
5.4 WATER QUALITY

5.4.1 INTRODUCTION

Purpose

The County of Los Angeles Department of Regional Planning Environmental Checklist Form, which has been prepared pursuant to the California Environmental Quality Act (CEQA), requires that water quality issues be evaluated as part of the environmental documentation process. The effects of the Project on the quality of both surface waters and groundwater are addressed. The impacts of the proposed development on the Project site are analyzed at a project-level of detail; direct and indirect impacts are addressed for each threshold criterion for both the on-site and off-site Project features. Growth-inducing impacts and cumulative impacts related to water quality are described in Sections 6.0 and 7.0, respectively. Drainage and flood-control issues are analyzed in Section 5.2, Hydrology and Flood; water supply is analyzed in Section 5.18, Water Resources (Supply and Services); and recycled water use is analyzed in Section 5.19, Wastewater.

Summary

In 2014, the County of Los Angeles (County) prepared its *Low Impact Development Standards Manual* (LID Standards Manual) to implement the National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) permit for storm water and non-storm water discharges issued to the County by the California Regional Water Quality Control Board, Los Angeles Region (CAS004001, Order No. R4- 2012-0175) (MS4 Permit). The LID Standards Manual also implements the County's Low Impact Development (LID) Ordinance (County Code Section 12.84). The objectives and goals of the LID Standards Manual, the County MS4 permit and the County LID Ordinance are to (1) lessen the adverse impacts of storm water runoff from development and urban runoff on natural drainage systems, receiving waters, and other water bodies; (2) minimize pollutant loadings from impervious surfaces by requiring development projects to incorporate properly designed, technically appropriate Best Management Practices (BMPs) and other LID strategies; and (3) minimize erosion and other hydrologic impacts on natural drainage systems by requiring development projects to incorporate properly designed, technically appropriate hydromodification control development principles and technologies (LACDPW 2014).

The proposed Project has been designed to meet or exceed County MS4 Permit, LID Standards Manual, and LID Ordinance water quality requirements for new development and to avoid impacts to applicable surface and groundwater beneficial uses designated in the basin plans adopted by the Lahontan and Los Angeles Regional Water Quality Control Boards (RWQCBs). The Project will include site-design, source-control, LID, and hydromodification-control BMP requirements. Most Project runoff will be subject to control and treatment in a regional system that consists of 28 detention and retention basins located throughout the Project site (see Exhibit 5.2-4, Proposed Infiltration Basin Locations, in Section 5.2, Hydrology and Flood). Other developed areas will treat and control runoff by utilizing distributed, smaller, or parcel-specific LID measures (see Exhibit 5.4-2, Low Impact

Development [LID] Drainage Areas with Project). These regional and distributed measures will also meet County LID standards for new development and will provide sufficient treatment capacity to reduce potential surface and groundwater quality impacts to less than significant levels.

The Project's water quality performance standard is consistent with County requirements for new development and is incorporated in Mitigation Measure (MM) 4-1. The Project will also implement integrated pest management (IPM) and landscaping BMPs consistent with IPM and pesticide and fertilizer application guidelines established by the University of California Division of Agriculture and Natural Resources Statewide Integrated Pest Management Program. The IPM and landscaping BMPs are incorporated in MM 4-2 and will be further confirmed prior to the issuance of building permits and during the County tract map review process. These measures will control potential pesticide, nitrogen, and other pest and landscaping-related water quality impacts to less than significant levels.

During construction, the Project will comply with and implement the requirements of the General Construction Permit issued by the State Water Resources Control Board (CAR000002, Order 2009-0009-DWQ as amended by Order 2010-0014-DWQ and Order 2012-0006-DWQ)(Construction General Permit). The Construction General Permit requires that potential risks to water quality be evaluated for construction activity and that a Stormwater Pollution Prevention Plan (SWPPP), including specific BMPs that will avoid potentially significant construction period storm water impacts based on the Project risk assessment, be implemented.

With mitigation, the Project would not have a significant impact on surface water or groundwater quality. Developed area runoff constituent concentrations would be below all water quality objectives and criteria. Qualitatively assessed constituents in post-development runoff would not occur at levels that would exceed water quality standards or adversely affect beneficial uses of receiving surface or ground waters. Implementation of the planned BMPs in compliance with the Los Angeles County MS4 Permit, LID Ordinance, and LID Standards Manual would meet or exceed the requirements of the federal, State, and County standards for water quality. As discussed in Section 5.19, Wastewater, the two proposed Wastewater Reclamation Facilities (WRFs) will produce recycled water treated to unrestricted reuse standards under Title 22 of the *California Code of Regulations*. The WRFs will be issued Waste Discharge Requirements (WDRs) by the Lahontan RWQCB and will be operated in accordance with the WDRs to protect surface and groundwater quality and designated beneficial uses. MM 19-5 in Section 5.19, Wastewater, requires that WRF compliance with Title 22 and WDR requirements be confirmed in documentation submitted to the County prior to the issuance of building permits for Project development.

Section Format

As described in Section 5.0, Environmental Setting, Impacts, and Mitigation, and in accordance with State CEQA Guidelines Article 9 (Contents of Environmental Impact Reports), each topical environmental analysis includes a description of the existing setting; identification of thresholds of significance; analysis of potential Project effects and identification of significant impacts; identification of mitigation measures, if required, to

reduce significant impacts; and level of significance after mitigation, if any. This information is presented in the following format (please refer to Section 2.0, Introduction, and Section 5.0 for descriptions of each of these topics):

- Introduction
 - Purpose
 - Summary
 - Section Format
 - References
- Relevant Plans, Policies, and Regulations
- Environmental Setting
- Project Design Features
- Water Quality Assessment Methodology
- Threshold Criteria
- Environmental Impacts—A separate analysis is provided for each of the following categories of potential impacts:
 - On-Site Impacts
 - Off-Site Impacts
- Mitigation Measures
- Level of Significance After Mitigation
- References

References

All references cited for preparation of this analysis are listed in Section 5.4.10. The primary technical references for this section are listed below.

1. Psomas. 2017 (April). *Centennial Master Plan Hydrology*. Santa Clarita, CA: Psomas (Appendix 5.2-A).
2. Geosyntec Consultants. 2016 (February). *Centennial Project Water Quality Technical Report*. Oakland, CA: Geosyntec Consultants (Appendix 5.4-A).

5.2.1 RELEVANT PLANS, POLICIES, AND REGULATIONS

Federal

Federal Clean Water Act

The federal Clean Water Act (CWA, *United States Code*, Title 33, Sections 1251 et seq.) requires National Pollutant Discharge Elimination System (NPDES) permits for the discharge of pollutants into “waters of the U.S.” from any point source. Point sources are discrete conveyances such as pipes or man-made ditches. Examples of pollutants include, but are not limited to, rock, sand, dirt, and agricultural, industrial, and municipal waste discharged into “waters of the U.S.”. Point sources that discharge into municipal sewer systems (e.g., such as

residential wastewater conveyance pipes) do not require individual permits, but the sewer systems do require an NPDES permit.

In California, responsibility for implementing the NPDES program has been delegated to the State Water Resources Control Board (SWRCB) and the nine Regional Water Quality Control Boards (RWQCBs) acting under the auspices of the state board. The SWRCB and the RWQCBs typically issue NPDES permits that also include waste discharge requirements (WDRs) under State law. The Los Angeles County MS4 permit and the state General Construction Permit have been issued as NPDES permits and as WDRs and are discussed in more detail below.

The CWA requires that States adopt water quality standards for receiving water bodies, including designated beneficial uses (e.g., wildlife habitat, agricultural supply, fishing) and the water quality criteria necessary to support those uses. Water quality criteria are prescribed concentrations or levels of constituents—such as lead, suspended sediment, or fecal coliform bacteria—or narrative statements that represent the quality of water that support a particular use. Water quality standards applicable to the Project site are established in the Basin Plans adopted by the Lahontan and Los Angeles Regional Water Quality Control Boards and also in the California Toxics Rule (CTR) (40 *Code of Federal Regulations* [CFR] 131.38) adopted by the U.S. Environmental Protection Agency (see the discussion of state regulations below) under the CWA.

Section 303(d) of the Clean Water Act

Section 303(d) of the CWA requires that water bodies for which beneficial uses are not being achieved be listed as “impaired” and that Total Maximum Daily Loads (TMDLs) must be developed for each impairing constituent to reduce discharge levels and meet applicable water quality standards. The list of impaired water bodies is commonly referred to as the “303d list”. A TMDL is an estimate of the total load of a constituent, including a margin of safety, from point, non-point, and natural sources that a water body may receive without exceeding applicable water quality standards. Once established, a TMDL allocates the total constituent load to current and future sources that discharge to the affected water body.

Approximately 96 percent of the Project site, including locations that will be preserved in open space and remain undeveloped, are located within the Antelope Valley Watershed (93 percent of the site) and the much smaller Quail Lake Watershed to the south (3 percent of the site), both of which are within the jurisdiction of the Lahontan RWQCB. Exhibit 5.2-1, Regional Water Quality Control Board Boundaries, in Section 5.2, Hydrology and Flood, shows the jurisdictional boundaries of the Lahontan RWQCB relative to the Project site. Water bodies in the Antelope Valley Watershed that could receive flows from the Project site are not listed as impaired on the currently applicable 2010 303(d) list or the proposed 2012 303(d) list (SWRCB 2015a, 2015b).

Approximately 4 percent of the site drains to Gorman Creek, which is located about 4.5 miles downstream from the southwestern edge of the Project site. Gorman Creek is within the Santa Clara River Watershed and the Santa Clara-Calleguas Hydrologic Unit, Piru Hydrologic Area as defined in the *Water Quality Control Plan for the Los Angeles Region* (Los Angeles Basin Plan). The Santa Clara River Watershed is under the jurisdiction of the Los Angeles

RWQCB. Exhibit 5.2-1, in Section 5.2, Hydrology and Flood, shows the jurisdictional boundaries of the Los Angeles RWQCB relative to the Project site.

Gorman Creek flows to Cañada de los Alamos in the Lower Hungry Valley before discharging to Pyramid Lake about six miles downstream from the Project boundary. Downstream of Pyramid Lake, Piru Creek flows south approximately 19 miles to Piru Lake, which is formed by the Santa Felicia Dam and then for approximately 6 miles south from Piru Lake to Reach 4 of the Santa Clara River. The point of confluence with the Santa Clara River is located approximately 40 miles south of the Project site.

