmanship, feeling, and association.

In all cases, CUL-MM#6 will be applied to require that the property be fully documented prior to construction to record the character-defining features, and CUL-MM#7 will be applied to provide for the creation of interpretive materials using documentation prepared under CUL-MM#6.

Additionally, CUL-MM#10 will require that new station facilities be designed in a manner consistent with the SOI's Standards for Rehabilitation.

While these mitigation measures will alleviate some of the impacts on the resources by documenting and interpreting their history, requiring that new station designs conform to the SOI's Standards for Rehabilitation, and moving project features when feasible, these measures will not fully mitigate for demolition or destruction of historical resources and their character-defining features or the alteration to the resources' settings. These measures will not fully mitigate for demolition or destruction of most of the historic resources and their character-defining features or the alteration to the resources' settings. The one exception is the Cozzi Family Property (Resource ID 4317), for which the impact would be mitigated to a less than significant level with the implementation of mitigation.

Should any buildings have to be moved under implementation of Mitigation Measure CUL-MM#4, a location would be selected that would affect no other resources. Therefore, other than the impacts on the moved buildings or structures, there would be no secondary effects on other resources as a result of implementing this mitigation measure.

No ground-disturbing activities or property acquisition will be necessary to comply with Mitigation Measures CUL-MM#6, CUL-MM#7, or CUL-MM#10. Therefore, there would be no secondary effects on other resources as a result of implementing these mitigation measures.

The Authority finds that Mitigation Measures CUL-MM#4, CUL-MM#6, CUL-MM#7, and CUL-MM#10 are required under the Preferred Alternative and that they will mitigate or avoid the

project's impact on the Cozzi Family Property (Resource ID 4317) below the CEQA level of significance; however, the CEQA impact from demolition, destruction, relocation, or alteration of built resources for the four other properties would remain significant and unavoidable. The Authority finds that there are no other feasible mitigation measures or alternatives that could be adopted to reduce this remaining impact to less-than-significant levels. The Authority finds that despite this otherwise significant and unavoidable impact, specific economic, social, and other considerations identified in the Statement of Overriding Considerations (Chapter 8 of this document) support certification of the Final EIR/EIS and approval of the project.

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5 CUMULATIVE IMPACTS (SECTION 3.19 OF THE FINAL EIR/EIS)

This section presents the Authority's findings regarding the cumulative impacts from implementing the Preferred Alternative in combination with other closely related past, present, and reasonably foreseeable future projects. The cumulative impact analysis for all resources is based on the cumulative project lists (Volume 2, Appendix 3.19-A, Cumulative Nontransportation Plans and Projects Lists, and Appendix 3.19-B, Cumulative Transportation Projects Lists, of the Final EIR/EIS), as well as plans and projections listed in Table 1 of Volume 2, Appendix 2-J, Regional and Local Plans and Policies, of the Final EIR/EIS.

CEQA defines cumulative impacts as two or more individual impacts that, when evaluated together, are considerable or capable of compounding or increasing other environmental impacts (CEQA Guidelines, Section 15355). Under CEQA, when a project would contribute to a significant cumulative impact, an EIR must discuss whether the project's incremental effect would be "cumulatively considerable." Cumulatively considerable means that the project's incremental effect would be significant when viewed in the context of past, present, and reasonably probable future projects that contribute to the cumulative impact. The discussion of cumulative impacts need not provide as much detail as that provided for the effects attributable to the project alone (CEQA Guidelines, Section 15130, subdivision [b]). As described in the Final EIR/EIS, the focus of the cumulative impacts analysis is on the Preferred Alternative and the regional context appropriate for each resource area, including adjacent sections of the California HSR System.

As presented in the Final EIR/EIS, Section 3.19, Cumulative Impacts, for the following subject areas, the analysis concludes that cumulative impacts, including impacts associated with construction and operation of the project, are less than significant under CEQA: EMF/EMI; Public Utilities and Energy; Geology, Soils, Seismicity, and Paleontology; Hazardous Materials; Socioeconomics and Communities; and Station Planning and Land Use. Because the overall cumulative impact in each of these subject areas is determined to be less than significant, as described in Section 3.19, the project cannot contribute to a significant cumulative impact and therefore the project contributions are less than significant. Consequently, these subjects are not discussed further below as the discussion focused on significant cumulative impacts that the project would contribute to.

5.1 Transportation

Construction of cumulative projects will result in a potentially significant cumulative impact on bus and passenger transit operations and freight rail operations. Construction of the Preferred Alternative and other development and transportation projects would create new, temporary closures of and modifications to some regionally significant roadways and would generate indirect impacts related to transportation, potentially leading to delays on roadways for bus service. During construction of HSR and other projects affecting the rail corridor, the combination of increased passenger rail service, potentially increased freight rail service, and construction of other projects like Bay Area Rapid Transit and HSR would result in increased delays to expanded passenger and freight rail service. Project features and mitigation measures, including installation of transit signal priority and preparation of a railway disruption control plan, will reduce the Preferred Alternative's contribution to the significant cumulative impact, and its contribution to cumulative impacts would not be cumulatively considerable.

The Authority finds that transportation mitigation measures have been incorporated into the Preferred Alternative (see Section 4.1 of this document) and that implementation of these mitigation measures will reduce the project's contribution to cumulatively considerable transportation impacts to less-than-cumulatively-considerable levels.

5.2 Air Quality and Greenhouse Gases

Construction of the Preferred Alternative, in combination with cumulative projects in the cumulative RSA, would result in a potentially significant regional cumulative impact with respect to ROG, NO_x, and PM₁₀ because construction activities would exceed air district thresholds. The Preferred Alternative's contribution to this significant cumulative impact would not be cumulatively

considerable because purchase of offsets through project-level mitigation will offset ROG, NO_x, and PM emissions to below air district thresholds or net zero. Therefore, CEQA does not require any further mitigation.

Construction of the project, in combination with cumulative projects in the cumulative RSA, would result in a significant regional cumulative impact with respect to CO because construction activities would exceed the SJVAPCD's threshold. The project's contribution to this significant cumulative impact would be cumulatively considerable because CO cannot be offset. Therefore, CO emissions would remain above the SJVAPCD's CEQA threshold even after implementation of all feasible mitigation. No further mitigation is available to address this cumulative impact other than the mitigation for the project already identified in Section 4.2 of this document. Therefore, the incremental effect of construction of the Preferred Alternative would be cumulatively considerable for CO emissions in SJVAPCD and would be significant and unavoidable.

Construction of the Preferred Alternative, in combination with cumulative projects in the cumulative RSA, would result in a significant cumulative impact with respect to localized NO₂, PM_{2.5}, and PM₁₀. The project's contribution to this significant cumulative impact would be cumulatively considerable because of new or worsened violations of the ambient air quality standards even after implementation of all feasible mitigation. No further mitigation is available to address this cumulative impact other than the mitigation for the project already identified in Section 4.2 of this document. Therefore, the incremental effect of construction of the Preferred Alternative would be cumulatively considerable for localized NO₂, PM_{2.5}, and PM₁₀ emissions and would be significant and unavoidable.

The combined effects of the electrified passenger rail service, displacement of vehicle miles traveled (VMT) and air travel, and motor vehicle and stationary source turnover represent the new emissions paradigm to which receptors would be exposed. Although there are areas of the RSA with greater existing health risks, the addition of HSR service would achieve health risk reductions in the RSA, constituting a localized operational air quality benefit. Nevertheless, ambient health risks and PM_{2.5} concentrations at certain locations exceed BAAQMD's thresholds. While construction of the project would not exceed BAAQMD's project-level risk thresholds, when combined with background risks, which already exceed the threshold, total cumulative cancer risks and noncancer impacts (including PM_{2.5} concentrations) on sensitive receptors near the project footprint would exceed the BAAQMD's thresholds, resulting in a significant cumulative impact. The project's contribution to this existing cumulative impact during construction would be cumulatively considerable. The Authority would coordinate with BAAQMD to identify if there are feasible additional measures consistent with the HSR project that may lower some of the cumulative health risks in areas with existing cumulative health risks above cumulative thresholds and where the HSR project would contribute in a limited way to those risks. This may result in lowering of some of the cumulative health risks identified, but the feasibility and effectiveness of any such measures are unknown at this time and not presumed for the purposes of CEQA determinations. Therefore, the incremental effect of construction of the Preferred Alternative would be cumulatively considerable for total cumulative health risk and PM_{2.5} concentration impacts on sensitive receptors and would be significant and unavoidable.

Project operations, in combination with cumulative projects in the cumulative RSA, would not result in local cumulative impacts with respect to CO hot spots. There would be no cumulative impact since the cumulative condition would not result in CO concentrations in excess of the NAAQS or CAAQS; therefore, CEQA does not require mitigation.

Project operations, in combination with cumulative projects in the cumulative RSA, would result in a local significant cumulative impact with respect to local PM_{2.5} because local concentrations at sensitive receptors near freight realignments would exceed the BAAQMD's threshold. The project's contribution to this significant cumulative impact would not be cumulatively considerable because the project would reduce PM_{2.5} concentrations relative to existing conditions. Accordingly, the freight realignments would not contribute any additional risk to the existing significant impact. Similarly, the project would not contribute to a new long-term cumulatively considerable impact as health risks from the HSR stations and the MOWF, in combination with cumulative projects in the cumulative RSA, would not exceed the BAAQMD's health risk thresholds. Therefore, CEQA does not require mitigation.

Past, present, and future projects cumulatively contribute to GHG impacts. Although construction of the Preferred Alternative would result in a temporary increase in GHG emissions, project operations would decrease overall GHG emissions by reducing vehicle and aircraft trips, offsetting the increase in GHG emissions associated with project construction in short order and resulting in substantial GHG emissions reductions over the lifetime of the HSR project. The contribution of the project to cumulative GHG impacts would be beneficial; therefore, CEQA does not require mitigation.

The Authority finds that construction air quality mitigation measures have been incorporated into the Preferred Alternative (see Section 4.2 of this document) and that implementation of these mitigation measures reduces the Preferred Alternative's construction and other off-site emissions to a less-than-cumulatively-considerable level except for CO, localized NO₂, PM_{2.5}, and PM₁₀. Specifically, BMPs will be required for reducing on-site fugitive dust emissions and goals for use of ZE or NZE technology, respectively. Additional mitigation will offset VOC and NO_x in the BAAQMD and SJVAPCD, respectively. Refer to Attachment A of these CEQA findings for additional information. The Authority further finds that the CEQA impacts for total cumulative cancer risks and noncancer impacts on sensitive receptors, and health risks of PM_{2.5} concentrations, during construction remain cumulatively considerable. The Authority finds that there are no other feasible mitigation measures or alternatives that will reduce these impacts to a less-than-cumulatively-considerable level. To the extent that these cumulatively considerable adverse impacts remain significant and unavoidable, the Authority finds that specific economic, social, and other considerations identified in the Statement of Overriding Considerations (Chapter 8 of this document) support certification of the Final EIR/EIS and approval of the project.

5.3 Noise and Vibration

Operation of the Preferred Alternative, combined with other cumulative projects, would result in a potentially significant cumulative noise impact associated with traffic-related noise increases. Even with the implementation of mitigation such as installation of noise barriers and additional noise analysis during final design, increases in traffic-related noise associated with operations of the Preferred Alternative would occur at roadway segments near San Jose Diridon Station, along the Monterey Corridor, and near Gilroy, increasing ambient noise above existing levels by more than 3 dB. In combination with existing sources of traffic noise, traffic-related noise associated with the Preferred Alternative would combine with noise generated by the cumulative projects to create a cumulative noise impact during operations. Therefore, the incremental effect of operations for the Preferred Alternative would be cumulatively considerable for noise impacts of traffic-related noise and would be significant and unavoidable.

Operation of the Preferred Alternative would result in significant cumulative noise impacts under CEQA because noise-sensitive receptors would experience noise levels above existing ambient levels and in exceedance of FRA criteria for moderate and severe noise impacts. The Preferred Alternative's contribution to the cumulative impact would be considerable because it would be the largest contributor to the cumulative noise impacts during operations. The Authority will implement mitigation measures to minimize operations noise impacts; however, these measures will not mitigate all noise impacts. Therefore, the incremental effect of operations for the Preferred Alternative would be cumulatively considerable for noise impacts and would be significant and unavoidable.

During operations, the Preferred Alternative in combination with the cumulative projects in the cumulative RSA would generate a significant cumulative vibration impact under CEQA because vibration levels would exceed acceptable FRA criteria of 72 vibration decibel (VdB) for residential use, 65 VdB for lab facilities, and 75 VdB for institutional use at multiple receptors in the San Jose Diridon Station Approach, Monterey Corridor, and Morgan Hill and Gilroy Subsections. The contribution of the project to this cumulative impact would be considerable because it would be the primary contributor to the increases in ground-borne vibration along the corridor. The Authority will implement mitigation measures to reduce vibration impacts from operations. There are various options to reduce train vibration, though it may not be possible in all instances to mitigate all vibration impacts because it may not be cost effective or acoustically feasible. The specific design and implementation of this mitigation measure will be identified during final design. There is no additional feasible mitigation. Therefore, the incremental effect of operations for the Preferred Alternative would be cumulatively considerable for operational vibration impacts, and this impact would be significant and unavoidable.

The Authority finds that mitigation measures (see Section 4.3 of this document) have been incorporated into the Preferred Alternative and that implementation of these mitigation measures will minimize or avoid the contribution of the Preferred Alternative to these cumulative impacts. (Because of length, mitigation measure text is presented separately in Attachment A to these CEQA findings.) However, the Preferred Alternative's contribution to the cumulative impact would remain cumulatively considerable. The Authority finds that there are no other feasible mitigation measures that will reduce these impacts on operational noise and operational vibration to a less-than-cumulatively-considerable level. To the extent that these cumulatively considerable adverse impacts remain significant and unavoidable, the Authority finds that specific economic, social, and other considerations identified in the Statement of Overriding Considerations (Chapter 8 of this document) support certification of the Final EIR/EIS and approval of the project.

5.4 Biological and Aquatic Resources

5.4.1 Special-Status Species

Construction of the Preferred Alternative, in combination with cumulative projects in the cumulative RSA, would result in a potentially significant cumulative impact under CEQA with respect to special-status species because it would contribute to ongoing habitat loss caused by development. The project's contribution to this impact would be considerable, however, extensive mitigation measures, such as species-specific avoidance, minimization, and compensatory mitigation measures (see Section 4.4 of this document), are proposed to help reduce the project's contribution to this impact. These measures will fully mitigate effects on listed species such that the project would not result in a cumulatively considerable contribution to impacts on special-status species.

Operations impacts on special-status wildlife are addressed in Section 5.4.6 of this document.

5.4.2 Non-Special-Status Wildlife

Construction of the Preferred Alternative, in combination with cumulative projects in the cumulative RSA, would result in a potentially significant cumulative impact under CEQA with respect to non-special-status wildlife because such activities would convert or degrade habitat of continental importance to migratory shorebirds and waterfowl in the San Joaquin Valley (GEA). Because the HSR project would be the sole contributor to this impact in the GEA, its contribution would be considerable. However, the project includes mitigation measures within the GEA and surrounding region that reduce the project's contribution toward impacts on non-special-status wildlife (see Section 4.4 of this document) such that the project would not result in a cumulatively considerable contribution to impacts on non-special-status wildlife.

Operations impacts on non-special-status wildlife are addressed in Section 5.4.6 of this document.

5.4.3 Special-Status Plant Communities

Construction of the Preferred Alternative, in combination with cumulative projects in the cumulative RSA, would result in a potentially significant cumulative impact under CEQA with respect to special-status plant communities because they would contribute to loss and degradation of these resources through conversion and development.

The project's contribution to this impact would be considerable, because it would increase the area and number of special-status plant communities affected by cumulative projects. However, the HSR project includes substantial mitigation measures that reduce the project's contribution toward habitat impacts (see Section 4.4 of this document) such that the project would not result in a cumulatively considerable contribution to impacts on special-status plant communities.

No cumulative impacts on special-status plant communities are anticipated during operations because these activities would be conducted in areas that had already been cleared of vegetation and subjected to extensive ground disturbance to construct the HSR track and systems and other cumulative projects and developments. It would be highly unlikely that any special-status plants would remain within the right-of-way or other areas of disturbance. Therefore, there would not be a significant cumulative impact during operations on special-status plant communities under CEQA caused by the project or to which the project would contribute.

5.4.4 Aquatic and Other Resources

Construction of the Preferred Alternative, in combination with cumulative projects in the cumulative RSA, would result in a potentially significant cumulative impact under CEQA with respect to aquatic and other resources because such activities would contribute to loss and degradation of these resources. The project's contribution to this impact would be considerable, because construction could result in the conversion and degradation of aquatic resources. However, measures are proposed to avoid and minimize such impacts and to compensate for any unavoidable effects on aquatic resources, including mitigation measures requiring compensatory mitigation for aquatic resources so that no net loss of aquatic resources will be achieved (see Section 4.4 of this document). With implementation of these mitigation measures, the project would not result in a cumulatively considerable contribution to impacts on aquatic resources.

No cumulative impacts on aquatic resources are anticipated during operations because workers would avoid sensitive areas, would avoid the introduction and spread of invasive nonnative species, and would be required to attend WEAP training about sensitive biological resources. Therefore, there would not be a significant cumulative impact during operations on aquatic resources under CEQA caused by the project or to which the project would contribute.

5.4.5 Protected Trees

Construction of the Preferred Alternative, in combination with cumulative projects in the cumulative RSA, would result in a potentially significant cumulative impact under CEQA with respect to protected trees because such activities would result in the loss and disturbance of trees protected under an array of local ordinances and general plan policies. The project's contribution to this impact would be considerable because of the multiple jurisdictions through which it passes where protected trees are present. However, mitigation is proposed to avoid and minimize such impacts by transplanting or providing compensatory mitigation if applicable for protected trees (see Section 4.4 of this document). With implementation of this mitigation, the project would not result in a cumulatively considerable contribution to impacts on protected trees.

5.4.6 Wildlife Movement

Construction of the Preferred Alternative, in combination with cumulative projects in the cumulative RSA, would result in a potentially significant cumulative impact under CEQA with respect to wildlife movement because such activities would interfere with wildlife movement across several known wildlife corridors as well as other portions of the alignment. Project design features include wildlife undercrossings in areas known to be important for wildlife movement

including Coyote Valley, Pacheco Pass and the San Joaquin Valley. In Coyote Valley in particular, the Authority will be constructing 10 new or expanded wildlife undercrossings that will allow for wildlife movement under the HSR railroad tracks. Coyote Valley is an important wildlife movement corridor at the narrowest point of connection between the Diablo Mountain Range and Santa Cruz Mountain Range. Existing transportation corridors in Coyote Valley include Union Pacific Railroad, Monterey Road, and US 101 have been a barrier to movement between these two mountain ranges. Currently, wildlife use existing sub-optimal undercrossings and culverts to traverse these transportation corridors. These 10 new or expanded wildlife undercrossings will be constructed underneath HSR, Union Pacific Railroad tracks and Monterey Road and are aligned with existing openings for US 101 to maximize wildlife permeability and improve wildlife movement in this important wildlife corridor. In addition to these aspects of project design, mitigation is proposed in Coyote Valley to preserve movement corridors between the Santa Cruz Mountains and Diablo Range (see Section 4.4 of this document).

In the San Joaquin Valley subsection, in the vicinity of the GEA, mitigation is proposed to avoid and minimize impacts to wildlife movement. This mitigation includes noise/visual barriers within the GEA to reduce noise and visual impacts, a constructed enclosure approximately 3.4 miles in length with the GEA IBA to enclose the train's operating envelope and overhead catenary system, and a requirement to preserve and offset impacts on biological resources by acquiring easements on 10,000 acres of land within or adjacent to the GEA which will help to preserve and establish additional wildlife habitat within the region (especially for shorebirds and waterfowl) which will offset wildlife movement impacts (see Section 4.4 of this document).

Notwithstanding these above-described project design features and mitigation the project would contribute to the cumulative wildlife movement impact because it would increase the impermeability of wildlife movement in the RSA as a result of cumulative projects (the existing SR 152, the HSR project, the new SR 152 alignment between SR 25 and SR 152 and the Fairview Road/Memorial Drive East-West arterial) as well as the level of disturbance to resident wildlife near the project alignment. The project-specific impacts would combine with those related to construction of other cumulative projects such that there would be a cumulative impact on wildlife movement in the region. As previously discussed, the HSR project includes substantial mitigation measures to address the project's contribution toward wildlife movement impacts (see Section 4.4 of this document). Additionally, the Authority has included Mitigation Measure BIO-MM#79b: Provide Wildlife Movement between the Diablo Range and Inner Coast Range, to further address the cumulatively considerable contribution to impacts on wildlife movement. Mitigation Measure BIO-MM#79b would facilitate the construction of a wildlife overcrossing over SR 152, which would benefit a variety of species, including mountain lion and other large animals. With implementation of these mitigation measures, the project would not result in a cumulatively considerable contribution to impacts on wildlife movement.

Construction of the wildlife overcrossing under Mitigation Measure BIO-MM#79b could result in secondary impacts, such as impacts on biological resources, including species habitat, aesthetics, air quality, cultural resources, or transportation; however, most of these impacts are expected to be minor because the overcrossing would be located within the existing SR 152 corridor, which is already significantly disturbed. If construction is undertaken by a third party, the wildlife overcrossing would undergo additional environmental review by the entity that implements the overcrossing. If the Authority constructs the overcrossing, BIO-MM#11 would also be applied to minimize biological impacts from the wildlife overcrossing. Overall, however, construction of a wildlife overcrossing is expected to result in beneficial effects.

Project operations, in combination with past and cumulative projects in the cumulative RSA, would result in a potentially significant cumulative impact under CEQA with respect to wildlife movement. The project would cause intermittent but permanent disturbance of migratory waterfowl and shorebirds in the GEA and also introduce both temporary and permanent new infrastructure into areas that already have wildlife movement constraints (e.g., the western Pacheco Pass region). However, the project would include mitigation measures (see Section 4.4 of this document) that will reduce the contribution of the project to these cumulative effects, as well as Mitigation Measure BIO#79b as discussed above. With implementation of these mitigation

measures, the project would not result in a cumulatively considerable contribution to operational impacts on wildlife movement.

5.4.7 Conservation Areas

Construction of the Preferred Alternative, in combination with cumulative projects in the cumulative RSA, would result in a potentially significant cumulative impact under CEQA with respect to conservation areas because the project would result in loss and disturbance of habitat and ecological function. The project-specific impacts would combine with those related to construction of other cumulative projects such that there would be a cumulative impact on habitat and ecological function in conservation areas. The contribution of the project to this cumulative impact would be cumulatively considerable because the HSR project would contribute to loss of habitat and ecological function in conservation areas. However, the HSR project includes mitigation measures to provide compensatory mitigation which will offset the loss of habitat and ecological function in conservation areas (see Section 4.4 of this document). With the implementation of these mitigation measures, the project would not result in a cumulatively considerable contribution to conservation areas.

Project operations, in combination with cumulative projects in the cumulative RSA, would result in direct impacts on habitat and ecological function in conservation areas. Mechanisms such as vehicular travel associated with maintenance activities, runoff from developed areas, and increased human traffic in and near conservation areas could indirectly affect water quality and could lead to the introduction of invasive nonnative organisms. However, the project would include features and mitigation measures that will reduce the contribution of the project to these cumulative effects such that the contribution will be less than considerable.

5.4.8 Habitat Conservation Plans

Construction of the Preferred Alternative, in combination with cumulative projects in the cumulative RSA, would result in a potentially significant cumulative impact under CEQA with respect to provisions of the SCVHP and planned wildlife crossings in the Coyote Valley Linkage. The project's contribution to this impact would be considerable, because it could conflict with aspects of the SCVHP and could conflict with certain elements of the Coyote Valley Linkage. However, the project includes mitigation measures to provide compensatory mitigation to ensure the SCVHP meets its conservation targets and mitigation to ensure that wildlife crossings are effective, with provisions for the protection and enhancement of wildlife movement habitat (see Section 4.4 of this document). With the implementation of these mitigation measures, the project would not result in a cumulatively considerable contribution to impacts on the SCVHP and the Coyote Valley Linkage.

