

APPENDIX D: MITIGATION MONITORING AND ENFORCEMENT PLAN

Merced to Fresno Section: Central Valley Wye

Mitigation Monitoring and Enforcement Plan

September 2020



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California High-Speed Rail Project

Merced to Fresno Section: Central Valley Wye



Mitigation Monitoring and Enforcement Plan

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1 Introduction

In August 2020, the California High-Speed Rail Authority (Authority), as the state lead agency and as the federal lead agency pursuant to the National Environmental Policy Act (NEPA) Assignment Memorandum of Understanding (July 23, 2019), prepared a Final Supplemental Environmental Impact Report (EIR)/Environmental Impact Statement (EIS) (Final Supplemental EIR/EIS) for the Merced to Fresno Section: Central Valley Wye of the California High-Speed Rail (HSR) Project (Project). The Final Supplemental EIR/EIS satisfies the requirements of the California Environmental Quality Act (CEQA) and NEPA and has been prepared to support a proposed Board action selecting the SR 152 (North) to Road 11 Wye Alternative. This alternative will extend approximately 51 miles through Merced and Madera Counties and will follow the existing Henry Miller Road and SR 152 rights-of-way as closely as practicable in the east-west direction and the Road 11, SR 99, and BNSF rights-of-way in the north-south direction.

This Mitigation Monitoring and Enforcement Plan (MMEP)¹ has been prepared for the Merced to Fresno Section: Central Valley Wye of the HSR Project. This MMEP supplements the MMEP for the Merced to Fresno Section, originally approved in 2012 and as subsequently amended. This MMEP applies to the implementation of the SR 152 (North) to Road 11 Wye portion of the Merced to Fresno Section. For purposes of this MMEP, the SR 152 (North) to Road 11 Wye portion of the Merced to Fresno Section is referred to as the “Preferred Alternative.” References to the “Project” herein may also refer to the Merced to Fresno Section as a whole or to the entire California High-Speed Rail System.

Table 1 of this MMEP describes mitigation measures that will mitigate the adverse environmental impacts of the Preferred Alternative. These measures were developed by the Authority in consultation with appropriate agencies, as well as input from the public, to meet the requirements of CEQA and NEPA. The mitigation measures in Table 1 are conditions of approval that the Authority is required to comply with as it implements the Preferred Alternative.

The Preferred Alternative incorporates impact avoidance and minimization features (IAMFs) including best management practices (BMPs) identified in the Final Supplemental EIR/EIS and described in detail in the technical reports that support the environmental document. As a result of incorporating these IAMFs, the Preferred Alternative will avoid potential adverse environmental impacts in several resource areas, including air quality and global climate change; noise and vibration; biological resources and wetlands; hazardous materials and wastes; land use and development; agricultural farmland; parks, recreation, and open space; aesthetics and visual resources; and cultural resources. In addition, the regulatory requirements, including permitting and coordination with regulatory agencies, for many project-related activities provide additional assurance that potential adverse environmental impacts will not occur. Three cooperating agencies are part of the NEPA review process: the U.S. Army Corps of Engineers (USACE), U.S. Bureau of Reclamation, and Surface Transportation Board (STB). As part of the CEQA process, the responsible agencies include the California Department of Fish and Wildlife (CDFW), Caltrans, the California Public Utilities Commission, the California State Lands Commission, the Central Valley Regional Water Quality Control Board, the Central Valley Flood Protection Board, and the San Joaquin Valley Air Pollution Control District (SJVAPCD). Like the mitigation measures listed in Table 1, the project IAMFs and compliance with regulatory requirements are a condition of approval and must be implemented by the Authority during design, construction, and operation of the Preferred Alternative.

The IAMFs that are part of the Preferred Alternative are listed in Table 2, and they are described in Appendix 2-B, California High-Speed Rail: Impact Avoidance and Minimization Features of the Final Supplemental EIR/EIS. The laws and orders the Preferred Alternative are subject to are described for the following resource areas in more detail in the corresponding sections of Chapter 3 of the Final Supplemental EIR/EIS.

- Transportation – Section 3.2.2
- Air Quality and Global Climate Change – Section 3.3.2
- Noise and Vibration – Section 3.4.2
- Electromagnetic Fields and Electromagnetic Interference – Section 3.5.2
- Public Utilities and Energy – Section 3.6.2
- Biological Resources and Wetlands – Section 3.7.2
- Hydrology and Water Resources – Section 3.8.2
- Geology, Soils, Seismicity, and Paleontological Resources – Section 3.9.2
- Hazardous Materials and Wastes – Section 3.10.2
- Safety and Security – Section 3.11.2
- Socioeconomics and Communities – Section 3.12.2
- Land Use and Development – Section 3.13.2
- Agricultural Farmland – Section 3.14.2
- Parks, Recreation, and Open Space – Section 3.15.2
- Aesthetics and Visual Resources – Section 3.16.2
- Cultural Resources – Section 3.17.2
- Regional Growth – Section 3.18.2
- Cumulative Impacts – Section 3.19.2

The MMEP adheres to the Council on Environmental Quality’s (CEQ) regulations (40 Code of Federal Regulations Section 1505) and Federal Railroad Administration Procedures for Considering Environmental Impacts (64 Federal Register 28545, May 26, 1999) and was prepared based on the CEQ finalized guidance entitled *Appropriate Use of Mitigation and Monitoring and Clarifying the Appropriate Use of Mitigated Findings of No Significant Impact* (CEQ January 14, 2011). The CEQ guidance assists NEPA lead agencies to develop mitigation programs that provide effective documentation, implementation, and monitoring of mitigation commitments.

¹ The MMEP is consistent with CEQA requirements for mitigation monitoring as set forth in Section 15097 of the CEQA Guidelines (Title 14 California Code of Regulations, Division 6, Chapter 3).

2 Mitigation Monitoring and Enforcement Plan

The environmental effects of the Preferred Alternative will result in impacts considered significant under CEQA and in impacts under NEPA. Mitigation measures that will reduce or eliminate potential adverse environmental impacts are described in Chapter 3 of Volume 1 of the Final Supplemental EIR/EIS. The specific provisions contained in this MMEP are presented as a table and include mitigation measures identified in the Final Supplemental EIR/EIS, organized by environmental issue and topical areas addressed in the Final Supplemental EIR/EIS. In collaboration with the appropriate agencies, the Authority may refine the means by which it will implement a mitigation measure, as long as the alternative means would ensure compliance during implementation. This MMEP describes implementation and monitoring procedural guidance, responsibilities, and timing for each mitigation measure identified in the Final Supplemental EIR/EIS. Components include:

Significant Impact: Provides the impact expected to occur from the Preferred Alternative as identified in the Final Supplemental EIR/EIS.

Mitigation Measure(s): Provides the mitigation measure and monitoring requirements as identified in the Final Supplemental EIR/EIS.

Implementing Party/Monitoring/Reporting Party: Identifies the entity that will be responsible for directly implementing the mitigation measures, monitoring, and reporting. Implementation can be the responsibility of the Authority or its Design-Build Contractor (Contractor). Monitoring will generally be the responsibility of the Contractor, with oversight provided by the Authority during construction. Long-term mitigation monitoring will be the responsibility of the Authority. The following roles are utilized in the text of mitigation measures in this MMEP.

Mitigation Timing (Implementation Schedule/Reporting Schedule): Not all mitigation actions will occur at the same time. Depending upon the measure, it may be undertaken prior to construction, during construction, or during project operations. Measures may also be undertaken in conjunction with different construction packages or at such time as project operations reach a certain level. The "Phase" and "Action" columns of the table respectively identify the stage of the project during which the mitigation action will be taken and when reporting is to occur, if reporting is required.

Implementation Mechanism: Identifies the actions required to implement the measures, including any required agreements and/or conditions.

Roles and Responsibilities

As the lead agency and proponent of this Project, the Authority will implement the mitigation measures through its own actions, those of its Contractors, and actions taken in cooperation with other agencies and entities. The Authority is ultimately accountable for the overall administration of the MMEP and for assisting relevant individuals and parties in their oversight and reporting responsibilities. The responsibilities of mitigation implementation, monitoring, and reporting extended to several entities as discussed above; however, the Authority will bear the primary responsibility for verifying that the mitigation measures are implemented. The Authority defines the mitigation measures required for the Project. When work is undertaken by the Authority's contractor, the Contractor shall implement the mitigation measures that are pertinent to its scope of work. The Contractor shall monitor construction activities to ensure that the mitigation measures are being properly implemented and accurately report its activity and results to the Authority. The Authority will periodically check the Contractor's activity, reports, and effectiveness of mitigation activities.

- **Authority:** While the Authority retains responsibility for the implementation and reporting on mitigation measures and IAMFs as specified in this MMEP, activities may be carried out by an Authority representative or an Authority-approved contractor. Authority responsibilities may also include certain measures outside of the scope of the Design-Build Contractor such as future studies or operations-phase implementation. In addition, oversight of implementation and reporting may be provided by Authority contractor or representatives as lead agency representatives to facilitate regulatory oversight agency coordination and compliance during implementation and reporting.
- **Contractor:** The Design-Build Contractor (or the environmental team provided by the Design-Build Contractor) will be responsible for implementing or monitoring mitigation measures and IAMFs as specified in this MMEP.
- **Mitigation Manager:** The Design-Build Contractor's representative responsible for overseeing their environmental team's implementation and reporting of environmental commitments reports the status of each mitigation measure to Authority in accordance with this MMEP.
- **Biological Monitor(s):** The Design-Build Contractor-provided Biological Monitor(s) will be approved by and report directly to the Contractor's Biologist. The Biological Monitor(s) will be present onsite within a reasonable monitoring distance during all ground-disturbing activities that have the potential to affect biological resources as directed by the Project Biologist and will be the principal agent(s) in the direct implementation of the MMEP and compliance assurance.
- **Cultural Resources Compliance Manager/Principal Investigator:** This position must be an Archaeologist who meets relevant Secretary of the Interior qualifications for an archaeologist. The Cultural Resources Compliance Manager/Principal Investigator is responsible for implementing mitigation measures in compliance with the terms and conditions outlined in the MMEP and treatment plans, and coordinating the status of archaeological mitigation with the Authority in accordance with this MMEP, the Authority's Programmatic Agreement with the California SHPO, and the Merced to Fresno Memorandum of Agreement.
- **Cultural Resources Monitor(s):** The Design-Build Contractor-provided Cultural Resources Monitor(s) will be approved by and report directly to the Cultural Resources Compliance Manager/Principal Investigator. This/these Monitor(s) will be present onsite within a reasonable monitoring distance during ground-disturbing activities in areas indicated as culturally sensitive and will be the principal agent(s) in the direct implementation of the MMEP and compliance assurance as directed by the Cultural Resources Compliance Manager/Principal Investigator.
- **Paleontological Resources Specialist:** The Design-Build Contractor-provided Paleontological Resources Specialist is responsible for implementing mitigation measures in compliance with the terms and conditions outlined in the MMEP, including preparation of the Paleontological Resources Management Plan and approval and direction of the Paleontological Resource Monitor(s).
- **Paleontological Resources Monitor(s):** The Design-Build Contractor-provided Paleontological Resources Monitor(s) will be approved by and report directly to the Paleontological Resources Specialist. The Paleontological Resources Monitor(s) will be present onsite within a reasonable monitoring distance during ground-disturbing activities in areas indicated as resource sensitive and will be the principal agent(s) in the direct implementation of the MMEP and compliance assurance as directed by the Paleontological Resources Specialist.

3 Environmental Mitigation Management and Assessment (EMMA) System

The Authority will implement an Environmental Mitigation Management and Assessment (EMMA) system consisting of strategic planning, policies, and procedures, organizational structure, staffing and responsibilities, milestones, schedule, and resources devoted to achieving the Authority's environmental commitments. The EMMA will also include a component that tracks the implementation of mitigation measures (as well as environmental commitments, BMPs, and IAMFs) and can produce reports on compliance. Authority staff will receive periodic reports on compliance and may request additional reports as necessary to ensure that the MMEP is fully implemented. This system will rely on data provided by the Design-Build Contractor, its consultants, and others to produce status reports regarding construction status, permitting activities, monitoring, inspections, and other compliance activities.

Table 1 Merced to Fresno Section: Central Valley Wye: Mitigation Monitoring and Enforcement Plan

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
Air Quality and Global Climate Change										
AQ-MM#1	Reduce Criteria Exhaust Emissions from Construction Equipment	Prior to issuance of construction contracts, the Authority will incorporate the following construction equipment exhaust emissions requirements into the contract specifications: All heavy-duty off-road construction diesel equipment used during the construction phase will use the cleanest reasonably available equipment (including newer equipment or tailpipe retrofits), but in no case less clean than the average fleet mix for the current calendar year, as set forth in CARB's OFFROAD 2011 database, and no less than a 40 percent reduction compared to a Tier 2 engine standard for NO _x emissions. The contractor will document efforts undertaken to locate newer equipment (such as, in order of priority, Tier 4, Tier 3, or Tier 2 equipment) or tailpipe retrofit equivalents. The contractor will provide documentation to the Authority of such efforts, including correspondence with at least two construction equipment rental companies. A copy of each unit's certified tier specification and any required CARB or air pollution control district operating permit will be made available by the Authority at the time of mobilization of each piece of equipment. The contractor will keep a written record (supported by equipment-hour meters where available) of equipment usage during Central Valley Wye alternatives construction for each piece of equipment. The contractor will provide the Authority with monthly reports of equipment operating hours (through the EMMA system) and annual reports documenting compliance.	Pre-construction	Contract requirements; Compliance reporting	Monthly and annually	Contractor	Contractor	Daily record keeping and monthly/annual reporting	A copy of each unit's certified tier specification and any required CARB or air pollution control district operating permit will be made available by the Authority at the time of mobilization of each piece of equipment	Impact AQ#1: Temporary Direct Impacts on Air Quality within the SJVAB Impact AQ#2: Temporary Direct Impacts on Implementation of an Applicable Air Quality Plan
AQ-MM#2	Reduce Criteria Exhaust Emissions from On-Road Construction Equipment	Prior to issuance of construction contracts, the Authority will incorporate the following material hauling truck fleet mix requirements into the contract specifications: All on-road trucks used to haul construction materials, including fill, ballast, rail ties, and steel, will consist of an average fleet mix of equipment model year 2010 or newer, but no less than the average fleet mix for the current calendar year as set forth in CARB's EMFAC2014 database. The contractor will provide documentation to the Authority of efforts to secure such a fleet mix. The contractor will keep a written record of equipment usage during construction of the Central Valley Wye alternatives for each piece of equipment and provide the Authority with monthly reports of vehicle miles traveled (through the EMMA system) and annual reports documenting compliance.	Pre-construction	Contract requirements; Compliance reporting	Monthly and annually	Contractor	Contractor	Monthly and annual reporting	Contract requirements and specifications	Impact AQ#1: Temporary Direct Impacts on Air Quality within the SJVAB Impact AQ#2: Temporary Direct Impacts on Implementation of an Applicable Air Quality Plan
AQ-MM#3	Reduce the Potential Impact of Concrete Batch Plants	Prior to construction of any concrete batch plant, the contractor will provide the Authority with a technical memorandum documenting consistency with the Authority's concrete batch plant siting criteria and utilization of typical control measures. Concrete batch plants will be sited at least 1,000 feet from sensitive receptors, including daycare centers, hospitals, senior	Pre-construction	Design measures; Compliance technical memorandum	Weekly	Contractor	Contractor	Weekly reporting	Contract requirements and specifications	Impact AQ#1: Temporary Direct Impacts on Air Quality within the SJVAB Impact AQ#2: Temporary Direct Impacts on

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		care facilities, residences, parks, and other areas where people may congregate. The concrete batch plant will utilize typical control measures to reduce fugitive dust, such as water sprays, enclosures, hoods, curtains, shrouds, movable and telescoping chutes, central dust collection systems and other suitable technology, to reduce emissions to be equivalent to the USEPA AP-42 controlled emission factors for concrete batch plants. The contractor will provide to the Authority documentation that each batch plant meets this standard during operation.								Implementation of an Applicable Air Quality Plan
AQ-MM#4	Offset Project Construction Emissions through an SJVAPCD Voluntary Emission Reduction Agreement (VERA)	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, PM ₁₀ , and PM _{2.5} from the entire HSR Project within the SJVAB. 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 shall enter into a VERA with the SJVAPCD 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.	Pre-construction	Reporting; Funding	Weekly	Authority	Contractor	Weekly reporting	Pursuant to the MOU, the Authority shall enter into a VERA (or modify the existing VERA) with the SJVAPCD to cover the portion of the project approved and funded for construction within the SJVAB	Impact AQ#1: Temporary Direct Impacts on Air Quality within the SJVAB Impact AQ#2: Temporary Direct Impacts on Implementation of an Applicable Air Quality Plan
AQ-MM#5	Purchase Offsets and Off-Site Emission Mitigation for Emissions Associated with Hauling Ballast Material in Certain Air Districts	By January 31 of each calendar year, the Contractor will inform the Authority through the submittal of a technical memorandum of any planned hauling of ballast material from quarries outside the SJVAB and if the hauling activities result in the exceedance of the annual applicable general conformity threshold(s) or local air basin CEQA threshold(s) for NO _x . To determine whether an exceedance will occur based on actual hauling activities, the Authority will at the beginning of each calendar year or as soon as practicable thereafter to obtain the most up-to-date information, based on actual or projected contractor-specific information about hauling in the Mojave AQMD, South Coast AQMD and Bay Area AQMD, and calculate for the next calendar year using the same methodology used in this EIR/EIS the expected NO _x emissions from hauling activities in those districts. If, based on that calculation, exceedance of the applicable NO _x threshold(s) is anticipated to occur in that next calendar year, the Authority will secure from the appropriate air district(s) or other appropriate source the production or generation of a sufficient quantity of NO _x offsets for that calendar year necessary to achieve conformity (in the case of exceedance of general conformity thresholds) and/or to result in net NO _x generation below the applicable CEQA threshold(s). At a minimum, sufficient mitigation/offsets will be secured so they are generated in the year of impact or as otherwise permitted by 40 C.F.R. Part 93 Section 93.163.	Pre-construction/ Construction	Reporting (technical memorandums); Funding	Weekly	Contractor and Authority	Contractor and Authority	Weekly reporting	Authority to coordinate the purchase of offsets with pertinent AQMDs per contractor reports	Impact AQ#3: Temporary Indirect Impacts on Air Quality outside the SJVAB

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
Noise and Vibration										
NV-MM#1	Construction Noise Mitigation	<p>Prior to construction (any ground-disturbing activities), the contractor will prepare a noise-monitoring program for Authority approval. The noise-monitoring program shall describe how during construction the contractor will monitor construction noise to verify compliance with the noise limits (an 8-hour Leq, 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. This can be done by either prohibiting certain noise-generating activities during nighttime hours or providing additional noise control measures to meet the noise limits. In addition, the noise-monitoring program will describe the actions required of the contractor to meet required noise limits. These actions will include the following nighttime and daytime noise control mitigation measures, as necessary:</p> <ul style="list-style-type: none"> ▪ Install a temporary construction site sound barrier near a noise source. ▪ Avoid nighttime construction in residential neighborhoods. ▪ Locate stationary construction equipment as far as possible from noise-sensitive sites. ▪ Re-route construction truck traffic along roadways that would cause the least disturbance to residents. ▪ During nighttime work, use smart back-up 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 moveable sound barriers at the source of the construction activity. 	Construction	Reporting	Weekly	Contractor	Contractor	Weekly Reporting	Contract requirements and specifications	<p>Impact NV#1: Temporary Exposure of Sensitive Receptors to Construction Noise</p> <p>Impact BIO#24: Indirect Impacts on Wildlife Movement Corridors</p>

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<ul style="list-style-type: none"> Limit or avoid certain noisy activities during nighttime hours. To mitigate noise related to pile driving, the use of an auger to install the piles instead of a pile driver would 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 Section 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 shall 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 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	Additional Noise Analysis during Final Design	During final design and prior to construction, the Authority will review the Central Valley Wye Noise and Vibration Technical Report. If final design or final vehicle specifications result in changes to the assumptions underlying the analysis in that report, the Authority will prepare additional environmental analysis, as required by CEQA and NEPA, to reassess noise impacts and potential mitigation.	Pre-construction/ Design	Reporting	Final design and prior to construction	Authority	Authority	Final design and prior to construction	Submit assessment and if required, supplemental environmental documentation	Impact NV#5: Intermittent Permanent Exposure of Sensitive Receptors to Noise from Operations Impact SO#18: Permanent impacts on Children's Health and Safety (Rail Operations)
NV-MM#3	Implement Proposed California High-Speed Rail Project Noise and Vibration Mitigation Guidelines	<p>Various options exist to address the potentially severe noise effects from high-speed trains. With input from local jurisdictions and balancing technological factors, such as structural and seismic safety, cost, number of affected receptors, and effectiveness, mitigation measures will be selected and implemented. The mitigation measure or suite of mitigation measures for severe noise impacts shall be designed to reduce the noise level from HSR operations from severe to moderate according to the provisions of the FRA noise and vibration manual (FRA 2012). The noise guidelines include the following mitigation measures:</p> <p>Building Sound Insulation If sound barriers are not proposed or do not reduce sound levels to below a severe impact level, building sound insulation can be installed. Sound insulation of residences and institutional buildings to improve the outdoor-to-indoor</p>	Pre-construction/ Construction/ Post-construction	Reporting	Weekly	Authority	Authority	Ongoing weekly monitoring during construction, and post-construction monitoring as needed to assess damage to buildings	Contract requirements and specifications; Noise and vibration mitigation guidelines	Impact NV#4: Permanent Traffic-Generated Noise from Realigned State Highways and Local Roads Impact NV#5: Intermittent Permanent Exposure of Sensitive Receptors to Noise from Operations Impact SO#8: Permanent impacts on Children's Health and Safety (Project-Related Roadway Changes) Impact SO#18:

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<p>noise reduction is a mitigation measure that can be considered when the use of sound 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 sound 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. Performance criteria would be established to balance existing noise events and ambient noise conditions as factors for determining mitigation measures.</p> <p>Noise Easements</p> <p>If a substantial noise reduction cannot be completed through the installation of sound barriers or building sound insulation, the Authority can acquire easements on properties severely affected by noise. This entails the establishment of an agreement between the Authority and the property owner wherein the Authority compensates the property owner for an easement that would encompass the property boundaries to the right-of-way of the rail line. In return, the property owner would accept the future noise conditions and release their right to petition the Authority regarding the noise level and subsequent disruptions. This approach would only be offered in isolated cases where other mitigation options are ineffective, infeasible, impractical, or too costly.</p>								Permanent impacts on Children's Health and Safety (Rail Operations)
NV-MM#4	Vehicle Noise Specification	In the procurement of an HSR vehicle technology, the Authority will require bidders to meet the federal regulations (40 C.F.R. 201.12/13) at the time of procurement for locomotives (currently a 90-dBA level standard) and rail cars (currently a 93-dBA level standard for cars operating at speeds of greater than 45 mph). Depending on the available technology, this could substantially reduce HSR noise levels during operation throughout the corridor.	Pre-construction/ Construction/ Post-construction	Reporting	Weekly	Authority	Authority	Ongoing weekly monitoring during construction, and post-construction monitoring as needed	Contract requirements and specifications; Noise and vibration mitigation guidelines	Impact NV#5: Intermittent Permanent Exposure of Sensitive Receptors to Noise from Operations
Biological Resources and Wetlands										
BIO-MM#1a	Establish Environmentally Sensitive Areas, Wildlife Exclusion Fencing, and Non-Disturbance Zones	Prior to any ground-disturbing activity in a Work Area, the Project Biologist will use flagging to mark ESAs that support special-status species or aquatic resources and are subject to seasonal restrictions or other avoidance and minimization measures. The Project Biologist will also direct the installation of WEF to prevent special-status wildlife species from entering Work Areas. The WEF will have exit doors to allow animals that may be inside an enclosed area to leave the area. The Project Biologist will also direct the installation of construction exclusionary fencing (exclusionary fencing) at the boundary of the Work	Pre-construction/ Construction	Identify and establish ESAs, WEF, and construction exclusionary fencing	In accordance with reporting schedule established by agency permit requirements	Contractor	Contractor	In accordance with reporting schedule established by agency permit requirements	Condition of design-build contract	<p>Impact BIO#1: Direct Impacts on Special-Status Plant Species</p> <p>Impact BIO#2: Indirect Impacts on Special-Status Plant Species and Other Native Plants</p> <p>Impact BIO#3:</p>

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<p>Area, as appropriate, to avoid and minimize impacts on special-status species or aquatic resources outside of the Work Area during the construction period. The ESAs, WEF, and exclusionary fencing will be delineated by the Project Biologist based on the results of habitat mapping or modeling and any pre-construction surveys, and in coordination with the Authority. The ESAs, WEF, and exclusionary fencing will be regularly inspected and maintained by the Project Biologist.</p> <p>The ESAs, 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 ESAs and WEF areas will be noted during worker tailgate sessions.</p>								<p>Direct Impacts on Special-Status Wildlife—Invertebrates</p> <p>Impact BIO#7: Direct Impacts on Special-Status Wildlife—Amphibians</p> <p>Impact BIO#9: Direct Impacts on Special-Status Wildlife—Reptiles</p> <p>Impact BIO#11: Direct Impacts on Special-Status Wildlife—Birds</p> <p>Impact BIO#13: Direct Impacts on Special-Status Wildlife—Mammals</p> <p>Impact BIO#14: Indirect Impacts on Special-Status Wildlife—Mammals</p> <p>Impact BIO#15: Direct Impacts on Special-Status Plant Communities</p> <p>Impact BIO#16: Indirect Impacts on Special-Status Plant Communities</p> <p>Impact BIO#17: Direct Impacts on Jurisdictional Aquatic Resources</p> <p>Impact BIO#21: Direct Impacts on Essential Fish Habitat</p>
BIO-MM#1b	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.	Construction	Compliance Report	Monthly or at other appropriate interval	Contractor	Contractor	In accordance with reporting schedule established by agency permit requirements	Condition of design-build contract	<p>Impact BIO#1: Direct Impacts on Special-Status Plant Species</p> <p>Impact BIO#2: Indirect Impacts on Special-Status Plant Species and Other Native Plants</p>

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<p>Pre-activity survey reports will be submitted within 15 days of completing the surveys and will include:</p> <ul style="list-style-type: none"> 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. <p>Daily Compliance Reports will be submitted to the Authority via EMMA within 24 hours of each monitoring day. Noncompliance events will be reported to the Authority the day of the occurrence. Daily Compliance Reports will include:</p> <ul style="list-style-type: none"> 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. <p>Daily Compliance Reports will also be included in the Monthly Compliance Reports, which will be submitted to the Authority by the 10th of each month and will include:</p> <ul style="list-style-type: none"> 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 to suitable habitats for each threatened and endangered species identified in USFWS and CDFW authorizations, including: <ul style="list-style-type: none"> An accounting of the number of acres of habitats for which we provide compensatory mitigation 								<p>Impact BIO#3: Direct Impacts on Special-Status Wildlife—Invertebrates</p> <p>Impact BIO#7: Direct Impacts on Special-Status Wildlife—Amphibians</p> <p>Impact BIO#9: Direct Impacts on Special-Status Wildlife—Reptiles</p> <p>Impact BIO#11: Direct Impacts on Special-Status Wildlife—Birds</p> <p>Impact BIO#13: Direct Impacts on Special-Status Wildlife—Mammals</p> <p>Impact BIO#14: Indirect Impacts on Special-Status Wildlife—Mammals</p> <p>Impact BIO#15: Direct Impacts on Special-Status Plant Communities</p> <p>Impact BIO#16: Indirect Impacts on Special-Status Plant Communities</p> <p>Impact BIO#17: Direct Impacts on Jurisdictional Aquatic Resources</p> <p>Impact BIO#21: Direct Impacts on Essential Fish Habitat</p>

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<p>that has been disturbed during the reporting month, and</p> <ul style="list-style-type: none"> – 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. <p>Annual Reports will be submitted to the Authority by January 20 and will include:</p> <ul style="list-style-type: none"> ▪ 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. <p>In addition to the compliance reporting requirements outlined above, the following items will be provided for compliance documentation purposes:</p> <ul style="list-style-type: none"> ▪ If agency personnel visit the Construction Footprint in accordance with BIO-IAMF#2, the Project Biologist will prepare a memorandum within 1 day of the visit that memorializes the issues raised during the field meeting. This memorandum will be submitted to the Authority via EMMA. Any issues regarding regulatory compliance raised by agency personnel will be reported to the Authority and the Contractor. ▪ Compliance reporting will be submitted to the Authority via EMMA in accordance with the report schedule. The Project Biologist will prepare and 								

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		<p>submit compliance reports that document the following:</p> <ul style="list-style-type: none"> - Compliance with BIO-MM#1a: Establish Environmentally Sensitive Areas, Wildlife Exclusion Fencing, and Non-Disturbance Zones. - Implementation and performance of the Restoration and Revegetation Plan described in BIO-MM#2a. - Summary of progress made regarding the implementation of the Weed Control Plan described in BIO-IAMF#7. - Compliance with BIO-IAMF#8: Establish Monofilament Restrictions. - Compliance with BIO-IAMF#9: Prevent Entrapment in Construction Materials and Excavations. - Compliance with BIO-IAMF#10: Delineate Equipment Staging Areas and Traffic Route. - Compliance with BIO-IAMF#11: Dispose of Construction Spoils and Waste. - Compliance with BIO-IAMF#12: Clean Construction Equipment. - BMP field manual implementation and any recommended changes to construction site housekeeping practices outlined in BIO-IAMF#13: Maintain Construction Sites. - Compliance with BIO-IAMF#15: Vehicle Traffic and Construction Site Speed Limits ▪ Work stoppages and measures taken under BIO-MM9a: Work Stoppage 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#1c	Conduct Presence/Absence Pre-construction Surveys for Special-Status Plant Species and Special-Status Plant Communities	<p>Prior to any ground-disturbing activity, the Project Biologist will conduct presence/absence botanical field surveys for special-status plant species and special-status plant sensitive natural communities in all potentially suitable habitats within a Work Area. The surveys shall be consistent with CDFW's <i>Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities</i> and USFWS's <i>Guidelines for Conducting and Report Botanical Inventories for Federally Listed, Proposed and Candidate Plants</i>. The Project Biologist will flag and record in GIS the locations of any observed special-status plant species and special-status plant sensitive natural communities.</p> <p>Portions of the project footprint that support special-status plant species that would be temporarily disturbed will be restored to pre-construction conditions as defined in the</p>	Pre-construction/ Construction/ Post-construction	Conduct protocol level, pre-construction surveys; Report findings; Restore temporarily disturbed areas	Report findings at least 30 days prior to ground disturbance	Contractor	Contractor	Report findings at least 30 days prior to ground disturbance	Condition of design-build contract following requirements established by regulatory compliance permits	<p>Impact BIO#1: Direct Impacts on Special-Status Plant Species</p> <p>Impact BIO#2: Indirect Impacts on Special-Status Plant Species and Other Native Plants</p> <p>Impact BIO#15: Direct Impacts on Special-Status Plant Communities</p> <p>Impact BIO#16: Indirect Impacts on Special-Status Plant Communities</p>

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		BRMP prepared under BIO-IAMF#6. Before disturbance, pre-construction conditions, including species composition, species richness, and percent cover of key species will be documented, and photo points will be established. If special-status plant species cannot be avoided, mitigation for impacts on these species will be documented (density, percent cover, key habitat characteristics, including soil type, associated species, hydrology, topography, and photo documentation of pre-construction conditions) and incorporated into a relocation/compensation program, as described in BIO-MM#2. The Project Biologist will provide verification of survey results and report findings to the Authority to document compliance with this measure.								
BIO-MM#2a	Prepare and Implement a Restoration and Revegetation Plan	<p>Prior to any ground-disturbing activity, the Project Biologist will prepare an 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, revegetating disturbed areas with native plant species, and using certified weed-free straw and mulch. The Authority will implement the RRP in all temporarily disturbed areas outside of the permanent right-of-way that potentially support special-status species, wetlands and/or other aquatic resources.</p> <p>Consistent with section 1415 of the Fixing America's Surface Transportation Act (FAST Act) restoration activities will provide habitat for native pollinators through plantings of native forbs and grasses. The Project Biologist will obtain a locally sourced native seed mix. The restoration success criteria will include limits on invasive species, as defined by the California Invasive Plant Council, to an increase no greater than 10 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:</p> <ol style="list-style-type: none"> 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. 	Pre-construction	Prepare plan/ Compliance reporting	Annual	Contractor	Contractor	Annual reporting	EMMA	<p>Impact BIO#1: Direct Impacts on Special-Status Plant Species</p> <p>Impact BIO#2: Indirect Impacts on Special-Status Plant Species and Other Native Plants</p> <p>Impact BIO#3: Direct Impacts on Special Status Wildlife—Invertebrates</p> <p>Impact BIO#7: Direct Impacts on Special-Status Wildlife—Amphibians</p> <p>Impact BIO#9: Direct Impacts on Special-Status Wildlife—Reptiles</p> <p>Impact BIO#11: Direct Impacts on Special-Status Wildlife—Birds</p> <p>Impact BIO#13: Direct Impacts on Special-Status Wildlife—Mammals</p> <p>Impact BIO#14: Indirect Impacts on Special-Status Wildlife—Mammals</p> <p>Impact BIO#15: Direct Impacts on Special-Status Plant Communities</p> <p>Impact BIO#16: Indirect Impacts on Special-Status Plant Communities</p>

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		<ul style="list-style-type: none"> e. Specification of the remedial measures to be taken if success criteria are not met. f. Methods and requirements for monitoring restoration/replacement efforts, which may involve a combination of qualitative and/or quantitative data gathering. g. Maintenance, monitoring, and reporting schedules, including an annual report due to the Authority by January 31 of the following year. <p>The RRP will be submitted to the Authority and regulatory agencies, as defined in the conditions of regulatory authorizations, for review and approval.</p>								Impact BIO#17: Direct Impacts on Jurisdictional Aquatic Resources Impact BIO#21: Direct Impacts on Essential Fish Habitat
BIO-MM#2b	Prepare and Implement Plan for Salvage, Relocation, and/or Propagation of Special-Status Plant Species	<p>Prior to construction (any ground-disturbing activity), the Project Biologist will collect seeds and plant materials and stockpile and segregate the top four inches of topsoil from locations within the Work Area where species listed as threatened or endangered under the FESA, threatened, endangered, or candidate for listing under CESA, state-designated "Rare" species, and California Rare Plant Rank 1B and 2 species were observed during surveys for use on off-site locations. Suitable sites to receive salvaged material include Authority mitigation sites, refuges, reserves, federal or state lands, and public/private mitigation banks.</p> <p>If relocation or propagation is required by authorizations issued under the FESA and/or CESA, the Project Biologist will prepare a plant species salvage plan to address monitoring, salvage, relocation, and/or seed banking of federal or State-listed species.</p> <p>The plan will include provisions that address the techniques, locations, and procedures required for the collection, storage, and relocation of seed or plant material; and collection, stockpiling, and redistribution of topsoil and associated seed. The plan will also include requirements related to outcomes such as percent absolute cover of highly invasive species, as defined by the California Invasive Plant Council (less than documented baseline conditions), maintenance, monitoring, implementation, and the 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.</p>	Pre-construction/ Construction/ Post-construction	Prepare and implement plan/ Report compliance	Follow reporting requirements as established by regulatory compliance permits	Contractor	Contractor	Follow reporting requirements as established by regulatory compliance permits	Condition of design-build contract: Salvage, relocation, and propagation of special-status plant species following requirements established by regulatory compliance permits	Impact BIO#1: Direct Impacts on Special-Status Plant Species Impact BIO#2: Indirect Impacts on Special-Status Plant Species and Other Native Plants Impact BIO#15: Direct Impacts on Special-Status Plant Communities Impact BIO#16: Indirect Impacts on Special-Status Plant Communities
BIO-MM#3a	Prepare and Implement a Compensatory Mitigation Plan (CMP) for Impacts to 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 defined as waters of the U.S. under the federal CWA and/or waters of the State under the Porter-Cologne Water Quality Control Act. The compensatory mitigation for state and federally protected aquatic resources will meet the federal and state policies for no net loss of functions and	Pre-construction/ Construction/ Post-construction	Compliance report	Before final design	Authority	Authority	Before final design	Authority to provide compensation for permanent and temporary impacts on jurisdictional aquatic resources as provided for in the final CMP approved by the	Impact BIO#1: Direct Impacts on Special-Status Plant Species Impact BIO#2: Indirect Impacts on Special-Status Plant Species Impact BIO#17: Direct Impacts on Jurisdictional Aquatic

