

APPENDIX 2-E: PROJECT IMPACT AVOIDANCE AND MINIMIZATION FEATURES

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Since publication of the Draft Environmental Impact Report (EIR)/Environmental Impact Statement (EIS), the following substantive changes have been made to this appendix:

- Additional context regarding impact avoidance and minimization features (IAMF) and their development was added to the introduction.
- Where appropriate, the verb “would,” when used specifically to describe IAMFs and their directly related activities, was changed to “will,” indicating their integration into project design.
- The following air quality IAMFs were updated to clarify requirements: AQ-IAMF#1, AQ-IAMF#3, AQ-IAMF#4, and AQ-IAMF#5. Additional fugitive dust control measures were added to AQ-IAMF#1. AQ-IAMF#6 was added to this appendix.
- The aesthetics and visual quality IAMFs (AVQ-IAMF#1 and AVQ-IAMF#2) were updated to clarify their requirements and performance standards.
- The following biological resources IAMFs were updated with clarifications: BIO-IAMF#1, BIO-IAMF#2, BIO-IAMF#4. Additionally, the title of BIO-IAMF#11 was updated.
- The following cultural resources IAMFs were updated to clarify requirements: CUL-IAMF#1, CUL-IAMF#2, CUL-IAMF#3, CUL-IAMF#4, CUL-IAMF#5, CUL-IAMF#6, CUL-IAMF#7, and CUL-IAMF#8.
- The electromagnetic fields (EMF)/electromagnetic interference (EMI) IAMFs (EMF/EMI-IAMF#1 and EMF/EMI-IAMF#2) were updated to clarify their requirements and performance standards.
- The following geologic resources IAMFs were updated to clarify requirements: GEO-IAMF#1, GEO-IAMF#3, GEO-IAMF#5, GEO-IAMF#6, GEO-IAMF#10, and GEO-IAMF#11.
- The following hazardous materials and wastes IAMFs were updated to clarify requirements: HMW-IAMF#1, HMW-IAMF#4, HMW-IAMF#5, HMW-IAMF#6, HMW-IAMF#7, and HMW-IAMF#9.
- The following hydrology and water resources IAMFs were updated to clarify requirements and performance standards: HYD-IAMF#1, HYD-IAMF#2, HYD-IAMF#3, and HYD-IAMF#4.
- The following public utilities and energy IAMFs were updated to clarify requirements: PUE-IAMF#1, PUE-IAMF#3, PUE-IAMF#4.
- The following safety and security IAMFs were updated to clarify requirements: SS-IAMF#1, SS-IAMF#2, and SS-IAMF#3.
- The following socioeconomics IAMFs were updated to clarify requirements: SOCIO-IAMF#1, SOCIO-IAMF#2, and SOCIO-IAMF#3. Additionally, the title of SOCIO-IAMF#3 was updated.
- The following transportation IAMFs were updated to clarify requirements: TR-IAMF#2, TR-IAMF#4, TR-IAMF#5, TR-IAMF#7, TR-IAMF#9, TR-IAMF#11, and TR-IAMF#12.

Impact Avoidance and Minimization Features

The California High-Speed Rail Authority (Authority) committed to integrate programmatic impact avoidance and minimization features (IAMF) consistent with the: (1) *Final Program Environmental Impact Report/Environmental Impact Statement (EIR/EIS) for the Proposed California High-Speed Train System* (Authority and Federal Railroad Administration [FRA] 2005), (2) *Bay Area to Central Valley High-Speed Train (HST) Program Final Environmental Impact Report/Environmental Impact Statement (EIR/EIS)* (Authority and FRA 2008), and (3) *Bay Area to Central Valley High-Speed Train Partially Revised Final Program Environmental Impact Report* (Authority 2012).

As the Authority moved from its Tier 1 decisions into Tier 2 project planning and environmental review, it developed the IAMFs as a standardized suite of project design assumptions for each Tier 2 project section of the statewide high-speed rail (HSR) system. The IAMFs provide

consistent application of the project design features and assumptions from the Tier 1 decisions to all Tier 2 projects for the HSR system. The IAMFs include, for example:

1. Standardized construction best management practices (BMP) in areas such as air quality and hazardous materials.
2. Standardized tools like construction management plans (CMP) for areas such as construction transportation and safety (emergency vehicle access).
3. Standardized design features such as use of regenerative braking (during the time that trains are braking), energy-efficient station facilities to minimize energy consumption, and design to minimize electrical interference between HSR systems and utilities.

Many of the IAMFs reflect compliance with regulatory requirements (e.g., air quality, hazardous materials), or industry-recognized performance standards (e.g., electromagnetic fields [EMF] and electromagnetic interference [EMI]), which the Authority will impose on the selected construction contractor. Other IAMFs reflect the Authority's established practices for non-regulatory topics such as aesthetics.

The Authority would implement the IAMFs during project design and construction of the San Francisco to San Jose Project Section (Project Section, or project) to minimize the potential for environmental and 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 and application of measures prior to the start of construction to avoid or minimize air quality and hydrology impacts based on applicable design standards (e.g., AQ-IAMF#1, which requires controls fugitive dust, and HYD-IAMF#3, which requires the contractor to prepare a stormwater pollution prevention plan [SWPPP]). IAMFs applied during design also can minimize impacts during operation (e.g., BIO-IAMF#12, which requires design of the catenary system, masts, and other structures to minimize harm to birds and raptors flying near the HSR system).

The Final Environmental Impact Report (EIR)/Environmental Impact Statement (EIS) describes how the IAMFs are applicable to project construction and operations and, where appropriate, how they are effective at avoiding or minimizing potential impacts. For purposes of California Environmental Quality Act (CEQA) thresholds of significance, the Final EIR/EIS text explains the effectiveness of IAMFs relative to the applicable thresholds for each topic area. The IAMFs are included in the Mitigation Monitoring and Enforcement Plan to enhance implementation tracking, identify the responsible party, and clarify implementation timing.

Descriptions of Impact Avoidance and Minimization Features

Air Quality

AQ-IAMF#1: Fugitive Dust Emissions

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

- Cover all vehicle loads transported on public roads to limit visible dust emissions and maintain at least 6 inches of freeboard space from the top of the container or truck bed.
- Clean all trucks and equipment before exiting the construction site using an appropriate cleaning station that does not allow runoff to leave the site or mud to be carried on tires off the site.
- Water exposed surfaces and unpaved roads at a minimum three times daily with adequate volume to result in wetting of the top 1 inch of soil but avoiding overland flow. Rain events

may result in adequate wetting of top 1 inch of soil to alleviate the need to manually apply water.

- Limit vehicle travel speed on unpaved roads to 15 miles per hour (mph).
- Suspend any dust-generating activities when average wind speed exceeds 25 mph.
- Stabilize all disturbed areas, including storage piles that are not being used on a daily basis for construction purposes, by using water, a chemical stabilizer/suppressant, hydro mulch or by covering with a tarp or other suitable cover or vegetative ground cover. In areas adjacent to organic farms, the Authority will use nonchemical means of dust suppression.
- Stabilize all on-site unpaved roads and off-site unpaved access roads using water or a chemical stabilizer/suppressant, to effectively control fugitive dust emissions. In areas adjacent to organic farms, the Authority will use nonchemical means of dust suppression.
- Apply water to or presoak all areas where land clearing, grubbing, scraping, excavation, land leveling, grading, cut and fill, and demolition activities are carried out.
- For buildings up to six stories tall, wet all exterior surfaces of buildings during demolition.
- Limit or expeditiously remove the accumulation of mud or dirt from adjacent public streets at a minimum of once daily, using a vacuum type sweeper.
- After the addition of materials to or the removal of materials from surface or outdoor storage piles, apply sufficient water or a chemical stabilizer/suppressant.
- Where feasible, install wind breaks (e.g., dust curtains, plastic tarps, solid fencing) on the average dominant windward side(s) of station construction areas. For purposes of implementation, chain-link fencing with added landscape mesh fabric adequately qualifies as solid fencing.
- Post a publicly visible sign with the telephone number and person to contact at the Authority regarding dust complaints. This person would respond and take corrective action within 48 hours. The phone number for the local air district would also be visible to ensure compliance with applicable regulations.

AQ-IAMF#2: Selection of Coatings

During construction, the contractor will use:

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

AQ-IAMF#3: Renewable Diesel

During construction, the contractor will use renewable diesel fuel to minimize and control exhaust emissions from all heavy-duty off-road diesel-fueled construction equipment and on-road diesel trucks. Renewable diesel must meet the most recent American Society for Testing and Materials (ASTM) specification for diesel with the lowest carbon intensity among petroleum fuels sold in California. The contractor will provide the Authority with monthly and annual reports, through the Environmental Mitigation Management and Application (EMMA) system, of renewable diesel purchase records and equipment and vehicle fuel consumption. Exemptions to use traditional diesel can be made where renewable diesel is not available from suppliers within 200 miles of the project site. The construction contract must identify the quantity of traditional diesel purchased and fully document the availability and price of renewable diesel to meet project demand.

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

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

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

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

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

- All on-road trucks used to haul construction materials, including fill, ballast, rail ties, and steel, will consist of an average fleet mix of equipment model year 2010 or newer, but no less than the average fleet mix for the current calendar year as set forth in the CARB's EMFAC 2014 database.
- The contractor will provide documentation to the Authority of efforts to secure such a fleet mix.
- The contractor will keep a written record of equipment usage during project construction for each piece of equipment and provide the Authority with monthly reports of vehicle miles traveled (through EMMA) and annual reports documenting compliance.

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

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

Aesthetics and Visual Quality

AVQ-IAMF#1: Aesthetic Options

For the numerous HSR non-station structures across the state, the Authority seeks to balance providing a consistent, project-wide aesthetic with the local aesthetic context. Accordingly, the Authority has created a guidance document, *Draft Design Opportunities for Local Jurisdictions and Aesthetic Requirements* (Authority 2017), to provide local jurisdictions with examples of aesthetic options that can be applied to non-station elements in the HSR system, such as integrated patterns and textures in the concrete on elevated guideway columns, parapets or retaining walls and the types of materials for sound walls. In addition, the Authority has prepared an *Aesthetics Manual for Non-Station Structures* (Authority 2014a) that establishes principles to

guide designers responding to requests for proposals for design-build services toward an appropriate level of aesthetic quality in their design. Prior to the selection of a design-build contractor, the *Draft Design Opportunities for Local Jurisdictions and Aesthetic Requirements* guidance document will be provided to local jurisdictions to inform their understanding of aesthetic options to be selected. The *Aesthetics Manual for Non-Station Structures* will be provided to proposing design-build contractors.