Project operations are not expected to result in any cumulative impacts on HCPs.

With respect to all of the cumulative impacts discussed above for biological and aquatic resources, the Authority finds that mitigation measures have been incorporated into the Preferred Alternative (see Section 4.4 of this document) and that implementation of these mitigation measures will minimize or avoid the contribution of the Preferred Alternative to these cumulative impacts. Because of length, mitigation measure text is presented separately in Attachment A to these CEQA Findings.

5.5 Hydrology and Water Quality

Potentially significant cumulative impacts related to surface water hydrology are anticipated during construction and operations of the project in combination with cumulative projects in the cumulative RSA. Substantial temporary construction impacts on surface water hydrology would result from the construction of tunnels in the Morgan Hill and Gilroy and Pacheco Pass Subsections. However, these temporary surface water hydrology impacts will be mitigated to a less-than-significant level. Project operations, in combination with cumulative projects, have the potential to directly affect waterbodies through the maintenance of bridges, culverts, and drainage systems. Of the cumulative projects, several developments are proposed with the intent to permanently and substantially alter surface water hydrology conditions in the RSA. Beginning in

2029, remedial actions and adaptive management measures associated with the GAMMP have the potential to overlap with permanent beneficial surface water hydrology impacts associated with the San Luis Low Reservoir Point Improvement Project (see Section 4.5 of this document). These temporary adverse impacts and permanent beneficial impacts would not result in significant cumulative adverse impacts on surface water hydrology. Therefore, the project would not result in cumulatively considerable contributions to construction or operational impacts on surface water hydrology.

The Preferred Alternative and cumulative projects would result in temporary and permanent construction impacts on waterbodies. Some of the cumulative projects, including the Preferred Alternative, would cause the permanent loss of aquatic resources and riparian habitat through fill and conversion to other land uses, resulting in increased turbidity and sediment concentrations, increases in water temperature, and decreases in dissolved oxygen concentrations in waterbodies. Project features and mitigation measures have been incorporated into the project to avoid and/or minimize these impacts as well as compensate for remaining impacts (see Section 4.5 of this document); these actions will include restoration of temporarily affected waterbodies, revegetating riparian areas, and compensatory mitigation for permanently affected aquatic resources so that no net loss of aquatic resources occurs. All cumulative projects would be subject to the same federal and state regulations that protect jurisdictional aquatic resources, including creeks, streams, wetlands, and riparian areas. Therefore, with implementation of these project features and mitigation measures, project-specific contributions to cumulative impacts on water quality would not be cumulatively considerable.

Potentially significant cumulative impacts related to groundwater are anticipated as a result of tunneling to construct the Preferred Alternative. Project tunneling activities have the potential to substantially lower the groundwater table and affect the productivity of water supplies derived from seeps, springs, and wells, but these impacts would be temporary. Mitigation has been incorporated into the Preferred Alternative to address any disruptions in the water supply associated with tunneling (see Section 4.5 of this document). There are no other cumulative projects in the Pacheco Pass area that would also adversely affect groundwater levels. Construction of Tunnels 1 and 2 are the only actions in the cumulative RSA that would substantially affect groundwater levels in the Morgan Hill and Gilroy and Pacheco Pass Subsections, respectively. With implementation of the mitigation, including the GAMMP, the project's tunnelling effects on groundwater would be less than significant. Therefore, the project would not result in a cumulatively considerable contribution to impacts on groundwater.

Construction of any of the Preferred Alternative would require temporary fill in 100-year floodplains. Some developments in the cumulative condition are also expected to involve installation of permanent infrastructure and buildings in the 100-year floodplains. The greatest potential for permanent cumulative floodplain impacts is in the Soap Lake floodplain. Regulatory standards and conditions of individual project approvals would minimize impacts on floodplains associated with cumulative projects, including HSR. On this basis, the project would not result in cumulatively considerable contributions to construction or operational impacts on floodplains, including Soap Lake.

The Authority finds that mitigation measures have been incorporated into the Preferred Alternative (see Section 4.5 of this document) and that implementation of these mitigation measures will minimize or avoid the contribution of the Preferred Alternative to these cumulative impacts. (Because of length, mitigation measure text is presented separately in Attachment A to these CEQA findings.)

5.6 Safety and Security

The Preferred Alternative, in combination with cumulative projects in the cumulative RSA, would result in a potentially significant cumulative impact on emergency response times because these projects would contribute to a potential increase in emergency response time in certain locations. Mitigation under the Preferred Alternative (see Section 4.7 of this document for information on the mitigation measures) will include emergency response improvements, which will also reduce the contribution to a less-than-considerable level, if implemented. However, 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 new fire stations. If the mitigation proposed is not adequately implemented, the Preferred Alternative in combination with cumulative projects would result in cumulatively significant delays to emergency response times. Therefore, the incremental effect of the Preferred Alternative would be cumulatively considerable for emergency response times and would be significant and unavoidable.

The Authority finds that mitigation measures have been incorporated into the Preferred Alternative (see Section 4.7 of this document) and that implementation of these mitigation measures will minimize or avoid the contribution of the Preferred Alternative to these cumulative impacts. (Because of length, mitigation measure text is presented separately in Attachment A to these CEQA findings.) However, the Preferred Alternative's contribution to the cumulative impact would remain cumulatively considerable.

The Authority finds that there are no other feasible mitigation measures that will reduce this impact on emergency response times to a less-than-cumulatively-considerable level. To the extent that this cumulatively considerable adverse impact remains significant and unavoidable, the Authority finds that specific economic, social, and other considerations identified in the Statement of Overriding Considerations (Chapter 8 of this document) support certification of the Final EIR/EIS and approval of the project.

5.7 Agricultural Farmland

The Preferred Alternative, in combination with cumulative projects in the cumulative RSA, would result in a significant cumulative impact with respect to agricultural farmland because construction would permanently convert large areas of agricultural farmland to nonagricultural uses. The project's contribution to this cumulative impact would be cumulatively considerable because the project would permanently convert Important Farmland to nonagricultural uses and no new agricultural farmland would be created to replace converted land. While project-level mitigation will address the permanent conversion of Important Farmland, no mitigation is available to replace the converted farmland, and the project contribution would remain cumulatively considerable. Therefore, the incremental effect of the Preferred Alternative would be cumulatively considerable for agricultural farmland and would be significant and unavoidable.

The Authority finds that mitigation measures have been incorporated into the Preferred Alternative (see Section 4.8 of this document) and that implementation of these mitigation measures would reduce the cumulative impacts. (Because of length, mitigation measure text is presented separately in Attachment A to these CEQA findings.) However, the Preferred Alternative's contribution to the cumulative impact would remain cumulatively considerable.

The Authority finds that there are no other feasible mitigation measures that will reduce this impact on agricultural farmland to a less-than-cumulatively-considerable level. To the extent that this cumulatively considerable adverse impact remains significant and unavoidable, the Authority finds that specific economic, social, and other considerations identified in the Statement of Overriding Considerations (Chapter 8 of this document) support certification of the Final EIR/EIS and approval of the project.

5.8 Parks, Recreation, Open Space, and School District Play Areas

During operations, the Preferred Alternative would result in severe noise impacts at parks, recreational facilities, open space resources, or school district play areas. When these severe noise impacts would combine with the noise emissions of other cumulative projects, it would result in a significant cumulative operational impact on parks, recreational facilities, open space resources, or school district play areas under CEQA because the combined noise exposure would create a perceived barrier to use. The Preferred Alternative's contribution to this cumulative impact would be considerable because operational noise would moderately to severely affect the user experience at these resources. Therefore, the incremental effect of the Preferred Alternative would be cumulatively considerable for impacts associated with a perceived barrier to use of

parks, recreational facilities, open space resources, and school district play areas and would be significant and unavoidable.

The Authority finds that mitigation measures have been incorporated into the Preferred Alternative (see Section 4.3 and Section 4.4 of this document) and that implementation of these mitigation measures would reduce the cumulative impacts. (Because of length, mitigation measure text is presented separately in Attachment A to these CEQA findings.) However, the Preferred Alternative's contribution to the cumulative impact would remain cumulatively considerable.

The Authority finds that there are no other feasible mitigation measures that will reduce this impact on perceived barriers to use of parks, recreational facilities, open space resources, and school district play areas to a less-than-cumulatively-considerable level. To the extent that this cumulatively considerable adverse impact remains significant and unavoidable, the Authority finds that specific economic, social, and other considerations identified in the Statement of Overriding Considerations (Chapter 8 of this document) support certification of the Final EIR/EIS and approval of the project.

5.9 Aesthetics and Visual Quality

The construction of the Preferred Alternative, combined with other cumulative projects, would result in permanent significant cumulative aesthetic impacts under CEQA because the visual quality and setting would be degraded. The project 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 TPFs and radio towers. While mitigation will reduce the impact of new permanent features, it will not fully eliminate the impact. The contribution of the Preferred Alternative to this cumulative impact would be considerable because the project would result in the largest perceived change in aesthetics and visual resources compared to other cumulative projects. Therefore, the incremental effect of the Preferred Alternative construction would be cumulatively considerable for aesthetic impacts due to the degradation of visual quality and setting and would be significant and unavoidable.

In addition, project operations in combination with other cumulative projects would result in permanent significant cumulative impacts under CEQA as a result of changes in land development, causing indirect changes to visual quality, and because operation of the Preferred Alternative would contribute to increases in nighttime light levels. Project features will reduce potential land use impacts by implementing HSR station area development principles and guidelines and will provide lighting and building design intended to conform to the local design context. Mitigation will include providing vegetation screening adjacent to residential areas, screening TPFs and radio towers, and implementing noise mitigation guidelines. While mitigation will reduce the impact of project operations, it will not fully eliminate the impact. The contribution of the project to this cumulative impact would be considerable because the Preferred Alternative would result in the largest perceived change in aesthetics and visual resources compared to other cumulative projects. Therefore, the incremental effect of the Preferred Alternative operations would be cumulatively considerable for indirect visual quality impacts and would be significant and unavoidable.

The Authority finds that mitigation measures have been incorporated into the Preferred Alternative (see Section 4.10 of this document) and that implementation of these mitigation measures would reduce the cumulative impacts. However, the Preferred Alternative's contribution to the cumulative impact would remain cumulatively considerable. (Because of length, mitigation measure text is presented separately in Attachment A to these CEQA findings.)

The Authority finds that there are no other feasible mitigation measures that will reduce these construction aesthetic impacts or the operations indirect visual quality impacts to a less-than-cumulatively-considerable level. To the extent that these cumulatively considerable adverse impacts remain significant and unavoidable, the Authority finds that specific economic, social, and

other considerations identified in the Statement of Overriding Considerations (Chapter 8 of this document) support certification of the Final EIR/EIS and approval of the project.

5.10 Cultural Resources

Construction of the Preferred Alternative would result in permanent demolition, destruction, relocation, or alteration of built historic resources or their settings, resulting in loss of the features that made the resource significant under NRHP or CRHR criteria. These impacts would combine with impacts of other cumulative projects to result in significant cumulative construction impacts on historic built resources under CEQA because these projects would result in the demolition, destruction, or alteration of historic built resources, their settings, or both. The contribution of the Preferred Alternative to this cumulative impact would be considerable because the Preferred Alternative would be the largest contributor to cumulative impacts on historic built resources. Therefore, the incremental effect of the Preferred Alternative construction would be cumulatively considerable for impacts associated with permanent demolition, destruction, relocation, or alteration of built historic resources or their settings and would be significant and unavoidable.

The Authority finds that mitigation measures have been incorporated into the Preferred Alternative (see Section 4.11 of this document) and that implementation of these mitigation measures would reduce the cumulative impacts. (Because of length, mitigation measure text is presented separately in Attachment A to these CEQA findings.) However, the Preferred Alternative's contribution to the cumulative impact would remain cumulatively considerable.

The Authority finds that there are no other feasible mitigation measures that will reduce these impacts on built historic resources to a less-than-cumulatively-considerable level. To the extent that this cumulatively considerable adverse impact remains significant and unavoidable, the Authority finds that specific economic, social, and other considerations identified in the Statement of Overriding Considerations (Chapter 8 of this document) support certification of the Final EIR/EIS and approval of the project.

6 FEASIBILITY OF POTENTIAL ALTERNATIVES

CEQA requires the lead agency, here, the Authority, to consider a reasonable range of potentially feasible alternatives to the proposed project (Public Resources Code, Sections 21002 and 21081; see also CEQA Guidelines, Section 15126.6). “Feasible” means capable of being accomplished in a successful manner within a reasonable time, taking into account economic, environmental, legal, social, and technological factors (CEQA Guidelines, Section 15364). The range of alternatives to be considered is governed by a “rule of reason” that requires the EIR to set forth only those alternatives necessary to permit a reasoned choice. The alternatives shall be limited to ones that would feasibly attain most or all of the basic objectives of the project (CEQA Guidelines, Section 15126.6[f]) while avoiding or substantially lessening any of the significant effects of the project. An EIR need not study in detail an alternative that a lead agency “has reasonably determined cannot achieve the project’s underlying fundamental purpose” (*In re Bay-Delta Programmatic Environmental Impact Report Coordinated Proceedings* (2008) 43 Cal.4th 1143, 1165).

Prior to moving forward with a project for which significant effects on the environment are identified, CEQA requires that the lead agency find that “specific economic, legal, social, technological, or other considerations, including considerations for the provision of employment opportunities for highly trained workers, make infeasible the ... [project] alternatives identified in the environmental impact report” (Public Resources Code, Section 21081). The determination of infeasibility “involves a balancing of various ‘economic, environmental, social, and technological factors’” (*City of Del Mar v. City of San Diego* [1982] 133 Cal.App.3d 401, 417). Where there are competing and conflicting interests to be resolved, the determination of infeasibility “is not a case of straightforward questions of legal or economic feasibility,” but rather, based on policy considerations (*California Native Plant Society v. City of Santa Cruz* [2009] 177 Cal.App.4th 957, 1001-02). “[A]n alternative that is ‘impractical or undesirable from a policy standpoint’ may be rejected as infeasible” (Id. at p. 1002, citing 2 Kostka & Zischke, Practice under CEQA (Cont.Ed.Bar 2010) Section 17.29, p. 824).

The key policy considerations that must be balanced in determining the feasibility of the project alternatives include the following:

- The Authority’s statutory responsibility, which is to:
 - “direct the development and implementation of intercity high-speed rail service that is fully integrated with the state’s existing intercity rail and bus network, consisting of interlinked conventional and high-speed rail lines and associated feeder buses. The intercity network in turn shall be fully coordinated and connected with commuter rail lines and urban rail transit lines developed by local agencies, as well as other transit services, through the use of common station facilities whenever possible (Public Utilities Code, Section 185030).”
- The purpose of the statewide HSR system, which is to provide reliable high-speed electrified train system that links the major metropolitan areas of the state, and that delivers predictable and consistent travel times. A further objective is to provide an interface with commercial airports, mass transit and the highway network and relieve capacity constraints of the existing transportation system as increases in intercity travel demand in California occur, in a manner sensitive to and protective of California’s unique natural resources.
- The Authority’s prior determination that serving intermediate markets in the Central Valley, rather than bypassing them, is an important component of the high-speed train system.
- The Authority’s decision to consider blended operations along the San Francisco Peninsula, which was memorialized in 2012 through four separate but related actions: Authority adoption of the 2012 Business Plan (Authority 2012d); Metropolitan Transportation Commission (MTC)

and MOU party adoption of MTC Resolution No. 4056 MOU³ (MTC 2012); and passage of Senate Bill (SB) 1029 and SB 557.

- The Authority's objectives, which are to:
 - Provide intercity travel capacity to supplement critically over-used interstate highways and commercial airports.
 - Meet future intercity travel demand that will be unmet by current transportation systems, and increase capacity for intercity mobility.
 - Maximize intermodal transportation opportunities by locating stations to connect with local transit, airports, and highways.
 - Improve the intercity travel experience for Californians by providing comfortable, safe, frequent, and reliable high-speed travel.
 - Provide a sustainable reduction in travel time between major urban centers.
 - Increase the efficiency of the intercity transportation system.
 - Maximize the use of existing transportation corridors and rights-of-ways, to the extent feasible.
 - Develop a practical and economically viable transportation system that can be implemented and generate revenues in excess of O&M costs.
 - Provide intercity travel in a manner sensitive to and protective of the region's natural and agricultural resources and reduce emissions and VMT for intercity trips.
 - Incorporate the San Jose to Merced project into the intermodal transportation station at San Jose Diridon, thereby providing interfaces with mass transit (VTA, Bay Area Rapid Transit, Caltrain, and Amtrak) and highways, resulting in local and regional transit and transportation hubs.
- The characteristics enumerated in Streets and Highways Code Section 2704.09 for the statewide high-speed train system as a whole, which include electric trains that can operate at high speeds, specified non-stop service travel times between certain cities, and following existing transportation and utility corridors to the extent feasible, as determined by the Authority, to reduce the potential for environmental impacts.
- The ability of an alternative to comply with Federal CWA Section 404 by qualifying as the "least environmentally damaging practicable alternative" (LEDPA) in terms of adverse effects on waters of the United States and jurisdictional wetlands (CWA, Section 404[b][1]). Alternatives other than the LEDPA would not receive the federal Section 404 permit that is necessary for construction. In April 2020, the USACE and USEPA provided letters concurring that the Authority's Preferred Alternative is the preliminary LEDPA for purposes of Section 404 compliance.
- Complexity of construction – Generally, construction is more complex within urban areas than in rural areas due to the necessity to minimize impacts on neighboring residences and businesses that are substantially more numerous in urban areas and the greater potential for conflicts with public utilities and infrastructure (i.e., sewer and water lines, local streets) in urban areas.

³ The Authority and eight other Bay Area agencies (Peninsula Corridor Joint Powers Board, City and County of San Francisco, San Francisco County Transportation Authority, Transbay Joint Powers Authority, San Mateo County Transportation Authority, VTA, City of San Jose, and MTC) approved the MOU in March 2012.

- The inherent tradeoffs in terms of environmental impacts that occur between (1) following existing transportation corridors, minimizing impacts on the biological resources, and agricultural lands and communities, but increasing impacts on urban communities and the urban environment and (2) departing from existing transportation corridors, minimizing impacts on urban communities and the urban environment, but increasing impacts on biological resources, agricultural lands, and agricultural communities.

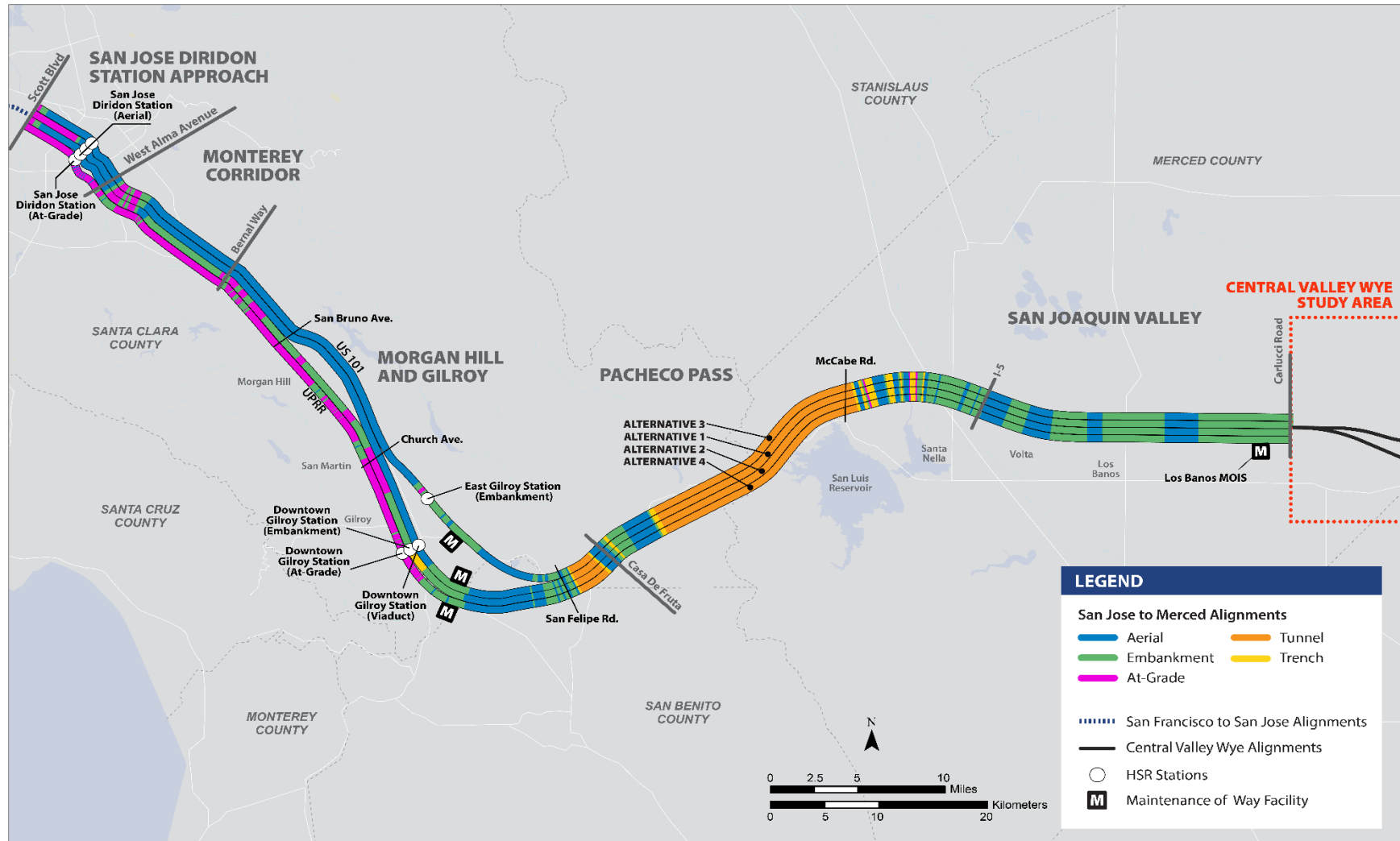
6.1 Alternatives Studied in the Draft EIR/EIS and Not Selected for Approval

Separate from the Preferred Alternative (Alternative 4 including San Jose Diridon Station, the DDV, the Downtown Gilroy Station, a MOWF near Gilroy, and the TDV), the Draft EIR/EIS evaluated the No Project Alternative, Alternative 1 (including a potential MOWF site near Gilroy), Alternative 2 (including Skyway Drive A and B and a potential MOWF site near Gilroy), and Alternative 3 (including an East Gilroy Station and a potential MOWF site near Gilroy). Alternatives 1, 2, and 3 (and their associated MOWF sites, as well as the East Gilroy Station associated with Alternative 3) were not selected for approval and are discussed below. These alternatives and design variants are described in detail in Chapter 2, Alternatives, of the Final EIR/EIS.

Figure 3 shows the four project alternatives carried forth for analysis in the Draft EIR/EIS and Final EIR/EIS.

6.1.1 No Project Alternative

The No Project Alternative would not meet any of the project objectives or the objectives of the Statewide Project. “[A]n alternative that is ‘impractical or undesirable from a policy standpoint’ may be rejected as infeasible” (Id. at p. 1002 citing 2 Kostka & Zischke, Practice under CEQA (Cont.Ed.Bar 2010) Section 17.29, p. 824). The No Project Alternative is rejected for that reason.



Source: Authority 2019a

JANUARY 2019

Note: San Jose to Merced Project alignments are described in Final EIR/EIS Chapter 2

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 3 San Jose to Merced Project Section

6.1.2 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 and bypassing downtown Morgan Hill. 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 profile would be increased to minimize ground intrusion. Alternative 1 would incorporate the viaduct to I-880 design 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. The alternative 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 an MOWF south of Gilroy. The alignment would continue predominantly on viaduct and embankment across the Soap Lake floodplain before entering a short tunnel (Tunnel 1) west of Casa De Fruta. The alignment and guideway in the Pacheco Pass Subsection would be the same for all four 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 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 GEA. Several local roadways 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.

