

APPENDIX 2-B: CALIFORNIA HIGH-SPEED RAIL: IMPACT AVOIDANCE AND MINIMIZATION FEATURES

Definitions

The California High-Speed Rail Authority (Authority) and the Federal Railroad Administration (FRA) have pledged to integrate programmatic impact avoidance and minimization features (IAMF) consistent with the *2005 Statewide Program Environmental Impact Report (EIR)/Environmental Impact Statement (EIS)* (Authority and FRA 2005), *2008 Bay Area to Central Valley Program EIR/EIS* (Authority and FRA 2008) and *2012 Bay Area to Central Valley High-Speed Train (HST) Partially Revised Final Program EIR* (Authority 2012).

The Authority and FRA would implement these features during project design and construction, as relevant to the Merced to Fresno Section: Central Valley Wye, to avoid or minimize impacts.

IAMFs incorporated into the Central Valley Wye alternatives design and construction would avoid or minimize the environmental or community impacts. The description of each measure details the means and effectiveness of the measure in avoiding or minimizing impacts, as well as the environmental benefits of implementing the measure. For example, an IAMF can require development of measures to reduce impacts on air quality and hydrology based on applicable design standards that would also reduce impacts to biological resources.

Each IAMF is described in the *Merced to Fresno Section: Central Valley Wye Draft Supplemental EIR/EIS* (Draft Supplemental EIR/EIS). The factual basis for their efficacy, feasibility, and implementation is provided. The IAMFs would be included in the mitigation monitoring and enforcement plan to enhance implementation tracking, identify responsible party, and clarify implementation timing.

Descriptions

Aesthetics and Visual Quality

AVR-IAMF#1: Design Standards

Prior to construction the contractor would document, through issue of a technical memorandum, how the Authority's adopted design standards and guidelines, such as the Authority Technical Memorandum *Aesthetic Guidelines for Non-Station Structures* (Authority 2011a; TM 200.06), have been employed to mitigate visual impacts. TM 200.6 provides guidance regarding a minimum aesthetic quality of long-lasting infrastructure.

AVR-IAMF#2: Context-Sensitive Solutions

Prior to construction the contractor would document, through issue of a technical memorandum, how the Authority's *Urban Design Guidelines for the California High Speed Train Project* (Authority 2011b), which discusses the principles of context-sensitive solutions to guide the design of stations, have been employed to mitigate visual impacts through context-sensitive design. This approach is equally applicable to elevated guideways.

AVR-IAMF#3: Design Review Process

Prior to construction, the contractor would document that the Authority's *Aesthetic Design Review Process* (TM 200.07) has been followed to guide the development of non-station-area structures. Documentation would be through issuance of a technical memorandum to the Authority.

Agricultural and Farmland

AG-IAMF#1: Restoration of Important Farmland Used for Temporary Staging Areas

Prior to any ground-disturbing activities at the site of a temporary construction staging area located on Important Farmland, the contractor would prepare a restoration plan addressing specific actions, sequence of implementation, parties responsible for implementation and successful achievement of restoration for temporary impacts. Actions would include removing and stockpiling the top 18 inches of soil for replacement on-site during restoration activities. Before

beginning construction use of sites on Important Farmland, the contractor would submit the restoration plan to the Authority for review and obtain Authority (and if applicable, the landowner) approval. The restoration plan would include time-stamped photographic documentation of the pre-construction conditions of all temporary staging areas.

All construction access, mobilization, material laydown, and staging areas on Important Farmlands would be returned to a condition equal to the pre-construction staging condition. This requirement is included in the design-build construction contract requirements.

AG-IAMF#2: Permit Assistance

Prior to disturbance-causing activities affecting any segment of a confined animal facility, the Authority would assign a representative to act as a single point of contact to assist each confined animal facility owner during the process of obtaining new or amended permits or other regulatory compliance necessary to the continued operation or relocation of the facility. The Authority would consider and may provide compensation when acquisition of a confined animal site would require either relocation of the facility or amendment of its existing regulatory permits. The Authority would create a permit assistance center for landowners and operators whose operations would be out of compliance with permits because of the HSR. This permit center would focus on helping the permit holders modify or obtain any new permits that are required because of the HSR impacts.

AG-IAMF#3: Farmland Consolidation Program

The Authority would establish and administer a farmland consolidation program to sell remnant parcels to neighboring landowners for consolidation with adjacent farmland properties. Upon request, the program would assist the owners of remnant parcels in selling those remnants to adjacent landowners. The goal of the program is to provide for continued agricultural use on the maximum feasible amount of remnant parcels that otherwise may not be economic to farm. The program would focus on severed remainder parcels, including those that were under Williamson Act or Farmland Security Act contract at the time of right-of-way acquisition and have become too small to remain in the local Williamson Act or Farmland Security Act program. The program would assist landowners in obtaining lot line adjustments where appropriate to incorporate remnant parcels into a larger parcel that is consistent with size requirements under the local government regulations.

The program would operate for a minimum of 5 years after construction of the section is completed. The Authority would document implementation of this measure through issuance of a compliance memorandum after the minimum operation period of 5 years has elapsed. The document would be filed with Environmental Mitigation Management and Assessment system (EMMA).

Air Quality

AQ-IAMF#1: Fugitive Dust Emissions

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

- Cover all vehicles transported on public roads to limit visible dust emissions, and maintain at least 6 inches of freeboard space from the top of the container or truck bed.
- Clean all trucks and equipment before exiting the construction site using an appropriate cleaning station that does not allow runoff to leave the site or mud to be carried on tires off the site.

- Water exposed surfaces and unpaved roads at a minimum three times daily with adequate volume to result in wetting of the top 1 inch of soil but avoiding overland flow. Rain events may result in adequate wetting of top 1 inch of soil thereby alleviating the need to apply water manually.
- Limit vehicle travel speed on unpaved roads to 15 miles per hour (mph).
- Suspend any dust-generating activities when average wind speed exceeds 25 mph.
- Stabilize all disturbed areas, including storage piles that are not being used on a daily basis for construction purposes, by using water, a chemical stabilizer/suppressant, hydro mulch or by covering with a tarp or other suitable cover or vegetative ground cover, to control fugitive dust emissions effectively. In areas adjacent to organic farms, the Authority would use nonchemical means of dust suppression.
- Stabilize all on-site unpaved roads and off-site unpaved access roads using water or a chemical stabilizer/suppressant to control fugitive dust emissions effectively. In areas adjacent to organic farms, the Authority would use nonchemical means of dust suppression.
- Apply water or presoak all land clearing, grubbing, scraping, excavation, land leveling, grading, cut and fill, and demolition activities to control fugitive dust emissions effectively.
- For buildings up to six stories in height, wet all exterior surfaces of buildings during demolition.
- Limit or expeditiously remove the accumulation of mud or dirt from adjacent public streets at a minimum of once daily, using a vacuum type sweeper.
- Apply sufficient water or a chemical stabilizer/suppressant after the addition of materials to, or the removal of materials from, the surface or outdoor storage piles to control fugitive dust emissions effectively.

AQ-IAMF#2: Selection of Coatings

During construction, the contractor would use:

- Low-volatile organic compound (VOC) paint that contains less than 10 percent of VOC contents (VOC, 10%).
- Super-compliant or Clean Air paint that has a lower VOC content than that required by South Coast Air Quality Management District Rule 1113 and San Joaquin Valley Unified Air Pollution Control District Rule 4601, when available. If not available, the contractor would document lack of availability and obtain concurrence from the Authority on appropriate paint.

Biological Resources

BIO-IAMF#1: Project Biologist

At least 15 days prior to commencement of any ground-disturbing activity, the contractor would submit the name(s) and resumes of biologists (contractor's project biologist(s)) and other qualified staff (e.g., biological monitors) who would conduct biological resource monitoring activities. No project ground-disturbance activities would begin until proponents have received written approval from the Authority, the U.S. Fish and Wildlife Service (USFWS) and the California Department of Fish and Wildlife (CDFW) that the biologists are approved to conduct the work. The Project biologist(s) is responsible for the timely implementation of the biological mitigation measures as outlined in the biological resources management plan (BRMP), construction documents, and pertinent resource agency permits. Additional duties of the project biologist(s) would include reviewing design documents and construction schedules, determining project biological monitoring needs, overseeing regulatory compliance requirements, monitoring restoration activities and guiding and directing the work of the biological monitors. The duties of the biological monitors would include monitoring construction crew activities, as needed, to document implementation and completion of applicable mitigation measures and compliance with permit

conditions. The project biologist(s) would report to the mitigation manager. The mitigation manager would report to the Authority. All compliance documentation would be submitted to the Authority via EMMA. The project biologist(s) and/or the biological monitor(s) may require special approval from the USFWS and CDFW prior to implementing certain mitigation measures (e.g., handling of listed species).

BIO-IAMF#2: Agency Access

During project activities, the contractor would allow access by the USFWS, U.S. Army Corps of Engineers (USACE), CDFW, State Water Resources Control Board (SWRCB) and other regulatory agency staff to the project site. Because of safety concerns, all visitors would check in with the Authority's resident engineer prior to gaining access to the construction site. If agency personnel were to gain access to the construction site, the project biologist would prepare a memorandum within 1 day of the visit to document agency access and the issues raised during the field meeting. This memorandum would be submitted to the mitigation manager, who would submit it to the Authority via EMMA. Any noncompliance issues would be reported to the contractor and Authority.

BIO-IAMF#3: Construction Period Worker Environmental Awareness Program (WEAP) Training

Prior to any ground-disturbing activity, the agency-approved project biologist would prepare and present a worker environmental awareness program (WEAP) for construction crews to educate them on the potential presence of sensitive biological resources near the project site. A video of the WEAP training prepared and presented by the project biologist and approved by the Authority may be used if the project biologist is not available to present the training in person.

At a minimum, WEAP training materials would include the following information: discussion of the federal Endangered Species Act (federal ESA), the California Endangered Species Act, the Bald and Golden Eagle Protection Act, the Migratory Bird Treaty Act, and the Clean Water Act; the consequences and penalties for violation or noncompliance with these laws and regulations and project permits; identification of special-status plants, special-status wildlife (species covered by regulatory agency permits), jurisdictional waters, and special-status plant communities and explanations about their value; hazardous substance spill prevention and containment measures; the contact person in the event of the discovery of a dead or injured wildlife species; and review of mitigation measures. In the WEAP, construction timing in relation to species' habitat and life-stage requirements would be detailed and discussed on project maps, which would show areas of planned minimization and avoidance measures. Crews would be informed during the WEAP training that, except when necessary as determined in consultation with the project biologist, travel within the marked project site would be restricted to established roadbeds. Established roadbeds include all pre-existing and project-constructed unimproved and improved roads. A fact sheet conveying this information would be prepared by the project biologist for distribution to the construction crews and to others who enter the project footprint. Fact sheet information would be duplicated in a wallet-sized format and would be provided in other languages as necessary to accommodate non-English-speaking workers. All construction staff would attend the WEAP training prior to beginning work on-site, and would attend the WEAP on an annual basis thereafter.

On completion of the WEAP training, construction crews would sign a form stating that they attended the training, understood the information presented, and would comply with the WEAP requirements. The project biologist would submit the signed WEAP training forms to the mitigation manager on a monthly basis. On an annual basis, the contractor would provide the Authority with a letter indicating that regular WEAP training has been implemented and would provide at least one PowerPoint annually of the WEAP training. On a monthly basis, the project biologist would provide updates and synopsis of the training to workers during the daily safety ("tailgate") meeting.

BIO-IAMF#4: Operation and Maintenance Period Worker Environmental Awareness Program (WEAP) Training

Prior to initiating operation and maintenance activities, maintenance personnel who work on-site would attend a WEAP training session provided by the Authority.

The environmental training would cover general and specific biological and legal information on federally and state listed species and their respective habitats. At a minimum, WEAP training materials would include the following information: discussion of the federal Endangered Species Act (federal ESA), the California Endangered Species Act, the Bald and Golden Eagle Protection Act, the Migratory Bird Treaty Act, and the Clean Water Act; the consequences and penalties for violation or noncompliance with these laws and regulations and project permits; identification of special-status plants, special-status wildlife (species covered by regulatory agency permits), jurisdictional waters, and special-status plant communities and explanations about their value; hazardous substance spill prevention and containment measures; and the contact person in the event of the discovery of a dead or injured wildlife species. The training would include an overview of provisions of the BRMP, annual vegetation, and management plan, weed control plan and security fencing and wildlife exclusion fencing maintenance plans pertinent to operation and maintenance activities. The training would be provided by the Authority staff responsible for environmental compliance. The training sessions would be given prior to initiation of maintenance activities for each employee and repeated for all maintenance employees, on an annual basis. Upon completion of the WEAP training, maintenance employees would sign a form stating that they attended the training and understand and would comply with the information presented. A fact sheet prepared by the Authority environmental compliance staff would be prepared for distribution to the maintenance employees. The Authority would conduct the WEAP training on an annual basis.