AVQ-IAMF#2: Aesthetic Review Process

Prior to selecting the design-build contractor, in accordance with the aesthetic review process identified for non-station structures in the Authority’s *Draft Design Opportunities for Local Jurisdictions and Aesthetic Requirements* guidance document, the Authority will:

- Prepare documentation that identifies elements along the HSR alignment that are recommended for aesthetic treatment and HSR system and local infrastructure elements for which design-build proposals will be expected to demonstrate aesthetic design expertise.
- Consult with local jurisdictions on how best to involve the community in the process to identify their aesthetic preferences. The Authority will present the project elements to local jurisdictions for discussion. Local jurisdictions will provide the Authority with their initial written input on local aesthetic treatment preferences.
- Evaluate the identified aesthetic preferences for potential cost, schedule, and operational impacts and compatibility with project-wide aesthetic goals.
- Coordinate with the local jurisdiction on the aesthetic approach that will be documented in a Design Options and Aesthetics Cooperative Agreement, as shown in Appendix A of the *Draft Design Opportunities for Local Jurisdictions and Aesthetic Requirements*.
- Incorporate the agreed-upon aesthetic approaches in the construction procurement documents.
- Work with the selected contractor and local jurisdictions to implement the local jurisdictions’ aesthetic preferences as documented in the Design Options and Aesthetics Cooperative Agreements.

Biological Resources

BIO-IAMF#1: Designate Project Biologist, Designated Biologists, Species-Specific Biological Monitors and General Biological Monitors

At least 15 business days prior to commencement of any ground-disturbing activity, including but not limited to geotechnical investigations, utility realignments, creation of staging areas, or initial clearing and grubbing, the Authority will submit the name(s) and qualifications of project biologists, designated biologists, species-specific biological monitors, and general biological monitors retained to conduct biological resource monitoring activities and implement avoidance and minimization measures. No ground-disturbing activity will begin until the Authority has received written approval from the U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), where applicable, and the California Department of Fish and Wildlife (CDFW) that the biologists and monitors have been approved to conduct the specified work. The project biologist is responsible for ensuring the timely implementation of the biological avoidance and minimization measures as outlined in the biological resources management plan (BRMP), and for guiding and directing the work of the designated biologists and biological monitors. Designated biologists will be responsible for directly overseeing and reporting the implementation of general and species-specific conservation measures. In some instances, Designated biologists will only be approved for specific species, in which case they will only be authorized to conduct surveys and implement measures for the species for which they have been approved. Species-specific biological monitors will be responsible for implementation of species-specific measures for the species for which they have been approved, and will report directly to a designated biologist. General biological monitors will report directly to a designated biologist or to the project

biologist. General biological monitors will be responsible for conducting worker environmental awareness program (WEAP) training, implementing general conservation measures, conducting general compliance monitoring, and reporting on compliance monitoring activities. When the Authority is specified as implementing an IAMF, it is assumed that the Authority, or its contractor or agent, is implementing the IAMF under the supervision of biologists and biological monitors, as appropriate.

BIO-IAMF#2: Facilitate Agency Access

Throughout the construction period, the Authority will allow access by the U.S. Environmental Protection Agency, USFWS, NMFS, U.S. Army Corps of Engineers (USACE), CDFW, State Water Resources Control Board (SWRCB), San Francisco Bay Conservation and Development Commission, and the San Francisco Bay Regional Water Quality Control Board to the project site. Because of safety concerns, all visitors will check in with the Authority's resident engineer prior to entering the project footprint. In the event that agency personnel visit the project footprint, the project biologist will prepare a memorandum within 3 business days after the visit documenting the issues raised during the field meeting. The project biologist will report any issues regarding regulatory compliance raised during visits by agency personnel to the Authority.

BIO-IAMF#3: Prepare WEAP Training Materials and Conduct Construction Period WEAP Training

Prior to any ground-disturbing activity, the project biologist will prepare a WEAP for the purpose of training construction crews to recognize and identify sensitive biological resources that may be encountered in the vicinity of the project footprint. The WEAP training materials will be submitted to the Authority for review and approval. A video of the WEAP training prepared and presented by the project biologist and approved by the Authority may be used if the project biologist is not available to present the training in person.

At a minimum, WEAP training materials will include the following information: the key provisions of the federal Endangered Species Act (FESA), the California Endangered Species Act (CESA), the Bald and Golden Eagle Protection Act (BGEPA), the Migratory Bird Treaty Act (MBTA), California Fish and Game Code Section 1600, Porter-Cologne Water Quality Control Act (Porter-Cologne Act), and the Clean Water Act (CWA); the consequences and penalties for violation or noncompliance with these laws and regulations and project authorizations; identification and characteristics of special-status plants, special-status wildlife, jurisdictional waters, and special-status plant communities and explanations about their ecological value; hazardous substance spill prevention and containment measures; the contact person in the event of the discovery of a dead or injured wildlife species; and review of avoidance, minimization, and mitigation measures.

The project biologist will present WEAP training to all construction personnel before they work in the project footprint. As part of the WEAP training, construction timing in relation to species' habitat and life-stage requirements will be detailed and discussed on project maps, which will show areas for planned minimization and avoidance measures. Crews will be informed during the WEAP training that, except when necessary as determined in consultation with the project biologist, travel within the project footprint is restricted to established roadbeds, which include all pre-existing and project-constructed unimproved and improved roads. A fact sheet conveying this information will be prepared by the project biologist for distribution to the construction crews and others who enter the project footprint. Fact sheet information will be duplicated in a wallet-sized format and will be provided in other languages as necessary to accommodate non-English-speaking workers. All construction staff will attend the WEAP training prior to beginning work on-site and will attend the WEAP training on an annual basis thereafter.

Upon completion of the WEAP training, each member of the construction crew will sign a form stating that they attended the training, understood the information presented, and agreed to comply with the requirements set out in the WEAP training. The project biologist will submit the signed WEAP training forms to the Authority on a monthly basis. On an annual basis, the Authority will certify that WEAP training had been provided to all construction personnel. On a

monthly basis, the project biologist will provide updates relevant to the training to construction personnel during the daily safety (“tailgate”) meeting.

BIO-IAMF#4: Conduct Operations and Maintenance Period WEAP Training

Prior to initiating operations and maintenance (O&M) activities, O&M personnel will attend a WEAP training session arranged by the Authority.

At a minimum, O&M WEAP training materials will include the following information: key provisions of the FESA, CESA, BGEPA, MBTA, California Fish and Game Code Section 1600, Porter-Cologne Act, and CWA; the consequences and penalties for violation or noncompliance with these laws and regulations and project authorizations; identification and characteristics of special-status plants, special-status wildlife, jurisdictional waters, and special-status plant communities and explanations about their ecological value; hazardous substance spill prevention and containment measures; and the contact person in the event of the discovery of a dead or injured wildlife species. In addition, the training will include an overview of provisions of the BRMP, annual vegetation, and management plan, weed control plan (WCP), and security fencing and wildlife exclusion fencing maintenance plans pertinent to O&M activities. A fact sheet prepared by the Authority environmental compliance staff will be prepared for distribution to the O&M employees. The training will be provided by the Authority environmental compliance staff. The training sessions will be provided to employees prior to their involvement in any O&M activity and will be repeated for all O&M employees on an annual basis. Upon completion of the WEAP training, O&M employees will, in writing, verify their attendance at the training sessions and confirm their willingness to comply with the requirements set out in those sessions.

BIO-IAMF#5: Prepare and Implement a Biological Resources Management Plan

Prior to any ground-disturbing activity, the project biologist will prepare the BRMP, which will include a compilation of the biological resources’ avoidance and minimization measures applicable to the HSR section. Project environmental plans, such as the restoration and revegetation plan (RRP) and WCP, will be included as appendices to the BRMP. The BRMP is intended to serve as a comprehensive document that sets out the range of avoidance and minimization measures to support the appropriate and timely implementation of those measures. The implementation of these measures will be tracked through final design, construction, and operation phases. The BRMP will contain, but not be limited to, the following information:

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

dust control measures, grading techniques, construction area limits, and biological monitoring requirements.

- Provisions for biological monitoring during ground-disturbing activities to confirm compliance and success of protective measures. The monitoring will: (1) identify specific locations of wildlife habitat and sensitive species to be monitored; (2) identify the frequency of monitoring and the monitoring methods (for each habitat and sensitive species to be monitored); (3) list required qualifications of biological monitor(s); (4) identify the reporting requirements; and (5) provide an accounting of impacts on special-status species habitat compared to pre-construction impact estimates.

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

BIO-IAMF#6: Establish Monofilament Restrictions

Prior to any ground-disturbing activity, the project biologist will verify that plastic monofilament netting (erosion control matting) or similar material is not being used as part of erosion control activities. The project biologist will identify acceptable material for such use, including: geomembranes, coconut coir matting, tackified hydroseeding compounds, and rice straw wattles (e.g., Earthsaver wattles: biodegradable, photodegradable, burlap). Within developed or urban areas, the project biologist may allow exceptions to the restrictions on the type of erosion control material if the project biologist determines that the construction area is of sufficient distance from natural areas to avoid potential impacts on wildlife.

BIO-IAMF#7: Prevent Entrapment in Construction Materials and Excavations

At the end of each work day during construction, the Authority will cover all excavated, steep-sided holes or trenches more than 8 inches deep and that have sidewalls steeper than 1:1 (45 degree) slope with plywood or similar materials, or provide a minimum of one escape ramp per 100 feet of trenching (with slopes no greater than 3:1) constructed of earth fill or wooden planks. The project biologist will thoroughly inspect holes and trenches for trapped animals at the start and end of each work day.

The Authority will screen, cover, or elevate at least 1 foot above ground, all construction pipe, culverts, or similar structures with a diameter of 3 inches or greater that are stored overnight within the project footprint. These pipes, culverts, and similar structures will be inspected by the project biologist for wildlife before such material is moved, buried, or capped.

