3.6 Construction Impacts

This section discusses impacts on various environmental resources from the construction of the HDC project build alternatives.

Affected Environment

To understand the temporary construction impacts associated with the HDC build alternatives, a typical construction sequence is provided.

Construction Sequence

Project construction would commence after acquisition by Caltrans of all right-of-way (ROW). The construction sequence would begin with site clearing of all improvements, which includes demolition of buildings and structures, followed by utility relocation, facility construction, and landscaping/finishing work. A construction schedule of about 36 to 48 months is expected to complete each of the project's projected six phases, as shown in Table 3.6-1. This schedule assumes that funding is available from the start to build the project; however, because the proposed project would be incrementally built over several years as funding becomes available, the construction schedule is currently expected to extend from 2016 to 2040, with the opening year for initial segment of 2020.

A Traffic Management Plan (TMP) would be developed to reduce the impacts of traffic congestion and detours during construction. Except for short-term closures to install bridge falsework (i.e., temporary supports while the bridge is being built), most of the arterial roadways and most secondary streets crossing the construction corridor would remain open during construction. The project would be designed so that existing passenger and freight railway operations would not be interrupted during construction. Some nighttime work would be planned on busy thoroughfares to minimize traffic disruption, especially when temporary lane or road closures are required.

The very generalized construction sequence for a project of this type and scale is described below for the purpose of impact assessment. The actual construction process would be determined by the contractor in accordance with requirements of the construction contract. Construction would be done in phases to minimize impacts to local residents and businesses. The timing of construction in certain areas, such as in the vicinity of active bird nests, would have to be scheduled in accordance with the seasonal restrictions established by the regulatory agencies, as described below under Avoidance, Mitigation, and/or Minimization Measures.

The contractor would require temporary laydown and staging areas for field trailers, storage and equipment, and construction-related activities within the vicinity of the project corridor. The contractor may propose to set up temporary rock-crushing equipment on the construction site to recycle concrete and asphalt rubble for use as base material to be placed under the street pavement. The contractor may also propose to set up and operate an onsite batch plant to prepare Portland cement concrete or hot-mix asphalt. Soil disposal would be undertaken according to the

regulatory requirements. The contractor would be responsible for identifying sites to obtain borrow/fill material.

Step 1: Mobilization and Staging

The first step in the construction process involves contractor preparation of the site for construction activities. This would be done after all required preconstruction surveys are conducted and permits are obtained.

Step 2: Site Clearing and Demolition

Under this step, the roadway/railway alignment would be cleared of conflicting structures and vegetation to prepare the site for construction. Asphalt and concrete from roadways, parking lots, and walkways would be removed and disposed.

Step 3: Utility Relocation

Utilities that would interfere with construction would be removed and relocated, or encased for continuing service, by the utility provider or their contractors. This work would involve close coordination with utility companies that meet a variety of service needs, including electric and gas power, water and wastewater distribution, stormwater, cable, and other providers. Each utility would be restored or replaced in accordance with design plans and within close proximity to its former location to allow access in conjunction with the new highway or highway/railway facility. Not all utility relocations would occur at the beginning of the project; some could be done at a later stage of construction, as appropriate.

Step 4: Construct Guideway and Highway

Roadway or roadway/railway construction activities would involve site excavation, grading, fill, and pavement installation. Bridges, overcrossings, undercrossings, soundwalls, and retaining walls along the alignment would be built in parallel with roadway or roadway/rail guideway construction.

Grading. Construction of the proposed project would require a substantial amount of grading and excavation. The freeway/expressway/tollway component of the project would require approximately 9 feet of fill above grade upon which to build the highway. The high-speed rail (HSR) component of the project would require approximately 15 feet of fill above grade. Given the amount of soil needed to construct the new infrastructure, the import of fill material from offsite locations would be required in addition to fill material produced during earth-moving activities within the ROW. Table 3.6-2 shows the total estimated fill required, the amount of fill that can be supplied with onsite excavation, and the amount of imported offsite soil required for the project alternatives. Two types of truck trips would be required as a result of earthwork activities: (1) Earthwork Balance – truck trips within the project site to utilize excess material as fill wherever possible; and (2) Imported Fill – truck trips to import borrow material from nearby mines. The potential sources for offsite fill supply are provided in Figure 3.6-1.

Table 3.6-1 Typical[1] Construction Sequencing for Each Phase[2]

Step	Activity	Months																																		
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
1	Mobilization and Staging																																				
2	Site Clearing and Demolition																																				
3	Utility Relocation																																				
4	Construct Guideway & Highway (including structures)																																				
5	Install Tollway/Railroad Infrastructure																																				
6	Manufacture & Commission Rolling Stock																																				
7	Pre-revenue Testing																																				
8	Landscaping and Finish Work																																				

[1] Actual construction process to be determined by the contractor in accordance with requirements of the construction contract.
[2] For the purposes of the analysis of construction impacts, it is assumed the project would be constructed in six phases, each about 10 miles in length.

Source: Parsons, 2014.

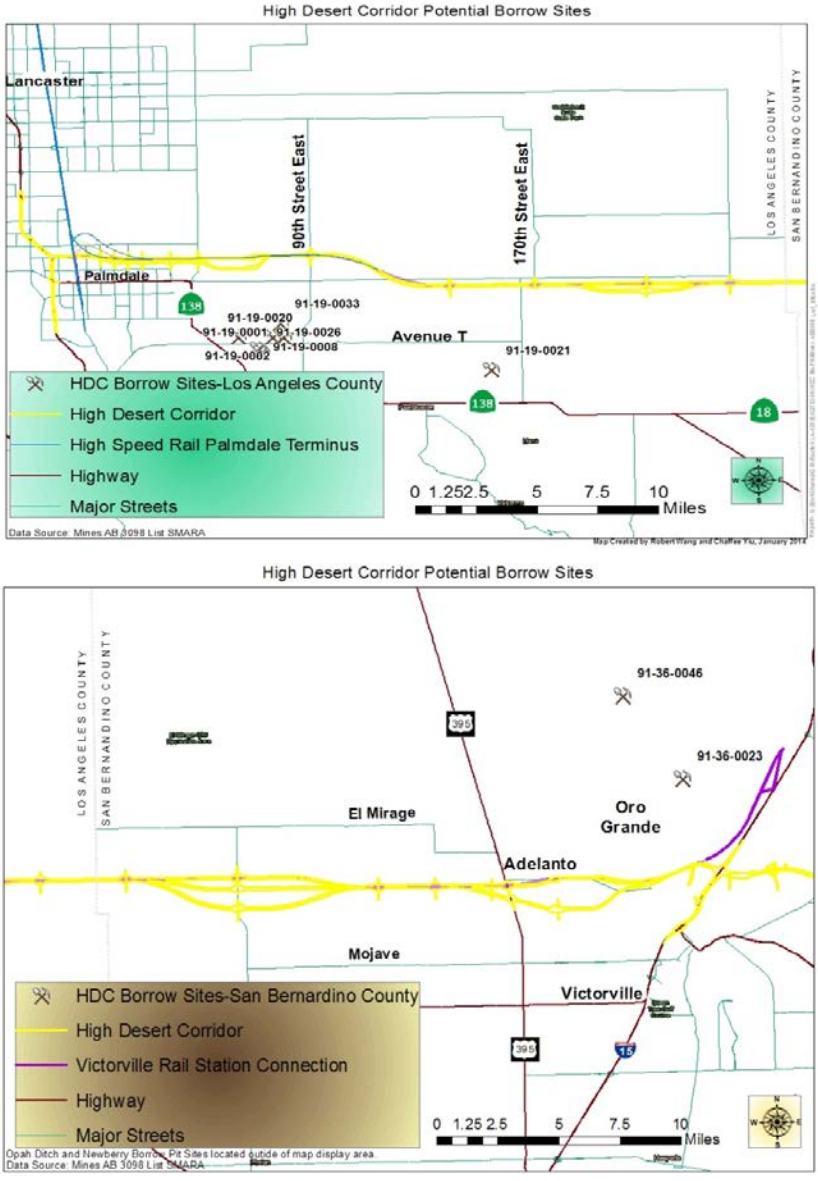
Table 3.6-2 Projected Fill Required for Construction of Build Alternatives