BIO-IAMF#5: Prepare and Implement a Restoration and Revegetation Plan

Prior to any ground-disturbing activity, the contractor's project biologist would prepare a restoration and revegetation plan (RRP) for ground disturbances within sensitive biological communities that could support federally listed species, wetlands, and/or other waters of the United States. Restoration activities would include but not be limited to grading landform contours to approximate predisturbance conditions, revegetating temporarily disturbed areas using native plant species to the extent possible, and using certified weed-free straw and mulch. Consistent with section 1415 of the Fixing America's Surface Transportation Act (FAST Act) restoration activities would include the use of native pollinators through plantings of native forbs (e.g. flowering plants) and grasses. The project biologist would locate a locally sourced native seed mix, which would be submitted for approval by the USFWS. The restoration performance standards would limit invasive species, as defined by the California Invasive Plant Council, to less than 10 percent greater than the predisturbance condition, or as determined through a comparison with an appropriate reference site with similar natural communities and management. The RRP would outline, at a minimum:

- Procedures for vegetation analyses of temporarily affected habitats to approximate their relative composition and procedures for site preparation, irrigation, planting, and maintenance. This information may be used to determine the requirements of the revegetation areas for both on-site temporary impacts and off-site compensatory sites.
- Sources of plant materials and methods of propagation.
- Specification of parameters for maintenance and monitoring of re-established habitats, including weed control measures, frequency of field checks, and monitoring reports for temporary disturbance areas.
- Specification of performance standards for the re-established plant communities within the construction limits.
- Specification of the remedial measures to be taken if performance standards are not met (e.g., a form of adaptive management).

- Methods and requirements for monitoring restoration/replacement efforts, which would be a combination of qualitative and quantitative data consistent with mitigation measures and permit conditions.
- Maintenance, monitoring, and reporting schedules, including an annual report due to the Authority by January 31st of the prior year during which restoration activities occurred.

The contractor would implement the RRP in temporarily disturbed areas. The RRP can be combined with the BRMP. The project biologist would prepare and submit compliance reports to the mitigation manager to document implementation and performance of the RRP. The RRP would be submitted to the Authority, and regulatory agencies as defined in permit requirements for review and approval. Compliance reporting would be submitted to the Authority via EMMA in accordance with the report schedule.

BIO-IAMF#6: Prepare and Implement a Biological Resources Management Plan

Prior to any ground-disturbing activity, the contractor's mitigation manager, or its designee (project biologist(s)) would prepare the BRMP and assemble the biological resources mitigation measures. The BRMP would include terms and conditions from applicable permits and agreements and make provisions for monitoring assignments, scheduling, and responsibility. The BRMP would also include habitat replacement and revegetation, protection during ground-disturbing activities, performance (growth) standards, maintenance criteria, and monitoring requirements for temporary and permanent native plant community impacts. All project environmental plans (e.g., RRP) would be included as appendices to the BRMP. The parameters for the BRMP would be formed with the mitigation measures from this project-level EIR/EIS, including terms and conditions as applicable from the USFWS, USACE, SWRCB, and CDFW permits. The goal of the BRMP is to provide an organized reporting tool to verify that the mitigation measures and terms and conditions are implemented in a timely manner. These measures, terms, and conditions include all avoidance, minimization, repair, mitigation, and compensatory actions stated in the mitigation measures or terms and conditions from the permits referenced above. These measures, terms, and conditions are tracked through final design, implementation, and post-construction phases. The BRMP would be submitted to the contractor and would contain, but not be limited to, the following information:

- A master schedule that shows construction of the project, pre-construction surveys, and establishment of buffers and exclusions zones to protect sensitive biological resources.
- Specific measures for the protection of special-status species.
- Identification (on construction plans) of the locations and quantity of habitats to be avoided or removed, along with the locations where habitats are to be restored.
- Identification of agency-approved project biologist(s) and biological monitor(s), including those responsible for notification and report of injury or death of federally- or state-listed species.
- Identification of specific parameters consistent with mitigation ratios and permit conditions for determining the amount of replacement habitat for temporary disturbance areas.
- Measures to preserve topsoil and control erosion.
- Design of protective fencing around environmentally sensitive areas, environmentally restricted areas, and the construction staging areas.
- Specification of the locations and quantities of gallinaceous guzzlers (catch basin/artificial watering structures) and the monitoring of water levels in them.
- Locations of trees to be protected as wildlife habitat (roosting sites) and locations for planting replacement trees.
- Specification of the purpose, type, frequency, and extent of chemical use for insect and disease control operations as part of vegetative maintenance within sensitive habitat areas.

- Specific construction monitoring programs for habitats of concern and special-status species, as needed.
- Specific measures for the protection of vernal pool habitat and riparian areas. These measures may include erosion and siltation control measures, protective fencing guidelines, dust control measures, grading techniques, construction area limits, and biological monitoring requirements.
- Provisions for biological monitoring during ground-disturbing activities to confirm compliance and success of protective measures. The monitoring procedures would (1) identify specific locations of wildlife habitat and sensitive species to be monitored; (2) identify the frequency of monitoring and the monitoring methods (for each habitat and sensitive species to be monitored); (3) list required qualifications of biological monitor(s), and (4) identify the reporting requirements.

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

BIO-IAMF#7 Prepare and Implement an Annual Vegetation Management Plan

Prior to operations and maintenance activities, the Authority would prepare an annual vegetation control plan. The Authority would generally follow the procedures established in Chapter C2 of the California Department of Transportation (Caltrans) Maintenance Manual to manage vegetation on Authority property (Caltrans 2010). Vegetation would be controlled by chemical, thermal, biological, cultural, mechanical, structural, and manual methods. The annual vegetation control plan would be updated each winter for implementation no later than April 1 of each year. The plan would consist of site-specific vegetation control methods, as outlined below:

- Chemical vegetation control noting planned usage
- Mowing program consistent section 1415 of the FAST Act
- Other nonchemical vegetation control plans (manual, biological, cultural, thermal (includes the use of propane heat or steam and is not specific to controlled burning) and structural)
- List of sensitive areas
- Other chemical pest control plans (e.g., insects, snail, rodent)

Only Caltrans-approved herbicides would be used in the vegetation control program. Pesticide application would be conducted in accordance with all requirements of the California Department of Pesticide Regulation and County Agricultural Commissioners by certified pesticide applicators. Noxious/invasive weeds would be treated where requested by county agricultural commissioners. The Authority would cooperate in area-wide control of noxious/invasive weeds if established by local agencies. Farmers/landowners who request weed control on state right-of-way that is not identified in the annual vegetation control plan would be encouraged to submit a permit request application for weed control that identifies the target weeds and control method desired.

The Authority would require that HSR maintenance crews follow the guidelines in the contractor weed control plan and annual vegetation control plan during project operation and maintenance.

The Authority or its designee would appoint the responsible party during the operations and maintenance period to verify the annual vegetation control plan is being carried out appropriately and effectively. The annual vegetation control plan update would include a section addressing issues encountered during the prior year and adaptive measures incorporated in the update as proactive measures.

BIO-IAMF#8: Prepare and Implement a Weed Control Plan

Prior to any ground-disturbing activity, the contractor's project biologist would develop and implement a construction-phase weed control plan. The purpose of the plan is to minimize and avoid the spread of noxious and invasive weeds during ground-disturbing activities.

The weed control plan would include the following, at a minimum:

- Prior to implementation, delineate environmentally sensitive area and environmentally restricted area (on plans and in field).
- Schedule for noxious weed surveys to be conducted in coordination with the BRMP. The success criteria for noxious and invasive weed control, as established by a qualified biologist. The success criteria would be linked to the BRMP standards for on-site work during ground-disturbing activities. In particular, the criteria would limit the introduction and spread of invasive species, as defined by the California Invasive Plant Council (Cal-IPC), to less than or equal to the predisturbance conditions in areas temporarily affected by ground-disturbing activities. If invasive species cover is found to exceed predisturbance conditions by 10 percent or is 10 percent more compared with a similar, nearby reference site with similar vegetation composition, a control effort would be implemented. If the target, or other success criteria identified in the weed control plan, has not been met by the end of the weed control plan monitoring and implementation period, the Authority or its designee would continue the monitoring and control efforts, and remedial actions would be identified and implemented until the success criteria are met. Depending on monitoring results, additional or revised measures may be necessary to verify that the introduction and spread of noxious weeds are not promoted by the construction and operation of the project.
- Provisions to verify that developing the weed control plan would be coordinated with the RRP so the RRP incorporates measures minimizing the spreading and establishing of noxious weeds. This coordination also provides for the RRP to specify the percentage of noxious weeds coverage in the revegetation performance standards.
- Identification of weed control treatments, including the use of permitted herbicides, and manual and mechanical removal methods. Herbicide application would be restricted from use in Environmentally Sensitive Areas and on compensatory mitigation sites.
- Determination of timing of the weed control treatment for each plant species.
- Identification of fire prevention measures.

The project biologist would prepare a monthly memorandum to document the progress of the plan and its implementation. The contractor would implement the weed control plan during the construction period. The Authority would appoint the responsible party during the operations period.

The weed control plan would be submitted to the Authority prior to any ground disturbance activity.

BIO-IAMF#9: Security Fence Maintenance Plan

Prior to operations and maintenance activities, the Authority would prepare a security fence maintenance plan that would be implemented by the Authority (and/or their operating partners) during HSR operation. The plan would provide for regular inspection and repair of HSR security fencing with specific provisions regarding fencing, barriers, and crossings related to threatened and endangered species and general wildlife movement.

BIO-IAMF#10: Construction Work Windows

Prior to any ground-disturbing activity, the contractor's project biologist, in coordination with the Authority, would consult with USFWS and CDFW regarding implementing construction work windows when working in sensitive species habitat or other protected communities. These measures may include nondisturbance zones, additional site- or species-specific biological monitoring, or approved passive or active relocation of species (when allowable).

Construction activities in wetlands and other waters of the United States (e.g., vernal pools, seasonal wetlands, seasonal riverine areas, and riparian areas) would be restricted during the rainy season (October 15 to April 15) and would be conducted when the resource is dry and/or lacks flowing or standing water. In the event that construction work window restrictions cannot be

adhered to, dewatering, water diversions, and additional best management practices (BMPs) necessary to avoid, minimize and reduce impacts to wetland resources would be employed as determined through consultation between the Authority and the USACE, USFWS, CDFW, National Marine Fisheries Service (NMFS), and SWRCB. Additional avoidance and minimization measures may be necessary to avoid or minimize effects to listed species when construction work window restrictions are not feasible.

Construction work windows for specific species would be adhered to as specified in the EIR/EIS mitigation measures and permit conditions and as appropriate relative to the species' ecology.

The project biologist would prepare a monthly memorandum regarding compliance with work window restrictions. The memorandum would be provided to the Authority for compliance monitoring documentation purposes.

BIO-IAMF#11: Conduct Biological Monitoring during Construction Activities

During any ground-disturbing activity, the contractor's project biologist would oversee and direct the work of the contractor's biological monitors, who would be present on site to verify permit compliance during construction activities and when establishing environmentally sensitive areas, wildlife exclusion fence zones (WEF), or nondisturbance zones. The contractor's biological monitor(s) would advise the contractor on methods that may minimize or avoid impacts on state and federally listed species in consultation with the project biologist. Daily compliance reports would be submitted to the Authority via EMMA within 24 hours of each monitoring day. Noncompliances would be submitted to the Authority the same day as they are observed on-site.

BIO-IAMF#12: "Take" Notification and Reporting

During monitoring of construction activities, in the event of an accidental death or injury to a federal- or state-listed species, the project biologist and/or approved biological monitor would immediately notify the mitigation manager and the Authority of the mortality or injury. The project biologist would then notify USFWS and/or CDFW within 24 hours (or as otherwise proscribed in applicable permits) in coordination with the Authority, via telephone and electronic mail, of the accidental death or injury and would fill out any required forms and submit them to the relevant agency and the Authority. The project biologist would submit a memorandum to the mitigation manager and Authority (via EMMA) to document compliance with this measure. The memorandum would also identify any suggested revisions to the construction activities or additional measures required to minimize or prevent future impacts from occurring. The BRMP would list all agency-approved individuals responsible for take notification and reporting.

BIO-IAMF#13: Environmentally Sensitive Areas, Wildlife Exclusion Fencing, and Nondisturbance Zones

Prior to any ground-disturbing activity, the contractor, under the supervision of the project biologist or approved biological monitors, would install wildlife-specific exclusion barriers at the edge of the project footprint as appropriate to minimize and avoid impacts to wildlife during the construction period. The fencing would be used to establish nondisturbance exclusion zones to restrict construction equipment and personnel from entering environmentally sensitive areas or restrict federally listed wildlife species from entering the construction areas. The nondisturbance/exclusion zones would be determined by the contractor's project biologist based on results of pre-construction surveys and in conjunction with Authority and resource agency consultation.

Both high-visibility environmentally sensitive areas fencing and WEF fencing would be used to delineate sensitive resources. Environmentally sensitive area and WEF fencing would be identified and depicted on an exclusion-fencing exhibit. WEF barriers would be made of durable material and would be regularly inspected and maintained. WEFs would be installed along the outer perimeter of environmentally sensitive areas and below grade (e.g., 6 to 10 inches below grade). The exact design specifications of the exclusion fencing would be determined through consultation with the USFWS and/or CDFW. The effectiveness and serviceability of environmentally sensitive areas and WEF would be monitored at regular intervals by the project

biologist and biological monitors throughout project construction, and would be removed after the completion of major construction activities (as deemed appropriate by the project biologist). The project biologist would submit a memorandum to the mitigation manager and Authority (via EMMA) to document compliance with this measure documenting the field delineation and installation of all environmentally sensitive areas and WEFs to the mitigation manager and the Authority prior to construction. The memorandum would identify any adaptive management measures identified by the project biologist based on effectiveness and serviceability monitoring. The contractor would verify that all environmentally sensitive areas are off-limits to construction personnel and equipment. The purpose of the exclusion area fencing would be explained at the WEAP training and displayed during worker “tailgate” meetings. The fencing exhibit would be posted at the construction site field office in a highly visible location.