BIO-IAMF#8: Delineate Equipment Staging Areas and Traffic Routes

Prior to any ground-disturbing activity, the Authority will establish staging areas for construction equipment in areas that minimize impacts on sensitive biological resources, including habitat for special-status species, seasonal wetlands, and wildlife movement corridors. Staging areas (including any temporary material storage areas) will be located in areas that will be occupied by permanent facilities, where practicable. Equipment staging areas will be identified on final project construction plans. The Authority will flag and mark access routes to restrict vehicle traffic within the project footprint to established roads, construction areas and other designated areas.

BIO-IAMF#9: Dispose of Construction Spoils and Waste

During ground-disturbing activities, the Authority may temporarily store excavated materials produced by construction activities in areas at or near construction sites within the project footprint. Where practicable, the Authority will return excavated soil to its original location to be used as backfill. Any excavated waste materials unsuitable for treatment and reuse will be disposed at an off-site location, in conformance with applicable state and federal laws.

BIO-IAMF#10: Clean Construction Equipment

Prior to any ground-disturbing activity, the Authority will check that all equipment entering the work area is free of mud and plant materials. The Authority will establish vehicle cleaning locations designed to isolate and contain organic materials and minimize opportunities for weeds

and invasive species to move in and out of the project footprint. Cleaning may be done by washing with water, blowing with compressed air, brushing, or other hand cleaning. The cleaning areas will be located to avoid impacts on surface waters and appropriate SWPPP BMPs will be implemented to further control any potential for the spread of weeds or other invasive species. Cleaning stations will be inspected regularly (at least monthly).

BIO-IAMF#11: Maintain Construction Sites and BMP Training

Prior to any ground-disturbing activity, the Authority will prepare a construction site BMP field manual. The manual will contain standard construction site housekeeping practices required to be implemented by construction personnel. The manual will identify BMPs for the following topics; temporary soil stabilization, temporary sediment control, wind erosion control, nonstormwater management, waste management and materials control, rodenticide use, and other general construction site cleanliness measures.

All construction personnel will receive training on BMP field manual implementation prior to working within the project footprint. All personnel will acknowledge, in writing, their understanding of the BMP field manual implementation requirements. The BMP field manual will be updated by January 31st of each year. The Authority will provide, on an annual basis, training updates to all construction personnel.

BIO-IAMF#12: Design the Project to be Bird Safe

Prior to final construction design, the Authority will ensure that the catenary system, masts, and other structures such as fencing, electric lines, communication towers and facilities are designed to be bird and raptor-safe in accordance with the applicable recommendations presented in *Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 2006* (Avian Power Line Interaction Committee [APLIC] 2006) and *Reducing Avian Collisions with Power Lines: State of the Art in 2012* (APLIC 2012). Applicable APLIC recommendations include, but are not limited to:

- Ensuring sufficient spacing of phase conductors to prevent bird electrocution
- Configuring lines to reduce vertical spread of lines and/or decreasing the span length if such options are feasible
- Marking lines and fences (e.g., Bird Flight Diverter for fencing and lines) to increase the visibility of lines and reduce the potential for collision. Where fencing is necessary, using bird-compatible design standards to increase visibility of fences to prevent collision and entanglement
- Installing perch guards to discourage avian presence on and near project facilities
- Minimizing the use of guywires. Where the use of guywires is unavoidable, demarcating guywires using the best available methods to minimize avian strikes (e.g., line markers).
- Reusing or co-locating new transmission facilities and other ancillary facilities with existing facilities and disturbed areas to minimize habitat impacts and avoid collision risks
- Structures will be monopole or dual-pole design versus lattice tower design to minimize perching and nesting opportunities. Communication towers will conform to *Recommended Best Practices for Communication Tower Design, Siting, Construction, Operation, Maintenance, and Decommissioning* (USFWS 2018).
- Use of facility lighting that does not attract birds or their prey to project sites. These include using non-steady burning lights (red, dual red and white strobe, strobe-like flashing lights) to meet Federal Aviation Administration requirements, using motion or heat sensors and switches to reduce the time when lights are illuminated, using appropriate shielding to reduce horizontal or skyward illumination, and avoiding the use of high-intensity lights (e.g., sodium vapor, quartz, halogen). Lighting will not be installed under viaduct and bridge structures in riparian habitat areas.

Additional bird operational actions will be required for dry lakes and playas, Audubon Important Bird Areas, and documented avian movement corridors. These measures include:

- Avoid, to the extent feasible, siting transmission lines across canyons or on ridgelines to prevent bird and raptor collisions.
- Install bird flight diverters on all facilities spanning or within 1,000 feet of stream and wash channels, canals, ponds, and any other natural or artificial body of water.
- Fencing or other type of flight diverter will be installed on all viaduct structures to encourage birds and raptors to fly over the HSR and avoid flying directly in the path of oncoming trains.
- Ensure poles do not have openings that could entrap birds. Measures may include sealing or capping all openings in poles or providing for escape routes (e.g., openings accommodating escape for various species).
- Design aerial structures (e.g., viaducts and bridges) and tunnel portals to discourage birds and bats from roosting in expansion joints or other crevices.

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

CUL-IAMF#2: WEAP Training Session

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

On completion of the WEAP training, construction crews will sign a form stating that they attended the training, understood the information presented, and will comply with the WEAP

requirements. The contractor’s archaeologist or architectural historian will submit the signed WEAP training forms to the mitigation manager on a monthly basis. On an annual basis, the contractor will provide the Authority with a letter indicating that regular WEAP training has been implemented and will provide at least one PowerPoint annually of the WEAP training. On a monthly basis, the contractor’s archaeologist or architectural historian will provide updates and synopsis of the training to workers during the daily safety (“tailgate”) meeting. Construction crews will be informed during the WEAP training that, to the extent possible, travel within the marked project site will be restricted to established roadbeds.

CUL-IAMF#3: Pre-Construction Cultural Resource Surveys

Prior to construction (any ground-disturbing activities in areas not yet surveyed) and the staging of materials and equipment, the contractor will conduct pre-construction cultural resource surveys. Resulting from lack of legal access, much of the construction footprint may not have been surveyed. Once parcels are accessible, the contractor will have archaeologists or architectural historians, as appropriate, who meet the SOI’s Professional Qualification Standards survey and complete appropriate reports for archaeological or historic built resources, in accordance with the documentation requirements stipulated in the Section 106 Programmatic Agreement. Identified resources will be evaluated for listing in the National Register of Historic Places (NRHP) and the California Register of Historical Resources (CRHR). The qualified archaeologist or architectural historian, as appropriate, will assess the project’s potential to affect historic properties (NRHP) by applying the effects criteria in 36 C.F.R. Section 800.5(a)(1). The project’s potential to cause significant impacts on historical resources (CRHR) will be analyzed by applying the criteria in CEQA Guidelines Section 15064.5(b). Should the Authority, in consultation with the State Historic Preservation Officer (SHPO), determine that any newly identified historic properties or historical resources will be adversely affected, the built environment treatment plan (BETP) or ATP will be amended to document the mitigation measures agreed upon by the Memorandum of Agreement (MOA) signatories. The schedule of these surveys will be dependent on the timing of obtaining legal access to the properties and may be driven by the need to complete construction-related activities (e.g., geotechnical borings, laydown yards). Prior to beginning surveys, updated records searches may be required by the Authority to validate that accurate information was obtained regarding previous inventory and evaluation efforts. The contractor’s archaeologist or architectural historian, in consultation with the Authority, will determine if an updated records search is required. If an updated records search is necessary, the search will be performed by the contractor’s archaeologist or architectural historian.

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 will delineate all of the applicable avoidance and protection measures as identified in the final treatment plans for identified archaeological and historic built resources on construction drawings prior to the start of construction.

Additionally, as the design progresses, the contractor will site project features such as communication towers or other rail infrastructure to avoid and protect identified archaeological and built historic properties and historical resources. The Authority will establish regular coordination meetings with the contractor’s qualified staff of archaeologists and architectural historians to ensure that the identified resources are avoided and the project designs have taken these resources into account.

CUL-IAMF#5: Archaeological Monitoring Plan and Implementation

Prior to construction the contractor’s professionally qualified archaeologist, as defined in the Section 106 Programmatic Agreement, will prepare a monitoring plan based on the results of geospatial data layer and archaeological sensitivity map and in accordance with the ATP to ensure that all protection measures and protocols for data recovery are followed. The plan is to be reviewed and approved by the Authority prior to any ground-disturbing activities and will

adhere to the *Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation*. During construction (any ground-disturbing activities) or staging of materials or equipment, the contractor will be responsible for implementing the monitoring plan and providing archaeological and tribal monitoring of ground-disturbing construction activities with a potential to affect archaeological remains in areas identified as archaeologically sensitive in the ATP. The contractor will obtain Authority approval of all persons providing archaeological or tribal monitoring.

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

Prior to construction (any ground-disturbing activities that are within 1,000 feet of a historic built resource), the contractor may be required to assess the condition of historic built resources adjacent to construction and prepare a Plan for the Protection of Historic Built Resources and Repair of Inadvertent Damage. The MOA and BETP will stipulate properties for which the plan is to be prepared. MOA signatories and consulting parties may comment on the adequacy of the assessments. Protection measures will be developed in consultation with the landowner or land-owning agencies as well as the SHPO and the MOA signatories and consulting parties, as required by the Section 106 Programmatic Agreement. As the design progresses, additional properties may be identified by the Authority as requiring this plan. The plan will record existing conditions to: (1) establish a baseline against which to compare the property's post-project condition, (2) identify structural deficiencies that make the property vulnerable to project construction-related damage, such as vibration, and (3) identify stabilization or other measures required to avoid or minimize inadvertent adverse effects. The plan will be further described in the BETP and be prepared by an interdisciplinary team, including (but not limited to) as appropriate, an architectural historian, architect, photographer, structural engineer, and acoustical engineer. Ambient conditions will be used to identify buildings that are sensitive receptors to construction-related vibration and require vibration monitoring during construction activities. Additional protective measures may be required if the property is vacant during construction.