Alternative	Quantity and Type of Earthwork (cubic yards)			
	Onsite Fill Excavated	Imported Soil Offsite[1]	Total Fill[2]	Soil Disposal Offsite
Highway Alternatives	6,809,088	10,213,632	17,022,720	0
Highway with HSR	9,859,755	14,789,632	24,649,387	0

[1] Assumes 60 percent of fill material would be imported from offsite.
[2] Assumes a 1.5-foot fill for the at-grade portion of the TSM/TDM, 9-foot fill for the Highway Alternatives, 15-foot fill for the HSR.

Source: Caltrans, 2014.

Figure 3.6-1 Potential Source Mines in High Desert for Borrow Material



Guideway and Highway. While grading and fill operations are being conducted to establish the roadbed for both the highway and railroad, simultaneous construction of aerial structures, grade separations, highway realignments, and surface street modifications would occur.

Step 5: Install Tollway and Railroad Infrastructure

For tollway, the contractor would install the electronic toll collection system, violation enforcement system, variable message and other signage, barriers, lane striping, and enforcement areas. Traffic signals on surface streets at ramp termini would also be installed.

For the optional railroad component of the project, the infrastructure required would depend on the train technology selected, diesel or electric. The two technology options would have similar ROW width requirements and largely the same construction footprint; however, diesel technology would not require the intricate electrical infrastructure characterized by electrification. The following discussion addresses application of electric technology.

Because the contractor would essentially be building the roadbed from the ground up, overhead contact system installation would most likely be conducted using off-track vehicles. Catenary pole and wire construction would typically occur along 1- to 2-mile sections of the route and would involve several "passes" per track – one pass to install the foundations, a second to place the poles, and another to install the feeder wires and support arms. These passes would then be followed by additional passes for installation of the messenger and contact wires. While this sequence is consecutive, construction would likely occur along several segments simultaneously, with different activities occurring at any or all of those locations.

Duct banks, or raceways contained in concrete-encased conduits, would be installed parallel to the guideway to carry the wiring for interconnections between electrical equipment. For construction of substation, switching, and paralleling stations, a ground grid composed of copper wire and driven ground rods would be installed below each traction power facility and covered with fill. Concrete foundations would be required for mounting of freestanding electrical transformers, circuit breakers, and disconnect switches, as well as for the prefabricated control and switchgear building. The equipment would be connected together by cable or by buss (open air comer or aluminum tubes). The primary service from the local utility network would be via either overhead or underground transmission lines. Station sites would typically be finished with fencing and landscaping along their periphery.

Step 6: Manufacture and Commission Rolling Stock

Train technologies for the HSR build alternatives have not been determined. The California High-Speed Train (HST) Project is going forward using an electric multiple unit train (EMU) system. For XpressWest, a diesel-electric multiple unit train (DEMU) is being evaluated in addition to the EMU. The rolling stock would be manufactured at a remote factory and transported to the project site for assembly and commissioning.

A computer-based automatic train control (ATC) system would be designed and installed to control the trains. The ATC system would provide for the Federal Railroad Administration (FRA)-mandated positive train control (PTC) safety requirements, including safe separation of trains, over-speed prevention, and work zone protection.

Step 7: Pre-revenue Testing

During the pre-revenue service period, the system (e.g., train control system, overhead contact system, communication system) would be tested, accepted, and commissioned. Implementation of the testing, acceptance, and commissioning activities would be conducted on a mainline test track of several miles in length. This process would take several months.

Step 8: Landscaping and Finish Work

Work under this step would include installation of irrigation systems and plant materials, street lighting, lane striping, signage installation, closing of detours, removal of temporary structures, and site cleanup. Permanent best management practices (BMPs) would be installed and maintained until the Notice of Termination is issued in compliance with the General Construction Stormwater Permit.

Environmental Consequences

No Build Alternative

Under this alternative, there would be no construction of the new corridor; therefore no construction impacts would occur.

Freeway/Highway and Freeway/Tollway Alternatives

The two alternatives would have the same construction footprint, and therefore the construction impacts would be similar with the exception that the Freeway/Tollway Alternative would require the installation of an electronic toll collection system and related signage and striping, which is considered a minor construction activity when compared to the scale of work within the entire corridor. Impacts to various environmental resources as a result of project construction are discussed below. Applicable measures to reduce these potential impacts are provided below under Avoidance, Minimization, and/or Mitigation Measures.

Parks and Recreation

Indirect noise and air emission impacts during construction of the proposed HDC Project may diminish the enjoyment of recreational uses at Desert Sands Park in Palmdale and Rockview Nature Park in Victorville. These impacts, while temporary inconveniences, would not substantially alter the use of these parks.

With implementation of the measure identified under Avoidance, Minimization, and/or Mitigation Measures – Parks and Recreation Impacts, Standard Conditions, adverse impacts would be minimized.

Farmlands

Construction activities and traffic detours would result in localized increases in traffic, which could affect access and mobility issues for farm equipment and vehicles. This could result in some delays in getting farm products to market and affect worker safety. Construction activities may also disrupt utilities and utility lines. Utility disruptions could jeopardize farm productivity, potentially putting some farmland at risk for conversion to nonagricultural use. Uncontrolled dust from construction activities could affect crop production on nearby farms.

Community Impacts

During construction of the HDC, delays would be experienced by local residents, particularly to those living in neighborhoods next to the selected build alternative. At times, local traffic detours would be required, requiring residents and business patrons to use slightly longer alternate routes to avoid construction zones on the way to their preferred destination; however, although some neighborhoods would be disrupted in this regard, access to residential and business properties within the proposed project vicinity would be maintained throughout construction. Appropriate signage would be required to alert drivers about detours and that businesses are open. These temporary impacts would mostly occur where the alignment crosses urbanized areas in the Antelope and Victor valleys.

Construction impacts would include temporary increases in noise and dust, visual changes, and traffic congestion related to temporary road closures or detours. These impacts would be temporary and would not disproportionately affect a low-income or minority population because everyone in the project area would experience these impacts.