6.1.3 Alternative 2

Alternative 2 is the alternative that most closely approximates the alignment and structure types identified in the prior program-level documents, implemented by limiting longitudinal encroachment into the UPRR right-of-way to combine railroad grade separations with minimum property displacements. The alignment most closely follows the existing UPRR and Monterey Road transportation corridor. The San Jose Diridon Station Approach Subsection under Alternative 2 would use a longer viaduct, ascending to aerial structure near Scott Boulevard rather than ascending to aerial structure south of I-880. The alignment would be at grade through the Monterey Corridor Subsection and through Morgan Hill, and on embankment on approach 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 predominantly on viaduct and embankment across the Soap Lake floodplain before entering Tunnel 1 west of Casa De Fruta. The remainder of this alternative is as described above.

Overall, this alternative would be comprised of 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.

6.1.4 Alternative 3

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

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 East Gilroy MOWF and would continue predominantly on viaduct and embankment across the Soap Lake floodplain before entering Tunnel 1 west of Casa De Fruta. The remainder of this alternative is as described above.

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.

6.1.5 LEDPA Findings Concerning Alternatives 1 through 3

Alternatives 1 through 3 are found to be infeasible because they do not qualify as the preliminary LEDPA. Two important processes that integrate project design with key federal regulatory requirements are Section 404 of the CWA and Section 408 of the Rivers and Harbors Act, as managed by the USACE with oversight from the USEPA. These laws establish the authority of the USACE to make permit decisions regarding the discharge of dredged or fill material into waters of the U.S. and alterations or modifications to existing federal flood risk management facilities. The USACE limits its approval of individual permits for discharge of dredged or fill material to the LEDPA. An alternative that does not qualify as the LEDPA will not be issued this key permit, and construction will not take place. The project cannot proceed without issuance of the Section 404/408 permits.

The issuance of Section 404/408 permits is a major part of project feasibility, as illustrated by the extent of land involved. The areal extent of direct permanent and temporary impacts (Section 3.7.5.3, Methods for Impact Analysis, of the Final EIR/EIS) on aquatic resources considered jurisdictional under Section 404 of the CWA and as waters of the state is shown in Final EIR/EIS Table 3.7-18. Overall, the total magnitude of permanent impacts on jurisdictional aquatic resources by alternative would be, in descending order, 110.8 acres under Alternative 3; 108.0 acres under Alternative 2; 100.5 acres under Alternative 1; and 96.5 acres under Alternative 4. The extent of temporary impacts would be, in descending order, 89.4 acres under Alternative 2; 87.5 acres under Alternative 1; 80.7 acres under Alternative 3; and 78.3 acres under Alternative 4.

To coordinate decision-making, the Authority and FRA entered into a National Environmental Policy Act (NEPA)/Section 404/Section 408 Integration Process MOU with the USACE and USEPA (FRA et al. 2010). The MOU outlines three major checkpoints in the integration of the NEPA, Section 404, and Section 408 processes. Each checkpoint consists of the submittal of technical data and studies to the USACE and USEPA for review and consideration prior to issuing a formal written agency response. The USACE concurred with the project's Purpose and Need statement on October 28, 2011, and the USEPA concurred on November 30, 2011. On September 21, 2017, September 26, 2017, January 22, 2019, and February 1, 2019, the USEPA and USACE concurred on the range of four alternatives to be carried forward in the Draft EIR/EIS. In April 2020, the USEPA and the USACE concurred that Alternative 4 represents the preliminary LEDPA for the project extent.

6.2 Development and Screening of Potential Design Options, including Alternatives Previously Considered and Not Carried Forward for Study in the Draft EIR/EIS or Final EIR/EIS

As described in Section 6.1 of this document, the Authority and FRA initially considered five potential options for the east-west connection with the San Jose to Merced Project Section to the

west, and prepared three subsequent alternatives analysis reports (the *San Jose to Merced Section Preliminary Alternatives Analysis Report* [PAA] [Authority and FRA 2010], the *Merced to Fresno Section Supplemental Alternatives Analysis Report* [Authority and FRA 2011a], and the *San Jose to Merced Section Supplemental Alternatives Analysis Report* [Authority and FRA 2011b]) in which these alternatives were evaluated.

The Authority and FRA screened potential design options on the way to selecting the four project alternatives carried forward for analysis in the Draft EIR/EIS or Final EIR/EIS. As discussed in Chapter 2 and illustrated in Table 2-3 of the Final EIR/EIS, this included nine design options for the San Jose Diridon Approach Subsection; nine design options for the Monterey Corridor Subsection, 14 design options and two maintenance facility options for the Morgan Hill to Gilroy Subsection; three design options for the Pacheco Pass Subsection; and three design options for the San Joaquin Valley Subsection of the project. The reasons for rejecting various design options are summarized in Table 2-3 of the Final EIR/EIS. The design options carried forward were the basis for the four project alternatives summarized above and detailed in Chapter 2 of the Final EIR/EIS.

The following summarizes the milestones in alternatives development and consideration during this period.

6.2.1 NEPA/CEQA Scoping (2009)

On February 23, 2009, the Authority distributed a Notice of Preparation announcing preparation of an EIR for the entire San Jose to Merced Project Section. The FRA published a Notice of Intent in the *Federal Register* on March 16, 2009, announcing the preparation of an EIS for the Project Section. The Authority held scoping meetings in Merced (March 18, 2009), San Jose (March 25, 2009), and Gilroy (March 26, 2009). More than 300 residents, property and business owners, agency representatives, elected officials, the media, and other interested parties participated in these meetings. The Authority and FRA solicited input concerning potential project-level alternatives and environmental effects.

Major issues raised during scoping included alignment options and alternatives for routes, stations, and maintenance facilities; design options for grade crossing and separations; considerations for alternative elevated, trenched, or tunneled alignments; parking locations; and other facilities. Additional alignment alternatives suggested included:

- In San Jose, to avoid potential impacts on the greater Gardner neighborhood, several options for an underground tunnel or at-grade and alignment design options along SR 87, south of I-280, between the Diridon and Tamien Caltrain stations
- In the south part of San Jose between the Tamien station to Coyote Valley, an option to follow SR 87 and SR 85, replacing the VTA light rail that runs along that corridor with HSR, and relocating the VTA light rail to Monterey Road
- South of San Jose, an option to follow U.S. Highway (US) 101 to reach Gilroy, bypassing downtown Morgan Hill
- East of Gilroy on the west side of Pacheco Pass, an option to explore alignment options that would avoid bisecting the Frazier Lake Airpark
- On the east side of Pacheco Pass, options to avoid the GEA and cross the San Joaquin Valley from Santa Nella to SR 99
- From Los Banos east, several options to follow SR 152 to reduce potential impacts on agricultural lands and Chowchilla
- Options south of SR 152 to reduce potential impacts on Chowchilla and make a connection to the Merced to Bakersfield Project Section

This input helped to shape the initial alternative alignments that were considered for this section of the HSR system.

6.2.2 Preliminary and Supplemental Alternatives Analysis (2010–2011)

The development of initial project-level alternatives in 2009 followed the process described in *Analysis Methods for Project EIR/EIS, Version 2* (Authority 2009b). The assessment of potential alternatives involved both qualitative and quantitative analyses to address applicable policy and technical considerations. These methods included field inspections of corridors; project team input and review considering local issues that could affect alignments; qualitative assessment of constructability, accessibility, operations, maintenance, right-of-way, public infrastructure, railway infrastructure, and environmental effects; engineering assessment of project length, travel time, and configuration of key features of the alignment (such as the presence of existing infrastructure); and GIS analysis of effects on farmland, water resources, wetlands, threatened and endangered species, cultural resources, current urban development, and infrastructure. Stakeholder input, concerns, and preferences were considered to provide local context.

Next, the Authority evaluated the narrowed range of alternatives against HSR system performance criteria. The screening process entailed use of environmental criteria to measure the potential effects of the proposed alternatives on the natural and human environment. For example, the land use criteria measured the extent to which a station alternative would support transit use; be consistent with existing adopted local, regional, and state plans; and be supported by existing and future growth areas. Constructability measured the feasibility of construction and the extent to which right-of-way would be constrained. Community effects measured the extent of disruption to neighborhoods and communities, such as the potential to minimize (1) right-of-way acquisitions, (2) the extent of division of an established community, and (3) conflicts with community resources. The analysis of biological resources and water quality evaluated the extent to which an alternative would minimize effects on natural resources. As a result of this screening process, some alignment alternatives were selected to proceed into the Draft EIR/EIS.

The PAA (Authority and FRA 2010) and the two San Jose to Merced Supplemental Alternatives Analysis reports (SAA) (Authority and FRA 2011a, 2011b) present the alternatives analysis. The PAA and SAAs considered the entire Project Section from the San Jose HSR Station through the Central Valley Wye (the planned junction with the Merced to Fresno Project Section) and north to Merced. The alternatives analyses provide the reader with an understanding of how alternatives were developed, taking into account alignment and station development considerations. While the alternatives analysis process considered multiple criteria, it emphasized the project objective to maximize the use of existing transportation corridors and available rights-of-way to the extent feasible as determined by the Authority (California Streets and Highways Code, Division 4, Chapter 20, Section 2704 et seq.). Those alternatives that were not carried forward by the Authority and FRA had greater direct and indirect environmental effects, were impracticable, or failed to meet the project purpose.

The three alternatives analysis reports referenced above (Authority and FRA 2010, 2011a, 2011b) evaluated alignment alternatives. These documents describe the procedure and rationale for selecting and rejecting alignment alternatives.

Public and agency comments were solicited by the Authority during preparation of the alternatives analysis reports. The PAA and SAAs describe the recommended alternatives to be carried forward for further analysis and alternatives to be withdrawn from further consideration.

6.2.3 2012 Business Plan (2012) and SB 1029

The 2012 Business Plan (Authority 2012d) introduced the blended system concept for the San Francisco to San Jose Project Section of the HSR system. Under the blended system, Caltrain and HSR would share the Caltrain corridor and tracks in a mostly at-grade system from San Jose to San Francisco. SB 1029 made the blended system a legislative mandate. The San Jose to Merced Project Section includes the area north of the San Jose Diridon Station to Scott Boulevard, and at-grade options ultimately were included in Alternatives 1 and 4 in the Final EIR/EIS.

6.2.4 Checkpoint B Summary Report (2013)

Pursuant to the NEPA/Section 404/Section 408 Integration Process Memorandum of Agreement with USACE and USEPA, the FRA and the Authority are required to obtain concurrence from the USACE and USEPA regarding the range of alternatives to be analyzed in the Draft EIR/EIS. The integration process makes certain that the evaluation considers potential alternatives that can be feasibly permitted by the USACE under the requirements of CWA Section 404 and Rivers and Harbors Act Section 408.

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 SAAs 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 EIR/EIS.

Following the completion of the Checkpoint B analysis in 2013, work on the San Jose to Merced Project Section as a whole was suspended, and the Authority initiated a more limited study focused on the Central Valley Wye. The Central Valley Wye study was advanced as a supplemental EIR/EIS for the Merced to Fresno Project Section. The *Merced to Fresno Section: Central Valley Wye Draft Supplemental EIR/EIS* (Authority 2019c) was published May 2, 2019.

In late 2015, the Authority reinitiated work on the project extent—that is, the portion of the San Jose to Merced Project Section that is located to the west of the Central Valley Wye. The additional analysis of the Project Extent began with, and built upon, the range of alternatives that had been documented in the *Checkpoint B Summary Report* for the San Jose to Merced Project Section (Authority and FRA 2013).

6.2.5 2016 Business Plan (2016)

The 2016 Business Plan (Authority 2016b) described the Authority's decision to shift its early focus from the project sections in Southern California to those in Northern California with a goal of initiating Central Valley to Silicon Valley (Valley-to-Valley) service in 2025. In light of updated ridership forecasts and operational planning undertaken since the 2012 Business Plan, the Authority identified certain new alternatives (such as a viaduct alternative between San Jose and Gilroy and blended operation north of Diridon Station) and also reconsidered the formerly dismissed at-grade alignment for the San Jose Diridon Station Approach Subsection as part of the 2016 Business Plan.

6.2.6 Further Outreach, Consultation, and Alternatives Refinement (2016–2017)

After reinitiating work on the project extent in 2015 and after adoption of the Business Plan in 2016, the Authority and FRA conducted additional community outreach and engineering along the corridor. 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 initial phase considered financial feasibility, constructability, and operations. If the alternative met these initial criteria, then it was also reviewed for community and environmental impact.

During 2016 and 2017, the Authority refined and modified the range of alternatives to be considered in the Draft EIR/EIS in response to changed community conditions, a more detailed understanding of environmental and community concerns, and cost and constructability issues.

The Authority and FRA conducted public outreach meetings; consulted with environmental regulatory agencies; consulted with cities and counties; met with federal, state, and private landowners; and met with other stakeholders during this process. The Authority presented the alternatives under consideration for the Draft EIR/EIS in a wide-ranging series of public, agency, and stakeholder meetings and received input regarding concerns about alternatives and

suggestions for additional alternatives. This additional outreach led to the development of new design options in the Monterey Corridor, Morgan Hill and Gilroy, and Pacheco Pass Subsections and reconsideration of some alternatives previously dismissed in earlier alternative evaluations.

The Authority and FRA reviewed prior design options and new design options developed during 2016 and 2017. The results of the evaluation of new design options and reconsideration of prior design options are presented in Section 2.4.3, Alternatives Considered during Alternatives Screening Process, and Appendix 2-I, Range of Potential Design Options Considered and Findings by Subsection, in the Final EIR/EIS.

The Authority and FRA developed a *Checkpoint B Summary Report Addendum 3* to narrow the range of alternatives to three end-to-end alternatives evaluated in the Draft EIR/EIS. The USACE and USEPA concurred with the range of alternatives in the *Checkpoint B Summary Report Addendum 3* (Authority and FRA 2017) on October 20, 2017.

6.2.7 2018 Business Plan (2018)

The 2018 Business Plan (Authority 2018a) confirmed the Authority's decision to focus on the project sections in Northern California with a goal of initiating Valley-to-Valley service in 2029. 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. The blended infrastructure and service between San Jose Diridon Station and Downtown Gilroy Station would occur largely at grade and predominantly within the existing Caltrain and UPRR rights-of-way.

6.2.8 Checkpoint B Summary Report Addendum 4 (2018)

The Authority and FRA reviewed a blended, at-grade design option developed during 2017 and 2018 that would implement the 2018 Business Plan concept. The blended alternative would represent a least-cost option for initiating early service between San Jose and downtown Gilroy and could reduce certain impacts relative to the other alternatives previously advanced for study.

The Authority and FRA developed a *Checkpoint B Summary Report Addendum 4* to review the preliminary effects of this alternative and assess whether to evaluate a new alternative in the Draft EIR/EIS. The USACE and USEPA concurred with the range of alternatives in the *Checkpoint B Summary Report Addendum 4* (Authority 2019d) on January 22 and February 1, 2019 (respectively).

6.3 Alternatives Suggested by Commenters

The Authority received comments questioning alternatives considered and reasons they were not carried forward; questioning the methodology used for identifying a preferred alternative; expressing a preference for one of the alternatives over the others or opposing a particular alternative because of its impacts; or suggesting the Authority study other alternatives.

Alternatives suggested by commenters in comments on the Draft EIR/EIS and the Revised/Supplemental Draft EIR/EIS and the reasons these alternatives were not considered further are summarized below:

- **US 101 alignments between San Jose and Gilroy:** A US 101 Alternative was not carried forward into the EIR/EIS because of challenges with the consistency with the HSR system and the purpose and need of the San Jose to Merced Project Section, impacts on the environment, construction costs, logistics regarding implementation/construction, incompatibility with land use, consistency with Authority transit-oriented development policies, and public/agency input. US 101 was built to accommodate vehicular traffic with a design speed of up to approximately 70 mph. High-speed trains are proposed for much higher speeds than 70 mph between San Jose and Gilroy. Because US 101 was designed for slower vehicular traffic, the curves of the highway are too sharp to safely accommodate a high-speed train track along the center median or with the same curvature as US 101 in the immediate adjacent area. Thus,

alternatives following US 101 would not be able to strictly follow the highway alignment and would thus need to use substantial areas of land adjacent to/near US 101 in order to have acceptable design curves. In Gilroy, Morgan Hill, and San Jose, alignments adjacent to US 101 would displace residential and/or commercial land uses. Alignments adjacent to US 101 would also result in impacts on farmland and wildlife habitat avoided by the Preferred Alternative.

- **Hybrid alternative for the northern approach to downtown Gilroy:** The City of Gilroy suggested a hybrid alternative consisting of an at-grade alignment north of Gilroy (as in the Preferred Alternative) transitioning to a viaduct alignment within the UPRR right-of-way through Gilroy in order to avoid the impacts of an at-grade alignment through Gilroy. This hybrid alternative is not feasible because UPRR has stated that it will not allow longitudinal encroachments (i.e., viaduct within the right-of-way that follows the right-of-way alignment) as it would significantly disrupt existing operations. Even if it were feasible, this alternative would result in a larger footprint, the need to acquire more right-of-way, and additional impacts on resources, as there would need to be a grade transition from a viaduct to at-grade to connect an at-grade alignment to a viaduct alignment. This alternative would either require embankment or retaining walls and affect UPRR operations. The transition would likely occur at Las Animas, where it is closest to the UPRR alignment. From Las Animas to 10th Street, under the City’s suggested hybrid alternative, there would be many more property acquisitions than required with the Preferred Alternative.
- **Light maintenance facility (LMF) between San Jose and Gilroy or at the MOWF facility south of Gilroy:** The City of Brisbane suggested analysis of alternatives that would include an LMF between San Jose and Gilroy or at the MOWF facility south of Gilroy. The City of Brisbane suggested that such alternatives would either reduce the size of or eliminate the need for a proposed LMF in Brisbane in the San Francisco to San Jose Project Section. An LMF located between San Jose and Gilroy that was providing daily light maintenance and overnight storage facilities for trains terminating at San Francisco would result in additional train travel over 60 to 80 miles each way, which would result in extended operational hours and environmental impacts, such as noise due to trains and sounding of horns at up to 70 at-grade crossings each way in addition to substantial increase in operational costs. Splitting of LMF functions with daily maintenance at a facility in Brisbane and quarterly maintenance at an LMF between San Jose and Gilroy would result in an overall larger footprint due to the construction of multiple facilities instead of a single consolidated facility with the additional footprint affecting farmland and/or wildlife habitat of higher value between San Jose and Gilroy versus the highly disturbed and lower value habitat in the LMF location in Brisbane and additional construction cost for two facilities.
- **Gilroy HSR mainline bypass alternative:** This alternative would include a mainline HSR alignment east of US 101 through Gilroy and Morgan Hill that would connect to the UPRR alignment used by Caltrain north of Capitol Expressway in south San Jose combined with a conventional rail connection from the mainline to downtown Gilroy with trains then proceeding along the UPRR alignment up to 125 mph through Morgan Hill to San Jose. This alternative would not avoid any of the environmental effects of the Preferred Alternative because it would require the same improvements along the UPRR alignment through Gilroy, Morgan Hill, and San Jose as the Preferred Alternative and would have additional construction and operational environmental effects along the “mainline” HSR alignment east of US 101. An alignment east of US 101 would also have additional effects on agricultural land, open space, and habitat for wildlife. Consequently, the suggested alternative is not considered preferable to the Preferred Alternative due to greater environmental impact, greater community impact, and greater cost.
- **Pacheco Pass southern alignment alternatives:** One commenter suggested two alignments that would cross the Pacheco Pass approximately 6 to 10 miles south of the proposed crossing would reduce tunnel length and thus cost. The commenter asserted

that these alignments would cross the Quien Sabe Volcanics and would have more favorable geologic conditions than the Preferred Alternative. There is no readily available information that would validate this assertion, and geologic investigations at a nearby mine in the Quien Sabe Volcanics refer to the rock being considerably fractured and faulted. In addition, there have been no previous investigations or projects through which one could assume that the rock at 1,500 feet below the surface would be any more competent. Consequently, assertions about more favorable geology are speculative. These alignments would require crossing fault lines in locations where there is little to no existing information or monitoring, therefore creating a higher risk due to the unknown conditions. These alignments would require up to 250-foot-tall viaduct structures close to existing active faults, requiring extensive seismic reinforcement, creating additional design and construction costs and risks. These alignments would likely require a single-direction bored tunnel, instead of tunneling from each end, increasing the construction schedule. These alignments would require additional track distance above grade, posing greater impact on the communities and environment than the current tunnel alignment and profile. These alignments are much further from existing transportation corridors than the Preferred Alternative, which contravenes Authority policy, but will also increase the amount of pre-construction work, trucking, construction emissions, construction access road impacts, access to water and electric power supply in sufficient capacity to support the tunnel construction and future HSR operations, and impacts on biological and community resources. These alternatives would require additional residential displacement, the impact of rebuilding approximately 17 miles of farm roads rebuilt to support heavy construction traffic, and greater impact on biological resources due to greater amounts of surface alignment. The southern alignments are located south and downstream of the San Luis Dam, creating an additional unique risk of flooding due to natural disasters. These alignments would pass close to an abandoned mine that may pose additional construction risks. These alignments would also require revisions to the alignment east of Pacheco to optimize southern route. The two southern alignments proposed are not potentially feasible, for the technical/engineering reasons and adverse secondary environmental impacts, as well as the increased costs, described above.

- **Horizontal and vertical alignment alternatives in the San Joaquin Valley**
Subsection: Multiple horizontal alternatives and a number of different vertical design options were considered for the San Joaquin Valley Subsection. The central route (Henry Miller Road to Carlucci Road) was determined to be potentially feasible and to result in less effects on aquatic resources than the other two horizontal alternatives identified during the Checkpoint B process; it is part of the Preferred Alternative. The Authority determined a tunnel alternative for portions of the San Joaquin Valley Subsection would be not feasible for reasons of cost. Two additional viaduct sections over Whitworth Road and west of I-5 were evaluated. Neither provided any benefits to the existing alignment.

6.4 Preferred Alternative

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. The Preferred Alternative includes two stations (San Jose Diridon and Downtown Gilroy) and a MOWF. South and east of Gilroy, HSR would operate on a dedicated guideway similar to that of Alternatives 1 and 2. The objectives of the blended at-grade 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 alternative is distinguished from the other three project alternatives by a blended, at-grade alignment that would operate on two electrified passenger tracks and one conventional freight track predominantly within the existing Caltrain and UPRR rights-of-way. The 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. Overall, this alternative 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.

The Draft EIR/EIS identified Alternative 4 as the Preferred Alternative, which the Authority confirmed in the Final EIR/EIS. This identification was based on balancing the impacts of the project alternatives on the natural environment and community resources presented in the Draft and Final EIR/EIS in the context of CEQA, NEPA, CWA, stakeholder preferences, and capital construction costs. The key considerations in making this selection are:

- While there are relative differences between the way each of the four alternatives would affect various community resources, Alternative 4 would have the lowest overall impacts because it would result in the fewest displacements of residences, businesses, community facilities, and agricultural structures; would result in the least conversion of agricultural farmland to nonagricultural uses (and thus lowest impact on agricultural employment); and would cause the least change in aesthetics and visual quality. Alternative 4 would have the most noise impacts (with noise barrier mitigation only) but the lowest impacts on Monterey Road travel times. While Alternative 4 would 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 would 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 would 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 would result in the lowest impacts from permanent use of Section 4(f) parks and NRHP-listed or eligible built environment historic resources.
- Alternative 4 is the lowest-capital cost alternative.

The Preferred Alternative qualifies as the LEDPA for purposes of permitting under the federal CWA. In correspondence received by the Authority in April 2020, pursuant to the NEPA integration process the Authority, USACE, and USEPA undertook pursuant to USEPA's Section 404(b)(1) guidelines, both USACE and USEPA concurred that the Authority's Preferred Alternative is the preliminary LEDPA.

6.5 Conclusion on Alternatives

In summary, the Authority finds that the Preferred Alternative is the environmentally superior alternative among the Build Alternatives. The No Project Alternative does not meet the project's underlying purpose and project objectives. Among the Build Alternatives, only the Preferred Alternative qualifies as the preliminary LEDPA and for reasons stated in Section 6.4, the Preferred Alternative's environmental impacts are lesser than the other Build Alternatives' impacts. However, because adverse environmental impacts remain, the Authority will adopt a Statement of Overriding Considerations, as discussed in the Chapter 8 of this document.