Stream segments listed as impaired in the approved 2010 303(d) list for the Los Angeles RWQCB within Piru Creek and Santa Clara River downstream of the Project include Reach 3 and Reach 1 (downstream of Reach 4) of the Santa Clara River; the Santa Clara River Estuary; and Piru Creek (from the confluence with the Santa Clara River to the headwaters). Reach 3 of the Santa Clara River is listed for ammonia, chloride, total dissolved solids (TDS), and toxicity. Reach 1 of the Santa Clara River, located approximately 68 miles downstream of the Project site, is listed for toxicity. The Santa Clara River Estuary (located approximately 72 miles downstream of the Project site) is listed for coliform, historical pesticides, Toxaphene, nitrate-nitrogen, and toxicity. Piru Creek is listed for boron, specific conductance, sulfates, and total dissolved solids in Santa Clara River Reach 11 (included on the list as Piru Creek from the confluence with Santa Clara River Reach 4 to the gauging station below the Santa Felicia Dam), and for chloride and hydrogen ion activity (pH) from the gauging station below the Santa Felicia Dam upstream to the creek headwaters (Los Angeles RWQCB 2006).

Section 401 and 404 of the Clean Water Act

Section 401 of the CWA (33 USC 1251 et seq.) requires that any person applying for a federal permit or license that may result in a discharge of pollutants into “waters of the U.S.” must obtain a State water quality certification that concludes that the activity complies with all applicable water quality standards, limitations, and restrictions. Subject to certain limitations, no license or permit may be issued by a federal agency until a Section 401-required certification has been granted. Further, no license or permit may be issued if certification has been denied. The CWA Section 404 permits and authorizations (described in the next paragraph) are subject to Section 401 certification by the local RWQCB.

Section 404 of the Clean Water Act (CWA) is a program that regulates the discharge of dredged and fill material into “waters of the U.S.”, including wetlands. Activities in “waters of the U.S.” that are regulated under this program include fills for development (including physical alterations to drainages to accommodate storm drainage, stabilization, and flood-control improvements); water resource projects (such as dams and levees); infrastructure development (such as highways and airports); and conversion of wetlands to uplands for farming and forestry. The U.S. Environmental Protection Agency (USEPA) and the U.S. Army Corps of Engineers (USACE) have issued Section 404(b)(1) Guidelines (40 CFR 230) that regulate dredge and fill activities, including water quality aspects of such activities. Subpart C of Sections 230.20–230.25 contains water quality regulations applicable to dredge and fill activities. Among other topics, these guidelines address discharges that alter substrate elevation or contours; suspended particulates and water clarity; nutrients and chemical

content; current patterns and water circulation; water fluctuations (including those that alter erosion or sediment rates); and salinity gradients. As discussed in Section 5.7, Biological Resources, approximately 1 percent of all on-site and immediately adjacent water features (1.8 acres of a total of 165.5 acres) have been delineated as federally jurisdictional waters by the USACE (see Table 5.7-9, Jurisdictional Wetlands and Waters Summary, from Section 5.7, Biological Resources).

Federal Antidegradation Policy

The Federal Antidegradation Policy (40 CFR 131.12) requires that, subject to specific exceptions, existing beneficial uses and water quality levels in unimpaired waters must be maintained and that new discharges may not degrade these uses and levels. The policy implements three tiers of antidegradation requirements. Tier 1 is the most broadly applicable and requires that existing uses and the water quality levels that support existing uses must be maintained. Tier 2 applies to high quality water bodies in which existing water quality exceeds levels necessary to support propagation of fish, shellfish, and wildlife and recreational uses. Tier 3 provides special protection for “Outstanding National Resources Waters” that have been designated as unique or ecologically sensitive. Activities that would degrade existing beneficial uses and water quality can be permitted by a State under the Federal Antidegradation Policy only after completion of applicable intergovernmental coordination and public participation requirements and findings that (a) allow that lower water quality is necessary to accommodate important economic or social development in the area in which the waters are located; (b) the State assures that, although degradation or lower water quality will occur, water quality adequate to protect existing uses will be maintained; and (c) all new and existing point sources and all cost-effective and reasonable best management practices for nonpoint source control achieve the highest statutory and regulatory requirements.

State

California Porter-Cologne Act

The Porter-Cologne Water Quality Control Act of 1970 (Porter-Cologne Act)(*California Water Code*, Sections 13000 et seq.) is California’s primary statute governing water quality and water pollution issues, including sediment transport and protection of surface waters and groundwater. The Porter-Cologne Act provides the SWRCB and nine RWQCBs with the authority to protect water quality and is the primary vehicle for implementing California’s responsibilities under the federal CWA. Each RWQCB must formulate and adopt a water quality control plan (commonly referred to as a “basin plan”) for the region within its jurisdiction. The basin plan must conform to the policies set forth in the Porter-Cologne Act and the state water policy established by the SWRCB. The basin plan establishes beneficial uses for surface and groundwaters in the region, and includes narrative and numeric water quality standards to protect those beneficial uses. Each RWQCB is also authorized to include water discharge prohibitions applicable to particular conditions, areas, or types of waste within its jurisdiction. The Act requires that, unless otherwise authorized by a general or other permit, Reports of Waste Discharge to regulated “waters of the State” must be provided to each RWQCB. The RWQCB may issue discharge permits under State law in response to a Report of Waste Discharge. These permits are commonly referred to as “waste discharge

requirements” (WDRs) and are issued by the RWQCBs for activities within each regional board’s jurisdiction.

State Antidegradation Policy

The State Antidegradation Policy (SWRCB Resolution No. 68-16), was adopted to prevent degradation of surface water and groundwater in California. The Antidegradation Policy requires that, whenever the existing quality of water is higher than the quality established in policies as of the date on which such policies become effective, the existing higher quality will be maintained until it has been demonstrated that any change (a) will be consistent with maximum benefit to the people of the state; (b) will not unreasonably affect present and anticipated beneficial use of the affected water; and (c) will not result in water quality that is lower than prescribed in the policies. The policy also provides that any activity that produces or may produce a waste or increased volume or concentration of waste and would discharge to existing high quality waters must meet waste discharge requirements that achieve the best practicable discharge treatment or control to ensure that (a) a pollution or nuisance will not occur and (b) the highest water quality consistent with maximum benefit to the people of the state will be maintained.

Construction General Permit

The NPDES program allows for the issuance of general permits that cover specific actions by multiple parties, such as construction activities. Dischargers covered under a general permit must comply with the permit terms and conditions. In 2009, the SWRCB issued the statewide Construction General Permit to regulate discharges or pollutants in storm water associated with construction activities (NPDES No. CAR000002, Water Quality Order 2009-0009-DWQ as amended by 2010-0014-DWQ and 2012-006-DWQ). Dischargers are required to obtain coverage under the Construction General Permit if a project disturbs one or more acres of soil or disturbs less than one acre, but is part of a larger common plan of development that, in total, disturbs one or more acres.

The Construction General Permit requires that projects implement an SWPPP that includes specific BMPs and establishes numeric effluent limitations to meet water quality and technology-based standards. Major components of the adopted Construction General Permit include the following:

Risk-Based Permitting Approach. The Construction General Permit includes a three-tiered system for discharges (identified as Risk Levels 1, 2, and 3) that is based on the relative risk a project poses to causing water quality impacts. Risk levels are established by calculating two factors: (1) the project’s sediment risk and (2) receiving water risk during periods of soil exposure (i.e., grading and site stabilization) (SWRCB 2015b). Sediment risk is determined by the relative amount of sediment that can be discharged from the construction site given the duration of construction, project location, and other project site details. Receiving water risk is based on whether a project drains to a sediment-sensitive waterbody. A high-risk waterbody has one of the following conditions:

- It is listed as impaired for sediment on the most recent List of Impaired Water bodies maintained in compliance with CWA Section 303(d).

- It has a USEPA-approved Total Maximum Daily Load implementation plan for sediment.
- Has been designated in an applicable basin plan for COLD (cold freshwater habitat), SPWN (spawning, reproducing and/or early development), and MIGR (migration of aquatic organisms) beneficial uses.

Depending on the level of risk identified for a project, the Construction General Permit requirements progressively increase. Certain short-duration projects of less than five acres and constructed during one dry season may qualify for a rainfall erosivity waiver under the permit.

Numeric Action Levels and Numeric Effluent Limitations. To be covered by the Construction General Permit, dischargers must meet specific Numeric Action Levels (NALs) for pH and turbidity. Exceedance of an NAL does not constitute a permit violation, but does trigger mandatory implementation of additional BMPs and/or corrective actions. In addition, the Construction General Permit requires that Risk Level 3 dischargers with direct discharges to surface waters monitor the receiving water body if an effluent sampling result exceeds receiving water monitoring triggers (effluent pH outside the range of 6.0 and 9.0 pH units or turbidity exceeding 500 Nephelometric Turbidity Units [NTU]). Where active treatment systems are used, dischargers must meet Numeric Effluent Levels (NELs) for turbidity. Exceedances of the Active Treatment System turbidity NEL are considered to be violations of the Construction General Permit.

Post-Construction Standards. The Construction General Permit requires that the pre-project water balance (i.e., the volume of rainfall that ends up as runoff) be replicated under post-construction conditions for the smallest storms up to the 85th percentile storm event (or the smallest storm event that generates runoff, whichever is larger). In addition, for projects that disturb more than two acres, the post-project time of runoff concentration must be equal to or greater than pre-project time of concentration. Finally, BMPs to reduce pollutants in storm water discharges that are reasonably foreseeable after all construction phases have been completed must be implemented under the permit.

Best Management Practices. The Construction General Permit specifies mandatory, minimum BMPs to prevent storm water pollution and post-construction impacts. The required level of BMPs increases with a project's risk level. The minimum BMPs for all projects include site run-on control, perimeter controls, and good housekeeping practices, among numerous other requirements. BMPs must be implemented to meet the Best Available Technology Economically Achievable (BAT)/Best Conventional Pollutant Control Technology (BCT) standard.

Rain Event Action Plan. During the rainy season, the permit requires that adequate sediment-control materials be available to control sediment discharges in the event of a predicted storm. Risk Level 2 and 3 sites must also develop and implement a Rain Event Action Plan (REAP) designed to protect all exposed portions of the site within 48 hours prior to any likely precipitation event. A written REAP specific for each rain event is required whenever there is a 50 percent or greater chance of receiving precipitation in the project area.