BIO-IAMF#14: Monofilament Restrictions

A minimum of 30 days prior to any ground-disturbing activities, the contractor’s project biologist would verify that that the contractor would not use plastic monofilament netting (erosion-control matting) or similar material in erosion control materials. A number of acceptable substitutes exists including: geomembranes, coconut coir matting, tackified hydroseeding compounds, rice straw wattles (e.g., Earthsaver wattles: biodegradable, photodegradable, burlap), and other reusable erosion, sediment, and wildlife control systems that can be approved by the regulatory agencies. The project biologist would submit memoranda to the mitigation manager and Authority to document compliance with this measure; the project biologist would submit an update to the memoranda monthly throughout project construction.

BIO-IAMF#15: Avoidance of Entrapment

During construction, at the end of each work day, the contractor, under the guidance of the contractor’s project biologist, would cover all excavated, steep-sided holes or trenches more than 8 inches deep with plywood or similar materials or provide a minimum of one escape ramp per 100 feet of trenching (with slopes no greater than a 3:1) constructed of earth fill or wooden planks. The project biologist or biological monitors would thoroughly inspect holes and trenches for trapped animals at the start of each workday and at the end of each workday. The contractor would screen, cover, or store, more than 1 foot off the ground, all construction pipe, culverts, or similar structures with a diameter of 3 inches or more that are stored at the construction site for one or more overnight periods. These pipes, culverts, and similar structures would be inspected by the project biologist or approved biological monitor(s) for wildlife before the material is moved, buried, or capped. The project biologist would submit memoranda to the mitigation manager and the Authority to document compliance with this measure; updated memoranda would be submitted on a monthly basis throughout project construction.

BIO-IAMF#16: Artificial Dens Associated with Wildlife Exclusion Fencing and Nondisturbance Zones

Prior to any ground-disturbing activities as determined by contractor’s project biologist, the contractor’s project biologist and/or biological monitor would oversee implementation of artificial den installation by the contractor’s field crew. The number and location of the artificial dens would be identified in the BRMP prepared by the contractor’s project biologist. These artificial dens would be located on parcels owned by the Authority or where access has been granted by a willing landowner. To mitigate the temporary impacts of environmentally sensitive area and WEF fencing on state and federal special status species and their movement/migration corridors during construction, artificial dens would be installed along the outer perimeter of the environmentally sensitive area and WEF fencing. Fencing would be set back from the edge of the project footprint (limits of construction for the preferred alternative analyzed in environmental documents) to provide space for the artificial dens to be constructed. Artificial dens or other similar concealment or escape structures would also be installed at dedicated wildlife crossing structures to provide escape cover for wildlife and prevent predation by larger predators.

BIO-IAMF#17: Equipment Staging Areas

Prior to any ground-disturbing activities, the contractor, under the supervision of the project biologist, would locate staging areas for construction equipment outside of areas of sensitive biological resources, including habitat for state and federal special-status species, seasonal wetlands, habitats of concern, and wildlife movement corridors. To the maximum extent possible as determined by the project biologist, staging areas (including any temporary material storage areas) would be located in areas that would be occupied by permanent facilities. Additional staging areas may be approved based on the contractor's needs, access to local road networks, and highway access with approval from the project biologist and the Authority, and other applicable approving (e.g., state/federal/county) agencies. Equipment staging areas would be identified on the mitigation manager's final project construction plans. The project biologist would submit a memorandum to the mitigation manager and Authority on a monthly basis documenting compliance with this measure.

BIO-IAMF#18: Construction Utility Requirements and Waste Disposal

During any ground-disturbing activities, the contractor(s) may temporarily store excavated materials produced by construction activities in areas at or near the construction site within the environmental footprint. Wherever possible, they would return excavated soil to its original location to be used as backfill. Any excavated waste materials unsuitable for treatment and reuse would be disposed of by hauling it off site to a permitted location in conformance with applicable state and federal laws. The contractor would provide the Authority with documentation that waste has been properly disposed.

BIO-IAMF#19: Cleaning of Construction Equipment

Prior to any ground-disturbing activities within or adjacent to sensitive habitat areas as defined by the project biologist, all equipment would be free of mud and plant materials to avoid introduction of invasive species. The contractor would establish vehicle-cleaning locations designed to contain potential organic materials and avoid the transportation of weeds and invasive species both on and off the construction work area. The cleaning areas would be located to avoid impacts to surface waters and incorporate appropriate stormwater pollution prevention plan (SWPPP) BMPs. Cleaning stations would be inspected regularly (at least monthly) and the mitigation manager would document compliance with this measure through the preparation of memoranda which would be submitted to the Authority on a monthly basis.

BIO-IAMF#20: Dewatering and Water Diversion

Prior to any construction activities within open or flowing water, the contractor would prepare a dewatering plan which would be submitted by the contractor for review and approval by the resource agencies (USACE, SWRCB, NMFS, and CDFW) prior to any work in that area. The plan would incorporate appropriate construction measures that minimize turbidity and siltation as determined through review and approval by the designated resource agencies. The project biologist and/or biological monitor would provide regular monitoring of dewatering and diversion sites and would collect water quality data (if applicable). Prior to dewatering or water diversion, pre-activity surveys would establish the presence or absence of special status wildlife species within the affected waterbody. In the event that special-status species are detected during pre-activity surveys, an agency approved project biologist would relocate the species (if allowable) to an approved location off-site.

BIO-IAMF#21: Vehicle Traffic and Construction Site Speed Limits

Prior to any ground-disturbing activities, the contractor would obtain confirmation from the project biologist that appropriate BMPs are in place to restrict project vehicle traffic within the construction area to established roads, construction areas, and other designated areas. The contractor would establish vehicle traffic in locations disturbed by previous activities to prevent further adverse ground-disturbing effects, require observance of a 15-mph speed limit for construction areas with potential special-status species habitat, clearly flag and mark access

routes, and prohibit off-road traffic. The project biologist would submit a memorandum to the mitigation manager and Authority to document compliance with this measure on a monthly basis.

BIO-IAMF#22: Work Stoppage

During any ground-disturbing activities, in the event that any special-status wildlife species is found within the project footprint, the project biologist(s) or biological monitor(s) would have the authority to halt work in the area of the observation to prevent inadvertent take of the animal(s). This work stoppage would be coordinated with the resident engineer and the Authority and/or its designee. The contractor would suspend ground-disturbing activities which could injure or kill the animal in the immediate area (e.g., within 50 to 100 feet) as determined by the project biologist; work may continue in other areas. Any state or federally listed wildlife species detected within the footprint during ground-disturbing activities would be relocated by the project biologist in accordance with agency guidance, as approved by the USFWS and/or CDFW (or other jurisdictional agencies; e.g., U.S. Forest Service), or in certain circumstances, it may require that they be allowed to leave the work zone on their own (such as with CDFW Fully Protected species). Before ground-disturbing activities, the contractor's project biologist would obtain written permission from CDFW to capture and relocate nonlisted wildlife species from within the project footprint. Work stoppages and measures taken would be documented in a memorandum prepared by the project biologist and submitted to the mitigation manager and Authority within 48 hours of the work stoppage.

BIO-IAMF#23: Compliance Reporting

The contractor's mitigation manager and/or project biologist would prepare monthly and annual reports documenting compliance with all IAMFs, mitigation measures, and governmental approval conditions. The Authority would review and approve all compliance reports prior to submittal to the regulatory agencies. Reports would comply with the content requirements outlined in the regulatory agency permits.

Pre-activity survey reports would be submitted within 15 days of completing the surveys and would include, at a minimum:

- Location(s) of where pre-activity surveys were completed, including latitude and longitude, assessor parcel number, and HSR parcel number.
- Written description of the surveyed area plus survey buffers. A figure of each surveyed location would be provided depicting the surveyed area and survey buffers over an aerial image.
- Date, time, and weather conditions observed at each location.
- Names of personnel who completed the pre-activity surveys.
- Verification of the Authority's habitat mapping at each location provided in writing and on a figure.
- Observations made during the survey, including the locations (written and geographic information system [GIS] data) of any sensitive resources detected.
- Identification of measures to be implemented as a result of the survey observations.

Daily compliance reports would be submitted to the Authority within 48 hours of the monitoring day and would include, at a minimum:

- 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.
- Noncompliances observed.

Monthly reports would be submitted to the Authority by the 10th of each month and would include, at a minimum:

- Summary of project activities and locations during the reporting month, including: any noncompliances and how they were resolved; any work stoppages; and any covered species take that occurred
- Summary of anticipated project activities and locations for the subsequent month.
- Tracking of impacts on suitable habitats for each threatened and endangered species (covered species) identified in USFWS and CDFW permits, including:
 - An accounting of the number of acres of covered species habitat that has been disturbed during the reporting month.
 - An accounting of the cumulative total number of acres of covered species habitat that has been disturbed during the project period.
- Up-to-date GIS layers, associated metadata, and photo documentation used to track acreages disturbed.
- Copies of all pre-activity survey reports, daily compliance reports, and noncompliance/ work stoppage reports for the reporting month.

Annual reports would be submitted to the Authority by the 20th of each month and would include, at a minimum:

- 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 takes of the covered species.
- Information about other project impacts on the covered species.
- A summary of findings from pre-construction surveys (e.g., number of times a covered 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 covered species habitat within the project area, both for the preceding 12 months and in total since incidental take permit issuance, and updated maps of all land disturbances and updated maps of identified habitat features suitable for covered species within the project area.
- Beginning and ending dates of operations and maintenance activities, emergency-related activities, and other covered activities undertaken during the reporting year.

BIO-IAMF#24: Construction Site Housekeeping

Prior to any ground-disturbing activities, the contractor would prepare a construction site BMP field manual. The manual would contain standard construction site housekeeping practices required to be implemented by the contractor. The manual would identify BMPs for the following topics: temporary soil stabilization, temporary sediment control, wind erosion control, tracking control, non-stormwater management, waste management and materials control, proper use of any rodenticides and other general construction site cleanliness measures. All construction site personnel would be provided training on BMP field manual implementation prior to working on the construction site. All personnel would sign a form documenting that they had received training and understand BMP field manual implementation requirements. The BMP field manual would be updated on by January 31st of each year. Annual training updates would be provided by the contractor to all construction personnel. The Authority would review and approve the initial BMP field manual prior to any ground-disturbing activities and all annual updates. The contractor would provide the Authority with a monthly memorandum documenting BMP field manual

implementation and identify any recommended changes to construction site housekeeping practices.

BIO-IAMF#25: Wildlife Crossings

To evaluate wildlife movement and habitat connectivity within the greater project area, the Authority would coordinate with recognized wildlife corridor specialists, the regional consultants, and the engineering team to prepare a wildlife corridor assessment. The wildlife corridor assessment would analyze and identify applicable landscape and habitat variables to both accommodate animal movement and to create linkages to core habitat areas. Information developed in the wildlife corridor assessment would inform an effects analysis that would develop and propose measures to facilitate safe animal passage through the alignment and minimize habitat fragmentation by providing for landscape-level habitat connectivity. The configuration of wildlife crossing infrastructure would be determined through consideration of known corridors, habitat quality, species requirements, movement patterns, existing barriers to movement, topography and drainage patterns, as well as habitat enhancement opportunities. Additionally, wildlife movement corridors would make use of the project's viaducts, tunnels and undercrossings and dual-purpose road and drainage culvert crossings to facilitate wildlife movement.

Local stakeholders and regulatory agencies would be consulted on the wildlife corridor assessment and an adaptive management strategy would be employed by the contractor before, during, and after construction to minimize construction impacts on animal movement and to refine the location of dedicated crossings prior to final wildlife crossing design.

BIO-IAMF#26: General Nesting Season Restrictions

If ground-disturbing activities are scheduled to occur during the nesting bird season (generally defined as occurring between February 1 and September 1, as early as January 1 for some raptors), prior to commencing work (ground-disturbing activities), the contractor's project biologist and/or biological monitor would conduct visual pre-construction surveys for nesting birds protected by the Migratory Bird Treaty Act and California Fish and Game Code. In the event active bird nests are encountered during the pre-activity survey, the project biologist and/or biological monitors, in consultation with the Authority and appropriate resource agency, would establish a 500-foot nest avoidance buffer zone around raptor nests and other-sized nest avoidance buffer zones for nonraptor species as appropriate. The size of the buffer area could be reduced on a case-by-case with concurrence from the USFWS and CDFW. The project biologist or biological monitor would periodically monitor active bird nests. The project biologist would maintain the nest avoidance buffer zone until nestlings have fledged and are no longer reliant on the next or parental care for survival or the nest is abandoned (as determined by the project biologist). The project biologist would submit a memorandum, on a monthly basis during the bird-breeding season, to the mitigation manager and Authority to document compliance with this measure.