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7 MITIGATION MEASURES SUGGESTED BY COMMENTERS

Some of the comments on the Draft EIR/EIS and the Revised/Supplemental Draft EIR/EIS suggested additional mitigation measures and/or modifications to the measures recommended in these documents. Some comments also suggested additions to the project that are not necessarily connected to an adverse environmental impact. The mitigation measures recommended in the Draft EIR/EIS and the Revised/Supplemental Draft EIR/EIS represent the professional judgment of subject matter experts on reasonable and feasible approaches to reduce significant adverse environmental impacts. Nevertheless, in some instances, the Authority has incorporated suggestions from comments to refine or improve mitigation in the Final EIR/EIS. This discussion explains the reasons for not incorporating certain of the mitigation measures suggested in comments. The Authority considered the following points in determining whether to include a mitigation measure suggested in comments:

- Whether the suggestion relates to a significant and unavoidable environmental effect of the project, or instead relates to an effect that is already less than significant or can be mitigated to less-than-significant levels by proposed mitigation measures in the Draft EIR/EIS or the Revised/Supplemental Draft EIR/EIS
- Whether the proposed language represents clear improvement, from an environmental standpoint, over the draft language that a commenter seeks to replace
- Whether the proposed language is sufficiently clear to be easily understood by those who will implement the mitigation as finally adopted
- Whether the language might be too inflexible to allow for pragmatic implementation
- Whether the suggestions are feasible from an economic, technical, legal, policy, or other standpoint
- Whether the measure addresses an impact not caused by the HSR project
- Whether the measure addresses a social or economic impact, as opposed to an impact on the physical environment

Authority staff, with assistance from subject matter experts, have carefully considered mitigation measures proposed in comments. The following identifies suggestions for mitigation measures that the Authority has not incorporated and the rationale for not including those measures. The list below is not intended to be exhaustive. To the extent that suggestions on mitigation measures that were rejected are not identified below, the Authority finds, based on the analysis contained in the Final EIR/EIS and the record as a whole, that such suggestions are appropriately rejected for one or more of the reasons identified above.

7.1 Section 3.2, Transportation

7.1.1 Measures That Are Considered Infeasible from an Economic, Technical, Legal, Policy, or Other Standpoint

Grade Separations

The following mitigation measures were not adopted because they are considered infeasible due to high capital costs, road closures and traffic disruptions during construction, extensive right-of-way acquisitions, life-cycle maintenance costs, aesthetic concerns due to height of elevated structures, and space-intensive designs:

- Install a grade separation at Monterey Road/Masten Avenue
- Install a grade separation at Monterey Road/Welburn Avenue-Leavesley Road
- Install a grade separation at Monterey Road/10th Street
- Install a grade separation at Monterey Road/Luchessa Avenue
- Install a grade separation at Tilton Avenue
- Install a grade separation at Dunne Avenue

- Install a grade separation at Tennant Avenue
- Install a grade separation at Skyway Drive
- Install a grade separation at Branham Road
- Install a grade separation at Chynoweth Avenue
- Install a grade separation at Auzerais Avenue
- Install a grade separation at West Virginia Street

The EIR/EIS analyzes four alternatives in detail. Alternatives 1, 2, and 3 would not have any at-grade crossings between San Jose and Gilroy, whereas Alternative 4 would be at grade, and HSR trains would cross through numerous at-grade crossings. In contrast, Alternatives 1 and 3 would primarily be on viaduct between San Jose and Gilroy and thus would be entirely grade-separated. Alternative 2 would be on embankment and would include grade separations of existing at-grade roadway crossings. As such, the EIR/EIS already considers potential alternatives that include grade separations.

The Final EIR/EIS analyzes the effect of increased gate-down time at the at-grade crossings with the Preferred Alternative on traffic delays at adjacent/nearby intersections in Section 3.2, Transportation, Impact TR#7. Mitigation Measure TR-MM#1 (as revised for the Final EIR/EIS to include site-specific traffic mitigation measures) provides various standard vehicle capacity enhancements, such as signal retiming or additions, lane restriping, road/intersection widening, and turn pocket additions/increases (including right-of-way acquisitions as needed). Mitigation Measure TR-MM#1 does not include grade separations as a potential mitigation option for traffic.

Constructing with grade separations to separate a rail alignment from roads can considerably widen a rail project's footprint and environmental impact including road closures and traffic disruptions during construction, extensive right-of-way acquisitions, aesthetic concerns due to height of elevated structures, and space-intensive designs. In addition, when grade separating alignments, the infrastructure can extend far beyond an individual roadway crossing because rail operations require that railway slope changes must be gradual. Thus, where there are at-grade roads crossing a rail alignment in close proximity to each other, any grade separation that uses a change in the railway elevation will likely require the changed elevation (whether above or below roadways) to be maintained across all the nearby at-grade crossings. In other words, it may not be possible to construct only one grade separation in some areas, where close proximity of at-grade crossings means that constructing one grade separation would then require constructing multiple other grade separations. This can increase environmental impacts including displacements, construction disruption, and aesthetic effects.

Overall, grade separations are a highly expensive mitigation strategy. Using an average assumed cost of \$75 million to \$150 million per crossing,⁴ grade separating the 29 at-grade crossings between San Jose and Gilroy under Alternative 4 could cost an additional \$2.175 billion to \$4.35 billion. Grade separations can sometimes cost more than \$150 million each depending on site-specific factors, so this estimate may be an underestimate. Also, the inclusion of grade separations for the at-grade alternative in the San Jose to Merced Project Section could set a precedent for the adjacent San Francisco to San Jose Project Section, which has an additional 39 at-grade crossings; using the cost range noted above, grade separations could add an additional cost of \$2.925 billion to \$5.85 billion, for a total cost of \$5.1 billion to \$10.2 billion for both project

⁴ This is a rough approximation of the average cost of grade separations. Cost varies by existing conditions and design. The City of San Jose, in their comments on the Draft EIR/EIS (see Volume 4 of the EIR/EIS) estimated the cost of grade separating Skyway, Branham, and Chynoweth as ranging from \$400 million to \$1.4 billion (\$133 million to \$467 million per crossing). On the lower end, Caltrain completed the San Bruno Grade Separation Project in 2014, which included three crossings and cost \$147 million, which is approximately \$49 million per crossing (PCJPB 2015). Caltrain and the City of San Mateo completed the San Mateo 15th Ave. Grade Separation Project, which included three crossings and cost \$205 million or about \$68 million per crossing (Caltrain n.d.). Grade separations along busy streets in cities will be of the higher end in terms of costs, whereas locations on smaller roads with lower volumes and less intervening development will be on the low end.

sections above the current estimated costs for the at-grade alternatives included in the two project sections.

The Authority, as described in its Business Plans, has not secured funding for constructing the entire Phase 1 system, including the San Jose to Merced Project Section and the San Francisco to San Jose Project Section. Cost has been and will continue to be a major concern for the HSR project as a whole. Given the high costs and disruptions associated with grade separations, the Authority cannot commit to grade separations as part of mitigation for Alternative 4 for the San Jose to Merced Project Section (or for the San Francisco to San Jose Project Section).

However, if Alternative 4 is ultimately selected, the Authority, in cooperation with local jurisdictions, transportation funding agencies, and state and federal agencies, would support community-led grade separation efforts over time as funding becomes available. The Authority would also work with its local, state, and federal partners to establish priorities for grade separations to be implemented as funding becomes available. This process would include working with local jurisdictions that are pursuing grade separation projects on their own so the HSR project, to the extent possible, does not create conflicts with future grade separation efforts. Finally, the Authority would also work with other rail parties to seek funding participation from multiple sources as opportunities arise.

7.1.2 Measure Does Not Represent Clear Improvements, from an Environmental Standpoint, Over the Draft Language That the Commenter Seeks to Replace

The following mitigation measure was not adopted because it does not offer clear environmental benefits over the mitigation measures already incorporated and adopted by the Authority.

- Widen US 101 consistent with the State of California’s US 101 South Comprehensive Corridor Plan for Caltrans District 4, specifically the construction of the improvements identified in the plan as “US 101 Express Lanes: Cochrane Road to Masten Avenue”.

Mitigation Measure TR-MM#1 in Section 3.2, Transportation, of the Final EIR/EIS provides a discussion of the mitigation identified for freeway effects. Mitigation for permanent congestion/LOS effects on freeway operations could include freeway widening and the construction of express lanes, as identified in the MTC Regional Transportation Plan (RTP) (MTC 2013, as cited in Section 3.2 of the Final EIR/EIS). These improvements would reduce the impact on freeway operations resulting from the project. While the improvements are included in the MTC RTP, they are not part of the implementation program funded for 2040. In concept, this measure would require the project to make a fair share contribution towards mobility improvements in the affected section of the highway corridor. Widening of the freeway and adding new freeway capacity would likely result in a substantial increase in VMT. The Authority is not intending to include mitigation measures for traffic delay/congestion if they would substantially increase VMT; as such, this measure is not proposed.

7.1.3 Measure Addresses an Impact That Is Less Than Significant

The following mitigation measures were not adopted because the impact was identified as less than significant.

- Signalize the Church Road/Monterey Road intersection with advance railroad preemption
- Install pre-signal with advance railroad detection at Masten Avenue crossing
- Signalize the Rucker Avenue/Monterey Road intersection with advance railroad preemption
- Signalize the Buena Vista Avenue/Monterey Road intersection with advance railroad preemption
- Install flashing light signals visible from each approach lane at 10th Street crossing

- Install advance railroad preemption at Luchessa Avenue crossing
- Install advance railroad preemption at Bloomfield Avenue crossing

No impact was identified within the EIR/EIS that would require these improvements as mitigation. Each at-grade intersection to be retained would be modernized and constructed to current engineering design standards and requirements. These improvements would include signalization, advance railroad preemption, quad gates, and other warning devices as necessary.

7.2 Section 3.3, Air Quality and Greenhouse Gases

7.2.1 Measure That is Considered Infeasible from an Economic, Technical, Legal, Policy or Other Standpoint

The following mitigation measure was not adopted because of the lack of flexibility in dictating construction equipment to be used by the Contractor, in the context of uncertainty about the actual availability of construction vehicles to make up the entirety of a fleet to be used for construction, renders the suggested measure infeasible from a technical, economic and policy standpoint.

- Commit to using only zero-emission on road and offroad trucks and construction equipment or otherwise use equipment with the best available technology offered at the time of construction.

Existing AQ-IAMFs#3-5 address standards for the construction equipment to be used to construct the San Jose to Merced Project Section, which will minimize exhaust emissions. Further, the Authority has identified feasible mitigation to address temporary construction impacts on localized air quality from criteria pollutants, including AQ-MM#1 and AQ-MM#2. Moreover, the application of AQ-MM#3 and AQ-MM#4 will offset VOC, NOX, and PM emissions, as required. However, these offsets could occur regionally throughout the SFBAAB and SJVAPCD. Therefore, the emission reductions achieved by these offsets may not contribute to enough localized reductions to avoid a project-level violation of the AAQS or SIL.

From a technical and economic perspective, the Authority is not positioned to require its Contractor to use zero-emissions vehicles for 100% of its on-road and off-road trucks and construction equipment, in constructing the San Jose to Merced Project Section. Even analyzing projections of the market for construction equipment in the year 2028, based on conservative assumptions (Chapter 2 of the Final EIR/EIS identifies the construction period as 2022-2028), the market for ZEV heavy construction and offroad equipment will not be sufficiently mature to allow for the Authority's Contractor to use entirely zero-emission construction equipment. (Assessment of Statewide Construction, Mining, and Industrial Vehicle Population by Fuel Type, Authority 2022e.) While there may be certain prototype equipment being developed, such prototypes are not projected to be available at the scale needed to undertake construction of this large infrastructure project.

From a policy perspective, the Authority is committed to small business participation. (Authority 2018a, 2018 Business Plan, p. 85.) Requiring an inflexible commitment to zero-emission construction equipment would not serve the Authority's policy goals related to small business participation, as those small businesses have comparatively less capacity to convert their fleets of off-road vehicles and other construction equipment to zero-emissions.

However, the Authority has committed to integrating zero-emission vehicles into construction of the San Jose to Merced Project Section in its commitment to AQ-MM#2. Moreover, the Authority has committed to using best available technology for diesel equipment (Tier 4) through AQ-IAMF#3-5; Tier 4 is currently the strictest emissions standard adopted by CARB. (Final EIR/S, 3.3-51.

7.3 Section 3.4, Noise and Vibration

7.3.1 Measure Addresses an Impact That Is Less Than Significant

The following mitigation measure was not adopted because the impact was identified as less than significant.

- Building insulation for schools in Morgan Hill

As explained in response to comments (Volume 4 of the Final EIR/EIS), the noise impact analysis does not identify noise impacts at schools in Morgan Hill.

7.3.2 Measures That Are Considered Infeasible from an Economic, Technical, Legal, Policy, or Other Standpoint

The following mitigation measure was not adopted because it is considered incompatible with the requirements for the HSR project in Proposition 1A.

- Operating at slower operating speeds in developed areas to reduce noise impacts

The purpose of the HSR project is to provide an efficient rail connection between northern and southern California, including the Central Valley. Proposition 1A establishes time requirements for travel on the HSR system that the system must be capable of meeting. In addition, to meet travel demands, the HSR system is designed to achieve travel durations that are competitive with air travel and road travel; accordingly, it must be designed consistent with certain speed requirements. Slowing operational speeds down within developed areas beyond that currently proposed would hinder the ability of the project to meet its purpose.

The following mitigation measure was not adopted because it is considered financially infeasible.

- Undergrounding of HSR service in developed areas to reduce noise impacts

Undergrounding alternatives through developed areas were considered during the alternatives evaluation phase and were eliminated due to their high costs. The costs of underground alignments are far higher than the cost of at-grade alignments or elevated (embankment, viaduct) alignments, and the addition of underground sections would make the project financially infeasible.

The following mitigation measure was not adopted because it would be inconsistent with the Authority's established noise mitigation guidelines and policy.

- Elimination of cost-effectiveness criteria of \$95,000 for noise mitigation

The Authority's noise mitigation guidelines are summarized in NV-MM#3 in Section 3.4, Noise and Vibration, of the Final EIR/EIS. These guidelines specify that noise barriers must be considered reasonable and feasible, including achieving a minimum of 5 dB noise reduction, benefitting at least 10 receptors per barrier, be at least 800 feet long, and be cost effective, which is defined as not exceeding \$95,000 per benefitted receptor. The cost-effectiveness criterion is consistent with Caltrans' criteria.

The following mitigation measure was not adopted because it would conflict with the FRA Horn Rule.

- Quieting horns to reduce noise

The FRA Horn Rule requires the sounding of horns when trains cross through at-grade crossings and in instances where the operator identifies a safety requirement to sound the horn. The FRA mandates the sound level of train horns, and the Authority cannot reduce the train horns below the federal requirements.

The following mitigation measure was not adopted because it would not be effective.

- Absorptive treatments on noise barriers

Absorptive treatments on noise barriers would not further reduce the number of noise impacts, as they would only reduce noise reflected off of the barriers to the opposite side of the tracks. Noise reflected off of nonabsorptive barriers to the opposite side of the tracks is only a concern when barriers are located very near to the tracks, which is not the case for the HSR project.

The following mitigation measure was not adopted because of the disadvantages of grade separation include high capital costs, road closures and traffic disruptions during construction, extensive right-of-way acquisitions, life-cycle maintenance costs, aesthetic concerns due to height of elevated structures, and space-intensive designs:

- Grade separations of at-grade crossings in San Jose, Morgan Hill, and Gilroy with Alternative 4 to address noise due to sounding of horns at at-grade crossings

Overall, grade separations are a highly expensive and environmentally disruptive mitigation strategy. As noted in Section 7.1 of this document, using an average assumed cost of \$75 million to \$150 million per crossing, grade separating the 29 at-grade crossings between San Jose and Gilroy under Alternative 4 could cost an additional \$2.175 billion to \$4.35 billion. Grade separations can sometimes cost more than \$150 million each depending on site-specific factors, so this estimate may be an underestimate. Also, the inclusion of grade separations for the at-grade alternative in the San Jose to Merced Project Section could set a precedent for the adjacent San Francisco to San Jose Project Section, which has an additional 39 at-grade crossings; using the cost range noted above, grade separations could add an additional cost of \$2.925 billion to \$5.85 billion, for a total cost of \$5.1 billion to \$10.2 billion for both project sections above the current estimated costs for the at-grade alternatives included in the two project sections.

In addition to costs, constructing with grade separations to separate a rail alignment from roads can considerably widen a rail project's footprint and environmental impact including road closures and traffic disruptions during construction, extensive right-of-way acquisitions, aesthetic concerns due to height of elevated structures, and space-intensive designs. In addition, when grade separating alignments, the infrastructure can extend far beyond an individual roadway crossing because rail operations require that railway slope changes must be gradual.⁵ Thus, where there are at-grade roads crossing a rail alignment in close proximity to each other, any grade separation that uses a change in the railway elevation will likely require the changed elevation (whether above or below roadways) to be maintained across all the nearby at-grade crossings. In other words, it may not be possible to construct only one grade separation in some areas, where close proximity of at-grade crossings means that constructing one grade separation would then require constructing multiple other grade separations. This can increase the construction and operational environmental impacts of a grade-separated rail alignment.

The Authority, as described in its Business Plans, has not secured funding for constructing the entire Phase 1 system, including the San Jose to Merced Project Section and the San Francisco to San Jose Project Section. Cost has been and will continue to be a major concern for the HSR project as a whole. Given the high costs and disruptions associated with grade separations, the Authority cannot commit to grade separations as part of mitigation for Alternative 4 for the San Jose to Merced Project Section (or for the San Francisco to San Jose Project Section).

However, if Alternative 4 is ultimately selected, the Authority, in cooperation with local jurisdictions, transportation funding agencies, and state and federal agencies, would support community-initiated grade separation efforts over time as funding becomes available. The Authority would also work with its local, state, and federal partners to establish priorities for grade separations to be implemented as funding becomes available. This process would include working with local jurisdictions that are pursuing grade separation projects on their own so the HSR project, to the extent possible, does not create conflicts with future grade separation efforts.

⁵ HSR design (Authority 2019a) for vertical curves limit the design to 0.26% to 0.4% per 100 feet (e.g., a change of 0.26 to 0.4 feet over 100 feet) at speeds of 125 mph. Allowed vertical curves for higher speeds than 125 mph are more gradual and allowed vertical curves for speeds lower than 125 mph are less gradual.

Finally, the Authority would also work with other rail parties to seek funding participation from multiple sources as opportunities arise.

The following mitigation measure was not adopted because it is outside of the Authority's control.

- Avoid sounding of horns when passing through Caltrain Stations

Policies regarding Caltrain Stations are established by Caltrain (for the stations that it owns) and/or VTA (for the stations that it owns). Train horns are required to be sounded when going through Caltrain Stations. The Authority does not control the Caltrain Stations and thus must comply with Caltrain/VTA requirements.

7.4 Section 3.11, Safety and Security

7.4.1 Measure Addresses an Impact That Is Less Than Significant

The following mitigation measure was not adopted because the impact was identified as less than significant.

- Grade separations of at-grade crossings in San Jose, Morgan Hill, and Gilroy with Alternative 4 to address at-grade crossing safety

Significant safety impacts are not expected related to increased HSR train crossings through at-grade crossings after consideration of project safety improvements for HSR portions of the corridor and Caltrain existing and planned safety improvements for the Caltrain corridor. As such, no mitigation is proposed for at-grade crossing safety in the EIR/EIS.

The following mitigation measure was not adopted because the impact was identified as less than significant.

- Incident training for first responders, including an identification of the types of specialized equipment that may be needed to facilitate a response

This comment is understood as suggesting a new mitigation measure that would mitigate for impacts on community safety and security, including from rail-related hazards. However, the Final EIR/EIS does not identify a significant impact under CEQA, and, accordingly, no mitigation is required.

7.4.2 Measure That Are Considered Infeasible from an Economic, Technical, Legal, Policy, or Other Standpoint

The following mitigation measure was not adopted because of the disadvantages of grade separation include high capital costs, road closures and traffic disruptions during construction, extensive right-of-way acquisitions, life-cycle maintenance costs, aesthetic concerns due to height of elevated structures, and space-intensive designs:

- Grade separations of at-grade crossings in San Jose, Morgan Hill, and Gilroy with Alternative 4 to address emergency vehicle response delay impacts

The Authority has identified feasible mitigation to address emergency vehicle response delay impacts, but residual impacts may occur if some of the necessary improvements included in Mitigation Measure SS-MM#4 are not implemented by local jurisdictions. Grade separations are considered financially infeasible and have extensive environmental effects as explained below.

Overall, grade separations are a highly expensive mitigation strategy. As noted in Section 7.1 of this document, using an average assumed cost of \$75 million to \$150 million per crossing, grade separating the 29 at-grade crossings between San Jose and Gilroy under Alternative 4 could cost an additional \$2.175 billion to \$4.35 billion. Grade separations can sometimes cost more than \$150 million each depending on site-specific factors, so this estimate may be an underestimate. Also, the inclusion of grade separations for the at-grade alternative in the San Jose to Merced Project Section could set a precedent for the adjacent San Francisco to San Jose Project Section, which has an additional 39 at-grade crossings; using the cost range noted above, grade separations could add an additional cost of \$2.925 billion to \$5.85 billion, for a total cost of \$5.1

billion to \$10.2 billion for both project sections above the current estimated costs for the at-grade alternatives included in the two project sections.

The Authority, as described in its Business Plans, has not secured funding for constructing the entire Phase 1 system, including the San Jose to Merced Project Section and the San Francisco to San Jose Project Section. Cost has been and will continue to be a major concern for the HSR project as a whole. Given the high costs and disruptions associated with grade separations, the Authority cannot commit to grade separations as part of mitigation for Alternative 4 for the San Jose to Merced Project Section (or for the San Francisco to San Jose Project Section).

In addition to costs, constructing with grade separations to separate a rail alignment from roads can considerably widen a rail project's footprint and environmental impact including road closures and traffic disruptions during construction, extensive right-of-way acquisitions, aesthetic concerns due to height of elevated structures, and space-intensive designs. In addition, when grade separating alignments, the infrastructure can extend far beyond an individual roadway crossing because rail operations require that railway slope changes must be gradual.⁶ Thus, where there are at-grade roads crossing a rail alignment in close proximity to each other, any grade separation that uses a change in the railway elevation will likely require the changed elevation (whether above or below roadways) to be maintained across all the nearby at-grade crossings. In other words, it may not be possible to construct only one grade separation in some areas, where close proximity of at-grade crossings means that constructing one grade separation would then require constructing multiple other grade separations. This can increase the construction and operational environmental impacts of a grade-separated rail alignment.

However, if Alternative 4 is ultimately selected, the Authority, in cooperation with local jurisdictions, transportation funding agencies, and state and federal agencies, would support community-initiated grade separation efforts over time as funding becomes available. The Authority would also work with its local, state, and federal partners to establish priorities for grade separations to be implemented as funding becomes available. This process would include working with local jurisdictions that are pursuing grade separation projects on their own so the HSR project, to the extent possible, does not create conflicts with future grade separation efforts. Finally, the Authority would also work with other rail parties to seek funding participation from multiple sources as opportunities arise.

7.5 Section 3.14, Agricultural Farmland

7.5.1 Measure Proposes Inflexible Response and is Considered Ineffective

The following revision to Mitigation Measure AG-MM#1 was not adopted because providing greater specificity for agricultural conservation easements would restrict the likelihood that the Authority would be capable of procuring required farmland, rendering the proposed mitigation ineffective.

- Use more specific language in AG-MM#1 to specify where mitigation would occur. Potentially align "agricultural regions" with county boundaries.

Requiring purchase of agricultural farmland for agricultural conservation easements in a more specific area than in the "same agricultural regions as the impacts," as stated in AG-MM#1, would restrict the Authority's ability to identify agricultural land of sufficient quality and quantity that would be available for agricultural conservation easement purchase. Therefore, it is less likely that the Authority would in fact be able to procure required farmland, rendering the mitigation less effective.