The plan content will be outlined in the BETP and is to be completed and approved by the Authority, with protective measures implemented before construction begins within 1,000 feet of the subject property. The plan will 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 built resource. The plan will direct that inadvertent damage to historic built resources will be repaired in accordance with the SOI's Standards for the Treatment of Historic Properties (U.S. Department of the Interior 1995). The plan will be developed in coordination with the Authority, and it will be submitted to the SHPO for review and approval. Protective plans will be required for buildings that will 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 built resource), the contractor will prepare a built environment monitoring plan (BEMP). The BEMPs will be prepared describing the properties that will require monitoring, the type of activities or resources that will require full-time monitoring or spot checks, the required number of monitors for each construction activity, and the parameters that will influence the level of effort for monitoring. Maximum vibration level thresholds may be established in the Plan for Protection of Historic Resources and Repair of Inadvertent Damage. Monitoring maximum vibration thresholds will be included in the BEMP. The BETP will outline the process for corrective action should the protection measures prove ineffective. Consultation procedures will also be defined in the BETP. The contractor will develop both the draft and final plans in coordination with the Authority and will submit the BETP to the SHPO for review and approval. The plan will be implemented prior to any ground-disturbing activities within 1,000 feet of properties identified as requiring monitoring, as specified in the BETP.

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

The contractor will implement the measures described in the Plan for Protection of Historic Resources and Repair of Inadvertent Damage and in the BETP. Such protection measures will include, but will not be limited to, vibration monitoring of construction in the vicinity of historic built resources; cordoning off of resources from construction activities (e.g., traffic, equipment storage, personnel); shielding of resources from dust or debris; and stabilization of buildings and structures adjacent to construction. The monitoring measures described in the BEMP will ensure that protection measures are in place before construction begins. Additionally, monitoring during construction will verify that the protection measures are effective. For resources requiring vibration monitoring, the monitor will be responsible for setting up on-site vibration monitoring devices at the approximate location of the construction site; monitoring vibration levels, issuing a temporary work stoppage if maximum vibration level thresholds are reached; implementing the procedures outlined in a vibration monitoring and control plan if construction activities result in vibration exceedances or an unanticipated impact occurs; reporting to the Authority any concerns or issues related to the historic built resources within the APE that may require further investigation; and documenting monitoring activities in a daily log and summarizing these activities in a monthly report. The contractor will submit the monitoring logs and monthly reports to the Authority as they are completed.

Temporary stabilization and protection measures will be removed after construction is complete, and the historic built resources will be restored to their pre-construction condition. For buildings that will be moved, treatment will include stabilization before, during, and after relocation; protection during temporary storage; and relocation to a new site, followed by rehabilitation.

Electromagnetic Fields and Electromagnetic Interference

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

Technical Memorandum: CHSTP Implementation Stage EMC Program Plan (ISEP) (TM 3.00.10) (Authority 2014b) requires coordination with adjacent railroads. During project design, the contractor will work with the engineering departments of railroads that operate parallel the HSR to apply current standard design practices to prevent interference with the electronic equipment operated by these railroads. The *California High-Speed Rail Authority Design Criteria Manual (HSR Design Criteria Manual) (Authority 2019) Chapter 7, Electromagnetic Compatibility*, summarizes the specific design standards listed in Section 7.1.2, Regulations, Codes, Standards, and Guidelines, include the following: California Public Utilities Commission Decisions 93-11-013 and 06-01-042, American Public Transportation Association (APTA) Standard PR-E-S-010-98, and Institute of Electrical and Electronics Engineers Std C95.1, C95.6 and 1143.

Prior to O&M of each operating segment, the contractor will certify through issuance of a technical memorandum to the Authority that design provisions to prevent interference have been established and have been determined to be effective prior to the activation of potentially interfering systems of the HSR.

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

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

Prior to construction, the contractor will prepare an EMF/EMI technical memorandum for review and approval by the Authority. The project will adhere to and comply with applicable federal and state laws and regulations. These guidelines are listed in Chapter 7, Electromagnetic Compatibility, of the HSR Design Criteria Manual, and include the following: California Public Utilities Commission Decisions 93-11-013 and 06-01-042, APTA Standard PR-E-S-010-98, and Institute of Electrical and Electronics Engineers Std C95.1, C95.6 and 1143. The project design

will follow ISEP (TM 300.10) (Authority 2014b), and the current HSR Design Criteria Manual Chapter 7, which provides detailed electromagnetic compatibility (EMC) design criteria for the HSR systems and equipment, and Chapter 13, Grounding and Bonding, which addresses grounding requirements for third-party metallic items on utility support structures, pipework, metallic casings, public network grounding systems, fences and fence segments, other facilities utility lines, which are adjacent and crossing under and over tracks 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 will perform EMC safety analyses, which will include identification of existing nearby radio systems, design of systems to prevent EMI with identified neighboring uses, and incorporation of these design requirements into bid specifications used to procure radio systems.
- Pipelines and other linear metallic objects that are not sufficiently grounded through direct contact with earth will be separately grounded in coordination with the affected owner or utility to avoid possible shock hazards. For cases where metallic fences are purposely electrified to inhibit livestock or wildlife from traversing the barrier, specific insulation design measures will be implemented.
- HSR standard corrosion protection measures will be implemented to eliminate risk of substantial corrosion of nearby metal objects.

Geologic Resources

GEO-IAMF#1: Geologic Hazards

Prior to construction, the contractor will prepare a CMP addressing how the contractor will address geologic constraints and minimize or avoid impacts related to geologic hazards during construction. This geologic hazard risk minimization plan will be submitted to the Authority for review and approval. The plan will address the following geological and geotechnical constraints/resources, with reference to the specific underlying standards set forth in the guidance and other manuals detailed in GEO-IAMF#10:

- a. Groundwater withdrawal. Controlling the amount of groundwater withdrawal from the project, by re-injecting groundwater at specific locations if necessary, or using 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.
- b. Unstable soils. Employing various methods to mitigate for the risk of ground failure from unstable soils. If soft or loose soils are encountered at shallow depths, they can be excavated and replaced with competent soils. To limit the excavation depth, replacement materials can also be strengthened using geosynthetics. Where unsuitable soils are deeper, ground improvement methods, such as stone columns, cement deep-soil-mixing, or jet-grouting, can be used. Alternatively, if sufficient construction time is available, preloading—in combination with prefabricated vertical drains (wicks) and staged construction—can be used to gradually improve the strength of the soil without causing bearing-capacity failures.
- c. Subsidence. The Authority addresses subsidence in its design and construction processes. For the initial design, survey monuments were installed to establish a datum and set an initial track profile. In the construction phase, the design-build contractors for railbed preparation will conduct topographic surveys for preparation of final design. Because subsidence could have occurred since the original benchmarks (survey monuments) were established, the design-build contractor's topographic surveys will be used to help determine whether subsidence has occurred. The updated topographic surveys will also be used to establish the top of rail elevations for final design where the HSR system is outside established floodplain areas and above water surface elevations. Where the HSR system is in floodplain areas susceptible to flooding, consideration is being given to overbuild the height of the railbed in anticipation of future subsidence.

- d. Water and wind erosion. The contractor will implement erosion control methods as appropriate from the various erosion control methods documented in the construction SWPPP (see HYD-IAMF#3), the California Department of Transportation (Caltrans) Construction Manuals, and the construction technical memorandum (see GEO-IAMF#6), and in coordination with other erosion, sediment, stormwater management and fugitive dust control efforts. Water and wind erosion control methods may include, but are not limited to, use of revegetation, stabilizers, mulches, and biodegradable geotextiles.
- e. Soils with shrink-swell potential. In locations where shrink-swell potential is marginally unacceptable, soil additives will be mixed with existing soil to reduce the shrink-swell potential. Construction specifications will be based upon the decision whether to remove or treat the soil. This decision is based on the soils, specific shrink-swell characteristics, the additional costs for treatment versus excavation and replacement, as well as the long-term performance characteristics of the treated soil.
- f. Soils with corrosive potential. In locations where soils have a potential to be corrosive to steel and concrete, the soils will be removed and buried structures will be designed for corrosive conditions, and corrosion-protected materials will be used in infrastructure.

GEO-IAMF#2: Slope Monitoring

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

GEO-IAMF#3: Gas Monitoring

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

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

GEO-IAMF#5: Hazardous Minerals

Prior to construction, the contractor will prepare a CMP addressing how the contractor will minimize or avoid impacts related to hazardous minerals (i.e., radon, mercury, naturally occurring asbestos) during construction. The CMP will be submitted to the Authority for review and approval. The CMP will include appropriate provisions federal and state instructions and guidelines 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.

GEO-IAMF#6: Ground Rupture Early Warning Systems

Prior to construction, the contractor will document how the project design incorporates installation of early warning systems, triggered by strong ground motion association with ground rupture. All known nearby active faults will be monitored. Linear monitoring systems such as time domain reflectometers or similar technology will be installed along rail lines in the zone of potential ground rupture. These devices emit electronic information that is processed in a centralized location and

will be used to temporarily control trains, thus reducing accidents due to fault creep. Damage to infrastructure from fault creep can be mitigated with routine maintenance including minor realignment.

GEO-IAMF#7: Evaluate and Design for Large Seismic Ground Shaking

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

GEO-IAMF#8: Suspension of Operations during an Earthquake

Prior to O&M activities, the contractor will document in a technical memorandum how suspension of operations during or after an earthquake was addressed in project design. Motion-sensing instruments to provide ground motion data and a control system to shut down HSR operations temporarily during or after a potentially damaging earthquake will be incorporated into final design. Monitoring equipment will be installed at select locations where high ground motions could occur. The system will then be inspected for damage due to ground motion and/or ground deformation, and then returned to service when appropriate.

GEO-IAMF#9: Subsidence Monitoring

Prior to O&M, the Authority will develop a stringent track monitoring program. Once tracks are operational, a remote monitoring program will be implemented to monitor the effects of ongoing subsidence. Track inspection systems will provide early warning of reduced track integrity. HSR trainsets will be equipped with autonomous equipment for daily track surveys. This specification will be added to HSR train bid packages. If monitoring indicates that track tolerances are not met, trains will operate at reduced speeds until track tolerances are restored. In addition, the contractor responsible for wayside maintenance will be required to implement a stringent program for track maintenance.

