3.2.2 Water Quality and Stormwater Runoff

Regulatory Setting

Federal Requirements: Clean Water Act

In 1972, Congress amended the Federal Water Pollution Control Act, making the addition of pollutants to the waters of the U.S. from any point source[7] unlawful unless the discharge is in compliance with a National Pollutant Discharge Elimination System (NPDES) permit. This act and its amendments are known today as the Clean Water Act (CWA). Congress has amended the act several times. In the 1987 amendments, Congress directed dischargers of stormwater from municipal and industrial/construction point sources to comply with the NPDES permit scheme. The following are important CWA sections:

- Sections 303 and 304 require states to issue water quality standards, criteria, and guidelines.
- Section 401 requires an applicant for a federal license or permit to conduct any activity that may result in a discharge to waters of the U.S. to obtain certification from the state that the discharge will comply with other provisions of the act. This is most frequently required in tandem with a Section 404 permit request (see below).
- Section 402 establishes the NPDES, a permitting system for the discharges (except for dredge or fill material) of any pollutant into waters of the U.S. Regional Water Quality Control Boards (RWQCB) administer this permitting program in California. Section 402(p) requires permits for discharges of stormwater from industrial/construction and municipal separate storm sewer systems (MS4s).
- Section 404 establishes a permit program for the discharge of dredge or fill material into waters of the U.S. This permit program is administered by the U.S. Army Corps of Engineers (USACE).

The goal of the CWA is "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters."

USACE issues two types of 404 permits: General and Standard permits. There are two types of General permits: Regional permits and Nationwide permits. Regional permits are issued for a general category of activities when they are similar in nature and cause minimal environmental effect. Nationwide permits are issued to allow a variety of minor project activities with no more than minimal effects.

Ordinarily, projects that do not meet the criteria for a Regional or Nationwide Permit may be permitted under one of USACE's Standard permits. There are two types of Standard permits: Individual permits and Letters of Permission. For Standard permits, approval by USACE is based on compliance with U.S. Environmental Protection Agency's (EPA) Section 404 (b)(1) Guidelines (EPA *Code of Federal Regulations* [CFR] 40 Part 230), and whether the permit approval is in the public interest. The Section 404(b)(1) Guidelines (Guidelines) were developed by EPA in conjunction

[7] A point source is any discrete conveyance, such as a pipe or a man-made ditch.

with USACE and allow the discharge of dredged or fill material into the aquatic system (waters of the U.S.) only if there is no practicable alternative that would have less adverse effects. The Guidelines state that USACE may not issue a permit if there is a least environmentally damaging practicable alternative (LEDPA) to the proposed discharge that would have lesser effects on waters of the U.S. and not have any other significant adverse environmental consequences. According to the Guidelines, documentation is needed that a sequence of avoidance, minimization, and compensation measures has been followed, in that order. The Guidelines also restrict permitting activities that violate water quality or toxic effluent[8] standards, jeopardize the continued existence of listed species, violate marine sanctuary protections, or cause "significant degradation" to waters of the U.S. In addition, every permit from USACE, even if not subject to the Section 404(b)(1) Guidelines, must meet general requirements (see 33 CFR 320.4). A discussion of the LEDPA determination is included in Section 3.3.2, Wetlands and Other Waters.

State Requirements: Porter-Cologne Water Quality Control Act

California's Porter-Cologne Act, enacted in 1969, provides the legal basis for water quality regulation within California. This act requires a "Report of Waste Discharge" for any discharge of waste (liquid, solid, or gaseous) to land or surface waters that may impair beneficial uses for surface waters and/or groundwaters of the state. It predates the CWA and regulates discharges to waters of the state. Waters of the state include more than just waters of the U.S., like groundwater and surface waters not considered waters of the U.S. Additionally, it prohibits discharges of "waste" as defined, and this definition is broader than the CWA definition of "pollutant." Discharges under the Porter-Cologne Act are permitted by Waste Discharge Requirements (WDRs) and may be required even when the discharge is already permitted or exempt under the CWA.