Monitoring and Reporting Requirements. In addition to visual monitoring at all sites, the Construction General Permit requires the following:

- Sampling, analysis, and monitoring requirements for non-visible pollutants at all sites;
- Effluent and receiving water monitoring for pH and turbidity for all Risk Level 3 sites;
- Receiving water bioassessment sampling before and after project completion for larger Risk Level 3 sites; and
- Submission of an Annual Report no later than September 1 of each year must be electronically submitted via the SMARTS website. Each Annual Report must include sampling data, a summary of all exceedances and violations, corrective actions, names of all responsible parties, and training documentation.

Title 22 (California Water Code)

The requirements of Title 22—as revised in 1978, 1990, 2001, and 2014—establish the quality and/or treatment processes required for recycled water to be used for a non-potable application. In addition to recycled water uses and treatment requirements, Title 22 addresses (1) sampling and analysis requirements at a treatment plant; (2) preparing an engineering report prior to production or use of recycled water; and (3) ensuring there are general treatment design requirements, reliability requirements, and alternative methods of treatment. Permits are issued to each water recycling project by one of the nine RWQCBs. These permits include water quality and public health protections, as detailed in Title 22.

California Green Building Standards (CALGreen) Code

In January 2013, the State of California enacted the third revision of the California Green Building Standards (CALGreen Code) Code as part 11 of the California Building Standards Code (Title 24). CALGreen measures are designed to improve public health, safety, and general welfare by utilizing design and construction methods that reduce the negative environmental impact of development and encourage sustainable construction practices.

CALGreen provides mandatory direction to developers of all new construction and renovations of residential and non-residential structures with regard to all aspects of design and construction, including but not limited to site drainage design, storm water management, and water use efficiency. Required measures are accompanied by a set of voluntary standards that are designed to encourage developers and cities to aim for a higher standard of development.

Under CALGreen, all residential and non-residential sites are required to be planned and developed to keep surface water from entering buildings and to incorporate efficient outdoor water use measures. Construction plans are required to show appropriate grading and surface water management methods such as swales, water collection and disposal systems, French drains, water retention gardens, and other water measures that keep surface water away from buildings and aid in groundwater recharge. Plans should also include outdoor water use plans that utilize weather- or soil-moisture-controlled irrigation systems. Non-residential structures are also required to develop an irrigation water budget

for landscapes greater than 2,500 square feet that conforms to a local water efficient landscape ordinance or to the State's Model Water Efficient Landscape Ordinance (MWELo) where no local ordinance is applicable. The MWELo was recently updated by the California Governor's Drought Executive Order (B-19-25) on July 15, 2015. The MWELo requirements for the project are discussed in Section 5.18, Water Resources.

California Toxics Rule (CTR)

The California Toxics Rule (CTR, 40 CFR 131.38) is a federal regulation issued by the USEPA that provides water quality criteria for potentially toxic constituents in California surface waters with human-health or aquatic-life designated uses. The USEPA adopted the CTR in 2000 to create legally applicable water quality criteria for priority toxic pollutants for inland surface waters, enclosed bays, and estuaries to protect human health and the environment for all purposes and programs under the CWA. The CTR aquatic life criterion was derived using a CWA Section 304(a) method that produces an estimate of the highest concentration of a substance in water which does not present a significant risk to the aquatic organisms in the water and their uses. The CTR water quality criteria provide a reasonable and adequate amount of protection with only a small possibility of substantial overprotection or under protection.

The CTR's numerical aquatic life criteria are expressed as short-term (acute) and long-term (chronic) averages, rather than one number, in order that the criterion more accurately reflect toxicological and practical realities. Acute criteria represent the highest concentration of a pollutant to which aquatic life can be exposed for a short period of time (one hour) without deleterious effects. Chronic criteria represent the highest concentration to which aquatic life can be exposed for an extended period of time (four days) without deleterious effects. Due to the intermittent nature of storm water runoff in Southern California, the acute criteria are considered to be more applicable to storm water conditions than chronic criteria and therefore are used in assessing Project impacts.

CTR criteria are applicable to the receiving water body. The metals criteria, which are expressed as a function of receiving water hardness, must be calculated based on the probable hardness values of the Project's receiving waters for evaluation of acute and chronic toxicity criteria. At higher hardness values, copper, lead, and zinc are more likely to be complexed or bound with other components in the water column, which reduces the bioavailability and resulting potential toxicity of the affected metals. Available hardness data for runoff in the Project vicinity (i.e., data from Piru Creek, see Table 5.4-1 in Section 5.4.3 below) averages approximately 589 milligrams per liter (mg/L) as calcium carbonate (CaCO₃) and the maximum hardness value used to calculate metals criteria in the CTR (CFR 131.38[c][4][b][2]) is 400 mg/L. As a result, a hardness value of 400 mg/L as CaCO₃ was used to approximate CTR criteria for metals in the project's water quality analysis.

Title 3 (California Code of Regulations)

To address concerns that pyrethroid (i.e. chemicals contained in some pesticides) concentrations found in California surface waters are negatively affecting water quality, the California Department of Pesticide Regulation (CDPR) adopted Section 6970 in Title 3 of the *California Code of Regulations* (CCR), titled "Surface Water Protection in Outdoor

Nonagricultural Settings”. The aim of these regulations is to reduce the amount of runoff from 17 pyrethroids commonly applied outdoors by any person performing pest control for hire (i.e., pest control businesses). Primarily, the regulations restrict applications made to and around impervious horizontal surfaces (e.g., building exteriors, foundations, walkways, and driveways), which are believed to be the primary transport conduit of pesticides from urban landscapes. The statewide regulations became effective on July 19, 2012.

Regional

Basin Plans

Portions of the Project site are subject to basin plans adopted by the Lahontan RWQCB and the Los Angeles RWQCB (Lahontan RWQCB 1994; Los Angeles RWQCB 2006, both as amended). The basin plans provide quantitative and narrative criteria for water quality constituents applicable to receiving surface and ground water within the Lahontan and Los Angeles RWQCB jurisdictions. Specific criteria are provided for larger water bodies within the two regions, and general criteria or guidelines are established for ocean waters, bays and estuaries, inland surface waters, and groundwater. In general, the narrative criteria preclude water quality degradation that would adversely impact a water body’s designated beneficial uses. For example, the Lahontan Basin Plan states that surface waters shall not contain suspended or settleable solids in amounts which “cause nuisance or adversely affect the water for beneficial uses” (Lahontan RWQCB 1994). Water quality criteria apply to receiving waters and do not apply directly to runoff prior to contact with applicable receiving waters.

The Basin Plans contain narrative and numerical water quality criteria for groundwater. For example, the Lahontan Basin Plan requires that “Ground waters shall not contain taste or odor producing substances in concentrations that cause nuisance or adversely affect beneficial uses” (Lahontan RWQCB 1994). For groundwaters designated for municipal beneficial uses, the Basin Plan requires that constituent concentrations not exceed maximum contaminant levels (MCLs) or adopted Secondary Maximum Contaminant Levels (SMCLs) specified in Title 22 of the *California Code of Regulations* (CCR). Maximum contaminant levels are the primary drinking water standards established for public water systems to prevent adverse health effects. Secondary maximum contaminant levels apply to contaminants that will not cause adverse health effects such as water color, taste, and odor.

Regional Water Quality Control Board Construction General Waste Discharge Requirements

Lahontan Regional Water Quality Control Board

The Lahontan RWQCB has issued General WDRs and NPDES Permit requirements (under Order No. R6T-2014-0049, NPDES No. CAG996001) for limited threat discharges to surface waters (Limited Threat Discharge Permit). The permit covers construction dewatering in addition to the following discharge categories:

- Diverted stream flows
- Dredge spoils dewatering

- Subterranean seepage dewatering
- Well construction and pump testing of aquifer supplies
- Geothermal well testing
- Hydrostatic testing, maintenance, repair, and disinfection of potable water supply pipelines, tanks, reservoirs, and other similar facilities
- Water treatment plant backflushing, residuals, and wasting
- Fire hydrant testing or flushing
- Hydrostatic testing of newly constructed pipelines, tanks, reservoirs, and other facilities used for purposes other than potable water supply (e.g., gas, oil, reclaimed water)

The Limited Threat Discharge Permit contains discharge prohibitions, receiving water limitations, and monitoring and reporting requirements.

Los Angeles Regional Water Quality Control Board

The Los Angeles RWQCB has issued a General NPDES Permit and General WDRs (Los Angeles RWQCB Order No. R4-2013-0095; NPDES No. CAG994004 [RWQCB 2013]) governing construction-related dewatering discharges. This permit, known as the General Dewatering Permit, addresses discharges from temporary dewatering operations associated with construction and permanent dewatering operations associated with development. The discharge requirements include provisions mandating notification, sampling and analysis, and reporting of dewatering and testing-related discharges. The General Dewatering Permit authorizes applicable construction-related dewatering activities so long as all conditions of the permit are fulfilled.

County of Los Angeles

Storm Water Permitting (Municipal Separate Storm Sewer System Permit)

In 2012, the Los Angeles RWQCB issued an MS4 permit covering Los Angeles County and several municipalities within the County in accordance with the federal NPDES permit program and WDRs under State law (CAS004001, Order No. R4-2012-0175) (MS4 Permit). In 2013, the County amended Chapter 12.84 of the Los Angeles County Code to require that new development utilize LID BMPs in conformance with the MS4 Permit. In 2014, the County prepared the LID Standards Manual to provide guidance for new development in meeting the storm water runoff standards in Chapter 12.84 of the County Code and in the MS4 Permit.

County Low Impact Development Ordinance

As amended in 2013, Chapter 12.84 requires that new development do the following:

- Mimic undeveloped storm water runoff rates and volumes in any storm event up to and including the “Capital Flood” event (a 50-year storm).

- Prevent pollutants of concern from leaving the development site in storm water as the result of storms, up to and including a water quality design storm event.
- Minimize hydromodification impacts to natural drainage systems.