⁶ HSR design (Authority 2019a) for vertical curves limit the design to 0.26% to 0.4% per 100 feet (e.g., a change of 0.26 to 0.4 feet over 100 feet) at speeds of 125 mph. Allowed vertical curves for higher speeds than 125 mph are more gradual, and allowed vertical curves for speeds lower than 125 mph are less gradual.

The following mitigation measure was not adopted because providing for a longer notification window for utility disruptions as a result of HSR construction would restrict the Authority's ability to schedule and implement construction plans.

- Increase advance notice provisions to as soon as practicable, but no less than 12 months in advance of construction activities.

The Authority complies with right-of-way notification requirements, which provide for a 3- to 12-month notification window.

7.5.2 Measure Does Not Represent a Clear Improvement, from an Environmental Standpoint, Over the Draft Language

The following revision to Mitigation Measure AG-MM#1 was not adopted because the proposal to offer remnant parcels for purchase either outright or for agricultural conservation easements would not provide opportunities that current mitigation does not already offer.

- Expressly offer the sale of land or easements on remnant parcels to local conservation organizations.

The Authority will work with all potential buyers to purchase conservation easements and would be glad to work with local conservation organizations.

The following revision to Mitigation Measure AG-MM#1 was not adopted because the proposal to revise the mitigation ratio for remnant parcels would not constitute a solution that would be better accepted by the agricultural stakeholders.

- Revise the mitigation ratio for remnant parcels. Potentially change the mitigation ratio to 1:1 for remnant parcels.

The Madera Settlement Agreement between agricultural stakeholders and the Authority established consensus that the mitigation ratio of 0.5:1, based on a 25-foot buffer around Important Farmland, was acceptable to all participating parties.

The following mitigation measure was not adopted because an existing project feature addresses the cost of noxious weed eradication.

- Pay for the cost of eradication of noxious weeds introduced to the Farmland after completion of HSR construction in order to maintain the Certified Organic status

Existing AG-IAMF#1 commits the Authority to restore farmland temporarily used for construction to its original condition. If the original condition is Certified Organic, then restoration would conform to these conditions.

The following mitigation measure was not adopted because adherence to existing legal requirements make it unnecessary.

- Replace existing agricultural infrastructure at the same level as that which is removed.

The Authority would ensure that any infrastructure affected by the project would be replaced in kind before the old infrastructure is deactivated. By law, the Authority is required to pay fair market value during restoration of Important Farmland used for project construction, as has been the practice with all other project sections.

7.5.3 Measure Is Infeasible from a Technical Standpoint

The following mitigation measure was not adopted because identifying land that might be at risk for future conversion to nonagricultural purposes would be speculative and therefore not technically or legally defensible.

- Ensure the protection of farmlands threatened by future development that could be generated by the project.

Because it is unknown which agricultural parcels could be converted by future development and how wide the influence of the project might reach, and because the future use of these parcels is under the jurisdiction of local city or county governments, projecting which parcels to protect would be both speculative and potentially in conflict with local policy.

7.5.4 Measure Addresses a Social Impact

The following mitigation measure was not adopted because the impact in question is a social impact as opposed to an impact on the environment.

- Ensure that property owners and leaseholders affected by construction of the Project Section are able to find alternative farmland to support their operations in the region.

Temporary and permanent impacts on the agricultural economy are addressed in Section 3.12, Socioeconomics and Communities, of the Final EIR/EIS. CEQA does not require mitigation for these economic and social changes. Further, as discussed in Section 3.12 of the Final EIR/EIS, there would likely be sufficient relocation supply for permanently affected agricultural businesses, and the Authority's right-of-way agents would work with each affected agricultural business to address issues of concern.

7.6 Section 3.15, Parks

7.6.1 Measure Addresses an Impact That Is Less Than Significant

The following mitigation measure was not adopted because the impact was identified as less than significant.

- The upgrade/enhancements to Fuller Park

Under the Preferred Alternative, the impact on Fuller Park would be less than significant because the permanent acquisition would not change the use of this park nor diminish its capacity. The mitigation measure is therefore not necessary. However, as described in Chapter 5, Environmental Justice, of the Final EIR/EIS, an offsetting mitigation measure, Fuller Park/Fuller Avenue Recreational Improvements, is included to improve general community welfare in the Gardner/North Willow Glen neighborhood to help offset general effects of the project.

8 STATEMENT OF OVERRIDING CONSIDERATIONS

The Final EIR/EIS and the CEQA Findings of Fact conclude that implementing the Preferred Alternative as part of the HSR system will result in certain significant impacts on the environment that cannot be fully avoided or substantially lessened with the application of feasible mitigation measures or feasible alternatives.

This Statement of Overriding Considerations is therefore adopted to comply with CEQA, Public Resources Code, Section 21081, and the CEQA Guidelines, Section 15093. The significant and unavoidable impacts and the benefits related to the Preferred Alternative are described below. The Authority Board has carefully weighed these impacts and benefits and finds that each of the benefits described below of implementing Alternative 4, the Preferred Alternative, independently of the other described benefits, outweigh the significant and unavoidable environmental impacts.

8.1 General Findings on Significant and Unavoidable Impacts Associated with the Preferred Alternative

Based upon the Final EIR/EIS and the CEQA Findings of Fact contained herein, as well as the evidentiary materials supporting these documents, the Authority finds that implementing the Preferred Alternative could result in the following list of significant and unavoidable impacts on the environment:

Air Quality

- Impact AQ#3: Temporary Direct and Indirect Impacts on Air Quality within the SJVAB (for CO emissions)
- Impact AQ#5: Temporary Direct Impacts on Localized Air Quality—Criteria Pollutants

Noise and Vibration

- Impact NV#1: Temporary Exposure of Sensitive Receptors to Construction Noise
- Impact NV#2: Intermittent Permanent Exposure of Sensitive Receptors to Noise from Train Operations
- Impact NV#6: Permanent Exposure of Sensitive Receptors to Vehicular Traffic Noise Increases
- Impact NV#10: Intermittent Permanent Exposure of Sensitive Receptors to Vibration from Operations

Safety and Security

- Impact S&S#4: Continuous Permanent Impacts on Emergency Access and Response Times

Agricultural Farmland

- Impact AG #2 – Permanent Conversion of Important Farmland to Nonagricultural Use
- Impact AG #3 – Permanent Creation of Remnant Parcels of Important Farmland

Aesthetics and Visual Quality

- Impact AVQ#19: Permanent Direct Impacts on Nighttime Light Levels at Fixed Locations

Cultural Resources

- Impact CUL#4: Permanent Demolition, Destruction, Relocation, or Alteration of Built Resources or Setting

Cumulative Impacts

- Construction of the Preferred Alternative would make a cumulatively considerable contribution to the cumulatively significant air quality impact of CO emissions, for which offset

programs are not applicable. Construction would make a cumulatively considerable contribution to the cumulatively significant air quality impact of localized NO₂, PM_{2.5}, and PM₁₀ emissions after implementation of all feasible mitigation. Construction would also make a cumulatively considerable contribution to the cumulatively significant health risk impact related to air quality. While the Authority will coordinate with BAAQMD to identify if there are feasible additional measures consistent with the HSR project that may lower some of the cumulative health risks, the feasibility and effectiveness of any such measures are unknown at this time and not presumed for the purposes of CEQA determinations.

- Operation of the Preferred Alternative would make a cumulatively considerable contribution to cumulatively significant noise impacts and vibration impacts after implementation of all feasible mitigation.
- Operation of the Preferred Alternative would make a cumulatively considerable contribution to cumulatively significant impacts on emergency response time in certain locations. While proposed mitigation will reduce the project's contribution to a less-than-significant level, the Authority cannot compel local jurisdictions to implement the mitigation.
- Construction of the Preferred Alternative would make a cumulatively considerable contribution to the cumulatively significant impact of conversion of Important Farmland to nonagricultural use after implementation of all feasible mitigation because no mitigation is available to replace the converted farmland.
- Construction of the Preferred Alternative would make a cumulatively considerable contribution to the cumulatively significant noise impact at parks, recreational facilities, open space resources, or school district play areas because the combined noise exposure would create a perceived barrier to use.
- Construction of the Preferred Alternative would make a cumulatively considerable contribution to the cumulatively significant impact on visual quality and setting after implementation of all feasible mitigation because the HSR project would result in a large perceived change in aesthetics and visual resources.
- Construction of the Preferred Alternative would make a cumulatively considerable contribution to the cumulatively significant impact on historic built resources because construction of the project would result in damage or destruction of historic built resources, resulting in their loss of significance. No additional mitigation is available.

With the approval of the Preferred Alternative and the adoption of the CEQA Findings of Fact, the Authority is committing to implement the mitigation measures identified for the entirety of the project alignment to ensure that significant impacts are mitigated to a less-than-significant level to the extent feasible, and that the project's contribution to cumulative impacts is minimized and mitigated to the extent feasible. As set forth in detail in Section 4 of this document, the Authority finds that the mitigation measures adopted with the findings are the appropriate measures to approve at this time because they apply to the Preferred Alternative.

The Authority further finds that while the mitigation measures it adopts as part of the CEQA Findings of Fact will substantially lessen or avoid many of the significant environmental impacts discussed in the Final EIR/EIS, and mitigation adopted to address one area may result in beneficial effects in other subject areas, the above impacts will not all be mitigated to a less-than-significant level and will remain significant and unavoidable.

The Authority finds that each of the following specific economic, legal, social, technological, environmental and other considerations and benefits of the Preferred Alternative, separately and independently, outweigh the unavoidable adverse environmental effects of the project.

The Authority further finds that each is an overriding consideration independently warranting project approval. The Authority finds that the significant unavoidable impacts of the project are overridden by each of these individual considerations, standing alone. The significant unavoidable environmental effects remaining after adoption of mitigation measures are

considered acceptable in light of these significant benefits of the Preferred Alternative, as described in this Statement of Overriding Considerations.

8.2 Overriding Considerations for the Preferred Alternative as Part of the Phase 1 High-Speed Rail System between San Francisco and Los Angeles/Anaheim

There are numerous benefits of the Preferred Alternative when considered as an integral part of the Phase 1 HSR system between San Francisco and Los Angeles/Anaheim. These benefits, viewed both individually and collectively, outweigh the significant and unavoidable adverse effects of implementing the Preferred Alternative. These benefits are in the areas of the environment, transportation, land use planning, and economic and social considerations, and are set forth below.

8.2.1 Environmental Benefits

The benefits of the HSR system include reduced VMT, reduced energy use for transportation, and reduced air pollution from transportation sources, including reduced emissions of GHGs (see Section 3.2, Transportation, Section 3.3, Air Quality and Greenhouse Gases, and Section 3.6, Public Utilities and Energy of the Final EIR/EIS). These benefits were derived based on the assumption that the San Jose to Merced Project Section will be operational as part of the Phase 1 HSR system between San Francisco and Los Angeles/Anaheim. The following summarizes the conclusions of specific benefits that were disclosed in the Final EIR/EIS.

8.2.1.1 Benefits from a Reduction in Vehicle Miles Traveled

The HSR project as a whole would divert automobile trips to HSR trips, thus reducing statewide, regional, and local VMT (Authority and FRA 2012). Silicon Valley to Central Valley HSR travel is estimated to be 10.6 million annual trips in 2025 (previous opening year for this project section) with 8.6 million annual trips diverted from automobiles and 1.4 million annual trips diverted from air travel. For 2040 at full Phase I HSR system operations (San Francisco to Anaheim), Silicon Valley to Central Valley HSR ridership is estimated to be 54.1 million annual trips with 47.3 million annual trips diverted from automobiles and 4.7 million annual trips diverted from air travel (Appendix 3.2-B). Statewide air travel would also be decreased with mode shifting from air to HSR travel assumed by reductions in the number of statewide flights. With the implementation of Silicon Valley to Central Valley HSR service, air flights are anticipated to be reduced by 13,651 flights in the opening year (see Appendix 3.2-B listed as 2025) and increasing to 107,154 flights in 2040 with full Phase 1 HSR system in operation. The reduction in both automobile and air travel VMT would provide benefits in the form of reduced congestion on the state's highway system and at airports.

Section 3.2, Transportation, of the Final EIR/EIS for the project arrives at similar conclusions regarding VMT reduction at a regional level. In 2029, the annual total No Project VMT in Santa Clara County would be 12.186 billion miles and the annual With Project VMT would be 12.027 billion miles, a reduction of 159 million miles. In San Benito County, the annual interregional No Project VMT would be 733 million miles and the annual With Project VMT would be 633 million miles, a reduction of 99 million miles. In Merced County, the annual interregional No Project VMT would be 1.507 billion miles and the annual With Project VMT would be 1.381 billion miles, a reduction of 125 million miles. In 2040, the annual total No Project VMT in Santa Clara County would be 13.201 billion miles and the annual With Project VMT would be 12.972 billion miles, a reduction of 230 million miles. In San Benito County, the annual interregional No Project VMT would be 846 million miles and the annual With Project VMT would be 676 million miles, a reduction of 170 million miles. In Merced County, the annual interregional No Project VMT would be 1,842 billion miles and the annual With Project VMT would be 1.642 billion, a reduction of 200 million miles. (Final EIR/EIS, Section 3.2, Impact TR # 5.)

8.2.1.2 Benefits from a Reduction in Air Pollution and Greenhouse Gas Emissions

During operations, the Preferred Alternative would result in net decreases in all criteria pollutant emissions (VOC, CO, NO_x, SO₂, PM₁₀ and PM_{2.5}) when compared to 2015 Existing and 2029 and 2040 No Project conditions, as shown in Table 3.322 through Table 3.324 of the Final EIR/EIS. This would be consistent with the air quality management plans set forth by Bay Area Air Quality Management District (BAAQMD), Monterey Bay Area Resources District (MBARD), and San Joaquin Valley Air Pollution Control District (SJVAPCD), as well as the local regional transportation plans set forth by Santa Clara Valley Transit Agency (VTA) and Merced County Association of Governments (MCAG). Although project operations would increase criteria pollutants associated with power plants, train movement, stations, and maintenance facilities, it would result in sizeable emissions reductions from on-road vehicles and aircraft relative to the 2015 Existing and 2029 and 2040 No Project conditions. These emissions benefits would be achieved by reductions in single-occupancy vehicle trips and aircraft activity; with a greater number of people traveling on the HSR system, fewer vehicle and aircraft trips would occur. Ultimately, the criteria pollutant reductions achieved by changes in on-road vehicles and aircraft activity would more than offset the emissions increase from project operations (electricity, train movement, stations, and maintenance facilities). Long-term operations of the project and the larger HSR system would, therefore, result in a net reduction in operational emissions from the 2015 Existing and 2029 and 2040 No Project conditions. (Final EIR/EIS, Section 3.3, Impact AQ#9, Tables 3.3-22 through 3.3-24.)

Emission reductions during operations of the project from reduced auto and aircraft trips would offset the short-term construction-related contribution to increased GHG emissions. San Jose to Merced Preferred Alternative construction would generate GHG emissions between 2022 and 2028. However, these emissions would be almost fully offset after 8 to 14 months of the Preferred Alternative operating as part of Phase 1 (depending on the ridership scenario). Shortly following the first year of operations, the Preferred Alternative operating as part of Phase 1 would result in annual emissions reductions and a GHG benefit as travel modes shift away from on-road vehicles and aircraft trips to HSR.

Additionally, the project is identified in CARB's Assembly Bill (AB) 32 Scoping Plan and 2017 Scoping Plan Update as a component of a sustainable transportation system, and would be consistent with the state's plan to achieve GHG emissions in the long run (CARB 2008, 2017). The GHG reductions from the Preferred Alternative operating as part of the Phase 1 HSR system would be consistent with statewide goals. Long-term operation of the HSR system would reduce GHG emissions, relative to No Project conditions, resulting in a statewide and regional GHG benefit. Annual reductions would range from 1.1 million metric tons carbon dioxide equivalent (CO₂e) to 1.6 million metric tons CO₂e, depending on the ridership scenario. The reduction in GHG emissions statewide is estimated to be approximately 2.5 million metric tons per year of carbon dioxide (CO₂) emissions for the HSR when compared to the reduction of 1.7 million metric tons per year of CO₂ emissions under the No-Project Alternative. (Final EIR/EIS, Section 3.3, Impact AQ#17.)

SB 375 is one major tool being used to meet AB 32's goals. SB 375 sets priorities to help California meet GHG-reduction goals and requires that Regional Transportation Plans prepared by metropolitan planning organizations include a Sustainable Communities Strategy (SCS) that supports the GHG emission reduction targets set by CARB. However, recent CARB (2018, 2021) analysis indicates that California is not on track to meet its climate-based mobility goals, and additional reductions in VMT are needed. That said, because of the potential for transit-oriented development and other land use planning benefits from HSR implementation in San Jose and Gilroy, the HSR project will contribute to planned VMT and GHG reductions as a key investment strategy in the Metropolitan Transportation Commission's adopted *Plan Bay Area 2050* (ABAG and MTC 2021). The HSR project will expand and modernize the regional rail system, with HSR stations as a Plan Bay Area 2050 growth geography, a focal point in the region to locate future jobs and housing, which, combined with other *Plan Bay Area 2050* strategies, will result in a

compact, efficient growth pattern that meets CARB's GHG-reduction targets and provides adequate housing for the Bay Area's growing population.

8.2.1.3 Benefits from a Reduction in Energy Use

The Final EIR/EIS acknowledges that, although the Phase 1 HSR project would require electricity to operate, it would nevertheless result in a permanent net reduction in energy use because it would divert trips from transportation modes with higher energy use (commercial air flights and automobiles) to HSR, which has lower energy use. Section 3.6, Public Utilities and Energy, of the Final EIR/EIS concluded that operation of the HSR would result in a reduction in VMT in Santa Clara, San Benito, and Merced Counties and would also result in a reduction in airplane flights in the Bay Area in which the project is located. The reduction in energy consumption for other modes of transportation that would result from operation of the HSR exceeds the increase in energy consumption for HSR operation of the project, resulting in a net decrease in statewide energy consumption. As a result, operation of the HSR would result in a net benefit to energy resources.

The HSR system would decrease automobile VMT and reduce energy consumption by automobiles, resulting in an overall reduction in energy use for intercity and commuter travel. The Final EIR/EIS shows the change in estimated daily VMT and associated energy consumption with and without the HSR system for the medium and high ridership scenarios for 2029 and 2040. HSR operation would reduce daily VMT in Santa Clara, San Benito, and Merced Counties by 333 million to 450 million VMT per year in 2029 for the medium and high ridership scenarios, and by 600 million to 816 million VMT per year in 2040 for the medium and high ridership scenarios. These values, together with associated average daily speed estimates, were used to develop predictions of the change in energy use associated with VMT for the three counties. The reduction in energy use from the VMT reduction in Santa Clara, San Benito, and Merced Counties in 2029 ranges from 1,026,000 million British thermal units (MMBtu) per year to 1,384,870 MMBtu per year under the medium and high ridership scenarios. The reduction in energy use from the VMT reduction in Santa Clara, San Benito, and Merced Counties in 2040 ranges from 1,644,010 MMBtu per year to 2,303,200 MMBtu per year under the medium and high ridership scenarios.

The number of airplane flights statewide (intrastate) would decrease with implementation of the HSR system when analyzed against the future No Project and existing conditions because some travelers would choose to use the HSR rather than fly to their destination. Table 3.6-19 of the Final EIR/EIS shows the reduction in the number of airplane flights associated with the Preferred Alternative for the medium and high ridership scenarios. Operation under the medium ridership scenario would reduce energy consumption from airplane flights by 2,478,640 MMBtu per year for the Bay Area and by 6,255,290 MMBtu per year statewide in 2029. Operation under the high ridership scenario would reduce energy consumption from airplane flights by 2,716,740 MMBtu per year for the Bay Area and by 6,915,460 MMBtu per year statewide in 2029. Operation under the medium ridership scenario would reduce energy consumption from airplane flights by 5,279,340 MMBtu per year for the Bay Area and by 13,362,110 MMBtu per year statewide in 2040. Operation under the high ridership scenario would reduce energy consumption from airplane flights by 5,052,810 MMBtu per year for the Bay Area and by 12,855,700 MMBtu per year statewide in 2040.

Final EIR/EIS Table 3.6-20 and Table 3.6-21 summarize energy consumption for project operation and the resulting changes in regional and statewide energy consumption from the reduction in VMT and airplane flights that would occur as a result of operation of the HSR for 2029 and 2040. Operation of the project in 2029 would reduce regional energy consumption by 3,002,480 MMBtu per year under the medium ridership scenario and by 3,549,230 MMBtu per year under the high ridership scenario. Operation of the project in 2029 would reduce statewide energy consumption by 8,365,550 MMBtu per year under the medium ridership scenario and by 5,964,040 MMBtu per year under the high ridership scenario. Operation of the project in 2040 would reduce regional energy consumption by 6,335,230 MMBtu per year under the medium ridership scenario and by 6,709,070 MMBtu per year under the high ridership scenario. Operation

of the project in 2040 would reduce statewide energy consumption by 15,427,700 MMBtu per year under the medium ridership scenario and by 23,641,110 MMBtu per year under the high ridership scenario. (Final EIR/EIS, Section 3.6, Impact PU&E#13.)

8.2.1.4 Other Environmental Benefits

The Authority has planned the Phase 1 HSR system to follow existing transportation corridors to the maximum extent feasible as a way to avoid and minimize the potential for environmental impacts, while still meeting the project's fundamental purpose and objectives. The Preferred Alternative has been crafted to avoid and/or minimize the potential for adverse impacts on cultural resources, parks, recreational facilities, and wildlife refuges to the greatest extent feasible in light of the project's objectives. In this way, the San Jose to Merced Project Section Preferred Alternative meets the purpose and need and project objectives for improving the state's transportation options, while doing so in an environmentally sensitive way.

The Authority's studies have shown that the HSR system can be constructed with less land and with fewer natural and community impacts than providing a similar level of mobility through expanded highways and airports (Authority 2012g, 2019b). The *2019 Equivalent Capacity Analysis* (Authority 2019e) found that it would cost an estimated \$122 billion to \$199 billion to provide the equivalent level of transportation capacity in highway lane miles (4,196 lane miles) and airport capacity (91 gates and 2 runways) that the Phase 1 HSR system would provide. Compared to the Phase 1 cost estimates from \$72 billion to \$105 billion in the Draft 2022 Business Plan (Authority 2022b), investment in high-speed rail is the more affordable choice. (Authority 2019c: pages 1-2.)

8.2.2 Transportation Benefits

8.2.2.1 Increases Mobility, Reduces Congestion, and Travel Delays by Providing a Safe, Reliable, and New High-Speed Travel Mode

The capacity of California's intercity transportation system is insufficient to meet existing and future demand, and the current and projected future congestion of the system will continue to result in deteriorating transportation conditions, reduced reliability, and increased travel times. The system has not kept pace with the tremendous increase in population, economic activity, and tourism in California. The interstate highway system, commercial airports, and conventional passenger rail system serving the intercity travel market are operating at or near capacity and will require large public investments for maintenance and expansion to meet existing demand and future growth over the next 20 years and beyond. Moreover, the ability to expand major highways and key airports is uncertain; some needed expansions may be impractical or may be constrained by physical, political, or other factors, as discussed in Section 1.2.4 of the Final EIR/EIS, Statewide and Regional Need for the High-Speed Rail System in the San Jose to Merced Project Section Area.

As described in Chapter 1, Project Purpose, Need, and Objectives, of the Final EIR/EIS, the Preferred Alternative as part of the Phase 1 HSR system would meet the need for a safe and reliable mode of travel that would link the major metropolitan areas of the state and deliver predictable, consistent travel times sustainable over time. The HSR system also would provide quick, competitive travel times between California's major intercity markets. For intercity trips such as Merced to San Francisco or Los Angeles, the HSR system would provide considerably quicker travel times than either air or automobile transportation, and would bring frequent HSR service to portions of the state such as the Central Valley that are not well served by air transportation. In addition, due to the HSR pricing model, the passenger cost for travel via the HSR service would be lower than for travel by air for the same intercity markets. (Authority 2020h, Table 5-1),

The result would be substantial reduction in expected VMT in the counties crossed by the project alignment when compared to the With Project to the No-Project outcomes, which would reduce traffic on intercity highways and around airports and reduce the need for their expansion by adding a new mode to the state's transportation infrastructure. As discussed in Section 3.2,

Transportation, of the Final EIR/EIS, in 2029 VMT in Santa Clara County would be reduced by 159 million miles. In San Benito County, the reduction would be 99 million miles. In Merced County, the reduction would be 125 million miles. In 2040, the annual VMT reduction in Santa Clara County would be 230 million miles. In San Benito County, the VMT reduction would be 170 million miles. In Merced County, the VMT reduction would be 200 million miles.