The State Water Resources Control Board (SWRCB) and RWQCBs are responsible for establishing the water quality standards (objectives and beneficial uses) required by the CWA and regulating discharges to ensure compliance with the water quality standards. Details about water quality standards in a project area are included in the applicable RWQCB Basin Plan. In California, Regional Boards designate beneficial uses for all water body segments in their jurisdictions and then set criteria necessary to protect these uses. As a result, the water quality standards developed for particular water segments are based on the designated use and vary depending on that use. In addition, the SWRCB identifies waters failing to meet standards for specific pollutants. These waters are then state-listed in accordance with CWA Section 303(d). If a state determines that waters are impaired for one or more constituents and the standards cannot be met through point source or nonpoint source controls (NPDES permits or WDRs), the CWA requires the establishment of Total Maximum Daily Loads (TMDLs). TMDLs specify allowable pollutant loads from all sources (i.e., point, nonpoint, and natural) for a given watershed.

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[8] The EPA defines "effluent" as "wastewater, treated or untreated, that flows out of a treatment plant, sewer, or industrial outfall."

State Water Resources Control Board and Regional Water Quality Control Boards

The SWRCB administers water rights, sets water pollution control policy, and issues water board orders on matters of statewide application, and oversees water quality functions throughout the state by approving Basin Plans, TMDLs, and NPDES permits. RWCQBs are responsible for protecting beneficial uses of water resources within their regional jurisdiction using planning, permitting, and enforcement authorities to meet this responsibility.

National Pollutant Discharge Elimination System Program

Municipal Separate Storm Sewer Systems

Section 402(p) of the CWA requires the issuance of NPDES permits for five categories of stormwater discharges, including MS4s. An MS4 is defined as "any conveyance or system of conveyances (roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, human-made channels, and storm drains) owned or operated by a state, city, town, county, or other public body having jurisdiction over stormwater, that is designed or used for collecting or conveying stormwater." The SWRCB has identified Caltrans as an owner/operator of an MS4 under federal regulations. Caltrans' MS4 permit covers all Caltrans rights-of-way (ROWs), properties, facilities, and activities in the state. The SWRCB or the RWQCB issues NPDES permits for 5 years, and permit requirements remain active until a new permit has been adopted.

Caltrans' MS4 Permit (Order No, 2012-0011-DWQ) was adopted on September 19, 2012, and became effective on July 1, 2013. The permit has three basic requirements:

- Caltrans must comply with the requirements of the Construction General Permit (see below);
- Caltrans must implement a year-round program in all parts of the state to effectively control stormwater and non-stormwater discharges; and
- Caltrans' stormwater discharges must meet water quality standards through implementation of permanent and temporary (construction) Best Management Practices (BMPs), to the Maximum Extent Practicable, and other measures as the SWRCB determines to be necessary to meet the water quality standards.

To comply with the permit, Caltrans developed the Statewide Storm Water Management Plan (SWMP) to address stormwater pollution controls related to highway planning, design, construction, and maintenance activities throughout California. The SWMP assigns responsibilities within Caltrans for implementing stormwater management procedures and practices, as well as training, public education and participation, monitoring and research, program evaluation, and reporting activities. The SWMP describes the minimum procedures and practices Caltrans uses to reduce pollutants in stormwater and non-stormwater discharges. It outlines procedures and responsibilities for protecting water quality, including the selection and implementation of BMPs. The proposed project will be programmed to follow the guidelines and procedures outlined in the latest SWMP to address stormwater runoff.

Construction General Permit

NPDES General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Order No. 2009-0009-DWQ, NPDES No. CAS000002 (Construction General Permit) was adopted on September 2, 2009, and became effective on July 1, 2010. The Construction General Permit regulates stormwater discharges from construction sites that result in a disturbed soil area (DSA) of 1 acre or greater, and/or smaller sites that are part of a larger common plan of development. By law, all stormwater discharges associated with construction activity where clearing, grading, and excavation result in soil disturbance of at least 1 acre must comply with the provisions of the General Construction Permit. Construction activity that results in soil disturbances of less than 1 acre is subject to this Construction General Permit if there is potential for significant water quality impairment resulting from the activity as determined by the RWQCB. Operators of regulated construction sites are required to develop a Storm Water Pollution Prevention Plan (SWPPP); to implement sediment, erosion, and pollution prevention control measures; and to obtain coverage under the Construction General Permit.