To achieve these objectives, Chapter 12.84 requires compliance with one or more of the following standards:

- 1) The project shall retain 100 percent of the Storm Water Quality Design Volume (SWQDv) on site, through infiltration, evapotranspiration, rainfall harvest and use, or a combination thereof, unless the Director of Public Works determines that it would be technically infeasible to do so;
- 2) If the Director determines that it would be technically infeasible to retain 100 percent of the SWQDv on site, the project shall comply with one of the following alternative compliance measures:
 - a. The project shall provide for on-site biofiltration of 1.5 times the portion of the SWQDv that is not retained on-site;
 - b. The project shall include infiltration or bioretention BMPs to intercept the portion of the SWQDv that is not retained on site at an off-site location, as approved by the Director of Public Works. The project shall also provide for treatment of the portion of the SWQDv discharged from the project site, as approved by the Director of Public Works;
 - c. The project shall provide for the replenishment of groundwater supplies that have a designated beneficial use in the Basin Plan.
 - i. Groundwater replenishment projects shall include infiltration or bioretention BMPs to intercept the portion of the SWQDv that is not retained on site at an off-site location, as approved by the Director of Public Works.
 - ii. Groundwater replenishment projects shall also provide for treatment of the portion of the SWQDv discharged from the project site, as approved by the Director of Public Works.
 - d. The project shall include infiltration, bioretention, or rainfall harvest and use BMPs to retrofit an existing development with similar land uses as the project to intercept the portion of the SWQDv that is not retained on-site
 - e. The County, independently or in conjunction with one or more cities, may apply to the RWQCB for approval of a regional or subregional storm water mitigation program to substitute in part or wholly for the provisions of Chapter 12.84 for the area covered by the regional or sub-regional storm water mitigation program. If the RWQCB approves the program, provisions of the program shall apply in lieu of any conflicting provisions of Chapter 12.84.

Development projects that consist of five or more residential units, or nonresidential development projects, must further comply with the following standards:

The excess storm water runoff volume (ΔV , defined by the LACDPW as the post-developed runoff volume minus the pre-developed runoff volume for the 85th percentile storm event) from each lot upon which such development is occurring shall be infiltrated at the lot level or in the alternative, the excess storm water runoff volume from the entire development site (including streets and public rights-of-way) shall be infiltrated in sub-regional infiltration facilities built for this specific purpose. The tributary area of a sub-regional infiltration facility shall be limited to five acres, but may be exceeded with approval of the Director of the LACDPW. When infiltration of all excess storm water runoff volume is not technically feasible, on-site storage, reuse, or other water conservation uses of the excess runoff volume is required and shall be implemented as authorized by the Director of the LACDPW in accordance with the requirements and provisions of the LID Standards Manual.

County Low Impact Development Standards Manual

The 2014 LID Standards Manual was prepared by the LACDPW and updates and provides a compilation of the following documents:

- Development Planning for Storm Water Management: A Manual for the Standard Urban Storm Water Mitigation Plan (SUSMP Manual, September 2002).
- Technical Manual for Stormwater Best Management Practices in the County of Los Angeles (2004 Design Manual, February 2004).
- Stormwater Best Management Practice Design and Maintenance Manual (2010 Design Manual, August 2010).
- Low Impact Development Standards Manual (2009 LID Manual, January 2009).

The LID Standards Manual also supersedes the water quality portions of the following ordinances and policies:

- Water Quality section of the Los Angeles County Hydrology Manual;
- Interim Drainage Policy for Quartz Hill;
- Acton Interim Drainage Policy and Guidelines;
- Antelope Valley Interim Drainage Policy;
- Financing the Cost to Maintain Standard Urban Stormwater Mitigation Plan Devices/Systems;
- Permanent Standard Urban Storm Mitigation Plan Devices for No Fee Miscellaneous Transfer Drains, Small Drainage Systems, and Storm Drain Connection Permits;
- Interim Peak Flow Runoff Criteria for New Development;
- Policy for New Percolation Basin Testing, Design, and Maintenance; and

- Clarification on the Policy for Financing the Cost to Maintain Standard Urban Stormwater Mitigation Plan (SUSMP) Devices/Systems Constructed by New Development or Other Agencies (LACDPW 2014).

The LID Standards Manual requires that “Designated Projects”, which include large scale residential and nonresidential development projects, prioritize the selection of BMPs to retain 100 percent of the SWQDv on site through infiltration, evapotranspiration, storm water runoff harvest and use, or a combination thereof, unless it is demonstrated that it is technically infeasible to do so. BMPs should be implemented in the following order of preference: (1) infiltration and/or bioretention and (2) storm water runoff harvest and use.

Designated Projects that are unable to fully retain the SWQDv on site through retention-based storm water quality control measures must implement alternative compliance measures (e.g., on-site biofiltration, off-site groundwater replenishment, off-site infiltration and/or bioretention, and off-site retrofit). Prior to off-site mitigation, the portion of the SWQDv that cannot be reliably retained on site must be treated to meet effluent quality standards.

The LID Standards Manual indicates site conditions where infiltration may not be possible, including the following:

- Locations where the corrected in-situ infiltration rate is less than 0.3 inch per hour and it is not technically feasible to amend the in-situ soils to attain an infiltration rate necessary to achieve reliable performance of retention-based storm water quality control measures for the SWQDv on site;
- Locations where seasonal high groundwater is within 10 feet of the surface;
- Locations within 100 feet of a groundwater well used for drinking water;
- Brownfield development sites or other locations where pollutant mobilization is a documented concern;
- Locations with potential geotechnical hazards;
- Smart growth and infill or redevelopment locations where the density and/or nature of the project would create significant difficulty for compliance with the on-site retention requirement;
- Locations where infiltration could cause adverse impacts to biological resources; and
- Locations where infiltration would cause health and safety concerns.

The LID Standards Manual also states where runoff harvest and use may not be possible:

- Projects that would not provide sufficient irrigation or (where permitted) domestic greywater demand for use of stored runoff due to limited landscaping or extensive use of low-water-use plant palettes in landscaped areas.
- Projects that are required to use recycled water for irrigation of landscaping.

- Development projects in which the storage and reuse of storm water runoff would conflict with local, State, or federal ordinances or building codes.
- Locations where storage facilities would cause potential geotechnical hazards, as outlined in a report prepared by a licensed geotechnical engineer.
- Locations where storage facilities would cause health and safety concerns.

Chapter 12.84 and the LID Standards Manual establish requirements for hydromodification, hydrology (flood) and water quality control and require projects to fully mitigate for off-site drainage impacts caused by hydromodification and changes in water quality, flow velocity, flow volume, and the depth/width of flow, as determined by the Director of Public Works, in accordance with the requirements and provisions specified in the LID Standards Manual. If the Director of Public Works determines that it is infeasible for a project to comply with applicable mitigation standards, then the project must obtain written consent to the unmitigated impacts from the owner of every impacted downstream property. In addition, the project must comply with one of the following alternative requirements:

1. The project shall infiltrate on site at least the runoff from a 2-year, 24-hour rainfall event;
2. The runoff flow rate, volume, velocity, and duration for the project's post-development condition shall not exceed the pre-development condition for the 2-year, 24-hour rainfall events; or
3. The erosion potential (Ep) as defined in the LID Standards Manual in the receiving water channel shall approximate 1, as demonstrated by a hydromodification analysis study approved by the Director of Public Works.

Los Angeles County Green Building Standards Code

In 2008, the County adopted the Green Building Program, which included the Drought-Tolerant Landscaping, Green Building, and Low Impact Development Ordinances (the Ordinances), and created an Implementation Task Force and Technical Manual. In November 2013, in response to the mandates set forth in the 2010 CALGreen Code, the Board of Supervisors adopted the Los Angeles County Green Building Standards Code (Title 31). The CALGreen Code and the Ordinances adopted in 2008 comprise the County's primary green building and low impact development standards. The County Green Building Standards Code requires that post-construction landscape designs comply with all of the following:

1. Turf areas shall not exceed 25 percent of the total landscaped area.
2. Non-invasive, drought-tolerant plant and tree species appropriate for the climate zone region shall be utilized in at least 75 percent of the total landscaped area.
3. Hydrozoning irrigation techniques shall be incorporated into the landscape design.

In addition, a water budget must be developed for landscape irrigation use that conforms to the state MWELo, which was recently updated by the California Governor's Drought Executive Order (B-19-25) on July 15, 2015. The MWELo requirements for the project are discussed in Section 5.18, Water Resources.

Los Angeles County General Plan and Antelope Valley Area Plan

The *Los Angeles County General Plan* and the *Antelope Valley Area Plan (AVAP)*, part of the County General Plan, were updated in 2015 and include goals and policies that address water quality issues in the unincorporated County. The AVAP goals and policies applicable to the analysis of water quality with Project implementation are listed below. Section 5.8, Land Use, Entitlements, and Planning, presents a more in-depth analysis of the Project's consistency with relevant plans, policies and regulations.

Goal LU 2: A land use pattern that protects environmental resources.

Policy LU 2.5: Except within economic opportunity areas, limit the amount of potential development in riparian areas and groundwater recharge basins, through appropriate land use designations with very low residential densities, as indicated in the Land Use Policy Map (Map 2.1) of this Area Plan.

Goal COS 1: Growth and development are guided by water supply constraints.

Policy COS 1.3: Limit the amount of potential development in groundwater recharge areas through appropriate land use designations with very low residential densities, as indicated in the Land Use Policy Map (Map 2.1) of this Area Plan.

Goal COS 2: Effective conservation measures provide an adequate supply of clean water to meet the present and future needs of humans and natural ecosystems.

Policy COS 2.3: Require onsite stormwater infiltration in all new developments through the use of appropriate measures, such as permeable surface coverage, permeable paving of parking and pedestrian areas, catch basins, and other low impact development strategies.

Goal COS 3: A clean water supply untainted by natural and man-made pollutants and contaminants.

Policy COS 3.1: Discourage the use of chemical fertilizers, herbicides and pesticides in landscaping to reduce water pollution.

Policy COS 3.4: Support preservation, restoration and strategic acquisition of open space to preserve natural streams, drainage channels, wetlands, and rivers, which are necessary for the healthy functioning of ecosystems.

Policy COS 3.5: Protect underground water supplies by enforcing controls on sources of pollutants.

Policy COS 3.6: Support and encourage water banking facilities throughout the Antelope Valley, including within Significant Ecological Areas.

Goal COS 17: Buildings are sustainable, conserving energy, water, and other resources, and limiting greenhouse gas emissions.

Policy COS 17.8: Require onsite stormwater infiltration in all new developments through use of appropriate measures, such as permeable surface coverage, permeable paving of parking and pedestrian areas, catch basins, and other low impact development strategies.

Goal PS 3: Protection of the public through flood hazard planning and mitigation.

Policy PS 3.2: Require onsite stormwater filtration in all new developments through use of appropriate measures, such as permeable surface coverage, permeable paving of parking and pedestrian areas, catch basins, and other low impact development strategies.

Policy PS 3.3: Review the potential local and regional drainage impacts of all development proposals to minimize the need for new drainage structures.