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		<p>values. Compensatory mitigation may involve the restoration, establishment, enhancement, and/or preservation of aquatic resources through one or more of the following methods:</p> <ul style="list-style-type: none"> ▪ 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. <p>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/or the Porter-Cologne Water Quality Control Act:</p> <ul style="list-style-type: none"> ▪ Vernal pools: 2:1. ▪ Seasonal wetlands: between 1.1:1 and 1.5:1 based on impact type, function and values lost. ▪ 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 <p>For mitigation involving establishment, restoration, enhancement, or preservation of aquatic resources by the Authority, the CMP will contain the following information:</p> <ul style="list-style-type: none"> ▪ 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 ensure that the compensatory mitigation will be successful. <p>Additional information required in a CMP as outlined in 33 C.F.R. 332.4(c), as deemed appropriate and necessary by the USACE will also be required 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</p>							USACE	Resources

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		number of credits proposed to be purchased, and a rationale for why this number of credits was determined appropriate.								
BIO-MM#3b	Prepare a Compensatory Mitigation Plan (CMP) for Species and Habitat	<p>The Authority will prepare a CMP 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 Fish and Game Code, and certain other special-status species. The CMP will include the following:</p> <ul style="list-style-type: none"> ▪ 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: <ul style="list-style-type: none"> – 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 CDFW and 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 the estimated direct permanent and temporary impacts to species and species habitat. ▪ A description of the process that will be used to confirm impacts. Actual impacts to species and habitat could differ from estimates. Should this occur, adjustments will be made to the compensatory mitigation that will be provided. Adjustments to impact estimates and compensatory mitigation will occur in the following circumstances: <ul style="list-style-type: none"> – impacts to species (typically measured as habitat loss) are reduced or increased as a result of changes in project design, <ul style="list-style-type: none"> ○ 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, or 	Construction/ Post-Construction	Implement the CMP and prepare monitoring reports and compliance memos	In accordance with reporting schedule established by agency permit requirements	Authority	Authority	In accordance with reporting schedule established by agency permit requirements	<p>Impact BIO#1: Direct Impacts on Special-Status Plant Species</p> <p>Impact BIO#3: Direct Impacts on Special-Status Wildlife—Invertebrates</p> <p>Impact BIO#5: Direct Impacts on Special-Status Wildlife—Fish</p> <p>Impact BIO#7: Direct Impacts on Special-Status Wildlife—Amphibians</p> <p>Impact BIO#9: Direct Impacts on Special-Status Wildlife—Reptiles</p> <p>Impact BIO#11: Direct Impacts on Special-Status Wildlife—Birds</p> <p>Impact BIO#13: Direct Impacts on Special-Status Wildlife—Mammals</p> <p>Impact BIO#15: Direct Impacts on Special-Status Plant Communities</p> <p>Impact BIO#19: Direct Impacts on Critical Habitat</p> <p>Impact BIO#21: Direct Impacts on Essential Fish Habitat</p>	

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		<ul style="list-style-type: none"> ○ impacts initially categorized as permanent qualify as temporary impacts. ▪ An overview of the strategy for mitigating effects on species. The overview will include the ratios to be applied to determine mitigation levels and the resulting mitigation totals. ▪ A description of habitat restoration or enhancement projects, if any, 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#4	Implement Measures to Minimize Impacts during Off-Site Habitat Restoration, Enhancement, or Creation on Mitigation Sites	<p>Prior to site preparation at the mitigation site(s), the Authority or its designee will consider the off-site habitat restoration, enhancement, or preservation program, and quantify short-term temporary and long-term permanent impacts associated with restoration/enhancement activities. A determination will be made on any impacts from the physical alteration of the site to on-site biological resources, including plant communities, land cover types, and the distribution of special-status plants and wildlife. Six potential mitigation/conservation banks and three potential PRM sites are under consideration for restoration, enhancement, or preservation of jurisdictional aquatic resources and special-status species habitat. Habitat restoration and enhancement activities on the six mitigation/conservation banks are already occurring and have been permitted by the bank operators. Therefore, any new impacts on resources present at off-site mitigation sites will be limited to the three PRM sites. All three PRM sites are located in the western foothills of the Sierra Nevada range and support the same types of jurisdictional aquatic resources and special-status species habitat that would be affected by the Central Valley Wye alternatives.</p> <p>Site 1 is an approximately 2,016-acre property in south-central Madera County that contains vernal pools, mixed riparian, seasonal wetlands, freshwater emergent marsh, natural watercourses, constructed basins, constructed watercourses, and open water. Given the high level of</p>	Pre-construction/ Construction/ Post-construction	Compliance report	Prior to operation or as established by regulatory compliance permits	Authority	Authority	Prior to operation or as established by regulatory compliance permits	Authority to provide compensatory mitigation for impacts on biological resources affected by the Contractor. Off-site habitat restoration, enhancement, and preservation program will be designed, implementation and monitored consistent with the terms and conditions of regulatory permit requirements they apply to their jurisdiction and resources onsite.	<p>Impact BIO#1: Direct Impacts on Special-Status Plant Species</p> <p>Impact BIO#2: Indirect Impacts on Special-Status Plant Species and Other Native Plants</p> <p>Impact BIO#3: Direct Impacts on Special-Status Wildlife—Invertebrates</p> <p>Impact BIO#5: Direct Impacts on Special-Status Wildlife—Fish</p> <p>Impact BIO#7: Direct Impacts on Special-Status Wildlife—Amphibians</p> <p>Impact BIO#9: Direct Impacts on Special-Status Wildlife—Reptiles</p>

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		<p>ecological functions currently supported at Site 1, restoration and enhancement opportunities are relatively limited, and will consist of restoration (rehabilitation) and enhancement of up to 20 acres of vernal pools and vernal swales.</p> <p>Site 2 is an approximately 3,300-acre property in northern Fresno County that contains vernal pools, mixed riparian, freshwater emergent marsh, natural watercourses, constructed watercourses, and open water. Restoration and enhancement opportunities at Site 2 include establishment or restoration (re-establishment) of up to 63 acres of vernal pools and enhancement of up to 62 acres of riparian habitat.</p> <p>Site 3 is an approximately 7,350-acre property on the border of eastern Merced County and western Mariposa County that contains vernal pools, natural watercourses, mixed riparian, seasonal wetlands, and open water. Numerous restoration and enhancement opportunities are apparent on Site 3, attributable largely to dry farming practices conducted between the 1930s and 1950s. Specifically, approximately 326 acres of clay slope wetlands, seasonal wetlands, vernal pools, vegetated swales, and riparian (stream) areas may be suitable for re-establishment and rehabilitation, and approximately 874 acres of upland grasslands may be suitable for enhancement.</p> <p>All three PRM sites provide habitat for special-status plants and wildlife. San Joaquin Valley Orcutt grass, succulent owl's-clover, and vernal pool fairy shrimp have been observed on all three sites. Other special-status wildlife species observed on PRM sites include Conservancy fairy shrimp (Site 2), vernal pool tadpole shrimp (Sites 2 and 3), California tiger salamander (Sites 1 and 2), western spadefoot (Sites 1 and 3), golden eagle (Site 2), Swainson's hawk (Sites 1 and 2), and San Joaquin kit fox (Sites 1 and 3). Aquatic features on the sites may support western pond turtle, and the extensive grassland on all three sites provides habitat for burrowing owl, grasshopper sparrow, northern harrier, short-eared owl, white-tailed kite, and American badger.</p> <p>Future restoration or enhancement activities on PRM Sites 1, 2, and 3 may include the following:</p> <ul style="list-style-type: none"> ▪ Grading ▪ Removal of nonnative invasive plants by hand (e.g., hand-pulling), mechanical (e.g., string trimming, mowing) or chemical (i.e., herbicides) methods ▪ Removal and disposal of existing agricultural infrastructure ▪ Excavation of existing channels or basins ▪ Stockpiling, disposal, and reuse of soils 								<p>Impact BIO#11: Direct Impacts on Special-Status Wildlife—Birds</p> <p>Impact BIO#13: Direct Impacts on Special-Status Wildlife—Mammals</p> <p>Impact BIO#14: Indirect Impacts on Special-Status Wildlife—Mammals</p> <p>Impact BIO#15: Direct Impacts on Special-Status Plant Communities</p> <p>Impact BIO#16: Indirect Impacts on Special-Status Plant Communities</p> <p>Impact BIO#17: Direct Impacts on Jurisdictional Aquatic Resources</p> <p>Impact BIO#19: Direct Impacts on Critical Habitat</p> <p>Impact BIO#21: Direct Impacts on Essential Fish Habitat</p>

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		<ul style="list-style-type: none"> ▪ Collection and/or planting of native vegetation for wetland and upland habitat enhancement ▪ Installation and maintenance of erosion control and/or irrigation systems ▪ Installation of piezometers for groundwater monitoring ▪ Installation and maintenance of protective fencing and signage ▪ Periodic hydrological, botanical, and wildlife monitoring by field technicians <p>Some of these activities, especially those involving ground disturbance, could result in the same type of impacts described in Section 3.7.7, Environmental Consequences, of the Final Supplemental EIR/EIS. Specifically, direct and indirect impacts on special-status plant and wildlife species (Impacts BIO#1–BIO#4 and BIO#7–BIO#14), special-status plant communities (Impacts BIO#15 and BIO#16), jurisdictional waters (Impacts BIO#17 and BIO#18), and critical habitat (Impacts BIO#19 and BIO#20) could occur where such resources are present on the PRM sites. The following IAMFs and mitigation measures will be applied at PRM sites to reduce, lessen, or avoid impacts on these resources:</p> <ul style="list-style-type: none"> ▪ BIO-IAMF#1: Designate Project Biologist, Designated Biologists, Species-Specific Biological Monitors and General Biological Monitors ▪ BIO-IAMF#2: Facilitate Agency Access ▪ BIO-IAMF#3: Prepare Worker Environmental Awareness Program (WEAP) Training Materials and Conduct Construction Period WEAP Training ▪ BIO-IAMF#7: Prepare and Implement a Weed Control Plan ▪ BIO-IAMF#8: Establish Monofilament Restrictions ▪ BIO-IAMF#9: Prevent Entrapment in Construction Materials and Excavations ▪ BIO-IAMF#10: Delineate Equipment Staging Areas and Traffic Routes ▪ BIO-IAMF#11: Dispose of Construction Spoils and Waste ▪ BIO-IAMF#12: Clean Construction Equipment ▪ BIO-IAMF#13: Maintain Construction Sites ▪ BIO-IAMF#14: Dewatering and Water Diversion ▪ BIO-IAMF#15: Vehicle Traffic and Construction Site Speed Limits ▪ BIO-MM#1a: Establish Environmentally Sensitive Areas, Wildlife Exclusion Fencing, and Non-Disturbance Zones 								

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<ul style="list-style-type: none"> ▪ BIO-MM#1c: Conduct Presence/Absence Pre-construction Surveys for Special-Status Plant Species and Special-Status Plant Communities ▪ BIO-MM#5: Conduct Pre-construction Surveys for Vernal Pool Wildlife Species ▪ BIO-MM#6: Implement Seasonal Vernal Pool Work Restriction ▪ BIO-MM#7: Implement and Monitor Vernal Pool Avoidance and Minimization Measures Within Temporary Impact Areas ▪ BIO-MM#9a: Work Stoppage ▪ BIO-MM#9b: Conduct Pre-construction Surveys for Special-Status Reptile and Amphibian Species ▪ BIO-MM#11: Conduct Pre-construction Surveys for California Tiger Salamander ▪ BIO-MM#12: Implement Avoidance and Minimization Measures for California Tiger Salamander ▪ BIO-MM#13: Conduct Emergence and Larval Surveys for Western Spadefoot Toad ▪ BIO-MM#16: Conduct Western Pond Turtle Pre-construction Surveys and Relocation ▪ BIO-MM#17: Conduct Western Pond Turtle Monitoring ▪ BIO-MM#18: Implement Western Pond Turtle Avoidance and Relocation ▪ BIO-MM#24a: Conduct Pre-construction Surveys and Delineate Active Nest Buffers and Exclusion Areas for Breeding Birds ▪ BIO-MM#24b: Conduct Pre-construction Surveys and Monitoring for Raptors ▪ BIO-MM#25a: Conduct Surveys and Implement Avoidance Measures for Active Tricolored Blackbird Nest Colonies ▪ BIO-MM#26: Conduct Surveys for Swainson's Hawk Nests ▪ BIO-MM#27: Implement Avoidance and Minimization Measures for Swainson's Hawk Nests ▪ BIO-MM#29: Conduct Protocol-level Surveys for Burrowing Owls ▪ BIO-MM#30: Implement Avoidance and Minimization Measures for Burrowing Owl ▪ BIO-MM#34: Conduct Pre-construction Surveys for American Badger Den Sites and Implement Minimization Measures ▪ BIO-MM#35: Conduct Pre-construction Surveys for Ringtail and Ringtail Den Sites and Implement Avoidance Measures ▪ BIO-MM#36: Conduct Pre-construction Surveys for San Joaquin Kit Fox 								

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<ul style="list-style-type: none"> BIO-MM#37: Minimize Impacts on San Joaquin Kit Fox 								
BIO-MM#5	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 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 USFWS 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 greater than 3 centimeters 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#5 would have temporary impacts on listed vernal pool branchiopods due to take of a few individuals; however, the surveys are minimally invasive and would not result in additional physical disturbance outside the project footprint.	Pre-construction	Aquatic assessment and sampling; Reporting	Report findings at least 30 days prior to ground disturbance	Contractor	Contractor	Report findings at least 30 days prior to ground disturbance	Condition of design-build contract following requirements established by regulatory compliance permits	Impact BIO#3: Direct Impacts on Special-Status Wildlife—Invertebrates
BIO-MM#6	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 buffer area during the rainy season, such activities should, to the extent feasible, be undertaken when the aquatic features are not inundated. BIO-MM#6 would be beneficial to listed vernal pool branchiopods and special-status amphibians because it would minimize the chance of loss of vernal pool branchiopods and special-status amphibians. Implementing a seasonal work restriction would not result in additional physical disturbance outside the project footprint.	Construction	Exclusion fencing; Compliance reporting	Follow reporting requirements as established by regulatory compliance permits	Contractor	Contractor	Follow reporting requirements as established by regulatory compliance permits	Condition of design-build contract following requirements established by regulatory compliance permits	Impact BIO#3: Direct Impacts on Special-Status Wildlife—Invertebrates
BIO-MM#7	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 to 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 occurring during the dry season, the Project Biologist will collect a representative sampling of soils from the affected vernal pools to obtain viable plant seeds and vernal pool branchiopod cysts. After collecting soil, the Project Biologist may also put rinsed gravel in the vernal pools and cover with geotextile fabric to minimize damage to the	Construction	Exclusion fencing; Collection of soil material; Off-site compensatory mitigation; Compliance reporting	Monthly or reporting requirements as established by regulatory compliance permits	Contractor	Contractor	Monthly or reporting requirements as established by regulatory compliance permits	Condition of design-build contract following requirements established by regulatory compliance permits	Impact BIO#3: Direct Impacts on Special-Status Wildlife—Invertebrates

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		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 issued under the FESA. BIO-MM#7 would have no impacts on vernal pool branchiopods because ground disturbance would not be required. Overall, implementation of this measure would be beneficial to listed vernal pool branchiopods because it would minimize the chance of loss of vernal pool branchiopods.								
BIO-MM#8a	Work Windows for Fish	<p>Near-water and in-water work will be conducted within specified work windows based on date, channel inundation, and water temperature. Work windows will include the general time periods when effects on migrating juvenile and adult California Central Valley steelhead and Central Valley spring-run Chinook salmon would be minimal. Additionally, in-water work will be allowed when salmonid use is temperature limited (defined as 1 week of average water temperature of 75°F or more); and work will be allowed in the channel and on the floodplain when channels are dry or ponded.</p> <p>Near-water work is defined as construction activities other than impact pile driving occurring within the floodplain but not in the wetted channel (i.e., located between the wetted channel and the landside toe of the bordering levees). In-water work is defined as all in-water work within the wetted channel and impact pile driving within the floodplain.</p> <p>For near-water work at the San Joaquin River and Eastside Bypass, the construction work window will be April 30 through December 1. For in-water work, the construction work window will be June 1 through December 1.</p> <p>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 of the work windows stated above. NMFS will be consulted to verify work can proceed if these conditions are present during construction.</p>	Construction	Identify work windows	During construction	Authority	Authority	During construction	Condition of design-build contract following requirements established by regulatory compliance permits	<p>Impact BIO#5: Direct Impacts on Special-Status Wildlife—Fish</p> <p>Impact BIO#21: Direct Impacts on Essential Fish Habitat</p>
BIO-MM#8b	Pile Driving Underwater Sound Pressure Measures	<p>If in-water pile driving occurs in the wetted channel during the in-water work window, one of the following means of attenuating underwater sound will be implemented:</p> <ul style="list-style-type: none"> Cofferdam—a cofferdam will be established around the pile driving area to keep it dewatered during impact pile driving. Air barrier—a pipe with a larger diameter than the driven pile will be set to keep the area between the pile and the pipe completely dewatered with an air barrier. 	Construction	Implement cofferdams, air barriers, and/or contained bubble curtain, if required	During construction	Contractor	Contractor	During construction	Condition of design-build contract following requirements established by regulatory compliance permits	<p>Impact BIO#5: Direct Impacts on Special-Status Wildlife—Fish</p> <p>Impact BIO#21: Direct Impacts on Essential Fish Habitat</p>

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<ul style="list-style-type: none"> Contained bubble curtain—a bubble curtain will be maintained around the driven pile. <p>NMFS will be consulted regarding the measure(s) to install piles and notified of the selected measure(s).</p> <p>During implementation of any of these measures and installation of driven piles, underwater sound monitoring will be conducted. If underwater sound monitoring indicates that underwater sound exceeds 206 peak strike decibels (estimated at 10 meters from the driven pile), or that the daily accumulated sound exposure level is calculated to have exceeded 187 decibels (estimated at 10 meters from the driven pile), NMFS will be notified (within 24 hours) and construction will cease until corrections are made to the attenuation apparatus/protocol so that the thresholds are not exceeded.</p>								
BIO-MM#8c	Water Diversion Measures for Fish	<p>Construction within waterways may require temporary dewatering to minimize potential impacts on fisheries and minimize potential erosion, sediment loss, scour, or increases in turbidity. If deemed necessary by NMFS, the Contractor will construct cofferdams around the proposed Work Area or areas. Cofferdams will be kept to the minimum footprint necessary. The cofferdams will be constructed of sheet piles, gravel-filled sandbags, or comparable material. The temporary fill used to construct the cofferdam will be kept to the minimum footprint necessary. The cofferdams will be constructed over visqueen or similar material to facilitate clean-up and removal of materials. Upon completion of construction, all temporary fills associated with the dewatering including sandbags and/or rock will be removed and the area restored to pre-construction contours.</p> <p>During implementation of any of these measures and installation of driven piles, underwater sound monitoring will be conducted. If underwater sound monitoring indicates that underwater sound exceeds 206 peak strike decibels (estimated at 10 meters from the driven pile), or that the daily accumulated sound exposure level is calculated to have exceeded 187 decibels (estimated at 10 meters from the driven pile), NMFS will be notified (within 24 hours) and construction will cease until corrections are made to the attenuation apparatus/protocol so that the thresholds are not exceeded.</p>	Construction	Implement cofferdams, if required; Monitoring	During construction	Contractor	Contractor	During construction	Condition of design-build contract following requirements established by regulatory compliance permits	<p>Impact BIO#5: Direct Impacts on Special-Status Wildlife—Fish</p> <p>Impact BIO#21: Direct Impacts on Essential Fish Habitat</p>
BIO-MM#8d	Fish Rescue Plan	<p>If construction requires the installation of cofferdams or dewatering, a fish rescue plan will be developed by the Authority in coordination with NMFS. The fish rescue plan will be approved by NMFS prior to starting work that may result in fish stranding. The plan will contain the following content:</p> <ul style="list-style-type: none"> Biologist Qualifications—Fish rescue and relocation will be conducted by a qualified fisheries biologist with a current CDFW Scientific Collecting Permit. 	Construction	Implement fish rescue plan including minimization measures and monitoring, if required	During construction	Authority in coordination with NMFS	Authority	During construction	Condition of design-build contract following requirements established by regulatory compliance permits	<p>Impact BIO#5: Direct Impacts on Special-Status Wildlife—Fish</p> <p>Impact BIO#21: Direct Impacts on Essential Fish Habitat</p>

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<ul style="list-style-type: none"> Timing and Approach—The fish rescue effort will be implemented during the dewatering of the areas behind the cofferdam(s) and will involve capture and return of those fish to suitable habitat within the adjacent waterways. The area will first be seined, followed by electrofishing to remove fish that are behind the cofferdam. A fisheries biologist will be on-site during initial pumping (dewatering) to confirm compliance with the fish rescue plan. Minimization Measures—Implementation of the fish rescue plan will include measures to minimize potential adverse effects on listed fish species (if present) associated with fish stranding during dewatering activities. The fish rescue plan will also contain methods for minimizing the risk of stress and mortality from capture and handling of fish removed from the construction sites and returned to adjacent waterways. Monitoring and Reporting Requirements—The progress of dewatering will be monitored and allow for the fish rescue to occur prior to completely closing the cofferdam and again when water depths reach approximately 2 feet. The NMFS will be notified at least 48 hours prior to the start of fish rescue efforts. Information on the species, number, and sizes of fish collected will be recorded during the fish rescue and provided in a letter report to be submitted to NMFS within 30 days of the fish rescue. 								
BIO-MM#9a	Work Stoppage	<p>In the event that any special-status wildlife species is found in a Work Area, the Project Biologist will have the authority to halt work to prevent the death of 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.</p> <p>Any such work stoppages and the measures taken to facilitate the removal of the species, if any, will be documented in a memorandum prepared by the Project Biologist and submitted to the Authority within 2 business days of the work stoppage.</p>	Construction	Reporting	In the event of work stoppage	Contractor	Contractor	Reporting within 48 hours of work stoppage	Condition of design-build contract	Impact BIO#3: Direct Impacts on Special-Status Wildlife—Invertebrates Impact BIO#5: Direct Impacts on Special-Status Wildlife—Fish Impact BIO#7: Direct Impacts on Special-Status Wildlife—Amphibians Impact BIO#9: Direct Impacts on Special-Status Wildlife—Reptiles Impact BIO#11: Direct Impacts on Special-Status Wildlife—Birds Impact BIO#13: Direct Impacts on Special-Status

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
										Wildlife—Mammals
BIO-MM#9b	Conduct Pre-construction Surveys for Special-Status Reptile and Amphibian Species	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 reptiles 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 Environmentally Sensitive Areas (ESA) or conduct species relocation.	Pre-construction/ Construction	Conduct pre-construction surveys; Establish ESAs, ERAs, and WEFs; Compliance reporting	Monthly	Contractor	Contractor	Surveys conducted 30 days prior to ground-disturbance; Submit monthly reports during construction	Condition of design-build contract following requirements established by regulatory compliance permits	Impact BIO#7: Direct Impacts on Special-Status Wildlife—Amphibians Impact BIO#9: Direct Impacts on Special-Status Wildlife—Reptiles
BIO-MM#10	Implement Avoidance and Minimization Measures for Special-Status Reptile and Amphibian Species	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 on 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 federal or state-listed species, relocations will be undertaken in accordance with regulatory authorizations issued under the FESA and/or CESA.	Construction	Monitoring; Compliance reporting	Daily monitoring; Monthly reporting	Contractor	Contractor	Daily monitoring and monthly reporting during construction	Condition of design-build contract following requirements established by regulatory compliance permits	Impact BIO#7: Direct Impacts on Special-Status Wildlife—Amphibians Impact BIO#9: Direct Impacts on Special-Status Wildlife—Reptiles
BIO-MM#11	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 modeled 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 Central California tiger salamander 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. 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 salamander using methods from the <i>Interim Guidance on Site Assessment and Field Surveys for Determining Presence or a Negative Finding of the California Tiger Salamander</i> or other more recent guidelines, if available.	Pre-construction	Conduct pre-construction survey	30 days prior to construction	Contractor	Contractor	30 days prior to construction	Condition of design-build contract following requirements established by regulatory compliance permits	Impact BIO#7: Direct Impacts on Special-Status Wildlife—Amphibians
BIO-MM#12	Implement Avoidance and Minimization Measures for California	Prior to any ground-disturbing activity, the Project Biologist will install WEF along the boundary of the Work Area containing California tiger salamander modeled suitable	Pre-construction/ Construction	Establish WEF	Daily or twice per week inspections (nonconsecutive)	Contractor	Contractor	Daily or twice per week inspections (nonconsecutive)	Condition of design-build contract	Impact BIO#7: Direct Impacts on Special-Status

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
	Tiger Salamander	<p>habitat or will implement similar measures as otherwise required pursuant to regulatory authorizations issued under the FESA and/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 California tiger salamander 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. WEF will be installed with turn-arounds at access points to direct California tiger salamander away from gaps in the fencing.</p> <p>To the extent feasible, construction activities will not be conducted within 250 feet of areas identified as occupied California tiger salamander breeding habitat during the rainy season (October 15–June 1). However, construction activities may begin within such areas after April 15 if the breeding habitat is no longer inundated.</p>			days)			days)		Wildlife—Amphibians
BIO-MM#13	Conduct Emergence and Larval Surveys for Western Spadefoot	The Project Biologist or designee (qualified herpetologist) will conduct pre-construction emergence and larval surveys for western spadefoot during the fall and winter rainy season. Emergence surveys will be conducted within the appropriate period(s) after precipitation events as evaluated by a qualified herpetologist and would be conducted partially in tandem with California tiger salamander surveys. Potential breeding depressions, including vernal pools, will be surveyed for western spadefoot larvae concurrently with special-status vernal pool branchiopod and California tiger salamander pre-construction surveys. Adults found within the project footprint during emergence surveys will be relocated to an appropriate area adjacent to another pool suitable for breeding. The Project Biologist will document compliance after surveys are complete.	Pre-construction	Conduct pre-construction surveys; Compliance report	Pre-construction within the appropriate period(s) after precipitation events	Contractor	Contractor	Pre-construction within the appropriate period(s) after precipitation events	Condition of design-build contract	Impact BIO#7: Direct Impacts on Special-Status Wildlife—Amphibians
BIO-MM#14	Conduct Protocol-level Surveys for Blunt-Nosed Leopard Lizard	<p>No more than 12 months before the start of any ground-disturbing activity, in accordance with authorizations under the FESA, a habitat assessment of the project footprint will be conducted by the Project Biologist to identify all habitat suitable for blunt-nosed leopard lizard within the project footprint. Within 12 months prior to any ground-disturbing activity, the Project Biologist will conduct surveys for blunt nosed leopard lizard in suitable habitats (e.g., areas containing burrows) within the Work Area. These surveys will be conducted in accordance with the CDFW's <i>Approved Survey Methodology for the Blunt-Nosed Leopard Lizard</i>, or other more recent guidelines, if available.</p> <p>In instances where blunt-nosed leopard lizards are observed at any time during presence/absence surveys, pre-construction surveys, or construction monitoring, USFWS and CDFW will be notified of the occurrence</p>	Pre-construction	Conduct protocol level surveys	Within 1 year prior to construction or as required in Survey Methodology	Contractor	Contractor	Within 1 year prior to construction or as required in Survey Methodology	Condition of design-build contract	Impact BIO#9: Direct Impacts on Special-Status Wildlife—Reptiles

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		within 2 business days.								
BIO-MM#15	Implement Avoidance Measures for Blunt-Nosed Leopard Lizard	<p>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. The WEF will be monitored daily and maintained.</p> <p>During the non-active season for blunt-nosed leopard lizards (October 16–April 14), to the extent feasible, ground-disturbing activities will not occur in areas where blunt-nosed leopard lizards or signs of the species have been observed and that contain burrows suitable for blunt-nosed leopard lizards. If ground-disturbing activities are scheduled during the non-active season, suitable burrows identified during the surveys will be avoided through establishment of 50-foot no-work buffers. The Project Biologist may reduce the size of the no-work buffers if information indicates that the extent of the underground portion of burrows is less than 50 feet.</p> <p>During the active season when blunt-nosed leopard lizards are moving above ground (April 15–October 15), the following measures will be implemented in areas where blunt-nosed leopard lizards or signs of blunt-nosed leopard lizards have been observed:</p> <ul style="list-style-type: none"> 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 project footprint so that blunt-nosed leopard lizards and/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. <p>Within 3 days of completing these surveys with negative results, WEF will be installed in a configuration that accounts for burrow locations and enables blunt-nosed leopard lizards to leave the Work Area. The following day, the Project Biologist will conduct an observational survey. If no blunt-nosed leopard lizards are observed, the Project</p>	Construction	Establish buffers; Fencing of Work Areas	Daily monitoring	Contractor	Contractor	Daily monitoring	Condition of design-build contract	Impact BIO#9: Direct Impacts on Special-Status Wildlife—Reptiles

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<p>Biologist will install additional WEF to further enclose the Work Area. This Work Area will be monitored daily while the WEF is in place.</p> <p>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.</p>								
BIO-MM#16	Conduct Western Pond Turtle Pre-construction Surveys and Relocation	<p>Prior to ground-disturbing activities, conduct pre-construction surveys for western pond turtles to determine the presence or absence of western pond turtles within the project footprint. If western pond turtles are found within the project footprint, conduct daily clearance surveys prior to the initiation of any construction activities.</p> <p>If a western pond turtle nest would be affected by ground-disturbing activities, relocate the eggs according to relocation protocol coordinated with CDFW for all life stages of western pond turtles. Relocate hatchling and adult turtles outside of the project footprint in suitable habitat. The Project Biologist will submit a report to the Authority documenting compliance.</p>	Pre-construction	Conduct pre-construction surveys; Relocation protocol; Compliance reporting	Daily monitoring	Contractor	Contractor	Daily monitoring	Condition of design-build contract	Impact BIO#9: Direct Impacts on Special-Status Wildlife—Reptiles
BIO-MM#17	Conduct Western Pond Turtle Monitoring	<p>During ground-disturbing activities, the Project Biologist will observe all construction activities within habitat that supports populations of western pond turtles identified during the pre-construction surveys described under BIO-MM#16. If environmentally sensitive areas are deemed necessary, the Project Biologist will conduct a clearance survey for western pond turtles prior to the time the fence is installed. If necessary, conduct daily clearance surveys prior to construction. The Project Biologist will submit a report to the Authority documenting compliance.</p>	Construction	Monitoring; Compliance reporting	Daily monitoring	Contractor	Contractor	Daily monitoring	Condition of design-build contract	Impact BIO#9: Direct Impacts on Special-Status Wildlife—Reptiles
BIO-MM#18	Implement Western Pond Turtle Avoidance and Relocation	<p>Prior to ground-disturbing activities, if a western pond turtle nesting area is present and would be affected by ground-disturbing activities as determined by the Project Biologist during the pre-construction surveys described under BIO-MM#16, the Contractor will avoid western pond turtle nesting areas by at least 50 feet. If avoidance is not feasible, as determined by the Authority or its designee, the Project Biologist will coordinate with CDFW to identify where to relocate western pond turtles. The Project Biologist will coordinate specific trapping and relocation protocols with CDFW for adults, hatchlings, and eggs prior to ground-disturbing activities. The Contractor will not move eggs or hatchlings without prior coordination with the Project Biologist and concurrence from CDFW. The Project Biologist will document compliance on a weekly basis or as determined appropriate pending construction progress.</p>	Pre-construction	Establish buffers; Conduct relocation protocols; Compliance reporting	Weekly	Contractor	Contractor	Weekly reporting	Condition of design-build contract	Impact BIO#9: Direct Impacts on Special-Status Wildlife—Reptiles
BIO-MM#19	Avoid Suitable Giant Garter Snake Habitat	<p>The Contractor will avoid impacts on giant garter snake aquatic habitat (i.e., freshwater marsh, natural</p>	Construction	Installing protective	Daily monitoring	Contractor	Contractor	Daily monitoring	Condition of design-build	Impact BIO#9: Direct Impacts on Special-Status

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		watercourses, open water, and rice field within mapped range of species) in the project footprint, but outside of permanent or temporary impact areas, by installing environmentally sensitive area fencing as directed by the Project Biologist or Biological Monitor(s) (consistent with BIO MM#1a). Protective fencing will be installed along the upper bank of aquatic habitat features within the project footprint (including temporary and permanent access roads). In addition, all construction equipment service and refueling procedures will be conducted at least 100 feet away from giant garter snake aquatic habitat.		fencing; Conduct construction equipment service and refueling procedures					contract	Wildlife—Reptiles
BIO-MM#20	Conduct Work in Giant Garter Snake Habitat during the Active Season	All construction activities affecting giant garter snake habitat will be conducted between May 1 and October 1, which is the active period for this species. Conducting construction activities during this period reduces the likelihood of mortality since snakes are expected to actively move and avoid danger. If construction activities in giant garter snake habitat are necessary between October 2 and April 30, the USFWS Sacramento Office will be contacted to determine whether additional take avoidance and minimization measures are necessary. Recommended measures will be implemented. After April 15, any dewatered habitat will remain dry for at least 15 consecutive days before workers excavate or fill the dewatered habitat.	Construction	All construction activities will be conducted between May 1 and October 1	Daily monitoring	Contractor	Contractor	Daily monitoring	Condition of design-build contract	Impact BIO#9: Direct Impacts on Special-Status Wildlife—Reptiles
BIO-MM#21	Conduct Pre-construction Surveys and Implement Minimization Measures for Giant Garter Snakes	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. 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) to prevent snakes from moving into upland areas within the Work Area. 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.	Pre-construction	Conduct pre-construction surveys; install WEF	2 weeks	Contractor	Contractor	2 weeks	Condition of design-build contract	Impact BIO#9: Direct Impacts on Special-Status Wildlife—Reptiles
BIO-MM#22	Conduct Pre-construction Surveys for Blainville's Horned Lizards, San Joaquin Coachwhip, and Silvery Legless Lizards	Before the start of ground-disturbing activities, a Biological Monitor (designated by the Project Biologist) will conduct pre-construction surveys in suitable habitats within the species' range to determine the presence or absence of Blainville's horned lizards (California annual grassland, valley sink scrub, and ruderal), San Joaquin coachwhip, and silvery legless lizards (California annual grassland and valley sink scrub) within the project footprint. Surveys will be conducted no more than 30 days before the start of	Pre-construction	Conduct pre-construction surveys; Place ESA and/or ERA fencing	Weekly	Contractor	Contractor	Weekly reporting	Condition of design-build contract	Impact BIO#9: Direct Impacts on Special-Status Wildlife—Reptiles