GEO-IAMF#10: Geology and Soils

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

- 2015 American Association of State Highway and Transportation Officials (AASHTO) *Load and Resistance Factor Bridge Design Specifications* and the 2015 AASHTO *Guide Specifications for Load and Resistance Factor Seismic Bridge Design* (AASHTO 2015a, 2015b) or their most recent versions. These documents provide guidance for characterization of soils, as well as methods to be used in the design of bridge foundations and structures, retaining walls, and buried structures. These design specifications will provide minimum specifications for evaluating the seismic response of the soil and structures will provide minimum specifications for evaluating the seismic response of the soil and structures.
- Federal Highway Administration (FHWA) Circulars and Reference Manuals. These documents provide detailed geotechnical guidance. Methods to characterize geotechnical conditions at sites is found in Chapter 6, Geotechnical, of *Federal Highway Lands, Project Development and Design Manual* (PDDM) (FHWA 2017). Methods for performing foundation design and recommendations on foundation construction are found in Chapter 10, Structural Design, of the PDDM. 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. The FHWA *Geotechnical Technical Guidance Manual* (FHWA 2007) supports the policies, standards and standard practices presented in Chapter 6 of the PDDM. Additionally, it provides guidance for activities where standards and standard practices do not exist, and it provides access to and guidance for the use of new technologies.

- 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 2015 International Building Code (IBC). This code contains general building design and construction requirements relating to fire and life safety, structural safety, and access compliance. Geologic and soils hazards are discussed in Chapter 16, Structural Design, and Chapter 18, Soils and Foundations, of the 2019 California Building Code, Title 24, Part 2 (Volumes 1 & 2) with a January 2020 Errata (iccsafe.org).
- IBC and American Society of Civil Engineers (ASCE)-7. These codes and standards will be used for the design of the maintenance facilities and stations. Sections in IBC and ASCE-7 provide minimum requirements for geotechnical investigations, levels of earthquake ground shaking, minimum standards for structural design, and inspection and testing requirements.
- 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 (Caltrans 2021a), for design of mechanically stabilized earth walls used for retained fills (Caltrans 2021b), and for design of various types of cantilever (e.g., soldier pile, secant pile, and tangent pile) (Caltrans 2021c), and tie-back walls used for retained cuts (Caltrans 2021d).
- Caltrans Construction Manuals. Caltrans has a number of construction manuals that will be followed addressing geology and soils conditions. These include the: *Field Guide to Construction Dewatering* (Caltrans 2014), *Caltrans Construction Site Best Management Practices (BMP) Manual* (Caltrans 2017a), and *Construction Site Best Management Practice (BMP) Field Manual and Troubleshooting Guide* (Caltrans 2003). BMPs for dewatering options and management are discussed in Section 1.2 of the *Field Guide to Construction Dewatering*, erosion control and soil stabilization are discussed in Section 3-5 of the *Caltrans Construction Site Best Management Process Manual*, nonstormwater management is discussed in Section 7 of the *Caltrans Construction Site Best Management Practices Manual*, and waste management at construction sites is discussed in Section 8 of the *Caltrans Construction Site Best Management Practices*.
- 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#11: Engage a Qualified Paleontological Resources Specialist

Prior to the 90 percent design milestone for each construction package¹ (CP) within the Project Section, the contractor will retain a paleontological resources specialist (PRS) responsible for:

- Reviewing the final design for the CP.

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.

- Developing a detailed Paleontological Resources Monitoring and Mitigation Plan (PRMMP) for the CP.
- Implementing the PRMMP, including development and delivery of WEAP Training, supervision of paleontological resource monitors (PRM), evaluation and treatment of finds, if any, and preparation of a final paleontological mitigation report, per the PRMMP and for each CP.

Retention of PRS staff will occur in a timely manner, in advance of the 90 percent design milestone for each CP, such that the PRS is on board and can review the 90 percent design submittal without delay when it becomes available. If feasible, the same PRS will be responsible for all CPs within a given Project Section.

All PRS staff will meet or exceed the qualifications for a Principal Paleontologist as defined in Caltrans' current *Standard Environmental Reference*, Chapter 8 (Caltrans 2017b) will be subject to review and approval by the Authority.

GEO-IAMF#12: Perform Final Design Review and Triggers Evaluation

For each CP within the Project Section, the responsible PRS will evaluate the 90 percent design submittal to identify the portions of the CP that will involve work in paleontologically sensitive geologic units (either at the surface or in the subsurface), based on findings of the final paleontological resources technical report prepared for the Project Section. Evaluation will consider the location, areal extent, and anticipated depth of ground disturbance, the construction techniques that are planned/proposed, and the geology (i.e., location of geologic units with high paleontological resources) of the CP and vicinity. The evaluation and resulting recommendations will 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 Standard Procedures) (SVP 2010), the *SVP Conditions of Receivership for Paleontologic Salvage Collections* (SVP Conditions of Receivership) (SVP 1996), and relevant guidance from Chapter 8 of the current Caltrans *Standard Environmental Reference* (Caltrans 2017b).

The purpose of the Final Design Review and Triggers Evaluation will be to develop specific language detailing the location and duration of paleontological monitoring and other requirements for paleontological resources applicable to each CP within the Project Section. Paleontological protection requirements identified through the Final Design Review and Triggers Evaluation will be recorded in a concise technical memorandum (Final Design Review Requirements for Paleontological Resources Protection), which will then be incorporated in full detail into the PRMMP for each CP. Those portions of the CP requiring paleontological monitoring will also be clearly delineated in the project construction documents for each CP.

GEO-IAMF#13: Prepare and Implement Paleontological Resources Monitoring and Mitigation Plan (PRMMP)

Following the Final Design Review and Triggers Evaluation for each CP, the PRS will develop a CP-specific PRMMP. For greater efficiency, PRMMPs may be written such that they cover more than one CP, as long as the specific requirements of the IAMF's are satisfied explicitly and in detail for each CP included.

The PRMMP for each CP will incorporate the findings of the Design Review and Triggers Evaluation for that CP and will be consistent with the SVP Standard Procedures (SVP 2010), the SVP Conditions of Receivership (SVP Conformable Impact Mitigation Guidelines Committee 1996), and relevant guidance from Chapter 8 of the current Caltrans *Standard Environmental Reference* (Caltrans 2017b). As such, the PRMMP will provide for at least the following:

- Implementation of the PRMMP by qualified personnel, including the following positions:
 - PRS – The PRS will be required to meet or exceed Principal Paleontologist qualifications per Chapter 8 of the current *Caltrans Standard Environmental Reference* (Caltrans 2017b). The supervising paleontologist may, but not necessarily, be the PRS who prepares the PRMMP.

- PRMs – The PRS will be required to meet or exceed Paleontological Monitor qualifications per Chapter 8 of the current Caltrans *Standard Environmental Reference* (Caltrans 2017b).
- Development of pre-construction and construction-period coordination procedures and communications protocols.
- Evaluation as to whether a pre-construction survey by qualified personnel is warranted for the CP. In general, pre-construction surveys are beneficial if there is a strong possibility that significant paleontological resources (e.g., concentrations of vertebrate fossils) are exposed at the ground surface and would be destroyed during the initial clearing and grubbing phase of earthwork. Such a determination can usually be made during preparation of the paleontological resources technical report.
- Requirements for paleontological monitoring by qualified PRMs of all ground-disturbance activities known to affect, or potentially affect, highly sensitive geologic units and for ground-disturbance activities affecting other geologic units in any areas where the PRS considers it warranted based on the findings of the paleontological resources technical report or any pre-construction surveys. In all areas of the CP subject to monitoring, monitoring will initially be conducted full-time for all ground-disturbance activities. However, the PRMMP may provide for monitoring frequency in any given location to be reduced once approximately 50 percent of the ground-disturbance activity in completed locations, if the reduction is appropriate based on the implementing PRS's professional judgment in consideration of actual site conditions.
- Provisions, if recommended by the PRS for paleontological monitoring of specific construction drilling operations. In general, small-diameter (i.e., <18 inches) drilling operations or drilling operations using bucket augers tend to pulverize impacted sediments and any contained fossils and are typically not monitored. The section in the PRMMP addressing monitoring for drilling operations will rely, in part, on the information supplied by the CP design and geotechnical teams, but will also take into consideration the nature, depth, and location of drilling needed, and the anticipated equipment and staging configurations.
- Provisions for the content development and delivery of paleontological resources WEAP training.
- Provisions for in-progress documentation of monitoring (and, if applicable, salvage/recovery operations) via "construction dailies" or a similar approved means.
- Provisions for a "stop work, evaluate, and treat appropriately" response in the event of a known or potential paleontological discovery, including finds in highly sensitive geologic units as well as finds, if any, in geologic units identified as less sensitive, or non-sensitive, for paleontological resources.
- Provisions for sampling and recovery of unearthed fossils consistent with SVP Standard Procedures (SVP 2010) and the SVP Conditions of Receivership (SVP 1996). Recovery procedures will provide for recovery of both macrofossils and microfossils.
- Provisions for acquiring a repository agreement from an approved regional repository for the curation, care, and storage of recovered materials, consistent with the SVP *Conditions of Receivership* (SVP 1996). If more than one repository institution is designated, separate repository agreements must be provided.
- Provisions for preparation of a final monitoring and mitigation report that meets the requirements of the Caltrans *Standard Environmental Reference* Chapter 8 provisions for the Paleontological Monitoring Report and Paleontological Stewardship Summary (Caltrans 2017b).
- Provisions for the preparation, identification, and analysis and curation of fossil specimens and data recovered, consistent with the SVP Conditions of Receivership (SVP 1996) and any specific requirements of the designated repository institution(s).

GEO-IAMF#14: Provide WEAP Training for Paleontological Resources

Prior to groundbreaking for each CP within the Project Section, the contractor will provide paleontological resources WEAP training delivered by the PRS. All management and supervisory personnel and construction workers involved with ground-disturbing activities will be required to take this training before beginning work on the project. Refresher training will also be made available to management and supervisory personnel and workers as needed, based on the judgment of the PRS.

At a minimum, paleontological resources WEAP training will include information on:

- Coordination between construction staff and paleontological staff
- Construction and paleontological staff roles and responsibilities in implementing the PRMMP
- Possibility of encountering fossils during construction
- 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 in the vicinity of 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 will 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 will require workers to sign a form stating that they attended the training and understand and will comply with the information presented. Verification of paleontological resources WEAP training will be provided to the Authority by the contractor.