With implementation of the measures identified under Avoidance, Minimization, and/or Mitigation Measures – Community Impacts, Standard Conditions, adverse impacts would be minimized.

Utilities/Emergency Services

Utilities

Several utility facilities and lines would be removed and relocated during project construction, particularly in the more populated municipalities on both ends of the corridor. This would be done through standard engineering practices to minimize any disruption of service those utilities provide. With implementation of the measures identified under Avoidance, Minimization, and/or Mitigation Measures – Utilities/Emergency Services, Standard Conditions, adverse impacts would be minimized.

Water supply interruptions during construction could affect water pressure and the ability of fire protection services to suppress fires. In general, the amount of water required for fire protection varies with the land use type, building structure, and fire intensity. During construction, there could be sporadic short-term localized

disruptions to water supply. All construction work would be conducted to comply with county and municipal fire codes.

Emergency Services

While emergency vehicle access for emergency services would be maintained at all times during construction, occasional travel delays would occur due to traffic detours, off-peak lane closures, shoulder closures, and lane shifts. These delays could slightly increase response times for police, fire, and other emergency service providers on a short-term basis. In addition to increased congestion from construction vehicles, construction activities would require detours and some road closures that adversely affect emergency response times. Local roads that cross the HDC alignment may be partially or fully closed when required to install falsework and or scaffolding for overcrossing construction. To the extent feasible, half the road would be open to traffic in most cases, or closed for very short durations. These intermittent traffic disruptions would be temporary and should not substantially affect emergency response times with implementation of the Traffic Management Plan discussed above.

Traffic and Transportation/Pedestrian and Bicycle Facilities

The project would temporarily affect motoring vehicular, bicycle, and pedestrian traffic during construction. The potential for traffic disruption would mostly exist where bridge crossings would be built and at connections to existing road and highway facilities. The duration of travel-time delays could be expected to last from a few days to more than a year in various construction zones and may require motorists to adjust their schedules to accommodate longer travel times. Based on the temporary nature of the roadway closures, implementation of a TMP and a public outreach program would minimize impacts related to increased travel time and distance.

Construction within the public ROW would also affect transit service on a temporary basis, from delays due to traffic detours and work zone operations. Some bus routes could be affected, and coordination would be necessary to arrange for temporary nearby route and/or stop relocations.

Temporary construction easements would be required at various roadway segments under construction to accommodate construction activities. Access in and out of any residential homes and businesses would not be blocked, and obstructions would be minimized to the extent possible. In addition, there may be a need for temporary parking space acquisitions for construction easement purposes. These areas required for temporary easements would be restored during construction to pre-project conditions. It is also possible that on-street parking could be restricted in and surrounding work areas to accommodate construction equipment and materials. If necessary, on-street parking would be restored after construction in the area is completed.

Short-term bicycle and pedestrian detours could be required during construction. Implementation of both the TMP and public outreach program throughout the construction period would minimize impacts in this regard.

With implementation of the measures identified under Avoidance, Minimization, and/or Mitigation Measures – Traffic and Transportation/Pedestrian and Bicycle Facilities, Standard Conditions, impacts during project construction would be minimized and are not considered adverse.

Visual/Aesthetics

Because the project would be constructed in phases, each with a duration of approximately 3 to 4 years, the selected build alternative would cause a short-term reduction in visual quality during construction within each segment. Construction activities would temporarily alter the visual and aesthetic environment from the vantage point of homes and other properties surrounding the construction site. Temporary visual intrusions, such as night lighting, dust, temporary structures, increased truck and other vehicle movements, and staging area yards, would occur. In addition, required safety devices, such as orange cones, as well as fencing and signage, would affect views. Workers would be present and visible throughout the construction phases. Additional vehicles, equipment, materials, safety devices, and workers would not be unexpected visual elements seen at a construction site. These images, including the presence and operation of construction equipment (e.g., heavy trucks, cranes, or excavators), would generally be visually disruptive and may be undesirable to some affected individuals or groups.

With implementation of the measures identified under Avoidance, Minimization, and/or Mitigation Measures – Visual/Aesthetics Impacts, Standard Conditions, impacts during project construction would be minimized and are not considered adverse.

Cultural Resources

As reported in the *Archaeological Survey Report* for the project, 43 archaeological resources have either been previously recorded or were encountered during a survey of the Area of Potential Effects (APE). Of this total, 5 historic period resources are possibly eligible for the National Register of Historic Places (NRHP). While there are no known archaeological or historical sites in the project area, construction activities have the potential of disturbing or destroying unknown sites that are currently buried. With implementation of the measures identified under Avoidance, Minimization, and/or Mitigation Measures – Cultural Resources, impacts to cultural resources during construction would be minimized and not considered adverse.

Hydrology and Floodplain

The build alternatives would encroach into the base floodplain areas, which could potentially impact property. Construction activities could exacerbate the effects of flooding during some storm events, including increases in peak discharge rates associated with new impervious surfaces, scouring from erosive velocities, risks to life and property, and potential damage or degradation of natural habitat or groundwater recharge.

The project would include design components intended to minimize hydrological and floodplain impacts during construction. For example, the existing drainage flow

pattern would be retained to the extent feasible. During rough grading, infiltration basins would be excavated to provide controls for temporary stormwater runoff. Also at this stage of construction, culvert drainage facilities would be installed underneath alignment embankments, where required, to maintain existing stormwater runoff patterns in the study area.

The project would use appropriate BMPs designed to provide temporary stormwater management. Site-specific BMPs would be evaluated in the Storm Water Pollution Prevention Plan (SWPPP) to prevent and attenuate construction impacts to the floodplains, waterways, and hydrologic systems. Stormwater runoff from the construction site would be managed so that uncontrolled construction-related drainage would not flow onto adjacent properties or public streets and would not adversely affect existing drainage systems. BMPs would also need to be implemented during pile development and other work necessary within wash channels. Work would not be conducted within the channels when water is flowing during storm events. Channel bottom contours would be restored to pre-existing conditions after the bridge crossings are constructed.

Compliance with existing regulations would apply to project design and construction. This would minimize construction impacts to floodplains, as presented in Section 3.2.1, Hydrology and Floodplain.

Water Quality and Stormwater Runoff

A water quality impact would occur if construction activities substantially affect surface water or groundwater quality. HDC construction activities could contribute pollutants to receiving water bodies from stormwater runoff and non-stormwater discharges. Pollutants that could be generated by construction activities include sediment, oils, fuels, paints, solvents, nutrients, trace metals, and hydrocarbons.

A risk analysis was done for the project based on characteristics of the project area, construction dates, and receiving waters. The risk level within the Antelope Valley Watershed and the Mojave Watershed was determined each as Risk Level 1 (i.e., lowest risk level) based on findings of the construction site sediment and receiving water risk determination. On April 12, 2012, members of the project team held a meeting with a representative from the Lahontan Regional Water Quality Control Board (RWQCB), during which it was concluded that the area shown in Figure 3.6-2 where the HDC alignment crosses the Mojave River in Victorville should be designated as Risk Level 2. A higher risk level is often associated with additional BMP and monitoring requirements.

