

California High-Speed Rail Authority

Palmdale to Burbank *Project Section*

Draft Environmental Impact Report/
Environmental Impact Statement

Appendix 3.1-C: Standardized Mitigation
Measures

Original Issuance: August 11, 2016



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

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Revision	Date	Description
0	Aug. 11, 2016	Original Issuance
1	Oct. 24, 2016	Revision of text following review by the Authority's Central Valley Construction Managers, Project Construction Managers (PCMs), and others.
2	Feb. 9, 2017	Insertion of CUL-MM#12: Statewide Historical Interpretation Program
3	Mar. 21, 2017	Revision of various mitigation measures regarding Air Quality; Noise and Vibration; Biological Resources; Socioeconomic; Station Planning, Land Use and Development; Parks and Recreation; Aesthetics and Visual Resources; Cultural Resources; and Historic Architectural Resources.
4	Apr. 12, 2017	Accepted earlier edits; revision of AQ-MM#1: Reduce Criteria Exhaust Emissions from Construction Equipment
5	Jul. 7, 2017	Revisions to various mitigation measures for Biological Resources; additional clarification on the identification of impact avoidance and minimization features (IAMFs) and mitigation measures.
6	Aug. 15, 2017	Revision of text for AVQ-MM#1, Minimize Visual Disruption from Construction Activities; AVQ-MM#4, Provide Vegetation Screening along At-Grade and Adjacent to Residential Areas; AVQ-MM#5, Replace Unused Portions of Land Acquired for the HSR; and AVQ-MM#6, Screen Traction Power Distribution Stations and Radio Communication Towers.
7	Dec. 13, 2017	Conversion of IAMF-AQ#1, IAMF-AQ#2, and IAMF#3 from mitigation measures to Impact Avoidance and Minimization Features (IAMFs). Renumbering remaining air quality mitigation measures.
8	July 31, 2018	Significant modifications to BIO-MMs, converting several BIO-IAMFs to MMs and revising existing MMs to reflect recommendations provided by outside counsel review.
9	March 6, 2019	Revision of text for BIO-MM#1, Conduct Presence/Absence Preconstruction Surveys for Special-Status Plant Species and Special-Status Plant Communities; BIO-MM#11, Conduct Surveys for Blunt-Nosed Leopard Lizard; BIO-MM#13, Implement Avoidance Measures for Blunt-Nosed Leopard Lizard; BIO-MM#15, Conduct Pre-Construction Surveys and Monitoring for Raptors; BIO-MM#16, Implement Avoidance Measures for California Condor; BIO-MM#26, Implement Bat Avoidance and Relocation Measures; BIO-MM#29, Conduct Pre-Construction Surveys for American Badger Den Sites and Implement Mitigation Measures; BIO-MM#36, Install Aprons and Barrier within Security Fencing; and BIO-MM#64, Establish Wildlife Crossings. Added new BIO measures #65 through #78.

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Acronyms and Abbreviations

AG	agricultural	EMMA	Environmental Mitigation Management and Assessment system	PHA	preliminary hazard analysis
APCD	Air Pollution Control District	EMT	emergency medical technician	PI	Principal Investigator
APE	Area of Potential Effect	EPA	U.S. Environmental Protection Agency	PM	particulate matter
APLIC	Avian Power Line Interaction Committee	ERA	Environmentally Restricted Areas	PRMMP	Paleontological Resource Monitoring and Mitigation Plan
AQ	air quality	ESA	environmentally sensitive areas	PRO	parks, recreation and open space
AQMD	Air Quality Management District	FLSP	fire/life safety programs	PRS	paleontological resource specialist
ATP	Archaeological Treatment Plan	FPP	Flood Protection Plan	PUE	public utilities and energy
Authority	California High-Speed Rail Authority	FRA	Federal Railroad Administration	RDP	Rail Delivery Partners
AVQ	aesthetics and visual quality	GEO	geologic resources	RFQs	requests for qualifications
BETP	Built Environment Treatment Plan	GIS	geographic information system	ROD	record of decision
BIO	biological resources	GPS	global positioning system	RRP	Restoration and Revegetation Plan
BMP	best management practice	HABS	Historic American Building Survey	SHPO	State Historic Preservation Officer
BRMP	Biological Resources Management Plan	HAER	Historic American Engineering Record	SHTAC	Swainson's Hawk Technical Advisory Committee
CADD	computer-aided design and drafting	HALS	Historic American Landscape Survey	SJVAB	San Joaquin Valley Air Basin
CARB	California Air Resources Board	HMF	heavy maintenance facility	SJVAPCD	San Joaquin Valley Air Pollution Control District
CDFG	California Department of Fish and Game (now CDFW)	HMMP	Habitat Mitigation and Monitoring Plan	SOCIO	socioeconomics and communities
CDFW	California Department of Fish and Wildlife	HMW	hazardous materials and waste	SOI	Secretary of the Interior
CDPR	California Department of Parks and Recreation	HSR	high-speed rail	SOIS	Secretary of the Interior's Standards
CFGC	California Fish and Game Code	HST	high-speed train	SOQs	statement of qualifications
CFR	Code of Federal Regulations	HYD	hydrology and water resources	SPSMP	Special Plant Species Management Plan
CHA	collision hazard analysis	IAMF	impact avoidance and minimization features	SS	safety and security
CMP	Construction Management Plan	LU	land use and development, station planning	SSP	Safety and Security Plan
CRHR	California Register of Historical Resources	MLD	most likely descendant	SWMTP	Stormwater Management and Treatment Plan
CSHP	construction safety and health plans	MM	mitigation measure	SWPPP	Stormwater Pollution Prevention Plan
CTP	Construction Transportation Plan	MMEP	Mitigation Monitoring and Enforcement Plan	SWRCB	State Water Resources Control Board
CUL	cultural resources	MOA	Memorandum of Agreement	TR	transportation
CWA	Clean Water Act	MOWF	maintenance-of-way facility	TVA	threat and vulnerability assessment
dB	decibel	mph	miles per hour	Uniform Act	Uniform Relocation Assistance and Real Property Acquisition Policies Act, as amended
DOGGR	California Department of Conservation, Division of Oil, Gas and Geothermal Resources	NAGPRA	Native American Graves Protection and Repatriation Act	USACE	U.S. Army Corps of Engineers
EIR	environmental impact report	NEPA	National Environmental Policy Act	USFWS	U.S. Fish and Wildlife Service
EIS	environmental impact statement	NOx	nitrogen oxide	VERA	Voluntary Emission Reduction Agreement
EMF	electromagnetic field	NPS	National Park Service	VOC	volatile organic compound
EMI	electromagnetic interference	NV	noise and vibration	WEAP	Worker Environmental Awareness Program
		OSHA	Occupational Safety and Health Administration	WEF	wildlife exclusion fencing
		PA	Programmatic Agreement		

MITIGATION MEASURES

Mitigation measures avoid or reduce significant impacts that exist after application of all appropriate impact avoidance or minimization features through project construction and operation. Specific mitigation measures are identified for each significant environmental impact.

Mitigation measures must:

- Be site-specific
- Describe the feasibility of implementation (e.g., would another governmental agency have to take an action to carry out the measure that is unlikely to occur or would require additional approvals?)
- Specify the timing of implementation and monitoring throughout the project process (e.g. prior to construction, during construction, post-construction, or during operation and maintenance)
- Detail the mechanism or means for reducing the significance of impacts (e.g., what is the action that will occur?)
- Provide substantial evidence that the mitigation measure effectively reduces or minimizes the particular aspect(s) of the impact that causes it to be significant (list studies, previous projects, research, handbooks, web sites or other documentation that the mitigation will work)
- Analyze the effectiveness of identified mitigation to determine the significance of residual impacts after mitigation. The explanation of impact avoidance or attenuation must be based upon substantial evidence in the environmental impact report / environmental impact statement (EIR/EIS) or associated appendices/volumes
- Identify responsibility and timing for implementation, as appropriate, to facilitate transition into the Mitigation Monitoring and Enforcement Plan (MMEP)

When mitigation measures cannot be precisely defined, the environmental practitioner should identify quantitative, qualitative, and locational criteria, at a minimum, to ensure their implementation and the subsequent reduction to the significant impact. Deferred mitigation measures are only acceptable where there are measureable performance criteria, there is a specified time or action trigger for performance, and the Authority commits to implement them. In the instance where mitigation measures would be implemented by another entity, such as a local jurisdiction or other agency that is not within the purview of the Authority, implementation cannot be guaranteed and the impact would therefore remain significant and unavoidable.

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, its Design Build Contractor (Contractor) or other Contractors (for example the upcoming Rolling Stock Contractor). Monitoring will generally be the responsibility of the Contractor, with oversight provided by the Authority during construction. Long-term mitigation monitoring responsibilities will be the responsibility of the Authority. The following roles are used in the text of mitigation measures in the MMEP:

As the proponent of the 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 accountable for the overall administration of the mitigation-monitoring

program and for assisting relevant individuals and parties in their oversight and reporting responsibilities. The responsibilities of mitigation implementation, monitoring, and reporting extend to several entities as discussed above; however, the Authority will bear the primary responsibility for verifying that the mitigation measures are implemented.

The Federal Railroad Administration (FRA) and Authority define the mitigation measures required for the project. When project work is undertaken by the Authority's contractor, the Contractor shall implement the mitigation measures that are pertinent to their scope of work. The Contractor shall monitor construction activities to verify that the mitigation measures are being properly implemented and accurately report their activity and results to the Authority. The Authority will periodically check the Contractor's activity, reports, and effectiveness of mitigation activities.

Roles and Responsibilities

- **Authority:** Implementation and reporting on mitigation, avoidance and minimization measures as specified in the this MMEP as the responsibility of the Authority may be carried out by an Authority representative or a contractor hired independent of the Design Build Contractor or the Environmental Team. Authority responsible implementation and reporting may 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:** Design Build Contractor (or the Environmental Team provided by the Design Build Contractor) responsible for implementing or monitoring and reporting mitigation, avoidance and minimization measures as specified in this MMEP.
- **Mitigation Manager:** 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.
- **Project Biologist:** The Design Build Contractor provided Project Biologist, upon approval by regulatory oversight agencies, is responsible for implementing mitigation measures in compliance with the terms and conditions outlined in the MMEP and U.S. Fish and Wildlife (USFWS), U.S. Army Corps of Engineers (USACE), State Water Resource Control Board (SWRCB), and California Department of Fish and Wildlife (CDFW) permits. The Project Biologist will direct compliance activities carried out by the Project Biological Monitors.
- **Biological Monitor(s):** The Design Build Contractor provided Biological Monitor(s) will be approved by and report directly to the Contractor's Biologist. The Project 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 (PI):** The Design-Build Contractor-provided Cultural

Resources professional, who meets the Secretary of the Interior (SOI) Professional Qualifications Standards in the field of archaeology, history, or architectural history, 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 cultural resources mitigation with the Authority in accordance with this MMEP, the Section 106 program-wide Programmatic Agreement, and the section-specific Memoranda of Agreement. A policy has been established by the Authority requiring that Native Americans be given the opportunity to participate in all archaeological surveys and construction monitoring in archaeologically sensitive areas. If no Native American is available, and it is documented, the survey and construction monitoring may proceed without a Native American monitor present. For the purposes of surveys and monitoring, the Design-Build Contractor's Cultural Resources Compliance Manager shall contact consulting Native Americans through the process established by the Authority. Per the Archaeological Treatment Plan (ATP) and Memorandum of Agreement (MOA), the Cultural Resources Compliance Manager shall determine whether the ground-disturbing activities are in an archaeologically sensitive area where a Native American monitor is required to be present.

- **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. The Archaeological 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. The Architectural History Monitor(s) will be present onsite within a reasonable monitoring distance during construction work adjacent to built historic properties that have been identified in the BETP to be susceptible to damage caused by construction-related activities.
- **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.

The mitigation measures contained in this document provide standardized wording addressing potential impacts from HSR construction and operation activities. Utilization of the mitigation measures contained in this document should be tied to a specific impact identified in the environmental document.

Additional Guidance Identifying IAMFs and Mitigation Measures (July 2017)

The Impact Avoidance and Minimization Features (IAMFs) are project features (such as standard engineering practices, adherence to legal requirements, and specific training for construction workers) that have been incorporated into an alternative to avoid or minimize impacts. For each action alternative, the Authority has committed that the IAMFs will be implemented as part of that alternative if the alternative is approved. As with any project design feature, IAMFs could be modified during the environmental review process in response to comments on the Draft EIR/EIS or as additional information is developed. Any changes to the IAMFs would be reflected in the Final EIR/EIS.

Mitigation measures are additional measures – above and beyond the IAMFs – that have been identified to further reduce, compensate for, or offset project impacts. An EIR/EIS identifies mitigation measures that the Authority proposes to implement if an action alternative is approved. The mitigation measures proposed in an EIR/EIS could be modified in response to public comments on the Draft EIR/EIS. Any changes to the list of mitigation measures will be included in the Final EIR/EIS.

Table 1 CHSR Standardized Mitigation Measures

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Frequency	Implementation Mechanism
Air Quality									
AQ-MM#1 Applies to construction projects within the SJVAPCD only	Offset Project Construction Emissions Through an SJVAPCD Voluntary Emission Reduction Agreement (VERA)	The Authority and SJVAPCD have entered into a contractual agreement to mitigate (by offsetting) to net zero the project's actual emissions from construction equipment and vehicle exhaust emissions of volatile organic compound (VOC), NOx, particulate matter (PM10), and PM2.5. The agreement will provide funds for the SJVAPCD's Emission Reduction Incentive Program [1] (SJVAPCD 2011) to fund grants for projects that achieve emission reductions, with preference given to highly affected communities, thus offsetting project-related impacts on air quality. To lower overall cost, funding for the VERA program to cover estimated construction emissions for any funded construction phase will be provided at the beginning of the construction phase. At a minimum, mitigation/offsets will occur in the year of impact, or as otherwise permitted by 40 Code of Federal Regulations (CFR) Part 93 Section 93.163.	Pre-construction	Reporting/ Funding	Annual	Authority	Contractor	Annual Reporting	The Authority and SJVAPCD will enter into a contractual agreement to mitigate the project's emissions by providing funds for the district's Emission Reduction Incentive Program to fund grants for projects that achieve emission reductions, thus offsetting project-related impacts on air quality.
AQ-MM#2 Applies to construction projects in the SJVAB only (update this MM as construction moves to other air basins and hauling affects other air basins)	Purchase Offsets and Offsite Emission Mitigation for Emissions Associated with Hauling Ballast Material in Certain Air Districts	By January 31 st of each calendar year, the Contractor shall inform the Authority through the submittal of a technical memorandum of any planned hauling of ballast material from quarries outside the San Joaquin Valley Air Basin (SJVAB) and if the hauling activities result in the exceedance of the annual applicable general conformity threshold(s) or local air basin California Environmental Quality Act (CEQA) threshold(s) for NOx. To determine whether an exceedance will occur based on actual hauling activities, the Authority shall 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 Air Quality Management District (AQMD) and Bay Area AQMD, and calculate for the next calendar year using the same methodology used in this EIR/EIS the expected NOx emissions from hauling activities in those districts. If, based on that calculation, exceedance of the applicable NOx 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 NOx offsets for that calendar year necessary to achieve conformity (in the case of exceedance of GC thresholds) and/or to result in net NOx 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 CFR Part 93 Section 93.163.	Pre-construction/ Construction	Reporting/ Funding	Annual reporting	Contractor and Authority	Contractor and Authority	Annual Reporting	
AQ-MM#3	Reduce the Potential Impact of Toxics	This mitigation measure will apply to heavy maintenance facility / maintenance-of-way facility (HMF/MOWF) operation for all site options to ensure that the nearest sensitive receptor has a health risk assessed at less than the applicable threshold for cancer risk of 10 in a million a hazard index of one. Final decisions on the range of mitigation measures to achieve emission reductions to meet this standard shall be made before the issuance of the authority to construct permit for the HMF facility. These measures may include the following options: use of electric or hybrid trucks to serve the facility; use of electric or clean switcher locomotive to minimize the emissions from HMF operation; when advertising for a train set vendor, a preference for the use of highly polished external manufactured aluminum for train sets will be stated in the proposal; adjustment of the facility operation and orientation to move emission activities to areas where impacts on the surrounding sensitive areas are lessened, thus reducing localized impacts on surrounding sensitive receptors; a minimum buffer distance of 1,300 feet from sensitive receptors for diesel vehicles,	Design/ Operation	Reporting	Final design/Final vehicle specification	Contractor/ Authority	Contractor/ Authority	Final design/Final vehicle specification	Submit assessment and additional environmental documentation