The Construction General Permit separates projects into Risk Levels 1, 2, or 3. Risk levels are determined during the planning and design phases, and are based on potential erosion and transport to receiving waters. Requirements apply according to the risk level determined. For example, a Risk Level 3 (highest risk) project would require compulsory stormwater runoff pH and turbidity monitoring, and before construction and after construction aquatic biological assessments during specified seasonal windows. For all projects subject to the Construction General Permit, applicants are required to develop and implement an effective SWPPP. In accordance with Caltrans' Standard Specifications, a Water Pollution Control Plan (WPCP) is necessary for projects with DSA less than 1 acre.

Section 401 Permitting

Under Section 401 of the CWA, any project requiring a federal license or permit that may result in a discharge to a water of the U.S. must obtain a 401 Certification, which certifies that the project will be in compliance with state water quality standards. The most common federal permits triggering 401 Certification are CWA Section 404 permits issued by USACE. The 401 permit certifications are obtained from the appropriate RWQCB, dependent on the project location, and are required before USACE issues a 404 permit.

In some cases, the RWQCB may have specific concerns with discharges associated with a project. As a result, the RWQCB may issue a set of requirements known as WDRs under the State Water Code (Porter-Cologne Act) that define activities, such as the inclusion of specific features, effluent limitations, monitoring, and plan submittals that are to be implemented for protecting or benefiting water quality. WDRs can be issued to address both permanent and temporary discharges of a project.

Affected Environment

Analysis in this section is based on the *Water Quality Assessment Report* (WQAR) (Parsons, 2014); the *Preliminary Hydrology and Hydraulics Report* (Parsons, 2014); and the *Final Preliminary Geomorphology Report* (Parsons, 2014), prepared for this project.

Surface Water

The project corridor traverses two watersheds (Antelope Valley and Mojave River). The hydrologic regime along the entire corridor exhibits the characteristics of an alluvial fan, with several channels that cross the project alignment. The project area has a High Desert-type climate, characterized by long, dry, hot summers and cold and windy winters. In the Antelope River and Mojave River valleys, the summer months are hot with little or no precipitation, and all areas within this region can be affected by summer monsoonal thunderstorms. Precipitation occurs as rainfall, with snow common in the high mountains (Parsons, 2014a). Table 3.2.2-1 summarizes the characteristics of hydrologic units within the project area.

Table 3.2.2-1 Characteristic of Hydrologic Units within the Project Area

	Antelope Hydrologic Unit		Mojave Hydrologic Unit	
Hydrologic Area	Lancaster	Rock Creek	El Mirage	Upper Mojave
Hydrologic Subarea (acres)	626.50	626.80	628.10	628.20
Watershed Area (acres)	557,620	265,344	106,382	556,821
Average Annual Rainfall (inches)	7.3	13.3	7.9	12

Source: High Desert Corridor Preliminary Hydrology and Hydraulics Report, 2014

The receiving water bodies within the project corridor include Big Rock Creek, Little Rock Creek, Bell Mountain Wash, Fremont Wash, Mescal Wash, Little Rock Wash, Big Rock Wash, Turner Wash, Ossam Wash, Desert Knolls Wash, and the Mojave River. The Little Rock Wash, Big Rock Wash, Fremont Wash, Bell Mountain Wash, and Mojave River have perennial low-flow channels with riparian vegetation located along the water's edge. For most of the HDC alignment that crosses undeveloped land, there are no man-made drainage systems. Existing drainage for most of the area west of Adelanto flows southerly to northerly across the proposed HDC before discharge to dry lakebeds or playas in the region. Rogers Dry Lake on Edwards Air Force Base is the most well-known of the playas.

Groundwater

The west portion of the project area is located in the Antelope Valley Groundwater Basin (AVG Basin). The AVG Basin has a surface area of 1,580 square miles and includes portions of Los Angeles, Kern, and San Bernardino counties. Recharge to the AVG Basin is primarily accomplished by perennial runoff from the surrounding mountains and hills. Most recharge occurs at the foot of the mountains and hills by percolation through the head of alluvial fan systems. The Big Rock and Little Rock Creeks, in the southern part of the basin, contribute to about 80 percent of the runoff in the AVG Basin. Other minor recharge is from the return of irrigation water and septic system effluent.

From 1975 through 1998, groundwater levels ranged from an increase of 84 feet to a decrease of 66 feet. The parts of the AVG Basin with declining water levels are along the SR-14 corridor from Palmdale through Lancaster to Rosamond and surrounding Rogers Lake on Edwards Air Force Base.