BIO-IAMF#27: Conservation Dogs

The Authority may employ the use of conservation dogs (i.e., detection dogs) for focused species surveys. This unique method has been used on a variety of wildlife species, including black bear (*Ursus americanus*), grizzly bear (*Ursus arctos*), maned wolf (*Chrysocyon brachyurus*), jaguar (*Panthera onca*), puma (*Puma concolor*), foxes, San Joaquin kit fox (*Vulpes macrotis mutica*), gray fox (*Urocyon cinereoargenteus*), red fox (*V. vulpes*), pine marten (*Martes martes*), Pacific pocket mouse (*Paragnathus longimembris pacificus*), and koalas (*Phascolarctos cinereus*). The methods and application have been thoroughly described (Wasser et al. 2004; Cynne et al. 2014; Smith et al. 2006; Cristescu et al. 2015). The use of conservation dogs on the project would be formally requested of and must be approved by the CDFW and/or USFWS prior to deployment.

Cultural Resources

CUL-IAMF#1: Geospatial Data Layer and Archaeological Sensitivity Map

Prior to construction (any ground-disturbing activities) and staging of materials and equipment, the contractor's archaeologist or geoarchaeologist would prepare a geospatial data layer

identifying the locations of all known archaeological resources and built historic resources that require avoidance or protection, and areas of archaeological sensitivity that require monitoring within the area of potential effect (APE). The contractor's archaeologist, who meets the Secretary of the Interior's Professional Qualifications Standards provided in 36 Code of Federal Regulations (C.F.R.) Part 61, is to use, as appropriate, a combination of the following: known locations of archaeological sites and built historic properties, tribal consultation, landforms, depositional processes, distance to water, mapping provided in the archaeological treatment plan, or historic mapping. This mapping is to be updated as the design progresses if it results in an expansion of the area of ground disturbance/APE, including temporary construction easements and new laydown and access areas. This mapping would be used to develop an archaeological monitoring plan to be prepared by the contractor's archaeologist, and upon approval by the Authority, implemented by the contractor's archaeologist. When design is sufficiently advanced, a geospatial data layer would be produced by the contractor overlaying the locations of all known archaeological resources and built historic resources within the APE, for which avoidance measures are necessary, and all archaeologically sensitive areas, for which monitoring is required.

CUL-IAMF#2: Worker Environmental Awareness Program (WEAP) Training Session

Prior to construction (any ground-disturbing activity), construction contractor personnel who work on-site would attend a WEAP training session provided by the contractor. The WEAP would include cultural resources awareness training performed by the contractor's archaeologist who meets the Secretary of the Interior's Professional Qualification Standards provided in 36 C.F.R. Part 61. The contractor would develop instructional materials and a fact sheet for distribution to the construction crews, and submit the materials, as well as qualifications of the personnel providing the training, to the Authority for approval at least 15 days prior to being permitted on-site access. The training would address measures required to avoid or protect built historical resources, educate crews on artifacts and archaeological features they may encounter and the mandatory procedures to follow should potential cultural resources be exposed during construction. Translation services would be provided by the contractor for non-English-speaking participants. The training sessions would be given prior to the initiation of any ground disturbance and repeated on an annual basis. Additionally, new construction crewmembers would attend an initial WEAP training session prior to working on-site.

On completion of the WEAP training, construction crews would sign a form stating that they attended the training, understood the information presented, and would comply with the WEAP requirements. The contractor's archaeologist would submit the signed WEAP training forms to the mitigation manager on a monthly basis. On an annual basis, the contractor would provide the Authority with a letter indicating that regular WEAP training had been implemented and would provide at least one PowerPoint annually of the WEAP training. On a monthly basis, the contractor's archaeologist would provide updates and synopsis of the training to workers during the daily safety ("tailgate") meeting. Construction crews would be informed during the WEAP training that, to the extent possible, travel within the marked project site would be restricted to established roadbeds.

CUL-IAMF#3: Preconstruction Cultural Resource Surveys

Prior to construction (any ground-disturbing activities in areas not yet surveyed) and the staging of materials and equipment, the contractor would conduct pre-construction cultural resource surveys. Resulting from lack of legal access, much of the project footprint may not have been surveyed. Once parcels are accessible the contractor would have archaeologists or architectural historians, as appropriate, who meet the Secretary of the Interior professional qualification standards survey and complete reporting in appropriate document for archaeology and / or built resources, in accordance with documentation requirements stipulated in the Programmatic Agreement. Identified resources would be evaluated for the National Register of Historic Places and the California Register of Historical Resources. The qualified archaeologist or architectural historian, as appropriate, would assess the potential to affect to historic properties by applying the effects criteria in 36 C.F.R. Part 800.5(a)(1), and the potential of significant impacts to historical

resources by applying the criteria in California Environmental Quality Act Guidelines 15064.5(b). Should the Authority and FRA determine, in consultation with the State Historic Preservation Office (SHPO), that any newly identified historic properties or historical resources would be adversely affected, the built environment treatment plan or archaeological treatment plan, as appropriate, would be amended, to document mitigation measures agreed upon by the Memorandum of Understanding (MOA) signatories. The schedule of these surveys would be dependent on the timing of obtaining legal access to the properties and may be driven by the need to complete construction-related activities (e.g., geotechnical borings, laydown yards). Prior to beginning surveys, updated records searches may be required by the Authority and FRA, depending on the length of the passage of time, to validate that accurate information was obtained regarding previous inventory and evaluation efforts. The contractor's archaeologist, in consultation with the Authority, would determine if an updated records search is required. If an updated records search is necessary, the search would be performed by the contractor's archaeologist.

CUL-IAMF#4: Relocation of Project Features when Possible

Changing the rail alignment to avoid newly discovered sites is likely infeasible; however, access areas and laydown sites may be relocated should their proposed location be found to be on archaeological sites or have the potential to affect historic built resources in the vicinity. The contractor would delineate all avoidance and protection measures for identified archaeological and built resources on construction drawings.

CUL-IAMF#5: Archaeological Monitoring Plan and Implementation

Prior to construction, the contractor's professionally qualified archaeologist, as defined in the Programmatic Agreement, would prepare a monitoring plan based on the results of geospatial data layer and archaeological sensitivity map. The plan would be reviewed and approved by the Authority prior to any ground-disturbing activities. During construction (any ground-disturbing activities) or staging of materials or equipment, the contractor would be responsible for implementing the monitoring plan and providing archaeological and tribal monitoring of ground-disturbing construction activities with a potential to affect archaeological remains in areas identified as archaeologically sensitive in the archaeological treatment plan. The contractor would obtain Authority approval of all persons providing archaeological or tribal monitoring.

CUL-IAMF#6: Preconstruction Conditions Assessment, Plan for Protection of Historic Built Resources, and Repair of Inadvertent Damage

Prior to construction (any ground-disturbing activities within 1,000 feet of a historic built property), the contractor may be required to assess the condition of construction-adjacent historic properties, and prepare a plan for the protection of historic built resources and repair of inadvertent damage. The MOA and built environment treatment plan (BETP) would stipulate for which properties the plan is to be prepared. MOA signatories and consulting parties may comment on the adequacy of the assessments. Protection measures would be developed in consultation with the landowner or land-owning agencies as well as the SHPO and the MOA signatories and consulting parties, as required by the Programmatic Agreement. As the design progresses, additional properties may be identified by the Authority as requiring this plan. The plan would record existing conditions in order to (1) establish a baseline against which to compare the property's post-project condition, (2) to identify structural deficiencies that make the property vulnerable to project construction related damage, such as vibration, and (3) to identify stabilization or other measures required to avoid or minimize inadvertent adverse effects. The plan would be further described in the BETP and be prepared by an interdisciplinary team, including (but not limited to) as appropriate, an architectural historian, architect, photographer, structural engineer, and acoustical engineer. Ambient conditions would be used to identify buildings that are sensitive receptors to construction-related vibration and require vibration monitoring during construction activities. Additional protective measures may be required if the property is vacant during construction.

The plan content would be outlined in the BETP and would be completed and approved by the Authority, with protective measures implemented before construction begins within 1,000 feet of the subject building. The plan would describe the protocols for documenting inadvertent damage (should it occur), as well as notification, coordination, and reporting to the SHPO, MOA signatories, and the owner of the historic property. The plan would direct that inadvertent damage to historic properties would be repaired in accordance with the Secretary of the Interior's Standards for the Treatment of Historic Properties (U.S. Department of the Interior 1995). The plan would be developed in coordination with the Authority and FRA, and would be submitted to the SHPO for review and approval. Protective plans would be required for buildings that would be moved as part of the project mitigation, including stabilization before, during, and after relocation; protection during temporary storage; and relocation to a new site, followed by rehabilitation.

CUL-IAMF#7: Built Environment Monitoring Plan

Prior to construction (any ground-disturbing activities within 1,000 feet of a historic property or resource), the contractor would prepare a built environment monitoring plan. Draft and final plans would describe the properties that would require monitoring, the type of activities or resources that would require full-time monitoring or spot checks, the required number of monitors for each construction activity, and the parameters that would influence the level of effort for monitoring. Maximum vibration level thresholds may be established in the plan for protection of historic resources and repair of inadvertent damage the monitoring of which would be included in this monitoring plan. The BETP would outline the process for corrective action should the protection measures prove ineffective. Consultation procedures would also be defined in the BETP. The contractor would develop both the draft and final plans in coordination with the Authority and FRA, and would submit the plan the SHPO for review and approval. The plan would be implemented prior to any ground-disturbing activities within 1,000 feet of properties identified as requiring monitoring, as specified in the BETP.

CUL-IAMF#8: Implement Protection and/or Stabilization Measures

Prior to construction, the contractor would implement protection and/or stabilization measures as for protection of historic resources and repair of inadvertent damage and as described in the BETP. Such protection measures would include but would not be limited to vibration monitoring of construction near historic properties; cordoning off resources from construction activities (e.g., traffic, equipment storage, personnel); shielding of resources from dust or debris; and stabilization of buildings adjacent to construction. Temporary stabilization and protection measures would be removed after construction is complete, and the historic properties would be restored to their pre-construction condition. For buildings that would be moved, treatment would include stabilization before, during, and after relocation; protection during temporary storage; and relocation to a new site, followed by rehabilitation.

Electromagnetic Fields and Electromagnetic Interference

EMF/EMI-IAMF#1: Preventing Interference with Adjacent Railroads

TM 3.00.10. Implementation Stage Electromagnetic Compatibility Program Plan (ISEP) requires coordination with adjacent railroads. During project design, the contractor would work with the engineering departments of railroads that operate parallel the HSR to apply standard design practices to prevent interference with the electronic equipment operated by these railroads. Prior to operations and maintenance of each operating segment, the contractor would certify through issuance of a technical memorandum to the Authority that design provisions to prevent interference have been established and have been determined to be effective prior to the activation of potentially interfering systems of the HSR.

The contractor would work with the railroad engineering departments where these railways parallel the HSR to apply the standard design practices to prevent interference with the electronic equipment operated by these railroads. Design provisions to prevent interference would be put in place and determined to be adequately effective by a qualified electrical engineering professional prior to the HSR activation of potentially interfering systems. The HSR Design Criteria Manual

Chapter 26 summarizes the applicable electromagnetic fields (EMF)/electromagnetic interference (EMI) design standards that the Authority would use for the project.

EMF/EMI-IAMF#2: Controlling Electromagnetic Fields/Electromagnetic Interference

Prior to construction, the contractor would prepare an electromagnetic field/electromagnetic interference technical memorandum for review and approval by the Authority. The HSR project would adhere to international guidelines and comply with applicable federal and state laws and regulations. The HSR project design would follow TM 300.10, ISEP, the HSR Design Criteria Manual Chapter 26, which provides detailed electromagnetic compatibility design criteria for the HSR systems and equipment, and the HSR Design Criteria Manual Chapter 22 which addresses grounding requirements for third-party metallic structures, including fences and pipelines, which are parallel and adjacent to the HSR right-of-way. These documents describe the design practices to avoid EMI and to provide for HSR operational safety. Some measures of the ISEP include:

- During the planning stage through system design, the Authority would perform electromagnetic compatibility /electromagnetic interference safety analyses, which would include identification of existing nearby radio systems, design of systems to prevent EMI with identified neighboring uses, and incorporation of these design requirements into bid specifications used to procure radio systems.
- Post signs at the traction power supply systems, switching stations, and on tie-line structures warning persons with an implanted medical device of the potential for high levels of EMF.
- Pipelines and other linear metallic objects that are not sufficiently grounded through the direct contact with earth would be separately grounded in coordination with the affected owner or utility to avoid possible shock hazards. For cases where metallic fences are purposely electrified to inhibit livestock or wildlife from traversing the barrier, specific insulation design measures would be implemented.
- HSR standard corrosion protection measures would be implemented to eliminate risk of substantial corrosion of nearby metal objects.