GEO-IAMF#15: Halt Construction, Evaluate, and Treat if Paleontological Resources Are Found

Consistent with the PRMMP if fossil materials are discovered during construction, regardless of the individual making the discovery, all activity in the immediate vicinity of the discovery will halt and the find will be protected from further disturbance. If the discovery is made by someone other than the PRS or PRM(s), the person who made the discovery will immediately notify construction supervisory personnel, who will in turn notify the PRS. Notification to the PRS will take place promptly (prior to the close of work the same day as the find), and the PRS will evaluate the find and prescribe appropriate treatment as soon as feasible. Work may continue on other portions of the CP while evaluation (and, if needed, treatment) takes place, as long as the find can be adequately protected in the judgment of the PRS.

If the PRS determines that treatment (i.e., recovery and documentation of unearthed fossils) is warranted, such treatment, and any required reporting, will proceed consistent with the PRMMP. The contractor will be responsible for ensuring prompt and accurate implementation, subject to verification by the Authority.

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

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

Hazardous Materials and Waste

HMW-IAMF#1: Property Acquisition Phase I and Phase II Environmental Site Assessments

During the right-of-way acquisition phase, Phase I environmental site assessments (ESA) will be conducted in accordance with standard ASTM methodologies per ASTM E 1527-13 to characterize each parcel. The determination of parcels that require a Phase II ESA (e.g., soil, groundwater, soil vapor subsurface investigations) will be informed by a Phase I ESA and may require coordination with state and local agency officials per ASTM E 1903-19. If the Phase II ESA concludes that the site is affected, remediation or corrective action (e.g., removal of contamination, in-situ treatment, or soil capping) will be conducted with state and local agency officials (as necessary) and in full compliance with applicable state and federal laws and regulations.

HMW-IAMF#2: Landfill

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

HMW-IAMF#3: Work Barriers

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

HMW-IAMF#4: Undocumented Contamination

Prior to construction, the contractor will prepare a CMP addressing provisions for the disturbance of undocumented contamination. The plan will be submitted to the Authority for review and approval. Undocumented contamination could be encountered during construction activities. Upon discovery of undocumented contamination, the contractor will contact the local Regional Water Quality Control Board (RWQCB) and the DTSC. The contractor will work with the RWQCB and DTSC to provide information on the contamination and to establish requirements for investigating the extent of the contamination and remediate it as necessary. The contractor will notify the Authority of the discovery of any undocumented contamination within 24 hours, and will provide a copy of all documentation pertaining to the investigation, remediation, and disposal of the contamination to the Authority within 30 days of completion of the incident.

HMW-IAMF#5: Demolition Plans

Prior to construction that involves demolition, the contractor will prepare demolition plans for the safe dismantling and removal of building components and debris. The demolition plans will include a plan for lead and asbestos abatement. The plans will be submitted to the project construction manager on behalf of the Authority for verification that appropriate demolition practices have been followed consistent with federal and state regulation regarding asbestos and lead paint abatement (e.g., 8 California Code of Regulations §§ 1529, 1532.1; National Emission Standards for Hazardous Air Pollutants [40 C.F.R. Part 61, Subpart M, Section 145]; Resource Conservation and Recovery Act [40 C.F.R. Part 261]; and 40 C.F.R. Part 745).

HMW-IAMF#6: Spill Prevention

Prior to construction (any ground-disturbing activities), the contractor will prepare a CMP addressing spill prevention. A spill prevention, control, and countermeasure plan (SPCCP) (or soil prevention and response plan if the total aboveground oil storage capacity is less than 1,320 gallons in storage containers greater than or equal to 55 gallons) will prescribe BMPs to prevent

hazardous material releases and clean-up of any hazardous material releases that may occur. Example BMPs would be: all containers are to remain tightly covered unless removing contents/adding to them; drums and other containers are not to be stacked; all containers with liquids are to have secondary containment; a spill response/containment kit is to be available in the area where the hazardous materials are stored. The plans will be prepared and submitted to the project construction manager on behalf of the Authority and will be implemented during construction.

HMW-IAMF#7: Transport of Materials

During construction, the contractor will comply with applicable state and federal regulations, such as the Resource Conservation and Recovery Act (40 C.F.R. Part 263), Comprehensive Environmental Response, Compensation, and Liability Act (42 United States Code Chapter 103), the Hazardous Materials Release Response Plans and Inventory Law (California Health and Safety Code § 6.95), and the Hazardous Waste Control Act (22 California Code of Regulations § 4.5). Prior to construction the contractor will provide the Authority with a hazardous materials and waste plan describing responsible parties and procedures for hazardous waste and hazardous materials transport.

HMW-IAMF#8: Permit Conditions

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

HMW-IAMF#9: Environmental Management System

The Authority is committed to identifying, avoiding, and minimizing hazardous substances in the material selection process for construction, operation, and maintenance of the HSR system. The Authority will use an Environmental Management System to describe the process that will be used to evaluate the full inventory of hazardous materials as defined by federal and state law employed on an annual basis and will replace hazardous substances with nonhazardous materials to the extent that appropriate substituting materials are available. The contractor will implement the material substitution recommendation contained in the annual inventory.

HMW-IAMF#10 Hazardous Materials Plans

Prior to O&M activities, the Authority will prepare hazardous materials monitoring plans. These will use as a basis source, such as a hazardous materials business plan as defined in Title 19 California Code of Regulations and an SPCCP.

Hydrology and Water Resources

HYD-IAMF#1: Stormwater Management

Prior to construction, the contractor will prepare a stormwater management and treatment plan in compliance with municipal separate storm sewer systems and construction stormwater general permits, issued by the SWRCB for review and approval by the Authority. During the detailed design phase, each receiving stormwater system's capacity to accommodate project runoff will be evaluated. As necessary, on-site stormwater BMPs, such as detention or selected upgrades to the receiving system, will be designed to provide adequate capacity and to comply with the design standards in the latest version of Authority Technical Memorandum 2.6.5 *Hydraulics and Hydrology Guidelines* (Authority 2011a), HSR Design Criteria Manual, *Caltrans Stormwater Quality Handbook: Project Planning and Design Guide* (Caltrans 2017d), and the requirements stated in the applicable state and local National Pollutant Discharge Elimination System (NPDES) permits and guidelines. On-site stormwater management treatment BMPs will be designed and built 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. These treatment BMPs will include measures to incorporate permeable surfaces into facility design plans where feasible, and how treated stormwater will be retained or detained on-site. Other BMPs will include strategies to manage the amount and quality of overall stormwater runoff. The design will prioritize low-impact development techniques, as referenced in the *Caltrans Project Planning* and the local NPDES guidelines as applicable, will be used to detain runoff on-site and to reduce off-site runoff. Low-impact development techniques will be used, where appropriate and include but are not limited to constructed wetland systems, biofiltration and bioretention systems, wet ponds, and vegetated systems (biofilters), such as vegetated swales and grass filter strips. The stormwater management and treatment plan will also address hydromodification such that pre-project hydrology is maintained. Hydromodification design measures will include incorporating on-site retention of stormwater runoff by using flow dispersion, infiltration, and evaporation (supplemented by detention where required). Additional flow control measures will be implemented where local regulations or drainage requirements dictate.

HYD-IAMF#2: Flood Protection

Prior to construction, the contractor will prepare a flood protection plan for Authority review and approval. The flood protection plan will be prepared to ensure that the project is designed both to remain operational during flood events and to minimize increases in 100-year or 200-year flood elevations, as applicable to locale. The contractor will be responsible for implementation of the design standards as presented in the flood protection plan. Design standards, as itemized in the flood protection plan, will 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 will not increase by more than 1 foot, or as required by state or local agencies, during the 100-year or 200-year flood flow [as applicable to locale]. Avoid placement of facilities in the floodplain or raise the ground with fill above the base-flood elevation.
- Design the floodplain crossings to maintain a 100-year floodwater surface elevation of no greater than 1 foot above current levels, or as required by state or local agencies, and project features within the floodway itself will not increase existing 100-year floodwater surface elevations in Federal Emergency Management Agency–designated floodways, or as otherwise agreed upon with the local county flood control district.

The following design standards will 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, complimented with native riparian plantings or other natural stabilization alternatives that will restore and maintain a natural riparian corridor.
- Place bedding materials under the stone protection at locations where the underlying soils require stabilization as a result of stream-flow velocity.

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

Prior to construction (i.e., any ground-disturbing activities), the contractor's fully trained and certified Qualified SWPPP Developer will prepare a site-specific SWPPP that complies with the California General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities (Construction General Permit) (NPDES No. CAS000002) issued by the SWRCB. The contractor will submit the following permit registration documents to the Authority for review and approval:

- Site-specific SWPPP
- Risk assessment determination
- Site map

The site map will include all the features referenced in Appendix B of the Construction General Permit. No ground disturbance activity shall commence until a waste discharge identification number is issued by the SWRCB. Until a new order is adopted and becomes effective, the contractor will comply with Construction General Permit Order No. 2009-0009-DWQ as listed in the SWRCB's stormwater website at:

https://www.waterboards.ca.gov/water_issues/programs/stormwater/constpermits.html.

The site-specific SWPPP shall identify BMPs that will be implemented to reduce or eliminate pollutants in stormwater and authorize nonstormwater discharges. The site-specific SWPPP will include water pollution control drawings that clearly present BMPs that will be implemented during each construction phase. For affected stream crossings, the site-specific SWPPP will identify BMPs that will be implemented for stream diversions. If dewatering is required, the site specific SWPPP will describe, list, and comply with applicable local and RWQCB permits for dewatering. Based on the potential pollutant sources, the site-specific SWPPP will identify and implement BMPs in the following categories to reduce or eliminate pollutant discharges from the site:

- Erosion controls
- Sediment controls
- Nonstormwater management
- Materials management
- Waste management

Furthermore, site-specific SWPPP will include, but is not limited to, the following measures to address water pollution control:

- Implement practices to minimize the contact of construction materials, equipment, and maintenance supplies with stormwater.
- Identify and eliminate, control, or treat nonstormwater discharges.
- Limit fueling and other activities using hazardous materials to areas at least 50 feet from surface water, provide drip pans under equipment, and perform daily checks for vehicle condition.
- Implement practices to reduce erosion of exposed soil, including preserving existing vegetation, soil stabilization with erosion control blankets, soil binders, and/or hydraulic mulch; watering for dust control per the opacity limits referenced in the local air quality management district permit; installing linear sediment controls along the toe of the slope, face of the slope, and at the grade breaks of exposed slopes to comply with flow lengths referenced in the Construction General Permit; and providing effective soil cover for inactive areas, all finished slopes, and completed lots.
- Implement practices to control sediment by designing catchment basins per the California Stormwater Quality Association Construction BMP Guidance Handbook; installing inlet protection; stabilizing construction entrances and exits; installing and maintaining linear

sediment controls along the perimeter of the construction area; and inspecting all immediate access roads daily.