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Frequency	Implementation Mechanism
		limitations on idling of diesel vehicles at the facility, or preparation of a detailed health risk assessment, using Hotspots Analysis and Reporting Program Version 2 (HARP2) or other agency-approved health risk assessment procedure, that shows cancer risk to be less than 10 in a million when the site design is refined.							
AQ-MM#4	Reduce the Potential Impact of Stationary Sources	Large stationary equipment (combustion equipment, paint booths, wastewater treatment, etc.) will use best industry practices, or alternative equipment will be used, to the extent practicable, to reduce emissions of criteria pollutants. This mitigation measure will apply to criteria pollutant Toxic Air Contaminants sources such as the HMF sites, concrete batch plants, and steam generators.	Design/ Operation	Reporting	Final design	Contractor/ Authority	Contractor/ Authority	Final design	Submit assessment and supplemental environmental documentation
Noise and Vibration									
N&V-MM #1	Construction Noise Mitigation Measures	<p>Prior to construction (any ground disturbing activities), the contractor shall 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 would 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 will 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. • 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. 	Construction	Reporting	Annual	Contractor	Contractor	Annual	Contract Requirements/ Specifications

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Frequency	Implementation Mechanism
		<ul style="list-style-type: none"> The Authority will establish and maintain in operation until completion of construction a toll-free "hotline" regarding the Section construction activities. The Authority shall 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 shall 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 shall make a log of the in-coming messages and the Authority's responsive actions publicly available on its website. <p>The contractor shall provide the Authority with an annual report by January 31st of the following year documenting how it implemented the noise-monitoring program.</p>							
N&V-MM #2	Construction Vibration Mitigation Measures	<p>Prior to construction involving impact pile driving within 50 feet of any building the Contractor shall provide the Authority with a vibration technical memorandum documenting how project pile driving criteria will be met. Upon approval of the technical memorandum by the Authority, and where a noise-sensitive receptor is present, the Contractor shall comply with the vibration reduction methods described in that memorandum. Potential construction vibration building damage is only anticipated from impact pile driving at very close distances to buildings. If pile driving occurs more than 25 to 50 feet from buildings, or if alternative methods such as push piling or auger piling are used, damage from construction vibration is not expected to occur. When a construction scenario has been established, pre-construction surveys will be conducted by the Contractor at locations within 50 feet of pile driving to document the existing condition of buildings in case damage is reported during or after construction. The Contractor will arrange for the repair of damaged buildings or will pay compensation to the property owner.</p>	Pre-construction/ Construction/ Post-construction	Reporting	Prior to Construction	Contractor	Contractor	Ongoing monitoring during construction/post-construction monitoring as needed to assess damage to buildings.	Contract Requirements/ Specifications
N&V-MM #3	Implement Proposed California High-Speed Rail Project Noise Mitigation Guidelines	<p>Prior to operation and maintenance of the HSR, the Authority shall prepare an HSR operation noise impact report. Based on the recommendations in the approved noise impact report the Authority will install sound barriers where they can achieve between 5 and 15 decibel (dB) of noise reduction, depending on their height and location relative to the tracks. The primary requirements for an effective sound barrier are that the barrier must (1) be high enough and long enough to break the line-of-sight between the sound source and the receiver, (2) be of an impervious material with a minimum surface density of four pounds per square foot, and (3) not have any gaps or holes between the panels or at the bottom. Because many materials meet these requirements, aesthetics, durability, cost, and maintenance considerations usually determine the selection of materials for sound barriers. Depending on the situation, sound barriers can become visually intrusive. Typically, the sound barriers style is selected with input from the local jurisdiction to reduce the visual effect of barriers on adjacent lands uses, refer to Aesthetic Options for Non-Station Structures, 2017. For example, sound barriers could be solid or transparent, and made of various colors, materials, and surface treatments. The minimum number of affected sites should be at least 10, and the length should be at least 800 feet. The maximum sound barrier height would be 14 feet for at-grade sections; however, all sound barriers would be designed to be as low as possible to achieve a substantial noise reduction. Berm and berm/wall combinations are the preferred types of sound barriers where space and other environmental constraints permit. On aerial structures, the maximum sound barrier height would also be 14 feet, but barrier material would be limited by engineering weight restrictions for barriers on the structure. Sound barriers on the aerial structure will still be designed to be as low as possible to achieve a substantial noise reduction. Sound barriers on both aerial structures and at-grade structures could consist of solid, semitransparent, or</p>	Post-construction/ Pre-Operation	Reporting	During Operation Testing	Authority	Authority	Ongoing monitoring as needed	Contract Requirements/ Specifications Noise and Vibration Mitigation Guidelines Aesthetic Options for Non-Station Structures

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Frequency	Implementation Mechanism
		<p>transparent materials as defined in the Aesthetic Options for Non-Station Structures, 2017.</p> <p>The Authority will work with the communities to identify how the use and height of sound barriers would be determined. Options may include reducing the height of sound barriers and combining barriers with sound insulation.</p> <p>If sound walls are not proposed or do not reduce sound levels to below a severe impact level, building sound insulation will be installed where approved by the property owner. Sound insulation of residences and institutional buildings to improve the outdoor-to-indoor noise reduction is a mitigation measure that can be provided when the use of sound barriers is not feasible in providing a reasonable level (5 to 7 dB) 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 dB) 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.</p> <p>If sound walls or sound installation is not effective, the Authority will acquire easements on properties severely affected by noise. This approach is usually taken only in isolated cases where other mitigation options are infeasible, impractical, or too costly.</p>							
N&V-MM#4 (RC to confirm current federal standard)	Vehicle noise specification	During high-speed rail (HSR) vehicle technology procurement, the Authority will require bidders to meet the federal regulations (40 CFR Part 201.12/13) at the time of procurement for locomotives (currently a 90-dB-level standard) operating at speeds of greater than 45 miles per hour (mph).	Pre-construction/ Construction/ Post-construction	Reporting	During Procurement	Authority	Authority	During vehicle technology procurement	Contract Requirements/ Specifications Noise and Vibration Mitigation Guidelines
N&V-MM#5	Special track work at crossovers and turnouts	Prior to construction, the Contractor shall provide the Authority with an HSR operation noise technical report for review and approval. The report shall address the minimization/elimination of rail gaps at turnouts. Because the impacts of HSR wheels over rail gaps at turnouts increases HSR noise by approximately 6 dB over typical operations, turnouts can be a major source of noise impact. If the turnouts cannot be moved from sensitive areas, the noise technical report will recommend the use special types of track work that eliminate the gap. The Authority will require the project design to follow the recommendations in the approved noise impact report.	Pre-construction/ Construction/	Reporting	Prior to Construction	Authority	Authority	Prior to Construction	Contract Requirements/ Specifications Noise and Vibration Mitigation Guidelines
N&V-MM #6	Additional Noise Analysis Following Final Design	Prior to Construction, the Contactor shall provide the Authority with a HSR operation noise technical report for review and approval. If final design or final vehicle specifications result in changes to the assumptions underlying the noise technical report, the Authority shall prepare necessary environmental documentation, as required by CEQA and National Environmental Policy Act (NEPA), to reassess noise impacts and mitigation.	Pre-construction/ Design/ Operation	Reporting	Final design/Final vehicle specification	Contractor/ Authority (vehicle)	Contractor/ Authority (vehicle)	Final design/Final vehicle specification	Submit assessment and supplemental environmental documentation
EMI/EMF									
		No standard measures; see IAMF's							
Public Utilities and Energy									
		No standard measures; see IAMF's							

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Frequency	Implementation Mechanism
Biological Resources									
BIO-MM#1	Conduct Presence/Absence Pre-construction Surveys for Special-Status Plant Species and Special-Status Plant Communities	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 Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities (CDFW 2018) and Guidelines for Conducting and Report Botanical Inventories for Federally Listed, Proposed and Candidate Plants (USFWS 2001). 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.	Pre-construction, Construction, and Post-construction	Conduct surveys for special-status plant species; Report findings; Restore temporary 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
BIO-MM#2	Prepare and Implement Plan for Salvage and Relocation of Special-Status Plant Species	<p>Prior to 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 ESA, 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 ESA 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 plant 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; 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 (Plan), Implementation during construction, Monitoring post-construction	Prepare/Implement Plan and 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 and Relocation of Special Status Plant Species Following requirements established by regulatory compliance permits
BIO-MM#3	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 cm of standing water 24 hours after a rain event. Approximately two 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.	Pre-construction	Vernal pool 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

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Frequency	Implementation Mechanism
BIO-MM#4	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.	Construction	Exclusion fencing, Reporting	Follow reporting requirements as established by regulatory compliance permits; monthly	Contractor	Contractor	Follow reporting requirements as established by regulatory compliance permits	Condition of Design Build Contract Following requirements established by regulatory compliance permits
BIO-MM#5	Implement and Monitor Vernal Pool Avoidance and Minimization Measures within Temporary Impact Areas	To the extent feasible, impacts to 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 to 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 soils and protect the pools' contours, as provided by regulatory authorizations issued under the federal Endangered Species Act. 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 ESA.	Construction	Exclusion fencing, collection of soil material, off-site compensatory mitigation; 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
BIO-MM#6	Prepare and Implement a Restoration and Revegetation Plan	Prior to any ground disturbing activity, the Project Biologist will prepare a Restoration and Revegetation Plan (RRP) to address temporary impacts resulting from ground disturbing activities within areas that potentially support special-status species, wetlands and/or other aquatic resources. Restoration activities may include, but not be limited to: grading landform contours to approximate pre-disturbance conditions, re-vegetating disturbed areas with native plant species, and using certified weed-free straw and mulch. The Authority will implement the RRP in all temporarily disturbed areas outside of the permanent right-of-way that potentially support special-status species, wetlands and/or other aquatic resources. Consistent with section 1415 of the Fixing America's Surface Transportation Act (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: <ul style="list-style-type: none"> a. Procedures for documenting pre-construction conditions for restoration purposes. b. Sources of plant materials and methods of propagation. c. 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. 	Pre-construction, construction, post-construction	Prepare/ Implement Plan and Report Compliance	Yearly	Contractor	Contractor	Monthly or reporting requirements as established by regulatory compliance permits	Condition of Design Build Permit

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Frequency	Implementation Mechanism
		<ul style="list-style-type: none"> d. Specification of success criteria for re-established plant communities. 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 31st 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>							
BIO-MM#7	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 (ESAs) or conduct species relocation.	Pre-construction, Construction	Pre-construction surveys for special status species, and establishment of ESAs and ERAs	Monthly or at other appropriate interval	Contractor	Contractor	Surveys conducted 30 days prior to ground disturbance, During construction submit weekly reports or reporting requirements as established by regulatory compliance permits	Condition of Design Build Contract Following requirements established by regulatory compliance permits
BIO-MM#8	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 to 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 ESA and/or CESA.	Construction	Monitoring during construction, reporting	Contractor	Contractor	Contractor	Daily monitoring, monthly or reporting requirements as established by regulatory compliance permits	Condition of Design Build Contract Following requirements established by regulatory compliance permits
BIO-MM#9	Conduct Pre-construction Surveys for California Tiger Salamander	<p>Prior to any ground disturbing activity scheduled to occur during the dry season (June 1 – October 15), the Project Biologist will conduct a pre-construction survey of 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 salamanders (CTS) are present. Such surveys will be conducted no earlier than 30 days prior to ground disturbing activities in the Work Area. The Project Biologist may employ the use of conservation dogs (scent dogs) to augment focused species surveys using methods described in Wasser et al. 2004, Smith et al. 2006, and/ or Filazzola et al 2017. The Project Biologist will coordinate with USFWS and CDFW before using conservation dogs.</p> <p>In the event that ground disturbing activities are scheduled to occur during the rainy season (October 15 – June 1), in addition to upland surveys, the Project Biologist will survey potential breeding habitat in the Work Area for the presence of CTS using</p>	Pre-construction	Pre-construction surveys	Pre-construction 30 day prior to construction; Weekly reporting or reporting requirements as established by regulatory compliance permits	Contractor	Contractor	Surveys (at least 1 year prior to ground disturbance), pre-construction 30 day prior to construction; Weekly reporting or reporting requirements as established by regulatory compliance permits	Condition of Design Build Contract Following requirements established by regulatory compliance permits

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Frequency	Implementation Mechanism
		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> (USFWS and CDFG 2003) or other more recent guidelines, if available.							
BIO-MM#10	Implement Avoidance and Minimization Measures for California Tiger Salamander	<p>Prior to any ground disturbing activity the Project Biologist will install Wildlife Exclusion Fencing (WEF) along the boundary of the Work Area containing CTS modeled suitable habitat or will implement similar measures as otherwise required pursuant to regulatory authorizations issued under the ESA 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 CTS 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 non-consecutive days and on a daily basis between October 15 and June 1. WEF will be installed with turn-arounds at access points to direct CTS 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 CTS breeding habitat during the rainy season (October 15 through June 1). However, construction activities may begin within such areas after April 15 if the breeding habitat is no longer inundated.</p>	Construction	Establish exclusion fencing	Daily or Twice per week inspections (non-consecutive days), weekly reporting	Contractor	Contractor	Daily or twice per week inspections (non-consecutive days), weekly reporting	Condition of Design Build Contract
BIO-MM#11	Conduct Surveys for Blunt-Nosed Leopard Lizard	<p>No more than twelve months before the start of any ground disturbing activity, in accordance with authorizations under the ESA, a habitat assessment of the project footprint will be conducted by the Project Biologist in suitable habitat for the blunt-nosed leopard lizard to identify all habitat suitable for blunt-nosed leopard lizard within the project footprint. Within twelve months prior to any ground-disturbing activity, the Project Biologist will conduct surveys for blunt nosed leopard lizard in blunt-nosed lizard suitable habitats (e.g., areas containing burrows) within the Work Area. These surveys will be conducted in accordance with the <i>Approved Survey Methodology for the Blunt-Nosed Leopard Lizard</i> (California Department of Fish and Game 2004), 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 within two business days.</p>	Pre-construction	Conduct surveys; Reporting	Surveys within one year prior to construction; Reporting weekly or in Survey Methodology	Contractor	Contractor	Within one year prior to construction or as required in Survey Methodology	Condition of Design Build Contract
BIO-MM#12	Will be blank								
BIO-MM#13	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 Wildlife Exclusion Fencing (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 through 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.</p>	Construction	Establish buffers, vegetation removal, pre-construction survey, and passive relocation; erect barriers; monitoring and reporting	Monthly reporting	Contractor	Contractor	Monthly reporting	Condition of Design Build Contract