Geologic Resources

GEO-IAMF#1: Geologic Resources

Prior to construction, the contractor would prepare a construction management plan (CMP) addressing how the contractor would address geologic constraints and minimize or avoid impacts to geologic resources during construction. The plan would be submitted to the Authority for review and approval. At a minimum, the plan would address the following geotechnical constraints/resources:

- **Groundwater Withdrawal.** Control the amount of groundwater withdrawal from the project by re-injecting groundwater at specific locations, if necessary, or use alternate foundation designs to offset the potential for settlement. This control is important for locations with retained cuts in areas where high groundwater exists, and where existing buildings are located near the depressed track section.
- **Unstable Soils.** Employ various methods to mitigate for the risk of ground failure from unstable soils. If soft or loose soils are encountered at shallow depths, they can be excavated and replaced with competent soils. To limit the excavation depth, replacement materials can also be strengthened using geosynthetics. Where unsuitable soils are deeper, ground improvement methods, such as stone columns, cement deep-soil-mixing, or jet grouting, can be used. Alternatively, if sufficient construction time is available, preloading—in combination with prefabricated vertical drains (wicks) and staged construction—can be used to gradually improve the strength of the soil without causing bearing-capacity failures.
- **Subsidence.** The Authority addresses subsidence in its design and construction processes. For the initial design, survey monuments were installed to establish a datum and set an initial

track profile. In the construction phase, the contractors for track bed preparation conduct topographic surveys for preparation of final design. Because subsidence could have occurred since the original benchmarks (survey monuments) were established, the contractor's topographic surveys would be used to help determine whether subsidence has occurred. The updated topographic surveys would also be used to establish the top of rail elevations for final design where the HSR system is outside established floodplain areas and above water surface elevations. Where the HSR system is in floodplain areas susceptible to flooding, consideration is being given to overbuild the height of the rail bed in anticipation of future subsidence.

- **Water and Wind Erosion.** The contractor would implement erosion control methods as appropriate from the various erosion control methods documented in the construction SWPPP (HYD-IAMF#3), the Caltrans construction manuals (Caltrans 2003a, 2003b, 2014a), and the construction technical memorandum (GEO-IAMF#6), and in coordination with other erosion, sediment, stormwater management and fugitive dust control efforts. Water and wind erosion control methods may include, but are not limited to, use of revegetation, stabilizers, mulches, and biodegradable geotextiles.
- **Soils with Shrink-Swell Potential.** In locations where shrink-swell potential is marginally unacceptable, soil additives would be mixed with existing soil to reduce the shrink-swell potential. Construction specifications would be based upon the decision whether to remove or treat the soil. This decision is based on the soils, specific shrink-swell characteristics, the additional costs for treatment versus excavation and replacement, as well as the long-term performance characteristics of the treated soil.

GEO-IAMF#2: Slope Monitoring

During operation and maintenance, the Authority would incorporate slope monitoring by a registered engineering geologist into the operation and maintenance procedures. The procedures would be implemented at sites identified in the CMP where a potential for long-term instability exists from gravity or seismic loading including but not limited to at-grade sections where slope failure could result in loss of track support, or where slope failure could result in additional earth loading to foundations supporting elevated structures.

GEO-IAMF#3: Evaluate and Design for Large Seismic Ground Shaking

Prior to construction, the contractor would document through preparation of a technical memorandum how all HSR components were evaluated and designed for large seismic ground shaking. Prior to final design, the contractor would conduct additional seismic studies to establish an up-to-date estimation of levels of ground motion. The most current Caltrans seismic design criteria at the time of design would be used in the design of any structures supported in or on the ground. These design procedures and features reduce to the greatest practical extent for potential movements, shear forces, and displacements that result from inertial response of the structure. In critical locations, pendulum base isolators may be used to reduce the levels of inertial forces. New composite materials may also be used to enhance seismic performance.

GEO-IAMF#4: Suspension of Operations during an Earthquake

Prior to operations and maintenance activities, the contractor would document in a technical memorandum how suspension of operations during or after an earthquake was addressed in project design. Motion-sensing instruments to provide ground motion data and a control system to shut down HSR operations temporarily during or after a potentially damaging earthquake would be incorporated into final design. Monitoring equipment would be installed at select locations where high ground motions could occur.

GEO-IAMF#5: Subsidence Monitoring

Prior to operations and maintenance activities, the Authority would develop a stringent track monitoring program. Once tracks are operational, a remote monitoring program would be implemented to monitor the effects of ongoing subsidence. Track inspection systems would provide early warning of reduced track integrity. HSR train sets would be equipped with

autonomous equipment for daily track surveys. This specification would be added to HSR train bid packages. If monitoring indicates that track tolerances are not met, trains would operate at reduced speed until track tolerances are restored. In addition, the contractor responsible for wayside maintenance would be required to implement a stringent program for track maintenance.

GEO-IAMF#6: Geology and Soils

Prior to construction, the contractor would document through issuance of a technical memorandum how the following guidelines and standards have been incorporated into facility design and construction:

- 2010 American Association of State Highway and Transportation Officials (AASHTO) Load and Resistance Factor Bridge Design Specifications and the 2009 AASHTO Guide Specifications for Load and Resistance Factor Seismic Bridge Design, or their most recent versions. These documents provide guidance for characterization of soils, as well as methods to be used in the design of bridge foundations and structures, retaining walls, and buried structures. These design specifications would provide minimum specifications for evaluating the seismic response of the soil and structures.
- Federal Highway Administration Circulars and Reference Manuals. These documents provide detailed guidance on the characterization of geotechnical conditions at sites, methods for performing foundation design, and recommendations on foundation construction. These guidance documents include methods for designing retaining walls used for retained cuts and retained fills, foundations for elevated structures, and at-grade segments. Some of the documents include guidance on methods of mitigating geologic hazards that are encountered during design.
- American Railway Engineering and Maintenance-of-Way Association Manual. These guidelines deal with rail systems. Although they cover many of the same general topics as AASHTO, they are more focused on best practices for rail systems. The manual includes principles, data, specifications, plans, and economics pertaining to the engineering, design, and construction of railways.
- California Building Code. The code is based on 2009 International Building Code. This code contains general building design and construction requirements relating to fire and life safety, structural safety, and access compliance.
- International Building Code and American Society of Civil Engineers-7. These codes and standards provide minimum design loads for buildings and other structures. They would be used for the design of the maintenance facilities and stations. Sections in these codes provide minimum requirements for geotechnical investigations, levels of earthquake ground shaking, minimum standards for structural design, and inspection and testing requirements.
- Caltrans Design Standards. Caltrans has specific minimum design and construction standards for all aspects of transportation system design, ranging from geotechnical explorations to construction practices. These amendments provide specific guidance for the design of deep foundations that are used to support elevated structures, for design of mechanically stabilized earth walls used for retained fills, and for design of various types of cantilever (e.g., soldier pile, secant pile, and tangent pile) and tie-back walls used for retained cuts.
- Caltrans Construction Manuals. Caltrans has a number of manuals including *Field Guide to Construction Dewatering* (Caltrans 2014a), *Construction Site Best Management Practices (BMP) Field Manual and Troubleshooting Guide* (Caltrans 2003a) and *Construction Site Best Management Practices* (Caltrans 2003b). These provide guidance and BMPs for dewatering options and management, erosion control and soil stabilization, non-stormwater management, and waste management at construction sites.

- American Society for Testing and Materials (ASTM). ASTM has developed standards and guidelines for all types of material testing- from soil compaction testing to concrete-strength testing. The ASTM standards also include minimum performance requirements for materials.

GEO-IAMF#7: Engage a Qualified Paleontological Resources Specialist

Prior to the 90% design milestone for each construction package¹ (CP) within the project section, the contractor would retain a paleontological resources specialist (PRS) responsible for the following actions:

- Reviewing the final design for the CP
- Developing a detailed paleontological resources monitoring and mitigation plan (PRMMP) for the CP. The paleontological resources specialist would be responsible for implementing the PRMMP, including delivery of WEAP training, and evaluation and treatment of finds, if any, per the PRMMP and for each CP. A supervising paleontologist, who is also a paleontological resources specialist, would be retained and act as lead paleontologist for the CP if multiple paleontological resources specialists are retained for a single CP.

Retention of paleontological resources specialists would occur in a timely manner, in advance of the 90 percent design milestone for each CP, such that the specialist is on board and can review the 90 percent design submittal without delay when it becomes available. If feasible, the same specialist would be responsible for all CPs within the project section. However, if efficiency dictates, separate qualified specialists may be retained for the various project section CPs. Should a CP retain more than one paleontological resources specialist, a supervising paleontologist would be identified.

All paleontological resources specialists would meet or exceed the qualifications for a principal paleontologist as defined in Caltrans' current *Standard Environmental Reference*, Chapter 8 (Caltrans 2014b). Appointment of paleontological resources specialists would be subject to review and approval by the Authority.

GEO-IAMF#8: Perform Final Design Review and Triggers Evaluation

For each CP within the project section, the responsible paleontological resources specialist would evaluate the 90 percent design submittal to identify the portions of the CP that would involve work in paleontologically sensitive geologic units (either on the surface or in the subsurface), in consideration of the final paleontological resources technical report prepared for the project section. Evaluation would consider the location, areal extent, anticipated depth of disturbance, the construction techniques that are planned/proposed, and the geology of the CP and vicinity. The evaluation and resulting recommendations would be consistent with guidance in the Society of Vertebrate Paleontology (SVP) *Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources* (SVP Impact Mitigation Guidelines Revision Committee 2010), the *SVP Conditions of Receivership for Paleontologic Salvage Collections* (SVP Conformable Impact Mitigation Guidelines Committee 1996), and relevant guidance from Chapter 8 of the current Caltrans *Standard Environmental Reference* (Caltrans 2014b).

The purpose of the final design review and triggers evaluation would be to develop specific language detailing the paleontological monitoring and other requirements applicable to each CP within the project section. Paleontological protection requirements identified through the final design review and triggers evaluation would be recorded in a concise technical memorandum (Final Design Review Requirements for Paleontological Resources Protection") and would then be incorporated in full detail into the PRMMP for each CP. Portions of the CP requiring

¹ Because of their length and complexity, most HSR project sections are expected to be designed and constructed in segments, with separate construction documents (plans and specifications) developed for each segment. *Construction package* refers to a portion (segment) of a project section for which a discrete, stand-alone construction document set will be developed.

paleontological monitoring would also be clearly delineated in the project construction documents for each CP.

GEO-IAMF#9: Prepare and Implement Paleontological Resources Monitoring and Mitigation Plan (PRMMP)

Following the final design review and triggers evaluation for each CP, the paleontological resources specialist would develop a CP-specific PRMMP. For greater efficiency, PRMMPs may be combined such that they cover more than one CP, as long as the specific requirements of this IAMF are satisfied explicitly and in detail for each CP included.

The PRMMP for each CP would incorporate the findings of the design review and triggers evaluation for that CP and would be consistent with the SVP *Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources* (SVP Impact Mitigation Guidelines Revision Committee 2010), the SVP *Conditions of Receivership for Paleontologic Salvage Collections* (SVP Conformable Impact Mitigation Guidelines Committee 1996), and relevant guidance from Chapter 8 of the current Caltrans *Standard Environmental Reference* (Caltrans 2014b). As such, the PRMMP would provide for at least the following:

- Implementation by qualified personnel, as follows:
 - The paleontological resources specialist would be required to meet or exceed principal paleontologist qualifications per Chapter 8 of the current *Caltrans Standard Environmental Reference* (Caltrans 2014b). The supervising paleontologist may, but not necessarily, be the paleontological resources specialist who prepares the PRMMP.
 - Paleontological monitors would be required to meet or exceed paleontological monitor qualifications per Chapter 8 of the current *Caltrans Standard Environmental Reference* (Caltrans 2014b).
- Pre-construction survey by qualified personnel, with salvage or protection in place, as appropriate, in areas where the CP would result in surface disturbance of geologic units identified as highly sensitive for paleontological resources (*highly sensitive units*).
- Pre-construction and construction-period coordination procedures and communications protocols.
- Paleontological monitoring by qualified staff for all ground-disturbing activities known to involve, or potentially involve, highly sensitive units and for activities involving other geologic units in any areas where the paleontological resources specialist considers it warranted based on the results of the technical report or field surveys. In all areas subject to monitoring, monitoring would initially be conducted full-time during all grading and excavation activities, but the PRMMP may provide for monitoring frequency in any given location to be reduced once 50 percent of the ground-disturbing activity in that location has been completed, if the reduction is appropriate based on the implementing paleontological resources specialist's professional judgment in consideration of actual site conditions.
- If the paleontological resources specialist considers it warranted, monitoring would also be stipulated for construction drilling operations. In general, small-diameter (i.e., less than 18 inches) drilling activities or drilling activities using bucket augers tend to pulverize impacted sediments and contained fossils and not typically monitored. The portion of the PRMMP monitoring program for drilling operations would be developed in conjunction with the CP design and geotechnical teams, in consideration of the nature, depth, and location of drilling needed, and the anticipated equipment and staging configurations.
- Provisions for the content and delivery of paleontological resources WEAP training.
- In-progress documentation of monitoring (and, if applicable, salvage/recovery operations) via daily "tailgate" meetings or a similar means.

- Provisions for a “stop work, evaluate, and treat appropriately” response in the event of a known or potential paleontological discovery, including finds in highly sensitive units as well as finds, if any, in units identified as less sensitive, or nonsensitive, for paleontological resources.
- Sampling and recovery procedures consistent with SVP *Standard Procedures* (SVP Impact Mitigation Guidelines Revision Committee 2010) and the SVP *Conditions of Receivership* (SVP Conformable Impact Mitigation Guidelines Committee 1996). Recovery procedures would provide for recovery of both macrofossils and microfossils.
- A repository agreement providing for appropriate curation of recovered materials, consistent with the SVP *Conditions of Receivership* (SVP Conformable Impact Mitigation Guidelines Committee 1996). If more than one repository institution is designated, separate repository agreements must be provided.
- Final report preparation procedures consistent with Caltrans *Standard Environmental Reference* Chapter 8 provisions for the Paleontological Monitoring Report and Paleontological Stewardship Summary (Caltrans 2014b).