It is estimated that the freeway/expressway and freeway/tollway alternatives would result in temporary disturbed soil areas of about 2,350 acres. Soil-disturbance work would include earth-moving activities such as excavation and trenching, soil compaction, cut and fill operations, and grading. Disturbed soils are susceptible to high rates of erosion from wind and rain, resulting in sediment transport via stormwater runoff. Sediment and other pollutants can lead to turbidity (i.e., cloudiness), which can block light transmission and penetration, reduce oxygen

levels, create changes in water temperature, and obscure sources of food, habitats, refuges, and nesting sites of fish.

Erosion and sediment control techniques to be implemented during construction would retain soil and sediment on the proposed project site. The SWPPP would include a description of erosion- and sediment-control BMPs to be applied.

Figure 3.6-2 Mojave River Crossing

Source: HDC Water Quality Assessment Report, 2014.

Pollutants in stormwater runoff from the site could also cause chemical degradation and aquatic toxicity in receiving waters, resulting in adverse effects to plant and animal species, their populations, and the ecosystem structure. The chemical contamination of site runoff during construction activities would pose a potentially adverse impact to water quality. The SWPPP would include good housekeeping practices and other controls to be implemented for non-stormwater discharges to minimize the potential water quality effect of these flows during construction.

In most locations along the alignment, the groundwater table is greater than 50 feet below ground surface, where dewatering would not be required during construction. Where removal of groundwater from excavations may be required, perhaps at Little Rock and Big Rock washes during bridge piles erection, it is possible that dewatering activities could result in the discharge of unsuitable and untreated water if discharged directly to the environment. There is the potential of discharging pollutants (i.e.,

primarily by entraining silt and clay, but also from encountering chemicals and other contaminants) through release of construction water directly to the environment.

Compliance with the Construction General Permit (Order No. 2009-0009-DWQ, as amended by 2010-0014-DWQ), would minimize construction water quality impacts. This includes development and application of construction site BMPs to be included in the SWPPP to minimize pollutants in stormwater and non-stormwater discharges during project construction. Given these considerations, and with implementation of the measures listed under Avoidance, Minimization, and/or Mitigation Measures – Water Quality and Stormwater Runoff, Standard Conditions, water quality and stormwater runoff construction impacts would not be adverse.

Geology/Soils/Seismic/Topography

As described in Section 3.2.3, the site is generally suitable for construction provided site development is performed in accordance with Caltrans standard design and construction procedures. Additional site-specific subsurface investigations and analyses are required to further evaluate soils. Some soils encountered during excavation activities could be susceptible to caving; however, use of standard construction practices would protect construction workers from the collapse of slopes within excavation areas and trenches. This would apply to all areas where excavation and trenching is required. These practices are stipulated by the Occupational Safety and Health Administration's (OSHA) Safety and Health regulations for construction. No adverse impacts associated with geology, soils, seismic, or topography are anticipated during construction.

Paleontology

Grading, excavation and other subsurface excavation in defined areas of the proposed project have the potential to impact significant nonrenewable fossil resources of Pleistocene and Pliocene age. Vertical impacts of construction are expected to be as much as 30 feet deep in bridge construction areas, approximately 30 to 40 feet for bents and other structural supports, and 5 to 10 feet for general grading. Due to the depth, these excavations have the potential to impact fossils in any of the Quaternary deposits. Even shallow excavations in areas mapped as Quaternary older alluvium (Qoa), particularly near the Mojave River, and the Anaverde Formation (Tac, Tas) have the potential to encounter significant paleontological resources.

With implementation of the measures listed under Avoidance, Minimization, and/or Mitigation Measures –Paleontology, impacts to paleontological resources would be minimized.

Hazardous Waste or Materials

During demolition and construction phases of the project, there is a limited risk of accidental release of hazardous materials such as gasoline, oil or other fluids in the operation and maintenance of construction equipment. As a result of construction activities, asbestos, lead-based paint (LBP), and/or aerially deposited lead (ADL) may also be encountered. Implementation of the measures listed under Avoidance,

Minimization, and/or Mitigation Measures –Hazardous Materials and Waste, impacts pertinent to hazardous materials and waste would be minimized.. Compliance with federal, state, and local regulations would also address worker safety handling such materials.

Air Quality

Criteria Pollutants

Construction of the project has the potential to create air quality impacts through the use of heavy-duty construction equipment within the construction site and through vehicle trips generated from haul trucks and construction workers traveling to and from the project site. In addition, fugitive dust emissions would result from earthwork (e.g., grading, excavation) and onsite construction activities. Off-road (onsite) mobile source emissions, primarily nitrogen oxides (NO_X) and carbon monoxide (CO), would result from use of construction equipment such as excavators, bulldozers, and loaders. During the finishing phase, paving operations and application of architectural coatings and other building materials would release reactive organic compounds and off-gassing products (e.g., paints and asphalt). Construction emissions can vary substantially from day to day, depending on the level of activity, the specific mix of construction equipment and, for dust, the prevailing weather conditions.

Construction-related emissions of criteria pollutants were estimated using the Sacramento Metropolitan Air Quality Management District's *Road Construction Emissions Model, Version 7.1.4*. The model was developed for the Sacramento Metropolitan Air Quality Management District and approved by the California Air Resources Board.

Estimated construction emissions generated by the aforementioned model are summarized in Table 3.6-3. Construction activities associated with the build alternatives of the proposed project would be temporary and would not require more than 5 years to complete; therefore, construction emissions are not considered for conformity purposes. Compliance with measures listed under Avoidance, Minimization, and/or Mitigation Measures – Air Quality (CI-AQ-1 and CI-AQ-2) would control fugitive emissions during construction.

Air Toxics and Asbestos

Potential for air toxics emissions during construction would be related to diesel particulate matter (DPM) emissions associated with heavy equipment operations; however, the health effects from carcinogenic air toxics at sensitive receptors would be considered less than significant because the risk posed by these pollutants is based on long-term (70-year lifetime) exposure. While the construction schedule is anticipated to last 6 years, construction is anticipated to be less than 5 years at each individual segment for this phased project. As a result, the project would not result in a long-term (i.e., 70 years) substantial source of air toxics emissions. Potential impacts related to air toxics emissions during construction would not be substantial, and no mitigation measures are required.

Table 3.6-3 Summary of Construction Emissions for Roadways

Constituent	Grubbing Land Clearing (lbs/day)	Grading Excavation (lbs/day)	Drainage Utilities Subgrade (lbs/day)	Paving (lbs/day)	Maximum (lbs/day)	Total (tons)
Reactive Organic Gases (ROG)	52.4	97.7	73.1	35.6	97.7	44.7
Carbon Monoxide (CO)	223.5	455.7	391.2	224.8	455.7	223.5
Nitrogen Oxides (NO_X)	353.3	896.2	546.4	216.8	896.2	366.8
Inhalable Particulate Matter (PM_{10})	518.1	543.1	531.0	13.0	543.1	271.4
Fine Particulate Matter ($PM_{2.5}$)	119.9	142.5	132.0	11.6	142.5	69.5
Carbon Dioxide (CO_2)	48,305.7	103,018.6	72,112.4	36,632.1	103,018.6	45,602.7

Source: HDC Air Quality Technical Report, 2014.