By providing a new intercity, interregional, and regional passenger mode, the HSR system will improve connectivity and accessibility to other existing transit modes and airports. Travel options available in the Central Valley and other areas of the state with limited bus, rail, and air service for intercity trips will be improved. The HSR system connecting the Bay Area to the Central Valley would provide beneficial transportation impacts beyond additional modal connectivity. The change from vehicles to HSR would reduce daily auto trips and corresponding vehicle delay and congestion. A substantial amount of intercity auto travel (primarily using US 101, SR 99, and I-5) would divert to HSR service, relieving projected future congestion on SR 99. The reduction in future intercity trips would also improve the ability of US 101, SR 99, and I-5 to accommodate freight traffic and would improve projected travel speeds on the freeway. The HSR system would also provide system redundancy in cases of extreme events such as adverse weather or petroleum shortages (HSR trains are powered by electricity, which will be generated from non-petroleum-fueled sources; automobiles and airplanes currently require petroleum). The HSR system would provide a predominantly separate transportation system that is less susceptible to many factors influencing reliability, such as capacity constraints, congestion, and incidents that disrupt service.

The state's growing population and the growing demand on the state's transportation system were the early impetus for high-speed rail in California. There are plans for improving the existing freeway network through efficiency enhancements in Santa Clara County and widening roadways to add capacity in Merced County; however, these improvements would not be sufficient to ease traffic flow and accommodate expected population and employment growth in the area (Authority and FRA 2005; Chapter 1). The same trends that motivated California to investigate, support, and proceed to plan the HSR System are just as compelling today as in the last two decades. The state's need for an expanded, safe, reliable and fast mode of intercity travel to meet its growing transportation demands continues to be a critical policy basis for moving the Preferred Alternative forward as part of the larger HSR system (Final EIR/EIS, Section 1.2).

8.2.2.2 Provides Passenger Rail and Transit Connectivity Between the Central Valley and Silicon Valley

The project, which would provide connectivity between sections of the HSR system in the Central Valley and the San Francisco Bay Area, would provide a new regional surface transportation system that complements and connects with existing transportation modes. Connecting the Central Valley with San Jose and the Silicon Valley would transform the relationship between the two regions by increasing mobility and reducing travel times (Authority 2018b). There is limited passenger rail service between the Bay Area and the Central Valley and car travel between the regions can take multiple hours. The Preferred Alternative operating as part of the Phase 1 HSR system would offer substantially more transportation service than existing rail passenger service at a much more reliable and faster travel time than cars between the regions (Authority 2020d). Additionally, the high-speed rail connection would provide redundancy in the transportation network that maintains a transportation connection between the regions in the case of major disruptions on the roads. Regular, fast, and reliable travel would allow employers to expand their option for office locations and for employees to have a wider range of job opportunities available to them. Agglomeration economies are likely to accrue to the state's economy from this increased and improved connectivity between the two regions (Authority 2018a: pages 6 and 20; 2018b).

8.2.3 Intermodal Connectivity and Land Use Benefits in San Jose

The Preferred Alternative would offer transformational intermodal connectivity and land use benefits in San Jose. The addition of HSR to the existing San Jose Diridon Station would expand rail transit capacity and offer new interregional travel options in San Jose and the South Bay Area

with improved intermodal connectivity to regional rail, light rail, and multimodal transportation options for passengers. The Preferred Alternative would increase Diridon Station capacity with platform improvements, and new pedestrian overcrossings and vertical circulation improvements to facilitate direct platform to platform transfers between Caltrain, VTA LRT, ACE, Amtrak and Capital Corridor. Ridership and revenues for BART, Caltrain, VTA LRT, ACE, Amtrak and Capital Corridor are expected to increase when these transit services can connect to new interregional and statewide HSR service, supporting long-term growth of transit ridership and rail system in San Jose to access Bay Area destinations (Authority 2020b: Section 3.13).

San Jose Diridon Station, with expansion of regional rail and new interregional HSR services, will advance the benefits of transit-oriented land use change associated with an increase in transit capacity in urban centers. Increased transit capacity will facilitate the concentration of higher-density population and employment at this regional intermodal station, supporting agglomeration economies and increasing regional economic productivity (City of San Jose 2014). This is demonstrated by Google locating 29,200 high wage jobs near San Jose Diridon Station, with a total employment impact of 114,797 direct, indirect, and induced jobs. Direct employee spending, indirect industry-to-industry transactions on regional goods and services, and induced impacts, including increased property values and property taxes in the station areas, and increased retail sales and sales tax revenues, would provide a total economic impact of the Google's Downtown West project anticipated to be \$70 billion of economic output annually (City of San Jose 2020: Appendix N1). The expansion of intermodal connectivity would help advance further economic growth in San Jose.

8.2.4 Economic and Social Benefits

The Phase 1 HSR system would generate economic benefits related to revenue generated by the system, economic growth and jobs generated by construction and operation of the system, benefits from reduced delays to air and auto travelers, and economic advantages related to proximity to the HSR system's stations.

8.2.4.1 Revenue Benefits

As described in the Final EIR/EIS, during operation, the Preferred Alternative operating as part of the Phase 1 HSR system would generate sales tax in the region from both direct and indirect effects, which would exceed sales tax revenues lost from displacements (Final EIR/EIS, Section 3.12, Impact SOCIO# 18). The increased sales tax revenues generated by purchases associated with operation of two passenger rail stations would go to the cities and counties. In addition, HSR employees as well as patrons arriving at and departing from the two stations would make purchases that would contribute to increases in regional sales tax revenues.

8.2.4.2 Economic Growth and Jobs

As discussed in Sections 3.12, Socioeconomics and Communities, and 3.18, Regional Growth, and illustrated in Tables 3.18-13 and 3.18-16 of the Final EIR/EIS, construction of the Preferred Alternative would result in the creation of 31,510 jobs in total new employment within the three-county study area (including both construction jobs and jobs induced by the construction). An estimated 1,110 new long-term jobs would be created by HSR O&M activities: 600 jobs directly supporting train operations and dispatching, infrastructure and equipment maintenance, station and train cleaning, ticketing and other commercial activities, and administration, and roughly 510 indirect and induced jobs including additional employment supporting, servicing, or supplying train operations, administration and dispatching, infrastructure and equipment maintenance, station and train cleaning, ticketing and other commercial activities, and other occupations such as security, operations of concessions, and provision of goods and services to riders entering and leaving the HSR system.

In addition, the HSR system would improve the economic productivity of workers engaging in intercity travel by providing an option to avoid the delays and unpredictability associated with air and highway travel. These economic benefits are in marked contrast to the cost of expanding airports and highways, which would be approximately twice the cost of the HSR system to meet

the future transportation demand, assuming this type of expansion is even feasible (Authority 2012d: page 3-15; Parsons Brinkerhoff 2011).

Economic Advantages Related to Proximity to HSR Stations

Experiences in other countries have shown that an HSR system can provide a location advantage to those areas in proximity to an HSR station because an HSR system would improve accessibility to labor and customer markets, potentially improving the competitiveness of the state's industries and the overall economy. Businesses that locate in proximity to an HSR station could operate more efficiently than businesses that locate elsewhere (Section 3.12 of the Final EIR/EIS). This competitive advantage may be quite pronounced in high-wage employment sectors that are frequently in high demand in many communities. Finally, the HSR system would provide an opportunity for connectivity for sectors of the population who currently are limited in their travel options. In addition, HSR is a mode of transportation that can enhance and strengthen urban centers. In combination with appropriate local land use policies, the increased accessibility afforded by the HSR service could encourage more intensive development and may lead to higher property values around stations.

Economic benefits at state, regional and local levels are anticipated with increased statewide accessibility and reduced travel times of HSR service. Regional employment and income growth that strengthens global competitiveness can arise from agglomeration economies associated with a statewide HSR network that links together California's largest cities and regions with supportive land use policy to enable higher-density urban development in HSR station areas (Mirakami & Cervero, 2010).

Increased HSR inter-regional accessibility can attract knowledge and service-based firms to co-locate at higher density, regional transportation served HSR station areas (Mirakami & Cervero, 2010), which can foster the agglomeration benefits of higher labor productivity, creativity and synergy associated with face-to-face contact to exchange knowledge and access to specialized labor (Cambridge Systematics, Inc. 1998).

Cities can realize agglomeration benefits with pro-active public policies to guide public and private investment to enable transit-oriented urban development that leverages the accessibility efficiencies and competitive economic advantages of station areas linked together in a statewide HSR network (Mirakami & Cervero, 2010). Attracting transit-oriented employment and population growth in station areas can lead to higher transit ridership, revenues, property values and investment in station areas (Cervero et al., 2002).

8.2.5 Benefits May be Lower Initially than in 2040 but Will Build Over Time

The Authority's Business Plans (Authority 2016b, 2018a, 2021b, 2022b) describe a phased implementation strategy for construction of the Phase 1 HSR system that acknowledge funding constraints. Because the system may be constructed and implemented more slowly over time than assumed in the Final EIR/EIS for purposes of environmental analysis (the Final EIR/EIS assumed the roughly 520-mile Phase 1 HSR system with mature operations by 2040), based on funding availability, benefits of the system may also accrue more slowly over time. The Final EIR/EIS assumed a time horizon for analysis of 2040 and prepared analysis of certain project beneficial effects for that horizon year. An operational HSR system, however, would continue to provide VMT-reduction, air pollution-reduction, and GHG-reduction benefits long past the 2040 horizon year of the Final EIR/EIS, and these benefits would build over time as ridership on the system increases. As discussed in the 2020 Business Plan, over time, the average annual GHG emissions savings of the Phase 1 HSR system, 1.9 million metric tons of CO_{2e}, is projected to be the equivalent of taking 400,000 passenger vehicles off the road very year (Authority 2021b: pages 10-11).

In addition, the Authority has previously committed to power the high-speed rail with an energy portfolio of 100 percent renewable sources and confirmed the feasibility of this approach with industry (Authority 2008, 2014a). This commitment was reaffirmed in the 2018 and 2020 Business Plans (Authority 2018b, 2021b). The environmental benefit of powering the HSR system

with 100 percent renewable energy is substantial in terms of CO₂-reduction benefits. Over time, a 100 percent renewable portfolio has potential to increase the GHG-reduction benefits from HSR operations over a nonrenewable portfolio.

In summary, although benefits of the Phase 1 HSR system in the areas of VMT reduction, air pollution and GHG reduction, and reduced transportation energy use may be lower initially than described in the Final EIR/EIS because of a phased implementation strategy, the benefits will still be significantly positive, the benefits will still grow over time, and they will eventually achieve and exceed the level of benefit the Final EIR/EIS describes. (Authority 2021b) These benefits therefore still outweigh the significant and unavoidable adverse environmental impacts described in the Final EIR/EIS and CEQA Findings of Fact.

Connecting the Central Valley with San Jose and the Silicon Valley would transform the relationship between the two regions, and the Preferred Alternative will solidify this needed regional connectivity by increasing mobility and reducing travel times. Regular, fast, reliable travel would allow companies to expand their options for office locations and for employees to have a wider range of job opportunities available to them. Agglomeration economies would accrue to the California economy (Authority 2018b).

8.3 Benefits of the Preferred Alternative in Connection with the Previously Approved Merced to Fresno, Fresno to Bakersfield, and Bakersfield to Palmdale Project Sections

The Preferred Alternative would also have numerous benefits that outweigh the unavoidable adverse impacts in the San Jose to Merced Project Section when considered with the previously approved Merced to Fresno, Fresno to Bakersfield, and Bakersfield to Palmdale Project Sections, even without considering other portions of the Phase 1 HSR system that are anticipated to be approved and constructed in the future.

8.3.1 Expands the Initial HSR in the Central Valley to Reach the Bay Area and Provides Opportunity for Expanded Early Interim Service

An important benefit of the Preferred Alternative is that it would create an opportunity for the Authority to expand its initial HSR service in the Central Valley between Merced and Bakersfield to the west, to reach Gilroy and the Bay Area. The Authority has previously approved the Merced to Fresno and Fresno to Bakersfield Project Sections, comprising the roughly 171-mile backbone of the Phase 1 HSR system in the Central Valley, including the Central Valley Wye and HSR alignment to the west (Authority 2012e, 2012f, 2014b, 2018c, 2018d, 2020e, 2020f, 2020g). In 2021, the Authority approved the Bakersfield to Palmdale Project Section Preferred Alternative, adding 79 miles between Bakersfield and Palmdale to create 250-miles of contiguously approved HSR alignment (Authority 2021c, 2021d, 2021e). The Preferred Alternative would extend the approved HSR alignment another 89 miles to the west and north, reaching San Jose and creating 339 miles of approved HSR alignment. See Figure 3 for locations and project status of the California HSR project sections.



Figure 3 Map of Environmental Document Status and Progress

The Authority has 119 miles of construction under way in the Central Valley between Madera and north of Bakersfield, which forms the foundation of the HSR system (Authority 2012a, 2014a). The Authority's 2020 Business Plan support expanding construction to 171 miles of HSR connecting Merced, Fresno, and Bakersfield as part of an early interim HSR service in the southern Central Valley (Authority 2021b: Chapter 4). Preliminary studies indicate an initial HSR service in the Central Valley is a viable interim step toward the Phase 1 HSR system (Authority 2022b). The Authority has also previously found that adding the 79-mile Bakersfield to Palmdale Project Section to the Central Valley would help realize a viable initial HSR service by connecting the Central Valley to Palmdale and/or connecting the initial Silicon Valley to Central Valley HSR service to Palmdale, where the Palmdale Station would offer Metrolink connections to Los Angeles, even if funding for the HSR system between Palmdale and Los Angeles/Anaheim is not immediately available (Authority 2021d.) The Preferred Alternative for the San Jose to Merced Project Section would also contribute to realizing a viable initial HSR service, connecting a Silicon Valley to Central Valley service to Palmdale and Los Angeles County, creating an opportunity for a total of 339 miles of initial HSR service, and serving as a critical foundation of the statewide HSR system (Authority 2022b).

8.3.2 Provides a New Expedited and Consistent Travel Option That Connects to Conventional Passenger Rail Service in San Jose

As discussed in the Authority's Business Plans, the Central Valley ranks as one of California's most underserved regions for rail transportation. The Central Valley is home to approximately 6 million residents and is becoming more prominent as the state's third regional economic engine. Fresno and Bakersfield, 2 of the 10 most populated cities in California, have experienced 20 percent population growth since 2000. The planned Merced to Bakersfield early interim HSR service will connect the three largest cities in the Central Valley and provide connections to existing and improved passenger rail and bus services to the north, west, and south of the Central Valley, reducing travel times by up to 100 minutes through the heart of California (Authority 2021b).

By connecting to the Merced to Bakersfield early interim HSR service and extending it to San Jose, where a passenger can connect to Caltrain service to reach San Francisco, the Preferred Alternative will provide reduced travel time within the Central Valley, between the Central Valley and the Silicon Valley, and between the Central Valley and San Francisco. In addition, the San Jose Diridon Station will provide links with other passenger services including BART, Amtrak, and VTA bus services. The new HSR mode will greatly improve transportation options for travelers in the Bay Area, and San Joaquin Valley.

8.3.3 Reduces Vehicle Miles Traveled

Extending the Merced to Fresno service further to Palmdale in the South and San Jose to the North, a further reduction of 723 million annual vehicle miles is estimated which represents a further increase of 280 percent in vehicle miles saved over the Palmdale extension from Bakersfield. This large increase captures new travel markets using the HSR system and allows for much longer travel distances by extending the system to San Jose and to Palmdale. This extension also will offer higher frequency service with addition of a San Jose to Palmdale service in addition to the Merced to Palmdale service. The service parameters were derived from the Silicon Valley to Central Valley alternative, which assumes higher service frequencies compared to the Merced to Bakersfield alternative. (Authority 2022c)

8.3.4 Improves Air Quality in the Central Valley

Based on the statewide analyses, the Central Valley segment (Merced to Bakersfield) shows reductions in all criteria pollutants and GHGs prior to implementation of the full Phase 1 system. The addition of the San Jose to Merced Project Section to the Central Valley segment and the Bakersfield to Palmdale Project Section to the proposed Valley to Valley initial service will continue to develop these emissions savings and is a key element to achieving the full emission reductions of the Phase 1 system (Authority 2022c).

8.3.5 Provides Economic and Social Benefits by Extending the Central Valley Construction to San Jose

The Authority's current construction of the HSR alignment in the Central Valley is providing important economic benefits to the region. To date, more than 5,000 well-paying construction jobs have been created for women and men working at 35 construction sites in the Central Valley.

- 77 percent of the people employed on the project live and work in the region.
- More than 600 small businesses are working on the project, including:
 - 192 certified Disadvantaged Business Enterprises
 - 67 Certified Disabled Veteran Business Enterprises

According to an Authority analysis, implementing the Merced and Bakersfield capital program (i.e., the extensions) is projected to generate \$37.9 billion in total economic activity and 203,000 job-years of employment (Authority 2021a: page 55; KPMG 2020: pages 10 and 66). According to Section 3.18.6.3 of the Final EIR/EIS, construction of the Preferred Alternative would generate 31,510 annual job-years of employment within the three-county study area (including construction jobs and jobs induced by construction), extending the benefit into San Jose.

8.3.6 Lays the Foundation for Nationwide High-Speed Rail Industry

The Authority plans to begin full high-speed rail service once it connects the Central Valley with Silicon Valley. This operation will be able to demonstrate the benefits of this new mode of transport (for the United States) and can lay the foundation for a nationwide high-speed rail industry. This project section is the essential connection between these two regions that will expand the system sufficiently to see those major benefits.

A new high speed rail line requires a whole series of products, parts, and high-tech systems to operate. This starts with the trains and the thousands of components and parts, to the power systems, signaling and communication systems, high-tech control centers, workshops, and stations. A new HSR network will create new manufacturing industry including an extensive supply chain made up of thousands of specialty companies. This new domestic industry will encourage small businesses, and create long-term, good paying, family-supporting jobs. The U.S. High Speed Rail Association estimates there will be millions of long-term jobs created throughout this entirely new domestic manufacturing industry and that this new industry will keep growing for many decades, cross-stimulate a number of other industries along the way, and will be an economic boom for the United States well into the future (U.S. High Speed Rail Association 2022).

8.4 Benefits of the Preferred Alternative on Its Own

The Preferred Alternative offers the greatest benefit when viewed as part of the Phase 1 HSR system between San Francisco and Los Angeles/Anaheim. The Preferred Alternative also offers considerable benefits when viewed in conjunction with the already approved HSR sections from Merced to Bakersfield to Palmdale. The benefits, however, are further augmented by the benefits the Preferred Alternative offers on its own, even without considering other sections of the HSR system.

8.4.1 Transportation Safety Benefits

- The Preferred Alternative would provide safety benefits between San Jose and Gilroy due to the addition of four-quadrant gates and median channelization at existing at-grade rail crossings, addition of traffic signal preemption at certain crossings and through fencing of the railroad right of way where not already fenced. The existing at-grade crossings do not have four quad gates at present; four quad gates have been shown to result in a substantial improvement in safety compared to no gates or two gates only. These improvements will improve safety conditions for existing Caltrain and Amtrak service as well as future passenger rail expansions.

8.4.2 Travel Time, Travel Reliability, and Environmental Benefits

- The Preferred Alternative would provide track capacity increases and electrification between San Jose and Gilroy which will allow Caltrain to extend their electrified service south of Tamien Station in San Jose and provide improved, increased and faster service between Gilroy and San Jose, increasing ridership and reducing VMT, as well as reducing criteria pollutant emissions and GHG emissions.

8.4.3 Benefits from Upgrading Infrastructure

- The Preferred Alternative would include rebuilding bridges (including Llagas Creek bridge) on the existing corridor, investing in infrastructure that has not been invested in since constructed in the 1930s.
- As part of the Preferred Alternative, the project would include relocation of a 3,800-ft segment of the 120-inch diameter Pacheco Water Conduit for Santa Clara Valley Water District (SCVWD). The conduit connects Santa Clara County residents to a major SCVWD water source, the Pacheco Reservoir in eastern Santa Clara County. SCVWD has identified the high-pressure conduit as at the end of its lifespan. HSR would replace the segment of the Pacheco Conduit within the project's footprint, and therefore reduce overall maintenance costs for SCVWD.
- The Preferred Alternative would also include drainage improvements to existing infrastructure, including reconstruction of Pacheco Tunnel, which will increase the lifetime of these drainage improvements.

8.4.4 Economic Benefits

- As described in the Final EIR/EIS, construction of the Preferred Alternative will generate sales tax revenue gains for the region over the 7-year construction period that have been estimated at approximately \$40.1 million. These sales tax revenue gains will increase local government revenues during the construction period and provide an economic benefit (Final EIR/EIS, Section 3.12, Impact SOCIO# 15.)
- As described in the Final EIR/EIS, construction of the Preferred Alternative will generate approximately 31,510 direct, indirect and induced jobs (Final EIR/EIS, Section 3.12, Table 3.12-23).
- As described in the Final EIR/EIS, operation of the Preferred Alternative will generate approximately 1,110 direct and indirect jobs annually (Final EIR/EIS, Section 3.12, Table 3.12-23).
- As described in the Final EIR/EIS, the statewide HSR system (San Francisco to Los Angeles) could increase statewide employment by 102,000 jobs because of improved connectivity, of which 21,860 would be in the three-county RSA (Final EIR/EIS, Section 3.12, Impact SOCIO#17).
- As the Authority has done in the Central Valley, the Authority will work to ensure that the local workforce is prepared for these kinds of economic opportunities by investing in workforce training which development.

8.5 Conclusion

The Preferred Alternative for San Jose to Merced Project Section of the California HSR System will result in certain significant impacts to the environment that cannot be avoided or substantially lessened with the application of feasible mitigation measures or feasible alternatives, as identified in Section 8.1, above, and as disclosed in the Final EIR/EIS. The Authority finds, however, that the above-enumerated benefits of the Preferred Alternative as part of the Phase 1 HSR System (Section 8.2), in connection with the previously approved Merced to Fresno, Fresno to Bakersfield, and Bakersfield to Palmdale project sections (Section 8.3), and/or viewed on its own (Section 8.4) outweigh the unavoidable adverse environmental effects. This finding is based on

the Authority's careful consideration of and balancing of the unavoidable adverse environmental effects against the Preferred Alternative's substantial environmental benefits, which render the unavoidable adverse environmental effects acceptable.

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ATTACHMENT A: MITIGATION MEASURES-EXTRACT OF MMEP

ATTACHMENT A: MITIGATION MEASURES-EXTRACT OF MMEP

The full text of each mitigation measure discussed in the Findings and Statement of Overriding Considerations document is provided in this attachment. The final form of the mitigation measures is found in the Mitigation Monitoring and Enforcement Program (MMEP); any conflict between the text of this Attachment A and the MMEP should be resolved in favor of the MMEP. For acronyms used in this attachment, see Chapter 15, Acronyms and Abbreviations, of the Final EIR/EIS. For references cited in this attachment, see Chapter 12, References, of the Final EIR/EIS.

A.1 Referenced Mitigation Measures for Transportation

TR-MM#1: Potential Mitigation Measures Available to Address Traffic Delays (NEPA Effect Only)

On February 5, 2021, the Authority finalized “Decision-making Guidance for the Adoption of Traffic Mitigation Measures” (Authority 2021). This memorandum describes SB 743 and its effect on CEQA transportation analysis, describes NEPA requirements concerning the analysis of traffic effects and consideration of traffic mitigation, and provides criteria for screening and selection of traffic mitigation. Five screening criteria were identified to ensure traffic mitigation measures:

- Do not cause an increase in VMT;
- Would not contradict the objectives of SB 743;
- Are not more disruptive to the community than the impact itself;
- Do not result in unmitigable secondary environmental effects; and
- Are determined by the Authority to be practicable (including consideration of cost).