Procedures for the preparation, identification, and analysis of fossil specimens and data recovered, consistent with the SVP *Conditions of Receivership* (SVP Conformable Impact Mitigation Guidelines Committee 1996) and any specific requirements of the designated repository institution(s).

GEO-IAMF#10: Provide Worker Environmental Awareness (WEAP) Training for Paleontological Resources

Prior to groundbreaking for each CP within the project section, the contractor would provide paleontological resources worker environmental awareness program (WEAP) training delivered by the Supervising Paleontologist. All management and supervisory personnel and construction workers involved with ground-disturbing activities would be required to take this training before beginning work on the project. Refresher training would also be made available to management and supervisory personnel and workers as needed, based on the judgment of the paleontological resources specialist.

At a minimum, paleontological WEAP training would include information on:

- Coordination between construction staff and paleontological staff
- Construction and paleontological staff roles and responsibilities in implementing the PRMMP
- The possibility of encountering fossils during construction
- The types of fossils that may be seen and how to recognize them
- Proper procedures in the event fossils are encountered, including the requirement to halt work near the find and procedures for notifying responsible parties in the event of a find.

Training materials and formats may include, but are not necessarily limited to, in-person training, prerecorded videos, posters, and informational brochures that provide contacts and summarize procedures in the event paleontological resources are encountered. WEAP training contents would be subject to review and approval by the Authority. Paleontological resources WEAP training may be provided concurrently with cultural resources WEAP training.

Upon completion of any WEAP training, the contractor would require workers to sign a form stating that they attended the training and understand and would comply with the information presented. Verification of paleontological resources WEAP training would be provided to the Authority by the contractor.

GEO-IAMF#11: Halt Construction, Evaluate, and Treat if Paleontological Resources Are Found

If known or potential fossil materials are discovered during construction, regardless of the individual making a paleontological discovery, all activity in the immediate vicinity of the discovery would halt and the find would be protected from further disturbance. If the discovery is made by someone other than the paleontological resources specialist or qualified paleontological monitor, the person who made the discovery would immediately notify construction supervisory personnel, who would notify the specialist. Notification to the paleontological resources specialist would take place promptly (prior to the close of work the same day as the find), and the specialist would evaluate the find and prescribe appropriate treatment as soon as feasible. Work may continue on other parts of the site while evaluation (and, if needed, treatment) takes place, as long as the find can be adequately protected in the judgment of the specialist.

If the paleontological resources specialist determines that treatment is warranted, such treatment, and any required reporting, would proceed consistent with the PRMMP. The contractor would be responsible for ensuring prompt and accurate implementation, subject to verification by the Authority.

The stop work requirement does not apply to drilling since drilling typically cannot be suspended in mid-course. However, if finds are made during drilling, the same notification and other follow-up requirements would apply. The paleontological resources specialist would coordinate with construction supervisory and drilling staff regarding the handling of recovered materials.

The requirements of this IAMF would be detailed in the PRMMP and presented as part of the paleontological resources WEAP training.

Hazardous Materials and Waste

HMW-IAMF#1: Transport of Materials

During construction, the contractor would comply with applicable state and federal regulations, such as the Resource Conservation and Recovery Act, Comprehensive Environmental Response, Compensation, and Liability Act, the Hazardous Materials Release Response Plans and Inventory Law, and the Hazardous Waste Control Act. Prior to construction, the contractor would provide the Authority with a hazardous materials and waste plan describing responsible parties and procedures for hazardous waste and hazardous materials transport.

HMW-IAMF#2: Permit Conditions

During construction, the contractor would comply with the SWRCB Construction Clean Water Act Section 402 General Permit conditions and requirements for transport, labeling, containment, cover, and other BMPs for storage of hazardous materials during construction. Prior to construction the contractor would provide the Authority with a hazardous materials and waste plan describing responsible parties and procedures for hazardous waste and hazardous materials transport, containment, and storage BMPs.

HMW-IAMF#3: Environmental Management System

To the extent feasible, the Authority would identify, avoid, and minimize hazardous substances in the material selection process for construction, operation, and maintenance of the HSR system. The Authority would use an environmental management system to describe the process that would be used to evaluate the full inventory of hazardous materials as defined by federal and state law employed on an annual basis and would replace hazardous substances with nonhazardous materials. The contractor would implement the material substitution recommendation contained in the annual inventory.

HMW-IAMF#4: Spill Prevention

Prior to construction (any ground-disturbing activities), the contractor would prepare a CMP addressing spill prevention. A spill prevention, control, and countermeasure plan or, for smaller quantities (if total aboveground oil storage capacity is fewer than 1,320 gallons in storage

containers more than or equal to 55-gallons), a spill prevention and response plan that prescribes BMPs to follow to prevent hazardous material releases and clean-up of any hazardous material releases that may occur. The plans would be prepared and submitted to the project construction manager on behalf of the Authority.

HMW-IAMF#5: Undocumented Contamination

Prior to construction, the contractor would prepare a CMP addressing provisions for the disturbance of undocumented contamination. The plan would be submitted to the Authority for review and approval. Undocumented contamination could be encountered during construction activities and the contractor would work closely with local agencies to resolve any such encounters and address necessary cleanup or disposal. Copies of all required hazardous material documentation would be provided within 30 days to the Authority.

HMW-IAMF#6: Demolition Plans

Prior to construction that involves demolition, the contractor would prepare demolition plans for the safe dismantling and removal of building components and debris. The demolition plans would include a plan for lead and asbestos abatement. The plans would be submitted to the project construction manager on behalf of the Authority for verification that appropriate demolition practices consistent with federal and state regulations regarding asbestos and lead paint abatement have been followed.

HMW-IAMF#7: Property Acquisition Phase I Assessments and Associated Testing and Remediation

During the right-of-way acquisition phase, Phase 1 environmental site assessments would be conducted in accordance with standard ASTM methods to characterize each construction site. The determination of parcels that require soil testing and the locations for testing would be informed by a Phase 1 environmental site assessment and made in coordination with state and local agency officials. Testing (Phase II Environmental Site Assessment) and appropriate remediation (Phase III Environmental Site Assessment) would be conducted prior to acquisition. Prior to construction, the contractor would conduct remediation activities that may include removal of contamination, in-situ treatment, or soil capping in full compliance with applicable state and federal laws and regulations.

HMW-IAMF#8: Work Barriers

Prior to construction (any ground-disturbing activities), the contractor would verify to the Authority through preparation of a technical memorandum the use of work barriers. Nominal design variances, such as the addition of a plastic barrier beneath the ballast material to limit the potential release of volatile subsurface contaminants, may be implemented in conjunction with site investigation and remediation.

HMW-IAMF#9: Landfill

Prior to construction (any ground-disturbing activities), the contractor would verify to the Authority through preparation of a technical memorandum that methane protection measures would be implemented for all work within 1,000 feet of a landfill, including gas detection systems and personnel training. This would be undertaken pursuant to State of California Title 27, Environmental Protection—Division 2, Solid Waste, and the hazardous materials BMPs plan.

HMW-IAMF#10: Hazardous Materials Plans

Prior to operations and maintenance activities, the Authority would prepare hazardous materials monitoring plans. These would use as a basis source, such as a hazardous materials business plan as defined in Title 19 California Code of Regulations and a spill prevention, control, and countermeasure plan.

HMW-IAMF#11: Hazardous Minerals

Prior to construction, the contractor would prepare a CMP addressing how the contractor would minimize or avoid impacts related to hazardous minerals during construction. The CMP would be

submitted to the Authority for review and approval. The CMP would include appropriate provisions for handling hazardous minerals including but limited to dust control, control of soil erosion and water runoff, and testing and proper disposal of excavated material.

HMW-IAMF#12: Gas Monitoring

Prior to construction, the contractor would prepare a CMP addressing how gas monitoring would be incorporated into construction BMPs. The CMP would be submitted to the Authority for review and approval. Hazards related to potential migration of hazardous gases due to the presence of oil fields, gas fields, or other subsurface sources can be reduced or eliminated by following strict federal and state Occupational Safety & Health Administration (OSHA/Cal-OSHA) regulatory requirements for excavations, and by consulting with other agencies as appropriate, such as the Department of Conservation (Division of Oil and Gas) and the California Environmental Protection Agency, Department of Toxic Substances Control, regarding known areas of concern.

Practices would include using safe and explosion-proof equipment during construction, and testing for gases regularly. Installation of passive or active gas venting systems, gas collection systems, as well as active monitoring systems and alarms would be required in underground construction areas and facilities where subsurface gases are present. Installing gas-detection systems can monitor the effectiveness of these systems.

Hydrology and Water Resources

HYD-IAMF#1: Stormwater Management

Prior to construction, the contractor would prepare a SWPPP for review and approval by the Authority. During the detailed design phase, each receiving stormwater system's capacity to accommodate project runoff would be evaluated for the design storm event. As necessary, on-site stormwater management measures, such as detention or selected upgrades to the receiving system, would be designed to provide adequate capacity and to comply with the design standards in the latest version of Authority Technical Memorandum 2.6.5 Hydraulics and Hydrology Guidelines (Authority 2011c). On-site stormwater management facilities would be designed and constructed to capture runoff and provide treatment prior to discharge of pollutant-generating surfaces, including station parking areas, access roads, new road over- and underpasses, reconstructed interchanges, and new or relocated roads and highways. Low-impact development techniques would be used to detain runoff on-site and to reduce off-site runoff. Constructed wetland systems, biofiltration and bioretention systems, wet ponds, organic mulch layers, planting soil beds, and vegetated systems (biofilters), such as vegetated swales and grass filter strips, would be used where appropriate. Stormwater infiltration or detention facilities would be built in compliance with the design standards indicated in (to be determined). Vegetated setbacks from streams would be established.

HYD-IAMF#2: Flood Protection

Prior to construction, the contractor would prepare a flood protection plan for Authority review and approval. The project would be designed to both remain operational during flood events and to minimize increases in 100-year or 200-year flood elevations, as applicable to locale. Design standards would include the following:

- Establish track elevation to prevent saturation and infiltration of stormwater into the subballast.
- Minimize development within the floodplain, to such an extent that water surface elevation in the floodplain would not increase by more than 1 foot, or as required by state or local agencies, during the 100-year or 200-year flood flow [as applicable to locale]. Avoid placement of facilities in the floodplain or raise the ground with fill above the base-flood elevation.
- Design the floodplain crossings to maintain a 100-year floodwater surface elevation of no more than 1 foot above current levels, or as required by state or local agencies, and project features within the floodway itself would not increase existing 100-year floodwater surface

elevations in Federal Emergency Management Agency-designated floodways, or as otherwise agreed upon with the county floodplains manager.

The following design standards would minimize the impacts of pier placement on floodplains and floodways:

- Design site crossings to be as nearly perpendicular to the channel as feasible to minimize bridge length.
- Orient piers to be parallel to the expected high-water flow direction to minimize flow disturbance.
- Elevate bridge crossings at least 3 feet above the high-water surface elevation to provide adequate clearance for floating debris, or as required by local agencies.
- Conduct engineering analyses of channel scour depths at each crossing to evaluate the depth for burying the bridge piers and abutments. Implement scour-control measures to reduce erosion potential.
- Use quarry stone, cobblestone, or their equivalent for erosion control along rivers and streams, complemented with native riparian plantings or other natural stabilization alternatives that would restore and maintain a natural riparian corridor.
- Place bedding materials under the stone protection at locations where the underlying soils require stabilization because of stream-flow velocity.

HYD-IAMF#3: Prepare and Implement a Construction Stormwater Pollution Prevention Plan

Prior to construction (any ground-disturbing activities), the contractor would comply with the SWRCB Construction General Permit requiring preparation and implementation of a SWPPP, providing BMPs to minimize potential short-term increases in sediment transport caused by construction, including erosion control requirements, stormwater management, and channel dewatering for affected stream crossings. The construction general permit separates projects into Risk Levels 1, 2, or 3. Risk levels are determined during the planning and design phases, and are based on potential erosion and transport to receiving waters. Requirements apply according to the Risk Level determined. For example, a Risk Level 3 (highest risk) project would require compulsory storm water runoff pH and turbidity monitoring, and pre- and post-construction aquatic biological assessments during specified seasonal windows.

These BMPs would include measures to provide permeable surfaces where feasible and to retain or detain and treat stormwater on-site. Other BMPs would include strategies to manage the overall amount and quality of stormwater runoff. The construction SWPPP would include measures to address, but are not limited to, the following:

- Hydromodification management to ensure maintenance of pre-project hydrology by emphasizing on-site retention of stormwater runoff using measures such as flow dispersion, infiltration, and evaporation, supplemented by detention where required. Additional flow control measures would be implemented where local regulations or drainage requirements dictate.
- Implementing practices to minimize the contact of construction materials, equipment, and maintenance supplies with stormwater.
- Limiting fueling and other activities using hazardous materials to areas distant from surface water, providing drip pans under equipment, and daily checks for vehicle condition.
- Implementing practices to reduce erosion of exposed soil, including soil stabilization, watering for dust control, perimeter silt fences, and sediment basins.
- Implementing practices to maintain current water quality including silt fences, stabilized construction entrances, grass buffer strips, ponding areas, organic mulch layers, inlet protection, and storage tanks and sediment traps to settle sediment.