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		ground-disturbing activities and will be phased with build-out of the Central Valley Wye alternatives. The results of the pre-construction survey will be used to guide the placement of the environmentally sensitive area and/or environmentally restricted area fencing.								
BIO-MM#23	Conduct Blainville's Horned Lizards, San Joaquin Coachwhip, and Silvery Legless Lizards Monitoring, Avoidance, and Relocation	During ground-disturbing activities, a Biological Monitor will observe all construction activities in habitat that supports Blainville's horned lizards, San Joaquin coachwhip, and silvery legless lizards as identified during the pre-construction surveys described under BIO-MM#22. If suitable habitat is present and environmentally sensitive areas or environmentally restricted areas are deemed necessary, the Biological Monitor will conduct a clearance survey within the area for Blainville's horned lizards, San Joaquin coachwhip, and silvery legless lizards and wildlife exclusion fencing will be installed. If a Blainville's horned lizard is present during construction, the Contractor will avoid the horned lizard, where feasible. Otherwise, the biological monitor will relocate Blainville's horned lizards, San Joaquin coachwhip, and silvery legless lizards found in the project footprint to an outside area approved by the CDFW. If necessary, clearance surveys will be conducted daily.	Construction	Monitoring; Compliance reporting	Daily monitoring; Monthly reporting	Contractor	Contractor	Daily monitoring and monthly reporting during construction	Condition of design-build contract	Impact BIO#9: Direct Impacts on Special-Status Wildlife—Reptiles
BIO-MM#24a	Conduct Pre-construction Surveys and Delineate Active Nest Buffers and Exclusion Areas for Breeding Birds	Prior to any ground-disturbing activity, including vegetation removal, scheduled to occur during the bird breeding season (February 1–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 listed under the Migratory Bird Treaty Act and/or the 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. 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 and/or CESA. 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 sound barriers.	Pre-construction	Conduct pre-construction surveys; Identify no-work buffers	Surveys conducted prior to ground disturbance	Contractor	Contractor	Surveys conducted prior to ground disturbance	Condition of design-build contract	Impact BIO#11: Direct Impacts on Special-Status Wildlife—Birds
BIO-MM#24b	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	Pre-construction/ Construction	Conduct pre-construction surveys; Establish nest buffers	Surveys conducted no more than 14 days prior to construction; Monthly	Contractor	Contractor	Surveys conducted no more than 14 days prior to construction; Monthly	Condition of design-build contract	Impact BIO#11: Direct Impacts on Special-Status Wildlife—Birds

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<p>surveys will be conducted in habitat areas within the construction footprint, and additional buffer areas, with the buffer distance depending on the potential for fully protected raptors to occur. Surveys for all raptors will be conducted within 500 feet of the boundary of the construction footprint, or within 0.5 mile of the boundary of the construction footprint 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 and/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.</p> <p>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 would be sufficient to avoid impacts on nesting raptors.</p>			reporting			reporting during construction		
BIO-MM#25a	Conduct Surveys and Implement Avoidance Measures for Active Tricolored Blackbird Nest Colonies	<p>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 (March 15–July 31).</p> <p>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 will avoid the nesting colonies during the breeding season (March 15–July 31) to the extent practicable within 300 feet of the colony, consistent with the CDFW's <i>Staff Guidance Regarding Avoidance of Impacts to Tricolored Blackbird Breeding Colonies on Agricultural Fields in 2015</i>. 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.</p>	Pre-construction/ Construction	Pre-construction surveys; Establish buffers	Surveys conducted prior to construction; Daily monitoring during construction	Contractor	Contractor	Surveys conducted prior to construction; Daily monitoring during construction	Condition of design-build contract	Impact BIO#11: Direct Impacts on Special-Status Wildlife—Birds

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
BIO-MM#25b	Provide Compensatory Mitigation for Impacts on Tricolored Blackbird Habitat	The Authority will provide compensatory mitigation 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 roosting habitat will be protected or restored at a ratio of 1:1 (protected: affected) if not occupied, and a ratio of 2:1 (protected: affected) if occupied by tricolored blackbirds. Compensatory mitigation will be provided using one or more of the methods described in the Compensatory Mitigation Plan.	Pre-construction/ Construction/ Post-construction	Provide compensatory mitigation	Prior to operation	Authority	Authority	Prior to operation	Compensatory mitigation based on amount of habitat lost and methods described in Compensatory Mitigation Plan	Impact BIO#11: Direct Impacts on Special-Status Wildlife—Birds
BIO-MM#25c	Bird Protection	<p>Prior to final construction design, the Authority will ensure that the catenary system, masts, and other structures such as fencing, electric lines, communication towers and facilities are designed to be bird- and raptor-safe in accordance with the applicable recommendations presented in <i>Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 2006</i> and <i>Reducing Avian Collisions with Power Lines: State of the Art in 2012</i>. Applicable APLIC recommendations include, but are not limited to:</p> <ul style="list-style-type: none"> ▪ Ensuring sufficient spacing of phase conductors to prevent bird electrocution. ▪ Configuring lines to reduce vertical spread of lines and/or decreasing the span length if such options are feasible. ▪ Marking lines and fences (e.g., Bird Flight Diverter for fencing and lines) to increase the visibility of lines and reduce the potential for collision. Where fencing is necessary, using bird compatible design standards to increase visibility of fences to prevent collision and entanglement. ▪ Installing perch guards to discourage avian presence on and near project facilities. ▪ Minimizing the use of guywires. Where the use of guywires is unavoidable, demarcating guywires using the best available methods to minimize avian strikes (e.g. line markers). ▪ Reusing or co-locating new transmission facilities and other ancillary facilities with existing facilities and disturbed areas to minimize habitat impacts and avoid collision risks. ▪ Structures will be monopole or dual-pole design versus lattice tower design to minimize perching and 	Pre-construction	Verify structures are bird and raptor safe in accordance with APLIC guidance; Compliance reporting	Prior to final design	Contractor	Contractor	Prior to final design	Condition of design-build contract; Condition of regulatory permits	<p>Impact BIO#11: Direct Impacts on Special-Status Wildlife—Birds</p> <p>Impact BIO#23: Direct Impacts on Wildlife Movement Corridors</p>

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<p>nesting opportunities. Communication towers will conform to USFWS's <i>Recommended Best Practices for Communication Tower Design, Siting, Construction, Operation, Maintenance, and Decommissioning</i>.</p> <ul style="list-style-type: none"> Use of facility lighting that does not attract birds or their prey to project sites. These include using nonsteady burning lights (red, dual red and white strobe, strobe-like flashing lights) to meet Federal Aviation Administration requirements, using motion or heat sensors and switches to reduce the time when lights are illuminated, using appropriate shielding to reduce horizontal or skyward illumination, and avoiding the use of high-intensity lights (e.g., sodium vapor, quartz, and halogen). Lighting will not be installed under viaduct and bridge structures in riparian habitat areas. 								
BIO-MM#26	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 through August) 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 Swainson's Hawk Technical Advisory Committee's <i>Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley</i> .	Pre-construction	Conduct pre-construction surveys; Compliance reporting	Monthly	Contractor	Contractor	Monthly reporting	Condition of design-build contract; Condition of regulatory permits	Impact BIO#11: Direct Impacts on Special-Status Wildlife—Birds
BIO-MM#27	Implement Avoidance and Minimization Measures for Swainson's Hawk Nests	<p>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 (February 1–September 1) will be monitored daily by the Project Biologist to assess whether the nest is occupied. If the nest is occupied, the Project Biologist will establish no-work buffers following CDFW's <i>Staff Report Regarding Mitigation for Impacts to Swainson's Hawks (Buteo swainsoni) in the Central Valley of California</i>, and the status of the nest will be monitored until the young fledge or for the length of construction activities, whichever occurs first. Adjustments to the buffer(s) may be made in consultation with CDFW.</p> <p>If an occupied Swainson's hawk nest tree is to be removed, an incidental take permit under CESA will be obtained and impacts will be minimized and fully mitigated.</p>	Pre-construction/ construction	Establish active nest buffers; Compliance reporting	Pre-construction daily monitoring if required; Monthly reporting	Contractor	Contractor	Pre-construction daily monitoring if required; Monthly reporting	Condition of design-build contract; Condition of regulatory permits	Impact BIO#11: Direct Impacts on Special-Status Wildlife—Birds
BIO-MM#28	Monitor Removal of Nest Trees for Swainson's Hawks	Prior to construction (any ground-disturbing activity), the biological monitor will monitor nest trees for Swainson's hawks in the project footprint following the Swainson's	Pre-construction/ construction	Monitoring; Compliance reporting	Monthly	Contractor	Contractor	Monthly reporting	Condition of design-build contract; Condition of	Impact BIO#11: Direct Impacts on Special-Status

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		Hawk Technical Advisory Committee Survey Recommendations. If an occupied Swainson's hawk nest must be removed, the Authority will obtain take authorization through a Section 2081 Incidental Take Permit (including compensatory mitigation to offset the loss of the nest tree) from CDFW. If ground-disturbing activities or other activities may cause nest abandonment by a Swainson's hawk or forced fledging within the specified buffer area, monitoring of the nest site by the Biological Monitor(s) will be conducted to determine if the nest was abandoned. Removal of nesting trees outside of the nesting season (generally between October 1 and February 1) does not require authorization under the Section 2081 Incidental Take Permit. The Project Biologist will report to the Authority on a monthly basis during the nesting season to document compliance with this measure.							regulatory permits	Wildlife—Birds
BIO-MM#29	Conduct Protocol-level Surveys for Burrowing Owls	Prior to any ground-disturbing activity, the Project Biologist will conduct protocol-level surveys for burrowing owl within suitable habitat located in the Work Area and/or extending 500 feet from the boundary of the Work Area, where access is available. Surveys will be conducted in accordance with guidelines in the CDFW <i>Staff Report on Burrowing Owl Mitigation</i> .	Pre-construction	Conduct protocol-level surveys; Compliance reporting	Monthly	Contractor	Contractor	Monthly reporting	Condition of design-build contract	Impact BIO#11: Direct Impacts on Special-Status Wildlife—Birds
BIO-MM#30	Implement Avoidance and Minimization Measures for Burrowing Owl	Occupied burrowing owl burrows that will be directly affected by ground-disturbing activities will be relocated in accordance with CDFW's <i>Staff Report on Burrowing Owl Mitigation</i> . To the extent feasible, the Project Biologist will establish 600-foot no-work buffers around occupied burrowing owl burrows in the Work Area during the nesting season (February 1–September 1). If the no-work buffer is not feasible and occupied burrows will be relocated during the nesting season, relocation will occur either before the birds have begun egg-laying and incubation or after the Project Biologist has determined that the juveniles from the occupied burrows are foraging independently and are capable of independent survival.	Pre-construction	Establish no-work buffers	Pre-construction	Contractor	Contractor	Pre-construction	Condition of design-build contract	Impact BIO#11: Direct Impacts on Special-Status Wildlife—Birds
BIO-MM#31	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 identified 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 to 2 hours after sunset for a minimum of 2 nights within the season that construction would 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	Pre-construction	Conduct pre-construction surveys; Compliance reporting	Monthly	Contractor	Contractor	Monthly reporting	Condition of design-build contract	Impact BIO#13: Direct Impacts on Special-Status Wildlife—Mammals Impact BIO#14: Indirect Impacts on Special-Status Wildlife—Mammals

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		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#32	Implement Bat Avoidance and Relocation Measures	Prior to any ground-disturbing activity, the Project Biologist will survey for active hibernacula or maternity roosts. 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 with CDFW guidance. Compensation will include the installation of nearby suitable alternative roosting structures if displacements are long term or permanent. The alternative roosting structure, if required, will be constructed in accordance with CDFW guidance and will be designed to have comparable size and quality of the impacted habitat. The Project Biologist will implement the relocation plan before the commencement of any ground-disturbing activities that would occur within 500 feet of the hibernacula. Removal of roosts will be guided by accepted exclusion and deterrent techniques.	Pre-construction	Prepare BMP memorandum and possibly a relocation plan; Compliance reporting	Monthly	Contractor	Contractor	Monthly reporting	Condition of design-build contract	Impact BIO#13: Direct Impacts on Special-Status Wildlife—Mammals Impact BIO#14: Indirect Impacts on Special-Status Wildlife—Mammals
BIO-MM#33	Implement Bat Exclusion and Deterrence Measures	If non-breeding or non-hibernating 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.	Pre-construction	Prepare BMP memorandum; Implement safe exclusion or eviction activities; Compliance reporting	Monthly	Contractor	Contractor	Monthly reporting	Condition of design-build contract	Impact BIO#13: Direct Impacts on Special-Status Wildlife—Mammals Impact BIO#14: Indirect Impacts on Special-Status Wildlife—Mammals
BIO-MM#34	Conduct Pre-construction Surveys for American Badger Den Sites and Implement 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	Pre-construction	Conduct pre-construction surveys; Compliance reporting	Monthly	Contractor	Contractor	Monthly reporting	Condition of design-build contract	Impact BIO#13: Direct Impacts on Special-Status Wildlife—Mammals Impact BIO#14: Indirect Impacts on Special-Status Wildlife—Mammals

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		will be implemented for 3 to 5 days to discourage the use of these dens prior to project disturbance activities.								
BIO-MM#35	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 within suitable habitat located 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.	Pre-construction	Establish buffer around active dens; Compliance reporting	Monthly	Contractor	Contractor	Monthly reporting	Condition of design-build contract	Impact BIO#13: Direct Impacts on Special-Status Wildlife—Mammals Impact BIO#14: Indirect Impacts on Special-Status Wildlife—Mammals
BIO-MM#36	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 modeled suitable habitat in the Work Area. The surveys will be conducted in accordance with USFWS' <i>San Joaquin Kit Fox Survey Protocol for the Northern Range</i> between May 1 and September 30 for the purpose of identifying potential San Joaquin kit fox dens. 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 is cleared, if necessary to allow construction activities to proceed.	Pre-construction	Conduct pre-construction surveys; Compliance reporting	Monthly	Contractor	Contractor	Monthly reporting	Condition of design-build contract; Condition of regulatory permits	Impact BIO#13: Direct Impacts on Special-Status Wildlife—Mammals Impact BIO#14: Indirect Impacts on Special-Status Wildlife—Mammals
BIO-MM#37	Minimize Impacts on San Joaquin Kit Fox	The Authority will implement USFWS' <i>Standardized Recommendations for Protection of the San Joaquin Kit Fox Prior to or During Ground Disturbance</i> to minimize impacts on this species, including: <ul style="list-style-type: none"> ▪ Disturbance to 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 periods 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 San Joaquin kit fox and their movement/migration corridors during construction, artificial dens will be installed along the outer perimeter of WEF and construction exclusion fencing. Artificial dens or similar escape structures 	Pre-construction	Prepare and implement BMPs; Compliance reporting	Monthly	Contractor	Contractor	Monthly reporting	Condition of design-build contract; Condition of regulatory permits	Impact BIO#13: Direct Impacts on Special-Status Wildlife—Mammals Impact BIO#14: Indirect Impacts on Special-Status Wildlife—Mammals

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		will also be installed at dedicated wildlife crossing structures to provide escape cover and protection against predation. The artificial dens will be located on parcels owned by the Authority or at locations where access is available.								
BIO-MM#38	Construction in Wildlife Movement Corridors	Prior to construction (any ground-disturbing activity), the Contractor's Project Biologist will submit a construction avoidance and minimization plan for wildlife movement linkages (as described in any permits or approvals) to the Authority via the Mitigation Manager for concurrence. The plan will limit the use of construction and avoid permanent fencing in wildlife movement linkages in areas where viaducts (e.g., elevated platforms) or bridges are included in the final design. The Contractor will minimize ground-disturbing activities within the wildlife linkages during nighttime hours to the extent practicable. The Contractor will also keep nighttime illumination (e.g., for security) from spilling into the linkages or shield nighttime lighting to avoid illumination spilling into the linkages. Inspections by the Project Biologist will verify compliance with this measure. The Project Biologist will report to the Authority on a monthly basis to document compliance with this measure.	Pre-construction	Prepare Avoidance and Minimization Plan; Compliance reporting	Monthly	Contractor	Contractor	Monthly reporting	Condition of design-build contract construction in wildlife movement linkages plan	Impact BIO#13: Direct Impacts on Special-Status Wildlife—Mammals Impact BIO#14: Indirect Impacts on Special-Status Wildlife—Mammals Impact BIO#23: Direct Impacts on Wildlife Movement Corridors
BIO-MM#39a	Establish Wildlife Crossings	The Authority will create dedicated wildlife crossings to accommodate wildlife movement across permanently fenced infrastructure (consistent with any wildlife corridor assessment prepared), where wildlife movement would be significantly reduced. Prior to final construction design, the Project Biologist will confirm appropriate placement and dimensions of wildlife crossings. For terrestrial wildlife, crossings will conform to the minimum design specifications below, unless different designs are specified in authorizations issued under the FESA or CESA. To the extent feasible, all wildlife crossings created specifically for terrestrial species will include the following features and design considerations: <ul style="list-style-type: none"> ▪ Native earthen bottom ▪ Ledges or tunnels incorporated into the design to facilitate safe passage of small mammals ▪ Unobstructed entrances (e.g., no riprap, energy dissipaters, grates), although vegetative cover, adjacent to and near the entrances of crossings, is permissible ▪ Openness and clear line of sight from end to end ▪ Year-round absence of water for a portion of the width of the crossing (i.e., no flowing water) ▪ Slight grade at approaches to prevent flooding ▪ Limited open space between crossing and cover/habitat 	Pre-construction	Create dedicated wildlife crossings in final construction plan	Final construction design	Authority	Contractor	Final construction design	Condition of design-build contract	Impact BIO#13: Direct Impacts on Special-Status Wildlife—Mammals Impact BIO#14: Indirect Impacts on Special-Status Wildlife—Mammals Impact BIO#23: Direct Impacts on Wildlife Movement Corridors

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<ul style="list-style-type: none"> Separation from human use areas (e.g., trails, multiuse undercrossings) Avoidance of artificial light at approaches to wildlife crossings <p>In addition, the Authority will incorporate features to accommodate wildlife movement into the design of bridges and culverts that are replaced or modified as part of project construction, wherever feasible. Project Biologist review of final construction design for consistency with placement and dimensions of wildlife crossings will be verified in a memorandum provided to the Authority.</p>								
BIO-MM#39b	Install Aprons or Barriers within Security Fencing	<p>Prior to final construction design the Project Biologist will review the fencing plans along any portion of the permanent right-of-way that is adjacent to natural habitats and confirm that the permanent security fencing will be enhanced with a barrier (e.g., fine mesh fencing) that extends at least 12 inches below ground and 12 inches above ground to prevent special-status reptiles, amphibians, and mammals from moving through or underneath the fencing and gaining access to areas within the right-of-way. At the 12-inch depth of the below-grade portion of the apron, it will extend or be bent at an approximately 90-degree angle, oriented outward from the right-of-way a minimum of 12 inches, to prevent fossorial mammals, reptiles, and amphibians from digging or tunneling below the security fence and gaining access to the right-of-way. A climber barrier (e.g., rigid curved or bent overhang) will be installed at the top of the apron to prevent reptiles, amphibians, and mammals from climbing over the apron.</p> <p>The Project Biologist will ensure that the selected apron material and climber barrier does not cause harm, injury, entanglement, or entrapment to wildlife species. The Authority will provide for quarterly inspection and repair of the fencing.</p> <p>The specific design and method for installation of an apron or barrier may vary as required by regulatory authorizations issued under the FESA and/or CESA. Prior to operation, the Project Biologist will field inspect the fencing along any portion of the permanent right-of-way that is adjacent to natural habitats and confirm that the fencing has been appropriately installed. Fencing plan review and field inspection will be documented in a memorandum from the Project Biologist and provided to the Authority.</p>	Pre-construction	Install aprons or barriers; field inspection and Reporting	Quarterly inspection and repair	Contractor	Authority	Quarterly inspection and repair	Condition of design-build contract; Requirement of regulatory agency permits	<p>Impact BIO#13: Direct Impacts on Special-Status Wildlife—Mammals</p> <p>Impact BIO#14: Indirect Impacts on Special-Status Wildlife—Mammals</p> <p>Impact BIO#23: Direct Impacts on Wildlife Movement Corridors</p>
BIO-MM#40	Conduct Pre-construction Surveys for Giant Kangaroo Rat, Nelson's Antelope Ground Squirrel, and Fresno Kangaroo Rat	<p>Prior to construction (any ground-disturbing activity), the Project Biologist will conduct pre-construction surveys for giant kangaroo rat, Nelson's antelope ground squirrel, and Fresno kangaroo rat burrows within suitable habitats (California annual grassland and valley sink scrub) in the project footprint plus a 50-foot buffer. Pre-construction surveys for giant kangaroo rat, Nelson's antelope ground</p>	Pre-construction	Conduct pre-construction surveys; Compliance reporting	Monthly	Contractor	Contractor	Monthly reporting	Condition of design-build contract; Condition of regulatory permits	<p>Impact BIO#13: Direct Impacts on Special-Status Wildlife—Mammals</p> <p>Impact BIO#14: Indirect Impacts on Special-Status</p>

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		squirrel, and Fresno kangaroo rat will be conducted 14 days prior to any ground-disturbing activities within the range of each of the species to identify known or potential burrows. If potential burrows are identified, live trapping surveys to determine occupancy by giant kangaroo rat Nelson's ground squirrel, or Fresno kangaroo rat may be used in coordination with the USFWS and CDFW.								Wildlife—Mammals
BIO-MM#41	Monitoring, Avoidance, and Relocation of Giant Kangaroo Rat, Nelson's Antelope Ground Squirrel, and Fresno Kangaroo Rat	At least 14 days prior to construction (any ground-disturbing activity), the Contractor, under the direction of the Project Biologist, will establish a 50-foot buffer around potential giant kangaroo rat, Nelson's antelope ground squirrel, and Fresno kangaroo rat burrows identified during the pre-construction surveys described under BIO-MM#40. The Contractor will cease construction activities within 50 feet of any potential burrow one-half hour before sunset and will not begin construction activities earlier than one-half hour after sunrise to avoid indirect impacts from artificial light to this nocturnal species. If any burrow cannot be avoided, and it is determined that the burrow is occupied by a giant kangaroo rat or Nelson's ground squirrel, the rodent will be allowed to leave the burrow and move to an area that will not be disturbed. A non-disturbance exclusion fence with one-way exit/escape points will be placed to exclude special-status rodents from the construction area. The wildlife exclusion fence will be established around burrows in a manner that allows special-status rodent species to leave the project footprint. Additional measures such as vegetation trimming and live trapping within the exclusion fence may be implemented in coordination with CDFW and USFWS. Adjustments to the buffer(s) would require prior approval by CDFW and USFWS as coordinated by the Project Biologist, under the supervision of the Mitigation Manager. The Project Biologist will report to the Authority on a monthly basis to document compliance with this measure.	Pre-construction/ construction	Monitoring; Establish buffer; Compliance reporting	Monthly	Contractor	Contractor	Monthly reporting	Condition of design-build contract; Condition of regulatory permits	Impact BIO#13: Direct Impacts on Special-Status Wildlife—Mammals Impact BIO#14: Indirect Impacts on Special-Status Wildlife—Mammals
BIO-MM#42	Measure Pile Driving Sound Pressure and Attenuate Underwater Sound	If in-water pile driving occurs in the wetted channel during the in-water work window, one of the following means of attenuating underwater sound will be implemented: <ul style="list-style-type: none"> Cofferdam—a cofferdam will be established around the pile driving area to keep it dewatered during impact pile driving. Air barrier—a pipe with a larger diameter than the driven pile will be set to keep the area between the pile and the pipe completely dewatered with an air barrier. Contained bubble curtain—a bubble curtain will be maintained around the driven pile. NMFS will be consulted regarding the measure(s) to install piles and notified of the selected measure(s). During implementation of any of these measures and installation of driven piles, underwater sound monitoring will be conducted. If underwater sound monitoring	Construction	Implement cofferdams, air barriers, and/or contained bubble curtain, if required; Monitoring	During construction	Contractor	Contractor	During construction	Condition of design-build contract following requirements established by regulatory compliance permits	Impact BIO#5: Direct Impacts on Special-Status Wildlife—Fish Impact BIO#21: Direct Impacts on Essential Fish Habitat

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		indicates that underwater sound exceeds 206 peak strike decibels (estimated at 10 meters from the driven pile), or that the daily accumulated sound exposure level is calculated to have exceeded 187 decibels (estimated at 10 meters from the driven pile), NMFS will be notified (within 24 hours) and construction will cease until corrections are made to the attenuation apparatus/protocol so that the thresholds are not exceeded.								
BIO-MM#43	Compensate for Impacts to Listed Plant Species	<p>The Authority will provide compensatory mitigation for direct impacts on federal and State-listed plant species based on the number of acres of plant habitat directly affected. Such mitigation will include the following measures:</p> <ul style="list-style-type: none"> Compensatory mitigation will be provided at a 1:1 ratio to offset direct impacts on federally listed plant species habitat, unless a higher ratio is required pursuant to regulatory authorizations issued under the FESA. Compensatory mitigation will be provided at a 1:1 ratio to offset direct impacts on State-listed plant species habitat, unless a higher ratio is required pursuant to regulatory authorizations issued under CESA. <p>Compensatory mitigation will be provided using one or more of the methods described in the Compensatory Mitigation Plan.</p>	Pre-construction/ Construction/ Post-construction	Compliance report	Before final design	Authority	Authority	Before final design	Authority to provide compensation based on extent of special-status plant species affected by the Contractor; Regulatory agency permit requirements	Impact BIO#1: Direct Impacts on Special-Status Plant Species
BIO-MM#44	Provide Compensatory Mitigation for Impacts on Vernal Pool Fairy Shrimp and Vernal Pool Tadpole Shrimp Habitat	The Authority will provide compensatory mitigation for direct and indirect impacts, including both temporary and permanent impacts, on vernal pool branchiopod habitat at a 1:1 ratio, unless a higher ratio is required by the FESA. Compensatory mitigation will be provided using one or more of the methods described in the Compensatory Mitigation Plan.	Pre-construction/ Construction/ Post-construction	Compliance report	Prior to operation	Authority	Authority	Prior to operation	Authority to provide compensation based on amount suitable habitat for vernal pool fairy shrimp and vernal pool tadpole shrimp affected by the Contractor; Regulatory agency permit requirements	Impact BIO#3: Direct Impacts on Special-Status Wildlife—Invertebrates
BIO-MM#45	Provide Compensatory Mitigation for Impacts on Valley Elderberry Longhorn Beetle Habitat	<p>The Authority will provide compensatory mitigation for impacts on valley elderberry longhorn beetle habitat, including through transplantation and replacement of elderberry shrubs and maintenance of replacement shrubs, consistent with the USFWS' <i>Framework for Assessing Impacts to the Valley Elderberry Longhorn Beetle</i>, as follows:</p> <ul style="list-style-type: none"> Suitable riparian habitat will be replaced at a 3:1 ratio (acres of mitigation to acres of impact). Suitable non-riparian habitat will be replaced at a ratio of 1:1. Individual valley elderberry shrubs in riparian areas will be replaced through a purchase of two credits at a USFWS-approved bank for each shrub that is 	Pre-construction/ Construction/ Post-construction	Compliance report	Transplant pre-construction; Compensation prior to operation	Authority	Authority	Transplant pre-construction; Compensation prior to operation	Authority to provide compensation based on amount suitable habitat for valley elderberry longhorn beetle affected by the Contractor; Regulatory agency permit requirements	Impact BIO#3: Direct Impacts on Special-Status Wildlife—Invertebrates

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<p>trimmed or removed, regardless of the presence of beetle exit holes.</p> <ul style="list-style-type: none"> Individual valley elderberry shrubs in non-riparian areas will be replaced through a purchase of one credit at a USFWS-approved bank for each shrub trimmed if beetle exit holes have been found in any shrub in or within 165 feet of the area to be disturbed. 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, and the transplanted shrub will be monitored for 10 years. <p>For transplanted valley 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.</p>								
BIO-MM#46	Provide Compensatory Mitigation for Impacts on California Tiger Salamander Habitat	The Authority will provide compensatory mitigation to offset the loss of California tiger salamander habitat. Compensatory mitigation will be provided in the following ratios, unless higher ratios are required through regulatory authorizations issued under the FESA and/or CESA. Permanent and temporary impacts on California tiger salamander habitat will be mitigated at ratios of 1:1 (acres preserved, enhanced, or restored: acres affected) and 0.5:1, respectively. Compensatory mitigation will be provided using one or more of the methods described in the Compensatory Mitigation Plan.	Pre-construction/ Construction/ Post-construction	Compliance report	Prior to operation	Authority in consultation USFWS	Authority	Prior to operation	Authority to provide compensation based on amount suitable habitat for California tiger salamander affected by the Contractor; Regulatory agency permit requirements	Impact BIO#7: Direct Impacts on Special-Status Wildlife—Amphibians
BIO-MM#47	Compensate for Impacts on Blunt-nosed Leopard Lizard and Nelson's Antelope Squirrel	The Authority will provide compensatory mitigation to offset the permanent and temporary loss of suitable habitat for the blunt-nosed leopard lizard and Nelson's antelope squirrel. Mitigation will be provided at a ratio of 1:1, unless a higher ratio is required by authorizations issued under the FESA for blunt-nosed leopard lizard or under CESA for Nelson's antelope squirrel. Compensatory mitigation will be provided using one or more of the methods described in the Compensatory Mitigation Plan.	Pre-construction/ Construction/ Post-construction	Compliance report	Prior to operation	Authority	Authority	Prior to operation	Authority to provide compensation based on amount suitable habitat for blunt-nosed leopard lizard and Nelson's antelope squirrel affected by the Contractor; Regulatory agency permit requirements	Impact BIO#9: Direct Impacts on Special-Status Wildlife—Reptiles Impact BIO#13: Direct Impacts on Special-Status Wildlife—Mammals
BIO-MM#48	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 surveys described in BIO-MM#26) and foraging habitat, the Authority will provide project-specific compensatory mitigation that replaces affected nest trees and provides foraging habitat. Lands proposed as compensatory mitigation for Swainson's hawk will meet the following minimum criteria: <ul style="list-style-type: none"> Support at least three mature native riparian trees suitable for Swainson's hawk nesting (i.e., valley oak, 	Pre-construction/ Construction/ Post-construction	Compliance report	Prior to operation	Authority	Authority	Prior to operation	Authority to provide compensation based on amount of habitat for Swainson's hawks affected by the Contractor; Regulatory agency permit requirements	Impact BIO#11: Direct Impacts on Special-Status Wildlife—Birds

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<p>Fremont cottonwood, or willow) for each Swainson's hawk nest tree removed by construction of the project extent.</p> <ul style="list-style-type: none"> ▪ Support at least one Swainson's hawk nesting territory in the last 5 years. ▪ Contribute to the project extent's mitigation commitment for Swainson's hawk foraging habitat, which will be calculated based on the following ratios: <ul style="list-style-type: none"> – 1:1 for impacts on Active primary foraging habitat – 0.75:1 for impacts on active secondary foraging habitat – 0.5:1 for impacts on active tertiary foraging habitat 								
BIO-MM#49	Provide Compensatory Mitigation for Loss of Burrowing Owl Active Burrows and Habitat	<p>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:</p> <ul style="list-style-type: none"> ▪ 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: <ul style="list-style-type: none"> – 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) 	Pre-construction/ Construction/ Post-construction	Compliance report	Prior to operation	Authority	Authority	Prior to operation	Authority to provide compensation number of burrowing owl burrows affected by the Contractor; Regulatory agency permit requirements	Impact BIO#11: Direct Impacts on Special-Status Wildlife—Birds
BIO-MM#50	Provide Compensatory Mitigation for Impacts to San Joaquin Kit Fox Habitat	<p>The Authority will provide compensatory mitigation for impacts on modeled 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 natural lands and at a ratio of 0.1:1 for suitable urban or agricultural lands, unless a higher ratio is required by regulatory authorizations issued under the FESA and/or CESA.</p>	Post-construction	Compliance report	Prior to operation	Authority	Authority	Prior to operation	Authority to provide compensation based on area of habitat for San Joaquin kit fox affected by the Contractor; Regulatory agency permit requirements	Impact BIO#13: Direct Impacts on Special-Status Wildlife—Mammals

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
BIO-MM#51	Provide Compensatory Mitigation for Impacts to Giant Garter Snake Habitat	The Authority will mitigate the destruction of giant garter snake habitat by the purchase of suitable, approved habitat (USFWS and CDFW). Habitat will be replaced at a minimum ratio of 1:1 for aquatic habitat and a ratio of 0.1:1 for suitable upland habitat to provide additional protection and habitat in a location that is consistent with the recovery of the species. The Authority will mitigate the impacts on giant garter snake in accordance with the USFWS Biological Opinion and/or CDFW 2081(b) Incidental Take Permit. The Authority will submit a memorandum to the USFWS and CDFW to document compliance with this measure.	Post-construction	Compliance report	Prior to operation	Authority	Authority	Prior to operation	Authority to provide compensation based on area of habitat for giant garter snake affected by the Contractor; Regulatory agency permit requirements	Impact BIO#9: Direct Impacts on Special-Status Wildlife—Reptiles
BIO-MM#52	Conduct Surveys and Implement Avoidance Measures for Crotch Bumble Bee	<p>Surveys for Crotch bumble bee in suitable habitat (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–September). For each sampling event, the biologist(s) will survey suitable habitat within the project footprint and 100-foot buffer surrounding the project footprint 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 would be required. General guidelines and best practices for bumble bee surveys will follow USFWS' <i>Survey Protocols for the Rusty Patched Bumble Bee (Bombus affinis)</i>, which are consistent with other bumble bee survey protocols used by The Xerces Society.</p> <p>If the surveys conducted within 1 year prior to construction identify occupied Crotch bumble bee habitat within the project footprint or the 100-foot buffer, 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 from March through September. The purpose of this pre-construction survey would be to identify active nest colonies and associated floral resources outside of 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 3 consecutive days indicating the colony has completed its</p>	Pre-construction	Conduct pre-construction surveys; Compliance reporting	Four evenly spaced sampling periods during March through September	Contractor	Contractor	Prior to construction	Condition of design-build contract; Condition of regulatory permits	Impact BIO#3: Direct Impacts on Special-Status Wildlife—Invertebrates