Historically, groundwater flowed north from the San Gabriel Mountains and south and east from the Tehachapi Mountains toward Rosamond Lake, Rogers Lake, and Buckhorn Lake. These dry lakes are places where groundwater can discharge by evaporation. Because of recent groundwater pumping, groundwater levels and flow have been altered in urban areas such as Lancaster and Edwards Air Force Base. Groundwater pumping has caused subsidence of the ground surface, as well as earth fissures to appear in Lancaster and on Edwards Air Force Base. By 1992, 292 square miles of Antelope Valley had subsided by more than 1 foot. This subsidence has permanently reduced aquifer system storage by about 50,000 acre-feet.

The east portion of the project area is located in the Mojave River Groundwater Basin (MRG Basin), which is managed by the Mojave Water Agency (MWA). The MRG Basin encompasses 1,400 square miles and has an estimated total water storage capacity of nearly 5 million acre-feet. Groundwater is recharged into the basin predominantly by infiltration of water from the Mojave River, which accounts for approximately 80 percent of the total basin natural recharge. Other recharge sources include infiltration of storm runoff from the mountains and recharge from human activities such as irrigation return flows, wastewater discharge, and enhanced recharge with imported water. More than 90 percent of the basin groundwater recharge originates in the San Gabriel and San Bernardino mountains. Groundwater is discharged from the basin primarily by well pumping, evaporation through soil, transpiration by plants, seepage into dry lakes where accumulated water evaporates, and seepage into the Mojave River.

Per the Lahontan RWQCB, the Mojave watershed management area includes the Mojave and Broadwell hydrologic units (HUs). In the Mojave River watershed (San Bernardino County), nonpoint source issues relating to overdraft of the groundwater are of concern, including impacts to wetlands and springs. The potential impacts of confined animal facilities (i.e., dairies and chicken farms) and other agricultural activities are of concern. The area is generally in transition from predominantly agricultural to urban land uses. Thus, the nonpoint source concerns are shifting towards urban runoff and construction-related impacts from land development. Other concerns include the use of chemical pesticides to control exotic plants and animals, as well as hydromodification caused by development and flood control projects.

The Antelope Valley watershed management area includes the following hydrologic units: Mesquite, Ivanpah, Owlshead, Leach, Granite, Bicycle, Goldstone, Coyote, Superior, Ballarat, Trona, Coso, Upper Cactus, Indian Wells, Fremont, Antelope, and Cuddeback. In these watersheds, land development (i.e., urban runoff, septic systems) contributes to nonpoint source discharges. At least one confined animal facility is of concern. Historic agricultural use was mainly alfalfa; currently, more common crops are row crops, such as carrots. Other potential nonpoint source discharges result from

pesticide applications, irrigation return water, and groundwater percolation. Groundwater overdraft is also an issue. Erosion and habitat loss from deforestation following wildfires is also of concern.

Beneficial Uses

All projects within the Lahontan Region are subject to the requirements of the Lahontan RWQCB. The Lahontan Region spans eastern California from the Oregon border in the north, to the Mojave Desert, San Bernardino Mountains, and eastern Los Angeles County in the south. The region is nearly 600 miles long and has a total area of more than 33,000 square miles. It includes the highest point (Mount Whitney, +14,494 feet) and lowest point (Badwater, Death Valley, –282 feet) in the contiguous U.S.

The Lahontan RWQCB has prepared the Water Quality Control Plan for the Lahontan Region (Basin Plan, 1995) to help preserve and enhance water quality and to protect the beneficial uses of State waters. The Basin Plan designates beneficial uses for surface waters and groundwaters, and it sets qualitative and quantitative objectives that must be attained or maintained to protect the designated beneficial uses and conform to the State's antidegradation policy. The Basin Plan also describes implementation programs to protect the beneficial uses of all waters in the region, as well as surveillance and monitoring activities to evaluate the effectiveness of the Basin Plan.

To protect beneficial uses, the RWQCB has set forth water quality objectives (WQOs) that are described in the Basin Plan. WQOs are intended (1) to protect public health and welfare, and (2) to maintain or enhance water quality in relation to the designated existing and potential beneficial uses of the water. The receiving water bodies within the project corridor with designated beneficial uses are shown in Table 3.2.2-2.