A range of potential traffic mitigation measures were evaluated using these criteria. The traffic mitigation measures considered and the evaluation as to which measures met or did not meet these criteria are presented in Volume 2, Appendix 3.2-C. The Authority is only describing in this Section the traffic mitigation measures that met the criteria (these are the mitigations included below).

Congested freeway operations can be addressed by freeway widening and the construction of express lanes by other agencies, as identified in the MTC RTP (MTC 2013). The Authority is not proposing freeway widening or construction of express lanes as specific mitigation for project congestion/delay effects, for the reasons discussed in Volume 2, Appendix 3.2-C.

Mitigation measures to address permanent congestion/LOS effects on intersection operations from permanent road closures and relocations, increased gate-down time at the at-grade crossings, and vehicle flow to/from HSR stations could include one or more combinations of various standard intersection capacity enhancements, such as signal retiming or additions, lane restriping, road/intersection widening and turn pocket additions/increases. Those mitigation measures that passed the screening evaluation in Volume 2, Appendix 3.2-C are described below.

The following site-specific mitigation measures to address adverse traffic delay/congestion effects are proposed.

TR-MM#1c: Optimize Signal Coordination on West Santa Clara Street from Stockton Street to Autumn Street in San Jose

Prior to HSR operations, the contractor would 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 would prepare all materials necessary for the approval of the City of San Jose for the implementation of the modification.

This mitigation measure would improve operations at these intersections by optimizing the effectiveness of the existing traffic signal systems, which would provide additional vehicle carrying capacity. The project's impacts would still be adverse at the West Santa Clara Street intersections with Stockton Street and Cahill Street and Autumn Street.

TR-MM#1e: Monterey Road/Chynoweth Avenue–Roeder Road—Widen and Reconfigure

Prior to HSR operations, the contractor would 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 would 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 would 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.

TR-MM#1q: Monterey Road/Tilton Avenue—Various Improvements

This measure would include reconfiguring the Monterey Road/Tilton Avenue intersection as follows (depending on alternative):

- The mitigation is the interconnection of the Monterey Road/Tilton Avenue intersection with the Monterey Road/Burnett Avenue intersection, which would be accomplished within the roadway right-of-way.

TR-MM#1t: Monterey Road/San Martin Avenue—Restripe Southbound Approach

Prior to HSR operations, the contractor would restripe the southbound Monterey Road approach to San Martin Avenue to provide additional capacity for the southbound left turn lane. This improvement would require the removal of the adjacent northbound left turn lane on Monterey Road into Burbank Avenue. This improvement would not require right-of way acquisition. The contractor would prepare all materials necessary for the approval of Santa Clara County for the implementation of the modification.

This mitigation measure would improve the operation at this intersection by providing additional vehicle capacity but would not avoid an adverse effect. Implementing TR-MM#1t would result in reduced vehicle capacity at an adjacent intersection (Monterey Road/Burbank Avenue).

TR-MM #1u; Monterey Road/IOOF Avenue—Widen and Reconfigure Southbound Approach

Prior to HSR operations, the contractor would widen the southbound approach of Monterey Road to IOOF Avenue to provide an additional southbound left turn pocket.

TR-MM#1w: Chestnut Street/Luchessa Street—Reconfigure Southbound Approach

Prior to HSR operations, the contractor would restripe the southbound approach of Chestnut Street to Luchessa Street to provide a southbound right turn pocket. This improvement would not require right-of-way acquisition.

TR-MM#1x: Install Traffic Signals at Various Locations

Prior to HSR operations, the contractor would install traffic signals at the following locations:

- TR-MM#1x.1: Cahill Street/Stover-Crandall Street)
- TR-MM#1x.2: Montgomery Street/Stover-Crandall Street
- TR-MM#1x.3: Cahill Street/West San Fernando Street
- TR-MM#1x.6: East Main Avenue/Depot Street
- TR-MM#1x.9: School Access/IOOF Avenue
- TR-MM#1x.10: SR 25/Bloomfield.

The contractor would 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.

TR-MM#2: Install Transit Signal Priority

Prior to construction, the contractor will install bus transit signal priority at all traffic signals in the following locations:

- San Jose Diridon Station Area
 - Cahill Street between West Santa Clara Street and Park Avenue
 - Montgomery Street between West Santa Clara Street and Park Avenue
 - Autumn Street between West Santa Clara Street and Park Avenue
- Gilroy Station Area

Prior to operations, the contractor will install bus transit signal priority at all traffic signals in the following locations:

- San Jose Diridon Station Area
 - Cahill Street between West Santa Clara Street and Park Avenue
 - Montgomery Street between West Santa Clara Street and Park Avenue
 - Autumn Street between West Santa Clara Street and Park Avenue
- Gilroy Station Area
- Monterey Road between 7th Street and 10th Street
- Alexander Street between 7th Street and 10th Street

The Contractor will prepare all materials necessary for the jurisdictional approvals for the implementation of this improvement.

TR-MM#3: Railway Disruption Control Plan

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.

The Authority will require the construction contractor, in cooperation with Caltrain, to implement the following coordination and consultation requirements:

- 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.
- 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.
- 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).

- 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.

The Authority will make efforts to contain and minimize disruption to freight and tenant passenger services during project construction, while allowing for expeditious completion of construction. Measures that will be implemented throughout the course of project construction will include, but will not be limited to, the following:

- 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.
- Provide safety measures for freight and passenger rail operation through construction zones.
- Require contractors to coordinate with rail dispatch to minimize disruption of rail service in the corridor.
- 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).
- 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.
- 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).
- 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.
- Provide advance notice to local and regional transit providers to facilitate advance notice to transit riders of any temporary disruption in passenger rail service.

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.

A.2 Referenced Mitigation Measures for Air Quality and Greenhouse Gases

AQ-MM#1: Implement Additional On-Site Emissions Controls

During construction, the Contractor will 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 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.

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 zero emission (ZE) or near-zero emission (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% ZEV by 2035
- Full transition to ZEV short haul/drayage trucks by 2035
- Full transition to ZEV 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 enter into a memorandum of understanding (MOU) with the Bay Area Clean Air Foundation (Foundation), a public nonprofit and supporting organization for the BAAQMD, to reduce VOC and NO_x to the required levels. The required levels in the SFBAAB are as follows:

1. For emissions in excess of the General Conformity *de minimis* thresholds (NO_x): net zero.
2. For emissions not in excess of *de minimis* thresholds, but above the BAAQMD's daily emission thresholds (VOC and NO_x): 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 Foundation will require an additional administrative fee of no less than five percent. The mitigation offset fee will be determined by the Authority and the Foundation based on the type of projects available at the time of mitigation. When the CEQA threshold is exceeded, these funds may be spent to reduce either VOC or NO_x emissions (“O₃ precursors”). When the General Conformity threshold is exceeded, these funds may be spent to reduce O₃ precursors, provided this is allowed by the federal CAA provisions addressing General Conformity. This fee is intended to fund emissions reduction projects to achieve reductions, with the estimated tonnage of emissions offsets required starting in 2022. Documentation of payment will be provided to the Authority or its designated representative.

The MOU 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 the Foundation will serve as an acknowledgment and commitment by the Foundation 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 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.

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_x, VOC, PM₁₀, and PM_{2.5} 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.

A.3 Referenced Mitigation Measures for Noise and Vibration

NV-MM#1: Construction Noise Mitigation Measures

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_{eq} 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:

- Install a temporary construction site noise barrier near a noise source.
- Avoid nighttime construction in residential neighborhoods.
- Locate stationary construction equipment as far as possible from noise-sensitive sites.
- Reroute construction truck traffic along roadways that will cause the least disturbance to residents.
- During nighttime work, use smart backup alarms, which automatically adjust the alarm level based on the background noise level, or switch off back-up alarms and replace with spotters.
- Use low-noise-emission equipment.
- Implement noise-deadening measures for truck loading and operations.
- Monitor and maintain equipment to meet noise limits.
- Line or cover storage bins, conveyors, and chutes with sound-deadening material.
- Use acoustic enclosures, shields, or shrouds for equipment and facilities.
- Use high-grade engine exhaust silencers and engine-casing sound insulation.
- Prohibit aboveground jackhammering and impact pile driving during nighttime hours.

- Minimize the use of generators to power equipment.
- Limit use of public address systems.
- Grade surface irregularities on construction sites.
- Use movable noise barriers at the source of the construction activity.
- Limit or avoid certain noisy activities during nighttime hours.
- 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.

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.

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.

NV-MM#2: Construction Vibration Mitigation Measures

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.

NV-MM#3: Implement Proposed California High-Speed Rail Project Noise Mitigation Guidelines

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.

The Noise and Vibration Mitigation Guidelines, included as Volume 2, Appendix 3.4-B of the Final EIR/EIS, describe the following mitigation measures and approach:

- **Noise Barriers**—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 attenuate bird startle effects.

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:

- Achieve a minimum of 5 dB of noise reduction, which is then defined as a benefited receptor.
- The minimum number of receptors should be at least 10.
- The length should be at least 800 feet.
- Must be cost-effective, defined as mitigation not exceeding \$95,000 per benefited receptor.

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.

Noise barriers on both aerial structures and at-grade structures will consist of solid, semitransparent, or transparent materials, as defined in *Aesthetic Options for Non-Station Structures* (Authority 2014). Volume 2, Appendix 3.4-B, Noise and Mitigation Guidelines, of the Final EIR/EIS provides additional details.

- **Install Building Sound Insulation**—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.
- **Noise Easements**—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 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.

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..

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.

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 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.

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. Draft EIR/EIS Table 3.4-22 in the Final EIR/EIS lists the mitigation procedures and their locations.

A.4 Referenced Mitigation Measures for Biological and Aquatic Resources

BIO-MM#P1: Provide Compensatory Mitigation for Impacts onto the Grasslands Ecological Area

To fulfill a program-level commitment set out in the Bay Area to Central Valley Final Program EIR/EIS (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.

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, 79, 84, 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:

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 be completed within 5 years of the start of operations for the project section, to the extent feasible.

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-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.

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 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 outline at a minimum:

- Procedures for documenting pre-construction conditions for restoration purposes.
- Sources of plant materials and methods of propagation.
- 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.
- Specification of success criteria for re-established plant communities.
- Specification of the remedial measures to be taken if success criteria are not met.
- Methods and requirements for monitoring restoration/replacement efforts, which may involve a combination of qualitative and/or quantitative data gathering.
- Maintenance, monitoring, and reporting schedules, including an annual report due to the Authority by January 31st of the following year.

The RRP will be submitted to the Authority and regulatory agencies, as defined in the conditions of regulatory authorizations, for review and approval.

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 construction and O&M.

The WCP will include, at a minimum, the following:

- A requirement to delineate environmentally sensitive areas (ESA) 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. 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 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 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.
- Identification of weed control treatments, including permitted herbicides and manual and mechanical removal methods.
- Timeframes for weed control treatment for each plant species.
- Identification of fire prevention measures.

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 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.

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.

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.

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.

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:

- Location(s) of where pre-activity surveys were completed, including latitude and longitude, Assessor Parcel Number, and HST parcel number.
- Written description of the surveyed area. A figure of each surveyed location will be provided that depicts the surveyed area and survey buffers over an aerial image.
- Date, time, and weather conditions observed at each location.
- Personnel who conducted the pre-activity surveys.
- Verification of the accuracy of the Authority's habitat mapping at each location, provided in writing and on a figure.
- Observations made during the survey, including the type and locations (written and GIS) of any sensitive resources detected.
- Identification of relevant measures from the BRMP to be implemented as a result of the survey observations.

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:

- Date, time, and weather conditions observed at each location where monitoring occurred.
- Personnel who conducted compliance monitoring.
- Project activities monitored, including construction equipment in use.
- Compliance conditions implemented successfully.
- Noncompliance events observed.

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:

- 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.
- Summary of anticipated project activities and work areas for the upcoming month.
- Tracking of impacts on suitable habitats for each threatened and endangered species identified in USFWS and CDFW authorizations, including:
 - An accounting of the number of acres of habitats for which we provide compensatory mitigation that has been disturbed during the reporting month, and
 - An accounting of the cumulative total number of acres of threatened and endangered species habitat that has been disturbed during the project period.

- Up-to-date GIS layers, associated metadata, and photo documentation used to track acreages disturbed.
- Copies of all pre-activity survey reports, daily compliance reports, and noncompliance/work stoppage reports for the reporting month.

Annual reports will be submitted to the Authority by the 20th of January and will include:

- Summary of all monthly compliance reports for the reporting year.
- A general description of the status of the project, including projected completion dates.
- All available information about project-related incidental take of threatened and endangered species.
- Information about other project impacts on the threatened and endangered species.
- 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).
- 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.

In addition to the compliance reporting requirements outlined above, the following items will be provided for compliance documentation purposes:

- If agency personnel visit the project footprint in accordance with BIO-IAMF#2, the Project Biologist will prepare a memorandum within one 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.
- 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:
 - Implementation and performance of the RRP described in BIO-MM#1
 - Summary of progress made regarding the implementation of the WCP described in BIO-MM#2
 - Compliance with BIO-MM#3
 - Compliance with BIO-IAMF#6
 - Compliance with BIO-IAMF#7
 - Compliance with BIO-IAMF#8
 - Compliance with BIO-IAMF#10
 - Compliance with BIO-MM#5
 - Compliance with BIO-IAMF#12
 - Compliance with BIO-IAMF#9
 - BMP field manual implementation and any recommended changes to construction site housekeeping practices outlined in BIO-IAMF#11
- 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.

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 *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities* (CDFW 2018c) and *Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Plants* (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 extended 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.

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 *Policy on Mitigation Guidelines Regarding Impacts to Rare, Threatened, and Endangered Plants* (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, 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

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, SWRCB, and Regional Water Quality Control Board (RWQCB) for review (and approval where applicable).

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.

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:

- **Baseline inventory**—As allowed by private property owners, the Authority will establish baseline hydrologic conditions within the groundwater resource study area (approximately 1 mile 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).¹
- **Groundwater modeling**—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.
- **Pre-tunneling supplemental water infrastructure provision**—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.
- **Construction monitoring**—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.
- **Supplemental water**—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 would, 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 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

¹ The baseline inventory will be used to estimate groundwater levels below ground surface. Once the groundwater levels are identified, the area of potential effect to oaks can be identified (defined as areas with groundwater levels within 70 feet of the surface), and oaks within the area of potential groundwater effect can then be identified.

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).

- **Contingency plan for supplemental water in areas outside of predicted area of effect**—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.
- **Temporary relocation**—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.
- **Post-construction monitoring**—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 conditions, monitoring will no longer be required.
- **Post-construction riparian or wetland restoration**—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.
- **Post-construction compensation**—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.

BIO-MM#10: Prepare and Implement a Habitat Mitigation Plan for Species and Species Habitat

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.

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 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.

The HMP will include the following:

- A description of the species and habitat types for which compensatory mitigation is being provided.
- A description of the methods used to identify and evaluate mitigation options. Mitigation options will include one or more of the following:
 - Purchase of mitigation credits from an agency-approved mitigation bank.
 - 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.
 - Payment to an existing in-lieu fee program.
- 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.
- A summary of the estimated direct permanent and temporary impacts on species and species habitat.
- 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:
 - Impacts on species (typically measured as habitat loss) are reduced or increased as a result of changes in project design
 - Pre-construction site assessments indicate that habitat features are absent (e.g., because of errors in land cover mapping or land cover conversion)
 - The habitat is determined to be unoccupied based on negative species surveys
 - Impacts initially categorized as permanent qualify as temporary impacts
- 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.
- 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).

- 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.
- 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.
- 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.
- A description of adaptive management approaches, if applicable, that will be used in the management of species habitat.
- A description of financial assurances that will be provided to demonstrate that the funding to implement mitigation is assured.

BIO-MM#11: Implement Measures to Minimize Impacts during Off-Site Habitat Restoration, or Enhancement, or Creation on Mitigation Sites

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.

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 or CESA, Cal. Fish and Game Code Section 1600 et seq., the CWA, and the Porter-Cologne Act.

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).

BIO-MM#12: Provide Compensatory Mitigation for Impacts on Listed Plant Species

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:

- 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.
- 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.

Compensatory mitigation will be provided using one or more of the methods described in BIO-MM#10.

BIO-MM#13: Implement Work Stoppage

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.

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.

BIO-MM#14: Avoid Direct Impacts on Bay Checkerspot and Monarch Butterfly Host Plants

Prior to construction, the Project Biologist would 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 would 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 would avoid host plants outside permanent impact areas.

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:

- 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.
- Place lighting under the viaduct in strategic locations to minimize shadows.
- 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.

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:

- Conservation of land near the alignment to improve survival conditions for dispersing butterflies.
- A monitoring and adaptive management process that will detail how the performance criteria of "no net change in dispersal" will be defined and maintained.

BIO-MM#16: Provide Compensatory Mitigation for Impacts on Bay Checkerspot Butterfly Habitat

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:

- Purchase of credits from an agency-approved conservation bank
- Acquisition in fee title of USFWS-approved property
- Purchase or establishment of a conservation easement with an endowment for long-term management of the property-specific conservation values

- An in-lieu fee contribution determined through negotiation and consultation with the USFWS
- Contribution to SCVHA habitat protection, restoration, or management efforts

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.

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.

- Habitat restoration and management will be needed on many Bay checkerspot 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 control nonnative plant species.
- 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.

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 checkerspots; and (4) ease and cost of protection. Habitat protection should include buffer zones as necessary. Bay checkerspot habitat areas considered for mitigation can be ranked in approximate order of priority as follows:

- Core habitat areas
 - a) Kirby (3,900 acres)
 - b) Metcalf (1,100 acres)
 - c) San Felipe (780 acres)
 - d) Silver Creek Hills (1,000 acres)
- Potential core areas—Santa Teresa Hills (1,100 acres)
- Larger, good-quality habitat areas near core populations
 - a) Tulare Hill (300 acres)
 - b) North of Llagas Avenue (420 acres),
 - c) West hills of Santa Clara Valley (74 acres)
- Stepping stones—Tulare Hill, Santa Teresa Hills, Redwood City
- 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.

The Authority will submit a memorandum to the USFWS to document compliance with this measure.

BIO-MM#17: Conduct Pre-Construction Surveys for Vernal Pool Wildlife Species

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 with 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 *Survey Guidelines for the Listed Large Brachiopods* (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 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.

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 brachiopod 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.

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 brachiopod 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.

BIO-MM#21: Implement Avoidance Measures for Elderberry Shrubs outside Permanent Impact Areas

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 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' *Framework for Assessing Impacts to the Valley Elderberry Longhorn Beetle* (USFWS 2017b):

- All areas to be avoided during construction activities will be fenced, flagged, or both as close to construction limits as feasible.
- 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.
- 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.
- A qualified biologist will monitor the work area at project-appropriate intervals to verify that all avoidance and minimization measures are implemented.
- 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).
- 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.
- 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.
- 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.

BIO-MM#22: Provide Compensatory Mitigation for Impacts on Valley Elderberry Longhorn Beetle Habitat

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' *Framework for Assessing Impacts to the Valley Elderberry Longhorn Beetle* (USFWS 2017b), as follows:

- Suitable riparian habitat will be replaced at a minimum of 3:1 (acres of mitigation to acres of impact).
- Suitable nonriparian habitat will be replaced at a minimum of 1:1 (acres of mitigation to acres of impact).
- 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.
- 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.
- 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.

For transplanted elderberry plants, a survival rate of at least 60 percent of the elderberry plants and 60 percent of the associated native plants must be maintained throughout the 10-year monitoring period. If survival rates drop below 60 percent during the monitoring period, failed plantings will be replaced and maintained until the 60 percent survival rate is achieved.

BIO-MM#23: Conduct Surveys and Implement Avoidance Measures for Crotch Bumble Bee

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' *Survey Protocols for the Rusty Patched Bumble Bee (Bombus affinis)* (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).

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 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.

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.

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 construction zones prior to dewatering and other construction activities.

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 California Salmonid Stream Habitat Restoration Manual (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.

BIO-MM#27a: Implement General Protection Measures for Fish

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:

- 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.
- 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, infiltration basins, rain gardens, and other design measures that will capture and treat polluted runoff before it reaches sensitive natural waterways.
- The following bank stabilization and erosion control measures will be implemented during design and construction to minimize habitat disturbance:
- Temporarily fence areas of natural riparian vegetation that can be avoided with high-visibility ESA fencing 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 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.
- Revegetate temporarily disturbed areas with native plants to resemble the existing vegetation.

BIO-MM#27b: Work Windows for Fish

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.

- 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.
- 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 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.
- 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 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

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:

- Injury threshold for fish of all sizes includes a peak sound pressure level of 206 decibels relative to 1 micropascal.
- 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.
- Disturbance threshold for fish of all sizes is 150 decibels root mean square relative to 1 micropascal.

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.

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 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

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:

- 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
- 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
- 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

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:

- Habitat complexity such as floodplain backwaters (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
- 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)
- Local and regional conservation goals
- Long-term access for monitoring and maintenance
- Upstream and downstream conditions

Conservation options developed to offset impacts on steelhead habitat and EFH will be considered in the development of the Compensatory Mitigation Plan (BIO-MM#10), Restoration and Revegetation Plan (BIO-MM#1) and Flood Protection Plan (HYD-IAMF#2).

BIO-MM#29: Conduct Pre-Construction Surveys for California Tiger Salamander

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.

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 *Interim Guidance on Site Assessment and Field Surveys for Determining Presence or a Negative Finding of the California Tiger Salamander* (CDFG and USFWS 2003) or other more recent guidelines, if available.

BIO-MM#30: Implement Avoidance and Minimization Measures for California Tiger Salamander

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 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.

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.

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.

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 *Revised Guidance on Site Assessments and Field Surveys for The California Red-legged Frog* (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.

BIO-MM#33: Provide Compensatory Mitigation for Impacts on California Red-Legged Frog Habitat

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:

- Purchase of credits from an agency-approved conservation bank
- Acquisition in fee title of USFWS-approved property
- Purchase or establishment of a conservation easement with an endowment for long-term management of the property-specific conservation values
- An in-lieu fee contribution determined through negotiation and consultation with the USFWS

Compensatory mitigation for red-legged frog will prioritize lands that will contribute to the recovery of the species 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:

- 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)
- Santa Clara Valley Core Recovery Area: protect existing populations and control nonnative predators (Recovery Task 1.17)

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.

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 *Considerations for Conserving the Foothill Yellow-Legged Frog* (CDFW 2018d), the *Visual Encounter Survey Protocol for Rana boylei in Lotic Environments* (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.

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 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.

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.

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.

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 *Approved Survey Methodology for the Blunt-Nosed Leopard Lizard* (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.

BIO-MM#39: Implement Avoidance Measures for Blunt-Nosed Leopard Lizard

For work areas where surveys confirm that blunt-nosed 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.

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.

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:

- **Establishment of no-work buffers**—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.
- **Fencing of work areas**—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.

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.

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.

BIO-MM#41: Conduct Pre-Construction Surveys and Implement Avoidance and Minimization Measures for Giant Garter Snake

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.

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.

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.

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.

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.

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:

- 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.
- Alternatively, the Authority or its contractor may conduct surveys for and avoid mountain plover wintering sites and sandhill 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.
 - 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.
 - 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.
 - 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.

BIO-MM#45: Conduct Surveys for Burrowing Owls

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 *Staff Report on*

Burrowing Owl Mitigation (CDFG 2012), but it may be updated based on future changes by the SCVHA.

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: 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.

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:

- Support at least two breeding adult owls for every breeding adult owl displaced by construction of the project
- 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:
 - Open terrain with well-drained soils
 - Short, sparse vegetation with few shrubs and no trees
 - 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.
 - Abundant and accessible prey (arthropods, small rodents, amphibians, lizards)

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 *Interim Golden Eagle Inventory and Monitoring Protocols* (Pagel et al. 2010), CDFW's *Bald Eagle Breeding Survey Instructions* (CDFW 2017), or current guidance. A nesting 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

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.

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.

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).

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.

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:

- 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.
- 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).

BIO-MM#51: Implement Avoidance Measures for California Condor

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:

- The Project Biologist will be present for construction activities occurring within 2 miles of known California condor roosting sites.
- 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.
- 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.
- 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.
- 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.