According to the California Division of Mines and Geology (2011), areas in Los Angeles and San Bernardino counties where the project is located are not listed as containing naturally occurring asbestos; therefore, the potential for construction activities to disturb naturally occurring asbestos is low, and mitigation measures are not required.

Asbestos-containing materials (ACMs) may be present in structures acquired for demolition. Compliance with measure CI-AQ-3 listed under Avoidance, Minimization, and/or Mitigation Measures – Air Quality, would control asbestos during demolition.

Odors

During project construction, objectionable odors would be related mainly to operation of diesel-powered equipment and to off-gas emissions during road-building activities, such as paving and asphalting. Antelope Valley Air Quality Management District's (AVAQMD) and Mojave Desert Air Quality Management District's (MDAQMD) Rule 401 and 402 (Visible Emissions and Nuisance, respectively) and South Coast Air Quality Management District's (SCAQMD) District Rule 1113 (Architectural Coatings) limit the amount of reactive organic gas (ROG) emissions from paving, asphalt, concrete curing, and cement coating operations. Construction of the project would be performed in compliance with SCAQMD's, AVAQMD's, and MDAQMD's rules.

While construction equipment onsite would generate some objectionable odors (mainly from diesel exhaust), these emissions would generally be limited to the

project site vicinity and would be temporary. Most potential sensitive receptors are far enough from the project site that odors would not affect a substantial number of people. No mitigation measures would be required; however, Avoidance and Minimization Measure CI-AQ-2 would further reduce diesel odors to sensitive receptors during construction.

Valley Fever

Construction of the project would occur in an endemic area where the fungi *Coccidioides immitis* has been known to naturally occur. Coccidioidomycosis, also known as Valley Fever, is a common cause of pneumonia in the endemic areas in which the fungus occurs, such as Los Angeles and San Bernardino Counties. Because the spores of *Coccidioides immitis* can become airborne during soil disturbance, all persons residing or traveling through Los Angeles and San Bernardino Counties are susceptible to the disease. Temporary soil disturbance during construction grading activities could cause fungal spores (if present) to become airborne, potentially putting construction personnel, residents, and wildlife at risk of contracting Valley Fever; however, there are a number of preventive and precautionary measures that can be undertaken to reduce exposure and which include the use of dust masks when conducting outdoor activities, such as field studies or performing construction activities in the winter months; seeking prompt medical treatment if flu-like or respiratory illness occurs during or within a few weeks following fieldwork or construction activities; getting a coccidioidin skin test to determine susceptibility to the disease; and educating all members of the field party and construction crew about the possibilities and consequences of infection.

Compliance with measures listed under Avoidance, Minimization, and/or Mitigation Measures – Air Quality would control dust during project construction. As a result, this measure would reduce the potential for contact with *Coccidioides immitis* spores and, as such, the potential for health impacts during construction of the project associated with Valley Fever would be minimized.

Noise and Vibration

During the construction phases of the project, noise from construction activities may intermittently dominate the noise environment in the immediate area of construction. Construction noise is regulated by Caltrans standard specifications, Section 7-1.01I, Sound Control Requirements. These requirements state that noise levels generated during construction shall comply with applicable local, State, and federal regulations.

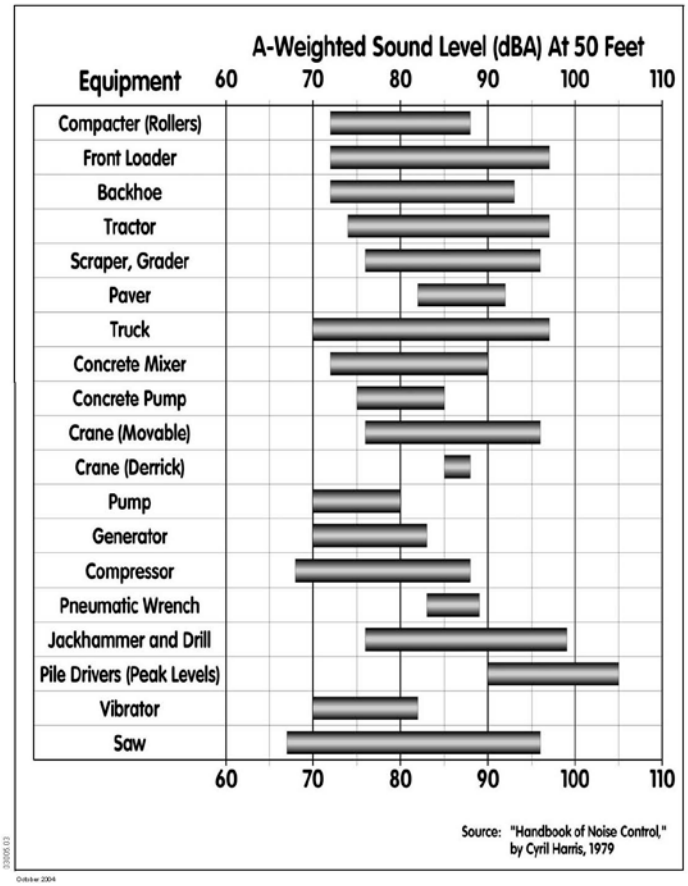
Figure 3.6-3 summarizes typical noise levels produced by construction equipment commonly used on roadway construction projects. As indicated, equipment involved in construction is expected to generate noise levels ranging from 70 to 90 dBA at a distance of 50 feet. Noise produced by construction equipment would be reduced over distance at a rate of about 6 dBA per doubling of distance. Normally, construction noise levels should not exceed 86 dBA (L_{max}) at a distance of 50 feet. No adverse noise impacts from construction are anticipated, because construction would be

conducted in accordance with Caltrans standard specifications and would be short-term, intermittent, and dominated by local traffic noise.

Sound control shall conform to the provisions in Section 14-8.02, “Noise Control,” of the Standard Specifications and Section 14-8.02, “Noise Control,” of the Standard Special Provisions. According to requirements of these specifications, construction noise cannot exceed 86 dBA at 50 feet from the job site activities from 9:00 p.m. to 6:00 a.m.

It is possible that certain construction activities could cause intermittent localized concern from vibration in the project area. During certain construction phases, processes, such as earth moving with bulldozers, the use of vibratory compaction rollers, impact pile driving, demolitions, or pavement braking, may cause construction-related vibration impacts such as human annoyance or, in some cases, building damages. It may be necessary to use this type of equipment close to residential buildings. Implementation of minimization measure CI-1 would eliminate or minimize vibration impacts during construction activities.

Figure 3.6-3 Construction Equipment Noise Levels



Mitigation techniques for control of equipment noise and vibration plus administrative measures, when properly implemented, can provide the most effective means to minimize the effects of construction activity impacts. These measures are listed under Avoidance, Minimization, and/or Mitigation Measures – Noise and Vibration, Standard Conditions.

Energy

Energy consumed for construction and maintenance is referred to as indirect energy usage. The project would result in one-time nonrecoverable energy costs associated with construction activities. In addition to energy expenditures for preparing the ground surface and building new facilities, there would also be energy consumption associated with the manufacture of building materials and rolling stock for the two build alternatives involving rail.