Table 3.2.2-2 Beneficial Uses

Water Body	Beneficial Use												
	MUN	AGR	IND	GWR	REC-1	REC-2	COMM	WARM	COLD	WILD	SPWN	WQE	FLD
Antelope HU 626.00													
Little Rock Creek	X				X	X	X		X	X			
Big Rock Creek	X	X	X		X	X	X		X	X	X		
Little Rock Reservoir	X	X	X	X	X	X	X		X	X			
Mojave HU 628.00													
Mojave River	X	X		X	X	X	X	X	X	X			
Turner Wash	X	X		X	X	X						X	X

MUN = Municipal and Domestic Supply; AGR= Agricultural Supply; IND = Industrial Service Supply; GWR = Groundwater Recharge; REC-1 = Water Contact Recreation; REC-2 = Non-contact Water Recreation; COMM = Commercial and Sports Fishing; WARM = Warm Freshwater Habitat; COLD = Cold Freshwater Habitat; WILD = Wildlife Habitat; SPWN = Spawning, Reproduction and Development; WQE = Water Quality Enhancement; FLD = Flood Peak Attenuation/Flood Water Storage

Source: High Desert Corridor Water Quality Assessment Report, 2014

Surface Water Quality

The SWRCB created the Surface Water Ambient Monitoring Program (SWAMP) to provide a measure of the State's ambient water quality and the effectiveness of the State's water quality protection programs. The SWAMP relies primarily on contractors, such as University of California, U.S. Geological Survey (USGS), and others, to collect information on the quality of the State's waters.

For the first 5 years of the SWAMP Program (i.e., 2000–2005), the primary goal of monitoring within the Lahontan Region was to determine whether ambient water quality at the monitored sites was in compliance with the chemical and physical WQOs contained in the Water Quality Control Plan for the Lahontan Region (Basin Plan), the California Toxics Rule , and California's Maximum Contaminant Levels (MCLs) for drinking water. SWAMP monitoring activities were conducted from July 2000 through August 25, 2005. The Little Rock Reservoir was the only site sampled within the Antelope HU. Two sampling sites within the Mojave HU that were near the HDC Project included the Mojave River at Upper Narrows and the Mojave River below the Forks Reservoir.

For the two HUs, there were 1,226 water quality results that were comparable to Basin Plan criteria. Of these, 44 samples exceeded Basin Plan objectives for pH, dissolved oxygen (DO), total dissolved solids (TDS), fluoride, sulfate (SO_4), and boron. No samples exceeding the California Toxics Rule (CTR) Human Health criteria were observed. Nine (9) samples exceeded the dissolved fluoride limit at the Mojave River below Forks Reservoir site. The remaining water quality results indicated compliance with drinking water primary MCLs. Five (5) samples collected at Little Rock Reservoir, however, exceeded the secondary drinking water criteria MCL for manganese.

List of Impaired Waters

The CWA requires states to identify water bodies that are considered impaired, which means the water body does not meet water quality standards. States must then place these water bodies onto a list, referred to as the "CWA Section 303(d) List of Water Quality Limited Segments." On October 11, 2011, EPA issued its final decision regarding the water bodies and pollutants added to California's 303(d) List. This list, referred to as the California 2010 Integrated Report, replaces the 2006 California CWA 303(d) List. The 2010 Integrated Report includes a combined list of CWA Section 303(d) water bodies that are listed as not meeting water quality standards and Section 305(b) water bodies that identifies water bodies still requiring the development of a TMDL, those that have a completed TMDL approved by EPA, and those that are being addressed by actions other than a TMDL.

Caltrans has identified pollutants that were discharged from Caltrans facilities with a load or concentration that commonly exceeded allowable standards and were still

considered treatable by currently available Caltrans-approved Treatment BMPs[9] (Caltrans, 2003). As of 2010, these pollutants, designated as Targeted Design Constituents (TDCs), include sediment, metals (i.e., total and dissolved fractions of zinc, lead, and copper), nitrogen, phosphorus, and general metals.