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		nesting season and the next season's queen has dispersed from the colony).								
BIO-MM#53	Provide Compensatory Mitigation for Impacts on Crotch Bumble Bee Habitat	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#52) 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 (if available), or through preservation of habitat in perpetuity including suitable habitat currently preserved by the Authority.	Post-construction	Compliance report	Prior to operation	Authority	Authority	Prior to operation	Authority to provide compensation based on area of habitat for Crotch bumble bee affected by the Contractor; Regulatory agency permit requirements	Impact BIO#3: Direct Impacts on Special-Status Wildlife—Invertebrates
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 and would 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.	Construction	Reporting; Monitoring	Weekly	Contractor	Contractor	Weekly reporting	Contract requirements and specifications	Impact HMW#5: Temporary Effects from Hazardous Materials and Wastes Activities in Proximity to Schools and Recreational Areas Impact SO#7: Temporary Impacts on Children's Health and Safety
Socioeconomics and Communities										
SO-MM#1	Implement Measures to Reduce Impacts Associated with the Division of Residential Neighborhoods	Prior to construction (in residential areas), the Authority will minimize impacts associated with the Preferred Alternative in residential areas by conducting special outreach to affected homeowners and residents to understand their special relocation needs fully. The Authority will make efforts to locate suitable replacement properties that are comparable to those currently occupied by these residents, including constructing suitable replacement facilities if necessary. In cases where residents wish to remain in the immediate vicinity, 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 replacement of services and utilities, as appropriate. Before land acquisition, the Authority will	Pre-construction/ Construction/ Post-construction	Reporting	Annual	Authority	Authority	Annual reporting	The Authority will conduct special outreach to affected homeowners and residents to design appropriate measures to minimize impacts.	Impact SO#2: Permanent Impacts on Communities—Community Cohesion Impact LU#3: Permanent Direct Impacts on Land Use Patterns

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		conduct community workshops to obtain input from those homeowners whose property would not be acquired, but whose community would be substantially altered by construction of HSR facilities, including the loss of many neighbors, to identify measures that could be taken to mitigate impacts on those who remain (including placement of sound barriers and landscaping, and potential uses for nonagricultural remnant parcels that could benefit the community in the long term). The Authority will document implementation of this measure through annual reporting.								
SO-MM#2	Implement Measures to Reduce Impacts Associated with the Division of Communities	<p>The Authority, in consultation with the community of Fairmead, will incorporate the following features into the final design of the Preferred Alternative to maintain a robust sense of community cohesion in Fairmead:</p> <ul style="list-style-type: none"> ▪ Two vehicular crossings, one each at Road 18 3/4 and Road 20 ▪ A multiuse trail along Road 19 1/2 between Avenue 24 and Avenue 22 3/4 to maintain pedestrian and bicycle access between the northern and southern portions of Fairmead (1.25 miles) ▪ Sidewalk installation at Avenue 23 (0.75 mile) and Arnott Drive (0.15 mile), and roadway repairs and sidewalk installations at Avenue 22 3/4 (0.5 mile), Moore Street (0.15 mile), Yates Avenue (0.33 mile), Road 19 1/2 (0.25 mile), Elm Street (0.33 mile), Fairmead Circle (0.12 mile), and Hickory Street (0.25 mile) ▪ Grading of Sycamore Street between Avenue 22 1/2 and Avenue 22 3/4 (0.25 mile) ▪ Roadway improvements, sidewalk installations, and landscaping at Fairmead Boulevard (1.65 miles), Sinclair Drive (0.2 mile), and Maple Street (0.4 mile) ▪ Street repair, sidewalk installation, and stormwater management at Avenue 22 1/2 (0.75 mile) ▪ Installation of streetlights at the Avenue 22 1/2 bus stop ▪ Landscaping along the HSR corridor (1.75 miles) <p>In addition, prior to construction, the Authority will minimize impacts associated with the Preferred Alternative in the existing established communities through a program of outreach to homeowners, residents, business owners, and community organizations in affected neighborhoods. The objective will be to maintain community cohesion and avoid physical deterioration. The Authority will also conduct community workshops about the future use of the area beneath the rail guideway, where these exist. These meetings shall provide residents and business owners with the opportunity to identify design and use options that could strengthen community cohesion and be compatible with the existing community character.</p>	Pre-construction/ Construction/ Post-construction	Reporting	Annual	Authority	Authority	Annual reporting	The Authority will conduct special outreach to affected homeowners and residents to design appropriate measures to minimize impacts, and hold workshops and create reports based on workshop and design findings	<p>Impact SO#2: Permanent Impacts on Communities—Community Cohesion.</p> <p>Impact LU#3: Permanent Direct Impacts on Land Use Patterns</p>

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<p>The Authority will present information at the workshops, giving the community options for areas along the right-of-way or beneath the rail guideway, and providing an opportunity for individuals to provide feedback. For example, if safety considerations prohibit such uses as bike paths or community gardens, alternatives, such as sculpture gardens or managed landscaping, could be considered. As part of the Central Valley Wye alternatives planning and development, the Authority has already initiated workshops in the community of Fairmead and received feedback from community members.</p> <p>The Authority will be responsible for interpreting the results of the community workshops and incorporating appropriate features into the design of the Preferred Alternative and measures that address the long-term management of the areas along the right-of-way or beneath the elevated HSR guideway. This would involve documenting the desired design concepts, incorporating them into the final design, and facilitating ongoing maintenance. The Authority will identify potential uses that may be developed in the right-of-way of the HSR system. These uses shall be compatible with the character of the adjacent community and sensitive to their needs. The costs associated with the development of these corridor improvements and how these costs would be paid would be determined during consultations with the affected city, county, parks district, or other community organizations. Furthermore, the parties or entities (i.e., the Authority, local government, park or recreation district, or nonprofit organization) responsible for some ongoing maintenance of these community areas would be determined. The Authority will document compliance with this measure through annual reporting.</p>								
Agricultural Farmland										
AG-MM#1	Conserve Important Farmland (Prime Farmland, Farmland of Statewide Importance, Farmland of Local Importance, and Unique Farmland)	<p>The Authority has entered into an agreement with the Department of Conservation 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 the converted farmlands, within the same agricultural regions as the impacts occur, at a replacement ratio of not less than 1:1 for lands that are permanently converted to nonagricultural use by the project.</p> <p>In addition to mitigation for Important Farmlands that are permanently 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</p>	Pre-construction	Compliance reporting	Monthly	Authority and California Farmland Conservancy	Authority	Monthly reporting prior to construction	The Authority has entered into an agreement with the DOC and its California Farmland Conservancy Program to implement agricultural land mitigation for the HSR system.	<p>Impact AG#2: Permanent Conversion of Important Farmland to Nonagricultural Use</p> <p>Impact AG#3: Creation of Remnant Parcels of Important Farmland</p>

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		25-foot-wide area adjacent to HSR permanently fenced infrastructure. The Authority will document implementation of this measure through issuance of a compliance memorandum annually.								
Aesthetics and Visual Resources										
AVR-MM#1	Minimize Visual Disruption from Construction Activities	<p>Prior to construction (any ground-disturbing activity) the Contractor will prepare a technical memorandum identifying how the project would adhere to local jurisdiction construction requirements (if applicable) regarding construction-related visual/aesthetic disruption. In order to minimize visual disruption, construction will employ the following activities:</p> <ul style="list-style-type: none"> Minimize pre-construction clearing to that necessary for construction. Limit the removal of buildings to those that would obstruct project components. Preserve existing vegetation, when possible, 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 replacement numbers and types to that which was removed based upon local jurisdictional requirements. If there are no local jurisdictional requirements, 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 10 mature trees in an area are removed, replant 20 younger trees that after 5 to 15 years (depending upon the growth rates of the trees) would provide coverage similar to the coverage provided by the trees that were removed for construction. To the extent feasible, do not locate construction staging sites within the immediate foreground distance (0 to 500 feet) of existing residential, recreational, or other high-sensitivity receptors. Where such siting is unavoidable, staging sites will be screened from sensitive receptors using appropriate solid screening materials such as temporary fencing and walls. Any graffiti or visual defacement of temporary fencing and walls will be painted over or removed within 5 business days. The technical memorandum will be submitted to the Authority for review and approval. 	Pre-construction/ Construction/ Post-construction	Prepare technical memorandum	Prior to construction	Contractor	Contractor	Prior to construction	Contract requirements and specifications	Impact AVR#1: Degraded Visual Quality for Residential Viewers during Construction
AVR-MM#2	Minimize Light Disturbance during Construction	Prior to construction (any ground-disturbing activity requiring nighttime construction), the Contractor will prepare a technical memorandum verifying how the Contractor will shield nighttime construction lighting and direct it downward in such a manner to minimize the light that falls outside the construction site boundaries.	Pre-construction/ Construction	Prepare technical memorandum	Prior to construction	Contractor	Contractor	Prior to construction	Contract requirements and specifications	Impact AVR#1: Degraded Visual Quality for Residential Viewers during Construction Impact BIO#24:

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		The technical memorandum will be submitted to the Authority for review and approval.								Indirect Impacts on Wildlife Movement Corridors
AVR-MM#3	Incorporate Design Criteria for Elevated Guideways and Station Elements That Can Adapt to Local Context	Prior to construction (any ground-disturbing activity), the Contractor will work with the Authority and local jurisdictions to incorporate the Authority-approved aesthetic preferences for non-station structures into final design and construction. Refer to <i>Aesthetic Options for Non-Stations Structures</i> (Authority 2017). A technical memorandum will be submitted to the Authority to document compliance.	Pre-construction/ Construction	Compliance technical memorandum	Prior to construction	Contractor	Contractor	Prior to construction	Contract requirements and specifications	Impact AVR#4: Decreased Visual Quality in the Robertson Boulevard Landscape Unit Impact LU#3: Permanent Direct Impacts on Land Use Patterns
AVR-MM#4	Provide Vegetation Screening along At-Grade and Elevated Guideways Adjacent to Residential Areas	Prior to operation and maintenance of the HSR system, the Contractor will plant trees (minimum 24-inch box and 8 feet in height) along the edges of the HSR rights-of-way in locations adjacent to residential areas to visually screen the elevated guideway and 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 on the Invasive Species Council of California's list will be planted. Upon 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 within the tree-planting areas. The Contractor will prepare a technical memorandum within 90 days of completing any construction section or segment documenting the species of trees that were incorporated into the edges of the HSR right-of-way adjacent to residential uses. The technical memorandum will be submitted to the Authority to document compliance.	Construction/ Post-construction	Plant trees; Compliance technical memorandum	Prior to operation planting trees; within 90 days of completing any construction section or segment documenting the species of trees that were incorporated into design	Contractor	Contractor	Prior to operation planting trees; within 90 days of completing any construction section or segment documenting the species of trees that were incorporated into design	Contract requirements, specifications; Landscaping, and maintenance will be provided by the Contractor for its scope of work until completion of the work at which time the Authority will assume responsibility for landscaping or assign the responsibility to other third parties	Impact AVR#4: Decreased Visual Quality in the Robertson Boulevard Landscape Unit Impact AVR#5: Decreased Visual Quality in the Fairmead Landscape Unit
AVR-MM#5	Replant Unused Portions of Lands Acquired for the HSR	Prior to operation and maintenance, the Contractor will plant vegetation within lands acquired for the project (e.g., shifting roadways) that are not used for the HSR or related supporting infrastructure, or other higher or better use. Plantings will allow adequate space between the vegetation and the HSR alignment and catenary lines. All street trees and other visually important vegetation removed in these areas during construction will be replaced with similar vegetation that, upon maturity, will be similar in size and character to the removed vegetation. Replaced shrubs shall be minimum 5 gallon and trees shall be minimum 24-inch box and 8 feet in height. The Authority will provide for continuous maintenance with appropriate irrigation systems. The Contractor will install the irrigation system within the planting areas. No species listed on the Invasive Species Council of California's list of invasive species will be planted.	Post-construction/ Operations	Plant vegetation; Reporting	Prior to operation and maintenance planting trees; Monthly reporting	Authority	Authority	Prior to operation and maintenance planting trees; Monthly reporting	Authority to implement appropriate landscape and maintenance plan	Impact AVR#4: Decreased Visual Quality in the Robertson Boulevard Landscape Unit Impact AVR#5: Decreased Visual Quality in the Fairmead Landscape Unit
AVR-MM#6	Landscape Treatments along the HSR	During final design, the Authority will consult with cities and counties regarding the landscaping program for	Construction/	Landscaping program	During final design	Authority	Contractor	During final design	Contract requirements and	Impact AVR#4:

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
	Overcrossings and Retained Fill Elements	<p>planting the slopes of the overcrossings and retained fill. Within 90 days from the completion of construction, the Contractor will plant the surface of the ground below overpasses (slope-fill overpasses) and retained fill elements with plant species that are consistent with the surrounding landscape (in terms of vegetative type, color, texture, and form) and based on their mature size and shape, growth rate, and drought tolerance. No species on the Invasive Species Council of California's list shall be planted. The landscaping will be continuously maintained, and appropriate irrigation systems will be installed if needed by the Authority.</p> <p>Where wall structures supporting the overpass or retained fill are proposed, architectural details, low-maintenance trees, and other vegetation will be employed to screen the structure, minimize graffiti, and reduce the effects of large walls. Surface coatings shall be applied on wood and concrete to facilitate cleaning and the removal of graffiti. Any graffiti or visual defacement or damage of fencing and walls will be painted over or repaired by the Authority within a reasonable time (approximately 10 business days) after notification.</p> <p>The Contractor will prepare a technical memorandum documenting implementation and submit the memorandum to Authority to document compliance.</p>	Final design	implemented; Compliance technical memorandum	implement landscaping program; Monthly reporting			implement landscaping program; Monthly reporting	specifications; Landscaping and maintenance will be provided by the Contractor for its scope of work until completion of the work at which time the Authority will assume responsibility for landscaping or assign the responsibility to other third parties	<p>Decreased Visual Quality in the Robertson Boulevard Landscape Unit</p> <p>Impact AVR#5: Decreased Visual Quality in the Fairmead Landscape Unit</p>
Cultural Resources										
CUL-MM#1	Amend Archaeological and Built Environment Treatment Plans	<p>As required by the Merced Fresno MOA², the ATP will be amended, as needed by the Authority, in consultation with the signatories to the Merced Fresno MOA, and shall be consistent with the requirements of the PA Stipulation VIII.B. The ATP amendment will identify specific steps and responsible parties for Merced Fresno MOA compliance (for example, the roles and qualifications of staff; a process consistent with Section 106 and the PA; summary of archaeological resources and anticipated archaeological types; expectations for survey design; excavation strategy; relevant research questions; a monitoring plan specifying protocols of monitoring; reporting requirements; curation planning).</p> <p>The BETP amendment will add a commitment for the Authority to require the Contractor to refine the design in the vicinity of the Robertson Boulevard Tree Row to minimize the number of trees affected. Implementation will be coordinated with the construction schedule; the related timing requirements will be included in the BETP.</p>	Pre-construction	Reporting	Pre-construction weekly reporting or as dictated by the ATP and BETP	Authority	Authority	Pre-construction weekly reporting or as dictated by the ATP and BETP	MOA/ATP/PA/BETP	<p>Impact CUL#1: Permanent Disturbance of Unknown Archaeological Sites</p> <p>Impact CUL#3: Permanent Demolition, Destruction, Relocation, or Alteration of Historic Architectural Resources or Setting</p>
CUL-MM#2	Mitigate Adverse Impacts on Archaeological and Built Environment	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	Pre-construction	Reporting	Pre-construction weekly reporting or as dictated by the ATP and	Contractor	Contractor	Pre-construction weekly reporting or as dictated by the ATP and	MOA/ATP/PA/BETP	Impact CUL#1: Permanent Disturbance of Unknown Archaeological Sites

² California High-Speed Train Merced to Fresno Section: Memorandum of Agreement for the Treatment of Adverse Effects on Historic Properties under Section 106 of the National Historic Preservation Act.

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
	Resources Identified during Phased Identification. Comply with the Stipulations Regarding the Treatment of Archaeological and Historic Built Resources in the PA and MOA	<p>properties that will be adversely affected, the following process will be followed, which is presented in detail in the BETP and ATP:</p> <ul style="list-style-type: none"> 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 can feasibly be preserved in place, or if data recovery is necessary. The methods of preservation in place shall 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 Contractor's Principal Investigator, 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 Contractor's Principal Investigator 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 California Public Resources Code 21083.2 by following protection, data recovery, and/or other appropriate steps outlined in the ATP. The review and approval requirements for these documents are outlined in the ATP. For historic built resources, the Contractor's Principal Investigator will amend the BETP to include the treatment and mitigation measures identified by the Authority/FRA in consultation with the MOA signatories and concurring parties. The Contractor's Principal Investigator will implement the treatment and mitigation measures accordingly. 			BETP			BETP		
CUL-MM#3	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 clearing 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 Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation (48 Fed. Reg. 44716-42), as amended (National Park Service); and Guidelines for the Implementation of CEQA, as amended (Title 14 California Code of Regulations Chapter 3, Article 9, Sections 15120-15132). Should the discovery include human remains, the	Construction	Reporting	Daily logs during active monitoring	Contractor and Authority	Contractor	Daily logs during active monitoring	MOA/ATP/PA	Impact CUL#1: Permanent Disturbance of Unknown Archaeological Sites

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<p>Contractor and the Authority will comply with federal and state regulations and guidelines regarding the treatment of human remains, including relevant sections of Native American Graves Protection and Repatriation Act (Section 3(c)(d)); California Health and Safety Code, Section 8010 et seq.; and California Public Resources Code Section 5097.98; and consult with the Native American Heritage Commission, tribal groups, and the SHPO.</p> <p>In the event of an unanticipated archaeological discovery, the Contractor will cease work in the immediate vicinity of the find, based on the direction of the archaeological monitor or the apparent location of cultural resources if no monitor is present. If no Qualified Archaeologist is present, no work can commence until it is approved by the Qualified Archaeologist in accordance with the MOA, ATP, and monitoring plan. The Contractor's Qualified Archaeologist will assess the potential significance of the find and make recommendations for further evaluation and treatment as necessary. These steps may include evaluation for the CRHR and NRHP and necessary treatment to resolve significant effects if the resource is a historical resource or historic property. If, after documentation is reviewed by the Authority and they determine 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, preservation in place will be considered by the Authority 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 the Contractor's qualified Principal Investigator will prepare a data recovery plan as required under CEQA Guidelines Section 15126.4(b)(3)(C), the MOA, and ATP, for the Authority's approval.</p> <p>The Contractor will notify the Authority, which will notify the California State Lands Commission, if the find is a cultural resource on or in the submerged lands of California and consequently under the jurisdiction of the California State Lands Commission. The Authority will comply with all applicable rules and regulations promulgated by California State Lands Commission with respect to cultural resources in submerged lands.</p> <p>If human remains are 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 Native American Heritage Commission to identify the 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</p>								

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<p>will be recorded with the Native American Heritage Commission and relevant information center of the California Historical Resources Information System.</p> <p>If human remains are part of an archaeological site, the Authority and Contractor will, in consultation with the MLD and other consulting parties, consider preservation in place as the first option, in the order of priority called for in CEQA Guidelines Section 15126.4(b)(3).</p> <p>In consultation with the relevant Native American Tribes, the Authority may conduct scientific analysis on the human remains if called for under a data recovery plan and amenable to all consulting parties. The Authority will work with the MLD to satisfy the requirements of California Public Resources Code Section 5097.98. Performance tracking of this mitigation measure will be based on successful implementation and acceptance of the documentation by the SHPO and appropriate consulting parties.</p>								
CUL-MM#4	Mitigation for Permanent Demolition, Destruction, Relocation, or Alteration of Historic Architectural Resources or Setting—Robertson Boulevard Tree Row	The Merced Fresno MOA outlines specific mitigation measures for the Robertson Boulevard Tree Row. Because the effect is similar, these same mitigation measures are appropriate for the Central Valley Wye alternatives impacts. These measures are detailed in the Merced Fresno MOA. Overall, these measures include conducting pre-construction conditions assessments of the trees, preparing plans for protection and stabilization, preparing response plans for unanticipated effect and inadvertent damage, preparing and submitting Historic American Landscape Survey documentation, and relocation of selected trees. Consequently, no changes to the Merced Fresno MOA would be necessary.	Pre-construction/ Construction	Implement measures per Merced Fresno MOA	Pre-construction weekly reporting or as dictated by the MOA	Contractor	Contractor	Pre-construction weekly reporting or as dictated by the MOA	MOA	Impact CUL#3: Permanent Demolition, Destruction, Relocation, or Alteration of Historic Architectural Resources or Setting
Environmental Justice										
EJ-MM#1	Provide a Community Center for the Community of Fairmead	<p>The Authority will provide Madera County with funding for the County to construct a community center in Fairmead. The Authority will base its funding estimate on comparable facilities in the region. The County will be responsible for construction, operation, and maintenance of the facility.</p> <p>For the purposes of the current environmental review, the Authority assumes that the construction of the community center will adhere to the following performance standards:</p> <ol style="list-style-type: none"> The project site does not contain any of the following: <ul style="list-style-type: none"> Important Farmland Any protected biological or wetland resources Any eligible cultural resources (and no such resources on adjacent/nearby sites) Any existing residence or business that would be displaced Incompatible land use on or associated with the proposed community center site 	Pre-construction	Funding	As set forth in Authority agreement with Madera County	Authority	Authority	Provision of funding to Madera County	Authority agreement with Madera County	Not Applicable

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<p>2. Further performance standards related to construction will include at least the following:</p> <ul style="list-style-type: none"> – Construction will be completed before trains are operating on the HSR system. EJ-MM#2 would already have been implemented by the time of community center construction, so that no separate new infrastructure extension would be required. <p>3. Construction of the community center will adhere to all IAMFs and mitigation measures applied to the Preferred Alternative.</p> <p>The Authority, through coordination with community leaders and Madera County, will provide guidance on the long-term sustainability of the center. This coordination will include identification of funding mechanisms for operation, maintenance, and insurance of the community center.</p> <p>The community center will provide residents a permanent meeting place for community gatherings and events. In concert with EJ-MM#2, this will reduce the adverse impacts on community cohesion from construction of the Preferred Alternative.</p>								
EJ-MM#2	Provide Water and Sewer Service for the Community of Fairmead	<p>Water Service</p> <p>The Authority will provide funding assistance and will work with Madera County to secure grant funds for the community of Fairmead to connect to the nearest safe and reliable municipal water supply system. The implementation of this connection will provide an improved water supply system for the community of Fairmead and Madera County. Ongoing operations and maintenance responsibility for the water supply system will remain with the community of Fairmead and Madera County.</p> <p>Access to a safe and reliable municipal water supply would improve the community's opportunity for future stability and growth. Providing water service for the community of Fairmead would, in concert with EJ-MM#1, reduce the impacts on community cohesion from construction of the Preferred Alternative. In addition, it would eliminate inadequate water service, a major stress facing residents, encourage business development (not possible without a reliable water supply), and increase the incentive of residents to remain in the community.</p> <p>Sewer Service</p> <p>The City of Chowilla has agreed to provide capacity for the community of Fairmead at the Chowchilla Wastewater Treatment Plant, but additional funding is needed to connect the community to the treatment plant. The Authority will provide funding assistance and will work with the City of Chowchilla to connect the community of Fairmead to the Chowchilla Wastewater Treatment Plant. In addition, the Authority will continue to work with the City of Chowchilla on grant applications to provide funding for the design and construction of a sewer distribution system</p>	Pre-construction	Funding	As set forth in agreements pending between Authority and Madera County, and Authority and City of Chowchilla	Authority	Authority	Provision of funding to Madera County and City of Chowchilla	Pending Authority agreements with Madera County and City of Chowchilla	Not Applicable

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<p>from Fairmead to Chowchilla with a sewer collection system located in the community of Fairmead.</p> <p>A centralized sewer system and access to a municipal wastewater treatment plant would provide a needed improvement to a critical community infrastructure system necessary for future stability and growth. Providing a centralized sewer service for the community of Fairmead would, in concert with EJ-MM#1, reduce impacts on community cohesion from the construction of the Preferred Alternative. In addition, it would eliminate decentralized sewer treatment and the potential for groundwater contamination that are major stresses facing residents, encourage business development (not possible without a centralized sewer system and wastewater treatment), and increase the incentive for residents to remain in the community.</p>								

°F	degrees Fahrenheit	CWA	Clean Water Act	MOA	memorandum of agreement	SJVAPCD	San Joaquin Valley Air Pollution Control District
AQMD	Air Quality Management District	dba	A-weighted decibels	MOU	memorandum of understanding	SR	State Route
APLIC	Avian Power Line Interaction Committee	DOC	Department of Conservation	mph	miles per hour	SWRCB	State Water Resources Control Board
ATP	Archaeological Treatment Plan	EIR	environmental impact report	NAHC	Native American Heritage Commission	USACE	U.S. Army Corps of Engineers
Authority	California High-Speed Rail Authority	EIS	environmental impact statement	NEPA	National Environmental Policy Act	USEPA	U.S. Environmental Protection Agency
BAAQMD	Bay Area Air Quality Management District	EMMA	Environmental Mitigation Management and Assessment system	NHPA	National Historic Preservation Act	USFWS	U.S. Fish and Wildlife Service
BETP	built environment treatment plan	ERA	environmentally restricted area	NMFS	National Marine Fisheries Service	VERA	Voluntary Emission Reduction Agreement
BMP	best management practice	ESA	environmentally sensitive area	NO _x	nitrogen oxides	VOC	volatile organic compounds
BRMP	biological resources management plan	FESA	Federal Endangered Species Act	NRHP	National Register of Historic Places	WEAP	worker environmental awareness program
CARB	California Air Resources Board	FRA	Federal Railroad Administration	OCS	overhead contact system	WEF	wildlife exclusion fencing
CDFW	California Department of Fish and Wildlife	GIS	Geographic Information System	PA	Programmatic Agreement		
CEQA	California Environmental Quality Act	HMP	habitat mitigation plan	PM	particulate matter		
CESA	California Endangered Species Act	HSR	high-speed rail	PRM	permittee-responsible mitigation		
C.F.R.	Code of Federal Regulations	HST	high-speed train	RRP	Restoration and Revegetation Plan		
CMP	Compensatory Mitigation Plan	IAMF	Impact Avoidance and Minimization Feature	SFBAAB	San Francisco Bay Area Air Basin		
CRHR	California Register of Historical Resources	Leq	equivalent sound level	SHPO	State Historic Preservation Officer		
		MLD	most likely descendent	SJVAB	San Joaquin Valley Air Basin		

Table 2 Merced to Fresno Section: Central Valley Wye Impact Avoidance and Minimization Features

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
Air Quality and Global Climate Change										
AQ-IAMF#1	Fugitive Dust Emissions	<p>During construction, the Contractor will employ the following measures to minimize and control fugitive dust emissions. The Contractor will prepare a fugitive dust control plan for each distinct construction segment. At a minimum, the plan will describe how each measure would be employed and identify an individual responsible for ensuring implementation. At a minimum, the plan will address the following components unless alternative measures are approved by the applicable air quality management district.</p> <ul style="list-style-type: none"> ▪ Cover all vehicle loads transported on public roads to limit visible dust emissions, and maintain at least 6 inches of freeboard space from the top of the container or truck bed. ▪ Clean all trucks and equipment before exiting the construction site using an appropriate cleaning station that does not allow runoff to leave the site or mud to be carried on tires off the site. ▪ Water exposed surfaces and unpaved roads at a minimum three times daily with adequate volume to result in wetting of the top 1 inch of soil but avoiding overland flow. Rain events may result in adequate wetting of top 1 inch of soil thereby alleviating the need to manually apply water. ▪ Limit vehicle travel speed on unpaved roads to 15 mph. ▪ Suspend any dust-generating activities when average wind speed exceeds 25 mph. ▪ Stabilize all disturbed areas, including storage piles that are not being used on a daily basis for construction purposes, by using water, a chemical stabilizer/suppressant, hydro mulch or by covering with a tarp or other suitable cover or vegetative ground cover, to control fugitive dust emissions effectively. In areas adjacent to organic farms, the Authority would use non-chemical means of dust suppression. ▪ Stabilize all on-site unpaved roads and off-site unpaved access roads, using water or a chemical stabilizer/suppressant, to effectively control fugitive dust emissions. In areas adjacent to organic farms, the Authority would use non-chemical means of dust suppression. ▪ Carry out watering or presoaking for all land clearing, grubbing, scraping, excavation, land leveling, grading, cut and fill, and demolition activities. ▪ For buildings up to 6 stories in height, wet all exterior surfaces of buildings during demolition. 	Construction	Prepare plan/Reporting	Weekly	Contractor	Contractor	Weekly reporting	Condition of design-build contract	<p>Impact AQ#1: Temporary Direct Impacts on Air Quality within the SJVAB</p> <p>Impact AQ#2: Temporary Direct Impacts on Implementation of an Applicable Air Quality Plan</p> <p>Impact AQ#5: Temporary Direct Impacts on Air Quality —Asbestos and Lead-Based Paint</p> <p>Impact AQ#6: Temporary Direct Impacts on Air Quality —Localized Health Impacts</p> <p>Impact SS#7: Temporary Exposure to Valley Fever</p> <p>Impact SO#7: Temporary Impacts on Children's Health and Safety</p> <p>Impact LU#2: Temporary Indirect Impacts on Land Use Patterns Related to Areas Used for Construction</p> <p>Impact PK#3: Temporary Impacts from Noise and Dust on School Play Areas and Recreational Facilities</p>

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<ul style="list-style-type: none"> Limit or expeditiously remove the accumulation of mud or dirt from adjacent public streets at a minimum of once daily, using a vacuum type sweeper. After the addition of materials to or the removal of materials from surface or outdoor storage piles, apply sufficient water or a chemical stabilizer/suppressant. 								
AQ-IAMF#2	Selection of Coatings	<p>During construction, the Contractor will use:</p> <ul style="list-style-type: none"> Low- VOC paint that contains less than 10 percent of VOC contents (VOC, 10%). Super-compliant or Clean Air paint that has a lower VOC content than that required by San Joaquin Valley Unified Air Pollution Control District Rule 4601, when available. If not available, the Contractor will document lack of availability, recommend alternative measure(s) to comply with Rule 4601 or disclose absence of measure(s) for full compliance and obtain concurrence from the Authority. 	Construction	Contractor	Monthly	Contractor	Contractor	At incorporation or completion of design/monthly reporting (during construction)	Condition of design-build contract	<p>Impact AQ#1: Temporary Direct Impacts on Air Quality within the SJVAB</p> <p>Impact AQ#2: Temporary Direct Impacts on Implementation of an Applicable Air Quality Plan</p> <p>Impact SO#7: Temporary Impacts on Children's Health and Safety</p>
Noise and Vibration										
NV-IAMF#1	Noise and Vibration	<p>Prior to construction, the Contractor will prepare and submit to the Authority a noise and vibration technical memorandum documenting how the Federal Transit Administration and FRA guidelines for minimizing construction noise and vibration impacts would be employed when work is being conducted within 1,000 feet of sensitive receptors. Typical construction practices contained in the Federal Transit Administration and FRA guidelines for minimizing construction noise and vibration impacts include the following:</p> <ul style="list-style-type: none"> Construct noise barriers, such as temporary walls or piles on excavated material, between noisy activities and noise sensitive resources. Route truck traffic away from residential streets, when possible. Construct walled enclosures around especially noisy activities or around clusters or noise equipment. Combine noisy operations so that they occur in the same period. Phase demolition, earthmoving, and ground-impacting operations so as not to occur in the same time period. Avoid impact pile driving where possible in vibration sensitive areas. 	Pre-construction/ Construction	Prepare technical memorandum/ Compliance reporting	Monthly	Contractor	Contractor	At incorporation or completion of design/monthly reporting (during construction)	Condition of design-build contract	<p>Impact NV#1: Temporary Exposure of Sensitive Receptors to Construction Noise</p> <p>Impact NV#2: Temporary Exposure of Sensitive Receptors and Buildings to Vibration from Construction</p> <p>Impact SO#1: Temporary Impacts on Communities—Community Cohesion</p> <p>Impact LU#2: Temporary Indirect Impacts on Land Use Patterns Related to Areas Used for Construction</p> <p>Impact LU#5: Permanent Conversion of Existing Land Uses to Transportation or Electrical Utility Resulting in Adjacent Incompatible Uses</p> <p>Impact PK#3: Temporary Impacts from Noise and Dust on School Play Areas and Recreational</p>

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
Electromagnetic Fields and Electromagnetic Interference										
EMF/EMI-IAMF#1	Preventing Interference with Adjacent Railroads	<p>TM 3.00.10. Implementation Stage Electromagnetic Compatibility Program Plan (ISEP) requires coordination with adjacent railroads. During project design, the Contractor will work with the engineering departments of railroads that operate parallel the HSR to apply standard design practices to prevent interference with the electronic equipment operated by these railroads. Prior to operation and maintenance of each operating segment, the Contractor will certify through issuance of a technical memorandum to the Authority that design provisions to prevent interference have been established and have been determined to be effective prior to the activation of potentially interfering systems of the HSR.</p> <p>The Contractor will work with the railroad engineering departments where these railways parallel the HSR to apply the standard design practices to prevent interference with the electronic equipment operated by these railroads. Design provisions to prevent interference would be put in place and determined to be adequately effective by a qualified electrical engineering professional prior to the HSR activation of potentially interfering systems. The Authority's Design Criteria Manual Chapter 26 summarizes the applicable EMI/EMF design standards that the Authority will use for the project.</p>	Design/ Construction	Prepare technical memorandum/ Compliance reporting	Monthly	Contractor	Contractor/ Authority	At incorporation or completion of design/monthly reporting (during construction)	ISEP	Impact EMF/EMI#5: Permanent Interference with Signal Systems of Adjacent Railroads
EMF/EMI-IAMF#2	Controlling Electromagnetic Fields/ Electromagnetic Interference	<p>Prior to construction, the Contractor will prepare an EMI/EMF technical memorandum for review and approval by the Authority. The HSR project shall adhere to international guidelines and comply with applicable federal and state laws and regulations. The HSR project design will follow TM 300.10, ISEP, the Authority's Design Criteria Manual Chapter 26, which provides detailed EMC design criteria for the HSR systems and equipment, and the Authority's Design Criteria Manual Chapter 22, which addresses grounding requirements for third-party metallic structures, including fences and pipelines, which are parallel and adjacent to the HSR right-of-way. These documents describe the design practices to avoid EMI and to provide for HSR operational safety. Some measures of the ISEP include:</p> <ul style="list-style-type: none"> During the planning stage through system design, the Authority will perform electromagnetic compatibility (EMC)/EMI safety analyses, which would include identification of existing nearby radio systems, design of systems to prevent EMI with identified neighboring uses, and incorporation of these design requirements into bid specifications used to procure radio systems. Pipelines and other linear metallic objects that are not sufficiently grounded through the direct contact with earth would be separately grounded in coordination with the affected owner or utility to avoid possible 	Design/ Construction	Prepare technical memorandum/ Compliance reporting	Monthly	Contractor	Contractor/ Authority	At incorporation or completion of design/monthly reporting (during construction)	Reporting contractor	<p>Impact EMF/EMI#2: Permanent Human Exposure to EMF</p> <p>Impact EMF/EMI#5: Permanent Interference with Signal Systems of Adjacent Railroads</p> <p>Impact EMF/EMI#6: Permanent Corrosion of Underground Pipelines and Cables</p>