Energy use for maintenance comprises day-to-day upkeep of equipment and systems, as well as the energy embedded in any replacement equipment, materials, and supplies. The indirect energy impacts associated with construction and maintenance of the build alternatives are directly related to the total project capital cost and maintenance cost. Table 3.6-4 shows the estimated construction and energy consumption for the highway and highway with HSR alternatives.

Table 3.6-4 Projected Construction and Maintenance Energy Consumption for the Build Alternatives

Annual Indirect Energy	Freeway/Expressway and Freeway/Tollway Alternatives	Freeway/Expressway and Freeway/Tollway with HSR Alternatives[1]
Construction		
Lane Miles[2]	630	756
Conversion Factor[3]	13,885	13,885/130,739
Energy Use (Trillion BTUs)	8.8	25.2
Maintenance		
Energy Use (Trillion BTUs)[4]	2.2	6.3
Total Indirect Energy Usage (Trillion BTUs)	10.9	31.5

[1] HSR was analyzed as a fully grade-separated two-lane facility.
[2] Assumed maximum buildout of 4 lanes + HOV in each direction of the 63-mile alignment.
[3] Construction energy factors from Oakridge Laboratory, 1993.
[4] Maintenance costs assumed to be 20% of total indirect costs

Source: HDC Energy Technical Study, 2014.

Construction of the project would require a substantial amount of grading and excavation. As previously described, the new facility would be built several feet above existing grade; hence, the import of fill material from offsite locations would be required in addition to fill material produced during earth-moving activities within

the ROW. Table 3.6-5 shows types of truck trips, associated truck hours, and the equivalent British thermal units (BTUs) consumed to acquire the fill material for the project alternatives. The estimated construction energy associated with the import of soil and truck activity for the Freeway/Expressway and Freeway/Tollway alternatives is 115.5 billion BTUs as opposed to 167.3 billion BTUs for the alternatives with HSR..

Table 3.6-5 Projected Construction Energy Consumption Required for Truck Activity for the Build Alternatives

Alternative	Truck Hours			BTUs (billions)[1]
	Earthwork Balance (Onsite)	Import	Total	
Freeway/ Expressway and Freeway/Tollway Alternatives	226,970	964,082	1,191,051	115.5
Freeway/ Expressway and Freeway/Tollway with HSR	328,658	1,396,018	1,724,677	167.3

[1] Assumes 20,539 BTUs per passenger mile for heavy duty trucks.

Source: HDC Energy Technical Study, 2014.

It should be noted that the energy consumption numbers are estimated values and are not time dependent on when the construction takes place and/or its duration. Indirect energy consumption is estimated at approximately 11 trillion BTUs for the Freeway/ Expressway and Freeway/Tollway alternatives (as opposed to 32 trillion BTUs for the alternatives with HSR). Although construction would require the use of nonrenewable resources, including fossil fuels and natural gas, the use of these resources would not substantially deplete existing supplies. The energy consumed during construction of the proposed project would be a small proportion of regional energy consumption; thus, construction of the build alternatives is not anticipated to create substantial impact on short-term energy demand during project construction.

In addition, the proposed green energy infrastructure would further offset some or all of the direct and indirect energy consumption associated with the proposed project; therefore, no substantial impacts related to indirect energy consumption would occur for the build alternatives.

Biological Environment

Construction work would involve the use of heavy equipment to clear vegetation and grade the project site. In February 1999, Executive Order (EO) 13112 was signed, requiring federal agencies to work on preventing and controlling the introduction and spread of invasive species. The project has the potential to spread invasive species to adjacent native habitats in the Biological Study Area (BSA) by entering and exiting construction equipment contaminated by invasive species, the inclusion of invasive species in seed mixtures and mulch, and the improper removal and disposal of invasive species so that seed is spread along the highway.

The proposed project may have adverse effects to the desert tortoise, which is federally and State-listed as threatened. With the selection of specific alternatives and implementation of avoidance measures discussed below, the project is not likely to have adverse effects to the federally and State-listed southwestern willow flycatcher or least Bell's vireo. The proposed project may also result in adverse effects to the State-listed as threatened Mohave ground squirrel.

Project construction activities would cause permanent and temporary impacts to jurisdictional waters. Permanent impacts are discussed in Section 3.3.2, Wetlands and Other Waters. Temporary construction impacts to Waters of the U.S. and Waters of the State of California will be determined as the final design in each phase proceeds. As described in the *Natural Environment Study*, impact calculations are based on mapped drainages within the BSA; hence, impacts are expected to decrease once designs are finalized. Compensatory mitigation for impacts to jurisdictional features of the U.S. Army Corps of Engineers (USACE), RWQCB, and California Department of Fish and Wildlife (CDFW) will be determined during the permitting process with the agencies.

Project construction activities would create noise, dust, and vibration that could adversely affect animals within and next to the construction site. This disturbance could cause animals to move away from construction. Habitat next to the construction site may not be used by species sensitive to construction noise, dust, and vibration effects. Vibration could collapse the burrows or dens of burrowing animals.

Silt runoff from the project site or improper disposal of petroleum and chemical products from construction equipment could adversely affect water quality during construction. Adverse effects on water quality could affect plants, animals, and habitats downstream of construction areas.

Night lighting during construction of the project could spill over into the adjacent open space and could adversely affect foraging activities of nocturnal species (e.g., burrowing owl, bats, and other small mammals) and may also increase predation of small mammals; therefore, the project's night lighting may affect nocturnal wildlife.

If construction limits are not clearly marked, construction operators could inadvertently remove habitat that should not be removed. Because the project includes numerous sensitive habitat areas, this effect could be potentially substantial.

Compliance with the standard condition and minimization and mitigation measures presented in Section 3.3, Biological Environment, would reduce construction impacts.

Freeway/Highway and Freeway/Tollway with HSR Alternatives

These two alternatives would have the same construction footprint, and therefore the construction impacts would be similar with the exception that the Freeway/Tollway Alternative would require the installation of an electronic toll collection system and related signage and striping, which is considered a minor construction activity when compared to the scale of the work within the entire corridor. Impacts to various

environmental resources under the alternatives with HSR would be similar to those described under the Freeway/Highway and Freeway/Tollway alternatives with the exception that the alternative with HSR would require the construction of station connections and the installation of rail lines in the median of the freeway/tollway. The soil disturbance area of the alternatives with HSR is estimated at approximately 3,000 acres as opposed to 2,350 acres for the alternatives without HSR. Since the construction would most likely be divided into phases, each phase of construction would have similar impacts to environmental resources as described under the alternatives without HSR. Overall, the energy consumption required to construct and maintain the alternatives with HSR would be higher as demonstrated in the energy discussion above.

Avoidance, Minimization, and/or Mitigation Measures

Parks and Recreation Impacts

CI-PAR-1: To minimize impacts on the recreational lands during the construction phase, no equipment staging will occur within the boundaries of the adjacent parks, golf course and other recreational facilities.

Community Impacts

CI-COM-1: To the extent practical, street closures required during construction shall be scheduled to occur during nighttime hours. This requirement will be addressed in the TMP to be prepared during the final design phase of project development.