5.2.2 ENVIRONMENTAL SETTING

Regional Watershed

Approximately 96 percent of the Project site, including locations that will be preserved in open space and remain undeveloped, is located within the Antelope Valley Watershed (93 percent of the site) and the much smaller Quail Lake Watershed to the south (3 percent of the site), both of which are within the jurisdiction of the Lahontan RWQCB. Approximately 4 percent of the site drains to Gorman Creek, which is located about 1.5 miles downstream from the southwestern edge of the Project site. Gorman Creek is within the Santa Clara River Watershed and the Santa Clara-Calleguas Hydrologic Unit, Piru Hydrologic Area as defined in the *Water Quality Control Plan for the Los Angeles Region* (Los Angeles Basin Plan). The Santa Clara River Watershed is under the jurisdiction of the Los Angeles RWQCB. Exhibit 5.2-1, Regional Water Quality Control Board Boundaries, in Section 5.2, Hydrology and Flood, shows the jurisdictional boundaries of the Los Angeles and Lahontan RWQCBs relative to the Project site.

As shown on Exhibit 5.2-2, Drainage Areas on the Project Site, in Section 5.2, four drainage systems extend into portions of the Project site. The two largest systems are the East Drainage Area and the Oso Creek Drainage Area. Portions of the Gorman Creek Drainage Area and the Quail Lake Drainage Area also extend into the west and southwest portions of the site. Larger canyons that convey channel flows in the Project area include Oso Canyon and Tentrock Canyon. Little Sycamore Creek and Los Alamos Creek are tributary to Oso Creek and traverse through a small portion of the site from the north.

As discussed in Section 5.2, Hydrology and Flood, and in Section 5.7, Biological Resources , the Project will avoid most of the watercourses and watershed area in the Gorman Creek, Quail Lake, and Oso Creek Drainage Areas (see Exhibit 5.2-2, Drainage Areas on the Project Site, in Section 5.2). Approximately 10 percent of the proposed development would occur

west of the West Branch of the Aqueduct, and drainage impacts in this area would primarily affect Oso Creek tributaries flowing north from the southern side (i.e., the northerly face) of Oso Canyon. Drainage impacts in the Gorman Creek Drainage Area would largely be avoided. No watercourse impacts would occur in the Quail Lake Drainage Area.

Approximately 90 percent of the proposed development would occur east of the West Branch of the Aqueduct. As discussed in Section 5.2, Hydrology and Flood, and in Section 5.7 Biological Resources, most of the Project impacts to existing watercourses would occur in the East Drainage Area (see Exhibit 5.2-2 in Section 5.2). Smaller drainages in this location would generally be integrated with the Project's storm drain system. Flow patterns associated with several existing larger tributary systems, including East Tributary systems and the Cow Spring Canyon, Horse Camp Canyon, the 300th Street Tributary systems, will largely be maintained by avoiding or constructing flow controls within existing channels or by recreating existing channels after site grading. Flow, LID, and hydromodification management facilities (e.g., detention and retention basins) will be constructed adjacent to channels, primarily in downstream reach locations. Approximately 17 basins would be at the elevation of the development pads, 3 would be adjacent to a channel, and 8 would be within a channel.

The following sections provide additional information about existing conditions in the four drainage areas that extend into the Project site, as shown on Exhibit 5.2-2.

East Drainage Area

The East Drainage Area includes approximately 18,910 acres, of which 41 percent is within the Project site. Flows in the drainage that are conveyed through the East Tributary systems originate just west of the West Branch of the Aqueduct where flows are conveyed under the Aqueduct via existing culverts. All watersheds contributing runoff to the East Tributaries are located within the Project site and within areas of proposed development. Flows from the north-facing slopes of La Liebre Mountain are conveyed to the north and east under State Route (SR) 138 through Cow Spring Canyon, Horse Camp Canyon, the 300th Street Tributary, Tentrock Canyon, and lower-lying tributaries. Ground elevations within the East Drainage Area range from 2,960 feet above mean sea level (msl) to 5,800 feet above msl. Flows from the East Drainage Area reach the East Branch of the Aqueduct to the east of the Project boundary and are conveyed by crossings at 292nd Street and 286th Street. In low-flow conditions, East Drainage Area flows are infiltrated in the valley floor prior to reaching the Aqueduct crossings.

Oso Canyon Drainage Area

The Oso Canyon Drainage Area drains a total of approximately 20,040 acres, of which approximately 18 percent is located within the Project site. Ground elevations within the drainage range from 3,000 feet above msl to 4,500 feet above msl. The primary watercourse in the Oso Canyon Drainage Area is Oso Canyon Creek (Oso Creek), which originates in the Tehachapi Mountains to the northwest of the site. Oso Creek drains northwest to east through the northern part of the site and merges with Los Alamos Creek at the eastern site boundary. The flows are conveyed across the West Branch of the California Aqueduct; reenter the extreme eastern portion of the site; and then merge with flows from Little

Sycamore Canyon off site after crossing the East Branch of the Aqueduct. Flows in the main stem of Oso Creek are typically ephemeral in the Project area and generally infiltrate when they reach the valley floor under low-flow conditions.

Quail Lake Drainage Area

The Quail Lake Drainage Area encompasses approximately 2,030 acres, of which approximately 17 percent is within the Project site. Ground elevations in the drainage range from 3,320 feet above msl at Quail Lake to approximately 3,600 feet above msl. Quail Lake is one of 29 storage facilities used to convey water in the State Water Project (SWP) and is managed by the California Department of Water Resources (DWR). The SWP conveyance system, including Quail Lake, is used to provide imported water for urban and agricultural uses throughout California, including Southern California. The lake was historically a sag pond along the San Andreas Fault and was expanded to store approximately 7,500 acre-feet of imported water from the West Branch of the Aqueduct. The SWP system conveys water from Quail Lake south to Pyramid Lake and further downstream to Castaic Lake, which is the southern terminus of the West Branch of the California Aqueduct. Pyramid Lake stores SWP water for delivery to Southern California, provides regulated storage for the Castaic power plant, and provides flood protection along Piru Creek. Downstream of Pyramid Lake, Piru Creek flows south approximately 20 miles to Piru Lake, which is formed by the Santa Felicia Dam and then for approximately 6 miles south to Reach 4 of the Santa Clara River. The point of confluence with the Santa Clara River is located approximately 35 miles south of the Project site.

Gorman Drainage Area

The Gorman Drainage Area encompasses approximately 960 acres, of which approximately 52 percent is within the Project site boundaries. The primary direction of surface water flow is westerly along SR-138. Ground elevations range from 3,100 feet above msl at the outlet to Gorman Creek to 3,600 feet above msl in the drainage. As shown in Exhibit 5.2-2, the Gorman Tributary flows into Gorman Creek about 1.5 miles downstream from the Project boundary. Gorman Creek flows to Cañada de los Alamos in the Lower Hungry Valley before discharging to Pyramid Lake about six miles downstream from the Project boundary.

Existing On-Site Channels

The Project site is predominately undeveloped with localized changes related to ongoing livestock grazing and agriculture. Most of the Project site is currently used for cattle grazing, which has occurred for over 150 years. Portions of the eastern site are used for agriculture. A few residential dwellings are located near the center of the northern property line, including single-family units and several trailers used in support of grazing and property caretaking activities. An inactive hunters' camp, located in the western portion of the site, consists of six trailers, a shooting range, and two outhouses. The site contains two aboveground water storage tanks and a water well (Geosyntec 2016a).

Several unpaved roads exist on the Project site. Paved roadways also traverse portions of the site that provide access to the National Cement Plant located to the north, facilities associated with the Aqueduct, and agricultural operations. SR-138 traverses through the southern

portion of the Project site, and 300th Street West runs north from SR- 138. Several siphons and culverts have been installed in conjunction with the Aqueduct to convey flows from existing drainages over or under the Aqueduct. Minor agricultural drainage ditches have also been constructed in certain locations (Geosyntec 2016a).

The existing site channel network is generally a dynamic (i.e., changing) system originating locally in the foothills of the Tehachapi Mountains to the west and north of the site and the La Liebre Mountains to the south. Uplift along the San Andreas Fault has tipped the valley floor down toward the north causing drainage channels to trend along south facing hill slopes. In the downstream and eastern portions of the Oso Canyon and East Drainage Areas, the alluvial valley floor is broader, the longitudinal slope is flatter, and the bed and banks consist of unconsolidated sands and fine gravel that promotes infiltration. East of the Aqueduct, and outside the Project's northeastern boundary, the channels become less defined and Oso Creek and the Eastern Drainage Area channels disappear into flat agricultural areas associated with the western portion of Antelope Valley (Geosyntec 2016a).

Surface Water Designated Beneficial Uses

Receiving waters for the Project site include drainages within the Antelope Valley Watershed, which is regulated by the Lahontan RWQCB, and within the Gorman Drainage Area, which is regulated by the Los Angeles RWQCB (see Exhibit 5.2-1, Regional Water Quality Control Board Boundaries, in Section 5.2, Hydrology and Flood).

The Lahontan Basin Plan lists existing or potential beneficial uses of major water bodies in the Antelope Valley. Waters that could receive flows from the Project site in the Antelope Valley Watershed are subject to the beneficial uses designated in the Basin Plan for "Minor Surface Waters", which include the following (Lahontan RWQCB 1994):

- **MUN:** Community, military, or individual water supply systems including, but not limited to, drinking water supply (existing or potential).
- **AGR:** Agricultural supply waters used for farming, horticulture, or ranching (existing or potential).
- **GWR:** Natural or artificial groundwater recharge (existing or potential).
- **FRSH:** Natural or artificial maintenance of surface water quantity or quality (e.g., salinity) (existing or potential).
- **REC-1:** Recreational bodily contact with water, where ingestion is reasonably possible (existing or potential).
- **REC-2:** Recreational activities involving contact in proximity to water, but not involving body contact (existing or potential).
- **COMM:** Commercial or recreational collection of fish or other organisms (existing or potential).
- **COLD:** Cold freshwater habitat to support cold water ecosystems (existing or potential).
- **WILD:** Waters that support wildlife habitats (existing or potential).

- **RARE:** Waters that support rare, threatened, or endangered species and their associated habitats (existing or potential).
- **SPWN:** High quality aquatic habitats suitable for reproduction and early development of fish (existing or potential).