- 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.
- Polychemical lines will not be used or stored on site to preclude condors from obtaining and ingesting pieces of them.
- 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, *Guidance on Hazing California Condors* (USFWS 2014), may be used as necessary.
- Prior to construction-related uses of helicopters, the 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.
- 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.

BIO-MM#52: Conduct Pre-Construction Surveys and Monitoring for Raptors

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.

BIO-MM#53: Conduct Surveys for Swainson's Hawk Nests

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 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 *Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley* (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 *Staff Report Regarding Mitigation for Impacts to Swainson’s Hawks (Buteo swainsoni) in the Central Valley of California* (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.

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:

- 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
- Support at least one Swainson’s hawk nesting territory in the last 5 years
- Contribute to regional conservation goals for agricultural and wildlife movement preservation where possible.

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 ratios:

- 1:1 for impacts on Primary Active Foraging Habitat
- 0.75:1 for impacts on Secondary Active Foraging Habitat
- 0.5:1 for impacts on Tertiary Active Foraging Habitat

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 *Staff Guidance Regarding Avoidance of Impacts to Tricolored Blackbird Breeding Colonies on Agricultural Fields in 2015* (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.

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 the HMP.

BIO-MM#58: Provide Compensatory Mitigation for Impacts on Waterfowl, Shorebird, and Sandhill Crane Habitat

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:

- 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.
- 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.

BIO-MM#59: Conduct Pre-Construction Surveys for San Joaquin Kit Fox

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' *San Joaquin Kit Fox Survey Protocol for the Northern Range* (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' *Standardized Recommendations for Protection of the Endangered San Joaquin Kit Fox prior to or during Ground Disturbance* (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.

BIO-MM#60: Implement San Joaquin Kit Fox Avoidance and Minimization Measures

The Authority will implement USFWS' *Standardized Recommendations for Protection of the San Joaquin Kit Fox Prior to or During Ground Disturbance* (USFWS 2011) to minimize impacts on this species, including:

- Disturbance of all kit fox dens will be avoided to the extent feasible.
- 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.
- 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.
- 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.
- 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.

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.

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 Biologist will oversee the installation, maintenance, and monitoring of WEF along the perimeter of the work area where adjacent to potentially suitable habitat.

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 *Survey Protocol for Determining Presence of San Joaquin Kangaroo Rats* (USFWS 2013b), or as otherwise provided pursuant to authorizations issued under the FESA and CESA.

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.

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.

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.

BIO-MM#65: Conduct Pre-Construction Surveys for Ringtail and Ringtail Den Sites and Implement Avoidance Measures

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 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.

BIO-MM#66: Conduct Pre-Construction Surveys for Dusky-Footed Woodrat and Implement Avoidance Measures

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:

- 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.

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.

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.

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.

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:

- Chemical vegetation control methods
- Mowing program consistent with Section 1415 of the FAST Act
- Other nonchemical vegetation control
- Other chemical pest control methods (e.g., insects, snail, rodent)

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.

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 Xerces Society Best Management Practices for Pollinators on Western Rangelands (Xerces Society 2018), conservation measures in the Nationwide Candidate Conservation Agreement for Monarch Butterfly on Energy and Transportation Lands (Cardno 2020), or other applicable sources.

BIO-MM#71: Restore Temporary Riparian Impacts

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).

BIO-MM#72: Provide Compensatory Mitigation for Permanent Impacts on Riparian Habitat

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.

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.

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:

- Purchase of credits from an agency-approved mitigation bank
- Preservation of aquatic resources through acquisition of property
- Establishment, restoration, or enhancement of aquatic resources
- In-lieu fee contribution determined through consultation with the applicable regulatory agencies

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:

- Vernal pools: 2:1
- Seasonal wetlands: between 1.1:1 and 1.5:1 based on impact type, function and values lost
 - 1:1 off-site for permanent impacts
 - 1:1 on-site and 0.1:1 to 0.5:1 off-site for temporary impacts
- All other wetland types: 1:1

- All non-wetland types: mitigated onsite at 1:1 or offsite 1:1 if onsite mitigation is not possible.

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:

- **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
- **Site selection**—A description of the factors considered during the term sustainability of the resource
- **Adaptive management plan**—A management strategy to address changes in site conditions or other components of the compensatory mitigation project
- **Financial assurances**—A description of financial assurances that will be provided to support success of the compensatory mitigation

Additional information required in a CMP as outlined in 33CFR 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.

BIO-MM#75: Implement Transplantation and Compensatory Mitigation for Protected Trees

Prior to ground-disturbing activities, the Project Biologist will conduct surveys in the work area to identify protected trees.

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.

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:

- Transplantation of protected trees to areas outside of the work area.
- Replacement of protected trees at an off-site location, based on the number of protected trees affected, at a 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.
- Contribution to a tree-planting fund.

The Authority will develop a native oak tree mitigation plan for oak trees that are transplanted or replaced. The oak tree mitigation plan will include the following:

- The number of affected oak trees and the number of transplanted and replaced native oak trees.
- A description of the mitigation site and reference site locations.
- A planting plan that includes planting acorns and understory species.
- A description of the success criteria that will be used to evaluate performance.

- 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.
- 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.
- A description of remedial actions that will be used if the success criteria are not met.

A description of financial assurances that will be provided to demonstrate that the funding to implement mitigation is assured.

BIO-MM#76a: Minimize Impacts on Wildlife Movement during Construction

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.

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 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.

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.

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.

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):

- Three- or four-strand wire design
- No more than 40 inches tall (to allow adult mammals to jump over)

- Bottom 18 inches off the ground (to allow animals to crawl under) (changes in topography such as gullies or dips can be used to provide this clearance distance)
- At least 12 inches between the top two wires
- Smooth top and bottom wires
- No vertical stays between posts; if stays are necessary, consider stiff plastic or composite stays
- Wood or steel posts at 16.5-foot intervals
- Gates, drop-downs, or other passage where wildlife can concentrate and cross
- Flagging or other measure to increase fence visibility (especially important for low-flying birds)

BIO-MM#76b: Minimize Impacts on Wildlife Movement in the Western Pacheco Pass Region

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.

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.

BIO-MM#77a: Design Wildlife Crossings to Facilitate Wildlife Movement

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:

- 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., within Coyote Valley). Directional fencing will be designed to benefit the greatest number of movement guilds feasible.
- Wildlife crossing width and height will be maximized and length minimized to the extent feasible.
- Native earthen bottom
- Avoid metal walls
- 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
- Design entrances to minimize light reflection from train lights
- 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 or permeable soils)
- 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
- 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 distance and absence of permanent physical obstacles between crossing and cover/habitat
- Separation from human use areas (e.g., trails, multiuse undercrossings, development)
- Avoidance of artificial light at approaches to wildlife crossings
- The addition of directional fencing in other important wildlife corridors (e.g., the western Pacheco Pass region) to funnel wildlife to crossing structures
- Consideration of habitat modification and/or habitat restoration at crossings to facilitate cover for crossing animals

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, 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.

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:

- A list of movement guild focal species for each wildlife crossing and hydrologic balancing features along the alignment
- 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
- A funnel fencing plan for wildlife crossing entrances/exits on the east side of Monterey Road in Coyote Valley
- Frequency of crossing design inspection

- A list of features to be inspected, criteria for passing inspection, and the response for failed inspection
- A description of how maintenance decisions will be informed by the wildlife crossing monitoring and adaptive management plan described below in BIO-MM#77b

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).

BIO-MM#77b: Monitoring and Adaptive Management of Wildlife Crossings

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:

- **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 wildlife movement monitoring to meet monitoring requirements outlined in the measure, provided the efforts are occurring within the same defined wildlife movement corridors.
- **Monitoring**—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. Additional monitoring associated with adaptive management will be confined to the location triggering the adaptive management and will not exceed 5 years.
- **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.
- **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.

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.

BIO-MM#78: Establish Wildlife Crossings at Embankment in West Slope of Pacheco Pass

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.

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 embankment, or trenched at the following locations:

- Crossing A: B3161+34: 120 feet long by 40 feet wide by 23 feet high.
- Crossing B: B3174+00: 120 feet long by 40 feet wide by 38 feet high
- Crossing C: B3197+00: 120 feet long by 40 feet wide by 38 feet high
- Crossing D: B3209+98: 120 feet long by 40 feet wide by 38 feet high

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.

BIO-MM#79a: Provide Wildlife Movement between the Santa Cruz Mountains and Diablo Range

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 between 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.

The extent of preservation or enhancement will provide for one of the following:

- 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
- 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 MOWF
- A combination of enhancement and protection where the implemented percentages of the above enhancement and preservation combine to 100 percent

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.

Preservation of natural or agricultural lands will be in perpetuity through either fee title acquisition or conservation easement.

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.

BIO-MM#79b: Provide Wildlife Movement between the Diablo Range and Inner Coast Range

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 Wildlife Crossing Structure Handbook (Clevenger and Huijser 2011), and consistent with guidelines within the Innovative Strategies to Reduce the Costs of Effective Wildlife Overpasses (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:

- 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
- 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.

BIO-MM#80: Minimize Permanent Intermittent Noise, Visual, and Train Strike Impacts on Wildlife Movement

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 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:

- Permanent hearing damage: 140 dBA or greater
- Temporary hearing damage: 93 dBA or greater but less than 140 dBA
- Masking: 84 dBA or greater but less than 93 dBA
- Arousal: 77 dBA or greater but less than 84 dBA

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:

- In the GEA IBA near Volta, between Stations B4550+00 and B4630+00
- In the UPR IBA (corresponding to the 10-year Pajaro River floodplain), between Stations B1932+00 and B2164+00

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. With the TDV, those same 17-foot-high noise barriers will be effective at reducing noise from trains going 220 mph (as they will for trains going 200 mph), but the area with noise above the thresholds will be somewhat larger than the alternatives without the TDV. As a result, the TDV will increase the acreage of different land cover types exposed to sound exceeding the thresholds as compared to the alternatives without the TDV.

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:

- Train performance
- Passenger comfort
- Fire-life-safety readiness and response
- Loading to viaduct girder structure and embankment foundation
- 100-year service life under suitable, acceptable maintenance practices and costs

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.

If structure designs in the UPR and GEA IBAs can be demonstrated through quantitative modeling to reduce 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.

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:

- In Coyote Valley to protect the wildlife crossings sited between Stations B0689+00 and B0704+00
- In upper Pacheco Creek between Stations B3254+70 and B3303+00
- At the crossing of the California Aqueduct at Stations B4248+00 to B4249+00

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.

The Authority will consult with CDFW, USFWS, 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

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):

- 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)
- 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)
- 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)
- 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
- All gates designed to prevent animal access
- 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

- Small, one-way exit flaps will be provided on each of the four fenced sections at each fence opening in Coyote Valley
- 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
- 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).

The success of exclusion fencing and crossings deterrents 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.

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 Measures to Reduce Road Impacts on Amphibians and Reptiles in California: Best Management Practices and Technical Guidance (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 Guidelines for Amphibian and Reptile Conservation during Road Building and Management Activities in British Columbia (Ministry of Environment and Climate Change Strategy 2020) when within the distances of occupied amphibian and reptile aquatic habitat described in the prior sentence.

BIO-MM#82: Minimize Permanent Intermittent Impacts on Aerial Species Wildlife Movement

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):

- Install pigeon wire or other features to discourage birds from perching on OCS throughout the project
- 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).
- Modify OCS poles to preclude bird entrapment in hollow poles (e.g., avoid the use of tubular poles or cap openings in all poles)
- Design aerial structures and tunnel portals to discourage bats from roosting in expansion joints or other crevices; light tunnel entrances

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 would 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 would be removed when the train is not in operation. This

measure would 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).

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.

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.

BIO-MM#85: Provide Compensatory Mitigation for Impacts on California Sycamore Woodland at the Pacheco Creek Open Space Regional Reserve

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 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-acre 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.

BIO-MM#86: Provide Compensatory Mitigation for Impacts on Monarch Butterfly Habitat

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:

- Purchase of credits from an agency-approved conservation bank
- Acquisition in fee title of USFWS-approved property
- Purchase or establishment of a conservation easement with an endowment for long-term management of the property-specific conservation values
- An in-lieu fee contribution determined through negotiation and consultation with the USFWS

- Contribution to monarch conservation and/or restoration initiatives in the project region (if available)

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.

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.

BIO-MM#87: Conduct Pre-Construction Surveys and Implement Avoidance and Minimization Measures for Mountain Lion Dens

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 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).

- **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.
- **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.

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.

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 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.

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):

- B670 to B1020 (Coyote Valley) and B1750 to B5335 (areas east of Gilroy)

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).

A.5 Referenced Mitigation Measures for Hydrology and Water Resources

HYD-MM#1: Prepare and Implement a Groundwater Adaptive Management and Monitoring Program

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.

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.

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:

- 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.
- Establish baseline groundwater and surface water hydrology conditions with data collection and in situ monitoring devices.
- 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.
- 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.
- 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 impact.
- 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.
- 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.

Goals, Objectives, and Review/Approval of GAMMP

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:

- Maintain water resource conditions during construction substantially like flows documented during pre-construction/baseline monitoring.
- Detect any material changes in conditions that may forewarn of conditions that have potential to affect groundwater and surface water resources.
- Avoid or minimize disruptions in public and private water supplies with adaptive management measures.

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).

Assessment, Modeling, and Monitoring Actions

Define Groundwater Study Area and Area of Potential Effects

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.

Baseline Inventory and Monitoring of Groundwater and Surface Water Resources

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 and groundwater resources within the groundwater study area, including but not limited to:

- 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.
- 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.
- Monitoring groundwater pressures within geotechnical bore holes and wells as well as monitoring of seeps and springs to collect information on flows.
- Typical responses of wells, springs, and seeps to seasonal changes and weather fluctuations.
- 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).

Groundwater Modeling

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 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.

Construction Monitoring

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:

- 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.
- 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.
- 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.
- 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.
- Compare minimum flow range of monitored resources to paired reference sites outside of construction influence to determine if factors, related or not related to construction, may be influencing trend (e.g., seasonal changes).
- 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.
- 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.
- Track groundwater recovery using pressure transducers or piezometers between the spring locations and increasing distance with the TBM that has passed a resource.
- Measure travel time through the system.
- Measure water quality parameters.
- Track groundwater and spring/seep flow recovery.
- Use of an on-site rainfall gaging station to correlate recovery of resources with rainfall quantities.

Post-Construction Monitoring

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.

- 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.
- 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.

Remedial Actions

Beneficial Reuse of Groundwater Inflows

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.

Adaptive Management Measures

Adaptive management measures will be implemented to remedy observed impacts on water supplies.

Adaptive Management Triggers

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; 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.

Notifications and Hotline

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.

Pre-Tunneling Supplemental Water Infrastructure Provision

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.

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. 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.

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.

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.

Adaptive Management Measures

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:

Additional Monitoring and Engineering Controls to Minimize Groundwater Inflows

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.

Upgrade Existing Water Supply Wells and/or Provide Supplemental Water

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 would:

- 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 as necessary during the time period required to modify the well equipment.
- 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.
- 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.
- 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.
- 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 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.

Provide Supplemental Water Outside of Area of Predicted Effects

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 would:

- 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.

- 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.
- 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.
- 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).
- 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.
- 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 long-term measure is implemented, as discussed in the following items.

Reporting Actions

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.

- 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.
- 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.
- 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.
- Prepare and publish quarterly post-construction monitoring reports to document recovery of water resources once the tunnels are complete.
- 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 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.

A.6 Referenced Mitigation Measures for Hazardous Materials and Wastes

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. No secondary impacts are assumed with proper implementation of this mitigation measure.

A.7 Referenced Mitigation Measures for Safety and Security

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 City of San Jose for the implementation of this improvement.

This mitigation measure will apply to areas of San Jose where EVP is not already in place, and in Morgan Hill and Gilroy.

SS-MM#4: Install Emergency Vehicle Response Improvements

This measure includes three components:

- San Jose Diridon Station Area: Emergency Vehicle Priority Plan and priority treatments
- Downtown Gilroy Station Area Emergency Vehicle Priority Plan and priority treatments; and
- At-Grade Crossing Emergency Vehicle Priority Treatment Plan and associated improvements

San Jose Diridon Station Area

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.

Downtown Gilroy Station Area

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.

At-Grade Crossings

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, the Authority will develop an Emergency Vehicle Priority Treatment Plan in conjunction with local agencies. 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.

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.

Travel time data will be collected at the following intervals:

- 1 year prior to initiation of new HSR service to establish a baseline travel time for each corridor,
- Monthly for the first 6 months of initial operations and annually thereafter for 3 years, and
- Starting approximately 6 months after initiation of any new HSR service, and annually thereafter for 3 years

Travel time data will be collected at the following at-grade crossing locations:

- Branham Avenue (San Jose)
- Chynoweth Avenue (San Jose)
- Skyway Drive (San Jose)
- Blanchard Road (San Jose)
- Palm Avenue (San Jose)
- Live Oak Avenue (Morgan Hill)
- East Main Street (Morgan Hill)
- East Dunne Avenue (Morgan Hill)
- San Pedro Avenue (Morgan Hill)
- Tennant Avenue (Morgan Hill)
- East Middle Avenue (Morgan Hill)
- San Martin Avenue (San Martin)
- Church Avenue (Gilroy)
- Masten Avenue (Gilroy)
- Rucker Avenue (Gilroy)
- Buena Vista Avenue (Gilroy)
- Cohansey Avenue (Gilroy)
- Las Animas Avenue (Gilroy)
- Leavesley Road (Gilroy)
- IOOF Avenue (Gilroy)
- Lewis Street (Gilroy)

- Martin Street (Gilroy)
- 6th Street (Gilroy)
- 7th Street (Gilroy)
- 10th Street (Gilroy)

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 after initiation of HSR service. The performance standard for the plan is to 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.

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:

- EVP equipment at roadway traffic signals
- Route-based roadway traffic signal priority control systems
- Emergency vehicle and transit queue bypass lanes at roadway intersections
- Roadway capacity and operational improvements to facilities paralleling the rail line to improve access to adjacent grade-separated rail crossings
- 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, 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)
- 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
- Increase in contracted first responder ambulance services to reduce first responder ambulance response times in affected areas

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 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.

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.

As noted above, if cities choose not to implement and operate emergency vehicle priority treatments using construction funds provided by the Authority, impacts would be considered significant and unavoidable. In that case, some of the site-specific traffic mitigation measures identified in Section 3.2 would 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 would affect emergency vehicle response times due to increased gate-down time. The following traffic mitigation measures would help to reduce peak hour traffic delays at intersections adjacent to or near at-grade crossings with significant emergency vehicle response time delays.

- TR-MM#1e: Monterey Road/Chynoweth Avenue-Roeder Road—Widen and Reconfigure
- TR-MM#1t: Monterey Road/San Martin Avenue—Restripe Southbound Approach
- TR-MM#1u: Monterey Road/IOOF Avenue—Widen and Reconfigure Southbound Approach
- TR-MM#1w: Chestnut Street/Luchessa Street—Reconfigure Southbound Approach
- TR-MM#1x.6: East Main Avenue/Depot Street—Install Traffic Signal
- TR-MM#1x.8: Llagas Road/San Martin Avenue—Install Traffic Signal
- TR-MM#1x.9: School Access/IOOF Avenue—Install Traffic Signal
- TR-MM#1x.10: SR 25/Bloomfield—Install Traffic Signal

Although these traffic mitigation measures would help to address traffic delays at adjacent or nearby intersections, they would 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 would remain significant and unavoidable.

A.8 Referenced Mitigation Measures for Socioeconomics and Communities

SO-MM#1: Implement Measures to Reduce Impacts Associated with Residential Displacement

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.

This measure applies only to the areas of insufficient residential relocation availability as follows:

- **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.

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.

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. Where relocation to existing residential units occurs, this will not require ground-disturbing activities that would result in secondary environmental impacts. Where relocation will include movement of homes to new sites or construction of suitable replacement facilities, this will only be done where determined suitable by local land use authorities and where it can be completed without resulting in significant secondary environmental impacts. The Authority, as a condition of providing funding, will require implementing partners to implement relevant IAMFs and direct mitigation measures discussed in this EIR/EIS.

A.9 Referenced Mitigation Measures for Agricultural Farmland

AG-MM#1: Conserve Important Farmland (Prime Farmland, Farmland of Statewide Importance, Farmland of Local Importance, and Unique Farmland)

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.

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.

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.

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 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 design-build 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.

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 the feasibility of a viaduct in this location, during preliminary engineering for design-build 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.

A.10 Referenced Mitigation Measures for Parks, Recreation, and Open Space

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. 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.

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. The activities will be incorporated into the design specifications and will be a pre-condition requirement.

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. The activities will be incorporated into the design specifications and will be a pre-condition requirement.

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.

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 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.

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.

- AQ-MM#1: Implement Additional On-Site Emissions Controls to Reduce Fugitive Dust
- AQ-MM#2: Offset Project Construction Emissions in the San Francisco Bay Area Air Basin
- AQ-MM#4: Offset Project Construction Emissions in the San Joaquin Valley Air Basin
- BIO-MM#80: Minimize Permanent Intermittent Noise, Visual, and Train Strike Impacts on Wildlife Movement
- NV-MM#1: Construction Noise Mitigation Measures
- NV-MM#2: Construction Vibration Mitigation Measures
- NV-MM#3: Implement Proposed California High-Speed Rail Project Noise Mitigation Guidelines
- NV-MM#4: Support Potential Implementation of Quiet Zones by Local Jurisdictions
- NV-MM#8: Project Vibration Mitigation Measures
- SS-MM#2: Construct Temporary Access Roads and Driveways for Morgan Hill Charter School

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.

A.11 Referenced Mitigation Measures for Aesthetics and Visual Quality

AVQ-MM#1: Minimize Visual Disruption from Construction Activities

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:

- Minimize pre-construction clearing to that necessary for construction.
- Limit the removal of buildings to those that will conflict with project components.
- Where possible, preserve existing vegetation, particularly vegetation along the edge of construction areas that may help screen views.
- 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.
- 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.

The contractor will submit the technical memorandum to the Authority for review and approval.

AVQ-MM#2: Minimize Light Disturbance during Construction

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.

The contractor will submit the technical memorandum to the Authority for review and approval.

AVQ-MM#4: Provide Vegetation Screening along At-Grade and Elevated Guideways Adjacent to Residential Areas

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, 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.

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.

AVQ-MM#5: Replant Unused Portions of Lands Acquired for the HSR

Prior to operations and maintenance, the contractor would 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 would 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 would be replaced with similar vegetation that, at maturity, would be similar in size and character to the removed vegetation. Replaced shrubs would be minimum 5-gallon planter size, and trees would be minimum 24-inch box and 8 feet in height. The Authority would provide for continuous maintenance with appropriate irrigation systems. The contractor would install the irrigation system within the planting areas. No species listed by the Invasive Species Council of California would be planted.

AVQ-MM#6: Screen Traction Power Distribution Stations and Radio Communication Towers

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.

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 jurisdiction. None of the mitigation measure options is expected to result in secondary impacts. 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.

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.

A.12 Referenced Mitigation Measures for Cultural Resources

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

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:

- The Authority will consult with the MOA signatories and concurring parties to determine the preferred treatment of the properties/resources and appropriate mitigation measures.
- 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).

- 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.
- 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.
- 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.

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

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 contractor, 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.

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.

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.

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 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 would, 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).

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.

CUL-MM#3: Other Mitigation for Effects on Pre-Contact Archaeological Sites

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.

Access to previously inaccessible properties to complete the archaeological resource identification effort is expected to be available after the ROD, during the design-build 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.

The MOA and ATP include protocols for the identification, evaluation, treatment, and data-recovery mitigation of as-yet-unidentified archaeological resources. Efforts to develop meaningful mitigation measures for effects on as-yet-unidentified 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.

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 consultation with the SHPO, MOA signatories, and concurring parties. Such documentation will follow the appropriate guidance for the recordation format and program selected.

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.

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.

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.

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 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.

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.

CUL-MM#10: Station Design Consistent with the Secretary of the Interior's Standards for the Treatment of Historic Properties

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.

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 Authority's professionally qualified staff will review and approve selected professionals' qualifications.

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.