CI-COM-2: To the extent practical, the contractor will avoid limiting access to businesses during construction during normal business hours. Businesses will be contacted and advised of nearby construction activities before their commencement.

CI-COM -3: Caltrans will notify emergency service providers, such as fire, police, and ambulance services, in advance of construction of the timing, location, and duration of construction activities and the locations of detours and lane closures.

CI-COM -4: During the final design phase, in coordination with affected facility owners or operators, Caltrans will develop and implement access plans for highly sensitive land uses such as police and fire stations, transit stations, hospitals, and schools.

Implementation of the Traffic Management Plan (TMP) as outlined in CI-T-1 under Traffic and Transportation/Pedestrian and Bicycle Facilities subsection below would avoid and/or minimize impacts to the communities along the construction zones.

Utilities/Emergency Services

CI-UT-1: In accordance with the requirements in the California Code of Regulations, prior to the initiation of construction, the contractor will

coordinate and notify the operators of underground or overhead utility and service lines prior to any excavation activities. Surveyors will meet onsite with utility company workers to locate, mark, and identify conflicting utility lines to avoid damage and limit disruption to utility services.

Implementation of the TMP as outlined in CI-T-1 under Traffic and Transportation/ Pedestrian and Bicycle Facilities subsection below would avoid and/or minimize adverse effects of the HDC on emergency services.

Traffic and Transportation/Pedestrian and Bicycle Facilities

CI-T-1: Caltrans will require the design team to develop a TMP to offset the effects of access restrictions and traffic congestion during construction of the freeway, ramps, and on local streets. The TMP will consider methods such as adjustment of signal timing and/or signal coordination to increase roadway efficiency; turn restrictions at intersections and roadways necessary to reduce congestion and improve safety; and parking restrictions on detour routes during work hours to increase capacity, reduce traffic conflicts, and improve access. The TMP will include a traffic contingency plan with procedures to be implemented for possible unforeseen circumstances and emergencies.

CI-T-2: Caltrans will require the contractor to provide motorist alert and awareness information during construction, as appropriate for the conditions, to include the following options: changeable message signs, stationary ground-mounted signs, traffic radio announcements, and the Caltrans Highway Information Network.

CI-T-3: Caltrans, in coordination with the affected local jurisdictions, will coordinate with Antelope Valley Transit Authority and Victor Valley Transit Authority to request and comply with applicable procedures for any required temporary bus stop relocations or other disruptions to transit service during construction.

Visual/Aesthetics

CI-V-1: During the project design and construction stages, existing vegetation in the corridor will be saved and protected to the extent that is feasible.

CI-V-2: Caltrans will require construction contractors to shield construction and storage areas from nearby public use areas (i.e., streets, private yards or recreation) to the extent feasible and where the safety of construction and traffic operations is not compromised.

Cultural Resources

CI-CUL-1: In accordance with Caltrans standard specifications, if cultural materials are discovered during construction, all earth-moving activities within and around the immediate discovery area will be

diverted until a qualified archaeologist can assess the nature and significance of the find. If human remains are discovered, Section 7050.5 of the State Health and Safety Code states that further disturbances and activities will stop in any area or nearby area suspected to overlie remains, and the county coroner will be contacted. Pursuant to Section 5097.98 of the Public Resources Code, if the remains are thought to be Native American, the coroner will notify the Resident Engineer and the Native American Heritage Commission (NAHC), who will then notify the Most Likely Descendent (MLD). At this time, the Resident Engineer will contact the District 7 or 8 Environmental Branch (depending on which district the discovery is located) so that staff may work with the MLD on the respectful treatment and disposition of the remains. Further provisions of Section 5097.98 of the Public Resources Code are to be followed as applicable.

CI-CUL-2: It is Caltrans' policy to avoid cultural resources whenever possible. Further investigation may be needed if resources cannot be avoided by the project. Additional survey(s) will be required if the project changes to include areas not previously surveyed.

Water Quality and Stormwater Runoff

CI-WQ-1: The project will conform to the requirements of the Caltrans' National Pollutant Discharge Elimination System (NPDES) Statewide Storm Water Permit (Order No. 2012-0011-DWQ, NPDES No. CAS000003), adopted by the State Water Resources Control Board on July 1, 2013, and any subsequent permit in effect at the time of construction. In addition, the contractor will comply with the requirements of the General NPDES Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Order No. 2009-0009-DWQ, NPDES No. CAS000002, as amended by 2010-0014-DWQ), also referred to as the Construction General Permit, as well as implementation of the BMPs specified in the Caltrans Storm Water Management Plan, to be prepared during final design of the project.

CI-WQ-2: The contractor will develop an acceptable Storm Water Pollution Prevention Plan (SWPPP) containing proven Temporary Construction Site BMPs to minimize stormwater pollution that has the potential to affect water quality. All construction site BMPs will follow the latest edition of the Storm Water Quality Handbooks and the Construction Site Best Management Practices Manual. In addition, the SWPPP will include implementation of specific stormwater effluent monitoring requirements based on the project's risk level to ensure water quality standards are met.

CI-WQ-3: During construction, should dewatering be required, the contractor will fully conform to the requirements specified in either the NPDES

General Permit, Limited Threat Discharges to Surface Waters, Board Order R6T-2008-0023, or General Waste Discharge Requirements for Discharges to Land with a Low Threat To Water Quality, WQO-2003-0003, both issued by the Lahontan RWQCB.

CI-WQ-4: The contractor will comply with all requirements of permits to be issued by USACE under Section 404 of the Clean Water Act (CWA) for the discharge of dredged or fill material into Waters of the U.S.

CI-WQ-5: The contractor will comply with all requirements of Water Quality Certifications to be issued by the Lahontan RWQCB under Section 401 of the CWA to ensure that all discharges comply with applicable federal and state effluent limitations and water quality standards.

Paleontology

CI-PAL-1: A qualified Principal Paleontologist will prepare a Paleontological Mitigation Plan (PMP) and obtain a BLM paleontological resources use permit for the project. The PMP will include the components specified in the SER Volume 1, Chapter 8. The portions of the project on BLM lands will be identified and all requirements of the BLM permit and BLM monitoring guidance will be incorporated into the plan. The PMP will also specify that a BLM Fieldwork Authorization (FA) will be obtained prior to the start of ground disturbing activities on the lands under BLM authority. A curation agreement with a qualified repository acceptable to Caltrans and the BLM will be included in the PMP. The Natural History Museum of Los Angeles County and the San Bernardino County Museum are examples of qualified repositories local to the project area. The PMP will be prepared when design is at or near completion.

CI-PAL-2: Paleontological monitoring or sampling or fossil recovery shall be conducted as specified in the PMP by qualified paleontologists.

CI-PAL-3: All recovered fossils shall be prepared to permit identification by experts and cataloged.

CI-PAL-4: Fossil meeting significance criteria shall be submitted to the appropriate repository along with copies of all records, photos and maps to obtain permanent accession numbers

CI-PAL-5: The Paleontological Mitigation Report shall include all elements specified in as components of a PMR in SER Chapter 8 and shall include all results including specimens recovered with permanent accession numbers.