- Implement the following measures to maintain current water quality: effective site management “housekeeping”, nonstormwater management erosion control, sediment controls, and run-on and runoff controls.
- Where feasible, avoid areas that may have substantial erosion risk, including areas with erosive soils and steep slopes.
- Use diversion ditches to intercept surface runoff from off-site.
- Where feasible, limit construction to dry periods when flows in aquatic resources are low or absent.
- Implement waste management practices to collect and provide proper off-site, commercially available disposal service of concrete wash water.
- Allow isolation of runoff from fresh concrete during curing to prevent it from reaching the local drainage system.
- Develop and implement a spill prevention and emergency response plan to manage and contain potential fuel and/or hazardous material spills.
- Dispose excess drilling mud and cuttings to a landfill specifically permitted to receive these materials. No on-site disposal will be allowed.
- Manage hazardous material waste such as asbestos concrete pipe, contaminated soil, and treated wood by accumulating wastes in closed containers and storing it within secondary containment areas. The contractor will not mix hazardous waste. All hazardous waste will be managed in compliance with federal, state, and local laws regarding storage, handling, transportation and disposal.

Implementation of the site-specific SWPPP will be performed by the contractor’s fully trained and certified Qualified SWPPP Practitioner (QSP). As part of the QSP’s responsibility, the effectiveness of construction BMPs will be visually monitored at least once a week and before, during, and after rain events. Records of these inspections and visual monitoring results will be summarized on the project’s Stormwater Multiple Application and Report Tracking System online database. The local RWQCB will have the opportunity to review the project’s records on this account. Furthermore, paper or electronic records or documents required by the site-specific SWPPP will be available at the site until construction is complete.

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

Prior to construction of any facility classified as an industrial facility, the contractor will comply with existing industrial stormwater quality regulations. The general permit for stormwater discharges associated with industrial activities, NPDES No. CAS000001, requires preparation of an industrial 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. The industrial SWPPP will describe the facility functions, treatment BMPs, operations BMPs, inspection and monitoring activities, and recordkeeping that will be implemented during the facility operations as they pertain specifically to stormwater. The SWPPP will be designed to:

1. Protect existing water quality and comply with the industrial NPDES permit.
2. Identify activities that have the potential to cause surface water or groundwater contamination and the BMPs required to reduce, eliminate, or prevent contamination.

The contractor will provide a fully trained and certified Qualified Industrial Storm Water Practitioner to assist with compliance and implementation of this permit.

Station Planning, Land Use, and Development

LU-IAMF#1: HSR Station Area Development: General Principles and Guidelines

Prior to O&M, the Authority will prepare a memorandum for each station describing how the Authority's station area development principles and guidelines are applied to achieve the anticipated benefits of station area development. Refer to *HST Station Area Development: General Principles and Guidelines* (Authority 2011b).

LU-IAMF#2: Station Area Planning and Local Agency Coordination

Prior to O&M, the Authority will prepare a memorandum for each station describing the local agency coordination and station area planning conducted to prepare the station area for HSR operations. Refer to *HST Station Area Development: General Principles and Guidelines* (Authority 2011b).

LU-IAMF#3: Restoration of Land Used Temporarily during Construction

Prior to any ground-disturbing activities at the site of land to be used temporarily during construction, the contractor will prepare a restoration plan addressing specific actions, sequence of implementation, and parties responsible for implementation and successful achievement of restoration for temporary impacts. Before beginning construction use of land, the contractor will submit the restoration plan to the Authority for review and obtain Authority approval. The restoration plan will include time-stamped photodocumentation of the pre-construction conditions of all temporary staging areas. All construction access, mobilization, material laydown, and staging areas will be returned to a condition equal to the pre-construction staging condition. This requirement is included in the design-build construction contract requirements.

Noise and Vibration

NV-IAMF#1: Noise and Vibration

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

- Construct noise barriers, such as temporary walls or piles on excavated material, between noisy activities and noise-sensitive resources.
- Route truck traffic away from residential streets, when possible.
- Construct walled enclosures around especially noisy activities or around clusters or noise equipment.
- Combine noisy operations so that they occur in the same period.
- Phase demolition, earthmoving, and ground impacting operations so they do not occur in the same time 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 will prepare and submit to the Authority a technical memorandum that identifies project design features to minimize construction impacts on parks,

recreation, and open space. Typical design measures to avoid or minimize impacts on parks and recreation may include:

- Provide safe and attractive access for present travel modes (e.g., motorists, bicyclists, pedestrians—as applicable) to existing park and recreation facilities.
- Design guideway, system, and station features in such a way as to enhance the surrounding local communities. Provide easy crossings of the guideway that allow for community use under the guideway or at station areas.

Public Utilities and Energy

PUE-IAMF#1: Design Measures

The HSR project design incorporates design elements that minimize impacts on public utilities. A key objective is to 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 electric utility services during construction or operation. These design elements are included in the design-build contracts.

Additionally, the Authority has adopted a Sustainability Policy (POLI-1007) that establishes project design and construction requirements that avoid and minimize impacts on public utilities. The policy commits the Authority to work toward net-zero water consumption during operations with compliance with the California Green Building Standards Code and net-zero energy consumption with facilities LEED-certified at the platinum level. The Authority also has committed to using 100 percent renewable energy for operation.

During construction, the policy calls for implementing the following:

- Follow construction waste practices that divert at least 85 percent of waste from landfill, unless the local regulation is higher.
- Recycle all steel and concrete waste generated.
- Reduce potable water use.
- Maximize the use of renewable transportation fuels.
- In compliance with the International Standards Organization 14001 standard, the Authority's contract requirements for the design-build contractor will be monitored throughout construction, performance data collected through the EMMA database, and data compiled into annual reports for verification and continuous improvement of sustainability practices, including minimizing impacts on public utilities.

PUE-IAMF#2: Irrigation Facility Relocation

Where relocating an irrigation facility is necessary, the contractor will verify a new facility is operational prior to disconnecting the original facility. Irrigation facility relocation preferences are included in the design-build contract and reduce unnecessary impacts on continued operation of irrigation facilities. The contractor will document all relocations in a memorandum for Authority review and approval.

PUE-IAMF#3: Public Notifications

Prior to construction in areas where utility service interruptions are unavoidable, the contractor will obtain written consent from utility owners prior to construction consistent with the HSR Design Criteria Manual Chapter 28, Utilities, Section 28.2.2.3.4, Level of Service and Service Interruptions. The contractor will notify the public through a combination of communication media (e.g., by phone, email, mail, newspaper notices, or other means) within that jurisdiction and the affected service providers of the planned outage. The notification will specify the estimated duration of the planned outage and will be published no less than 7 days prior to the outage. Construction will be coordinated to avoid interruptions of utility service to hospitals and other

critical users. The contractor will submit the public communication plan to the Authority 60 days in advance of the work for verification that appropriate messaging and notification are to be provided.

PUE-IAMF#4: Utilities and Energy

Prior to construction, the contractor will prepare a technical memorandum documenting how construction activities will be coordinated with utility service providers to minimize or avoid planned and accidental temporary interruptions. The memorandum will identify all affected utility service providers, proposed coordination activities before and during construction, as well as the location of all known underground utilities. The technical memorandum will be provided to the Authority for review and approval prior to the start of coordination with any utility service providers. Confirmation of existing utilities will be conducted with all utility service providers consistent with the HSR Design Criteria Manual Section 28.2.2.3.2, Utility Verification Request to Owner. In addition, the contractor and each utility service provider will agree on the best ways to coordinate during construction for all planned and accidental interruptions of utility service. Following these initial contractor coordination activities with the utility service providers, the contractor will prepare a second technical memorandum to document the location of confirmed utility infrastructure that will be affected by construction activities consistent with the HSR Design Criteria Manual Chapter 28, Utilities, and California Government Code Section 4215 as well as the negotiated protocols the contractor will use to coordinate during construction with each affected utility service provider. This technical memorandum will be reviewed and approved by the Authority.

Safety and Security

SS-IAMF#1: Construction Safety Transportation Management Plan

Prior to construction (any ground-disturbing activity), the contractor will prepare for submittal to the Authority a construction safety transportation management plan. The plan will describe the contractor's coordination efforts with local jurisdictions for maintaining emergency vehicle access. The plan also will address duration of road and traffic lane closures, length of detour routes, and ongoing coordination during construction with local jurisdictions as well as emergency service providers. The plan will also specify the contractor's procedures for implementing temporary road closures including: access to residences and businesses during construction, lane closures, signage and flag persons, temporary detour provisions, alternative bus and delivery routes, emergency vehicle access, and alternative access locations. The Authority requires the design-build contractor to maintain emergency vehicle access and access for nearby residences and business throughout the duration of construction. The contractor will 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

The Authority will require the design-build contractor to prepare a safety and security management plan that complies with the below-listed requirements to protect public safety and security. Sixty days after receiving from the Authority a construction notice-to-proceed, the contractor will provide the Authority with a technical memorandum documenting how the following requirements, 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 will be responsible for implementing all construction-related safety and security plans and the Authority will be responsible for implementing all safety and security plans related to HSR operation.