The Mojave Forks Reservoir outlet to Upper Narrows is listed as impaired for fluoride. The Mojave River (Upper Narrows to Lower Narrows) is listed as impaired for fluoride, SO_4, and TDS. Little Rock Reservoir is listed as impaired for manganese. When comparing these pollutants with the Caltrans TDCs, only manganese would be considered a TDC.

Once a water body is listed as impaired, the State is required to develop a TMDL to address each pollutant causing the impairment. A TMDL defines how much of a pollutant load a water body can tolerate and still meet water quality standards. The TMDL is required to account for contributions from point sources (i.e., permitted discharges), as well as contributions from nonpoint sources, including natural background. TMDLs allocate allowable pollutant loads for each source and identify management measures that, when implemented, will assure that water quality standards are attained. Through the RWQCB's basin planning process, TMDLs and TMDL implementation plans are adopted into a RWQCB's Basin Plan.

All three water bodies (i.e., Little Rock Reservoir, Mojave Forks Reservoir outlet to Upper Narrows, and Mojave River Upper Narrows to Lower Narrows) are listed in the 2010 Integrated Report as requiring the development of a TMDL. It is anticipated that the TMDL for these pollutants (i.e., fluoride, SO_4, TDS, and manganese) will be completed by January 2021.

Groundwater Quality

Groundwater quality in the Antelope Valley groundwater basin is typically calcium bicarbonate in character near the surrounding mountains and sodium bicarbonate or sodium sulfate character in the central part of the basin. In the eastern part of the basin, the upper aquifer has sodium-calcium bicarbonate-type water and the lower aquifer has sodium bicarbonate-type water. TDS content in the basin averages 300 milligrams per liter (mg/L) and ranges from 200 to 800 mg/L. Data from 213 public supply wells show an average TDS content of 374 mg/L and ranges from 123 to 1,970 mg/L.

According to the Antelope Valley Integrated Regional Water Management Plan, groundwater quality is excellent within the principal aquifer but is not as good towards the northern portion of the dry lake areas. Some portions of the basin contain groundwater with high fluoride, boron, TDS, and nitrate concentrations. Arsenic is another emerging contaminant of concern in the Antelope Valley Region. Research conducted by the Los Angeles County Waterworks District and USGS has shown the

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[9] California Department of Transportation, *Storm Water Monitoring and Data Management: Final Discharge Characterization Study Report*, November 2003, CTSW-RT-03-065.51.42.

problem to reside primarily in the deep aquifer, and it is not anticipated that the existing arsenic problem will lead to future loss of groundwater as a water supply resource for the Antelope Valley.

Mojave Water Agency (MWA)'s groundwater basins contain numerous areas with water quality issues. Key contaminants include arsenic, nitrates, iron, manganese, Chromium VI, and TDS. Measurements in excess of drinking water standards have been found for some of these constituents within the MRG Basin.

Another potential water quality issue facing MWA is the accumulation of salt in the groundwater basins. Because the Mojave Basin area is considered a closed basin, salts added to the locally generated wastewater, salts contained in the imported reclaimed wastewater, and salts in the SWP supplies are generally not removed from the basin.

To understand the potential long-term water quality changes that may occur in the MRG Basin over time due to long-term effects of wastewater and importation of SWP water into the MWA service area, the Lahontan RWQCB and the MWA worked cooperatively to develop a regional salt balance model. The model was finalized in 2007 and generally showed that the importation of SWP water mitigated the long-term effects of salt loading (i.e., TDS increases) primarily caused by population increases and the associated larger volumes of wastewater entering the basin.

Areas of Special Biological Significance

To protect and restore ecologically sensitive ecosystems along the coast, California created 34 Areas of Special Biological Significance spanning the length of the coast. This designation was intended to bring special protection to fragile coastal biological communities by strictly limiting or prohibiting discharges of point source waste and requiring nonpoint source pollution to be controlled to the "extent practicable" before it reaches an Area of Special Biological Significance to preserve natural water quality conditions. According to the map provided by the SWRCB (SWRCB, 2011b), there are no Areas of Special Biological Significance sites within the project limits.

Environmental Consequences

No Build Alternative

No impacts to ground or surface water quality would occur under the No Build Alternative.