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<p>shock hazards. For cases where metallic fences are purposely electrified to inhibit livestock or wildlife from traversing the barrier, specific insulation design measures would be implemented.</p> <ul style="list-style-type: none"> HSR standard corrosion protection measures would be implemented to eliminate risk of substantial corrosion of nearby metal objects. 								
Public Utilities and Energy										
PUE-IAMF#1	Design Measures	The HSR project design incorporates utilities and design elements that minimize electricity consumption (e.g., using regenerative braking, energy-saving equipment on rolling stock and at station facilities, implementing energy saving measures during construction, and automatic train operations to maximize energy efficiency during operations). Thus, the project would not overburden utility services. The design elements are included in the design-build contract. Additionally, the Authority has adopted a sustainability policy that establishes project design and construction requirements that avoid and minimize impacts.	Design/ Construction	Reporting	Monthly	Contractor	Contractor	At incorporation or completion of design/monthly reporting (during construction)	Condition of design-build contract	Impact PUE#1: Planned Temporary Interruption of Major Utility Services Impact PUE#7: Permanent Impacts on Wastewater or Stormwater Pipelines Impact PUE#8: Temporary Impacts from Energy Consumption
PUE-IAMF#2	Irrigation Facility Relocation	Where relocating an irrigation facility is necessary, the Contractor will verify the new facility is operational prior to disconnecting the original facility, where feasible. Irrigation facility relocation preferences are included in the design-build contract and reduce unnecessary impacts on continued operation of irrigation facilities. The Contractor will document all relocations in a memorandum for Authority review and approval.	Design/ Pre-construction	Reporting	Monthly	Contractor	Contractor	At incorporation or completion of design/monthly reporting (during construction)	Condition of design-build contract	Impact PUE#1: Planned Temporary Interruption of Major Utility Services Impact PUE#5: Permanent Conflicts with Existing Utilities Requiring Relocation Impact AG#4: Disruption of Agricultural Infrastructure
PUE-IAMF#3	Public Notifications	Prior to construction in areas where utility service interruptions are unavoidable, the Contractor will notify the public through a combination of communication media (e.g., by phone, email, mail, newspaper notices, or other means) within that jurisdiction and the affected service providers of the planned outage. The notification will specify the estimated duration of the planned outage and will be published no fewer than 7 days prior to the outage. Construction will be coordinated to avoid interruptions of utility service to hospitals and other critical users. The Contractor will submit the public communication plan to the Authority 60 days in advance of the work for verification that appropriate messaging and notification are to be provided.	Pre-construction/ Construction	Public notification	Monthly	Contractor	Contractor	60 days in advance of work for verification	Condition of design-build contract	Impact PUE#1: Planned Temporary Interruption of Major Utility Services Impact PUE#5: Permanent Conflicts with Existing Utilities Requiring Relocation Impact AG#4: Disruption of Agricultural Infrastructure
PUE-IAMF#4	Utilities and Energy	Prior to construction, the Contractor will prepare a technical memorandum documenting how construction activities would be coordinated with service providers to minimize or avoid interruptions. It would include upgrades of existing power lines to connect the HSR system to	Design/ Pre-construction	Prepare a technical memorandum	Monthly	Contractor	Contractor	At incorporation or completion of design/monthly reporting (during	Condition of design-build contract	Impact PUE#1: Planned Temporary Interruption of Major

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		existing utility substations. The technical memorandum will be provided to the Authority for review and approval.						construction)		Utility Services Impact PUE#5: Permanent Conflicts with Existing Utilities Requiring Relocation Impact AG#4: Disruption of Agricultural Infrastructure
Biological Resources and Wetlands										
BIO-IAMF#1	Designate Project Biologist, Designated Biologists, Species-Specific Biological Monitors and General Biological Monitors	At least 15 business days prior to commencement of any ground-disturbing activity, including but not limited to geotechnical investigations, utility realignments, creation of staging areas, or initial clearing and grubbing, the Authority will submit the name(s) and qualifications of Project Biologists, Designated Biologists, Species-Specific Biological Monitors, and General Biological Monitors retained to conduct biological resource monitoring activities and implement avoidance and minimization measures. No ground-disturbing activity will begin until the Authority has received written approval from the USFWS, NMFS, where applicable, and the CDFW that the biologists and monitors have been approved to conduct the specified work. The Project Biologist is responsible for ensuring the timely implementation of the biological avoidance and minimization measures as outlined in the BRMP, and for guiding and directing the work of the Designated Biologists and Biological Monitors. Designated Biologists will be responsible for directly overseeing and reporting the implementation of general and species-specific conservation measures. In some instances, Designated Biologists will only be approved for specific species, in which case they will only be authorized to conduct surveys and implement measures for the species for which they have been approved. Species-Specific Biological Monitors will be responsible for implementation of species-specific measures for the species for which they have been approved, and will report directly to a Designated Biologist. General Biological Monitors will report directly to a Designated Biologist or to the Project Biologist. General Biological Monitors will be responsible for conducting WEAP training, implementing general conservation measures, conducting general compliance monitoring, and reporting on compliance monitoring activities. The term Project Biologist is used in these IAMFs to mean the Project Biologist, Designated Biologists, Species-Specific Biological Monitors, and General Biological Monitors, as appropriate. When the Authority is specified as implementing an IAMF, it is assumed that the Authority, or its contractor or agent, is implementing the IAMF under the supervision of biologists and biological monitors, as appropriate	Pre-construction	Compliance reporting	Monthly	Contractor	Contractor	At incorporation or completion of design/monthly reporting (during construction)	EMMA	Impact BIO#1: Direct Impacts on Special-Status Plant Species Impact BIO#2: Indirect Impacts on Special-Status Plant Species and Other Native Plants Impact BIO#3: Direct Impacts on Special-Status Wildlife—Invertebrates Impact BIO#4: Indirect Impacts on Special-Status Wildlife—Invertebrates Impact BIO#5: Direct Impacts on Special-Status Wildlife—Fish Impact BIO#6: Indirect Impacts on Special-Status Wildlife—Fish Impact BIO#7: Direct Impacts on Special-Status Wildlife—Amphibians Impact BIO#8: Indirect Impacts on Special-Status Wildlife—Amphibians Impact BIO#9: Direct Impacts on Special-Status Wildlife—Reptiles

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
										Impact BIO#10: Indirect Impacts on Special-Status Wildlife—Reptiles Impact BIO#11: Direct Impacts on Special-Status Wildlife—Birds Impact BIO#12: Indirect Impacts on Special-Status Wildlife—Birds Impact BIO#13: Direct Impacts on Special-Status Wildlife—Mammals Impact BIO#14: Indirect Impacts on Special-Status Wildlife—Mammals Impact BIO#15: Direct Impacts on Special-Status Plant Communities Impact BIO#16: Indirect Impacts on Special-Status Plant Communities Impact BIO#17: Direct Impacts on Jurisdictional Aquatic Resources Impact BIO#18: Indirect Impacts on Jurisdictional Aquatic Resources Impact BIO#19: Direct Impacts on Critical Habitat Impact BIO#20: Indirect Impacts on Critical Habitat Impact BIO#21: Direct Impacts on Essential Fish Habitat

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
										Impact BIO#22: Indirect Impacts on Essential Fish Habitat Impact BIO#23: Direct Impacts on Wildlife Movement Corridors Impact BIO#24: Indirect Impacts on Wildlife Movement Corridors
BIO-IAMF#2	Facilitate Agency Access	Throughout the construction period, the Authority will allow access by the USFWS, NMFS, USACE, CDFW, and SWRCB to the project site. Because of safety concerns, all visitors will check in with the Authority's resident engineer prior to entering the project footprint. In the event that agency personnel visit the project footprint, the Project Biologist will prepare a memorandum within 3 business days after the visit documenting the issues raised during the field meeting. The Project Biologist will report any issues regarding regulatory compliance raised by agency personnel to the Authority.	Construction	Compliance reporting	Daily	Contractor	Contractor	Daily reporting	Condition of design-build contract	Impact BIO#1: Direct Impacts on Special-Status Plant Species Impact BIO#2: Indirect Impacts on Special-Status Plant Species and Other Native Plants Impact BIO#3: Direct Impacts on Special-Status Wildlife—Invertebrates Impact BIO#5: Direct Impacts on Special-Status Wildlife—Fish Impact BIO#7: Direct Impacts on Special-Status Wildlife—Amphibians Impact BIO#9: Direct Impacts on Special-Status Wildlife—Reptiles Impact BIO#11: Direct Impacts on Special-Status Wildlife—Birds Impact BIO#13: Direct Impacts on Special-Status Wildlife—Mammals Impact BIO#14: Indirect Impacts on Special-Status Wildlife—Mammals

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
										Impact BIO#15: Direct Impacts on Special-Status Plant Communities Impact BIO#16: Indirect Impacts on Special-Status Plant Communities Impact BIO#17: Direct Impacts on Jurisdictional Aquatic Resources Impact BIO#19: Direct Impacts on Critical Habitat Impact BIO#21: Direct Impacts on Essential Fish Habitat
BIO-IAMF#3	Prepare Worker Environmental Awareness Program (WEAP) Training Materials and Conduct Construction Period WEAP Training	<p>Prior to any ground-disturbing activity, the Project Biologist will prepare a WEAP for the purpose of training construction crews to recognize and identify sensitive biological resources that may be encountered in the vicinity of the project footprint. The WEAP training materials will be submitted to the Authority for review and approval. A video of the WEAP training prepared and presented by the Project Biologist and approved by the Authority may be used if the Project Biologist is not available to present the training in person.</p> <p>At a minimum, WEAP training materials will include the following information: key provisions of the FESA, the CESA, the Bald and Golden Eagle Protection Act, the Migratory Bird Treaty Act, California Fish and Game Code 1600, Porter-Cologne Water Quality Control Act, and the Clean Water Act; the consequences and penalties for violation or noncompliance with these laws and regulations and project authorizations; identification and characteristics of special-status plants, special-status wildlife, jurisdictional waters, and special-status plant communities and explanations about their ecological value; hazardous substance spill prevention and containment measures; the contact person in the event of the discovery of a dead or injured wildlife species; and review of avoidance, minimization, and mitigation measures.</p> <p>The Project Biologist will present WEAP training to all construction personnel before they work in the project footprint. As part of the WEAP training, construction timing in relation to species' habitat and life-stage requirements will be detailed and discussed on project maps, which will show areas of planned minimization and avoidance</p>	Pre-construction	Training program/ Reporting	Annual (training)/ Monthly (reporting)	Contractor/ Authority	Contractor/ Authority	Annual (training)/ monthly (reporting)	WEAP	Impact BIO#1: Direct Impacts on Special-Status Plant Species Impact BIO#2: Indirect Impacts on Special-Status Plant Species and Other Native Plants Impact BIO#3: Direct Impacts on Special-Status Wildlife—Invertebrates Impact BIO#4: Indirect Impacts on Special-Status Wildlife—Invertebrates Impact BIO#5: Direct Impacts on Special-Status Wildlife—Fish Impact BIO#6: Indirect Impacts on Special-Status Wildlife—Fish Impact BIO#7: Direct Impacts on Special-Status Wildlife—Amphibians

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		<p>measures. Crews will be informed during the WEAP training that, except when necessary as determined in consultation with the Project Biologist, travel within the project footprint is restricted to established roadbeds, which include all pre-existing and project-constructed unimproved and improved roads. A fact sheet conveying this information will be prepared by the Project Biologist for distribution to the construction crews and to others who enter the project footprint. Fact sheet information will be duplicated in a wallet-sized format and will be provided in other languages as necessary to accommodate non-English speaking workers. All construction staff will attend the WEAP training prior to beginning work on-site, and will attend the WEAP training on an annual basis thereafter.</p> <p>Upon completion of the WEAP training, each member of the construction crew will sign a form stating that they attended the training, understood the information presented, and agreed to comply with the requirements set out in the WEAP training. The Project Biologist will submit the signed WEAP training forms to the Authority on a monthly basis. On an annual basis, the Authority will certify that WEAP training had been provided to all construction personnel. On a monthly basis, the Project Biologist will provide updates relevant to the training to construction personnel during the daily safety ("tailgate") meeting.</p>								<p>Impact BIO#8: Indirect Impacts on Special-Status Wildlife—Amphibians</p> <p>Impact BIO#9: Direct Impacts on Special-Status Wildlife—Reptiles</p> <p>Impact BIO#10: Indirect Impacts on Special-Status Wildlife—Reptiles</p> <p>Impact BIO#11: Direct Impacts on Special-Status Wildlife—Birds</p> <p>Impact BIO#12: Indirect Impacts on Special-Status Wildlife—Birds</p> <p>Impact BIO#13: Direct Impacts on Special-Status Wildlife—Mammals</p> <p>Impact BIO#14: Indirect Impacts on Special-Status Wildlife—Mammals</p> <p>Impact BIO#15: Direct Impacts on Special-Status Plant Communities</p> <p>Impact BIO#16: Indirect Impacts on Special-Status Plant Communities</p> <p>Impact BIO#17: Direct Impacts on Jurisdictional Aquatic Resources</p> <p>Impact BIO#18: Indirect Impacts on Jurisdictional Aquatic Resources</p>

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
										Impact BIO#19: Direct Impacts on Critical Habitat Impact BIO#20: Indirect Impacts on Critical Habitat Impact BIO#21: Direct Impacts on Essential Fish Habitat Impact BIO#22: Indirect Impacts on Essential Fish Habitat Impact BIO#23: Direct Impacts on Wildlife Movement Corridors Impact BIO#24: Indirect Impacts on Wildlife Movement Corridors
BIO-IAMF#4	Conduct Operation and Maintenance Period Worker Environmental Awareness Program (WEAP) Training	Prior to initiating O&M activities, O&M personnel will attend a WEAP training session arranged by the Authority. At a minimum, O&M WEAP training materials will include the following information: key provisions of the FESA, CESA, the Bald and Golden Eagle Protection Act, the Migratory Bird Treaty Act, the Porter-Cologne Water Quality Control Act, and the Clean Water Act; the consequences and penalties for violation or noncompliance with these laws and regulations and project authorizations; identification and characteristics of special-status plants, special-status wildlife, jurisdictional waters, and special-status plant communities and explanations about their ecological value; hazardous substance spill prevention and containment measures; and the contact person in the event of the discovery of a dead or injured wildlife species. The training will include an overview of provisions of the BRMP, annual vegetation, and management plan, weed control plan and security fencing and wildlife exclusion fencing maintenance plans pertinent to O&M activities. A fact sheet prepared by the Authority environmental compliance staff will be prepared for distribution to the O&M employees. The training will be provided by the Authority environmental compliance staff. The training sessions will be provided to employees prior to their involvement in any O&M activity and will be repeated for all O&M employees on an annual basis. Upon completion of the WEAP training, O&M employees will, in writing, verify their attendance at the training sessions and confirm their willingness to comply with the requirements set out in those sessions.	Post-construction	Training program/ Reporting	Annual	Contractor/ Authority	Contractor/ Authority	Annual reporting	WEAP	Impact BIO#25: Direct Impacts on Special-Status Plant Species Impact BIO#26: Indirect Impacts on Special-Status Plants Impact BIO#27: Direct Impacts on Special-Status Wildlife—Invertebrates Impact BIO#29: Direct Impacts on Special-Status Wildlife—Fish Impact BIO#30: Indirect Impacts on Special-Status Wildlife—Fish Impact BIO#31: Direct Impacts on Special-Status Wildlife—Amphibians and Reptiles Impact BIO#32: Indirect Impacts on Special-Status

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										Wildlife—Amphibians and Reptiles Impact BIO#33: Direct Impacts on Special-Status Wildlife—Birds Impact BIO#34: Indirect Impacts on Special-Status Wildlife—Birds Impact BIO#35: Direct Impacts on Special-Status Wildlife—Mammals Impact BIO#36: Indirect Impacts on Special-Status Wildlife—Mammals Impact BIO#37: Direct Impacts on Special-Status Plant Communities Impact BIO#39: Direct Impacts on Aquatic Resources Impact BIO#40: Indirect Impacts on Aquatic Resources Impact BIO#41: Direct Impacts on Critical Habitat Impact BIO#43: Direct Impacts on Essential Fish Habitat Impact BIO#44: Indirect Impacts on Essential Fish Habitat Impact BIO#45: Indirect Impacts on Wildlife Movement Corridors
BIO-IAMF#5	Prepare and Implement a Biological Resources Management Plan	Prior to any ground-disturbing activity, the Project Biologist will prepare the BRMP, which will include a compilation of the biological resources avoidance and minimization measures applicable to the HSR project section. All project environmental plans, such as the Restoration and	Pre-construction	Prepare plan	Prior to any ground-disturbing activity	Contractor	Contractor	Prior to any ground-disturbing activity	USFWS, USACE, SWRCB, and CDFW permits	Impact BIO#1: Direct Impacts on Special-Status Plant Species

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<p>Revegetation Plan and Weed Control Plan, will be included as appendices to the BRMP. The BRMP is intended to serve as a comprehensive document that sets out the range of avoidance and minimization measures to support the appropriate and timely implementation of those measures. The implementation of these measures will be tracked through final design, construction, and operation phases. The BRMP will contain, but not be limited to, the following information:</p> <ul style="list-style-type: none"> ▪ A master schedule that shows construction of the project, pre-construction surveys, and establishment of buffers and exclusions zones to protect sensitive biological resources. ▪ Specific measures for the protection of special-status species. ▪ Identification (on construction plans) of the locations and quantity of habitats to be avoided or removed, along with the locations where habitats are to be restored. ▪ Identification of agency-approved Project Biologist(s) and Biological Monitor(s), including those responsible for notification and report of injury or death of federally or State-listed species. ▪ Measures to preserve topsoil and control erosion. ▪ Design of protective fencing around Environmentally Sensitive Areas and the construction staging areas. ▪ Locations of trees to be protected as wildlife habitat (roosting sites) and locations for planting replacement trees. ▪ Specification of the purpose, type, frequency, and extent of chemical use for insect and disease control operations as part of vegetative maintenance within sensitive habitat areas. ▪ Specific measures for the protection of vernal pool habitat and riparian areas. These measures may include erosion and siltation control measures, protective fencing guidelines, dust control measures, grading techniques, construction area limits, and biological monitoring requirements. ▪ Provisions for biological monitoring during ground-disturbing activities to confirm compliance and success of protective measures. The monitoring will: (1) identify specific locations of wildlife habitat and sensitive species to be monitored; (2) identify the frequency of monitoring and the monitoring methods (for each habitat and sensitive species to be monitored); (3) list required qualifications of biological monitor(s); (4) identify the reporting requirements; and (5) provide an accounting of impacts to special-status species habitat compared to pre-construction impact estimates. 								<p>Impact BIO#2: Indirect Impacts on Special-Status Plant Species and Other Native Plants</p> <p>Impact BIO#3: Direct Impacts on Special-Status Wildlife—Invertebrates</p> <p>Impact BIO#4: Indirect Impacts on Special-Status Wildlife—Invertebrates</p> <p>Impact BIO#5: Direct Impacts on Special-Status Wildlife—Fish</p> <p>Impact BIO#6: Indirect Impacts on Special-Status Wildlife—Fish</p> <p>Impact BIO#7: Direct Impacts on Special-Status Wildlife—Amphibians</p> <p>Impact BIO#8: Indirect Impacts on Special-Status Wildlife—Amphibians</p> <p>Impact BIO#9: Direct Impacts on Special-Status Wildlife—Reptiles</p> <p>Impact BIO#10: Indirect Impacts on Special-Status Wildlife—Reptiles</p> <p>Impact BIO#11: Direct Impacts on Special-Status Wildlife—Birds</p> <p>Impact BIO#12: Indirect Impacts on Special-Status Wildlife—Birds</p> <p>Impact BIO#13:</p>

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		The BRMP will be submitted to the Authority for review and approval prior to any ground-disturbing activity.								Direct Impacts on Special-Status Wildlife—Mammals Impact BIO#14: Indirect Impacts on Special-Status Wildlife—Mammals Impact BIO#15: Direct Impacts on Special-Status Plant Communities Impact BIO#16: Indirect Impacts on Special-Status Plant Communities Impact BIO#17: Direct Impacts on Jurisdictional Aquatic Resources Impact BIO#18: Indirect Impacts on Jurisdictional Aquatic Resources Impact BIO#19: Direct Impacts on Critical Habitat Impact BIO#20: Indirect Impacts on Critical Habitat Impact BIO#21: Direct Impacts on Essential Fish Habitat Impact BIO#22: Indirect Impacts on Essential Fish Habitat Impact BIO#23: Direct Impacts on Wildlife Movement Corridors Impact BIO#24: Indirect Impacts on Wildlife Movement Corridors Impact BIO#25: Direct Impacts on Special-Status Plant

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
										Species Impact BIO#26: Indirect Impacts on Special-Status Plants Impact BIO#27: Direct Impacts on Special-Status Wildlife—Invertebrates Impact BIO#28: Indirect Impacts on Special-Status Wildlife—Invertebrates Impact BIO#29: Direct Impacts on Special-Status Wildlife—Fish Impact BIO#30: Indirect Impacts on Special-Status Wildlife—Fish Impact BIO#31: Direct Impacts on Special-Status Wildlife—Amphibians and Reptiles Impact BIO#32: Indirect Impacts on Special-Status Wildlife—Amphibians and Reptiles Impact BIO#33: Direct Impacts on Special-Status Wildlife—Birds Impact BIO#34: Indirect Impacts on Special-Status Wildlife—Birds Impact BIO#35: Direct Impacts on Special-Status Wildlife—Mammals Impact BIO#36: Indirect Impacts on Special-Status Wildlife—Mammals

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
										Impact BIO#37: Direct Impacts on Special-Status Plant Communities Impact BIO#38: Indirect Impacts on Special-Status Plant Communities Impact BIO#39: Direct Impacts on Jurisdictional Aquatic Resources Impact BIO#40: Indirect Impacts on Jurisdictional Aquatic Resources Impact BIO#41: Direct Impacts on Critical Habitat Impact BIO#42: Indirect Impacts on Critical Habitat Impact BIO#43: Direct Impacts on Essential Fish Habitat Impact BIO#44: Indirect Impacts on Essential Fish Habitat Impact BIO#45: Indirect Impacts on Wildlife Movement Corridors
BIO-IAMF#6	Prepare and Implement an Annual Vegetation Management Plan	Prior to O&M activities, the Authority will prepare an annual vegetation control plan. The Authority will generally follow the procedures established in Chapter C2 of the Caltrans Maintenance Manual to manage vegetation on Authority property. Vegetation will be controlled by chemical, thermal, biological, cultural, mechanical, structural, and manual methods. The annual vegetation control plan would be updated each winter for implementation no later than April 1 of each year. The plan will consist of site-specific vegetation control methods, as outlined below: <ul style="list-style-type: none"> ▪ Chemical vegetation control noting planned usage ▪ Mowing program consistent section 1415 of the Fixing America's Surface Transportation Act (FAST Act) 	Post-construction	Prepare control plan	Annual	Authority	Authority	Annual plan	Condition of design-build contract	Impact BIO#25: Direct Impacts on Special-Status Plant Species Impact BIO#26: Indirect Impacts on Special-Status Plants Impact BIO#27: Direct Impacts on Special-Status Wildlife—Invertebrates Impact BIO#29: Direct Impacts on Special-Status

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<ul style="list-style-type: none"> Other nonchemical vegetation control plans (manual, biological, cultural, thermal (includes the use of propane heat or steam and is not specific to controlled burning) and structural) List of sensitive areas Other chemical pest control plans (e.g., insects, snail, rodent) <p>Only Caltrans-approved herbicides will be used in the vegetation control program. Pesticide application would be conducted in accordance with all requirements of the California Department of Pesticide Regulation and County Agricultural Commissioners by certified pesticide applicators. Noxious/invasive weeds would be treated where requested by county agricultural commissioners. The Authority will cooperate in area-wide control of noxious/invasive weeds if established by local agencies. Farmers/landowners who request weed control on state right-of-way that is not identified in the annual vegetation control plan would be encouraged to submit a permit request application for weed control that identifies the target weeds and control method desired.</p> <p>The Authority will require that HSR maintenance crews follow the guidelines in the Contractor's Weed Control Plan and annual vegetation control plan during project operation and maintenance.</p> <p>The Authority or its designee will appoint the responsible party during the operations and maintenance period to verify the annual vegetation control plan is being carried out appropriately and effectively. The annual vegetation control plan update will include a section addressing issues encountered during the prior year and adaptive measures incorporated in the update as proactive measures.</p>								Wildlife—Fish Impact BIO#30: Indirect Impacts on Special-Status Wildlife—Fish Impact BIO#31: Direct Impacts on Special-Status Wildlife—Amphibians and Reptiles Impact BIO#32: Indirect Impacts on Special-Status Wildlife—Amphibians and Reptiles Impact BIO#33: Direct Impacts on Special-Status Wildlife—Birds Impact BIO#35: Direct Impacts on Special-Status Wildlife—Mammals Impact BIO#36: Indirect Impacts on Special-Status Wildlife—Mammals Impact BIO#39: Direct Impacts on Aquatic Resources Impact BIO#41: Direct Impacts on Critical Habitat Impact BIO#42: Indirect Impacts on Critical Habitat Impact BIO#43: Direct Impacts on Essential Fish Habitat Impact BIO#44: Indirect Impacts on Essential Fish Habitat
BIO-IAMF#7	Prepare and Implement a Weed Control Plan	Prior to any ground-disturbing activity, the Contractor's Project Biologist will develop and implement a construction-phase Weed Control Plan. The purpose of the plan is to minimize and avoid the spread of noxious and invasive weeds during ground-disturbing activities.	Design/ Pre-construction	Prepare plan/ Reporting	Monthly	Contractor	Contractor	Monthly reporting	Condition of design-build contract	Impact BIO#1: Direct Impacts on Special-Status Plant Species

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<p>The Weed Control Plan will include the following, at a minimum:</p> <ul style="list-style-type: none"> ▪ Prior to implementation, delineate environmentally sensitive area and environmentally restricted area (on plans and in field). ▪ Schedule for noxious weed surveys to be conducted in coordination with the BRMP. The success criteria for noxious and invasive weed control, as established by a Qualified Biologist. The success criteria would be linked to the BRMP standards for on-site work during ground-disturbing activities. In particular, the criteria would limit 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 areas temporarily affected by ground-disturbing activities. If invasive species cover is found to exceed pre-disturbance conditions by 10 percent or is 10 percent more compared with a similar, nearby reference site with similar vegetation composition, a control effort would be implemented. If the target, or other success criteria identified in the Weed Control Plan, has not been met by the end of the Weed Control Plan monitoring and implementation period, the Authority or its designee would continue the monitoring and control efforts, and remedial actions would be identified and implemented until the success criteria are met. Depending on monitoring results, additional or revised measures may be necessary to verify that the introduction and spread of noxious weeds are not promoted by the construction and operation of the project. ▪ Provisions to verify that developing the Weed Control Plan would be coordinated with the Restoration and Revegetation Plan so the Restoration and Revegetation Plan incorporates measures minimizing the spreading and establishing of noxious weeds. This coordination also provides for the Restoration and Revegetation Plan to specify the percentage of noxious weeds coverage in the revegetation performance standards. ▪ Identification of weed control treatments, including the use of permitted herbicides, and manual and mechanical removal methods. Herbicide application would be restricted from use in Environmentally Sensitive Areas and on compensatory mitigation sites. ▪ Determination of timing of the weed control treatment for each plant species. ▪ Identification of fire prevention measures. <p>The Project Biologist will prepare a monthly memorandum to document the progress of the plan and its</p>								<p>Impact BIO#2: Indirect Impacts on Special-Status Plant Species and Other Native Plants</p> <p>Impact BIO#3: Direct Impacts on Special-Status Wildlife—Invertebrates</p> <p>Impact BIO#5: Direct Impacts on Special-Status Wildlife—Fish</p> <p>Impact BIO#4: Indirect Impacts on Special-Status Wildlife—Invertebrates</p> <p>Impact BIO#7: Direct Impacts on Special-Status Wildlife—Amphibians</p> <p>Impact BIO#8: Indirect Impacts on Special-Status Wildlife—Amphibians</p> <p>Impact BIO#9: Direct Impacts on Special-Status Wildlife—Reptiles</p> <p>Impact BIO#10: Indirect Impacts on Special-Status Wildlife—Reptiles</p> <p>Impact BIO#11: Direct Impacts on Special-Status Wildlife—Birds</p> <p>Impact BIO#13: Direct Impacts on Special-Status Wildlife—Mammals</p> <p>Impact BIO#14: Indirect Impacts on Special-Status Wildlife—Mammals</p> <p>Impact BIO#15:</p>

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		<p>implementation. The Contractor will implement the Weed Control Plan during the construction period. The Authority will appoint the responsible party during the operations period.</p> <p>The Weed Control Plan will be submitted to the Authority prior to any ground disturbance activity.</p>								<p>Direct Impacts on Special-Status Plant Communities</p> <p>Impact BIO#16: Indirect Impacts on Special-Status Plant Communities</p> <p>Impact BIO#17: Direct Impacts on Jurisdictional Aquatic Resources</p> <p>Impact BIO#18: Indirect Impacts on Jurisdictional Aquatic Resources</p> <p>Impact BIO#19: Direct Impacts on Critical Habitat</p> <p>Impact BIO#20: Indirect Impacts on Critical Habitat</p> <p>Impact BIO#21: Direct Impacts on Essential Fish Habitat</p> <p>Impact BIO#25: Direct Impacts on Special-Status Plant Species</p> <p>Impact BIO#26: Indirect Impacts on Special-Status Plants</p> <p>Impact BIO#27: Direct Impacts on Special-Status Wildlife – Invertebrates</p> <p>Impact BIO#28: Indirect Impacts on Special-Status Wildlife—Invertebrates</p> <p>Impact BIO#31: Direct Impacts on Special-Status Wildlife—Amphibians and Reptiles</p> <p>Impact BIO#32: Indirect Impacts on Special-Status</p>

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
										Wildlife—Amphibians and Reptiles Impact BIO#33: Direct Impacts on Special-Status Wildlife—Birds Impact BIO#34: Indirect Impacts on Special-Status Wildlife—Birds Impact BIO#35: Direct Impacts on Special-Status Wildlife—Mammals Impact BIO#36: Indirect Impacts on Special-Status Wildlife—Mammals Impact BIO#37: Direct Impacts on Special-Status Plant Communities Impact BIO#38: Indirect Impacts on Special-Status Plant Communities Impact BIO#39: Direct Impacts on Jurisdictional Aquatic Resources Impact BIO#40: Indirect Impacts on Jurisdictional Aquatic Resources Impact BIO#41: Direct Impacts on Critical Habitat Impact BIO#42: Indirect Impacts on Critical Habitat
BIO-IAMF#8	Establish Monofilament Restrictions	Prior to any ground-disturbing activity, the Project Biologist will verify that plastic monofilament netting (erosion control matting) or similar material is not being used as part of erosion control activities. The Project Biologist will identify acceptable material for such use, including: geomembranes, coconut coir matting, tackified hydroseeding compounds, and rice straw wattles (e.g.,	Pre-construction	Compliance reporting	Monthly	Contractor	Contractor	Monthly reporting	Condition of design-build contract	Impact BIO#1: Direct Impacts on Special-Status Plant Species Impact BIO#2: Indirect Impacts on Special-Status Plant

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<p>Earthsaver wattles: biodegradable, photodegradable, burlap). Within developed or urban areas, the Project Biologist may allow exceptions to the restrictions on the type of erosion control material if the Project Biologist determines that the construction area is of sufficient distance from natural areas to ensure the avoidance of potential impacts on wildlife.</p>								<p>Species and Other Native Plants</p> <p>Impact BIO#3: Direct Impacts on Special-Status Wildlife—Invertebrates</p> <p>Impact BIO#5: Direct Impacts on Special-Status Wildlife—Fish</p> <p>Impact BIO#7: Direct Impacts on Special-Status Wildlife—Amphibians</p> <p>Impact BIO#8: Indirect Impacts on Special-Status Wildlife—Amphibians</p> <p>Impact BIO#9: Direct Impacts on Special-Status Wildlife—Reptiles</p> <p>Impact BIO#10: Indirect Impacts on Special-Status Wildlife—Reptiles</p> <p>Impact BIO#11: Direct Impacts on Special-Status Wildlife—Birds</p> <p>Impact BIO#13: Direct Impacts on Special-Status Wildlife—Mammals</p> <p>Impact BIO#14: Indirect Impacts on Special-Status Wildlife—Mammals</p> <p>Impact BIO#15: Direct Impacts on Special-Status Plant Communities</p> <p>Impact BIO#16: Indirect Impacts on Special-Status Plant Communities</p>

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
										Impact BIO#17: Direct Impacts on Jurisdictional Aquatic Resources Impact BIO#19: Direct Impacts on Critical Habitat Impact BIO#21: Direct Impacts on Essential Fish Habitat
BIO-IAMF#9	Prevent Entrapment in Construction Materials and Excavations	At the end of each work day during construction, the Authority will cover all excavated, steep-sided holes or trenches more than 8 inches deep and that have sidewalls steeper than 1:1 (45 degree) slope with plywood or similar materials, or provide a minimum of one escape ramp per 100 feet of trenching (with slopes no greater than 3:1) constructed of earth fill or wooden planks. The Project Biologist will thoroughly inspect holes and trenches for trapped animals at the start and end of each work day. The Authority will screen, cover, or elevate at least 1 foot above ground all construction pipe, culverts, or similar structures with a diameter of 3 inches or greater that are stored overnight within the project footprint. These pipes, culverts, and similar structures will be inspected by the Project Biologist for wildlife before such material is moved, buried, or capped.	Construction	Monitoring/ Compliance reporting	Daily monitoring/ Monthly reporting	Contractor	Contractor	Daily monitoring/ monthly reporting	Condition of design-build contract	Impact BIO#1: Direct Impacts on Special-Status Plant Species Impact BIO#2: Indirect Impacts on Special-Status Plant Species and Other Native Plants Impact BIO#3: Direct Impacts on Special-Status Wildlife—Invertebrates Impact BIO#4: Indirect Impacts on Special-Status Wildlife—Invertebrates Impact BIO#5: Direct Impacts on Special-Status Wildlife—Fish Impact BIO#7: Direct Impacts on Special-Status Wildlife—Amphibians Impact BIO#8: Indirect Impacts on Special-Status Wildlife—Amphibians Impact BIO#9: Direct Impacts on Special-Status Wildlife—Reptiles Impact BIO#11: Direct Impacts on Special-Status Wildlife—Birds

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
										Impact BIO#13: Direct Impacts on Special-Status Wildlife—Mammals Impact BIO#14: Indirect Impacts on Special-Status Wildlife—Mammals Impact BIO#15: Direct Impacts on Special-Status Plant Communities Impact BIO#16: Indirect Impacts on Special-Status Plant Communities Impact BIO#17: Direct Impacts on Jurisdictional Aquatic Resources Impact BIO#19: Direct Impacts on Critical Habitat Impact BIO#21: Direct Impacts on Essential Fish Habitat Impact BIO#23: Direct Impacts on Wildlife Movement Corridors Impact BIO#24: Indirect Impacts on Wildlife Movement Corridors
BIO-IAMF#10	Delineate Equipment Staging Areas and Traffic Routes	Prior to any ground-disturbing activity, the Authority will establish staging areas for construction equipment in areas that minimize effects on sensitive biological resources, including habitat for special-status species, seasonal wetlands, and wildlife movement corridors. Staging areas (including any temporary material storage areas) will be located in areas that would be occupied by permanent facilities, where practicable. Equipment staging areas will be identified on final project construction plans. The Authority will flag and mark access routes to ensure that vehicle traffic within the project footprint is restricted to established roads, construction areas, and other designated areas.	Pre-construction	Compliance reporting	Monthly	Contractor	Contractor	Monthly reporting	Condition of design-build contract	Impact BIO#1: Direct Impacts on Special-Status Plant Species Impact BIO#2: Indirect Impacts on Special-Status Plant Species and Other Native Plants Impact BIO#3: Direct Impacts on Special-Status Wildlife—Invertebrates