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Frequency	Implementation Mechanism
		<p>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 through 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 Construction 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 wildlife exclusion fence (WEF), the Project Biologist will confirm that no blunt-nosed leopard lizard 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. <ul style="list-style-type: none"> ○ Within 3 days of completing these surveys with negative results, WEF will be installed in a configuration that accounts for burrow locations and enables blunt-nosed leopard lizards to leave the Work Area. The following day, the Project Biologist will conduct an observational survey. If no blunt-nosed leopard lizards are observed, the Project Biologist will install additional WEF to further enclose the Work Area. This Work Area will be monitored daily while the WEF is in place. ○ If blunt-nosed leopard lizards are observed prior to installing the last of the WEF, the Project Biologist will continue observational surveys until the lizard is observed leaving the Work Area or until 30 days elapse with no blunt-nosed leopard lizards observations within the Work Area. 							
BIO-MM#14	Conduct Pre-construction Surveys and Delineate Active Nest Buffers Exclusion Areas for Breeding Birds	<p>Prior to any ground disturbing activity, including vegetation removal, scheduled to occur during the bird breeding season (February 1 to September 1), the Project Biologist will conduct visual pre-construction surveys within the Work Area for nesting birds and active nests (nests with eggs or young) of non-raptor species listed under the Migratory Bird Treaty Act and/or the Fish and Game Code.</p> <p>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</p>	Pre-construction	Pre-construction surveys, and establish nest buffers	Surveys conducted prior to disturbance; Report monthly or as established by regulatory compliance permits	Contractor	Contractor	Surveys conducted prior to disturbance; Report monthly or as established by regulatory compliance permits	Condition of Design Build Permit

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Frequency	Implementation Mechanism
		distance of 75 feet, unless a larger buffer is required pursuant to regulatory authorizations issued under the ESA 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.							
BIO-MM#15	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 to September 1), no more than 14-days before the start of the activities, the Project Biologist will conduct pre-construction surveys for nesting raptors in areas where suitable habitat is present. Specifically, such surveys will be conducted in habitat areas within the Construction Footprint and, where access is available, within 500 feet of the boundary of the Construction Footprint. 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 ESA 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. Nest buffers may be adjusted if the Project Biologist determines that smaller buffers would be sufficient to avoid impacts to nesting raptors.	Pre-construction, Construction	Pre-construction surveys, and establishment of nest buffers	Surveys conducted no more than 14 days prior to construction; Report monthly or as established by regulatory compliance permits	Contractor	Contractor	Surveys conducted no more than 14 days prior to construction; Report monthly or as established by regulatory compliance permits	Condition of Design Build Permit
BIO-MM#16	Implement Avoidance Measures for California Condor	<p>During any ground-disturbing activities within the range of the California condor, as delineated in the USFWS database, the Authority will implement the following avoidance measures:</p> <ul style="list-style-type: none"> The Project Biologist will be present for construction activities occurring within two miles of known California condor roosting sites. If USFWS informs the Authority or if the Authority is otherwise made aware that California condors are roosting within 0.5 miles of a Work Area, no construction activity will occur during the period between one hour before sunset and one hour after sunrise. All construction materials located within Work Areas, including items that could pose a risk of entanglement, such as ropes and cables, will be properly stored and secured when not in use. Littering of trash and food waste is prohibited. All litter, small artificial items (screws, washers, nuts, bolts, etc.), and food waste will be collected and disposed of from Work Areas on at least a daily basis. All fuels and components with hazardous materials or wastes will be handled in accordance with applicable regulations. These materials will be kept in segregated, secured and/or secondary containment facilities as necessary. Any spills of liquid substances that could harm condors will be immediately addressed. Avoid the use of ethylene glycol-based anti-freeze or other ethylene glycol-based liquid substances. All parked vehicles/equipment will be kept free of leaks, particularly anti-freeze. 	Construction	Verify structures are raptor safe in accordance with Avian Power Line Interaction Committee (APLIC) guidance; Compliance Reporting, maintain work-site appropriately	Prior to final design	Contractor	Contractor	Prior to final design	Condition of Design Build Contract Condition of regulatory permits

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Frequency	Implementation Mechanism
		<ul style="list-style-type: none"> • Polychemical lines will not be used or stored on-site to preclude condors from obtaining and ingesting pieces of polychemical lines. • If a California condor(s) lands in any Work Area, the Project Biologist will assess construction activities occurring at the time and determine whether those activities present a potential hazard to the individual California condor. Activities determined by the Project Biologist to present a potential hazard to the California condor will be stopped until the bird has abandoned the area. Methods approved by USFWS for hazing California condors to encourage abandonment of the construction site, <i>Guidance on Hazing California Condors</i> (September 2014), may be used as necessary. • The Project Biologist will coordinate with USFWS prior to construction-related uses of helicopters to establish that no California condors are present in the area. If California condors are observed in the area in which helicopters will operate, helicopter use will not be permitted until the Project Biologist has determined that the California condors have left the area. 							
BIO-MM#17	Conduct Surveys for Swainson's Hawk Nests and Implement Avoidance and Minimization Measures	Surveys must be performed no more than one 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 <i>Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley</i> (Swainson's Hawk Technical Advisory Committee [SHTAC] 2000).	Pre-construction	Conduct Protocol Surveys; Compliance Reporting	Monthly or as established by regulatory compliance permits	Contractor	Contractor	Monthly or as established by regulatory compliance permits	Condition of Design Build Contract Condition of regulatory permits
BIO-MM#18	Implement Avoidance and Minimization Measures for Swainson's Hawk Nests	Any active Swainson's hawk nests (defined as a nest used one or more times in the last five years) found within 0.5-mile of the boundary of the Work Area during the nesting season (February 1 to 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 Staff Report Regarding Mitigation for Impacts to Swainson's Hawks (<i>Buteo swainsoni</i>) in the Central Valley of California (CDFG 1994), and the status of the nest will be monitored until the young fledge or for the length of construction activities, whichever occurs first. Adjustments to the buffer(s) may be made in consultation with CDFW. 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.	Construction	Establish active nest buffers; Compliance Reporting	Monthly or as established by regulatory compliance permits	Contractor	Contractor	Monthly or as established by regulatory compliance permits	Condition of Design Build Contract Condition of regulatory permits
BIO-MM#19	Will be blank								
BIO-MM#20	Conduct Protocol 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 Staff Report on Burrowing Owl Mitigation (CDFG 2012c).	Pre-construction	Protocol level surveys; Compliance Reporting	Monthly or at other appropriate interval	Contractor	Contractor	Monthly or at other appropriate interval	Condition of Design Build Contract
BIO-MM#21	Implement Avoidance and Minimization	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</i>	Construction	Establish exclusion zones or	Monthly or at other appropriate interval	Contractor	Contractor	Monthly or at other appropriate interval	Condition of Design Build Contract

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Frequency	Implementation Mechanism
	Measures for Burrowing Owl	<i>Owl Mitigation</i> (CDFG 2012). 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 through 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.		buffers; Compliance Reporting					
BIO-MM#22	Conduct Pre-Construction Surveys for Nelson's Antelope Squirrel, Tipton Kangaroo Rat, Dulzura Pocket Mouse, and Tulare Grasshopper Mouse	Prior to any ground disturbing activity, the Project Biologist will conduct pre-construction surveys in potentially suitable habitat within the Work Area to identify burrows or signs of presence of Nelson's antelope squirrel, Tipton kangaroo rat, Dulzura pocket mouse, or Tulare grasshopper mouse. The surveys will be conducted within two years of, and at least 14 days before, the start of ground disturbing activities in a Work Area.	Pre-construction	Habitat Assessment	Monthly or as established by regulatory compliance permits	Contractor	Contractor	Monthly or as established by regulatory compliance permits	Condition of Design Build Contract Condition of regulatory permits
BIO-MM#23	Implement Avoidance and Minimization Measures for Nelson's Antelope Squirrel, Tipton Kangaroo Rat, Dulzura Pocket Mouse, and Tulare Grasshopper Mouse	If burrows or signs of Nelson's antelope squirrel, Tipton kangaroo rat, Dulzura pocket mouse, or Tulare grasshopper mouse are observed during pre-construction surveys, the Project Biologist will establish Environmentally Sensitive Areas (ESAs) and install Wildlife Exclusion Fencing at least 14 days before the start of ground disturbing activities in areas where burrows or signs were observed. To the extent feasible, no-work buffers extending 50 feet beyond the ESAs will be established. The WEF will be installed in a manner that provides for the exclusion of the special-status small mammals from the Work Area, but allows them to exit the area. After the WEF is installed, the Project Biologist will conduct trapping and relocation for Nelson's antelope squirrel, Tipton kangaroo rat, Dulzura pocket mouse, and Tulare grasshopper mouse, in coordination with CDFW and USFWS regarding appropriate methods.	Construction	Establish Exclusion Zones, Vegetation Removal and Small Mammal Trapping; Compliance Reporting	Monthly or as established by regulatory compliance permits	Contractor	Contractor	Monthly or as established by regulatory compliance permits	Condition of Design Build Contract Condition of regulatory permits
BIO-MM#24	Implement Minimization Measures for Fresno Kangaroo Rat	Prior to any ground disturbing activity, the Project Biologist, will assess suitable habitat within the Work Area to determine whether kangaroo rat burrows or signs of kangaroo rats are present. If no burrows or signs of kangaroo rats are detected and kangaroo rats are determined to be absent from the Work Area, the following actions will be implemented: <ul style="list-style-type: none"> The Project Biologist may oversee the installation, maintenance, and monitoring of Wildlife Exclusion Fencing (WEF) along the perimeter of the Work Area. <p>If kangaroo rat individuals, burrows, or signs of the presence of kangaroo rats are found within the Work Area during the habitat assessment, the Project Biologist will take further steps to determine whether, or the extent to which, Fresno kangaroo rat is present, including through trapping, genetic analysis of scat, or the use of conservation dogs trained to detect the species, or as otherwise provided pursuant to authorizations issued under the ESA and/or CESA.</p> <p>In the unlikely event that Fresno kangaroo rat is confirmed present in the Work Area, USFWS and CDFW will be notified within two business days or as required under</p>	Pre-construction	Habitat assessment; Agency Coordination; Compliance Reporting	Monthly Reporting or at other appropriate interval	Contractor	Contractor	Monthly Reporting or at other appropriate interval	Condition of Design Build Contract Condition of regulatory permits

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Frequency	Implementation Mechanism
		authorizations issued under the ESA and/or CESA. The Project Biologist will install WEF in areas where Fresno kangaroo rat is present and will establish 50-foot no-work buffers, unless a different buffer distance is specified under authorizations issued under the ESA and/or CESA.							
BIO-MM#25	Conduct Pre-construction Surveys for Special-Status Bat Species	No earlier than thirty days prior to the start of ground disturbing activities in a Work Area, the Project Biologist will conduct a visual and acoustic survey (over the course of one day and one evening at a minimum) for roosting bats in the Work Area and extending 500 feet from the boundary of the Work Area, where access is available. Such surveys will be conducted only in those areas in which bridges, abandoned structures, trees with large cavities or dense foliage are present within a half mile of the boundary of the Work Area.	Pre-construction	Pre-construction Surveys, Compliance Reporting	Monthly or at other appropriate interval	Contractor	Contractor	Monthly or at other appropriate interval	Condition of Design Build Contract
BIO-MM#26	Implement Bat Avoidance and Relocation Measures	<p>Prior to any ground-disturbing activity, the Project Biologist shall 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.</p> <p>The Project Biologist will implement the relocation plan before the commencement of any ground disturbing activities that will occur within 500 feet of the hibernacula. Removal of roosts will be guided by accepted exclusion and deterrent techniques.</p>	Construction	Pre-construction Surveys, Bat Roost Relocation Plan; Compliance Reporting	Monthly or at other appropriate interval	Contractor	Contractor	Monthly or at other appropriate interval	Condition of Design Build Contract
BIO-MM#27	Implement Bat Exclusion and Deterrence Measures	<p>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.</p> <p>To the extent feasible, the Authority will leave the roost undisturbed by project activities for a minimum of one 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.</p>	Construction	Bat exclusion and deterrence; Compliance Reporting	Monthly or at other appropriate interval	Contractor	Contractor	Monthly or at other appropriate interval	Condition of Design Build Contract
BIO-MM#28	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 through June 15) and a 50-foot no work buffer around occupied dens during other times of the year.	Pre-construction	Conduct Pre-construction survey; Compliance Report	Monthly Reporting or other appropriate interval	Contractor	Contractor	Monthly Reporting or other appropriate interval	Condition of Design Build Contract

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Frequency	Implementation Mechanism
BIO-MM#29	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 through July 1) and a 50-foot no-work buffer around occupied dens during other times of the year. If non-maternity dens are found and cannot be avoided during construction activities, they will be monitored for badger activity. If the Project Biologist determines that dens may be occupied, passive den exclusion measures will be implemented for three to five days to discourage the use of these dens prior to project disturbance activities.	Construction	Establish buffer around active dens; Compliance Reporting	Monthly Reporting or other appropriate interval	Contractor	Contractor	Monthly Reporting or other appropriate interval	Condition of Design Build Contract
BIO-MM#30	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> (USFWS 1999b) 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 Survey for San Joaquin kit fox; Compliance Reporting	Monthly Reporting or as established by regulatory compliance permits	Contractor	Contractor	Monthly Reporting or as established by regulatory compliance permits	Condition of Design Build Contract Condition of regulatory permits
BIO-MM#31	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> (USFWS [1999] 2011) 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 Service and CDFW to capture and relocate the kit fox if it does not safely leave the area by its own volition. To minimize the temporary impacts of WEF and construction exclusion fencing on kit fox and their movement/migration corridors during construction, artificial dens will be installed along the outer perimeter of WEF and construction exclusion fencing. Artificial dens or similar escape structures 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. 	Construction	Implement Standardized Recommendations for Protection of the San Joaquin Kit Fox Prior to or During Ground Disturbance; Compliance Reporting	Monthly Reporting or as established by regulatory compliance permits	Contractor	Contractor	Monthly Reporting or as established by regulatory compliance permits	Condition of Design Build Contract Condition of regulatory permits
BIO-MM#32	Restore Temporary Riparian Habitat Impacts	Within ninety days of completing construction in a Work Area, the Project Biologist will direct the revegetation of any riparian areas temporarily disturbed as a result of the construction activities, using appropriate native plants and seed mixes. Native	Post-construction	Restoration of temporary disturbance areas;	Within 90 days of completing construction	Contractor	Contractor	Weekly Within 90 days of completing construction	Condition of Design Build Contract