- Implementing practices to capture and provide proper off-site disposal of concrete wash water, including isolation of runoff from fresh concrete during curing to prevent it from reaching the local drainage system, and possible treatment with dry ice or other acceptable means to reduce the alkaline character of the runoff (high pH) that typically results from new concrete.
- Developing and implementing a spill prevention and emergency response plan to handle potential fuel or other spills.
- Using diversion ditches to intercept surface runoff from off-site.
- Where feasible, avoiding areas that may have substantial erosion risk, including areas with erosive soils and steep slopes.
- Where feasible, limiting construction to dry periods when flows in water bodies are low or absent.

Implementation of a SWPPP would be performed by the construction contractor's as directed by the contractor's qualified SWPPP practitioner or designee. As part of that responsibility, the effectiveness of construction BMPs must be monitored before and after storm events. Records of these inspections and monitoring results are submitted to the SWRCB/Regional Water Quality Control Board (RWQCB) as part of the annual report required by the Statewide Construction General Permit. The reports are available to the public online. The SWRCB and RWQCB have the opportunity to review these documents.

HYD-IAMF#4: Prepare and Implement an Industrial Stormwater Pollution Prevention Plan

Prior to construction of any facility classified as an industrial facility, the contractor would comply with existing water quality regulations. The stormwater general permit requires preparation of a SWPPP and a monitoring plan for industrial facilities that discharge stormwater from the site, including vehicle maintenance facilities associated with transportation operations. The permit includes performance standards for pollution control.

Land Use and Development

LU-IAMF#1: Local Agency Coordination

Prior to operations and maintenance activities, the Authority would prepare a technical memorandum for each station describing how multimodal connectivity was addressed. The Authority and FRA have a strategy for long-term coordination with local transit agencies and cities to develop transit connectivity plans for HSR station areas and for connectivity to neighboring communities where high HSR ridership is projected. The Authority and FRA expect HSR and connectivity to reduce the overall demand for parking at stations by facilitating alternative methods of station access. The strategy includes the following components:

- Design and construct stations to enhance pedestrian, bicycle and other shared ride access. Mobility features such as walking paths, bicycle lockers, and drop off zones would be encouraged to enhance access.
- Work with local transit agencies around stations to provide easy transfer and fare payment options and would install wayfinding signs, maps, and other techniques to identify local connections within HSR stations.
- In coordination with station cities, identify street enhancements for pedestrian and bicycle access such as improved sidewalks, multiuse pathways, trails, bike lanes and shared parking sites.
- Provide station space for taxis, private buses and shared rides.

LU-IAMF#2: Improve Pedestrian and Bicycle Safety

Prior to construction, the contractor would provide a technical memorandum referencing the design/build plans and documenting how improvements to pedestrian and bicycle safety were

incorporated into project design. Roadway improvements included in the project would improve pedestrian and bicycle safety through associated street enhancements, traffic restriction, and new traffic signals. Road overcrossings would be built with sidewalks that provide pedestrian and bicycle access across the HSR tracks, as appropriate. The roadway improvements and road overcrossings are the responsibility of the contractor and would be incorporated into design/build plans. Additionally, the Authority's station area development policies (Authority 2008) specifically promote compact pedestrian-oriented design to provide for walking, bicycle, and transit access with streetscapes that include landscaping, small parks, and pedestrian spaces.

Noise and Vibration

NV-IAMF#1: Noise and Vibration

Prior to construction, the contractor would prepare and submit to the Authority a noise and vibration technical memorandum documenting how the FRA guidelines for minimizing construction noise and vibration impacts would be employed when work is being conducted within 1,000 feet of sensitive receptors. Typical construction practices contained in the FRA guidelines for minimizing construction noise and vibration impacts include the following:

- Build construct sound barriers, such as temporary walls or piles of excavated material, between noisy activities and noise sensitive resources.
- Route truck traffic away from residential streets, if possible.
- Construct walled enclosures around especially noisy activities or around clusters of noisy equipment.
- Combine noisy operations so they occur in the same period.
- Phase demolition, earthmoving, and ground-impacting operations so as not to occur in the same period.
- Avoid impact pile driving where possible in vibration sensitive areas.

Parks, Recreation and Open Space

PK-IAMF#1: Parks, Recreation, and Open Space

Prior to construction, the contractor would verify by preparing and submitting to the Authority a technical memorandum that identifies project design features to be implemented to minimize impacts on parks, recreation, and open space. Typical design measures to avoid or minimize impacts to parks and recreation may include:

- Locate HSR guideway system components to maintain safe and attractive access for present travel modes (e.g., motorists, bicyclists, pedestrians—as applicable) to park and recreation facilities.
- Maintain sufficient separation of the HSR guideway system and facilities from existing parks, recreation facilities, and open space areas to preserve, to the extent feasible, user experience for intended recreational purpose (e.g., passive recreation, active recreation, wilderness experience).
- Design guideway and station features in such a way as to encourage or enhance the surrounding local communities in a way that provides easy crossing of the guideway and or allows for community sponsored use under the guideway or at station areas.

Public Utilities and Energy

PUE-IAMF#1: Design Measures

The HSR project design would incorporate utilities and design elements that minimize electricity consumption (e.g., using regenerative braking, energy-saving equipment on rolling stock and at station facilities, implementing energy saving measures during construction, and automatic train operations to maximize energy efficiency during operations). Thus, the project would not overburden utility services. The design elements would be included in the design build contract.

Additionally, the Authority has adopted a sustainability policy that establishes project design and construction requirements that avoid and minimize impacts.

PUE-IAMF#2: Irrigation Facility Relocation

When relocating an irrigation facility is necessary, the Authority would ensure the new facility is operational prior to disconnecting the original facility, where feasible. This would reduce the potential for construction to interrupt irrigation services unnecessarily, which would adversely affect farming operations and result in a loss of productivity. The contractor would document all relocations in a memorandum for Authority review and approval.

PUE-IAMF#3: Public Notifications

Prior to construction in areas where utility service interruptions are unavoidable, the contractor would notify the public through a combination of communication media (e.g., by phone, email, mail, newspaper notices, or other means) within that jurisdiction and the affected service providers of the planned outage. The notification would specify the estimated duration of the planned outage and would be published no fewer than 7 days prior to the outage. Construction would be coordinated to avoid interruptions of utility service to hospitals and other critical users. The contractor would submit the public communication plan to the Authority 60 days in advance of the work for verification that appropriate messaging and notification are to be provided.

PUE-IAMF#4: Utilities and Energy

Prior to construction, the contractor would prepare a technical memorandum documenting how construction activities would be coordinated with service providers to minimize or avoid interruptions. It would include upgrades of existing power lines to connect the HSR system to existing utility substations. The technical memorandum would be provided to the Authority for review and approval.

Safety and Security

SS-IAMF#1: Construction Safety Transportation Management Plan

Prior to construction (any ground-disturbing activity), the contractor would prepare for submittal to the Authority a construction safety transportation management plan. The plan would describe the contractor's coordination efforts with local jurisdictions for maintaining emergency vehicle access. The plan would also specify the contractor's procedures for implementing temporary road closures including: access to residences and businesses during construction, lane closures, signage and flag persons, temporary detour provisions, alternative bus and delivery routes, emergency vehicle access, and alternative access locations. The contractor would prepare and submit monthly reports to the Authority documenting construction transportation plan implementation activities for compliance monitoring.

SS-IAMF#2: Safety and Security Management Plan

Sixty days after receiving from the Authority a construction notice-to-proceed, the contractor would provide the Authority with a technical memorandum documenting how the requirements, plan, programs, and guidelines were considered in design, construction, and eventual operation to protect the safety and security of construction workers and users of the HSR. The contractor would be responsible for implementing all construction-related safety and security plans and the Authority would be responsible for implementing all safety and security plans related to HSR operation.

- The Authority and contractor would comply with federal and state workplace safety requirements. Workplace worker safety is generally governed by the Occupational Health and Safety Act of 1970, which established OSHA. OSHA establishes standards and oversees compliance with workplace safety and reporting of injuries and illnesses of employed workers. In California, OSHA enforcement of workplace requirements is performed by Cal OSHA. Under Cal OSHA regulations, as of July 1, 1991, every employer must establish, implement, and maintain an injury and illness prevention program.

- The Authority has adopted a safety and security management plan to guide the safety and security activities, processes, and responsibilities during design, construction, and implementation phases of the project to protect the safety and security of construction workers and the public. A systems safety program plan and a system security plan would be implemented prior to the start of revenue service to guide the safety and security of the operation of the HSR system.
- The contractor would provide the Authority with a safety and security management plan documenting how they would implement the Authority's safety and security requirements within their project scope.
- The Authority would implement site-specific health and safety plans and site-specific security plans to establish minimum safety and security guidelines for contractors of, and visitors to, construction projects. The contractors would develop and implement site-specific measures that address regulatory requirements to protect human health and property at construction sites.
- The Authority or its contractor would prepare of a valley fever action plan that includes:
 - Information on causes, preventative measures, symptoms, and treatments for valley fever to individuals who could potentially be exposed through construction activities (i.e., construction workers, monitors, managers, and support personnel).
 - Continued outreach and coordination with California Department of Public Health.
 - Coordination with county departments of public health to ensure that the above referenced information concerning Valley fever is readily available to nearby residents, schools, and businesses and to obtain area information about valley fever outbreaks and hotspots.
 - Provide a qualified person dedicated to overseeing implementation of the valley fever prevention measures to encourage a culture of safety of the contractors and subcontractors.
- The Valley fever health and safety designee would coordinate with the county public health officer and oversee and manage the implementation of Valley fever control measures. The designee would be responsible for ensuring the implementation of measures in coordination with the county public health officer. Medical information would be maintained following applicable and appropriate confidentiality protections. The Valley fever health and safety designee, in coordination with the county public health officer, would determine what measures would be added to the requirements for the safety and security management plan regarding preventive measures to avoid valley fever exposure. Measures would include, but are not limited to the following:
 - Train workers and supervisors on how to recognize symptoms of illness and ways to minimize exposure, such as washing hands at the end of shifts.
 - Provide washing facilities nearby for washing at the end of shifts.
 - Provide vehicles with enclosed, air conditioned cabs and make sure workers keep the windows closed.
 - Equip heavy equipment cabs with high efficiency particulate air filters.
 - Make National Institute of Occupational Safety and Health-approved respiratory protection with particulate filters as recommended by the California Department of Public Health available to workers who request them.
- The Authority would incorporate FRA requirements in system safety program plans and implement them upon FRA approval. FRA's system safety program plan requirements would be determined in FRA's new system safety regulation (49 C.F.R. 270).

- The Authority would ensure HSR complies with FRA requirements for tracks, equipment, railroad operating rules and practices, passenger safety, emergency response, and passenger equipment safety standards found in 49 C.F.R. Parts 200-299.
- The HSR *Urban Design Guidelines* (Authority 2011b) require implementing the principles of crime prevention through environmental design. The Authority would consider four basic principles of crime prevention through environmental design during station design and site planning: territoriality (design physical elements that express ownership of the station or site); natural surveillance (arrange physical features to maximize visibility); improved sightlines (provide clear views of surrounding areas); and access control (provide physical guidance for people coming and going from a space). The HSR design would include emergency access to the rail right-of-way; elevated HSR structure design would include emergency egress points.
- The Authority would implement fire/life safety and security programs that promote fire and life safety and security in system design, construction, and implementation. The fire and life safety program would be coordinated with local emergency response organizations to provide them with an understanding of the rail system, facilities, and operations, and to obtain their input for modifications to emergency response operations and facilities, such as evacuation routes. The Authority would establish fire/life safety and security committees throughout the HSR section.
- The Authority would implement system security plans that address design features intended to maintain security at the stations within the track right-of-way, at stations, and onboard trains. A dedicated police force would ensure that the security needs of the HSR system are met.
- In accordance with design standards and guidelines, the Authority would provide emergency walkways on both sides of the tracks for both elevated and at-grade sections and appropriate space as defined by fire and safety codes along at-grade sections of the alignment to allow for emergency response access.
- The Authority would implement standard operating procedures and emergency operating procedures, such as the FRA-mandated roadway worker protection program to address the day-to-day operation and emergencies that would maintain the safety of employees, passengers, and the public.

SS-IAMF#3: Hazard Analyses

The Authority's hazard management program would include the identification of hazards, assessment of associated risk, and application of control measures (mitigation) to reduce the risk to an acceptable level. Hazard assessment would include a preliminary hazard analysis and threat and vulnerability assessment.