- Workplace worker safety is generally governed by the Occupational Health and Safety Act of 1970. This Act established the OSHA, which 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 the *California High-Speed Rail Program Safety and Security Management Plan* (Authority 2018) 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 (SSP) and a security and emergency preparedness plan will be implemented prior to the start of revenue service to guide the safety and security of the operation of the HSR system.
 - Prior to construction, the contractor will provide the Authority with a safety and security management plan documenting how they will implement the Authority's safety and security requirements within their project scope.
 - Implement site-specific health and safety plans and site-specific security plans to establish minimum safety and security guidelines for contractors of, and visitors to, construction projects. Contractors will be required to develop and implement site-specific measures that address regulatory requirements to protect human health and property at construction sites.
 - Preparation of a Valley fever action plan that includes: (A) information on causes, preventative measures, symptoms, and treatments for Valley fever to individuals who could potentially be exposed through construction activities (i.e., construction workers, monitors, managers, and support personnel); (B) continued outreach and coordination with California Department of Public Health; (C) coordination with county departments of public health to ensure that the above referenced information concerning Valley fever is readily available to nearby residents, schools, and businesses and to obtain area information about Valley fever outbreaks and hotspots; and (D) provide a qualified person dedicated to overseeing implementation of the Valley fever prevention measures to encourage a culture of safety of the contractors and subcontractors. The Valley Fever Health and Safety (VFHS) designee will coordinate with the county Public Health Officer and oversee and manage the implementation of Valley fever control measures. The VFHS designee is responsible for coordinating the implementation of measures with the county Public Health Officer. Medical information will be maintained following applicable and appropriate confidentiality protections. The VFHS in coordination with the county Public Health Officer will determine what measures will be added to the requirements for the safety and security management plan regarding preventive measures to avoid Valley fever exposure. Measures will include, but are not limited to the following: (A) train workers and supervisors on how to recognize symptoms of illness and ways to minimize exposure, such as washing hands at the end of shifts; (B) provide washing facilities nearby for washing at the end of shifts; (C) provide vehicles with enclosed, air conditioned cabs and make sure workers keep the windows closed; (D) equip heavy equipment cabs with high-efficiency particulate air (HEPA) filters; and (E) make National Institute for 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.
 - System safety program plans incorporate FRA requirements and are implemented upon FRA approval. FRA's SSP requirements will be determined in FRA's new System Safety Regulation (49 C.F.R. Part 270).
 - Rail systems must comply with FRA requirements for tracks, equipment, railroad operating rules and practices, passenger safety, emergency response, and passenger equipment safety standards found in 49 C.F.R. Parts 200–299.
 - The HSR *Urban Design Guidelines* (Authority 2011c) requires implementing the principles of crime prevention through environmental design. The contractor will consider four basic principles of crime prevention through environmental design during station design and site planning: territoriality (design physical elements that express ownership of the station or site); natural surveillance (arrange physical features to maximize visibility); improved sightlines

(provide clear views of surrounding areas); and access control (provide physical guidance for people coming and going from a space). The HSR design includes emergency access to the rail right-of-way and elevated HSR structure design includes emergency egress points.

- 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 will 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 will establish fire/life safety and security committees throughout the Project Section.
- Implement system security plans that address design features intended to maintain security at the stations within the track right-of-way, at stations, and onboard trains. A dedicated police force will ensure that the security needs of the HSR system are met.
- The design standards and guidelines require emergency walkways on both sides of the tracks for both elevated and at-grade sections and the provision of appropriate space as defined by fire and safety codes along at-grade sections of the alignment to allow for emergency response access.
- Implement standard operating procedures and emergency operating procedures, such as the FRA-mandated Roadway Worker Protection Program to address the day-to-day operation and emergency situations that will maintain the safety of employees, passengers, and the public.

SS-IAMF#3: Hazard Analyses

The Authority's hazard management program includes the identification of hazards, assessment of associated risk, and application of control measures (mitigation) to reduce risk to an acceptable level. Prior to project construction the Authority or its contractor will prepare a hazard assessment that includes a preliminary hazard analysis (PHA) and threat and vulnerability assessment (TVA). The Authority's programmatic PHAs are developed in conformance with the FRA's *Collision Hazard Analysis Guide: Commuter and Intercity Passenger Rail Service* (FRA 2007), and the U.S. Department of Defense's System Safety Program Plan (MIL-STD-882E) to identify and determine the facility hazards and vulnerabilities so that they can be addressed by—and either eliminated or minimized—the design.

- TVAs establish provisions for the deterrence and detection of, as well as the response to, criminal and terrorist acts for rail facilities and system operations. Provisions include right-of-way fencing, intrusion detection, security lighting, security procedures and training, and closed-circuit televisions. Intrusion-detection technology could also alert to the presence of inert objects, such as toppled tall structures or derailed freight trains, and stop HSR operations to avoid collisions.
- During design and construction, the contractor will conduct site-specific PHA and TVA assessments to apply the programmatic work to specific project designs.

The Authority's safety and security committees will be responsible for implementing the recommendations contained in the hazard analysis during HSR operation.

Socioeconomics and Communities

SOCIO-IAMF#1: Construction Management Plan

Prior to construction, the contractor will prepare a CMP providing measures that minimize construction impacts on communities, in particular low-income households and minority populations that are more sensitive to construction-borne disruptions. The plan will be submitted to the Authority for review and approval. The plan will include actions pertaining to communications, visual protection, air quality, safety controls, noise controls, and traffic controls to minimize impacts on surrounding communities, particularly low-income households and

minority populations. The plan will verify that property access is maintained for local businesses, residences, and emergency services. This plan will include maintaining customer and vendor access to local businesses throughout construction by using signs to instruct customers about access to businesses during construction. In addition, the plan will include efforts to consult with local transit providers to minimize impacts on local and regional bus routes in affected communities.

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

The Authority must comply with the Uniform Relocation Assistance and Real Property Acquisition Policies Act, as amended (Uniform Act). The provisions of the Uniform Act, a federally mandated program, will apply to all acquisitions of real property or displacements of persons resulting from this federally assisted project. It was created to provide for fair and equitable treatment of all affected persons. Additionally, the Fifth Amendment of the U.S. Constitution provides that private property may 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. A right-of-way specialist is assigned to each property owner to assist him or her through the acquisition process. The Uniform Act also provides benefits to displaced individuals to assist them financially and with advisory services related to relocating their residence or business operation. Benefits are available to both owner occupants and tenants of either residential or business properties.

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 provides for consistent and fair treatment of property owners. However, because the project will receive federal funding, the Uniform Act takes precedence. Owners of private property have federal and state constitutional guarantees that their property will not be acquired or damaged for public use unless owners first receive just compensation. Just compensation is measured by the “fair market value,” where the property value is considered to be the highest price that 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).

More detailed information about how the Authority plans to comply with the Uniform Act and the California Relocation Assistance Act is provided in the following three detailed relocation assistance documents modeled after Caltrans versions, all of which are provided in Appendix 3.12-A, Relocation Assistance Documents:

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

SOCIO-IAMF#3: Relocation Implementation Plan

Before any acquisitions occur, the Authority will develop a relocation implementation 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 implementation plan will be written in a style that also enables it to be used as a public information document.

The relocation implementation plan will 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 as a result of property acquisition.
- Within the limits established by law and regulation, minimize the economic disruption caused to property owners by relocation.
- In individual situations, where warranted, consider the cost of obtaining the entitlement permits necessary to relocate to a suitable location and take those costs into account when establishing the fair market value of the property.
- Provide those business owners who require complex permitting with regulatory compliance assistance.

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

TR-IAMF#2: Construction Transportation Plan

The contractor will prepare a detailed construction transportation plan (CTP) for the purpose of minimizing the impact of construction and construction traffic on adjoining and nearby roadways in close consultation with the local jurisdiction having authority over the site. The Authority must review and approve the CTP before the contractor commences any construction activities. This plan will address, in detail, the activities to be carried out in each construction phase, with the requirement that the requirement of maintaining traffic flow during peak travel periods. Such

activities include, but are not limited to, the routing and scheduling of materials deliveries, materials staging and storage areas, construction employee arrival and departure schedules, employee parking locations, and temporary road closures, if any. The CTP will provide traffic controls pursuant to the *California Manual on Uniform Traffic Control Devices* sections on temporary traffic controls (Caltrans 2017c) 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 will be considered as an alternative to temporary closures where practicable and where it will result in better traffic flow than will a detour.
- Identified routes for construction traffic.
- Provisions for safe Americans with Disabilities Act (ADA)–compliant pedestrian and bicycle passage or convenient nearby 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 will provide for scheduled transit access where construction will otherwise impede such access. Where an existing bus stop is within the work zone, the design-builder will provide a temporary bus stop at a safe and convenient location away from where construction is occurring in close coordination with the transit operator. Adequate measures will be taken to separate students and parents walking to and from the temporary bus stop from the construction zone.
- 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 will consider and account for the potential for overlapping construction projects.

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

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

TR-IAMF#4: Maintenance of Pedestrian Access

The contractor will prepare specific CMPs, as part of the CTP, to address maintenance of pedestrian access during the construction period, to the extent feasible, in accordance with design, safety, and ADA requirements. Construction actions that limit pedestrian access may include, but not be limited to, sidewalk closures, bridge closures, crosswalk closures or pedestrian rerouting at intersections, placement of construction-related material within pedestrian pathways or sidewalks, and other actions that may affect the mobility or safety of pedestrians during the construction period. If sidewalks are maintained along the construction site frontage, the contractor will provide covered walkways and fencing.

TR-IAMF#5: Maintenance of Bicycle Access

The contractor will prepare specific CMPs, as part of the CTP, to address maintenance of bicycle access during the construction period, to the extent feasible, in accordance with design, safety, and ADA requirements. Construction actions that limit bicycle access may 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.

TR-IAMF#6: Restriction on Construction Hours

The contractor will limit construction material deliveries between 7 a.m. and 9 a.m. and between 4 p.m. and 6 p.m. on weekdays to minimize impacts on traffic on roadways. The contractor will limit the number of construction employees arriving or departing the site between the hours of 7 a.m. and 8:30 a.m. and 4:30 p.m. and 6 p.m. Areas where these restrictions will be implemented will be determined as part of the CTP. Based on Authority review of the CTP, the restricted hours may be altered due to local travel patterns.

TR-IAMF#7: Construction Truck Routes

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

TR-IAMF#8: Construction during Special Events

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

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

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

TR-IAMF#11: Maintenance of Transit Access

The contractor will prepare specific CMPs, as part of the CTP, to address maintenance of transit access during the construction period, to the extent feasible, in accordance with design, safety, and ADA requirements. Construction actions that limit transit access may 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.

TR-IAMF#12: Pedestrian and Bicycle Safety

Prior to construction, the contractor will provide a technical memorandum describing how during operation pedestrian and bicycle accessibility will be provided and supported across the HSR corridor, to and from stations, and on station property. Priority for the safety for pedestrians and bicycles and vulnerable populations over motor vehicle access will be carried out in a manner to encourage maximum potential access from nonmotorized modes. Local access programs, such as Safe Routes to Schools, will be maintained or enhanced. Access to community facilities for vulnerable populations will be maintained or enhanced.

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