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Frequency	Implementation Mechanism
		plants and seed mixes will be obtained from stock originating from areas within the local watershed, to the extent feasible. The Project Biologist will monitor restoration activities consistent with provisions in the Restoration and Revegetation Plan (RRP)(BIO-MM#6).		Compliance Reporting					Condition of regulatory permits
BIO-MM#33	Restore Aquatic Resources Subject to Temporary Impacts	Within ninety day of the completion of construction activities in a Work Area, the Authority will begin to restore aquatic resources that were temporarily affected by the construction. Aquatic resources are those resources considered waters of the U.S. under the federal Clean Water Act or waters of the state under the Porter-Cologne Act. As set out in the Restoration and Revegetation Plan (RRP), such areas will be, to the extent feasible, restored to their natural topography. In areas where gravel or geotextile fabrics have been installed to protect substrate and to otherwise minimize impacts, the material will be removed and the affected features will be restored. The Authority will revegetate affected aquatic resources using appropriate native plants and seed mixes (from local vendors where available). The Authority will conduct maintenance monitoring consistent with the provisions of the (RRP).	Construction or Post-construction	Restoration of temporary disturbance areas; Compliance Reporting	Within 90 days of completing construction.	Contractor, Authority	Contractor	Within 90 days of completing construction.	Condition of Design Build Contract Condition of regulatory permits
BIO-MM#34	Monitor Construction Activities within Aquatic Resources	The Project Biologist will monitor construction activities that occur within or adjacent to aquatic resources, including activities associated with the installation of protective barriers (e.g., silt fencing, sandbags, fencing), install and/or removal of creek material to accommodate crossings, construction of access roads, and removal of vegetation. As part of this effort, the Project Biologist will document compliance with applicable avoidance and minimization measures including measures set forth in regulatory authorizations issued under the CWA and/or Porter-Cologne.	Construction	Compliance Monitoring, Compliance Reporting	Monthly Reporting or as established by regulatory compliance permits	Contractor	Contractor	Monthly Reporting or as established by regulatory compliance permits	Condition of Design Build Contract Condition of regulatory permits
BIO-MM#35	Implement Transplantation and Compensatory Mitigation Measures for Protected Trees	<p>Prior to ground disturbing activities, the Project Biologist will conduct surveys in the Work Area to identify protected trees.</p> <p>The Project Biologist will establish ESAs around protected trees with the potential to be affected by construction activities, but do not require removal. The ESAs will extend outward five feet from the drip lines of such protected trees.</p> <p>The Authority will provide compensatory mitigation for impacts to protected trees, including impacts associated with removing or trimming a protected tree. Compensation will be based on requirements set out in applicable local government ordinances, policies and regulations. Compensatory mitigation may include, but is not limited to, the following:</p> <ul style="list-style-type: none"> • Transplantation of protected trees to areas outside of the Work Area. • Replacement of protected trees at an offsite location, based on the number of protected trees impacted, at a ratio not to exceed 3:1 for native trees or 1:1 for ornamental trees, unless higher ratios are required by local government ordinances or regulations. • Contribution to a tree-planting fund. 	Pre-construction, Construction, Post-construction	Conduct Surveys prior to removal; Provide tree protection; Authority Compensate for Impacts	Monthly	Contractor	Contractor	Monthly	Condition of Design Build Contract

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Frequency	Implementation Mechanism
BIO-MM#36	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 and 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 ESA 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>	Construction, Operations and Maintenance	Install aprons or barriers;field inspection and Reporting	Yearly	Contractor	Contractor	Yearly	Condition of Design Build Contract Requirement of Regulatory Agency Permits
BIO-MM#37	Minimize Effects to Wildlife Movement Corridors During Construction	To the extent feasible, the Authority will avoid placing fencing, either temporarily or permanently, within known wildlife movement corridors in those portions of the alignment where the tracks are elevated (e.g., viaducts or bridges). The Authority will avoid conducting ground disturbing activities in wildlife movement corridors during nighttime hours, to the extent feasible, and will shield nighttime lighting to avoid illuminating wildlife movement corridors in circumstances where avoidance of such activities is not feasible.	Construction	Prepare Avoidance and Minimization Plan for Construction in Wildlife Movement linkages	Monthly or as established by regulatory compliance permits	Contractor	Contractor	Monthly or as established by regulatory compliance permits	Condition of Design Build Contract Construction in Wildlife Movement Linkages Plan
BIO-MM#38	Compensate for Impacts to Listed Plant Species	<p>The Authority will provide compensatory mitigation for direct impacts to 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 to federally listed plant species habitat, unless a higher ratio is required pursuant to regulatory authorizations issued under the ESA. • Compensatory mitigation will be provided at a 1:1 ratio to offset direct impacts to 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>	Construction, Post-Construction	Compliance Report	Before final design	Authority	Authority	Before final design	Authority to provide compensatory mitigation based on extent of special-status plant species affected by the Contractor.

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Frequency	Implementation Mechanism
BIO-MM#39	Provide Compensatory Mitigation for Impacts to 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, to vernal pool branchiopod habitat at a 1:1 ratio, unless a higher ratios is required by the ESA. Compensatory mitigation will be provided using one or more of the methods described in the Compensatory Mitigation Plan.	Construction, Post-construction	Compliance Report	Prior to Operation	Authority	Authority	Prior to Operation	Authority to compensate based on amount of suitable habitat for vernal pool fairy shrimp and vernal pool tadpole shrimp affected by the Contractor. Regulatory agency permit requirements
BIO-MM#40	Provide Compensatory Mitigation for Impacts onto Valley Elderberry Longhorn Beetle Habitat	The Authority will provide compensatory mitigation for impacts to valley elderberry longhorn beetle habitat, including through transplantation and replacement of elderberry shrubs and maintenance of replacement shrubs, consistent with the USFWS' <i>Framework for Assessing Impacts to the Valley Elderberry Longhorn Beetle</i> (USFWS 2017), as follows: <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 nonriparian habitat will be replaced at a ratio of 1:1. Individual elderberry shrubs in riparian areas will be replaced through a purchase of two credits at a USFWS-approved bank for each shrub that is trimmed or removed, regardless of the presence of beetle exit holes. Individual elderberry shrubs in nonriparian areas will be replaced through a purchase of one credit at a USFWS-approved bank for each shrub 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 ten years. <p>For transplanted elderberry plants, a survival rate of at least 60 percent of the elderberry plants and 60 percent of the associated native plants must be maintained throughout the ten-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>	Construction, Post-construction	Compliance Report	Transplant Pre-construction; Compensatory prior to Operation	Authority	Authority	Transplant Pre-construction; Compensatory prior to Operation	Authority to compensate based on number of host plants for the valley elderberry longhorn beetle affected by the Contractor. Regulatory agency permit requirements
BIO-MM#41	Provide Compensatory Mitigation for Impacts to California Tiger Salamander Habitat	The Authority will provide compensatory mitigation to offset the loss of modeled California tiger salamander habitat. Compensatory mitigation will be provided in the following ratios, unless higher ratios are required through regulatory authorizations issued under the ESA and/or CESA: Compensatory mitigation will be provided using one or more of the methods described in the Compensatory Mitigation Plan.	Construction, Post-construction	Compliance Report	Prior to Operation	Authority	Authority	Prior to Operation	Authority to compensate based on amount of suitable habitat for California tiger salamander affected by the Contractor. Regulatory agency permit requirements
BIO-MM#42	Provide Compensatory Mitigation for Impacts to Habitat for Blunt-Nosed Leopard Lizard, Tipton Kangaroo Rat, and	The Authority will provide compensatory mitigation to offset the permanent and temporary loss of suitable habitat for the blunt-nosed leopard lizard, Tipton kangaroo rat, 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 ESA and/or	Construction, Post-construction	Compliance Reports	Prior to Operation	Authority	Authority	Prior to Operation	Authority to compensate based on amount of suitable habitat for Blunt-nosed leopard lizard, Tipton

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Frequency	Implementation Mechanism
	Nelson's Antelope Squirrel	CESA. Compensatory mitigation will be provided using one or more of the methods described in the Compensatory Mitigation Plan.							kangaroo rat and Nelson's Antelope Squirrel impacted by the Contractor. Regulatory agency permit requirements
BIO-MM#43	Provide Compensatory Mitigation for Loss of Swainson's Hawk Nesting Trees and Habitat	<p>To compensate for permanent impacts on active Swainson's hawk nest trees (i.e., trees in which Swainson's hawks were observed building nests during protocol-level surveys described in BIO-MM#48) and foraging habitat, the Authority would provide project-specific compensatory mitigation that replaces affected nest trees and provides foraging habitat. Lands proposed as compensatory mitigation for Swainson's hawk would meet the following minimum criteria:</p> <ul style="list-style-type: none"> • Support at least three mature native riparian trees suitable for Swainson's hawk nesting (i.e., valley oak, Fremont cottonwood, or willow) for each Swainson's hawk nest tree removed by construction of the project extent • Support at least one Swainson's hawk nesting territory in the last 5 years • Contribute to the project extent's mitigation commitment for Swainson's hawk foraging habitat, which would 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 	Construction, Post-construction	Compliance Reports	Prior to Operation	Authority	Authority	Prior to Operation	Authority to compensate based on amount of habitat for Swainson's hawks affected by the Contractor. Regulatory agency permit requirements
BIO-MM#44	Provide Compensatory Mitigation for Loss of Active Burrowing Owl Burrows and Habitat	To compensate for permanent impacts to nesting, occupied, and satellite burrows for burrowing owls and/or their habitat, the Authority will provide compensatory mitigation at a ratio of X using one or more of the methods described in the Compensatory Mitigation Plan.	Construction, Post-construction	Compliance Reports	Prior to Operation	Authority	Authority	Prior to Operation	Authority to compensate based on number of burrowing owl burrows affected by the Contractor.
BIO-MM#45	Provide Compensatory Mitigation for Impacts to San Joaquin Kit Fox Habitat	<p>The Authority will provide compensatory mitigation for impacts to 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 ESA and/or CESA.</p> <p>Compensatory mitigation will be provided using one or more of the methods described in the Compensatory Mitigation Plan.</p>	Post-construction	Compliance Memo	Prior to Operation	Authority	Authority	Prior to Operation	Authority to compensate based on area of habitat for San Joaquin kit fox affected by the Contractor. Regulatory agency permit requirements
BIO-MM#46	Provide Compensatory Mitigation for Permanent Impacts to Riparian Habitat	The Authority will compensate for permanent impacts to riparian habitats at a ratio of 2:1, unless a higher ratio is required by agencies with regulatory jurisdiction over the resource. Compensatory mitigation may occur through habitat restoration, the acquisition of credits from an approved mitigation bank, or participation in an in lieu fee program.	Post-construction	Compliance Memo	Prior to Operation	Authority	Authority	Prior to Operation	Authority to compensate based on area of permanent riparian habitat affected by the Contractor Regulatory agency permit requirements
BIO-MM#47	Prepare and Implement a Compensatory Mitigation Plan (CMP) for Impacts to Aquatic Resources	The Authority will prepare and implement a Compensatory Mitigation Plan (CMP) that identifies mitigation to address temporary and permanent loss, including functions and values, of aquatic resources as defined as waters of the U.S. under the federal Clean Water Act (CWA) and/or waters of the State under the Porter-	Construction, Post-construction	Authority responsible for the preparation of and implementation of the CMP,	Prepare CMP Pre-construction; Implement CMP During	Authority	Authority	Prepare CMP Pre-construction; Implement CMP During Construction	Requirement to acquire regulatory agency permits. Authority to compensate based on area of temporary and

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Frequency	Implementation Mechanism
		<p>Cologne Act. 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 unless a higher ratio is required pursuant to regulatory authorizations issued under Section 404 of the CWA and/or the Porter-Cologne 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. • 1:1 offsite for permanent impacts. • 1:1 onsite and 0.1:1 to 0.5:1 offsite for temporary impacts. <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>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 and the method for calculating credits.</p>		monitoring, and reporting. Implement CMP, and prepare Monitoring Reports and Compliance Memos	Construction and Post-Construction			and Post-Construction	permanent jurisdictional waters affected by the Contractor
BIO-MM#48	Will be blank								
BIO-MM#49	Will be blank								
BIO-MM#50	Implement Measures to Minimize Impacts During Offsite Habitat Restoration, or Enhancement, or	Prior to ground disturbing activities associated with habitat restoration, enhancement, and/or creation actions at a mitigation site, the Authority will conduct a site assessment of the Work Area to identify biological and aquatic resources, including plant communities, land cover types, and the distribution of special-status plants and wildlife.	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 impacted by the Contractor. Offsite

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Frequency	Implementation Mechanism
	Creation on Mitigation Sites	<p>Based on the results of the site assessment, the Authority will obtain any necessary regulatory authorizations prior to conducting habitat restoration, enhancement and/or creation activities, including authorization under the ESA or CESA, Fish and Game Code Section 1600 et seq., the Clean Water Act , and the Porter-Cologne Act.</p> <p>The Authority will implement the following measures to avoid or minimize impacts to species habitat and aquatic biological resources during habitat restoration, enhancement or creation activities:</p> <ul style="list-style-type: none"> • IAMF: Prepare WEAP Training Materials and Conduct Construction Period WEAP Training • IAMF: Establish Monofilament Restrictions • IAMF: Prevent Entrapment in Construction Materials and Excavations • IAMF: Delineate Equipment Staging Areas and Traffic Routes • IAMF: Dispose of Construction Spoils and Waste • IAMF: Clean Construction Equipment • IAMF: Maintain Construction Sites • MM: Conduct Pre-construction Surveys and Delineate Active Nest Buffers Exclusion Areas for Breeding Birds • MM: Conduct Pre-construction Surveys and Monitoring for Raptors • MM: Restore Temporary Riparian Habitat Impacts • MM: Restore Aquatic Resources Subject to Temporary Impacts • MM: Prepare and Implement a Weed Control Plan • MM: Notify and Report on "Take" • MM: Delineate Environmentally Sensitive Areas and Install Wildlife Exclusion Fencing • MM: Limit Vehicle Traffic and Construction Site Speeds • MM: Work Stoppage 							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
BIO-MM#51	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, Wildlife Exclusion Fencing (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 two weeks or more.	Pre-construction; construction	Pre-construction surveys; daily clearance surveys; reporting	Surveys within 30 days prior to ground disturbance; daily clearance surveys; monthly reporting or reporting requirements as established by regulatory compliance permits	Contractor	Contractor	Surveys within 30 days prior to ground disturbance; daily clearance surveys; monthly reporting or reporting requirements as established by regulatory compliance permits	Condition of Design Build Permit
BIO-MM#52	Conduct Blainville's Horned Lizards, San Joaquin Coachwhip, and Silvery Legless Lizards Monitoring, and	Prior to ground disturbing activities, the Project Biologist will conduct a clearance survey in suitable habitat within the Work Area for Blainville's horned lizards, San Joaquin coachwhip, and silvery legless lizards. The Project Biologist may establish Wildlife Exclusion Fencing (WEF) to keep the species from entering the Work Area. If Blainville's horned lizard, San Joaquin coachwhip, or silvery legless lizard is	Construction	Daily monitoring; daily clearance surveys; Reporting	Monthly	Contractor	Contractor	Daily monitoring; daily clearance surveys; monthly reporting	Condition of Design Build Permit

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Frequency	Implementation Mechanism
	Implement Avoidance and Minimization Measures	observed during construction, measures will be taken to avoid the individual(s) and the species will be allowed to leave on its own volition or will be relocated outside of the Work Area by the Project Biologist. Clearance surveys will be conducted daily unless the Project Biologist determines that the surveys are no longer necessary.							
BIO-MM#53	Prepare a Compensatory Mitigation Plan (CMP) for Species and Species Habitat	<p>The Authority will prepare a Compensatory Mitigation Plan that sets out the compensatory mitigation that will be provided to offset permanent and temporary impacts to 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 ○ impacts initially categorized as permanent qualify as temporary impacts. 	Construction, Post-construction	Authority responsible for the preparation of and implementation of the CMP, monitoring, and reporting. Implement CMP, and prepare Monitoring Reports and Compliance Memos	Implement CMP During Construction and Post-Construction	Authority	Authority	Implement CMP During Construction and Post-Construction	