- The Authority's programmatic preliminary hazard analyses would conform to the FRA's Collision Hazard Analysis Guide: Commuter and Intercity Passenger Service (FRA 2007) and the U.S. Department of Defense's System Safety Program Plan (MIL-STD-882) to identify and determine the facility hazards and vulnerabilities so that they can be addressed by—and either eliminated or minimized—the design.
- The threat and vulnerability assessment would establish provisions for the deterrence and detection of, as well as the response to, criminal and terrorist acts for rail facilities and system operations. Provisions would include right-of-way fencing, intrusion detection, security lighting, security procedures and training, and closed-circuit televisions. Intrusion-detection technology could also alert to the presence of inert objects, such as toppled tall structures or derailed freight trains, and stop HSR operations to avoid collisions.
- During design and construction, the contractor would conduct site-specific preliminary hazard analysis and threat and vulnerability assessments to apply the programmatic work to their specific project designs. The Authority's safety and security committees would be responsible

for implementing the recommendations contained in the hazard analysis during HSR operation.

SS-IAMF#4: Oil and Gas Wells

Prior to ground-disturbing activities, the contractor would identify and inspect all active and abandoned oil and gas wells within 200 feet of the HSR tracks. Any active wells would be abandoned and relocated by the contractor in accordance with the California Department of Conservation, Division of Oil, and Gas and Geothermal Resources standards in coordination with the well owners. In the event that relocated wells do not attain the current production rates of the now-abandoned active wells, the Authority would be responsible for compensating the well owner for lost production. All abandoned wells within 200 feet of the HS tracks would be inspected and re-abandoned, as necessary, in accordance with the standards and in coordination with the well owner. The contractor would provide the Authority with documentation that the identification and inspection of the wells has occurred prior to construction.

Socioeconomics and Communities

SO-IAMF#1: Construction Management Plan

Prior to construction, the contractor would prepare a CMP providing measures that minimize effects on low-income households and minority populations and would submit the plan to the Authority for review and approval. The plan would include actions pertaining to communications, visual protection, air quality, safety controls, noise controls, and traffic controls to minimize effects on low-income households and minority populations. The plan would verify that property access is maintained for local businesses, residences, and emergency services. This plan would include maintaining customer and vendor access to local businesses throughout construction by using signs to instruct customers about access to businesses during construction. In addition, the plan would include efforts to consult with local transit providers to minimize impacts on local and regional bus routes in affected communities.

SO-IAMF#2: Compliance with Uniform Relocation Assistance and Real Property Acquisition Policies Act.

The Authority would comply with the Uniform Relocation Assistance and Real Property Acquisition Policies Act, as amended (Uniform Act). The provisions of the Uniform Act, a federally mandated program, would apply to all acquisitions of real property or displacements of persons resulting from this federally assisted project. The Uniform Act was created to provide for and ensure fair and equitable treatment of all affected persons. Additionally, the Fifth Amendment of the United States Constitution provides that private property may not be taken for a public use without payment of “just compensation.”

The Uniform Act requires that the owning agency provide notification to all affected property owners of the agency’s intent to acquire an interest in their property. This notification includes a written offer letter of just compensation. The Authority would assign a right-of-way specialist to each property owner to assist him or her through the acquisition process. The Uniform Act also provides benefits to displaced individuals to assist them financially and with advisory services related to relocating their residence or business operation. Benefits would be available to both owner occupants and tenants of either residential or business properties affected by the HSR.

The Uniform Act requires provision of relocation benefits to all eligible persons regardless of race, color, religion, sex, or national origin. Benefits to which eligible owners or tenants may be entitled are determined on an individual basis and explained in detail by an assigned right-of-way specialist.

The California Relocation Assistance Act essentially mirrors the Uniform Act and ensures consistent and fair treatment of property owners. However, because the Central Valley Wye would receive federal funding, the Uniform Act takes precedence. Owners of private property have federal and state constitutional guarantees that their property would not be acquired or damaged for public use unless owners first receive just compensation. Under the law, just compensation is measured by the “fair market value,” where the property value is considered the

highest price that would be negotiated on the date of valuation. The value must be agreed upon by a seller who is willing, not obliged to sell, but under no particular or urgent necessity and by a buyer who is ready, willing, and able to buy but under no particular necessity. Both the owner and the buyer must deal with the other with the full knowledge of all the uses and purposes for which the property is reasonably adaptable and available (Code of Civil Procedure § 1263.320a).

The following three detailed relocation assistance documents provide more detailed information about how the Authority would comply with the Uniform Act and the California Relocation Assistance Act. The Authority modeled the documents after California Department of Transportation (Appendix 3.12-A, Relocation Assistance Documents):

- *Your Rights and Benefits as a Displacee under the Uniform Relocation Assistance Program (Residential)* (Authority 2013a)
- *Your Rights and Benefits as a Displacee under the Uniform Relocation Assistance Program (Mobile Home)* (Authority 2013b)
- *Your Rights and Benefits as a Displaced Business, Farm, or Nonprofit Organization under the Uniform Relocation Assistance Program* (Authority 2013c)

This feature reduces the potential impacts of displacement by providing displacement assistance.

SO-IAMF#3: Relocation Mitigation Plan

Before any acquisitions occur, the Authority would develop a relocation mitigation plan, in consultation with affected cities and counties and property owners. In addition to establishing a program to minimize the economic disruption related to relocation, the relocation mitigation plan would be written in a style that also enables it to be used as a public-information document. The relocation mitigation plan would be designed to meet the following objectives:

- Provide affected property and business owners and tenants a high level of individualized assistance in situations when acquisition is necessary and the property owner desires to relocate the existing land use.
- Coordinate relocation activities with other agencies acquiring property resulting in displacements in the study area to provide for all displaced persons and businesses to receive fair and consistent relocation benefits.
- Make a best effort to minimize the permanent closure of businesses and nonprofit agencies because of property acquisition.
- Within the limits established by law and regulation, minimize the economic disruption caused to property owners by relocation.
- In individual situations, where warranted, consider the cost of obtaining the entitlement permits necessary to relocate to a suitable location and consider those costs when establishing the fair market value of the property.
- Assist those business owners who require complex permitting with regulatory compliance.

The relocation mitigation plan would include the following components:

- A description of the appraisal, acquisition, and relocation process as well as a description of the activities of the appraisal and relocation specialists.
- A means of assigning appraisal and relocation staff to affected property owners, tenants, or other residents on an individual basis.
- Individualized assistance to affected property owners, tenants, or other residents in applying for funding, including research to summarize loans, grants, and federal aid available, and research areas for relocation.
- Creation of an ombudsman's position to act as a single point of contact for property owners, residents, and tenants with questions about the relocation process. The ombudsman would

also act to address concerns about the relocation process as it applies to the individual situations of property owners, tenants, and other residents.

Transportation

TR-IAMF#1: Protection of Public Roadways during Construction

Prior to construction, the contractor would provide a photographic survey documenting the condition of the public roadways along truck routes providing access to the proposed project site. The photographic survey would be submitted for approval to the agency responsible for road maintenance and the Authority. The contractor would be responsible for the repair of any structural damage to public roadways caused by HSR construction or construction access, returning any damaged sections to the equivalent of their original pre-HSR construction structural condition or better. The contractor would survey the condition of the public roadways along truck routes providing access to the project site after construction is complete. The contractor would complete a before- and after-survey report and submit it to the Authority for review, indicating the location and extent of any damage.

TR-IAMF#2: Construction Transportation Plan

The contractor would prepare a detailed construction transportation plan (CTP) for minimizing the impact of construction and construction traffic on adjoining and nearby roadways in close consultation with the local jurisdiction having authority over the site. The Authority would review and approve the CTP before the contractor commences any construction activities. This plan would address, in detail, the activities to be carried out in each construction phase, with the requirement of maintaining traffic flow during peak travel periods. Such activities would include, but are not limited to, the routing and scheduling of materials deliveries, materials staging and storage areas, construction employee arrival and departure schedules, employee parking locations, and temporary road closures, if any. The CTP would provide traffic controls pursuant to the *California Manual on Uniform Traffic Control Devices sections* on temporary traffic controls (Caltrans 2014c) and would include a traffic control plan that includes, at a minimum, the following elements:

- Temporary signage to alert drivers and pedestrians to the construction zone
- Flag persons or other methods of traffic control
- Traffic speed limitations in the construction zone
- Temporary road closures and provisions for alternative access during the closure
- Detour provisions for temporary road closures—alternating one-way traffic would be considered as an alternative to temporary closures where practicable and where it would result in better traffic flow than would a detour
- Identified routes for construction traffic
- Provisions for safe pedestrian and bicycle passage or convenient detour
- Provisions to minimize access disruption to residents, businesses, customers, delivery vehicles, and buses to the extent practicable—where road closures are required during construction, limit to the hours that are least disruptive to access for the adjacent land uses
- Provisions for farm equipment access
- Provisions for 24-hour access by emergency vehicles
- Safe vehicular and pedestrian access to local businesses and residences during construction. The plan would provide for scheduled transit access where construction would otherwise impede such access. Where an existing bus stop is within the work zone, the contractor would provide a temporary bus stop at a safe and convenient location away from

where construction is occurring in close coordination with the transit operator. Adequate measures would be taken to separate students and parents walking to and from the temporary bus stop from the construction zone.

- Advance notification to the local school district of construction activities and rigorously maintained traffic control at all school bus loading zones, to provide for the safety of schoolchildren. Review existing or planned safe routes to schools with school districts and emergency responders to incorporate roadway modifications that maintain existing traffic patterns and fulfill response route and access needs during project construction and HSR operations.
- Identification and assessment of the potential safety risks of project construction to children, especially in areas where the project is located near homes, schools, day care centers, and parks
- Promotion of child safety within and near the project area. For example, crossing guards could be provided in areas where construction activities are located near schools, day care centers, and parks.

CTPs would consider and account for the potential for overlapping construction projects.

TR-IAMF#3: Off-Street Parking for Construction-Related Vehicles

The contractor would identify adequate off-street parking for all construction-related vehicles throughout the construction period to minimize impacts on public on-street parking areas. If adequate parking cannot be provided on the construction sites, the contractor would designate a remote parking area and arrange for the use a shuttle bus to transfer construction workers to and from the job site. This measure would be addressed in the CTP.

TR-IAMF#4: Maintenance of Pedestrian Access

The contractor would prepare specific construction management plans to address maintenance of pedestrian access during the construction period. Actions that limit pedestrian access would include, but not be limited to, sidewalk closures, bridge closures, crosswalk closures, or pedestrian rerouting at intersections, placement of construction-related material within pedestrian pathways or sidewalks, and other actions that may affect the mobility or safety of pedestrians during the construction period. If sidewalks are maintained along the construction site frontage, provide covered walkways and fencing. The plan objective would be to maintain pedestrian access where feasible (i.e., meeting design, safety, Americans with Disabilities Act requirements). This measure would be addressed in the CTP.

TR-IAMF#5: Maintenance of Bicycle Access

The contractor would prepare specific construction management plans to address maintenance of bicycle access during the construction period. Actions that limit bicycle access would include, but not be limited to, bike lane closures or narrowing, closure or narrowing of streets that are designated bike routes, bridge closures, placement of construction-related materials within designated bike lanes or along bike routes, and other actions that may affect the mobility or safety of bicyclists during the construction period. Maintain bicycle access where feasible (i.e., meeting design, safety, Americans with Disabilities Act requirements). This measure would be addressed in the CTP.

TR-IAMF#6: Restriction on Construction Hours

The contractor would limit construction material deliveries between 7 a.m. and 9 a.m. and between 4 p.m. and 6 p.m. on weekdays to minimize impacts on traffic on roadways. The contractor would limit the number of construction employees arriving or departing the site between the hours of 7 a.m. and 8:30 a.m. and 4:30 p.m. and 6 p.m. Areas where these

restrictions would be implemented would be determined as part of the CTP. Based on Authority review of the CTP, the restricted hours maybe altered due to local travel patterns.

TR-IAMF#7: Construction Truck Routes

The contractor would deliver all construction-related equipment and materials on the appropriate truck routes and would prohibit heavy-construction vehicles from using alternative routes to get to the site. Truck routes would be established away from schools, day care centers, and residences, or along routes with the least impact if the Authority determines those areas are unavoidable. This measure would be addressed in the CTP.

TR-IAMF#8: Construction during Special Events

The contractor would provide a mechanism to prevent roadway construction activities from reducing roadway capacity during major athletic events or other special events that substantially (10 percent or more) increase traffic on roadways affect by project construction. Mechanisms include the presence of police officers directing traffic, special-event parking, use of within-the-curb parking, or shoulder lanes for through-traffic and traffic cones. This measure would be addressed in the CTP.

TR-IAMF#9: Protection of Freight and Passenger Rail during Construction

The contractor would repair any structural damage to freight or public railways that may occur during the construction period and return any damaged sections to their original structural condition. If necessary, during construction a “shoofly” track would be constructed to allow existing train lines to bypass any areas closed for construction activities. Upon completion, tracks would be opened and repaired or new mainline track would be constructed, and the “shoofly” would be removed. Contractor repair responsibility would be included in the design/build contract.

TR-IAMF#10: Maintenance of Transit Access

The contractor would prepare specific construction management plans to address maintenance of transit access during the construction period. Actions that limit transit access would include, but not be limited to, roadway lane closures or narrowing, closure or narrowing of streets that are designated transit routes, bus stop closures, bridge closures, placement of construction-related materials within designated transit lanes, bus stop or layover zones or along transit routes, and other actions that may affect the mobility or safety of bus transit during the construction period. Maintain transit access where feasible (i.e., meeting design, safety, Americans with Disabilities Act requirements). This measure would be addressed in the CTP.

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