The Los Angeles Basin Plan designates beneficial uses for water bodies in the Los Angeles RWQCB region. Beneficial uses for the Gorman Creek Tributary that could receive flows from the Project site are not specifically identified. The following beneficial uses are designated in the Los Angeles Basin Plan for Gorman Creek, which located downstream from the tributary (Los Angeles RWQCB 2006):

- **MUN:** Community, military, or individual water supply systems including, but not limited to, drinking water supply (intermittent and conditional [i.e., may be considered for exemptions at a later date]).
- **AGR:** Agricultural supply waters used for farming, horticulture, or ranching (intermittent).
- **GWR:** Natural and artificial groundwater recharge (intermittent).
- **REC-1:** Recreational bodily contact with water where ingestion is reasonably possible (intermittent).
- **REC-2:** Recreational activities involving contact in proximity to water (intermittent).
- **WARM:** Warm freshwater habitat to support warm water ecosystems (intermittent).
- **COLD:** Cold freshwater habitat to support cold water ecosystems (intermittent).
- **WILD:** Wildlife habitat waters that support wildlife habitats (existing).
- **RARE:** Waters that support rare, threatened, or endangered species and their associated habitats (potential).

Groundwater Designated Beneficial Uses

Approximately 96 percent of the Project site, including locations that will be preserved in open space and remain undeveloped, is located within the Antelope Valley and Quail Lake Watersheds and is subject to the jurisdiction of the Lahontan RWQCB. As discussed in Section 5.18, Water Resources, in December 2015 the Superior Court of California entered an adjudication Judgment and Physical Solution in the consolidated Antelope Valley Groundwater Cases litigation. A copy of the Judgment and Physical Solution is attached as Appendix 5.18-E of this Draft EIR. The adjudication regulates groundwater use in the Antelope Valley Basin and its surrounding watershed to avoid overdraft conditions and to ensure that future groundwater production is consistent with a total sustainable yield of approximately 110,000 acre-feet per year. As shown on Exhibit 5.4-1, Groundwater Basins in the Project Area, most of the Project site is located within the adjudication area boundary, including the Antelope Valley Groundwater Basin and its contributing watershed (also see Exhibit 5.18-3 in Section 5.18, Water Resources, for a map of the Antelope Valley Adjudication Area, as defined in the litigation).

The groundwater basin and watershed includes low lying alluvial portions of the Antelope Valley in Los Angeles County and Kern County, which receive flows from drainages that originate in the surrounding mountains and foothills. Most of the surrounding drainages flow only during storm events and are dry during other periods. In general, the valley floor lacks defined natural channels outside the foothills and is subject to unpredictable sheet-flow patterns. For more information concerning the Antelope Valley Watershed, please see Section 5.18.3, Environmental Setting, Antelope Valley Groundwater Basin. For more information regarding site geology, topography and drainage characteristics, please see Section 5.7.3, Biological Resources, Environmental Setting, Characteristics of the Site.

The Lahontan Basin Plan designates the following beneficial uses for the Antelope Valley Groundwater Basin (Lahontan RWQCB 1994):

- **MUN:** Community, military, or individual water supply systems including, but not limited to, drinking water supply (existing or potential).
- **AGR:** Agricultural supply waters used for farming, horticulture, or ranching (existing or potential).
- **IND:** Industrial activities that do not depend primarily on water quality (existing or potential).
- **FRSH:** Natural or artificial maintenance of surface water quantity or quality (e.g., salinity) (existing or potential).

A small portion (approximately four percent) of the southwestern corner of the Project site is connected to the Hungry Valley and Peace Valley Groundwater Basins included in the Los Angeles Basin Plan. The Basin Plan designates the following beneficial uses for these basins (Los Angeles RWQCB 2006):

- **MUN:** Community, military, or individual water supply systems including, but not limited to, drinking water supply (existing).
- **IND:** Industrial activities that do not depend primarily on water quality (potential).
- **PROC:** Industrial activities that depend primarily on water quality (existing).
- **AGR:** Agricultural supply waters used for farming, horticulture, or ranching (existing).

Existing Receiving Water Quality (Surface and Groundwater)

Water quality data for the Project site's receiving waters are limited. The USGS and the DWR regularly monitor water quality in the California Aqueduct, but existing water quality data for Oso Creek, the East Drainage Area drainages, Gorman Creek, and Quail Lake are not available. Groundwater monitoring has been conducted in the Project vicinity (Geosyntec 2016b). The following sections qualitatively discuss the existing water quality of the Project site's receiving surface waters with quantitative data provided where available.

Oso Creek and the East Drainage Area

As described above, Oso Creek is an ephemeral drainage that terminates in the Antelope Valley floor to the northeast of the Project boundary. Similarly, the East Drainage Area consists of several drainages originating in the mountains and foothills that flow across the valley floor and eventually pond in the dry lakes adjacent to the Kern County line. During large rainfall events, these drainages are likely to carry a high sediment load, indicated by elevated total suspended solids (TSS) and turbidity, due to the dirt roads, steep slopes, gullied land, and exposed silty and sandy soils in the watershed.

Cañada de los Alamos (downstream of Gorman Creek)

A small portion of the Project site drains through an unnamed tributary to Gorman Creek about 4.5 miles downstream from the site boundary. Gorman Creek flows through Cañada de los Alamos in the Lower Hungry Valley to the Warne Power Plant at Pyramid Lake, about six miles downstream from the site boundary. Hungry Valley is one of the largest Off-Highway Motor Vehicle (OHV) recreational areas in California with over 130 miles of trails across 19,000 acres. The impact of off-road vehicles on soil compaction and erosion rates has been documented by a number of researchers. Therefore, it is likely that, during storm events large enough to produce runoff, TSS and turbidity are high in Cañada de los Alamos.

Piru Creek (Downstream of Quail Lake)

The closest surface water sampling data available near the Project site is for Piru Creek and one of its tributaries, Lockwood Creek, which are located about ten miles to the southwest of the Project area and drain to Pyramid Lake. The drainage area is undeveloped. Data were available on the California Environmental Data Exchange Network (CEDEN) for 17 locations on Piru Creek and Lockwood Creek, with most locations only having one sample event. Data are summarized in Table 5.4-1 below as well as associated water quality standards from the Los Angeles Basin Plan for Piru Creek from the gauging station below the Santa Felicia Dam upstream to the headwaters. The only constituent with results greater than applicable water quality objectives is total dissolved solids (TDS), which had an average value of over 1,000 mg/L from 14 sampling events. As discussed above, this reach of Piru Creek is listed as impaired for chloride and pH on the 2010 CWA 303(d) List. The sources for the TDS concentrations are unknown.

**TABLE 5.4-1
SUMMARY OF MONITORING DATA IN PIRU CREEK**

Constituent	Water Quality Standard	Number of Samples	Number of Detections	Average ^a
pH	b	22	22	7.97
TSS (mg/L)	c	10	10	4.44
TDS (mg/L)	500 ^d	14	14	1,023
Hardness (mg/L as CaCO ₃)	N/A	7	7	589
Chloride (mg/L)	500 ^d	20	20	10.3
Total Phosphorus (mg/L)	e	11	11	0.012
Ammonia-N (mg/L)	1.24 ^f	9	5	0.034
Nitrate-N (mg/L)	10 ^g	18	12	0.295
Nitrite-N (mg/L)	1 ^g	14	1	0.003
Total Nitrogen (mg/L)	10 ^g	10	10	0.785
Dissolved Aluminum (µg/L)	N/A	4	4	5.53
Total Aluminum (µg/L)	1000 ^h	4	4	37.7
Dissolved Copper (µg/L)	50 ⁱ	4	4	0.61
Total Copper (µg/L)	52 ⁱ	4	4	0.60
Dissolved Lead (µg/L)	281 ⁱ	4	1	0.011
Total Lead (µg/L)	477 ⁱ	4	2	0.013
Dissolved Zinc (µg/L)	379 ⁱ	8	3	8.32 ^j
Total Zinc (µg/L)	388 ⁱ	4	3	1.73
Dissolved Iron (µg/L)	N/A	3	3	24.3
Total Iron (µg/L)	N/A	3	3	93
Dissolved Arsenic (µg/L)	N/A	4	4	3.84
Total Arsenic (µg/L)	10 ^h	4	4	3.8
Dissolved Chromium (µg/L)	N/A	4	4	0.453
Total Chromium (µg/L)	50 ^h	4	3	0.445
Dissolved Nickel (µg/L)	N/A	4	4	4.95
Total Nickel (µg/L)	100 ^h	4	4	5.23
Dissolved Selenium (µg/L)	N/A	7	3	0.854
Total Selenium (µg/L)	50 ^h	4	3	0.868
Dissolved Silver (µg/L)	37 ⁱ	4	1	0.018
Total Silver (µg/L)	44 ⁱ	4	0	<0.02
Dissolved Cadmium (µg/L)	N/A	4	3	0.036

pH: hydrogen potential; TSS: total suspended solids; mg/L = milligrams per liter; TDS: total dissolved solids; nitrate-N, nitrite-N and ammonia-N are inorganic forms of nitrogen; CaCO₃: calcium carbonate; N/A: not applicable; µg/L = micrograms per liter; CEDEN: California Environmental Data Exchange Network; USEPA: U.S. Environmental Protection Agency; MCL: maximum contaminant level; ELS: early life stage; °C: degrees Celsius; CTR: California Toxics rule

^a Data averaged from 17 locations on Piru Creek and Lockwood Creek (small tributary to Piru Creek), upstream of Pyramid Lake. Data accessed October 12, 2015, on CEDEN. Sample dates from 6/21/00–5/30/13. Averages were calculated assuming non-detects were equivalent to half of the associated sample detection limit.

**TABLE 5.4-1
SUMMARY OF MONITORING DATA IN PIRU CREEK**

Constituent	Water Quality Standard	Number of Samples	Number of Detections	Average ^a
b	The pH of inland surface waters shall not be depressed below 6.5 or raised above 8.5 as a result of waste discharges. Ambient pH levels shall not be changed more than 0.5 unit from natural conditions as a result of waste discharge.			
c	Water shall not contain suspended or settleable material in concentrations that cause nuisance or adversely affect beneficial uses.			
d	USEPA secondary Maximum Contaminant Level (MCL) for MUN beneficial use.			
e	Waters shall not contain biostimulatory substances in concentrations that promote aquatic growth to the extent that such growth causes nuisance or adversely affects beneficial uses			
f	30-day average, ELS present, based on average pH (7.97) and average temperature of 25°C.			
g	Waters shall not exceed 10 mg/L nitrogen as nitrate-nitrogen plus nitrite-nitrogen (NO ₃ -N + NO ₂ -N), 45 mg/L as nitrate (NO ₃), 10 mg/L as nitrate-nitrogen (NO ₃ -N), or 1 mg/L as nitrite-nitrogen (NO ₂ -N).			
h	California primary MCL for MUN beneficial use.			
i	Water quality standards for metals are acute (maximum one hour average concentration) CTR criteria for the maximum hardness value (400 mg/L) for waters with hardness of over 400 mg/L.			
j	High detection limits for some samples resulted in a high dissolved concentration when calculating the average using half of the detection limit.			
Source: Geosyntec Consultants 2016b (see Appendix 5.4-A).				