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Frequency	Implementation Mechanism
		<ul style="list-style-type: none"> An overview of the strategy for mitigating effects to 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#54	Prepare and Implement an Annual Vegetation Control Plan	<p>Prior to the operation and maintenance of the HSR, the Authority will prepare an Annual Vegetation Control Plan (VCP) to address vegetation removal for the purpose of maintaining clear areas around facilities, reducing the risk of fire, and controlling invasive weeds during the operational phase. The Authority will generally follow the procedures established in Chapter C2 of the Caltrans Maintenance Manual to manage vegetation on Authority property (California Department of Transportation [Caltrans] 2010). Vegetation will be controlled by chemical, thermal, biological, cultural, mechanical, structural, and manual methods. The VCP will be updated each winter and completed in time to be implemented no later than April 1 of each year. The annual update to the VCP would include a section addressing issues encountered during the prior year and changes to be incorporated into the VCP. The plan will describe site-specific vegetation control methods, as outlined below:</p> <ul style="list-style-type: none"> Chemical vegetation control methods. Mowing program consistent with section 1415 of the FAST Act. Other non-chemical vegetation control. Other chemical pest control methods (e.g., insects, snail, rodent). <p>Only Caltrans-approved herbicides may be used in the vegetation control program. Pesticide application will 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 will be treated where requested by County Agricultural Commissioners. The Authority will cooperate in area-wide efforts to control of noxious/invasive weeds if such programs have been established by local agencies.</p>	Prior to Operation	Compliance Report	Yearly	Authority	Authority	Prior to Operation	
BIO-MM#55	Prepare and Implement a Weed Control Plan	<p>Prior to any ground disturbing activity during the construction phase, the Project Biologist will develop a Weed Control Plan (WCP), subject to review and approval by the Authority. The purpose of the WCP is to establish approaches to minimize and</p>	Pre-construction; construction	Compliance Report	Yearly	Contractor	Contractor	Prior to Ground Disturbance	Condition of Design Build Permit

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Frequency	Implementation Mechanism
		<p>avoid the spread of invasive weeds during ground disturbing activities during construction and operations and maintenance.</p> <p>The WCP will include, at a minimum, the following:</p> <ul style="list-style-type: none"> • A requirement to delineate Environmentally Sensitive Areas (ESAs) in the field prior to weed control activities. • A schedule for weed surveys to be conducted in coordination with the BRMP. • Success criteria for invasive weed control. The success criteria would be linked to the BRMP standards for on-site work during ground disturbing activities. In particular, the criteria would establish limits on the introduction and spread of invasive species, as defined by the California Invasive Plant Council (CalIPC), to less than or equal to the pre-disturbance conditions in the area temporarily affected by ground disturbing activities. If invasive species cover is found to exceed pre-disturbance conditions by greater than 10 percent or is 10 percent greater than levels at a similar, nearby reference site, a control effort will be implemented. If the target, or other success criteria identified in the WCP, has not been met by the end of the WCP monitoring and implementation period, the Authority will continue the monitoring and control efforts, and remedial actions will be identified and implemented until the success criteria are met. • Provisions to ensure consistency between the WCP and the RRP, including verification that the RRP includes measures to minimize the risk of the spread and/or establishment of invasive species and reflects the same revegetation performance standards as the WCP. • Identification of weed control treatments, including permitted herbicides and manual and mechanical removal methods. • Timeframes for weed control treatment for each plant species. • Identification of fire prevention measures. 							
BIO-MM#56	Conduct Monitoring of Construction Activities	During any initial ground disturbing activity, the Project Biologist will be present in the Work Area to verify compliance with avoidance and minimization measures, to establish ESAs, and install wildlife exclusion fencing (WEF) and construction exclusion fencing (exclusion fencing).	Construction	Compliance Report	Daily	Contractor	Contractor	Daily	Condition of Design Build Permit
BIO-MM#57	Will be blank								
BIO-MM#58	Establish Environmentally Sensitive Areas and Non-Disturbance Zones	Prior to any ground disturbing activity in a Work Area, the Project Biologist will use flagging to mark Environmentally Sensitive Areas (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 Wildlife Exclusion Fencing (WEF) to prevent special-status wildlife species from entering Work Areas. The WEF will have exit doors to allow animals that may be inside an enclosed area to leave the area. The Project Biologist will also direct the installation of construction exclusionary fencing (exclusionary fencing) at the boundary of the Work Area, as appropriate, to avoid and minimize impacts to 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 ESA, WEF, and exclusionary fencing will be regularly inspected and maintained by the Project Biologist.	Pre-construction; construction	Compliance Report	Monthly	Contractor	Contractor	Monthly or at other appropriate interval	Condition of Design Build Permit

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Frequency	Implementation Mechanism
		The ESA, WEF, and exclusionary fencing locations will be identified and depicted on an exclusion fencing exhibit. The purpose of the ESAs and WEF will be explained at WEAP training and the locations of the ESA and WEF areas will be noted during worker tailgate sessions.							
BIO-MM#59	Will be blank								
BIO-MM#60	Limit Vehicle Traffic and Construction Site Speeds	Prior to any ground disturbing activities, the Project Biologist will ensure that appropriate measures have been instituted to restrict project vehicle traffic within the Construction Footprint to established roads, construction areas, and other permissible areas. The Project Biologist will establish vehicle speed limits of no more than 15 mph for unimproved access roads and for temporary and permanent construction areas within the Construction Footprint. The Project Biologist will also direct that access routes be flagged and marked and that measures be adopted to prevent off-road vehicle traffic.	Pre-construction; construction	Compliance Report	Monthly	Contractor	Contractor	Daily	Condition of Design Build Permit
BIO-MM#61	Establish and Implement a Compliance Reporting Program	<p>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.</p> <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. Non-compliance 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. • Non-compliance events observed. 	Construction	Compliance Report	Various as outlined in the MM	Contractor	Contractor	Monthly or at other appropriate interval	Condition of Design Build Permit

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Frequency	Implementation Mechanism
		<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 non-compliance 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 that has been disturbed during the reporting month, and ○ An accounting of the cumulative total number of acres of threatened and endangered species habitat that has been disturbed during the project period. • Up-to-date GIS layers, associated metadata, and photo documentation used to track acreages disturbed. • Copies of all pre-activity survey reports, daily compliance reports, and non-compliance/ work stoppage reports for the reporting month. <p>Annual Reports will be submitted to the Authority by the 20th of January 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 one day of the visit that memorializes the issues raised during the field meeting. This memorandum will be submitted to the Authority via EMMA. 							

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Frequency	Implementation Mechanism
		<p>Any issues regarding regulatory compliance raised by agency personnel will be reported to the Authority and the Contractor.</p> <ul style="list-style-type: none"> Compliance reporting will be submitted to the Authority via EMMA in accordance with the report schedule. The Project Biologist will prepare and submit compliance reports that document the following: <ul style="list-style-type: none"> Implementation and performance of the Restoration and Revegetation Plan described in BIO-MM. Summary of progress made regarding the implementation of the Weed Control Plan described in BIO-MM. Compliance with work window restrictions described in BIO-IAMF. The memorandum will be provided to the Authority for compliance monitoring documentation purposes. Compliance with BIO-MM: Notify and Report on "Take". Compliance with BIO-MM: Establish Environmentally Sensitive Areas and Non-Disturbance Zones and Install Wildlife Exclusion Fencing. Compliance with BIO-IAMF: Establish Monofilament Restrictions; the Project Biologist. Compliance with BIO-IAMF: Prevent Entrapment in Construction Materials and Excavations. Compliance with BIO-IAMF: Delineate Equipment Staging Areas. Compliance with BIO-IAMF: Clean Construction Equipment. Compliance with BIO-MM: Limit Vehicle Traffic and Construction Site Speed. Compliance with BIO-IAMF: Design the Project to be Bird Safe. Compliance with BIO-IAMF: Dispose of Construction Spoils and Waste has been properly disposed. BMP field manual implementation and any recommended changes to construction site housekeeping practices outlined in BIO-IAMF: Maintain Construction Sites. Work stoppages and measures taken under BIO-MM: Stop Work and Remove Special Status Species from Construction Sites will be documented in a memorandum prepared by the Project Biologist and submitted to the Authority within two business days of the work stoppage. 							
BIO-MM#62	Prepare Plan for Dewatering and Water Diversions	<p>Prior to initiating any construction activity that occurs within open or flowing water, the Authority will prepare a dewatering plan, which will be subject to the review and approval by the applicable regulatory agencies. The plan will incorporate measures to minimize turbidity and siltation. The Project Biologist will monitor the dewatering and/or water diversion sites, including collection of water quality data, as applicable. Prior to the dewatering or diverting of water from a site, the Project Biologist will conduct pre-activity surveys to determine the presence or absence of special-status species within the affected waterbody. In the event that special-status species are detected during pre-activity surveys, the Project Biologist will relocate the species (unless the species is Fully Protected under State law), consistent with any regulatory authorizations applicable to the species.</p>	Pre-construction; construction	Compliance Report	Monthly	Contractor	Contractor	Monthly or at other appropriate interval	Condition of Design Build Permit
BIO-MM#63	Work Stoppage	<p>In the event that any special-status wildlife species is found in a Work Area, the Project Biologist will have the authority to halt work to prevent the death or injury to the species. Any such work stoppage will be limited to the area necessary to protect the species and work may be resumed once the Project Biologist determines that the</p>	Construction	Compliance Report	Monthly	Contractor/ Authority	Contractor	Monthly Reporting or other appropriate interval	Condition of Design Build Permit

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Frequency	Implementation Mechanism
		<p>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 two business days of the work stoppage.</p>							
BIO-MM#64	Establish Wildlife Crossings	<p>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 shall confirm appropriate placement and dimensions of wildlife crossings.</p> <p>For terrestrial wildlife, crossings will conform to the minimum spacing and dimensions in the table below (INSERT TABLE, IF WILDLIFE CORRIDOR ASSESSMENT (WSA) WAS PREPARED USING CROSSINGS IDENTIFIED IN WSA), unless different dimensions are specified in authorizations issued under the ESA or CESA.</p> <p>To the extent feasible, all wildlife crossings created specifically for terrestrial species will include the following features and design considerations:</p> <ul style="list-style-type: none"> • Native earthen bottom • Ledges or tunnels will be incorporated into the design to facilitate safe passage of small mammals • Unobstructed entrances (e.g., no riprap, energy dissipaters, grates), although vegetative cover, adjacent to and near the entrances of crossings, is permissible • Openness and 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 • 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>	Pre-construction; Construction	Compliance Report	Yearly	Contractor	Contractor	Monthly or at other appropriate interval	Condition of Design Build Permit
BIO-MM#65	Conduct Pre-construction Surveys and Monitoring for Bald and Golden Eagles	<p>At least one year prior to the start of any ground disturbing activities and construction, the Project Biologists will conduct nesting season surveys for eagles. Surveys for bald and golden eagle nests will be conducted within 4 miles of any construction areas supporting suitable nesting habitat and important eagle roost sites and foraging areas. Surveys will be conducted in accordance with the USFWS Interim Golden Eagle Inventory and Monitoring Protocols (USFWS 2010a), and CDFW's Bald Eagle Breeding Survey Instructions (CDFG 2010), or current guidance. A nesting territory or inventoried habitat will be considered unoccupied by golden eagles only after completing at least two full surveys in a single breeding season. Prior to initial construction activities, the Project Biologist will conduct a pre-construction sweep of the project site for golden eagle use.</p>	Pre-construction	Conduct Pre-construction Survey for Bald and Golden Eagles at least one year prior; Compliance Reporting	Monthly Reporting or other appropriate interval	Contractor	Contractor	Monthly Reporting or other appropriate interval	Condition of Design Build Contract

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Frequency	Implementation Mechanism
BIO-MM#66	Implement Avoidance Measures for Active Eagle Nests	<p>Prior to the start of any ground disturbing activity, if an occupied nest (as defined by Pagel et al., 2010) is detected within 4 miles of the work areas, the Authority will implement a one-mile line-of-sight and one-half mile no line-of-sight no work buffer during the breeding season (January 1 through August 31) to ensure that construction activities do not result in injury or disturbance to eagles.</p> <p>The no work buffer will be maintained throughout the breeding season or until the young have fledged and are no longer dependent upon the nest or parental care that includes nest use for survival.</p> <p>Buffers around occupied nests may be reduced if the Project Biologist determines that smaller buffers would be sufficient to avoid impacts to nesting eagles. Factors to be considered for determining buffer size will include: the presence of natural buffers provided by vegetation or topography; nest height; locations of foraging territory; and baseline levels of noise and human activity. Buffers will be maintained and nests monitored until the Project Biologist has determined that young have fledged and are no longer reliant upon the nest or parental care that includes nest use for survival.</p> <p>Eagle nest exclusion zones may be removed if monitoring reveals the nest to be inactive as determined by the Project Biologist. An inactive eagle nest is one that is "no longer being used by eagles as determined by the continuing absence of any adult, egg, or dependent young at the nest for at least 10 consecutive days prior to, and including, at present" (USFWS 2016i). Monitoring to demonstrate inactivity of eagle nests will follow observational procedures described by Pagel et al. (2010).</p> <p>In bald and golden eagle nesting territories, the Project Biologist will examine debris piles and determine if there is a potential to attract prey species. If the Project Biologist determines debris piles may attract prey species and pose a danger to eagles, the debris piles will be removed or moved.</p>	Pre-construction	Pre-construction surveys, establish buffer around active nests; Compliance Reporting	Monthly Reporting or other appropriate interval	Contractor	Contractor	Monthly Reporting or other appropriate interval	Condition of Design Build Contract
BIO-MM#67	Provide Compensatory Mitigation for Loss of Eagle Nests	<p>If preconstruction surveys identify active eagle nests in the permanent impact area, the Authority, in consultation with the USFWS, will develop a nest relocation or replacement plan for the affected nest(s). The plan will describe why there is no practicable alternative to nest removal while enabling project extent construction. Any relocation or replacement of eagle nests will be in accordance with the Bald and Golden Eagle Protection Act and subject to the following minimum requirements:</p> <ul style="list-style-type: none"> The nest will be relocated, or a suitable nest will be provided, within the same territory to provide a viable nesting option for the affected eagle pair. Post construction monitoring to confirm continued nesting within the affected nesting territory will occur for a minimum of 3 years using observation procedures described by Pagel et al. (2010). 	Pre-construction, post construction	Pre-construction surveys, prepare nest relocation plan, Compliance reporting	Monthly Reporting or other appropriate interval for a minimum of 3 years after relocation	Contractor	Contractor	Monthly Reporting or other appropriate interval	Condition of Design Build Contract
BIO-MM#68	Avoid and Minimize Impacts to White-tailed kite	<p>If construction activities are scheduled to occur between February 1 and August 31, the Project Biologist will conduct surveys for white-tailed kite. Surveys will cover a minimum of a 0.5-mile radius around the construction area. If nesting white-tailed kites are detected, the Project Biologist will establish a 0.25 mile no disturbance buffer unless the Project Biologist determines that smaller buffers would be sufficient to avoid impacts. Buffers will be maintained until the Project Biologist has determined that the young have fledged and are no longer reliant upon the nest or parental care that includes nest use for survival.</p>	Pre-construction	Pre-construction surveys, establish buffer around active nests; Compliance Reporting	Monthly Reporting or other appropriate interval	Contractor	Contractor	Monthly Reporting or other appropriate interval	Condition of Design Build Contract
BIO-MM#69	Conduct Surveys and Implement Avoidance	<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 preconstruction surveys to establish use of nesting habitat by</p>	Pre-construction	Pre-construction surveys 15 days	Monthly Reporting or	Contractor	Contractor	Monthly Reporting or other	Condition of Design Build Contract