Freeway/Expressway and Freeway/Tollway Alternatives

The proposed project would result in an increase in impervious surface areas; therefore, the velocity and volume of downstream flow is expected to increase. Once the new facility is completed, potential pollutant sources would be associated with motor vehicle operations (i.e., brake dust; oil and grease; and nitrites), highway maintenance activities (i.e., sediment and tree/shrub clippings), illegal dumping (i.e., trash), accidental spills (i.e., hazardous and nonhazardous chemicals), and landscaping care (i.e., fertilizers, pesticides, and herbicides). Based on the W*ater Quality Assessment Report, 2014*, the Freeway/Expressway and Freeway/Tollway

alternatives, which include the variations and options, would add about 995 acres to the existing 80-acre impervious surface area.

Under existing conditions, runoff and sediment discharges are in a state of equilibrium. Under these build alternatives, sediment yield from the road is negligible because it is paved. The proposed project would modify existing slopes and create new slopes. Proposed slopes would generally follow existing grade and would not be steeper than 2:1 (horizontal [H]: vertical [V]) and would be constructed at 4:1 (H:V) or flatter to the maximum extent practicable. Final design and construction criteria includes cut and fill slopes, which would be revegetated after construction so that they would not provide additional sources of sediment. Furthermore, infiltration basins, earthen and concrete channels, cross culverts, storm drain pipelines and inlets, riprap energy-dissipation devices, and other forms of erosion protection would be constructed so that runoff would be intercepted and conveyed along and across the roadway alignment, minimizing erosion potential.

The addition of impervious surfaces resulting from implementation of the build alternatives would not interfere with groundwater recharge because recharge to the Antelope Valley Basin is primarily accomplished by perennial runoff from the surrounding mountains and hills. Recharge to the MRG Basin is predominantly accomplished by infiltration of Mojave River water. The other recharge sources include infiltration of stormwater runoff, irrigation return flows, wastewater discharge, and enhanced recharge with imported water. Recharge facilities within this basin are located in the Alto subarea and include the Oro Grande Demonstration Recharge site (approximately 3 miles from the HDC) and the Rock Springs Recharge Site and the proposed Antelope Wash Recharge Site, both of which are located approximately 10 miles from the HDC.

None of the build alternatives are expected to result in the destruction of groundwater wells or the permanent lowering of groundwater levels. There would be no placement of impervious road surfaces in recharge areas. Furthermore, all of the offsite water would be conveyed through the facility and back to the environment. All onsite water would be treated and then released into the environment via the proposed infiltration basins. Although all of the build alternatives would result in alterations to drainage, such as changes in ground surface permeability via paving and changes in topography via grading and excavation, a reduction in recharge is not expected to occur that could affect groundwater levels in the aquifers or existing and potential water supplies.

Freeway/Expressway and Freeway/Tollway with HSR Alternatives

The nature of impacts to water quality under the alternatives with HSR, which also includes the variations and options, are the same as that discussed under the Freeway/Expressway and Freeway/Tollway alternatives. However, the Freeway/Expressway and Freeway/Tollway with HSR alternatives would add about 1,365 acres to the existing 80-acre impervious surface area.

Similar to the Freeway/Expressway and Freeway/Tollway alternatives, infiltration basins, earthen and concrete channels, cross culverts, storm drain pipelines and inlets,

riprap energy-dissipation devices, and other forms of erosion protection would be constructed so that runoff would be intercepted and conveyed along and across the roadway alignment, minimizing erosion potential.

Avoidance, Minimization, and/or Mitigation Measures

Potential long-term water quality impacts associated with operation and maintenance of the transportation facility would be minimized with the implementation of Maintenance, Design Pollution Prevention, and Treatment BMPs. Specifically, the proposed drainage system would include infiltration at most of the intersections to treat highway runoff flow and to partially contain flows from pavement runoff before discharging offsite. Numerous channels and ditches would be placed at the edge of the ROW along the alignment to convey flows to the bridge crossings and cross culverts. Given that all onsite water would be treated and then released into the environment via the proposed infiltration basins, water quality impacts would be minimized with the implementation of any of the build alternatives. Overall, with incorporation of Temporary Construction Site BMPs (e.g., silt fence, fiber roll, stabilized construction entrance/exit) and Permanent BMPs (e.g., infiltration basins), water quality impacts would be minimized with implementation of the project.

The standard conditions provided in Section 3.6, Construction Impacts would minimize impacts to water quality due to stormwater erosion, construction discharges, and bank or streambed alteration.