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
										Impact BIO#4: Indirect Impacts on Special-Status Wildlife—Invertebrates Impact BIO#5: Direct Impacts on Special-Status Wildlife—Fish Impact BIO#6: Indirect Impacts on Special-Status Wildlife—Fish Impact BIO#7: Direct Impacts on Special-Status Wildlife—Amphibians Impact BIO#8: Indirect Impacts on Special-Status Wildlife—Amphibians Impact BIO#9: Direct Impacts on Special-Status Wildlife—Reptiles Impact BIO#10: Indirect Impacts on Special-Status Wildlife—Reptiles Impact BIO#11: Direct Impacts on Special-Status Wildlife—Birds Impact BIO#12: Indirect Impacts on Special-Status Wildlife—Birds Impact BIO#13: Direct Impacts on Special-Status Wildlife—Mammals Impact BIO#14: Indirect Impacts on Special-Status Wildlife—Mammals

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
										Impact BIO#15: Direct Impacts on Special-Status Plant Communities Impact BIO#16: Indirect Impacts on Special-Status Plant Communities Impact BIO#17: Direct Impacts on Jurisdictional Aquatic Resources Impact BIO#18: Indirect Impacts on Jurisdictional Aquatic Resources Impact BIO#19: Direct Impacts on Critical Habitat Impact BIO#21: Direct Impacts on Essential Fish Habitat Impact BIO#22: Indirect Impacts on Essential Fish Habitat
BIO-IAMF#11	Dispose of Construction Spoils and Waste	During ground-disturbing activities, the Authority may temporarily store excavated materials produced by construction activities in areas at or near construction sites within the project footprint. Where practicable, the Authority will return excavated soil to its original location to be used as backfill. Any excavated waste materials unsuitable for treatment and reuse will be disposed at an off-site location, in conformance with applicable State and federal laws.	Construction	Compliance reporting	Monthly	Contractor	Contractor	Monthly reporting	Condition of design-build contract	Impact BIO#1: Direct Impacts on Special-Status Plant Species Impact BIO#2: Indirect Impacts on Special-Status Plant Species and Other Native Plants Impact BIO#3: Direct Impacts on Special-Status Wildlife—Invertebrates Impact BIO#4: Indirect Impacts on Special-Status Wildlife—Invertebrates Impact BIO#5: Direct Impacts on Special-Status Wildlife—Fish Impact BIO#6:

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
										Indirect Impacts on Special-Status Wildlife—Fish Impact BIO#7: Direct Impacts on Special-Status Wildlife—Amphibians Impact BIO#8: Indirect Impacts on Special-Status Wildlife—Amphibians Impact BIO#9: Direct Impacts on Special-Status Wildlife—Reptiles Impact BIO#10: Indirect Impacts on Special-Status Wildlife—Reptiles Impact BIO#11: Direct Impacts on Special-Status Wildlife—Birds Impact BIO#13: Direct Impacts on Special-Status Wildlife—Mammals Impact BIO#14: Indirect Impacts on Special-Status Wildlife—Mammals Impact BIO#15: Direct Impacts on Special-Status Plant Communities Impact BIO#16: Indirect Impacts on Special-Status Plant Communities Impact BIO#17: Direct Impacts on Jurisdictional Aquatic Resources Impact BIO#18: Indirect Impacts on Jurisdictional Aquatic

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
										Resources Impact BIO#19: Direct Impacts on Critical Habitat Impact BIO#21: Direct Impacts on Essential Fish Habitat Impact BIO#22: Indirect Impacts on Essential Fish Habitat
BIO-IAMF#12	Clean Construction Equipment	Prior to any ground-disturbing activity, the Authority will ensure that all equipment entering the Work Area is free of mud and plant materials. The Authority will establish vehicle cleaning locations designed to isolate and contain organic materials and minimize opportunities for weeds and invasive species to move in and out of the project footprint. Cleaning may be done by washing with water, blowing with compressed air, brushing, or other hand cleaning. The cleaning areas will be located so as to avoid impacts on surface waters and appropriate SWPPP BMPs will be implemented so as to further control any potential for the spread of weeds or other invasive species. Cleaning stations will be inspected regularly (at least monthly).	Pre-construction	Compliance reporting	Monthly	Contractor	Contractor	Monthly reporting	Condition of design-build contract	Impact BIO#1: Direct Impacts on Special-Status Plant Species Impact BIO#2: Indirect Impacts on Special-Status Plant Species and Other Native Plants Impact BIO#3: Direct Impacts on Special-Status Wildlife—Invertebrates Impact BIO#4: Indirect Impacts on Special-Status Wildlife—Invertebrates Impact BIO#5: Direct Impacts on Special-Status Wildlife—Fish Impact BIO#6: Indirect Impacts on Special-Status Wildlife—Fish Impact BIO#7: Direct Impacts on Special-Status Wildlife—Amphibians Impact BIO#8: Indirect Impacts on Special-Status Wildlife—Amphibians Impact BIO#9: Direct Impacts on Special-Status Wildlife—Reptiles

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
										Impact BIO#10: Indirect Impacts on Special-Status Wildlife—Reptiles Impact BIO#11: Direct Impacts on Special-Status Wildlife—Birds Impact BIO#13: Direct Impacts on Special-Status Wildlife—Mammals Impact BIO#14: Indirect Impacts on Special-Status Wildlife—Mammals Impact BIO#15: Direct Impacts on Special-Status Plant Communities Impact BIO#16: Indirect Impacts on Special-Status Plant Communities Impact BIO#17: Direct Impacts on Jurisdictional Aquatic Resources Impact BIO#18: Indirect Impacts on Jurisdictional Aquatic Resources Impact BIO#19: Direct Impacts on Critical Habitat Impact BIO#20: Indirect Impacts on Critical Habitat Impact BIO#21: Direct Impacts on Essential Fish Habitat Impact BIO#22: Indirect Impacts on Essential Fish Habitat

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BIO-IAMF#13	Maintain Construction Sites	<p>Prior to any ground-disturbing activity, the Authority will prepare a construction site BMP field manual. The manual will contain standard construction site housekeeping practices required to be implemented by construction personnel. The manual will identify BMPs for the following topics: temporary soil stabilization, temporary sediment control, wind erosion control, non-stormwater management, waste management and materials control, rodenticide use, and other general construction site cleanliness measures.</p> <p>All construction personnel will receive training on BMP field manual implementation prior to working within the project footprint. All personnel will acknowledge, in writing, their understanding of the BMP field manual implementation requirements. The BMP field manual will be updated by January 31 of each year. The Authority will provide, on an annual basis, training updates to all construction personnel.</p>	Pre-construction	Reporting	Monthly	Contractor	Contractor	Monthly reporting	Condition of design-build contract	<p>Impact BIO#1: Direct Impacts on Special-Status Plant Species</p> <p>Impact BIO#2: Indirect Impacts on Special-Status Plant Species and Other Native Plants</p> <p>Impact BIO#3: Direct Impacts on Special-Status Wildlife—Invertebrates</p> <p>Impact BIO#4: Indirect Impacts on Special-Status Wildlife—Invertebrates</p> <p>Impact BIO#5: Direct Impacts on Special-Status Wildlife—Fish</p> <p>Impact BIO#6: Indirect Impacts on Special-Status Wildlife—Fish</p> <p>Impact BIO#7: Direct Impacts on Special-Status Wildlife—Amphibians</p> <p>Impact BIO#8: Indirect Impacts on Special-Status Wildlife—Amphibians</p> <p>Impact BIO#9: Direct Impacts on Special-Status Wildlife—Reptiles</p> <p>Impact BIO#10: Indirect Impacts on Special-Status Wildlife—Reptiles</p> <p>Impact BIO#11: Direct Impacts on Special-Status Wildlife—Birds</p> <p>Impact BIO#13:</p>

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
										Direct Impacts on Special-Status Wildlife—Mammals Impact BIO#14: Indirect Impacts on Special-Status Wildlife—Mammals Impact BIO#15: Direct Impacts on Special-Status Plant Communities Impact BIO#16: Indirect Impacts on Special-Status Plant Communities Impact BIO#17: Direct Impacts on Jurisdictional Aquatic Resources Impact BIO#18: Indirect Impacts on Jurisdictional Aquatic Resources Impact BIO#19: Direct Impacts on Critical Habitat Impact BIO#21: Direct Impacts on Essential Fish Habitat Impact BIO#22: Indirect Impacts on Essential Fish Habitat
BIO-IAMF#14	Dewatering and Water Diversion	Prior to any construction activities within open or flowing water, the Contractor will prepare a dewatering plan and submitted it for review and approval by the resource agencies (USACE, SWRCB, NMFS, and CDFW) prior to any work in that area. The plan will incorporate appropriate construction measures that minimize turbidity and siltation as determined through review and approval by the designated resource agencies. The Project Biologist and/or Biological Monitor will provide regular monitoring of dewatering and diversion sites and would collect water quality data (if applicable). Prior to dewatering or water diversion, pre-activity surveys will establish the presence or absence of special status wildlife species within the affected waterbody. In the event that special-status species are detected during pre-activity surveys, an agency approved Project Biologist will	Pre-construction/ Construction	Prepare a plan/ Monitoring	Daily	Contractor	Contractor	Daily monitoring during construction	Condition of design-build contract	Impact BIO#1: Direct Impacts on Special-Status Plant Species Impact BIO#2: Indirect Impacts on Special-Status Plant Species and Other Native Plants Impact BIO#3: Direct Impacts on Special-Status Wildlife—Invertebrates Impact BIO#5: Direct Impacts on Special-Status

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		relocate the species (if allowable) to an approved location off-site.								Wildlife—Fish Impact BIO#6: Indirect Impacts on Special-Status Wildlife—Fish Impact BIO#7: Direct Impacts on Special-Status Wildlife—Amphibians Impact BIO#9: Direct Impacts on Special-Status Wildlife—Reptiles Impact BIO#11: Direct Impacts on Special-Status Wildlife—Birds Impact BIO#13: Direct Impacts on Special-Status Wildlife—Mammals Impact BIO#14: Indirect Impacts on Special-Status Wildlife—Mammals Impact BIO#15: Direct Impacts on Special-Status Plant Communities Impact BIO#16: Indirect Impacts on Special-Status Plant Communities Impact BIO#17: Direct Impacts on Jurisdictional Aquatic Resources Impact BIO#18: Indirect Impacts on Jurisdictional Aquatic Resources Impact BIO#19: Direct Impacts on Critical Habitat

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
										Impact BIO#21: Direct Impacts on Essential Fish Habitat Impact BIO#22: Indirect Impacts on Essential Fish Habitat
BIO-IAMF#15	Vehicle Traffic and Construction Site Speed Limits	Prior to any ground-disturbing activities, the Contractor will obtain confirmation from the Project Biologist that appropriate BMPs are in place to restrict project vehicle traffic within the construction area to established roads, construction areas, and other designated areas. The Contractor will establish vehicle traffic in locations disturbed by previous activities to prevent further adverse ground-disturbing effects, require observance of a 15-mph speed limit for construction areas with potential special-status species habitat, clearly flag and mark access routes, and prohibit off-road traffic. The Project Biologist will submit a memorandum to the Mitigation Manager and Authority to document compliance with this measure on a monthly basis.	Pre-construction	Compliance reporting	Monthly	Contractor	Contractor	Monthly reporting	Condition of design-build contract	Impact BIO#1: Direct Impacts on Special-Status Plant Species Impact BIO#2: Indirect Impacts on Special-Status Plant Species and Other Native Plants Impact BIO#3: Direct Impacts on Special-Status Wildlife—Invertebrates Impact BIO#5: Direct Impacts on Special-Status Wildlife—Fish Impact BIO#7: Direct Impacts on Special-Status Wildlife—Amphibians Impact BIO#8: Indirect Impacts on Special-Status Wildlife—Amphibians Impact BIO#9: Direct Impacts on Special-Status Wildlife—Reptiles Impact BIO#10: Indirect Impacts on Special-Status Wildlife—Reptiles Impact BIO#11: Direct Impacts on Special-Status Wildlife—Birds Impact BIO#13: Direct Impacts on Special-Status Wildlife—Mammals

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
										Impact BIO#14: Indirect Impacts on Special-Status Wildlife—Mammals Impact BIO#15: Direct Impacts on Special-Status Plant Communities Impact BIO#16: Indirect Impacts on Special-Status Plant Communities Impact BIO#17: Direct Impacts on Jurisdictional Aquatic Resources Impact BIO#19: Direct Impacts on Critical Habitat Impact BIO#21: Direct Impacts on Essential Fish Habitat Impact BIO#23: Direct Impacts on Wildlife Movement Corridors Impact BIO#24: Indirect Impacts on Wildlife Movement Corridors
Hydrology and Water Resources										
HYD-IAMF#1	Stormwater Management	Prior to construction, the Contractor will prepare a stormwater management and treatment plan for review and approval by the Authority. During the detailed design phase, each receiving stormwater system's capacity to accommodate project runoff would be evaluated. As necessary, on-site stormwater management measures, such as detention or selected upgrades to the receiving system, would be designed to provide adequate capacity and to comply with the design standards in the latest version of Authority TM 2.6.5 Hydraulics and Hydrology Guidelines. On-site stormwater management facilities would be designed and constructed to capture runoff and provide treatment prior to discharge from pollutant-generating surfaces, including station parking areas, access roads, new road over- and underpasses, reconstructed interchanges, and new or relocated roads and highways. Low-impact development techniques would	Design/ Construction	Contractor	Monthly	Contractor	Contractor	At incorporation or completion of design/during monthly construction report	Condition of design-build contract	Impact HYD#1: Temporary Changes to Drainage Patterns and Stormwater Runoff Impact HYD#2: Permanent Changes to Drainage Patterns

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		be used to detain runoff on site and to reduce off site runoff, such as constructed wetland systems, biofiltration and bioretention systems, wet ponds, organic mulch layers, planting soil beds, and vegetated systems (biofilters), such as vegetated swales and grass filter strips, would be used where appropriate.								Impact # and Impact Title and Stormwater Runoff Impact HYD#3: Temporary Surface Water Quality Impacts Impact HYD#4: Permanent Surface Water Quality Impacts Impact HYD#5: Temporary Groundwater Quality and Volume Impacts Impact HYD#6: Permanent Groundwater Quality and Volume Impacts Impact BIO#5: Direct Impacts on Special-Status Wildlife–Fish Impact BIO#17: Direct Impacts on Jurisdictional Aquatic Resources Impact BIO#21: Direct Impacts on Essential Fish Habitat Impact BIO#29: Direct Impacts on Special-Status Wildlife–Fish Impact BIO#43: Direct Impacts on Essential Fish Habitat Impact PUE#7: Permanent Impacts on Wastewater or Stormwater Pipelines
HYD-IAMF#2	Flood Protection	Prior to construction, the Contractor will prepare a flood protection plan for Authority review and approval. The project would be designed both to remain operational during flood events and to minimize increases in 100-year or 200-year flood elevations, as applicable to locale. Design standards will include the following: <ul style="list-style-type: none"> Establish track elevation to prevent saturation and infiltration of stormwater into the sub-ballast. 	Design/Construction	Authority/Contractor	Monthly	Contractor	Contractor	At incorporation or completion of design/during monthly construction report	Condition of design-build contract	Impact HYD#8: Permanent Changes to Floodplain Flows Impact HYD#9: Intermittent Permanent Changes in

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<ul style="list-style-type: none"> Minimize development within the floodplain, to such an extent that water surface elevation in the floodplain would not increase by more than 1 foot, or as required by state or local agencies, during the 100-year or 200-year flood flow (as applicable to locale). Avoid placement of facilities in the floodplain or raise the ground with fill above the base-flood elevation. Design the floodplain crossings to maintain a 100-year floodwater surface elevation of no greater than 1 foot above current levels, or as required by state or local agencies, and project features within the floodway itself would not increase existing 100-year floodwater surface elevations in FEMA-designated floodways, or as otherwise agreed upon with the county floodplains manager. <p>The following design standards would minimize the effects of pier placement on floodplains and floodways:</p> <ul style="list-style-type: none"> Design site crossings to be as nearly perpendicular to the channel as feasible to minimize bridge length. Orient piers to be parallel to the expected high-water flow direction to minimize flow disturbance. Elevate bridge crossings at least 3 feet above the high-water surface elevation to provide adequate clearance for floating debris, or as required by local agencies. Conduct engineering analyses of channel scour depths at each crossing to evaluate the depth for burying the bridge piers and abutments. Implement scour-control measures to reduce erosion potential. Use quarry stone, cobblestone, or their equivalent for erosion control along rivers and streams, complimented with native riparian plantings or other natural stabilization alternatives that would restore and maintain a natural riparian corridor. Place bedding materials under the stone protection at locations where the underlying soils require stabilization as a result of stream-flow velocity. 								Hydraulic Capacity and Connectivity Impact HYD#13: Intermittent Permanent Floodplain Impacts Impact HYD#14: Continuous Permanent Exposure to Flood Hazards from Seismic Events Impact BIO#5: Direct Impacts on Special-Status Wildlife–Fish Impact BIO#17: Direct Impacts on Jurisdictional Aquatic Resources Impact BIO#21: Direct Impacts on Essential Fish Habitat Impact BIO#29: Direct Impacts on Special-Status Wildlife–Fish Impact BIO#43: Direct Impacts on Essential Fish Habitat Impact PUE#7: Permanent Impacts on Wastewater or Stormwater Pipelines
HYD-IAMF#3	Prepare and Implement a Construction Stormwater Pollution Prevention Plan	Prior to construction (any ground-disturbing activities), the Contractor will comply with the SWRCB Construction General Permit requiring preparation and implementation of a SWPPP. The Construction SWPPP will propose BMPs to minimize potential short-term increases in sediment transport caused by construction, including erosion control requirements, stormwater management, and channel dewatering for affected stream crossings. These BMPs would include measures to incorporate permeable surfaces into facility design plans where feasible, and describe how treated stormwater would be retained or detained on-site. Other BMPs shall include strategies to manage the amount and quality of overall stormwater runoff. The Construction SWPPP would	Design/ Construction	Authority/ Contractor	Monthly	Contractor	Contractor	At incorporation or completion of design/during monthly construction report	Condition of design-build contract	Impact HYD#1: Temporary Changes to Drainage Patterns

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<p>include, but are not limited to, measures to address the following:</p> <ul style="list-style-type: none"> Hydromodification management to verify maintenance of pre-project hydrology by emphasizing on site retention of stormwater runoff using measures such as flow dispersion, infiltration, and evaporation (supplemented by detention where required). Additional flow control measures would be implemented where local regulations or drainage requirements dictate. Implementing practices to minimize the contact of construction materials, equipment, and maintenance supplies with stormwater. Limiting fueling and other activities using hazardous materials to areas distant from surface water, providing drip pans under equipment, and daily checks for vehicle condition. Implementing practices to reduce erosion of exposed soil, including soil stabilization, regular watering for dust control, perimeter siltation fences, and sediment catchment basins. Implementing practices to maintain current water quality, including siltation fencing, wattle barriers, stabilized construction entrances, grass buffer strips, ponding areas, organic mulch layers, inlet protection, storage tanks, and sediment traps to arrest and settle sediment. Where feasible, avoiding areas that may have substantial erosion risk, including areas with erosive soils and steep slopes. Using diversion ditches to intercept surface runoff from off-site. Where feasible, limiting construction to dry periods when flows in water bodies are low or absent. Implementing practices to capture and provide proper off-site disposal of concrete wash water, including isolation of runoff from fresh concrete during curing to prevent it from reaching the local drainage system, and possible treatments (e.g., dry ice). Developing and implementing a spill prevention and emergency response plan to handle potential fuel and/or hazardous material spills. <p>Implementation of a SWPPP will be performed by the construction contractors as directed by the Contractor's Qualified SWPPP Practitioner or designee. As part of that responsibility, the effectiveness of construction BMPs must be monitored before, during and after storm events. Records of these inspections and monitoring results are submitted to the local regional water quality control board as part of the annual report required by the Statewide Construction General Permit. The reports are available to</p>								<p>and Stormwater Runoff</p> <p>Impact HYD#3: Temporary Surface Water Quality Impacts</p> <p>Impact HYD#4: Permanent Surface Water Quality Impacts</p> <p>Impact HYD#5: Temporary Groundwater Quality and Volume Impacts</p> <p>Impact HYD#6: Permanent Groundwater Quality and Volume Impacts</p> <p>Impact HYD#7: Temporary Changes to Floodplain Flows</p> <p>Impact HYD#8: Permanent Changes to Floodplain Flows</p> <p>Impact HYD#13: Intermittent Permanent Floodplain Impacts</p> <p>Impact BIO#5: Direct Impacts on Special-Status Wildlife-Fish</p> <p>Impact BIO#17: Direct Impacts on Jurisdictional Aquatic Resources</p> <p>Impact BIO#20: Indirect Impacts on Critical Habitat</p> <p>Impact BIO#21: Direct Impacts on Essential Fish Habitat</p> <p>Impact GEO#1:</p>

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		the public online. The SWRCB and regional water quality control board would have the opportunity to review these documents.								Soil Erosion Impact PUE#7: Permanent Impacts on Wastewater or Stormwater Pipelines
HYD-IAMF#4	Prepare and Implement an Industrial Stormwater Pollution Prevention Plan	Prior to construction of any facility classified as an industrial facility, the Contractor will comply with existing water quality regulations. The stormwater general permit requires preparation of a SWPPP and a monitoring plan for industrial facilities that discharge stormwater from the site, including vehicle maintenance facilities associated with transportation operations. The permit includes performance standards for pollution control.	Design/ Construction	Authority/ Contractor	Monthly	Contractor	Contractor	At incorporation or completion of design/during monthly construction report	Condition of design-build contract	Impact HYD#3: Temporary Surface Water Quality Impacts Impact HYD#9: Intermittent Permanent Changes in Hydraulic Capacity and Connectivity Impact BIO#5: Direct Impacts on Special-Status Wildlife-Fish Impact BIO#17: Direct Impacts on Jurisdictional Aquatic Resources Impact BIO#21: Direct Impacts on Essential Fish Habitat Impact BIO#29: Direct Impacts on Special-Status Wildlife-Fish Impact BIO#43: Direct Impacts on Essential Fish Habitat Impact PUE#7: Permanent Impacts on Wastewater or Stormwater Pipelines
Geologic Resources										
GEO-IAMF#1	Geologic Hazards	Prior to construction, the Contractor will prepare a CMP addressing how the Contractor would address geologic constraints and minimize or avoid impacts on geologic hazards during construction. The plan would be submitted to the Authority for review and approval. At a minimum, the plan would address the following geological and geotechnical constraints/resources: a. Groundwater Withdrawal. Controlling the amount of groundwater withdrawal from the project, by re-inject groundwater at specific locations if necessary, or use alternate foundation designs to offset the potential for settlement. This control is important for locations with	Design/ Construction	Design/ Reporting	Annual	Contractor	Contractor	At incorporation or completion of design/during monthly construction report	Condition of design-build contract	Impact GEO#1: Soil Erosion Impact GEO#2: Moderate to High Shrink-Swell Potential Impact GEO#4: Unstable Soils Resulting in On-Site or Off-Site Slumps and Small Slope Failures

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<p>retained cuts in areas where high groundwater exists, and where existing buildings are located near the depressed track section.</p> <p>b. Unstable Soils. Employing various methods to mitigate for the risk of ground failure from unstable soils. If soft or loose soils are encountered at shallow depths, they can be excavated and replaced with competent soils. To limit the excavation depth, replacement materials can also be strengthened using geosynthetics. Where unsuitable soils are deeper, ground improvement methods, such as stone columns, cement deep-soil-mixing, or jet-grouting, can be used. Alternatively, if sufficient construction time is available, preloading—in combination with prefabricated vertical drains (wicks) and staged construction—can be used to gradually improve the strength of the soil without causing bearing-capacity failures.</p> <p>c. Subsidence. The Authority addresses subsidence in its design and construction processes. For the initial design, survey monuments were installed to establish a datum and set an initial track profile. In the construction phase, the design-build contractors for track bed preparation will conduct topographic surveys for preparation of final design. Because subsidence could have occurred since the original benchmarks (survey monuments) were established, the design-build contractor's topographic surveys would be used to help determine whether subsidence has occurred. The updated topographic surveys would also be used to establish the top of rail elevations for final design where the HSR system is outside established floodplain areas and above water surface elevations. Where the HSR system is in floodplain areas susceptible to flooding, consideration will be given to overbuild the height of the rail bed in anticipation of future subsidence.</p> <p>d. Water and Wind Erosion. The Contractor will implement erosion control methods as appropriate from the various erosion control methods documented in the Construction SWPPP (See HYD-IAMF#3), the Caltrans Construction Manuals, and the construction technical memorandum (see GEO-IAMF#6), and in coordination with other erosion, sediment, stormwater management and fugitive dust control efforts. Water and wind erosion control methods may include, but are not limited to, use of revegetation, stabilizers, mulches, and biodegradable geotextiles.</p> <p>e. Soils with Shrink-Swell Potential. In locations where shrink-swell potential is marginally unacceptable, soil additives will be mixed with existing soil to reduce the shrink-swell potential. Construction specifications</p>								<p>Impact GEO#5: Soil Settlement at Structures or along Trackway</p> <p>Impact GEO#6: Slope Failure</p> <p>Impact HYD#3: Temporary Surface Water Quality Impacts</p> <p>Impact HYD#5: Temporary Groundwater Quality and Volume Impacts</p> <p>Impact HMW#1: Temporary Effects from the Transport, Use, Storage, and Disposal of Hazardous Materials and Wastes</p> <p>Impact HMW#6 Temporary Effects Associated with Risks during Construction on or near Landfills and Oil and Gas Wells</p>

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		<p>would be based upon the decision whether to remove or treat the soil. This decision is based on the soils, specific shrink-swell characteristics, the additional costs for treatment versus excavation and replacement, as well as the long-term performance characteristics of the treated soil.</p> <p>f. Soils with Corrosive Potential. In locations where soils have a potential to be corrosive to steel and concrete, the soils will be removed and buried structures would be designed for corrosive conditions, and corrosion-protected materials would be used in infrastructure.</p>								
GEO-IAMF#2	Slope Monitoring	During O&M, the Authority will incorporate slope monitoring by a Registered Engineering Geologist into the O&M procedures. The procedures will be implemented at sites identified in the CMP where a potential for long-term instability exists from gravity or seismic loading including but not limited to at-grade sections where slope failure could result in loss of track support or where slope failure could result in additional earth loading to foundations supporting elevated structures.	Operation	Contractor	Monthly	Contractor	Contractor	During operation	Condition of design-build contract	<p>Impact GEO#4: Unstable Soils Resulting in On-Site or Off-Site Slumps and Small Slope Failures</p> <p>Impact GEO#6: Construction of the Central Valley Wye alternatives could result in slope failure.</p>
GEO-IAMF#3	Evaluate and Design for Large Seismic Ground Shaking	Prior to construction, the Contractor will document through preparation of a technical memorandum how all HSR components were evaluated and designed for large seismic ground shaking. Prior to final design, the Contractor would conduct additional seismic studies to establish up-to-date estimation of levels of ground motion. The most current Caltrans seismic design criteria at the time of design will be used in the design of any structures supported in or on the ground. These design procedures and features reduce to the greatest practical extent for potential movements, shear forces, and displacements that result from inertial response of the structure. In critical locations, pendulum base isolators may be used to reduce the levels of inertial forces. New composite materials may also be used to enhance seismic performance.	Design/ Construction	Authority/ Contractor	Monthly	Authority/ Contractor	Authority/ Contractor	Monthly record keeping	Condition of design-build contract	<p>Impact GEO#4: Unstable Soils Resulting in On-Site or Off-Site Slumps and Small Slope Failures</p> <p>Impact GEO#6: Construction of the Central Valley Wye alternatives could result in slope failure.</p> <p>Impact GEO#7: Seismic-Induced Ground Shaking and Secondary Seismic Hazards (Construction)</p> <p>Impact GEO#10: Seismic-Induced Ground Shaking and Secondary Seismic Hazards (Operations)</p> <p>Impact SS#13: Continuous Permanent Safety Hazard to Schools</p>
GEO-IAMF#4	Suspension of Operations during an Earthquake	Prior to O&M activities, the Contractor will document in a technical memorandum how suspension of operations during or after an earthquake was addressed in project design. Motion-sensing instruments to provide ground-motion data and a control system to shut down HSR operations temporarily during or after a potentially damaging earthquake would be incorporated into final design. Monitoring equipment would be installed at select	Design/ Construction/ Operation	Reporting	As needed	Contractor/ Authority	Contractor/ Authority	At incorporation or completion of design/during monthly construction report	As needed based on an earthquake event	<p>Impact GEO#10: Seismic-Induced Ground Shaking and Secondary Seismic Hazards (Operations)</p> <p>Impact SS#13: Continuous Permanent Safety Hazard to Schools</p>

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		locations where high ground motions could occur. The system would then be inspected for damage due to ground motion and/or ground deformation, and then returned to service when appropriate.								
GEO-IAMF#5	Subsidence Monitoring	Prior to O&M, the Authority will develop a stringent track monitoring program. Once tracks are operational, a remote monitoring program would be implemented to monitor the effects of ongoing subsidence. Track inspection systems would provide early warning of reduced track integrity. HSR train sets would be equipped with autonomous equipment for daily track surveys. This specification would be added to HSR train bid packages. If monitoring indicates that track tolerances are not met, trains would operate at reduced speed until track tolerances are restored. In addition, the contractor responsible for wayside maintenance would be required to implement a stringent program for track maintenance.	Design/ Operation	Contractor	Monthly	Contractor	Contractor	During operation	Condition of design-build contract	Impact GEO#4: Unstable Soils Resulting in On-Site or Off-Site Slumps and Small Slope Failures
GEO-IAMF#6	Geology and Soils	<p>Prior to construction, the Contractor will document through issuance of a technical memorandum how the following guidelines and standards have been incorporated into facility design and construction:</p> <ul style="list-style-type: none"> 2015 AASHTO Load and Resistance Factor Bridge Design Specifications and the 2015 AASHTO Guide Specifications for Load and Resistance Factor Seismic Bridge Design, or their most recent versions. These documents provide guidance for characterization of soils, as well as methods to be used in the design of bridge foundations and structures, retaining walls, and buried structures. These design specifications would provide minimum specifications for evaluating the seismic response of the soil and structures. Federal Highway Administration Circulars and Reference Manuals: These documents provide detailed guidance on the characterization of geotechnical conditions at sites, methods for performing foundation design, and recommendations on foundation construction. These guidance documents include methods for designing retaining walls used for retained cuts and retained fills, foundations for elevated structures, and at-grade segments. Some of the documents include guidance on methods of mitigating geologic hazards that are encountered during design. American Railway Engineering and Maintenance-of-Way Association Manual: These guidelines deal with rail systems. Although they cover many of the same general topics as AASHTO, they are more focused on best practices for rail systems. The manual includes principles, data, specifications, plans, and economics pertaining to the engineering, design, and construction of railways. 	Design/ Construction/ Operation	Design/ Reporting	Annual	Contractor	Contractor	At incorporation or completion of design/during monthly construction reporting	Implementation of guidelines during design, construction, and operation phases	<p>Impact GEO#1: Soil Erosion</p> <p>Impact GEO#2: Moderate to High Shrink-Swell Potential</p> <p>Impact GEO#3: Moderately to Highly Corrosive Soils</p> <p>Impact GEO#4: Unstable Soils Resulting in On-Site or Off-Site Slumps and Small Slope Failures</p> <p>Impact GEO#5: Soil Settlement at Structures or along Trackway</p> <p>Impact GEO#6: Slope Failure</p> <p>Impact GEO#7: Seismic-Induced Ground Shaking and Secondary Seismic Hazards</p> <p>Impact GEO#8: Difficult Excavations due to Hardpan and Shallow Groundwater</p> <p>Impact GEO#9: Loss of Availability of Mineral or Energy Resources and Increase in Safety Risk</p>

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		<ul style="list-style-type: none"> California Building Code: The code is based on 2015 IBC. This code contains general building design and construction requirements relating to fire and life safety, structural safety, and access compliance. IBC and ASCE-7: These codes and standards provide minimum design loads for buildings and other structures. They would be used for the design of the maintenance facilities and stations. Sections in IBC and ASCE-7 provide minimum requirements for geotechnical investigations, levels of earthquake ground shaking, minimum standards for structural design, and inspection and testing requirements. Caltrans Design Standards: Caltrans has specific minimum design and construction standards for all aspects of transportation system design, ranging from geotechnical explorations to construction practices. These amendments provide specific guidance for the design of deep foundations that are used to support elevated structures, for design of mechanically stabilized earth (MSE) walls used for retained fills, and for design of various types of cantilever (e.g., soldier pile, secant pile, and tangent pile) and tie-back walls used for retained cuts. Caltrans Construction Manuals: Caltrans has a number of manuals including Field Guide to Construction Dewatering, Caltrans Construction Site BMPs Manual and Construction Site BMP Field Manual and Troubleshooting Guide. These provide guidance and best management practices for dewatering options and management, erosion control and soil stabilization, non-stormwater management, and waste management at construction sites. ASTM: ASTM has developed standards and guidelines for all types of material testing—from soil compaction testing to concrete-strength testing. The ASTM standards also include minimum performance requirements for materials. 								<p>due to Disruption of Subsurface Oil and Gas Resources</p> <p>Impact GEO#10: Seismic-Induced Ground Shaking and Secondary Seismic Hazards (Operations)</p> <p>Impact HYD#3: Temporary Surface Water Quality Impacts</p>
GEO-IAMF#7	Engage a Qualified Paleontological Resources Specialist	<p>Prior to the 90 percent design milestone for each construction package (CP) within the project section, the Contractor will retain a Paleontological Resources Specialist (PRS) responsible for:</p> <ul style="list-style-type: none"> Reviewing the final design for the CP, and Developing a detailed Paleontological Resources Monitoring and Mitigation Plan (PRMMP) for the CP <p>The PRS will be responsible for implementing the PRMMP, including development and delivery of WEAP training, supervision of Paleontological Resource Monitors (PRMs), and evaluation and treatment of finds, if any, and preparation of a final paleontological mitigation report, per the PRMMP and for each CP. A Supervising Paleontologist, who is also a PRS, will be retained and act as Lead Paleontologist for the CP if there are multiple</p>	Design	Contractor would retain paleontological resources specialist	Prior 90 percent design milestone for each CP	Contractor	Contractor	Prior to 90 percent design milestone for each CP	Condition of design-build contract	Impact PAL#1: Common Impacts on Paleontological Resources due to Construction

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<p>PRSS retained for a single CP.</p> <p>Retention of PRS staff will occur in a timely manner, in advance of the 90 percent design milestone for each CP, such that the PRS is on board and can review the 90 percent design submittal without delay when it becomes available. If feasible, the same PRS would be responsible for all CPs within a given project section.</p> <p>All PRS staff will meet or exceed the qualifications for a Principal Paleontologist as defined in the Caltrans current Standard Environmental Reference, Chapter 8 (Caltrans 2014). Appointment of PRS staff will be subject to review and approval by the Authority.</p>								
GEO-IAMF#8	Perform Final Design Review and Triggers Evaluation	<p>For each CP within the project section, the responsible PRS will evaluate the 90 percent design submittal to identify the portions of the CP that would involve work in paleontologically sensitive geologic units (either at the surface or in the subsurface), based on findings of the final Paleontological Resources Technical Report prepared for the project section. Evaluation would consider the location, areal extent, and anticipated depth of ground disturbance, the construction techniques that are planned/proposed, and the geology (i.e., location of geologic units with high paleontological resources) of the CP and vicinity. The evaluation and resulting recommendations would be consistent with guidance in the Society of Vertebrate Paleontology (SVP) Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources (SVP Impact Mitigation Guidelines Revision Committee 2010), the SVP Conditions of Receivership for Paleontologic Salvage Collections (SVP Conformable Impact Mitigation Guidelines Committee 1996), and relevant guidance from Chapter 8 of the current Caltrans Standard Environmental Reference (Caltrans 2014).</p> <p>The purpose of the Final Design Review and Triggers Evaluation IAMF would be to develop specific language detailing the location and duration of paleontological monitoring and other requirements for paleontological resources applicable to each CP within the Project Section. Paleontological protection requirements identified through the Final Design Review and Triggers Evaluation IAMF will be recorded in a concise technical memorandum ("Final Design Review Requirements for Paleontological Resources Protection"), which would then be incorporated in full detail into the PRMMP for each CP. Those portions of the CP requiring paleontological monitoring will also be clearly delineated in the project construction documents for each CP.</p>	Design	Reporting	Each CP	Contractor	Contractor	CP reporting	Condition of design-build contract	Impact PAL#1: Common Impacts on Paleontological Resources due to Construction
GEO-IAMF#9	Prepare and Implement Paleontological Resources Monitoring	<p>Following the Final Design Review and Triggers Evaluation for each CP, the PRS will develop a CP-specific PRMMP. For greater efficiency, PRMMPs may be written such that they cover more than one CP, as long as</p>	Design	Reporting	Each CP	Contractor	Contractor	CP reporting	Condition of design-build contract	Impact PAL#1: Common Impacts on Paleontological Resources due to Construction.