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Frequency	Implementation Mechanism
	Measures for Active Tricolored Blackbird Nest Colonies	<p>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 Staff Guidance Regarding Avoidance of Impacts to Tricolored Blackbird Breeding Colonies on Agricultural Fields in 2015 (CDFW 2015). This minimum buffer may be reduced in areas with dense forest, buildings, or other habitat features between the construction activities and the active nest colony, or where there is sufficient topographic relief to protect the colony from excessive noise or visual disturbance as determined by a Project Biologist experienced with tricolored blackbird. If tricolored blackbirds colonize habitat adjacent to construction after construction has been initiated, the Authority will reduce disturbance through establishment of buffers or sound curtains, as determined by the Project Biologist.</p>		prior to construction, establish buffer around active nests; Compliance Reporting	other appropriate interval or as established by regulatory compliance permits			appropriate interval or as established by regulatory compliance permits	
BIO-MM#70	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 close 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	Construction, Post-construction	Compliance Report	Prior to Operation	Authority	Authority	Prior to Operation	Authority to compensate based on area of habitat for tricolored blackbird affected by the Contractor. Regulatory agency permit requirements
BIO-MM#71	Implement California Condor Avoidance Measures During Helicopter Use	Prior to construction-related uses of helicopters, the Project Biologist will coordinate with USFWS to establish that no California condors are present in the area. If California condors are observed in the area in which helicopters will operate, including the helicopter's flight pattern from its origination, during construction use and the return flight, helicopter use will not be permitted until the Project Biologist has determined that the California condors have left the area.	Construction, Post-construction,	Compliance Report	Monthly Reporting or other appropriate interval	Contractor	Contractor	Monthly Reporting or other appropriate interval	Condition of Design Build Contract
BIO-MM#72	Implement Avoidance of Nighttime Light Disturbance for California Condor	Nighttime light disturbance will be minimized in and adjacent to suitable habitat where California condor may be present. In the event that nighttime lighting is required, it will be focused, shielded, and directed away from adjacent suitable habitat including nighttime roost areas. The Project Biologist will be on site during nighttime light use to determine if the lighting poses a risk or otherwise disturbs or harms condors.	Construction, Post-construction,	Compliance Report	Monthly Reporting or other appropriate interval	Contractor	Contractor	Monthly Reporting or other appropriate interval	Condition of Design Build Contract
BIO-MM#73	Implement Removal of Carrion that may Attract Condors and Eagles	During operation and within California condor foraging areas, automated security monitoring and track inspections will be used to detect fence failures and/or the presence of a carcass (carrion) within the right-of-way that could be an attractant to condors and eagles. Dead and injured wildlife found in the right-of-way will be removed during construction and during operations when the train is not in operation.	Operation	Compliance Report	Daily Reporting or other appropriate interval	Authority	Authority	Daily Reporting or other appropriate interval	Daily Inspections
BIO-MM#74	Implement Bird Nest and Avian Special Status Species Avoidance	For construction activities involving the use of a helicopter, the buffer for nesting birds will be 200-foot horizontal and 150-foot vertical. Buffers will be measured from the location of the nest. If a nest is located on a tower or a tree the vertical buffer	Construction, Post-Construction	Compliance Report	Monthly Reporting or	Contractor	Contractor	Monthly Reporting or other	Condition of Design Build Contract

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Frequency	Implementation Mechanism
	Measures for Helicopter-Based Construction Activities	begins from the nest location. For raptors, that are not state or federal special status raptors the default buffer is 300-feet.			other appropriate interval			appropriate interval	
BIO-MM#75	Minimize Impacts on Kern Primrose Sphinx Moth Host Plants	<p>Prior to ground disturbing activity in areas that Kern primrose sphinx moths are found, the following additional measures will be implemented:</p> <ul style="list-style-type: none"> All Biological Monitors will be trained on the life history and identification of Kern primrose sphinx moth. As necessary, conduct an additional survey(s) for Kern primrose sphinx moth host and nectaring plants in areas where adults are observed. To the maximum extent feasible, host and nectaring plants will be flagged and avoided when eggs and/or larvae may be present (February through May). Larval host plants include evening primrose (<i>Camissonia contorta epilobiodes</i>) and filaree (<i>Erodium Cicutarium</i>). Initial ground or vegetation disturbing activities will be avoided in areas where Kern primrose sphinx have been observed until the flight and larval seasons (cumulatively, February 1 through May 31) are passed to allow sufficient time for the adults to lay eggs and for the larvae to pupate. 	Pre-construction	Pre-construction surveys	Monthly Reporting or other appropriate interval	Contractor	Contractor	Monthly Reporting or other appropriate interval	Condition of Design Build Contract
BIO-MM#76	Implement Wildlife Rescue Measures	During construction, maintenance and operation if an injured or trapped wildlife species, including but not limited to birds and raptors, are observed the Project Biologist shall be notified immediately to determine if it is appropriate to release or take the wildlife species to the nearest CDFW permitted rehabilitation center. The Project Biologist will follow all relevant guidelines for federal and state listed species. If an injured or trapped bird is incidentally observed during maintenance or construction, personnel will notify the Project Biologist immediately to determine if it is appropriate to release or take the bird to the nearest CDFW permitted rehabilitation center.	Construction and Operation	Compliance Report	Monthly Reporting and/or individual event or other appropriate interval	Contractor	Contractor	Monthly Reporting or other appropriate interval	Condition of Design Build Contract
BIO-MM#77	Implement Wildlife Height Requirements for Enhanced Security Fencing	Prior to final construction design the Project Biologist shall review the fencing plans to confirm Security Fencing design will prevent access into the right of way and tracks by mountain lion. Security Fencing height will be increased to a minimum of 10-feet tall in mountain lion suitable habitat as identified in the Wildlife Corridor Analysis and determined by the Project Biologist. If the fence is placed on a slope, the fence height will be adjusted (increased) to ensure that mountain lion and mule deer cannot jump from an upslope position over the fence; fence height on slopes will be determined by Project Biologist. During the fencing plan review the Project Biologist will evaluate the fence design for the purpose of avoiding harm, injury, entanglement or entrapment to wildlife species. Prior to operation, the Project Biologist will field inspect the fencing along any portion where increased height was determined necessary during the plan review. Fencing plan review and field inspection shall be documented in a memorandum from the Project Biologist and provided to the Authority.	Construction, Operations and Maintenance	Install and maintain fencing ;field inspection and Reporting	Monthly Reporting and/or individual event (installation of fencing) or other appropriate interval	Contractor design and installation, Authority maintenance	Contractor design and installation, Authority maintenance	Monthly Reporting and/or individual event (installation of fencing) or other appropriate interval	Condition of Design Build Contract for design and installation
BIO-MM#78	Install Wildlife Jump-outs	Prior to final construction design the Project Biologist shall review the fencing plans for placement of wildlife jump-outs. In areas with documented ungulate or other large mammal movement, where terrain or project design (e.g., at-grade crossings) could allow these large animals to enter the right-of-way, features to reduce access (e.g., taller fencing or wildlife barriers at crossings) or features to allow large animals to escape from the fenced right-of-way (e.g., wildlife jump-outs or escape ramps) would be incorporated into the project at these locations. Specific locations of these features would be based on the behavior of target species (e.g. mule deer, mountain lion, black bear), adjacent habitat and terrain, and other design constraints as	Construction, Operations and Maintenance	Install and maintain fencing ;field inspection and Reporting	Monthly Reporting and/or individual event (installation of jump-outs) or other appropriate interval	Contractor design and installation, Authority maintenance	Contractor design and installation, Authority maintenance	Monthly Reporting and/or individual event (installation of fencing) or other appropriate interval	Condition of Design Build Contract for design and installation

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Frequency	Implementation Mechanism
		determined by the Project Biologist and Project Engineer. Prior to operation, the Project Biologist will field inspect the fencing for appropriate placement of jump-outs as determined necessary during the plan review. Fencing plan review and field inspection shall be documented in a memorandum from the Project Biologist and provided to the Authority.							
Hydrology and Water Resources									
		No standard measures; see IAMF's							
Geology, Soils, and Seismicity									
		No standard measures; see IAMF's							
Hazardous Materials									
HMW-MM#1	Limit Use of Extremely Hazardous Materials near Schools during Construction	Prior to Construction the Contractor shall prepare a memorandum regarding hazardous materials best management practices related to construction activity for approval by the Authority. The memorandum shall confirm that the Contractor shall 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 shall acknowledge that prior to construction activities, signage will be installed to delimit all work areas within 0.25 mile of a school, informing the Contractor not to bring extremely hazardous substances into the area. The Contractor would be required to monitor all use of extremely hazardous substances. The 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 shall be submitted to the Authority prior to any construction involving an extremely hazardous substance.	Construction	Reporting and Monitoring	Prior to Construction	Contractor Hazardous Materials Monitor	Contractor	Construction	Reporting Contract Requirements/ Specifications
Safety and Security									
S&S-MM #1:	Monitor Response of Local Fire, Rescue, and Emergency Service Providers to Incidents at Stations and Provide a Fair Share Cost of Service	During the first three years of Operation and Maintenance the Authority shall begin monitoring response of local fire, rescue, and emergency service providers to incidents at stations and provide a fair share of cost of service. Monitoring should begin one year prior to planned opening of a HSR station. Service levels consist of the monthly volume of calls for fire and police protection, as well as county, city- or fire protection district-funded emergency medical technician (EMT)/ambulance calls that occur in the station site service areas. Prior to operation of the stations for HST service, the Authority will enter into an agreement with the public service providers of fire, police, and emergency services to fund the Authority's fair share of services above the average baseline service demand level for the station and HMF service areas (as established during the monitoring period). The fair share will be based on projected passenger use for the first year of operations, with a growth factor for the first five years of operation. This cost-sharing agreement will include provisions for ongoing monitoring and future negotiated amendments as the stations are expanded or passenger use increases. Such amendments will be made on a regular basis for the first five years of station operation, as will be provided in the agreement. To make sure that services are made available, impact fees will not constitute the sole funding mechanism, although impact fees may be used to fund capital improvements or fixtures (i.e., police substation, additional fire vehicle, on-site defibrillators, etc.) necessary to service delivery. After the first five years of operation, the Authority will enter into a new or revised agreement with the public service providers of fire, police, and emergency services to fund the Authority's fair share of services. The fair share will take into account the volume of ridership, past record and trends in service	Construction/ Post-construction/ Operation	Monitor/ Fair Share Agreement	Annually	Authority	Authority	Monitoring of service levels during construction near the Fresno, Kings/Tulare, and Bakersfield stations to determine baseline service demands. Prior to operation of the stations for HST service	Authority to fund through fair share of services agreement.

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Frequency	Implementation Mechanism
		demand at the stations and HMF site, new local revenues derived from station area development, and any services that the Authority may be providing at the station.							
Socioeconomics									
SO-MM#1:	Implement measures to reduce impacts associated with the division of residential neighborhoods	<p>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.</p> <p>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 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 walls and landscaping, and potential uses for non-agricultural remnant parcels that could benefit the community in the long term). The Authority shall document implementation of this measure through annual reporting.</p>	Pre-construction/ Construction/ Post-construction	Reporting	Annual	Authority	Authority	Annual reporting	The Authority will meet with affected residents and property owners and design appropriate measures to minimize impacts
SO-MM#2:	Implement measures to reduce impacts associated with the division of communities	<p>Prior to Construction (in mixed use communities) the Authority will minimize impacts associated with the Preferred Alternative in the existing communities through a program of outreach to homeowners, residents, land owners, business owners, community organizations and local officials in affected neighborhoods. The objective will be to maintain community cohesion and avoid physical deterioration. The Authority will evaluate the community's modified access, including the effectiveness of providing overcrossings or undercrossings of the HSR track to allow continued use of community facilities and connectivity. This includes the design of overcrossings or undercrossings to allow multimodal passage.</p> <p>The Authority will also conduct community workshops about the future use of the area beneath the rail guideway, where these would exist. These meetings will provide the community an opportunity to identify design and use options that could strengthen community cohesion and be compatible with the existing community character.</p> <p>To maximize attendance and generate awareness of the workshops, the Authority will work with either community organizations or community leaders within the neighborhoods. A location and time will be selected to increase attendance and be based on the community's needs.</p> <p>The Authority will present information at the workshops giving the community options for the future use of the area beneath or above the rail guideway, and provide an opportunity for individuals to provide feedback and propose solutions. 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. The Authority will consider comments and feedback in planning for the sites.</p> <p>Upon gathering feedback from the community, the Authority will coalesce the input and define solutions. The Authority will report the decisions, through a public workshop and in a written report made available to the public.</p> <p>The Authority will be responsible for implementing the measures to reduce impacts through project design and through the long-term management of the measures. This will involve documenting the desired design concepts, incorporating them into</p>	Pre-construction/ Construction/ Post-construction/ Operations	Reporting/ Monitoring	Annually	Authority	Authority	Annual reporting	The Authority will meet with affected residents and property owners and design appropriate measures to minimize impacts. The Authority will hold workshops and create reports based on workshop and design findings

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Frequency	Implementation Mechanism
		the final design, and facilitating ongoing maintenance. The Authority will identify potential uses that may be developed in the project right-of-way. These uses will be compatible with the character of the adjacent community and sensitive to project needs (as outlined in Section 3.11, Safety and Security). The costs associated with the development of these corridor improvements and how these costs will be paid will be determined during consultations with the affected jurisdictions or community organizations. Furthermore, the parties or entities (e.g., the Authority, local government, park or recreation district, or nonprofit organization) responsible for ongoing maintenance of these community areas will be determined. The Authority shall document compliance with this measure through annual reporting.							
SO-MM#3:	Implement measures to reduce impacts associated with the relocation of important facilities	<p>Prior to Construction, the Authority will minimize impacts resulting from the acquisition, displacement, and/or relocation of key community facilities</p> <p>The Authority will consult with the appropriate parties before land acquisition to assess potential opportunities to reconfigure land use and buildings and/or relocate affected facilities, as necessary, to minimize the disruption of facility activities and services, and to provide for relocation that allows the community currently being served to continue to use these services.</p> <p>The Authority will continue to implement a comprehensive non-English speaking language outreach program as land acquisition begins. This program will facilitate the identification of approaches that would maintain continuity of operation and allow space and access for the types of services currently provided and planned for these facilities. To avoid disruption to these community amenities, the Authority will provide for reconfiguring land uses or buildings, or relocating of community facilities is completed before the demolishing existing structures. The Authority shall document compliance with this measure through annual reporting.</p>	Pre-construction/ Construction	Reporting/ Monitoring	Annually	Authority	Authority	Annual reporting	The Authority will meet with affected residents and property owners and design appropriate measures to minimize impacts. The Authority will hold workshops and create reports based on workshop and design findings.
SO-MM#4	Provide access modifications to affected farmlands.	Prior to Construction in cases where partial-property acquisitions result in division of agricultural parcels by the HSR alignment or facilities, the Authority will evaluate with the property owner's input modified access, including the effectiveness of providing overcrossings or undercrossings of the HSR track to allow continued use of agricultural lands and facilities. This could include the design of overcrossings or undercrossings to allow farm equipment passage. The Contractor shall prepare a technical memorandum for Authority review and approval detailing outreach to affected property owners, evaluation results and what measures were implemented to address bifurcated agricultural properties.	Pre-construction/ Construction	Reporting/ Monitoring	Annual	Authority	Authority	Annual reporting	The Authority will meet with affected residents and property owners and design appropriate measures to minimize impacts. The Authority will hold workshops and create reports based on workshop and design findings.
Station Planning, Land Use, and Development									
LU-MM #1:	HSR Station Area Development General Principles and Guidelines	Prior to Station Construction the Authority shall document how Station Area Planning Agreements has been implemented with each station city. The HSR Station Area Development General Principles and Guidelines (February 3, 2011) describe the intended outcomes by the Authority for station cities. Upon review of each station city's plans, the Authority will determine if mitigation strategies (including consultant assistance) are necessary to assist station cities with implementation of station area plans to implement TOD strategies and value capture at and around the station. Station Area Planning documentation reports shall be produced to document mitigation measure compliance.	Pre-construction	Station agreements	One-time	Authority/City	Authority	One-time	Interagency Agreement or other agreement or MOU mechanism.