Hazardous Waste or Materials

CI-HAZ-1: A Health and Safety Plan (HSP) for the protection of construction workers will be prepared and implemented during construction. The HSP will include, among others, safety measures for conducting deep excavations or deep soil borings for bridge columns located near abandoned oil and gas wells to avoid exposure of construction personnel to harmful concentrations of naturally occurring hydrocarbons, methane, and hydrogen sulfide. Soil test results will be the basis for developing health and safety plans for the protection of construction workers at these locations. Other avoidance and minimization measures that would be considered include ventilation of work areas, excavation of impacted soils, and revising column design to avoid contaminated areas.

CI-HAZ-2: Prepare and implement an HSP that will address worker safety when working with potentially hazardous materials including ACM, LBP, ADL, and/or other construction-related materials.

CI-HAZ-3: Implement the Construction Contingency Plan (CCP) prepared during the final design phase (refer to Mitigation Measure Haz-3) during all construction phases.

CI-HAZ-4: If there is an unexpected release of hazardous substances that exceeds reportable quantities during the construction phase, cease work immediately at the general location of the release and immediately report the release to the National Response Center at 1-800-424-8802. The construction contractor will be responsible for cleanup of all unexpected releases under the appropriate federal, State, or local agency oversight and in accordance with federal, State, and local regulations.

to minimize impacts to the environment from hazardous waste and materials are presented in Section 3.2.5 of this environmental document.

Air Quality

CI-AQ-1: Caltrans will incorporate requirements into the contract specifications requiring that the contractor comply with the AVAQMD's Rule 403 (Fugitive Dust) and MDAQMD's Rule 403.2 (Fugitive Dust Control for the Mojave Desert Planning Area), and SCAQMD's Rules 401, 402, and 403.

CI-AQ-2: To minimize the temporary exhaust emissions from heavy-duty trucks and construction equipment adjacent to certain sensitive receptors, certain construction activities (e.g., extended idling, material storage, and equipment maintenance) will need to be conducted in areas at least 500 feet away from those sensitive receptors.

CI-AQ-3: Caltrans will incorporate requirements into the contract specifications requiring that the contractor comply with the limitations of the National Emissions Standards for Hazardous Air Pollutants regulations as listed in the CFR requiring notification and inspection for the construction activities that are involved with demolition, renovation, or removal of ACMs. Before starting any demolition or renovation of any building, Caltrans will require the contractor to consult with AVAQMD's and the MDAQMD's Compliance Division to determine inspection and compliance requirements.

Noise and Vibration

CI-NOI-1: Equipment noise control shall be applied to revising old equipment and designing new equipment to meet specified noise levels.

CI-NOI-2: In-use noise control shall be used where existing equipment is not permitted to produce noise levels in excess of specified limits.

CI-NOI-3: Site restrictions shall be used in an attempt to achieve noise reduction through modifying the time, place, or method of operation of a particular source.

CI-NOI-4: Personal training of operators and supervisors is needed to become more aware of the construction site noise problems.

CI-NOI-5: Equipment noise control is needed to reduce the noise emissions from construction sites by mandating a specified noise level for design of new equipment and updating old equipment with new noise control devices and techniques presented below:

- Mufflers are very effective devices that reduce the noise emanating from the intake or exhaust of an engine, compressor, or pump. The fitting of effective mufflers on all new equipment and retrofitting of mufflers on existing equipment is necessary to yield an immediate noise reduction at all types of road construction sites.
- Sealed and lubricated tracks for crawler-mounted equipment will lessen the sound radiated from the track assembly resulting from metal-to-soil and metal-to-metal contact. Contractors, site engineers, and inspectors shall ensure that the tracks are kept in excellent condition by periodic maintenance and lubrication.
- Lowering exhaust pipe exit height closer to the ground can result in an offsite noise reduction. Barriers are more effective in attenuating noise when the noise source is closer to ground level.
- General noise control technology can have substantially quieter construction equipment when manufacturers apply state-of-the-art technology to new equipment or repair old equipment to maintain original equipment noise levels.

CI-NOI-6: In–use site noise control is necessary to prevent existing equipment from producing noise levels in excess of specified limits. Any equipment that produces noise levels less than the specified limits will not be affected; however, those exceeding the limit will be required to meet compliance by repair, retrofit, or replacement. New equipment with the latest noise-sensitive components and noise-control devices are generally quieter than older equipment, if properly maintained and inspected regularly. They shall be repaired or replaced if necessary to maintain the in-use noise limit. All equipment applying the in-use noise limit will achieve an immediate noise reduction if properly enforced.

CI-NOI-7: Site restrictions will be applied to achieve noise reduction through different methods, resulting in an immediate reduction of noise emitted to the community without requiring any modification to the source noise emissions. The methods include shielding with barriers for equipment and site, truck rerouting and traffic control, time scheduling, and equipment relocation. The effectiveness of each method depends on the type of construction involved and the site characteristics.

- Shielding with barriers shall be implemented at an early stage of a project to reduce construction equipment noise. The placement of barriers must be carefully considered to reduce limitation of site access. Barriers may be natural or man-made, such as excess land fill used as a temporary berm strategically placed to act as a barrier.
- Efficient rerouting of trucks and control of traffic activity on construction site will reduce noise due to vehicle idling, gear shifting, and accelerating under load. Planning proper traffic control will result in efficient workflow and reduce noise levels. In addition, rerouting trucks does not reduce noise levels but transfers noise to other areas that are less sensitive to noise.
- Time scheduling of activities shall be implemented to minimize noise impact on exposed areas. Local activity patterns and surrounding land uses must be considered in establishing site curfews; however, limiting working hours can decrease productivity. Sequencing the use of equipment with relatively low noise levels versus equipment with relatively high noise levels during noise-sensitive periods is an effective noise control measure.
- Equipment location shall be as far from noise-sensitive land use areas as possible. The contractor shall substitute quieter equipment or use quieter construction processes at or near noise sensitive areas.

CI-NOI-8: Educating contractors and their employees to be sensitive to noise impact problems and noise control methods. This may be one of the most cost-effective ways to help operators and supervisors become more aware of the construction site noise problem and to implement

the various methods of improving the conditions. A training program for equipment operators is recommended to instruct them in methods of operating their equipment to minimize environmental noise. Many training programs are presently given on the subject of job safety. This can be extended to include the impact due to noise and methods of abatement.

Biological Resources

CI-BIO-1: The contractor will comply with all requirements of the Streambed Alteration Agreements to be issued by CDFW per Section 1602 of the California Fish and Game Code.

CI-BIO-2: The contractor will prepare a Noise and Vibration Monitoring and Mitigation Plan by a qualified Acoustical Engineer and submit it for approval. The plan must outline noise- and vibration-monitoring procedures at predetermined noise- and vibration-sensitive sites, as well as historic properties. The plan also must include calculated noise and vibration levels for various construction phases and mitigation measures that may need to meet the project specifications. The contractor will not start any construction work or operate any noise-generating construction equipment at the construction site before approval of the plan. The plan must be updated every 3 months or sooner if there are any changes to the construction activities.

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