Antelope Valley Groundwater Basin

Groundwater in closed basins, such as the Antelope Valley, is generally high in dissolved salts because evapotranspiration concentrates minerals in the water. Consequently, drinking water standards are often exceeded in local wells for TDS and fluoride. TDS concentrations remained relatively constant in the Antelope Valley between 1908 and 1955. The groundwater chemistry in the Antelope Valley is typically characterized as calcium bicarbonate near the surrounding mountains and as sodium bicarbonate or sodium sulfate in the central part of the basin.

Groundwater monitoring near the Project site was conducted in 2007 by Geosyntec Consultants (see Appendix 5.4-A) for two Tejon Ranch Company (TRC) wells and one DWR well in the Project area. The sampled wells are located in the Antelope Valley Groundwater Basin. The area is underlain by the three separate aquifers (i.e., western, southern, and deep), and one sample was collected from each separate aquifer. The monitoring results are summarized in Table 5.4-2, 2007 Groundwater Monitoring Data for the Project Area, below. The Maximum Contaminant Level (MCL) is provided in the table for each sampled water quality parameter. Additional water quality tests were conducted in 2010 by GEI, Inc. at well TRC-98 (located at the existing TRC water bank in the Project vicinity) and at well TRC-106 (located within the Project site at the approximate location of the proposed on-site water bank) were consistent with the 2007 sampling results (for a discussion of the existing TRC water bank and the proposed on-site water bank, please see Section 5.18, Water Resources). The results of the 2010 GEI groundwater testing are presented in Table 5.4-3, 2010 Groundwater Monitoring Data for the Project Area, below.

**TABLE 5.4-2
2007 GROUNDWATER MONITORING DATA FOR THE PROJECT AREA**

Parameter	Units	MCL or Other Threshold	DWR-32	TRC-98	Harris Well (MW-5D)	TRC-98 (DUP 1)
Metals						
Arsenic	mg/L	0.010 ^a	ND	0.0119	0.0157	0.0116
Barium	mg/L	1.0 ^a	0.0394	0.0548	0.0532	0.0532
Molybdenum	mg/L	0.04 ^b	0.00618	0.00806	ND	0.00722
Vanadium	mg/L	0.036 ^c	ND	0.00558	ND	0.0054
Iron	mg/L	0.3 ^d	ND	ND	0.317	ND
Manganese	mg/L	0.05 ^d	ND	ND	0.00785	ND
Boron	mg/L	1 ^c	0.148	0.255	0.546	0.247
Zinc	mg/L	5 ^c	0.13	0.0309	0.455	0.0205
Chromium VI	mg/L	0.01 ^a	ND	ND	ND	ND
General Chemistry						
Chloride	mg/L	250 ^d	22	16	14	16
Sulfate	mg/L	250 ^d	83	55	88	56
Perchlorate	µg/L	6 ^a	ND	ND	ND	ND
Color	Color unit	15 ^d	5	5	5	5
Turbidity	NTU	5 ^d	1.2	0.090	3.1	0.070
Odor	TON	3 ^d	ND	ND	ND	ND
Specific Conductance	µS/cm	900 ^d	600	470	570	470
TDS	mg/L	500 ^d	394	318	402	322
pH	pH units	6.5–8.5 ^e	7.33	7.49	7.42	7.47
Cyanide	mg/L	0.15 ^a	ND	ND	ND	ND
Fluoride	mg/L	2 ^a	0.74	0.62	0.38	0.62
Nitrite	mg/L	1	ND	ND	ND	ND
Nitrate	mg/L	10 ^f	2.9	2.8	1.6	3
MBAS	mg/L	0.5 ^d	ND	ND	ND	ND
MCL: Maximum Contaminant Level; mg/L: milligrams per liter; ND: Not Detected; µg/L: micrograms per liter; NTU: Nephelometric Turbidity Units, a measurement of turbidity; TON: Threshold Odor Numbers, a measurement dilutions needed to achieve odor free water; µS/cm: microSiemens per centimeter, or a measurement of the rate of electrical flow through a solution; pH: hydrogen potential; CCR: California Code of Regulations; USEPA: U.S. Environmental Protection Agency						
^a California Department of Public Health Primary Drinking Water MCL (22 CCR, Table 64431-A and Table 64444-A). ^b USEPA Health Advisory ^c California Department of Public Health Notification Level 1 ^d California Department of Public Health Secondary Drinking Water MCL (22 CCR, Table 64449-A and Table 64449-B). ^e USEPA Secondary MCL ^f USEPA Primary MCL						
Source: Geosyntec Consultants 2016b.						

**TABLE 5.4-3
2010 GROUNDWATER MONITORING DATA FOR THE PROJECT AREA**

Constituent	MCL	Units	Well	
			TRC-98	TRC-106
TDS	500	mg/L	310	320
pH - Lab	6.5-8.5 ^a	units	8	8.1
Specific Conductance - Lab	1,600 ^b	µmhos/cm	500	540
Total Hardness (as CaCO ₃)		mg/L	160	190
Total Alkalinity (as CaCO ₃)		mg/L	150	170
Calcium		mg/L	48	55
Magnesium		mg/L	11	13
Potassium		mg/L	1.3	1.5
Sodium		mg/L	43	41
Copper	1,000 ^b	µg/L	ND	ND
Iron	300 ^b	µg/L	ND	ND
Manganese	50 ^b	µg/L	ND	ND
Zinc	5,000 ^b	µg/L	ND	ND
Bicarbonate		mg/L	180	210
Sulfate	250 ^b	mg/L	49	51
Chloride	250 ^b	mg/L	15	13
Nitrate (as NO ₃)	45	mg/L	20	13
Nitrite (as N)	1	mg/L	4.5	3
Fluoride	4	mg/L	0.5	0.4
Aggressiveness Index		mg/L	12	13
Langelier Index - 25 degree		mg/L	0.47	0.76
Aluminum	1,000 ^b	µg/L	ND	ND
Antimony	6	µg/L	ND	ND
Arsenic	10	µg/L	8.9	<u>13</u>
Barium	1,000	µg/L	51	47
Beryllium	4	µg/L	ND	ND
Cadmium	5	µg/L	ND	ND
Chromium	50	µg/L	ND	1.1
Lead	50	µg/L	ND	ND
Mercury	2	µg/L	ND	ND
Thallium	2	µg/L	ND	ND
Chromium VI	0.2 ^c		ND	ND
Color	15 ^b	units	ND	ND
Odor	3 ^b	TON	3	3
Turbidity	5 ^b	NTU	0.15	0.1
DBCP	0.2	µg/L	ND	ND
EDB	0.05	µg/L	ND	ND

**TABLE 5.4-3
2010 GROUNDWATER MONITORING DATA FOR THE PROJECT AREA**

Constituent	MCL	Units	Well	
			TRC-98	TRC-106
MCL: Maximum Contaminant Level; TDS: total dissolved solids; mg/L: milligrams per liter; pH: hydrogen potential; μ mhos/cm: microm; CaCO ₃ : calcium carbonate; μ g/L: micrograms per liter; ND: Not Detected; TON: Threshold Odor Numbers, a measurement dilutions needed to achieve odor free water; NTU: Nephelometric Turbidity Units; DBCP: 1,2-Dibromo-3-chloropropane; EDB: 1,2-Dibromoethane; USEPA: U.S. Environmental Protection Agency; PHG: California Public Health Goal				
Notes: Numbers in <i>bold italic underlined</i> are >MCL				
a	California Department of Health Services Secondary Drinking Water MCL			
b	USEPA Secondary Drinking Water MCL			
c	PHG rescinded, MCL not yet established			
Source: GEI Consultants 2010 (see Appendix A of EIR Appendix 5.18-A)				

With the exception of arsenic, none of the groundwater samples analyzed in 2007 contained concentrations that exceeded the listed MCLs. As shown in Table 5.4-3, the arsenic concentrations in the TRC-98 and TRC-106 wells were 8.9 micrograms per liter (μ g/L) and 13 μ g/L, respectively. The sample from the TRC-106 well is slightly above the MCL of 10 μ g/L, as set by the USEPA. The arsenic levels appear to be from natural conditions in the geologic structure of the aquifer; MCL standards can be met for this small exceedance through blending with higher quality water or through other methods discussed in Section 5.18, Water Resources. Therefore, arsenic is not considered a pollutant of concern for analysis. No other metals were detected above their respective MCL.

Hungry Valley Groundwater Basin

According to California's Groundwater Bulletin 118, bicarbonate is the major anion (i.e., negatively charged ion) in the Hungry Valley Groundwater Basin, and calcium, sodium, and potassium occur in almost equal amounts. The average TDS concentration is less than 350 mg/L. The groundwater has an average pH of 8.1, which is slightly alkaline (Geosyntec Consultants 2016b). There are no data in the vicinity of the Project site for this groundwater basin.

5.2.3 PROJECT DESIGN FEATURES

Project Design Features

PDF 4-1 The Project will implement a comprehensive system of site design, source control, low impact development, and hydromodification Best Management Practices (BMPs) that meet or exceed the water quality and hydrology (stormwater runoff) and hydromodification standards for new development in the County Low Impact Development (LID) Ordinance (Los Angeles County Code Section 12.84) and the County LID Standards Manual. Both these documents were adopted and prepared by the County of Los Angeles Department of Public Works to comply with the revised Los Angeles County

Municipal Separate Storm Sewer System (MS4) Permit (Order No. R4-2012-0175). All controls are designed to meet or exceed the following LID performance standards, which are consistent with the requirements of the MS4 Permit, the LID Ordinance, and the LID Standards Manual:

LID BMPs shall be selected and sized to retain the volume of stormwater runoff produced from the 85th percentile, 24-hour storm depth as determined from the Los Angeles County 85th Percentile 24-hr Rainfall Isohyetal Map (February 2004) (LID design volume). When it has been demonstrated that 100 percent of the LID design volume cannot be feasibly infiltrated within the Project, then biofiltration shall be provided for 1.5 times the portion of the LID design volume that is not retained. Runoff from roadways shall be retained or biofiltered in retention or biofiltration BMPs sized to capture the design storm volume or flow, per the guidance in USEPA's *Managing Wet Weather with Green Infrastructure: Green Streets*. LID BMPs may be parcel-based or regional facilities.