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
	and Mitigation Plan (PRMMP)	<p>the specific requirements of the IAMFs are satisfied explicitly and in detail for each CP included.</p> <p>The PRMMP for each CP will incorporate the findings of the Design Review and Triggers Evaluation for that CP and would be consistent with the SVP Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources (SVP Impact Mitigation Guidelines Revision Committee 2010), the SVP Conditions of Receivership for Paleontologic Salvage Collections (SVP Conformable Impact Mitigation Guidelines Committee 1996), and relevant guidance from Chapter 8 of the current Caltrans Standard Environmental Reference (Caltrans 2014). As such, the PRMMP would provide for at least the following:</p> <ul style="list-style-type: none"> ▪ Implementation of the PRMMP by qualified personnel, including the following positions: <ul style="list-style-type: none"> – Paleontological Resource Specialist: The PRS will be required to meet or exceed Principal Paleontologist Qualifications per Chapter 8 of the current Caltrans Standard Environmental Reference (Caltrans 2014). The Supervising Paleontologist may, but not necessarily, be the PRS who prepares the PRMMP. – Paleontological Resources Monitors: The PRS would will be required to meet or exceed Paleontological Monitor qualifications per Chapter 8 of the current Caltrans Standard Environmental Reference (Caltrans 2014). ▪ Development of pre-construction and construction-period coordination procedures and communications protocols. ▪ Evaluation as to whether a pre-construction survey by qualified personnel is warranted for the CP. In general, pre-construction surveys are beneficial if there is a strong possibility that significant paleontological resources (e.g., concentrations of vertebrate fossils) are exposed at the ground surface and would be destroyed during the initial clearing and grubbing phase of earthwork. Such a determination can usually be made during preparation of the paleontological resources technical report. ▪ Requirements for paleontological monitoring by qualified PRMs of all ground-disturbing activities known to affect, or potentially affect, highly sensitive geologic units and for ground-disturbing activities affecting other geologic units in any areas where the PRS considers it warranted based on the findings of the paleontological resources technical report or any pre-construction surveys. In all areas of the CP subject to monitoring, monitoring would initially be conducted full-time for all ground-disturbing activities. However, the PRMMP may provide for monitoring 								

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		<p>frequency in any given location to be reduced once approximately 50 percent of the ground-disturbing activity in locations has been completed, if the reduction is appropriate based on the implementing PRS's professional judgment in consideration of actual site conditions.</p> <ul style="list-style-type: none"> ▪ Provisions, if recommended by the PRS for paleontological monitoring of specific construction drilling operations. In general, small-diameter (i.e., less than 18 inches) drilling operations or drilling activities operations using bucket augers tend to pulverize impacted sediments and any contained fossils and are typically not monitored. The section in the PRMMP addressing monitoring program for drilling operations would rely, in part, on the information supplied by the CP design and geotechnical teams but would also take into consideration of the nature, depth, and location of drilling needed, and the anticipated equipment and staging configurations. ▪ Provisions for in-progress documentation of monitoring (and, if applicable, salvage/recovery operations) via "construction dailies" or a similar approved means. ▪ Provisions for a "stop work, evaluate, and treat appropriately" response in the event of a known or potential paleontological discovery, including finds in highly sensitive geologic units, as well as finds, if any, in geologic units identified as less sensitive, or nonsensitive, for paleontological resources. ▪ Provisions for sampling and recovery of unearthened fossils consistent with SVP Standard Procedures (SVP Impact Mitigation Guidelines Revision Committee 2010) and the SVP Conditions of Receivership (SVP Conformable Impact Mitigation Guidelines Committee 1996). Recovery procedures would provide for recovery of both macrofossils and microfossils. ▪ Provisions for acquiring a repository agreement from an approved regional repository for the curation, care, and storage of recovered materials, consistent with the SVP Conditions of Receivership (SVP Conformable Impact Mitigation Guidelines Committee 1996). If more than one repository institution is designated, separate repository agreements must be provided. ▪ Provisions for preparation of a final monitoring and mitigation report that meets the requirements of the Caltrans Standard Environmental Reference Chapter 8 provisions for the Paleontological Monitoring Report and Paleontological Stewardship Summary (Caltrans 2014). 								

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		<ul style="list-style-type: none"> Provisions for the preparation, identification, and analysis and curation of fossil specimens and data recovered, consistent with the SVP Conditions of Receivership (SVP Conformable Impact Mitigation Guidelines Committee 1996) and any specific requirements of the designated repository institution(s). 								
GEO-IAMF#10	Provide Worker Environmental Awareness (WEAP) Training for Paleontological Resources	<p>Prior to groundbreaking for each CP within the project section, the Contractor will provide paleontological resources WEAP training delivered by the PRS. All management and supervisory personnel and construction workers involved with ground-disturbing activities will be required to take this training before beginning work on the project. Refresher training would also be made available to management and supervisory personnel and workers as needed, based on the judgment of the PRS.</p> <p>At a minimum, paleontological resources WEAP training will include information on:</p> <ul style="list-style-type: none"> The coordination between construction staff and paleontological staff, The construction and paleontological staff roles and responsibilities in implementing the PRMMP, The possibility of encountering fossils during construction, The types of fossils that may be seen and how to recognize them, and The proper procedures in the event fossils are encountered, including the requirement to halt work in the vicinity of the find and procedures for notifying responsible parties in the event of a find. <p>Training materials and formats may include, but are not necessarily limited to, in-person training, prerecorded videos, posters, and informational brochures that provide contacts and summarize procedures in the event paleontological resources are encountered. WEAP training contents would be subject to review and approval by the Authority. Paleontological resources WEAP training may be provided concurrently with cultural resources WEAP training.</p> <p>Upon completion of any WEAP training, the Contractor will require workers to sign a form stating that they attended the training and understand and would comply with the information presented. Verification of paleontological resources WEAP training will be provided to the Authority by the Contractor.</p>	Pre-construction	Training program/ Reporting	Annual (training)/ Monthly (reporting)	Contractor/ Authority	Contractor/ Authority	Annual (training)/ monthly (reporting)	Condition of design-build contract	Impact PAL#1: Common Impacts on Paleontological Resources due to Construction
GEO-IAMF#11	Halt Construction, Evaluate, and Treat if Paleontological Resources Are Found	<p>Consistent with the PRMMP, if fossil materials are discovered during construction, regardless of the individual making the discovery, all activity in the immediate vicinity of the discovery will halt and the find would be protected from further disturbance. If the discovery is made by someone other than the PRS or</p>	Construction	Reporting	Daily logs during active monitoring	Contractor	Contractor	Weekly reporting (if resource is identified during construction)	PRMMP, WEAP	Impact PAL#1: Common Impacts on Paleontological Resources due to Construction

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<p>PRM(s), the person who made the discovery would immediately notify construction supervisory personnel, who would in turn notify the PRS. Notification to the PRS would take place promptly (prior to the close of work the same day as the find), and the PRS would evaluate the find and prescribe appropriate treatment as soon as feasible. Work may continue on other portions of the CP while evaluation (and, if needed, treatment) takes place, as long as the find can be adequately protected in the judgment of the PRS.</p> <p>If the PRS determines that treatment (i.e., recovery and documentation) of unearthed fossil(s) is warranted, such treatment and any required reporting would proceed consistent with the PRMMP. The Contractor would be responsible for ensuring prompt and accurate implementation, subject to verification by the Authority.</p> <p>The stop work requirement does not apply to drilling operations because drilling typically cannot be suspended in mid-course. However, if finds are made during drilling, the same notification and other follow-up requirements would apply. The PRS would coordinate with construction supervisory and drilling staff regarding the handling of recovered fossils.</p> <p>The requirements of this IAMF will be detailed in the PRMMP and presented as part of the paleontological resources WEAP training.</p>								
Hazardous Materials and Wastes										
HMW-IAMF#1	Transport of Materials	<p>During construction, the Contractor will comply with applicable state and federal regulations, such as the Resource Conservation and Recovery Act (RCRA), Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), the Hazardous Materials Release Response Plans and Inventory Law, and the Hazardous Waste Control Act. Prior to construction, the Contractor will provide the Authority with a hazardous materials and waste plan describing responsible parties and procedures for hazardous waste and hazardous materials transport.</p>	Pre-construction/ Construction	Reporting	Monthly	Contractor	Contractor	Weekly record keeping/monthly reporting	Condition of design-build contract	<p>Impact HMW#1: Temporary Effects from the Transport, Use, Storage, and Disposal of Hazardous Materials and Wastes</p> <p>Impact HMW#2: Temporary Effects from Inadvertent Disturbance of Hazardous Materials and Wastes</p> <p>Impact HMW#3: Temporary Effects from Asbestos or Lead Exposure as a Result of Demolition</p> <p>Impact HMW#5: Temporary Effects from Hazardous Materials and Wastes Activities in Proximity to Schools and Recreational Areas</p> <p>Impact HMW#7: Intermittent Effects from the Transport,</p>

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
										Use, Storage, and Disposal of Hazardous Materials and Wastes Impact HYD#3: Temporary Surface Water Quality Impacts Impact SO#7: Temporary Impacts on Children's Health and Safety
HMW-IAMF#2	Permit Conditions	During construction the Contractor will comply with the State Water Resources Control Board Construction Clean Water Act Section 402 General Permit conditions and requirements for transport, labeling, containment, cover, and other BMPs for storage of hazardous materials during construction. Prior to construction, the Contractor will provide the Authority with a hazardous materials and waste plan describing responsible parties and procedures for hazardous waste and hazardous materials transport, containment, and storage BMPs that would be implemented during construction.	Pre-construction/ Construction	Prepare a plan	Prior to construction	Contractor	Contractor	Provide a hazardous materials and waste plan	Condition of design-build contract	Impact HMW#1: Temporary Effects from the Transport, Use, Storage, and Disposal of Hazardous Materials and Wastes
HMW-IAMF#3	Environmental Management System	To the extent feasible, the Authority is committed to identifying, avoiding, and minimizing hazardous substances in the material selection process for construction, operation, and maintenance of the HSR system. The Authority would use an Environmental Management System to describe the process that would be used to evaluate the full inventory of hazardous materials as defined by federal and state law employed on an annual basis and would replace hazardous substances with nonhazardous materials. The Contractor will implement the material substitution recommendation contained in the annual inventory will	Pre-construction/ Construction	Reporting	Annual	Contractor	Contractor	Annual reporting	Condition of design-build contract	Impact HMW#1: Temporary Effects from the Transport, Use, Storage, and Disposal of Hazardous Materials and Wastes Impact HMW#2: Temporary Effects from Inadvertent Disturbance of Hazardous Materials and Wastes Impact HMW#4: Temporary Effects from Construction on or near Potential Environmental Concern Sites Impact HYD#5: Temporary Groundwater Quality and Volume Impacts Impact HYD#10: Intermittent Permanent Surface Water Quality Impacts
HMW-IAMF#4	Spill Prevention	Prior to construction (any ground-disturbing activities), the Contractor will prepare a Construction Management Plan addressing spill prevention. A Spill Prevention, Control, and Countermeasure plan (or Soil Prevention and	Pre-construction/ Construction	Reporting	As needed	Contractor	Contractor	Reporting as needed	Condition of design-build contract	Impact HMW#1: Temporary Effects from the Transport, Use, Storage, and Disposal of Hazardous Materials and Wastes

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		Response Plan if the total above-ground oil storage capacity is less than 1,320 gallons in storage containers greater than or equal to 55 gallons) shall prescribe BMPs to follow to prevent hazardous material releases and clean-up of any hazardous material releases that may occur. The plans would be prepared and submitted to the Project Construction Manager on behalf of the Authority and will be implemented during construction.								<p>Impact HMW#4: Temporary Effects from Construction on or near Potential Environmental Concern Sites</p> <p>Impact HMW#5: Temporary Effects from Hazardous Materials and Wastes Activities in Proximity to Schools and Recreational Areas</p> <p>Impact HMW#6 Temporary Effects Associated with Risks during Construction on or near Landfills and Oil and Gas Wells</p> <p>Impact HYD#3: Temporary Surface Water Quality Impacts</p> <p>Impact HYD#5: Temporary Groundwater Quality and Volume Impacts</p> <p>Impact HYD#10: Intermittent Permanent Surface Water Quality Impacts</p> <p>Impact SO#7: Temporary Impacts on Children's Health and Safety</p>
HMW-IAMF#5	Undocumented Contamination	Prior to construction, the Contractor will prepare a CMP addressing provisions for the disturbance of undocumented contamination. The plan shall be submitted to the Authority for review and approval. Undocumented contamination could be encountered during construction activities and the Contractor will work closely with local agencies to resolve any such encounters and address necessary clean-up or disposal. Copies of all required hazardous material documentation will be provided within 30 days to the Authority.	Pre-construction/ Construction	Reporting	As needed	Contractor	Contractor	Reporting as needed	Condition of design-build contract	<p>Impact HMW#2: Temporary Effects from Inadvertent Disturbance of Hazardous Materials and Wastes</p> <p>Impact HMW#4: Temporary Effects from Construction on or near Potential Environmental Concern Sites</p> <p>Impact HYD#5: Temporary Groundwater Quality and Volume Impacts</p>

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
HMW-IAMF#6	Demolition Plans	Prior to construction that involves demolition, the Contractor will prepare demolition plans for the safe dismantling and removal of building components and debris. The demolition plans would include a plan for lead and asbestos abatement. The plans will be submitted to the Project Construction Manager on behalf of the Authority for verification that appropriate demolition practices have been followed consistent with federal and state regulations regarding asbestos and lead paint abatement.	Pre-construction/ Construction	Reporting	As needed	Contractor	Contractor	Reporting as needed	Condition of design-build contract	Impact HMW#2: Temporary Effects from Inadvertent Disturbance of Hazardous Materials and Wastes Impact HMW#3: Temporary Effects from Asbestos or Lead Exposure as a Result of Demolition Impact HMW#4: Temporary Effects from Construction on or near Potential Environmental Concern Sites
HMW-IAMF#7	Property Acquisition Phase 1 and Phase 2 Environmental Site Assessments	During the right-of-way acquisition phase, Phase 1 environmental site assessments (ESA) will be conducted in accordance with standard ASTM methodologies to characterize each parcel. The determination of parcels that require a Phase 2 ESA (e.g., soil, groundwater, soil vapor subsurface investigations) would be informed by a Phase 1 ESA and may require coordination with state and local agency officials. If the Phase 2 ESA concludes that the site is impacted, remediation or corrective action (e.g., removal of contamination, in-situ treatment, or soil capping) will be conducted with state and local agency officials (as necessary) and in full compliance with applicable state and federal laws and regulations.	Pre-construction/ Construction	Reporting	Monthly	Contractor	Contractor	Phase 1 report	Condition of design-build contract	Impact HMW#4: Temporary Effects from Construction on or near Potential Environmental Concern Sites
HMW-IAMF#8	Work Barriers	Prior to construction (any ground-disturbing activities), the Contractor will verify to the Authority through preparation of a technical memorandum the use of work barriers. Nominal design variances, such as the addition of a plastic barrier beneath the ballast material to limit the potential release of volatile subsurface contaminants, may be implemented in conjunction with site investigation and remediation.	Pre-construction/ Construction	Reporting	Monthly	Contractor	Contractor	Monthly record keeping	Condition of design-build contract	Impact HMW#4: Temporary Effects from Construction on or near Potential Environmental Concern Sites
HMW-IAMF#9	Landfill	Prior to construction (any ground-disturbing activities), the Contractor will verify to the Authority through preparation of a technical memorandum that methane protection measures would be implemented for all work within 1,000 feet of a landfill, including gas detection systems and personnel training. This would be undertaken pursuant to State of California Title 27, Environmental Protection – Division 2, Solid Waste, and the hazardous materials best management practices plan.	Pre-construction/ Construction	Reporting	Monthly	Contractor	Contractor	Monthly record keeping	Condition of design-build contract	Impact HMW#6 Temporary Effects Associated with Risks during Construction on or near Landfills and Oil and Gas Wells
HMW-IAMF#10	Hazardous Materials Plans	Prior to Operations and Maintenance activities, the Authority will prepare hazardous materials monitoring plans. These would use as a basis sources such as a hazardous materials business plan as defined in Title 19 California Code of Regulations and a Spill Prevention,	Post-construction	Prepare plans	Prior to operations	Authority	Authority	Prepare hazardous materials monitoring plans	Condition of design-build contract	Impact HMW#4: Temporary Effects from Construction on or near Potential Environmental Concern Sites

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		Control, and Countermeasure plan.								Impact HMW#7: Intermittent Effects from the Transport, Use, Storage, and Disposal of Hazardous Materials and Wastes
HMW-IAMF#11	Hazardous Minerals	Prior to construction, the Contractor will prepare a CMP addressing how the Contractor would minimize or avoid impacts related to hazardous minerals (i.e., radon, mercury, and naturally occurring asbestos) during construction. The CMP would be submitted to the Authority for review and approval. The CMP will include appropriate provisions for handling hazardous minerals including but not limited to dust control, control of soil erosion and water runoff, and testing and proper disposal of excavated material.	Pre-construction/ Construction	Reporting	As needed	Contractor	Contractor	Reporting as needed	Condition of design-build contract	Impact HMW#1: Temporary Effects from the Transport, Use, Storage, and Disposal of Hazardous Materials and Wastes
HMW-IAMF#12	Gas Monitoring	Prior to construction, the Contractor will prepare a CMP addressing how gas monitoring would be incorporated into construction BMPs. The CMP would be submitted to the Authority for review and approval. Hazards related to potential migration of hazardous gases due to the presence of known oil and gas fields, areas of active or historic landfills, or other subsurface sources can be reduced or eliminated by following strict federal and state Occupational Safety and Health Administration (OSHA/Cal-OSHA) regulatory requirements for excavations, and by consulting with other agencies as appropriate, such as the Department of Conservation (Division of Oil and Gas) and the California Environmental Protection Agency, Department of Toxic Substances Control, regarding known areas of concern. Practices would include using safe and explosion-proof equipment during construction and testing for gases regularly. Installation of passive or active gas venting systems, gas collection systems, as well as active monitoring systems and alarms would be required in underground construction areas and facilities where subsurface gases are present. Installing gas-detection systems allows for monitoring of the effectiveness of these systems.	Pre-construction/ Construction	Reporting	As needed	Contractor	Contractor	Reporting as needed	Condition of design-build contract	Impact HMW#6: Temporary Effects Associated with Risks during Construction on or near Landfills and Oil and Gas Wells
Safety and Security										
SS-IAMF#1	Construction Safety Transportation Management Plan	Prior to construction (any ground-disturbing activity), the Contractor will prepare for submittal to the Authority a Construction Safety Transportation Management Plan. The plan would describe the Contractor's coordination efforts with local jurisdictions for maintaining emergency vehicle access. The plan would also specify the Contractor's procedures for implementing temporary road closures, including access to residences and businesses during construction, lane closures, signage and flag persons, temporary detour provisions, alternative bus and delivery routes, emergency vehicle access, and alternative	Pre-construction/ Construction	Compliance reporting	Monthly	Contractor	Contractor	Monthly reporting	Condition of design-build contract	Impact SS#1: Temporary Interference with Emergency Response Times Impact SS#4: Temporary Motor Vehicle, Pedestrian, and Bicycle Safety Risks Impact SO#7:

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		access locations. The Contractor will prepare and submit monthly reports to the Authority documenting construction transportation plan implementation activities for compliance monitoring.								Temporary Impacts on Children's Health and Safety
SS-IAMF#2	Safety and Security Management Plan	<p>Sixty days after receiving from the Authority a construction notice to proceed, the Contractor will provide the Authority with a technical memorandum documenting how the following requirements, plans, programs and guidelines were considered in design, construction, and eventual operation to protect the safety and security of construction workers and users of the HSR. The Contractor will be responsible for implementing all construction-related safety and security plans and the Authority will be responsible for implementing all safety and security plans related to HSR operation.</p> <ul style="list-style-type: none"> Workplace worker safety is generally governed by the Occupational Health and Safety Act of 1970, which established the OSHA. OSHA establishes standards and oversees compliance with workplace safety and reporting of injuries and illnesses of employed workers. In California, OSHA enforcement of workplace requirements is performed by Cal OSHA. Under Cal OSHA regulations, as of July 1, 1991, every employer must establish, implement, and maintain an injury and illness prevention program. The Authority has adopted a Safety and Security Management Plan to guide the safety and security activities, processes, and responsibilities during design, construction and implementation phases of the project to protect the safety and security of construction workers and the public. A Systems Safety Program Plan and a System Security Plan would be implemented prior to the start of revenue service to guide the safety and security of the operation of the HSR system. Prior to construction, the Contractor will provide the Authority with a Safety and Security Management Plan documenting how they would implement the Authority's safety and security requirements within their project scope. Implement site-specific health and safety plans and site-specific security plans to establish minimum safety and security guidelines for contractors of, and visitors to, construction projects. Contractors would be required to develop and implement site-specific measures that address regulatory requirements to protect human health and property at construction sites. Preparation of a Valley fever action plan that includes: (1) information on causes, preventative measures, symptoms, and treatments for Valley fever to individuals who could potentially be exposed 	Pre-construction/ Construction	Reporting	Sixty days after receiving a construction notice to proceed	Contractor/ Authority	Contractor/ Authority	Sixty days after receiving a construction notice to proceed	Condition of design-build contract	<p>Impact SS#3: Temporary Exposure to Construction Site Hazards</p> <p>Impact SS#7: Temporary Exposure to Valley Fever</p> <p>Impact SS#8: Continuous Permanent Interference with Emergency Response</p> <p>Impact SS#9: Continuous Permanent Exposure to Wildfire Hazards</p> <p>Impact SS#11: Continuous Permanent Exposure to High-Risk Facilities.</p> <p>Impact SS#12: Continuous Permanent Criminal and Terrorist Activity</p> <p>Impact GEO#9: Loss of Availability of Mineral or Energy Resources and Increase in Safety Risk due to Disruption of Subsurface Oil and Gas Resources</p> <p>Impact HYD#14: Continuous Permanent Exposure to Flood Hazards from Seismic Events</p> <p>Impact SO#7: Temporary Impacts on Children's Health and Safety</p>

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<p>through construction activities (i.e., construction workers, monitors, managers, and support personnel); (2) continued outreach and coordination with California Department of Public Health; (3) coordination with county departments of public health to ensure that the above-referenced information concerning Valley fever is readily available to nearby residents, schools, and businesses and to obtain area information about Valley fever outbreaks and hotspots; and (4) provide a qualified person dedicated to overseeing implementation of the Valley fever prevention measures to encourage a culture of safety of the contractors and subcontractors. The Valley Fever Health and Safety designee will coordinate with the county Public Health Officer and oversee and manage the implementation of Valley Fever control measures. The Valley Fever Health and Safety designee will be responsible for ensuring the implementation of measures in coordination with the county Public Health Officer. Medical information would be maintained following applicable and appropriate confidentiality protections. The Valley Fever Health and Safety designee, in coordination with the county Public Health Officer, would determine what measures would be added to the requirements for the Safety and Security Management Plan regarding preventive measures to avoid Valley fever exposure. Measures shall include, but are not limited to, the following: (1) train workers and supervisors on how to recognize symptoms of illness and ways to minimize exposure, such as washing hands at the end of shifts; (2) provide washing facilities nearby for washing at the end of shifts; (3) provide vehicles with enclosed, air conditioned cabs and make sure workers keep the windows closed; (4) equip heavy equipment cabs with high-efficiency particulate air (HEPA) filters; and (5) make NIOSH-approved respiratory protection with particulate filters as recommended by the California Department of Public Health available to workers who request them.</p> <ul style="list-style-type: none"> ▪ System safety program plans incorporate FRA requirements and are implemented upon Authority approval. FRA's Systems Safety Program Plans requirements would be determined in FRA's new System Safety Regulation (49 C.F.R. 270). ▪ Rail systems must comply with FRA requirements for tracks, equipment, railroad operating rules and practices, passenger safety, emergency response, and passenger equipment safety standards found in 49 C.F.R. Parts 200-299. ▪ The <i>HSR Urban Design Guidelines</i> (Authority 2011) require implementing the principles of crime 								

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		<p>prevention through environmental design. The Contractor will consider four basic principles of crime prevention through environmental design during station design and site planning: (1) territoriality (design physical elements that express ownership of the station or site); (2) natural surveillance (arrange physical features to maximize visibility); (3) improved sightlines (provide clear views of surrounding areas); and (4) access control (provide physical guidance for people coming and going from a space). The HSR design includes emergency access to the rail right-of-way, and elevated HSR structure design includes emergency egress points.</p> <ul style="list-style-type: none"> Implement fire/life safety and security programs that promote fire and life safety and security in system design, construction, and implementation. The fire and life safety program is coordinated with local emergency response organizations to provide them with an understanding of the rail system, facilities, and operations, and to obtain their input for modifications to emergency response operations and facilities, such as evacuation routes. The Authority would establish fire/life safety and security committees throughout the HSR section. Implement system security plans that address design features intended to maintain security at the stations within the track right-of-way, at stations, and onboard trains. A dedicated police force would ensure that the security needs of the HSR system are met. The design standards and guidelines require emergency walkways on both sides of the tracks for both elevated and at-grade sections and the provision of appropriate space as defined by fire and safety codes along at-grade sections of the alignment to allow for emergency response access. Implement standard operating procedures and emergency operating procedures, such as the FRA-mandated Roadway Worker Protection Program to address the day-to-day operation and emergency situations that would maintain the safety of employees, passengers, and the public. 								
SS-IAMF#3	Hazard Analyses	<p>The Authority's hazard management program includes the identification of hazards, assessment of associated risk, and application of control measures (mitigation) to reduce the risk to an acceptable level. Hazard assessment includes a preliminary hazard analysis and threat and vulnerability assessment.</p> <ul style="list-style-type: none"> The Authority's programmatic preliminary hazard analyses are developed in conformance with the FRA's <i>Collision Hazard Analysis Guide: Commuter and Intercity Passenger Service</i> (FRA 2007) and the U.S. Department of Defense's <i>System Safety</i> 	Pre-construction/ Construction	Reporting	Monthly	Authority	Authority	Monthly reporting	Condition of design-build contract	<p>Impact SS#11: Continuous Permanent Exposure to High-Risk Facilities</p> <p>Impact SS#12: Continuous Permanent Criminal and Terrorist Activity</p> <p>Impact SS#13: Continuous Permanent Safety Hazard to</p>

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		<p><i>Program Plan (MIL-STD-882)</i> to identify and determine the facility hazards and vulnerabilities so that they can be addressed—and either eliminated or minimized—by the design.</p> <ul style="list-style-type: none"> Threat and vulnerability assessments establish provisions for the deterrence and detection of, as well as the response to, criminal and terrorist acts for rail facilities and system operations. Provisions include right-of-way fencing, intrusion detection, security lighting, security procedures and training, and closed-circuit televisions. Intrusion-detection technology could also alert to the presence of inert objects, such as toppled tall structures or derailed freight trains, and stop HSR operations to avoid collisions. During design and construction, the Contractor would conduct site-specific preliminary hazard analysis and threat and vulnerability assessments to apply the programmatic work to their specific project designs. <p>The Authority's safety and security committees would be responsible for implementing the recommendations contained in the hazard analysis during HSR operation.</p>								<p>Schools</p> <p>Impact HYD#14: Continuous Permanent Exposure to Flood Hazards from Seismic Events</p>
SS-IAMF#4	Oil and Gas Wells	<p>Prior to ground-disturbing activities, the Contractor will identify and inspect all active and abandoned oil and gas wells within 200 feet of the HSR tracks. Any active wells would be abandoned and relocated by the Contractor in accordance with the California Department of Conservation, Division of Oil, and Gas and Geothermal Resources (DOGGR) standards in coordination with the well owners. In the event that relocated wells do not attain the current production rates of the now-abandoned active wells, the Authority would be responsible for compensating the well owner for lost production. All abandoned wells within 200 feet of the HSR tracks would be inspected and re-abandoned, as necessary, in accordance with DOGGR standards and in coordination with the well owner. The Contractor would provide the Authority with documentation that the identification and inspection of the wells has occurred prior to construction.</p>	Pre-construction	Reporting	Monthly	Authority	Authority	Monthly reporting	Condition of design-build contract	<p>Impact SS#3: Temporary Exposure to Construction Site Hazards</p> <p>Impact SS#11: Continuous Permanent Exposure to High-Risk Facilities</p> <p>Impact GEO#9: Loss of Availability of Mineral or Energy Resources and Increase in Safety Risk due to Disruption of Subsurface Oil and Gas Resources</p>
Socioeconomics and Communities										
SO-IAMF#1	Construction Management Plan	<p>Prior to construction, the Contractor will prepare a CMP providing measures that minimize impacts on low-income households and minority populations. The plan will be submitted to the Authority for review and approval. The plan would include actions pertaining to communications, visual protection, air quality, safety controls, noise controls, and traffic controls to minimize impacts on low-income households and minority populations. The plan would verify that property access is maintained for local businesses, residences, and emergency services. This plan would include maintaining customer and vendor access to local businesses throughout construction by using signs to instruct customers about access to</p>	Design/ Construction	Reporting	Monthly	Contractor	Contractor	At incorporation or completion of design/monthly reporting (during construction)	Condition of design-build contract	<p>Impact SO#1: Temporary Impacts on Communities—Community Cohesion</p> <p>Impact SO#2: Permanent Impacts on Communities—Community Cohesion</p> <p>Impact SO#14: Permanent Impacts on Agricultural Economy</p>

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		businesses during construction. In addition, the plan would include efforts to consult with local transit providers to minimize impacts on local and regional bus routes in affected communities.								Impact LU#2: Temporary Indirect Impacts on Land Use Patterns Related to Areas Used for Construction
SO-IAMF#2	Compliance with Uniform Relocation Assistance and Real Property Acquisition Policies Act	<p>The Authority must comply with the Uniform Act. The provisions of the Uniform Act, a federally mandated program, would apply to all acquisitions of real property or displacements of persons resulting from this federally assisted project. It was created to provide for fair and equitable treatment of all affected persons. Additionally, the Fifth Amendment of the U.S. Constitution provides that private property may not be taken for a public use without payment of "just compensation."</p> <p>The Uniform Act requires that the owning agency provide notification to all affected property owners of the agency's intent to acquire an interest in their property. This notification includes a written offer letter of just compensation. A right-of-way specialist is assigned to each property owner to assist him or her through the acquisition process. The Uniform Act also provides benefits to displaced individuals to assist them financially and with advisory services related to relocating their residence or business operation. Benefits are available to both owner occupants and tenants of either residential or business properties.</p> <p>The Uniform Act requires provision of relocation benefits to all eligible persons regardless of race, color, religion, sex, or national origin. Benefits to which eligible owners or tenants may be entitled are determined on an individual basis and explained in detail by an assigned right-of-way specialist.</p> <p>The California Relocation Assistance Act essentially mirrors the Uniform Act and also provides for consistent and fair treatment of property owners. However, because the Project would receive federal funding, the Uniform Act takes precedence. Owners of private property have federal and state constitutional guarantees that their property would not be acquired or damaged for public use unless owners first receive just compensation. Just compensation is measured by the "fair market value," where the property value is considered to be the highest price that would be negotiated on the date of valuation. The value must be agreed upon by a seller who is willing, not obliged to sell, but under no particular or urgent necessity and by a buyer who is ready, willing, and able to buy but under no particular necessity. Both the owner and the buyer must deal with the other with the full knowledge of all the uses and purposes for which the property is reasonably adaptable and available (Code of Civil Procedure Section 1263.320a).</p> <p>More detailed information about how the Authority plans to</p>	Design/ Construction/ Operation	Reporting and meeting with interested parties	Monthly	Authority	Authority	Monthly reporting and record keeping	Compliance with acts, creation of ombudsman office and reporting	<p>Impact SO#2: Permanent Impacts on Communities—Community Cohesion</p> <p>Impact SO#3: Displacements and Relocations of Residences</p> <p>Impact SO#4: Displacements and Relocations of Commercial and Industrial Businesses</p> <p>Impact SO#5: Displacements and Relocations of Agricultural Operations</p> <p>Impact SO#20: Permanent Impacts on Agricultural Economy</p>

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<p>comply with the Uniform Act and the California Relocation Assistance Act is provided in the following three detailed relocation assistance documents modeled after Caltrans versions:</p> <ul style="list-style-type: none"> Your Rights and Benefits as a Displacee under the Uniform Relocation Assistance Program (Residential) Your Rights and Benefits as a Displacee under the Uniform Relocation Assistance Program (Mobile Home) Your Rights and Benefits as a Displaced Business, Farm, or Nonprofit Organization under the Uniform Relocation Assistance Program 								
SO-IAMF#3	Relocation Mitigation Plan	<p>Before any acquisitions occur, the Authority will develop a Relocation Mitigation Plan, in consultation with affected cities and counties and property owners. In addition to establishing a program to minimize the economic disruption related to relocation, the Relocation Mitigation Plan will be written in a style that also enables it to be used as a public-information document.</p> <p>The Relocation Mitigation Plan would be designed to meet the following objectives:</p> <ul style="list-style-type: none"> Provide affected property and business owners and tenants a high level of individualized assistance in situations when acquisition is necessary and the property owner desires to relocate the existing land use. Coordinate relocation activities with other agencies acquiring property resulting in displacements in the study area to provide for all displaced persons and businesses to receive fair and consistent relocation benefits. Make a best effort to minimize the permanent closure of businesses and nonprofit agencies as a result of property acquisition. Within the limits established by law and regulation, minimize the economic disruption caused to property owners by relocation. In individual situations, where warranted, consider the cost of obtaining the entitlement permits necessary to relocate to a suitable location and take those costs into account when establishing the fair market value of the property. Provide those business owners who require complex permitting with regulatory compliance assistance. <p>The Relocation Mitigation Plan would include the following components:</p> <ul style="list-style-type: none"> A description of the appraisal, acquisition, and relocation process as well as a description of the activities of the appraisal and relocation specialists. 	Design/ Construction	Prepare plan	Prior to acquisitions	Authority	Authority	Prior to acquisitions	Condition of design-build contract	<p>Impact SO#2: Permanent Impacts on Communities—Community Cohesion</p> <p>Impact SO#3: Displacements and Relocations of Residences</p>