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Frequency	Implementation Mechanism
Agricultural Land									
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 High-Speed Rail Project. 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 non-agricultural 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 25-foot wide area adjacent to HSR permanently fenced infrastructure. The Authority shall document implementation of this measure through issuance of a compliance memorandum annually.</p>	Pre-construction	Reporting	Annual	Authority & California Farmland Conservancy	Authority	Prior to construction/ Monthly reporting	The Authority will enter into an agreement with the DOC California Farmland Conservancy Program to implement the preservation of farmland. The Authority and California Farmland Conservancy Program will develop selection criteria under this agreement to guide the pursuit and purchase of conservation easements.
Parks and Recreation									
PR-MM#1	Temporary Restricted Access to Park Facilities During Construction	Prior to Construction (any ground disturbing activity impacting trails) the Contractor shall prepare a technical memorandum documenting how connections to the unaffected trail portions and nearby roadways are maintained during construction. The contractor will provide alternative access via a temporary detour of the trail using existing roadways or other public rights of way. The contractor will provide detour signage and lighting and will provide that the alternative routes meet public safety requirements. The technical memorandum shall be submitted to the Authority for review and approval.	Pre-construction/ Construction	Reporting/ Compensation	Prior to Construction	Contractor	Authority/ Contractor	Pre-construction/ Construction. Authority to coordinate with local jurisdictions	The Authority and Contractor will work with respective jurisdictions to develop a staging plan and detour plan for alternative access plan to affected Trails.
PR-MM#2	Providing Park Access	Prior to Construction (any ground disturbing activity affecting park access) the Contractor shall prepare a technical memorandum documenting how the Contractor will ensure that connections to the unaffected park portions or nearby roadways are maintained after construction. If a proposed linear park closure restricts connectivity, the Contractor will provide permanent multimodal access using existing roadways or other public rights of way. The technical memoranda shall be submitted to the Authority for review and approval.	Pre-construction/ Construction/ Post-construction/ Operations	Reporting/ Compensation	Prior to Construction	Authority	Authority	Prior to construction	The Authority and Contractor will work with respective jurisdictions to develop a staging plan and detour plan for alternative access plan to affected park facilities.

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Frequency	Implementation Mechanism
Aesthetics and Visual Resources									
AVQ-MM#1	Minimize Visual Disruption from Construction Activities	<p>Prior to Construction (any ground disturbing activity) the Contractor shall prepare a technical memorandum identifying how the project will minimize construction-related visual/aesthetic disruption and include 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 conflict with project components. When possible, preserve existing vegetation, particularly vegetation along the edge of construction areas that may help screen views. After construction, regrade areas disturbed by construction, staging, and storage to original contours and revegetate with plant material similar in numbers and types to that that was removed, based upon local jurisdictional requirements. If no local jurisdictional requirements exist, replace removed vegetation at a 1:1 replacement ratio for shrubs and small trees, and a 2:1 replacement ratio for mature trees. For example, if the contractor removes 10 mature trees in an area, replant 20 younger trees that within 5 to 15 years (depending upon the growth rates of the trees) would be of a height and spread to provide visual screening similar to the visual screening provided by the trees that were removed for construction. Replaced shrubs shall be a minimum 5 gallon and replaced trees shall be a minimum 24" box and minimum 8' in height. To the extent feasible, do not locate construction staging sites within the immediate foreground distance (0 to 500 feet) of existing residential neighborhoods, recreational areas, or other land uses that include highly-sensitivity viewers. Where such siting is unavoidable, screen staging sites from viewers using appropriate solid screening materials such as temporary fencing and walls. Paint over or remove any graffiti or visual defacement of temporary fencing and walls within five business days of it occurring. <p>The technical memorandum will be submitted to the Authority for review and approval.</p>	Pre-construction/ Construction/ Post-construction	Reporting/ Monitoring	Monthly	Contractor	Contractor	Construction/ Monthly Reporting	Contract Requirements/ Specifications
AVQ-MM#2	Minimize Light Disturbance during Construction	<p>Prior to Construction (any ground disturbing activity requiring nighttime construction) the Contractor shall 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.</p> <p>The technical memorandum will be submitted to the Authority for review and approval.</p>	Pre-construction/ Construction	Reporting	Monthly	Contractor	Contractor	Construction/ Monthly reporting	Contract Requirements/ Specifications
AVQ-MM#3	Incorporate Design Aesthetic Preferences into Final Design and Construction of Non-Station Structures	<p>Prior to Construction (any ground disturbing activity) the Contractor shall 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 Aesthetic Options for Non-Stations Structures, 2017. A technical memorandum will be submitted to the Authority to document compliance.</p>	Pre-construction/ Design	Reporting	Final design	Contractor and Authority	Contractor and Authority	Final design and Construction	Established local consultation process with communities along the alignment
AVQ-MM#4	Provide Vegetation Screening along At-Grade and Elevated Guideways Adjacent to Residential Areas	<p>Prior to Operation and Maintenance of HSR, the Contractor will plant trees (minimum 24" box and 8' 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, to 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</p>	Construction/ Post-construction	Reporting	Prior to Operations	Contractor and Authority	Contractor	Operations	Contract Requirements/ Specifications and Landscaping and maintenance will be provided by the Contractor until substantial completion of the work at which

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Frequency	Implementation Mechanism
		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 shall 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.							time the Authority shall assume responsibility for landscaping or
AVQ-MM#5	Replant Unused Portions of Land Acquired for the HSR	Prior to Operation and Maintenance the Contractor will plant vegetation within land 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" box and 8' 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	Reporting	Prior to Operations	Authority	Authority	Operations	Contractor to implement appropriate landscape and maintenance plan
AVQ-MM#6	Screen Traction Power Distribution Stations and Radio Communication Towers	Within 90 days of completing traction power substation or radio tower construction, the Contractor will screen from public view the traction power substations (located at approximately 30-mile intervals along the HSR guideway), including radio towers where required, through the use of landscaping or solid walls/fences. This will consist of context-appropriate landscaping of a type and scale that does not draw attention to the station or feature. Plant species will be selected based on their mature size and shape, growth rate, hardiness, and drought tolerance. Planted shrubs shall be a minimum 5 gallon and trees shall be a minimum 24" box and 8' in height. No species on the Invasive Species Council of California's list will be planted. The landscaping will be continuously maintained and appropriate irrigation systems will be installed within the landscaped areas. Walls will be constructed of cinder-block, or similar material, and will be painted a neutral color to blend in with the surrounding context. If a chain-link or cyclone fence is used, it will include slats in the fencing. Any graffiti or visual defacement or damage of fencing and walls will be painted over or repaired within a reasonable period as agreed between the Authority and local jurisdiction. None of the mitigation measure options is expected to result in secondary effects. The mitigation measures are typical of visual treatments applied on linear transportation facilities; they have been defined to be specific in range and implementable according to context, and designed in coordination with local jurisdictions. The Contractor shall prepare a technical memorandum documenting how the requirements in this measure were implemented. The technical memorandum will be submitted to the Authority to document compliance.	Post-construction/ Operation	Reporting	Annually	Contractor	Contractor	Post Construction/ Operations	Landscaping and maintenance will be provided by the Contractor for its scope of work until substantial completion of the work at which time the Authority shall assume responsibility for landscaping or assign the responsibility to other third parties.

Cultural Resources

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Frequency	Implementation Mechanism
CUL-MM #1	Mitigate Adverse Effects to Archaeological and Built Environment Resources Identified During Phased Identification. Comply with the Stipulations Regarding the Treatment of Archaeological and Historic Built Resources in the Programmatic Agreement (PA) and Memorandum of Agreement (MOA)	<p>Once parcels are accessible and surveys have been completed, including consultation as stipulated in the MOA, additional archaeological and built environment resources may be identified. For newly identified eligible properties that will be adversely affected, the following process will be followed, which is presented in detail in the Built Environment Treatment Plan (BETP) and Archaeological Treatment Plan (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 California Register of Historical Resources (CRHR)-eligible archaeological resources, the Authority shall 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 § 15126.4(b)(3). If data recovery is the only feasible treatment the Authority shall adopt a data recovery plan as required under CEQA Guidelines § 15126.4(b)(3)(C). Should data recovery be necessary, the Contractor's PI, in consultation with the MOA signatories and consulting parties, will prepare a data recovery plan for approval from the Authority/FRA and in consultation with the MOA signatories. Upon approval, the Contractor's PI will implement the plan. For archaeological resources the Authority shall also determine if the resource is a unique archaeological site under CEQA. If the resource is not an historical resource but is an archaeological site the resource shall 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 PI 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 PI will implement the treatment and mitigation measures accordingly. 	Pre-construction	For newly identified properties, implementation of measures stipulated in the MOA and associated treatment plans.	Monthly	Contractor	Contractor	Dependent on access to parcels and any change in footprint.	PA/MOA/ATP/BETP
CUL-MM #2	Halt Work in the Event of an Archaeological Discovery and Comply with the Programmatic Agreement (PA), Memorandum of Agreement (MOA), Archaeological Treatment Plan (ATP), and all State and Federal Laws, as applicable.	<p>During construction (any ground disturbing activities, including clearing and grubbing) should there be an unanticipated discovery, the Contractor shall 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 FR 44716-42), as amended (National Park Service); and Guidelines for the Implementation of CEQA, as amended (Title 14 CCR Chapter 3, Article 9, Sections 15120-15132). Should the discovery include human remains, the Contractor, the Authority, and the FRA shall 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 (NAGPRA) (§3(c)(d)); California Health and Safety Code, Section 8010 et seq.; and CPRC Section 5097.98; and consult with the Native American Heritage Commission, tribal groups, and the State Historic Preservation Officer (SHPO).</p> <ul style="list-style-type: none"> 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 	Pre-construction/Construction/Post Construction	Reporting	No reporting necessary unless there is an inadvertent discovery of remains are identified	Contractor's PI/ Authority	Contractor's PI, in coordination with the Authority, SHPO, MOA signatories and appropriate consulting parties	If a site is discovered or remains are identified during construction. Weekly reporting.	ATP/MOA

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Frequency	Implementation Mechanism
		<p>NRHP and necessary treatment to resolve significant effects if the resource is an historical resource or historic property. If, after documentation is reviewed by the Authority and FRA, 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 shall be considered by the Authority in the order of priority provided in CEQA Guidelines § 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 (PI) shall prepare a data recovery plan as required under CEQA Guidelines § 15126.4(b)(3)(C), the MOA, and ATP, for the Authority's approval.</p> <p>The contractor shall notify the Authority, who shall notify the California State Lands Commission (CSLC), if the find is a cultural resource on or in the submerged lands of California and consequently under the jurisdiction of the CSLC. The Authority will comply with all applicable rules and regulations promulgated by CSLC with respect to cultural resources in submerged lands.</p> <p>If human remains are discovered on state-owned or private lands the contractor shall 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 shall contact the Native American Heritage Commission to identify the most likely descendant (MLD). The MLD shall be empowered to reinter the remains with appropriate dignity. If the MLD fails to make a recommendation the remains shall be reinterred in a location not subject to further disturbance and the location shall 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 shall, 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.</p> <p>Performance tracking of this mitigation measure will be based on successful implementation and acceptance of the documentation by the SHPO and appropriate consulting parties.</p>							
CUL-MM #3	Other Mitigation for Effects to Pre-Contact Archaeological Sites	<p>Due to limited access to private properties during the environmental review phase of this project, the FRA's and Authority's ability to fully identify and evaluate archaeological resources within the Area of Potential Effect (APE) has, correspondingly, also been limited. Thus, the majority of the project APE has not been subject to archaeological field inventories. As pedestrian field surveys are a necessary component of the archaeological resource identification and evaluation effort, the commitment to complete the field surveys, prior to ground disturbing activities associated with the project, are codified in the Memorandum of Agreement (MOA) that has been executed as a condition of this Final EIR/EIS.</p> <p>Access to previously-inaccessible properties to complete the archaeological resource identification effort is expected to be available after the Record of Decision, during the design-build phase of the project. However, due to the design constraints associated with constructing a high-speed train, the ability to shift the alignment to avoid any newly-identified archaeological resources at this late phase of the project delivery process is substantially limited and/or unlikely, as the alignment is already established. As such, impacts/effects to as-yet-undiscovered significant</p>	Pre-construction/ Construction/ Post-construction	Dependent on mitigation selected	Dependent on mitigation selected	Authority may have contractor implement	To be determined	To be determined	ATP/MOA

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Frequency	Implementation Mechanism
		archaeological resources as a result of this project are anticipated; however, the nature and quantity of such effects remains unknown until completion of the archaeological field identification and evaluation effort. Protocols for the identification, evaluation, treatment, and data-recovery mitigation of as-yet-unidentified archaeological resources are addressed in the MOA and Archaeological Treatment Plan (ATP). Efforts to develop meaningful mitigation measures for effects to as-yet-unidentified Native American archaeological resources that cannot be avoided will be negotiated with the tribal Consulting Parties. Measures that are negotiated among the MOA signatories and tribal Consulting Parties will be the responsibility of the Authority to implement.							
Historic Architectural Resources									
CUL-MM #4	Minimize Adverse Effects through Relocation of Historic Buildings and Structures	The Authority-prepared Memorandum of Agreement (MOA) and Built Environment Treatment Plan (BETP) may identify historic properties/historical resources for relocation to avoid their destruction and minimize direct adverse effects resulting from physical damage or alteration. The development of plans for relocation and the implementation of relocation will take place before construction is undertaken within 1000 feet of the properties. The relocation of the historic properties/historical resources will be specified in the BETP by the Authority or the Contractor's Principal Investigator (PI), depending on when the location is identified, and take into account the historic site and layout (i.e., the orientation of the buildings to the cardinal directions) and their potential re-use. The contractor's qualified architectural historian, along with an interdisciplinary team of professionals as appropriate, will prepare a relocation plan that will provide for protection and stabilization of the buildings or structures before, during, and after the move, as well as measures to address inadvertent damage. The plan will be subject to review and approval by the Authority/FRA, in consultation with the MOA signatories and concurring parties. The relocation will be implemented according to the plan. As the design progresses, additional properties may be determined by the Authority as requiring this mitigation.	Pre-construction/ Construction/ Post-Construction	Reporting	Weekly (during physical relocation)	Contractor	Contractor	Pre-construction surveys and Construction/weekly reporting or as dictated by the BETP and the MOA	BETP/Relocation Plan, PA HABS/HAER/ HALS/MOA
CUL-MM #5	Minimize Adverse Operational Noise Effects	The Authority-prepared Memorandum of Agreement (MOA) and Built Environment Treatment Plan (BETP) will identify the historic properties/historical resources that will be subject to treatment to minimize the indirect adverse effects caused by the operational noise of the HSR. The manner in which each property that is subject to this mitigation will be treated will be developed in consultation with the landowner or land-owning agencies and the Authority, and specified in the BETP. The Contractor is responsible for the planning and implementation of the noise abatement mitigation identified in the BETP. All plans will be approved by the Authority/FRA in consultation with the MOA signatories prior to their implementation. Should a noise wall be selected as mitigation, the Contractor shall evaluate additional effects to the historic property. If the Authority/FRA finds the effects to be adverse in consultation with the MOA signatories and concurring parties, the Authority/FRA will develop additional mitigation measures in consultation with the signatories of the MOA. If additional effects are determined to be adverse, mitigation measures will be determined in consultation with the SHPO and MOA signatories and concurring parties and carried out by the Contractor. As the design progresses, additional properties may be determined by the Authority as requiring this mitigation.	Construction	Reporting	Monthly	Contractor	Contractor	To be determined during construction phase	BETP, MOA PA
CUL-MM #6	Prepare and Submit Additional Recordation and Documentation	The Authority-prepared Memorandum of Agreement (MOA) and Built Environment Treatment Plan (BETP) will identify specific historical resources that would be physically altered, damaged, relocated, or destroyed by the project and require documentation. This documentation may consist of preparation of updated recordation forms (Department of Parks and Recreation [DPR] 523), or may be consistent with the Historic American Building Survey (HABS), the Historic American Engineering Record (HAER), or the Historic American Landscape Survey (HALS)	Pre-construction	Reporting	Monthly	Contractor, Authority to coordinate with SHPO	Contractor	Prior to construction/ monthly reporting	BETP and MOA HABS/HAER/ HALS/MOA

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Frequency	Implementation Mechanism
		<p>programs; a Historic Structure Report; or other recordation methods stipulated in the MOA and described in the BETP. The specific mitigation for each property will be determined in consultation with the MOA signatories and concurring parties. The BETP will detail the appropriate type and level of recordation for each property. The recordation undertaken by this treatment would focus on the aspect of integrity that would be affected by the project for each historic property subject to this treatment. For example, historic properties in an urban setting that would experience an adverse visual effect would be photographed to capture exterior and contextual views; interior spaces would not be subject to recordation if they would not be affected. The appropriate method of documentation will be specified in the BETP for each property, resulting from consultation with the SHPO, MOA signatories and concurring parties. Such documentation will follow the appropriate guidance for the recordation format and program selected. Copies of the documentation will be provided to the consulting parties and offered to the appropriate local governments, historical societies and agencies, or other public repositories, such as libraries, as specified in the BETP. The documentation will also be offered in printed and electronic form to any repository or organization to which the SHPO, the Authority, and the local agency with jurisdiction over the property, through consultation, may agree. The electronic copy of the documentation may also be placed on an agency or organization's website. As the design progresses, additional properties may be determined by the Authority as requiring documentation.</p> <p>In general, photography should capture views of the historic property from multiple views, and could include reproduction of historic images, architectural and/or engineering drawings as well. All fieldwork necessary for photographic documentation, architectural or engineering drawings, and/or digital recordation through geographic information or global positioning systems (geographic information system [GIS] and global positioning system [GPS], respectively) shall be completed by the Contractor and approved by the Authority and SHPO before project construction begins. The written data will include a historic narrative for the historic property that will utilize existing inventory, evaluation, and/or nomination documents to the extent possible.</p> <p>This kind of documentation will require the contractor to engage an interdisciplinary team to adequately complete this mitigation, The team will likely be required to include, at a minimum, an architectural historian, and/or a historian, and a photographer. Other team members may include a landscape architect and/or computer-aided design and drafting (CADD) technician. The BETP shall detail the required personnel and qualification standards for these preparers; the Authority shall submit the documentation to the SHPO for review and comment. If the documentation is to follow the HABS/HAER/HALS program, consultation by the Authority with National Park Service (NPS) will be required. The final documentation will be prepared by the Contractor's qualified team, be approved by NPS, and submitted to the Library of Congress by the Authority. The BETP shall identify the distribution of printed and electronic copies of the photo documentation, as well as permanent archival disposition of the record, if applicable.</p>							
CUL-MM #7	Prepare Interpretive or Educational Materials	The Authority-prepared Memorandum of Agreement (MOA) and Built Environment Treatment Plan (BETP) will identify historic properties and historical resources that will be subject to historic interpretation or preparation of educational materials. Interpretive and educational materials will address the significance of the properties that would be affected by the project. Interpretive or educational materials could include, but are not limited to: brochures, videos, websites, study guides, teaching guides, articles or reports for general publication, commemorative plaques, or exhibits. The agreed-upon method of interpretation will be specified in the BETP for	Pre and Post-construction (photographic documentation of existing conditions may be required prior to construction.)	Reporting	Annual	Authority	Authority, in consultation with the SHPO and appropriate consulting parties	Post-construction/annual reporting	BETP Photographic documentation

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Frequency	Implementation Mechanism
		<p>each property, resulting from consultation with the State Historic Preservation Officer (SHPO), MOA signatories and concurring parties. The contractor will be responsible for assembling the appropriate interdisciplinary team to fulfill the mitigation. The required professionals and their qualifications will be specified in the BETP.</p> <p>In the preparation of the interpretive or educational materials, the contractor's team will utilize previous research included in the environmental technical documents, images, narrative history, drawings, or other material produced for the mitigation described above. The interpretive or educational materials should be made available to the public in physical or digital formats, at local libraries, historical societies, or public buildings, as specified in the BETP.</p>							
CUL-MM #8	Repair of Inadvertent Damage	<p>The Authority-prepared Memorandum of Agreement (MOA) and Built Environment Treatment Plan (BETP) will identify properties subject to the preparation of plans for the repair of inadvertent damage, plans to be developed prior to the start of construction in the immediate proximity of the historic properties; the HSR standard impact avoidance and minimization measures require the Contractor to prepare these plans. Should any of the properties or resources be damaged as a result of construction activities, the contractor will repair them in accordance with the approved plan and with the Secretary of the Interior's (SOI) Standards for Rehabilitation. Inadvertent damage is any damage that results in a significant impact to a historical resource within the meaning of CEQA Guidelines Section 15064.5(b)(2) or adverse effects to historic properties within the meaning of 36 CFR Part 800.5(a)(1). All repairs will be reviewed and approved by the Authority prior to determining that the treatment has been adequately implemented.</p> <p>There may be instances where a property or resource that is damaged during construction will be better served by temporary stabilization and protection, with final repairs occurring post construction. This will be determined by the Authority, in consultation with the MOA signatories. Should this be the preferred approach, the contractor will have their interdisciplinary team prepare plans for the temporary work, for approval by the Authority and MOA signatories prior to construction commencing in the area of the damaged property. Any emergency stabilization deemed necessary by the contractor prior to plan approval must be reversible.</p>	Post-construction	Reporting	Monthly	Authority	Authority, in consultation with the SHPO and appropriate consulting parties	Monthly reporting	BETP, Conformance with SOI's Standards of Rehabilitation, Plans for repairs to historic properties
CUL-MM #9	Visual Screening	<p>The Authority-prepared Memorandum of Agreement (MOA) and Built Environment Treatment Plan (BETP) will identify historic properties and historical resources that will be subject to visual screening. Visual screening will be installed by the Contractor and consist of plant material that will minimize the view of the project from the property subject to mitigation. This treatment will minimize adverse effects on historic properties/historical resources. Plant species will be selected by the Contractor's interdisciplinary team of architectural historians and landscape architects based on species' mature size and shape, growth rate, appropriateness to the historic property, fire resistance, and drought tolerance. The design and recommended plant make-up of the screen will be reviewed and approved by the Authority/FRA in consultation with the MOA signatories and land owner or land-owning agency. No species that are listed on the Invasive Species Council of California's list of invasive species will be planted. The Contractor will arrange to have the landscaping continuously maintained for a period specified in the plan and appropriate irrigation systems will be installed if the landscape architect determines it is needed. The plan will define the terms of replacement should the plants die.</p>	Post-construction	Reporting	Annual	Authority	Authority	Post-construction/annual reporting	BETP Photographic documentation Visual Screening Plan
CUL-MM #10	Station Design Consistent with the Secretary of Interior's Standards for the	<p>Prior to HSR station construction adjacent to or on a National Register of Historic Place (NRHP) and/or a California Register of Historical Resources (CRHR) site, the Contractor shall prepare a historic properties compatibility report for Authority review and approval. Several HSR stations will be constructed adjacent to or on the site of</p>	Design/Pre-construction	Contract with design contractor	Design scheme submittals	Contractor, Authority to coordinate with SHPO	Contractor	N/A	ATP/MOA

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Frequency	Implementation Mechanism
	Treatment of Historic Properties	<p>National Register of Historic Places/California Register of Historical Resources - listed or -eligible railroad stations, within historic districts, or in close proximity to other historic properties. At the time of the records of decision (RODs) for each project section, the station locations are identified as a footprint. Station design will be prepared post ROD. The Authority will be issuing requests for qualifications (RFQs) to receive statements of qualifications (SOQs) from qualified firms (contractor) for station designs and related services. Such firms will be contracted to provide professional consultant and design services for all design stages through final design. Selected firms will be responsible for ensuring their designs are context sensitive and meet the Secretary of the Interior's Standards (SOIS) for the treatment of historic properties. Stations that require this mitigation measure will be identified in the Section 106 Memorandum of Agreement (MOA) and Built Environment Treatment Plan (BETP) for each project section, as appropriate. The consultation roles of MOA signatories and interested parties in the design of the stations will also be specified in the MOAs and BETPs. At a minimum, the Authority/RDP professionally qualified architectural historians and the State Historic Preservation Officer (SHPO) will be given the opportunity to review and comment on the designs.</p> <p>If the proposed location is on the site of or adjacent to historic properties, the contractor at a minimum will be required to include a professionally qualified architectural historian, and may also be required to include a historical architect, a landscape architect with experience related to historic properties, an archaeologist, or other historic preservation professionals on their team. The selected professionals' qualifications will be reviewed and approved by the Authority/RDP professionally qualified staff.</p> <p>The contractor will be required by the Authority to provide three schemes for Authority review, including an evaluation of each scheme. The deliverables will also include drawings – sections, plans, elevations, and renderings. The contractor will be required to include in each evaluation a historic property design compatibility report prepared by a qualified architectural historian describing how the scheme is consistent with the SOIS for Rehabilitation for infill designs or additions, and if any restoration or rehabilitation will be required of the historic buildings and structures and how such restoration is consistent with the SOIS Standards for Restoration. The report will reference applicable National Park Service Preservation Briefs, such as #14, New Exterior Additions to Historic Buildings and discuss size, scale and massing of the proposed project and how it will be differentiated from the historic property, and include application of the criteria of adverse effect (36 CFR § 800.5) to each proposed scheme, considering both direct and indirect effects to historic properties, to ensure that the selected design will not adversely affect historic properties. For the purposes of evaluating effects to historic properties, the contractor may be required to produce renderings that include adjacent properties. The report will be reviewed and approved by the Authority/Rail Delivery Partners (RDP) professionally qualified staff and may require revision prior to transmitting it to the SHPO and other MOA signatories and consulting parties, as specified in the MOA and BETP.</p>							
CUL-MM#11	Statewide Historical Interpretation Program	<p>Prior to operation the Contractor shall provide the Authority with a cultural resources rail passenger visual and narrative electronic device application. Prior to preparing the application the Contractor shall obtain Authority approval of the application outline and content. The initial application shall be designed within a statewide context addressing the first operating segment with the ability to add future segments prior to their operation. Contractors of additional segments shall embellish the initial application and add relevant new segment cultural resource material. The cultural resources technical studies prepared to support the findings and effects identified in the environmental documents for each project section include</p>	Post-construction	Reporting	Annual	Authority	Authority in consultation with the SHPO and appropriate consulting parties	Post construction/ annual reporting	BETP

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Implementation Frequency	Implementation Mechanism
		prehistoric, Native American ethnographic, and historic contexts. The Authority is using these contexts as the foundation for a geographically referenced historical visual and narrative “application” for the total rail alignment, to be enjoyed by rail passengers through their smart phones or tablets, or other electronic devices. The Authority-prepared Memorandum of Agreement (MOA) and Built Environment Treatment Plan (BETP) for each project section will identify historic themes to be developed for the application, as well as identify any properties to be specifically referenced, as agreed upon in consultation with the State Historic Preservation Officer (SHPO), MOA signatories, and consulting parties. In consultation with the Authority, the Contractor will be responsible for assembling the appropriate interdisciplinary team to synthesize the information and provide electronic files of exhibits found in the cultural resources studies that may be used for such a program. The required professionals and their qualifications will be specified in the BETP, as will the number, type, and format of required exhibits. Bibliographies for the technical documents may be used as a tool to locate additional visual material for the application. In the gathering of visual materials, the Contractor’s team will also utilize any research, as appropriate, included in material produced for other interpretive mitigation. The contractor will ensure that all exhibits provided as recommended for use in the application be licensed or otherwise legally reproducible for such use. As described above the Contractor will work with the Authority and Authority’s program consultant, and provide materials needed to ensure consistency and quality in the fulfillment of this state-wide program.							
Paleontological Resources									
		No standard measures; see IAMF’s							
Transportation									
TRAN-MM #1	In-Lieu Traffic & Parking Improvements	<p>The Authority will enter cooperative agreements with HSR station host cities and/or partner transportation providers to implement transportation improvements in-lieu of parking expansion or general roadway traffic improvements to address identified parking or traffic impacts. This approach supports the Authority’s guidelines and policies to encourage HSR access via non-auto modes, helping reduce traffic congestion and associated air quality impacts at and around HSR stations. In-lieu improvements will be negotiated with host cities and partner transportation providers and include, but are not limited to, these types of improvements:</p> <ul style="list-style-type: none"> • Pedestrian facilities including but not limited to sidewalks, curb-cuts, pathways, multi-use trails and signage and wayfinding within 1/2 mile of HSR stations • Bicycle facilities including but not limited to on-street bicycle lanes and cycle tracks, off-street bicycle or multi-use trails, signalization, bicycle parking, and bicycle rental, sharing or repair facilities and signage and wayfinding within 3 miles of HSR stations • On- and off-street bus transit facilities including but not limited to transit centers, stations, stops, shelters, lighting, terminal layover facilities, operator restrooms, fare vending equipment, information and wayfinding, bus pads, electric charging stations, transit lanes, and traffic signal priority equipment and software within 3 miles or HSR stations • Public transit bus rolling stock • On- or off-street vehicle pick-up/drop-off and queueing space within ¼ mile of HSR stations • On-going bus, streetcar or urban rail service operations & maintenance funding to support expanded connecting transit service at HSR stations 	Pre-construction, during construction and post-construction	Station access & funding agreements	Annual	Authority	Authority, in consultation with partner cities and transportation providers	One-time	Memoranda of Understanding

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