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<ul style="list-style-type: none"> A means of assigning appraisal and relocation staff to affected property owners, tenants, or other residents on an individual basis. Individualized assistance to affected property owners, tenants, or other residents in applying for funding, including research to summarize loans, grants, and federal aid available, and research areas for relocation. Creation of an ombudsman's position to act as a single point of contact for property owners, residents, and tenants with questions about the relocation process. The ombudsman would also act to address concerns about the relocation process as it applies to the individual situations of property owners, tenants, and other residents. 								
Land Use and Development										
LU-IAMF#1	Station Area Planning and Local Agency Coordination	<p>Prior to operations and maintenance activities, the Authority will prepare a technical memorandum for each station describing how multimodal connectivity was addressed. The Authority has a strategy for long-term coordination with local transit agencies and cities to develop transit connectivity plans for HSR station areas and for connectivity to neighboring communities where high HSR ridership is projected. The Authority expects HSR and connectivity to reduce the overall demand for parking at stations by facilitating alternative methods of station access. The strategy includes the following components:</p> <ul style="list-style-type: none"> Design and construct stations to enhance pedestrian, bicycle and other shared ride access. Mobility features such as walking paths, bicycle lockers, and drop-off zones would be encouraged to enhance access. Work with local transit agencies around stations to provide easy transfer and fare payment options and install wayfinding signs, maps, and other techniques to identify local connections within HSR stations. In coordination with station cities, identify street enhancements for pedestrian and bicycle access such as improved sidewalks, multiuse pathways, trails, bike lanes, and shared parking sites. Provide station space for taxis, private buses, and shared rides. 	Post-construction	Reporting	For each station	Authority	Authority	Authority would prepare a technical memorandum for each station	Condition of design-build contract	Impact LU#5: Permanent Conversion of Existing Land Uses to Transportation or Electrical Utility Resulting in Adjacent Incompatible Uses
Agricultural Farmland										
AG-IAMF#1	Restoration of Important Farmland Used for Temporary Staging Areas	<p>Prior to any ground-disturbing activities at the site of a temporary construction staging area located on Important Farmland, the Contractor will prepare a restoration plan addressing specific actions, sequence of implementation, parties responsible for implementation, and successful achievement of restoration for temporary impacts. Actions shall include removing and stockpiling the top 18 inches of</p>	Pre-construction	Reporting	Monthly	Contractor	Contractor	At incorporation or completion of design	Condition of design-build contract	Impact AG#1: Temporary Use of Important Farmland Impact LU#1: Temporary Direct Impacts on Land Use Patterns Related to Areas Used for

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		soil for replacement on-site during restoration activities. Before beginning construction use of sites on Important Farmland, the Contractor will submit the restoration plan to the Authority for review and obtain Authority (and if applicable, the landowner) approval. The restoration plan shall include time-stamped photo documentation of the pre-construction conditions of all temporary staging areas. All construction access, mobilization, material laydown, and staging areas on Important Farmlands would be returned to a condition equal to the pre-construction staging condition. This requirement is included in the design-build construction contract requirements.								Construction Impact LU#2: Temporary Indirect Impacts on Land Use Patterns Related to Areas Used for Construction
AG-IAMF#2	Permit Assistance	Prior to disturbance-causing activities affecting any segment of a confined animal facility, the Authority will assign a representative to act as a single point of contact to assist each confined animal facility owner during the process of obtaining new or amended permits or other regulatory compliance necessary to the continued operation or relocation of the facility. The Authority would consider and may provide compensation when acquisition of a confined animal site would require either relocation of the facility or amendment of its existing regulatory permits. The Authority would create a permit assistance center for landowners and operators whose operations would be out of compliance with permits because of the HSR. This permit center would focus on helping the permit holders modify or obtain any new permits that are required because of the HSR impacts.	Pre-construction	Reporting	Monthly	Authority	Authority representative	At incorporation or completion of design/monthly reporting during construction	Condition of design-build contract	Impact SO#2: Permanent Impacts on Communities—Community Cohesion Impact SO#5: Displacements and Relocations of Agricultural Operations Impact SO#14: Permanent Impacts on Agricultural Economy
AG-IAMF#3	Farmland Consolidation Program	The Authority will establish and administer a farmland consolidation program to sell remnant parcels to neighboring landowners for consolidation with adjacent farmland properties. In addition, the program would assist the owners of remnant parcels in selling those remnants to adjacent landowners, upon request. The goal of the program is to provide for continued agricultural use on the maximum feasible amount of remnant parcels that otherwise may not be economic to farm. The program would focus on severed remainder parcels, including those that were under Williamson Act or Farmland Security Act contract at the time of right-of-way acquisition and have become too small to remain in the local Williamson Act or Farmland Security Act program. The program would assist landowners in obtaining lot line adjustments where appropriate to incorporate remnant parcels into a larger parcel that is consistent with size requirements under the local government regulations. The program will operate for a minimum of 5 years after construction of the project section is completed. The Authority will document implementation of this measure through issuance of a compliance memorandum, after the minimum operation period of 5 years has elapsed. The document will be filed with EMMA.	Operation	Establish program	Program would operate for a minimum of 5 years after construction of the project section is completed	Authority	Authority	Program would operate for a minimum of 5 years after construction of the project section is completed	Condition of design-build contract	Impact AG#3: Creation of Remnant Parcels of Important Farmland

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
Parks, Recreation and Open Space										
PK-IAMF#1	Parks, Recreation, and Open Space	<p>Prior to construction, the Contractor will prepare and submit to the Authority a technical memorandum that identifies project design features to be implemented to minimize impacts on parks, recreation, and open space. Typical design measures to avoid or minimize impacts on parks and recreation may include:</p> <ul style="list-style-type: none"> Provide safe and attractive access for present travel modes (e.g., motorists, bicyclists, pedestrians—as applicable) to existing park and recreation facilities. Design guideway, system, and station features in such a way as to enhance the surrounding local communities. Provide easy crossings of the guideway which allows for community use under the guideway or at station areas. 	Pre-construction	Reporting	Monthly	Contractor	Contractor	At incorporation or completion of design/monthly reporting during construction	Condition of design-build contract	<p>Impact PK#1: Permanent Impacts on Future Development of Recreational Trail Corridors in the Berenda Slough Open-Space Corridor</p> <p>Impact PK#2: Permanent Impacts on Future Development of Recreational Trail Corridors in the Ash Slough Open-Space Corridor</p>
Aesthetics and Visual Quality										
AVR-IAMF#1	Aesthetic Options	<p>Prior to construction, the Contractor will document, through issue of a technical memorandum, how the Authority's aesthetic guidelines have been employed to minimize visual impacts. The Authority seeks to balance providing a consistent, project-wide aesthetic with the local context for the numerous HSR non-station structures across the state. Examples of aesthetic options would be provided to local jurisdictions that can be applied to nonstandard structures in the HSR system. Refer to <i>Aesthetic Options for Non-Station Structures</i> (Authority 2017). will</p>	Pre-construction	Reporting	Monthly	Contractor	Contractor	At incorporation or completion of design/monthly reporting during construction	Condition of design-build contract	<p>Impact AVR#4: Decreased Visual Quality in the Robertson Boulevard Landscape Unit</p> <p>Impact AVR#5: Decreased Visual Quality in the Fairmead Landscape Unit</p>
AVR-IAMF#2	Aesthetics Review Process	<p>Prior to construction, the Contractor will document that the Authority's aesthetic review process has been followed to guide the development of non-station area structures. Documentation shall be through issuance of a technical memorandum to the Authority. The Authority will identify key non-station structures recommended for aesthetic treatment, consult with local jurisdictions on how best to involve the community in the process, solicit input from local jurisdictions on their aesthetic preferences, and evaluate aesthetic preferences for potential cost, schedule, and operational impacts. The Authority will also evaluate compatibility with project-wide aesthetic goals, include recommended aesthetic approaches in the construction procurement documents, and work with the Contractor and local jurisdictions to review designs and local aesthetic preferences and incorporate them into final design and construction. Refer to <i>Aesthetic Options for Non-Station Structures</i> (Authority 2017).will</p>	Pre-construction	Reporting	Monthly	Contractor	Contractor	At incorporation or completion of design/monthly reporting during construction	Condition of design-build contract	<p>Impact AVR#4: Decreased Visual Quality in the Robertson Boulevard Landscape Unit</p>
Cultural Resources										
CUL-IAMF#1	Geospatial Data Layer and Archaeological Sensitivity Map	<p>Prior to construction (any ground-disturbing activities) and staging of materials and equipment, the Contractor's archaeologist or geoarchaeologist will prepare a geospatial data layer identifying the locations of all known</p>	Design/Pre-construction	Prepare geospatial data layer	Near full design	Contractor's archaeologist or geoarchaeologist	Authority	At incorporation or completion of design	Condition of design-build contract	<p>Impact CUL#1: Permanent Disturbance of Unknown Archaeological Sites</p>

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		archaeological resources and built historic resources that require avoidance or protection, and areas of archaeological sensitivity that require monitoring within the APE. The Contractor's archaeologist, who meets the Secretary of the Interior's Professional Qualifications Standards provided in 36 C.F.R. Part 61, is to use, as appropriate, a combination of the following: known locations of archaeological sites and built historic properties, tribal consultation, landforms, depositional processes, distance to water, mapping provided in the Archaeological Treatment Plan, or historic mapping. This mapping is to be updated as the design progresses if it results in an expansion of the area of ground disturbance/APE, including temporary construction easements and new laydown and access areas. This mapping would be used to develop an archaeological monitoring plan to be prepared by the Contractor's archaeologist, and upon approval by the Authority, implemented by the Contractor's archaeologist. When design is sufficiently advanced, a geospatial data layer would be produced by the Contractor overlaying the locations of all known archaeological resources and built historic resources within the APE, for which avoidance measures are necessary, and all archaeologically sensitive areas, for which monitoring is required.								
CUL-IAMF#2	Worker Environmental Awareness Program (WEAP) Training Session	<p>Prior to construction (any ground-disturbing activity) construction contractor personnel who work on site will attend a WEAP training session provided by the Contractor. The WEAP will include cultural resources awareness training performed by the Contractor's archaeologist who meets the Secretary of the Interior's Professional Qualification Standards provided in 36 C.F.R. Part 61. The Contractor will develop instructional materials and a fact sheet for distribution to the construction crews, and submit the materials, as well as qualifications of the personnel providing the training, to the Authority for approval at least 15 days prior to being permitted on-site access. The training will address measures required to avoid or protect built historic resources, educate crews on artifacts and archaeological features they may encounter and the mandatory procedures to follow should potential cultural resources be exposed during construction. Translation services will be provided by the Contractor for non-English speaking participants. The training sessions will be given prior to the initiation of any ground-disturbing activities and repeated on an annual basis. Additionally, new construction crewmembers will attend an initial WEAP training session prior to working on site.</p> <p>On completion of the WEAP training, construction crews will sign a form stating that they attended the training, understood the information presented, and will comply with the WEAP requirements. The Contractor's archaeologist will submit the signed WEAP training forms</p>	Pre-construction	Training program/ Reporting	Annual (training)/ Monthly (reporting)	Contractor	Contractor	Annual (training)/ monthly (reporting)	Condition of design-build contract	Impact CUL#1: Permanent Disturbance of Unknown Archaeological Sites

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		to the Mitigation Manager on a monthly basis. On an annual basis, the Contractor will provide the Authority with a letter indicating that regular WEAP training has been implemented and will provide at least one PowerPoint annually of the WEAP training. On a monthly basis, the Contractor's archaeologist will provide updates and synopsis of the training to workers during the daily safety ("tailgate") meeting. Construction crews will be informed during the WEAP training that, to the extent possible, travel within the marked project site would be restricted to established roadbeds.								
CUL-IAMF#3	Preconstruction Cultural Resource Surveys	Prior to construction (any ground-disturbing activities in areas not yet surveyed) and the staging of materials and equipment, the Contractor will conduct pre-construction cultural resource surveys. Resulting from lack of legal access, much of the construction footprint may not have been surveyed. Once parcels are accessible, the Contractor will have archaeologists or architectural historians, as appropriate, who meet the Secretary of the Interior professional qualification standards, survey and complete reporting in appropriate document for archaeology and/or built resources, in accordance with documentation requirements stipulated in the Programmatic Agreement. Identified resources will be evaluated for the National Register of Historic Places (NRHP) and the California Register of Historical Resources (CRHR). The qualified archaeologist or architectural historian, as appropriate, will assess the potential to affect to historic properties (NRHP) by applying the effects criteria in 36 C.F.R. Part 800.5(a)(1), and the potential of significant impacts on historical resources (CRHR) by applying the criteria in CEQA Guidelines 15064.5(b). Should the Authority determine, in consultation with the SHPO, that any newly identified historic properties or historical resources would be adversely affected, the BETP or Archeological Treatment Plan, as appropriate, would be amended, to document mitigation measures agreed upon by the MOA signatories. The schedule of these surveys would be dependent on the timing of obtaining legal access to the properties and may be driven by the need to complete construction-related activities (e.g., geotechnical borings, laydown yards). Prior to beginning surveys, updated records searches may be required by the Authority, depending on the length of the passage of time, to validate that accurate information was obtained regarding previous inventory and evaluation efforts. The Contractor's archaeologist, in consultation with the Authority, would determine if an updated records search is required. If an updated records search is necessary, the search will be performed by the Contractor's archaeologist.	Pre-construction	Conduct pre-construction surveys; Identify historic and/or cultural resources	Surveys conducted prior to ground disturbance	Contractor	Contractor	Surveys conducted prior to ground disturbance	Condition of design-build contract	Impact CUL#1: Permanent Disturbance of Unknown Archaeological Sites Impact CUL#3: Permanent Demolition, Destruction, Relocation, or Alteration of Historic Architectural Resources or Setting
CUL-IAMF#4	Relocation of Project Features when	Changing the rail alignment to avoid newly discovered sites is likely infeasible; however, access areas and	Construction	Relocation of access areas	As needed	Contractor	Contractor	As needed	Condition of design-build contract	Impact CUL#1: Permanent Disturbance of Unknown

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
	Possible	laydown sites may be relocated should their proposed location be found to be on archaeological sites or have the potential to affect historic built resources in the vicinity. The Contractor will delineate all avoidance and protection measures for identified archaeological and built resources on construction drawings.		and laydown sites						Archaeological Sites
CUL-IAMF#5	Archaeological Monitoring Plan and Implementation	Prior to construction the Contractor's professionally qualified archaeologist, as defined in the Programmatic Agreement, will prepare a monitoring plan based on the results of geospatial data layer and archaeological sensitivity map. The plan is to be reviewed and approved by the Authority prior to any ground-disturbing activities. During construction (any ground-disturbing activities) or staging of materials or equipment, the Contractor would be responsible for implementing the monitoring plan and providing archaeological and tribal monitoring of ground-disturbing construction activities with a potential to affect archaeological remains in areas identified as archaeologically sensitive in the Archaeological Treatment Plan. The Contractor will obtain Authority approval of all persons providing archaeological or tribal monitoring.	Pre-construction/ Construction	Prepare and implement monitoring plan	Prior to construction (prepare plan)/ During construction (implement plan)	Contractor	Contractor	Prior to construction (prepare plan)/ during construction (implement plan)	Condition of design-build contract	Impact CUL#1: Permanent Disturbance of Unknown Archaeological Sites
CUL-IAMF#6	Preconstruction Conditions Assessment, Plan for Protection of Historic Built Resources, and Repair of Inadvertent Damage	Prior to construction (any ground-disturbing activities that are within 1,000 feet of a historic built property) the Contractor may be required to assess the condition of construction-adjacent historic properties, and prepare a Plan for the Protection of Historic Built Resources and Repair of Inadvertent Damage. The MOA and BETP would stipulate for which properties the plan is to be prepared. MOA signatories and consulting parties may comment on the adequacy of the assessments. Protection measures would be developed in consultation with the landowner or land-owning agencies as well as the SHPO and the MOA signatories and consulting parties, as required by the Programmatic Agreement. As the design progresses, additional properties may be identified by the Authority as requiring this plan. The plan will record existing conditions in order to (1) establish a baseline against which to compare the property's post-project condition, (2) identify structural deficiencies that make the property vulnerable to project construction related damage, such as vibration, and (3) identify stabilization or other measures required to avoid or minimize inadvertent adverse effects. The plan would be further described in the BETP and be prepared by an interdisciplinary team, including (but not limited to) as appropriate, an architectural historian, architect, photographer, structural engineer, and acoustical engineer. Ambient conditions would be used to identify buildings that are sensitive receptors to construction-related vibration and require vibration monitoring during construction activities. Additional protective measures may be required if the property is vacant during construction. The plan content will be outlined in the BETP and is to be completed and approved by the Authority, with protective	Pre-construction	Conduct assessment and protection plan	Required if within 1,000 feet of historic built property	Contractor/ Authority	Contractor/ Authority	Required if within 1,000 feet of historic built property	MOA/PA/BETP	Impact CUL#3: Permanent Demolition, Destruction, Relocation, or Alteration of Historic Architectural Resources or Setting

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		measures implemented before construction begins within 1,000 feet of the subject building. The plan shall describe the protocols for documenting inadvertent damage (should it occur), as well as notification, coordination, and reporting to the SHPO, MOA signatories, and the owner of the historic property. The plan shall direct that inadvertent damage to historic properties shall be repaired in accordance with the Secretary of the Interior's <i>Standards for the Treatment of Historic Properties</i> (U.S. Department of the Interior, 1995). The plan shall be developed in coordination with the Authority and shall be submitted to the SHPO for review and approval. Protective plans would be required for buildings that would be moved as part of the project mitigation, including stabilization before, during, and after relocation; protection during temporary storage; and relocation to a new site, followed by rehabilitation.								
CUL-IAMF#7	Built Environment Monitoring Plan	Prior to construction (any ground-disturbing activities within 1,000 feet of a historic property or resource) the Contractor will prepare a Built Environment Monitoring Plan. Draft and final Built Environment Monitoring Plans will be prepared describing the properties that would require monitoring, the type of activities or resources that would require full-time monitoring or spot checks, the required number of monitors for each construction activity, and the parameters that would influence the level of effort for monitoring. Maximum vibration level thresholds may be established in the Plan for Protection of Historic Resources and Repair of Inadvertent Damage, the monitoring of which would be included in this monitoring plan. The BETP will outline the process for corrective action should the protection measures prove ineffective. Consultation procedures would also be defined in the BETP. The Contractor will develop both the draft and final plans in coordination with the Authority, and the plans shall be submitted to the SHPO for review and approval. The plan will be implemented prior to any ground-disturbing activities within 1,000 feet of properties identified as requiring monitoring, as specified in the BETP.	Pre-construction	Prepare monitoring plan	Required if within 1,000 feet of historic built property	Contractor/ Authority	Contractor/ Authority	Required if within 1,000 feet of historic built property	BETP	Impact CUL#3: Permanent Demolition, Destruction, Relocation, or Alteration of Historic Architectural Resources or Setting
CUL-IAMF#8	Implement Protection and/or Stabilization Measures	Implement the plan described in the Plan for Protection of Historic Resources and Repair of Inadvertent Damage and in the BETP. Such protection measures will include, but not be limited to, vibration monitoring of construction in the vicinity of historic properties; cordoning off of resources from construction activities (e.g., traffic, equipment storage, personnel); shielding of resources from dust or debris; and stabilization of buildings adjacent to construction. Temporary stabilization and protection measures would be removed after construction is complete, and the historic properties would be restored to their pre-construction condition. For buildings that would be moved, treatment would include stabilization before, during, and after relocation; protection during temporary	Pre-construction	Implement protection and/or stabilization measures	Per BETP	Contractor	Contractor	Per BETP	BETP	Impact CUL#3: Permanent Demolition, Destruction, Relocation, or Alteration of Historic Architectural Resources or Setting

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		storage; and relocation to a new site, followed by rehabilitation.								
Transportation										
TR-IAMF#1	Protection of Public Roadways during Construction	Prior to construction, the Contractor will provide a photographic survey documenting the condition of the public roadways along truck routes providing access to the proposed project site. The photographic survey shall be submitted for approval to the agency responsible for road maintenance and the Authority. The Contractor will be responsible for the repair of any structural damage to public roadways caused by HSR construction or construction access, returning any damaged sections to the equivalent of their original pre-HSR construction structural condition or better. The Contractor will survey the condition of the public roadways along truck routes providing access to the proposed project site after construction is complete. The Contractor will complete a before- and after-survey report and submit it to the Authority for review, indicating the location and extent of any damage.	Pre-construction/ Post-construction	Reporting	Immediately prior to and immediately following construction, and during construction as needed.	Contractor	Contractor	Implementation during construction	Condition of design-build contract	Impact TR#6: Temporary Impacts on Major Highway Operations Impact TR#8: Temporary Construction Impacts on Rural Roadway Operations Impact TR#16: Temporary Impacts on School Bus Routes Impact SO#1: Temporary Impacts on Communities—Community Cohesion Impact SO#7: Temporary Impacts on Children's Health and Safety Impact SO#14: Permanent Impacts on Agricultural Economy
TR-IAMF#2	Construction Transportation Plan	The design-build contractor will prepare a detailed CTP for the purpose of minimizing the impact of construction and construction traffic on adjoining and nearby roadways in close consultation with the local jurisdiction having authority over the site. The Authority must review and approve the CTP before the Contractor commences any construction activities. This plan will address, in detail, the activities to be carried out in each construction phase, with the requirement of maintaining traffic flow during peak travel periods. Such activities include, but are not limited to, the routing and scheduling of materials deliveries, materials staging and storage areas, construction employee arrival and departure schedules, employee parking locations, and temporary road closures, if any. The CTP will provide traffic controls pursuant to the <i>California Manual on Uniform Traffic Control Devices</i> sections on temporary traffic controls (Caltrans 2012) and will include a traffic control plan that includes, at a minimum, the following elements: <ul style="list-style-type: none"> Temporary signage to alert drivers and pedestrians to the construction zone. Flag persons or other methods of traffic control. 	Design/ Construction	CTP to be prepared prior to construction, followed by reporting	Weekly during construction	Contractor	Contractor	At incorporation or completion of design/ implementation during construction	Condition of design-build contract	Impact TR#1: Temporary Impacts on Major Roadways from Temporary Road Closures and Relocations Impact TR#3: Temporary Impacts on Major Roadways and Truck Routes from Construction Vehicle Operations Impact TR#4: Temporary Impacts on Circulation and Emergency Access Impact TR#6: Temporary Impacts on Major Highway Operations Impact TR#8: Temporary Construction Impacts on Rural

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		<ul style="list-style-type: none"> ▪ Traffic speed limitations in the construction zone. ▪ Temporary road closures and provisions for alternative access during the closure. ▪ Detour provisions for temporary road closures—alternating one-way traffic would be considered as an alternative to temporary closures where practicable and where it would result in better traffic flow than would a detour. ▪ Identified routes for construction traffic. ▪ Provisions for safe pedestrian and bicycle passage or convenient detour. ▪ Provisions to minimize access disruption to residents, businesses, customers, delivery vehicles, and buses to the extent practicable—where road closures are required during construction, limit to the hours that are least disruptive to access for the adjacent land uses. ▪ Provisions for farm equipment access. ▪ Provisions for 24-hour access by emergency vehicles. ▪ Safe vehicular and pedestrian access to local businesses and residences during construction. The plan would provide for scheduled transit access where construction would otherwise impede such access. Where an existing bus stop is within the work zone, the design-builder would provide a temporary bus stop at a safe and convenient location away from where construction is occurring in close coordination with the transit operator. Adequate measures would be taken to separate students and parents walking to and from the temporary bus stop from the construction zone. ▪ Advance notification to the local school district of construction activities and rigorously maintained traffic control at all school bus loading zones, to provide for the safety of schoolchildren. Review existing or planned Safe Routes to Schools with school districts and emergency responders to incorporate roadway modifications that maintain existing traffic patterns and fulfill response route and access needs during project construction and HSR operations. ▪ Identification and assessment of the potential safety risks of project construction to children, especially in areas where the project is located near homes, schools, daycare centers, and parks. ▪ Promotion of child safety within and near the project area. For example, crossing guards could be provided in areas where construction activities are located near schools, daycare centers, and parks. <p>CTPs would consider and account for the potential for</p>							<p>Roadway Operations</p> <p>Impact TR#10: Temporary Loss of Property Access</p> <p>Impact TR#12: Temporary Impacts on Bus Transit Operations</p> <p>Impact TR#16: Temporary Impacts on School Bus Routes</p> <p>Impact TR#18: Temporary Impacts on Pedestrian and Bicycle Access</p> <p>Impact TR#20: Temporary Impacts on Major Roadway Operations</p> <p>Impact SO#1: Temporary Impacts on Communities—Community Cohesion</p> <p>Impact SO#7: Temporary Impacts on Children's Health and Safety</p> <p>Impact SO#14: Permanent Impacts on Agricultural Economy</p> <p>Impact LU#2: Temporary Indirect Impacts on Land Use Patterns Related to Areas Used for Construction</p> <p>Impact AG#4: Disruption of Agricultural Infrastructure</p> <p>Impact PK#4 Access to School Play Areas and Recreational Facilities</p>	

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
		overlapping construction projects.								
TR-IAMF#3	Off-Street Parking for Construction-Related Vehicles	The Contractor will identify adequate off-street parking for all construction-related vehicles throughout the construction period to minimize impacts on public on-street parking areas. If adequate parking cannot be provided on the construction sites, the Contractor will designate a remote parking area and arrange for the use a shuttle bus to transfer construction workers to/from the job site. This measure shall be addressed in the CTP.	Design/ Construction	CTP to be prepared prior to construction followed by reporting	Weekly	Contractor	Contractor	At incorporation or completion of design/monthly reporting during construction	Condition of design-build contract	Impact TR#3: Temporary Impacts on Major Roadways and Truck Routes from Construction Vehicle Operations Impact TR#8: Temporary Construction Impacts on Rural Roadway Operations Impact SO#1: Temporary Impacts on Communities—Community Cohesion
TR-IAMF#4	Maintenance of Pedestrian Access	The Contractor will prepare specific construction management plans to address maintenance of pedestrian access during the construction period. Actions that limit pedestrian access would include, but not be limited to, sidewalk closures, bridge closures, crosswalk closures or pedestrian rerouting at intersections, placement of construction-related material within pedestrian pathways or sidewalks, and other actions that may affect the mobility or safety of pedestrians during the construction period. If sidewalks are maintained along the construction site frontage, the Contractor will provide covered walkways and fencing. The plan objective shall be to maintain pedestrian access where feasible (i.e., meeting design, safety, and ADA requirements). This measure shall be addressed in the CTP.	Design/ Construction	CTP to be prepared prior to construction followed by reporting	Weekly	Contractor	Contractor	At incorporation or completion of design/monthly reporting during construction	Condition of design-build contract	Impact TR#18: Temporary Impacts on Pedestrian and Bicycle Access Impact SO#1: Temporary Impacts on Communities—Community Cohesion Impact SO#7: Temporary Impacts on Children's Health and Safety Impact PK#4 Access to School Play Areas and Recreational Facilities
TR-IAMF#5	Maintenance of Bicycle Access	The Contractor will prepare specific Construction Management Plans to address maintenance of bicycle access during the construction period. Actions that limit bicycle access would include, but not be limited to, bike lane closures or narrowing, closure or narrowing of streets that are designated bike routes, bridge closures, placement of construction-related materials within designated bike lanes or along bike routes, and other actions that may affect the mobility or safety of bicyclists during the construction period. The plan objective will be to maintain bicycle access where feasible (i.e., meeting design, safety, and ADA requirements). This measure shall be addressed in the CTP.	Design/ Construction	CTP to be prepared prior to construction followed by reporting	Weekly	Contractor	Contractor	At incorporation or completion of design/monthly reporting during construction	Condition of design-build contract	Impact TR#18: Temporary Impacts on Pedestrian and Bicycle Access Impact SO#1: Temporary Impacts on Communities—Community Cohesion Impact SO#7: Temporary Impacts on Children's Health and Safety Impact PK#4 Access to School Play Areas and Recreational Facilities

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
TR-IAMF#6	Restriction on Construction Hours	The Contractor will limit construction material deliveries between 7 a.m. and 9 a.m. and between 4 p.m. and 6 p.m. on weekdays to minimize impacts on traffic on roadways. The Contractor will limit the number of construction employees arriving or departing the site between the hours of 7 a.m. and 8:30 a.m. and 4:30 p.m. and 6 p.m. Areas where these restrictions would be implemented would be determined as part of the CTP. Based on Authority review of the CTP, the restricted hours may be altered due to local travel patterns.	Construction	CTP to be prepared prior to construction followed by reporting	Weekly	Contractor	Contractor	Implementation during construction	Condition of design-build contract	Impact TR#8: Temporary Construction Impacts on Rural Roadway Operations Impact SO#1: Temporary Impacts on Communities—Community Cohesion Impact SO#14: Permanent Impacts on Agricultural Economy
TR-IAMF#7	Construction Truck Routes	The Contractor will deliver all construction-related equipment and materials on the appropriate truck routes and shall prohibit heavy-construction vehicles from using alternative routes to get to the site. Truck routes will be established away from schools, daycare centers, and residences, or along routes with the least impact if the Authority determines those areas are unavoidable. This measure shall be addressed in the CTP.	Construction	CTP to be prepared prior to construction followed by reporting.	Weekly	Contractor	Contractor	Implementation during construction	Condition of design-build contract	Impact TR#3: Temporary Impacts on Major Roadways and Truck Routes from Construction Vehicle Operations Impact TR#8: Temporary Construction Impacts on Rural Roadway Operations Impact TR#14: Temporary Impacts on Passenger Rail Operations Impact SO#1: Temporary Impacts on Communities—Community Cohesion Impact SO#14: Permanent Impacts on Agricultural Economy Impact PK#4 Access to School Play Areas and Recreational Facilities
TR-IAMF#8	Construction during Special Events	The Contractor will provide a mechanism to prevent roadway construction activities from reducing roadway capacity during major athletic events or other special events that substantially (10 percent or more) increase traffic on roadways affected by project construction. Mechanisms include the presence of police officers directing traffic, special-event parking, use of within-the-curb parking, or shoulder lanes for through-traffic and traffic cones. This measure shall be addressed in the CTP.	Construction	CTP to be prepared prior to construction followed by reporting	Weekly	Contractor	Contractor	Implementation during construction	Condition of design-build contract	Impact TR#8: Temporary Construction Impacts on Rural Roadway Operations Impact SO#1: Temporary Impacts on Communities—Community Cohesion Impact PK#4

IAMF	Title	IAMF Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Text	Implementation Mechanism	Impact # and Impact Title
										Access to School Play Areas and Recreational Facilities
TR-IAMF#9	Protection of Freight and Passenger Rail during Construction	The 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, during construction, a "shoofly" track would be constructed to allow existing train lines to bypass any areas closed for construction activities. Upon completion, tracks would be opened and repaired; or new mainline track would be constructed, and the "shoofly" would be removed. Contractor repair responsibility would be included in the design-build contract.	Construction	Design-build and CTP to be prepared prior to construction followed by reporting	Weekly	Contractor	Contractor	Implementation during construction	Condition of design-build contract	Impact TR#14: Temporary Impacts on Passenger Rail Operations Impact SO#1: Temporary Impacts on Communities—Community Cohesion
TR-IAMF#10	Maintenance of Transit Access	The Contractor will prepare specific Construction Management Plans to address maintenance of transit access during the construction period. Actions that limit transit access include, but are not limited to, roadway lane closures or narrowing, closure or narrowing of streets that are designated transit routes, bus stop closures, bridge closures, placement of construction-related materials within designated transit lanes, bus stop or layover zones or along transit routes, and other actions that may affect the mobility or safety of bus transit during the construction period. A plan objective shall be to maintain transit access where feasible (i.e., meeting design, safety, and ADA requirements). This measure shall be addressed in the CTP.	Construction	Design-build and CTP to be prepared prior to construction followed by reporting	Weekly	Contractor	Contractor	Implementation during construction	Condition of design-build contract	Impact TR#12: Temporary Impacts on Bus Transit Operations

AASHTO	American Association of State Highway and Transportation Officials	FEMA	Federal Emergency Management Agency
ADA	Americans with Disabilities Act	GIS	geographic information system
ASCE	American Society of Civil Engineers	HSR	high-speed rail
ASTM	American Society for Testing and Materials	IBC	International Building Code
APE	area of potential effect	ISEP	Implementation Stage Electromagnetic Compatibility Program Plan
Authority	California High-Speed Rail Authority	IAMF	impact avoidance and minimization feature
BETP	built environment treatment plan	MOA	Memorandum of Understanding
BMP	best management practice	NHPA	National Historic Preservation Act
BRMP	biological resources management plan	NMFS	National Marine Fisheries Service
Cal OSHA	California Occupational Safety and Health Administration	NO _x	nitrogen oxide
Caltrans	California Department of Transportation	O&M	operations and maintenance
CDFW	California Department of Fish and Wildlife	OSHA	Occupational Safety & Health Administration
CEQA	California Environmental Quality Act	PM10	particulate matter smaller than or equal to 10 microns in diameter
CESA	California Endangered Species Act	PRM	Paleontological Resource Monitors
C.F.R.	Code of Federal Regulations	PRMMP	Paleontological Resources Monitoring and Mitigation Plan
CMP	construction management plan	SHPO	State Historic Preservation Office
CP	construction package	SJVAPCD	San Joaquin Valley Unified Air Pollution Control District
CTP	construction transportation plan	SR	State Route
DOGGR	California Department of Conservation, Division of Oil, and Gas and Geothermal Resources	SVP	Society of Vertebrate Paleontology
DWR	California Department of Water Resources	SWPPP	Stormwater Pollution Prevention Plan
EIR	environmental impact report	SWRCB	State Water Resources Control Board
EIS	environmental impact statement	Uniform Act	Uniform Relocation Assistance and Real Property Acquisition Policies Act, as amended
EMF	electromagnetic field	USACE	U.S. Army Corps of Engineers
EMI	electromagnetic interference	USFWS	U.S. Fish and Wildlife Service
EMMA	Environmental Mitigation Management and Assessment	VOCs	volatile organic compounds
ESA	Environmental Site Assessment	WEF	wildlife exclusion fence zones
FESA	Endangered Species Act	WEAP	Worker Environmental Awareness Program
FAST Act	Fixing America's Surface Transportation Act		
FRA	Federal Railroad Administration		