During construction, the Project will comply with the State Construction General Permit, the Lahontan Regional Water Quality Control Board (RWQCB) Limited Threat Discharge Permit, and the Los Angeles RWQCB General Dewatering Permit.

PDF 4-2 The Project will implement integrated pest management (IPM) and landscaping BMPs consistent with the integrated pest management and pesticide and fertilizer application guidelines established by the University of California Division of Agriculture and Natural Resources Statewide Integrated Pest Management Program. The IPM and landscaping BMPs will be confirmed in a landscaping plan submitted to the County during the review and approval process for each tract map application. The BMPs will include a planting plan that is consistent with the plant water use requirements of Section 3.3 of the *Centennial Specific Plan*, with procedures for removing non-native vegetation and planting native vegetation, fertilizer guidelines, and the IPM approach for preventing or suppressing pest problems (i.e., insects and diseases) through a combination of techniques including using pest-resistant plants; biological controls; cultural practices; habitat modification; and the judicious use of pesticides. The IPM and landscaping BMPs will address:

- Pest identification.
- Practices to prevent pest incidence and reduce pest buildup.
- Monitoring requirements to examine vegetation and surrounding areas for pests; to evaluate trends; and to identify when controls are needed.
- Establishment of action thresholds that trigger control actions.
- Pest-control methods (cultural, mechanical, environmental, biological) and appropriate pesticides.

- Pesticide management controls including those that comply with safety requirements (e.g., Material Safety Data Sheets, precautionary statements, protective equipment); regulatory requirements; spill mitigation measures; groundwater and surface water protection measures associated with pesticide use; and pesticide applicator certifications, licenses, and training (i.e., all pesticide applicators must be certified by the California Department of Pesticide Regulation).
- Fertilizer management tasks including those for soil assessment, fertilizer types, application methods, and storage and handling.

5.2.4 WATER QUALITY ASSESSMENT METHODOLOGY

Surface Water Pollutants of Concern

Pollutants of concern exhibit one or more of the following deleterious characteristics: current loadings or historic deposits of the pollutant are impacting the beneficial uses of a receiving water; elevated levels of the pollutant are found in sediments of a receiving water and/or have the potential to bioaccumulate in organisms therein; or the detectable inputs of the pollutant are at concentrations or loads considered potentially toxic to humans and/or flora and fauna.

The pollutants of concern for the water quality analysis are those that are anticipated to be or could potentially be generated by the Project at concentrations, that exhibit these characteristics (i.e., based on water quality data collected in Los Angeles County from land uses that are the same as those proposed by the Project). Consideration of each Basin Plan's beneficial uses and water quality objectives, CTR criteria, and current 303(d) listings are also factored into the identification of the pollutants of concern for the Project. The Water Quality Technical Report (see Section 4 of Appendix 5.4-A) lists the pollutants of concern for both surface water and groundwater (discussed further below); the basis for their selection; and the significance criteria that will be applied for each (Geosyntec Consultants 2016b). The report also explains why other Basin Plan constituents are not considered to be pollutants of concern for the Project.

Based upon the above considerations, the following pollutants were chosen as pollutants of concern for purposes of evaluating water quality:

- Sediments (Total Suspended Solids [TSS] and turbidity)
- Nutrients (phosphorus and nitrogen [Nitrate-N, Nitrite-N, Ammonia-N, and Total Nitrogen])
- Trace metals (copper, lead, and zinc)
- Chloride
- Pesticides (including herbicides, insecticides, and fungicides)
- Pathogens (bacteria, viruses, and protozoa)

- Petroleum hydrocarbons (oil and grease and polynuclear aromatic hydrocarbons [PAHs])
- Trash and debris
- Methylene blue activated substances (MBAS)

Brief descriptions of the characteristics of each of the above pollutants of concern are provided below.

Sediments (Total Suspended Solids [TSS] and Turbidity)

Excessive erosion, transport, and deposition of sediment in surface waters comprise a significant form of pollution that can result in major water quality problems. Sediment imbalances can impair the beneficial uses of receiving waters. Excessive sediment can impair aquatic life by filling interstitial spaces of spawning gravel; by impairing fish food sources; by filling rearing pools; and by reducing beneficial habitat structure in stream channels. In addition, excessive sediment can create taste and odor problems in drinking water supplies and block water intake structures.

Nutrients (Phosphorous and Nitrogen [Nitrate-N, Nitrite-N, Ammonia-N, and Total Nitrogen])

Nutrients are inorganic forms of phosphorous and nitrogen (nitrate, nitrite, and ammonia). Phosphorous can be measured as total phosphorous (TP) or as dissolved phosphorous. Dissolved phosphorous is the more bioavailable form of phosphorous. TP is often composed mostly of soil-related particulate phosphorous. Organic forms of nitrogen are associated with vegetative matter such as particulates from sticks and leaves. Inorganic forms of nitrogen include nitrate, nitrite, and ammonia. Total Nitrogen (TN) is a measure of all nitrogen present, including inorganic and particulate forms. There are several sources of nutrients in urban areas, mainly fertilizers in runoff from lawns; pet wastes; failing septic systems; atmospheric deposition from industry and automobile emissions; and soil erosion. Nutrient over-enrichment is especially prevalent in agricultural areas where manure and fertilizer inputs to crops significantly contribute to nitrogen and phosphorous levels in streams and other receiving waters. Eutrophication in surface water from excessive nutrient input can lead to changes in algae, benthic, and fish communities; extreme eutrophication can cause hypoxia or anoxia (too much or too little oxygen, respectively), resulting in fish kills. Eutrophication is characterized by an abundant accumulation of nutrients that support a dense growth of algae and other organisms, the decay of which depletes the shallow waters of oxygen in summer. Surface algal scum, water discoloration, and the release of potentially toxic metals from sediment can also occur.

Trace Metals (Copper, Lead, and Zinc)

The primary sources of trace metals in storm water are typically commercially available metals used in vehicles (e.g., automobiles), buildings, and infrastructure. Metals are also found in fuels, adhesives, paints, and other coatings. Copper, lead, and zinc are the most prevalent metals typically found in urban runoff. Other trace metals (such as cadmium, chromium, and mercury) are typically not detected in urban runoff or are detected at very low levels. Metals are of concern because of the potential for toxic effects on aquatic life and the potential for ground water contamination. High metal concentrations can lead to bioaccumulation in fish and shellfish and can affect beneficial uses of receiving waters. Bioaccumulation takes place within an organism when the rate of intake of a substance is greater than the rate of excretion or metabolic transformation of that substance.

Chloride

Irrigation of salt-sensitive crops (e.g., avocados and strawberries with water-containing elevated levels of chloride) can potentially result in reduced crop yields. Chloride levels in some areas exceed water quality standards. Chloride TMDLs have been developed and adopted into the Los Angeles Basin Plan for the Santa Clara River Reaches 3, 5 and 6. The major source of elevated chloride levels in the Santa Clara River are discharges from a wastewater treatment plant. Minor point sources are dewatering operations and uncontrolled swimming pool and water ride discharges. High levels of chloride in Piru Creek above the Santa Felicia Dam have caused listings for impairment, although these chloride sources are unknown.

Pesticides

Pesticides (including herbicides, insecticides, and fungicides) are chemical compounds commonly used to control insects, rodents, plant diseases, and weeds. Excessive application of a pesticide in connection with landscaping or cultivating agriculture may result in runoff that contains toxic levels of the pesticide's active ingredient. Pesticides may be classified as organochlorine pesticides or organophosphorous pesticides, the former being associated with persistent bioaccumulative pesticides (e.g., dichlorodiphenyltrichloroethane [DDT] and other legacy pesticides) which have been banned. The Santa Clara River estuary is listed as impaired for legacy pesticides, including chlorinated pesticides. Santa Clara River Reaches 6, 3, and 1 and the estuary are also included on the state CWA Section 303(d) list for toxicity, which can be a byproduct of pesticides. As discussed above, Reaches 3 and 1 and the estuary are located 48, 68, and 72 miles south and southwest of the Project site, respectively (Reach 6 is upgradient of where Piru Creek flows into the Santa Clara River). Toxic organophosphorous pesticides include diazinon and chlorpyrifos whose uses also are being banned or restricted by the USEPA. The current pesticides of concern for water quality are pyrethrums; parathyroids (bifenthrin, cyfluthrin, cypermethrin, deltamethrin, esfenvalerate, and permethrin); carbaryl; Malathion; and imidacloprid.

Pathogens (Bacteria, Viruses, and Protozoa)

Elevated pathogens are typically caused by the transport of domestic animal, wildlife, or human fecal wastes from a watershed. Even runoff from natural areas can contain pathogens (e.g., from wildlife). Other sources of pathogens in urban areas include pets, septic systems, and leaky sanitary sewer pipes. The presence of pathogens in runoff can impair receiving waters and contaminate drinking water sources. Historically, fecal indicator bacteria (FIB) such as fecal coliform have been used to indicate the presence of pathogens due to the difficulty of monitoring for pathogens directly. More recently, the scientific community has questioned the use of certain indicator organisms, as there are various confounding factors that affect the reliability of some FIB as pathogen indicators in storm water runoff. The Basin Plan objective is now based on the use of *E. Coli* as a pathogen indicator in fresh waters designated for water contract recreation (REC-1) beneficial use, including the Santa Clara River. Santa Clara River Reaches 5, 6, and 7 and the estuary are identified on the state CWA Section 303(d) list as impaired by high fecal coliform counts from point and non-point sources. An Indicator Bacteria TMDL was approved by the Regional Water Board for the estuary and Reaches 3, 5, 6, and 7 on July 8, 2010. As discussed above, Reach 3 and the estuary are, respectively, 48 to 72 miles south and southwest of the Project site. Santa Clara River Reaches 5, 6, and 7 are upgradient of where Piru Creek flows into the Santa Clara River.

Petroleum Hydrocarbons (Oil, Grease, and polynuclear aromatic hydrocarbons [PAHs])

The sources of oil, grease, and other petroleum hydrocarbons in urban areas include spills of fuels and lubricants, discharge of domestic and industrial wastes, atmospheric deposition, and runoff. Runoff can be contaminated by leachate from asphalt roads, wearing of tires, and deposition from automobile exhaust. A leachate is a product or solution formed by the removal of soluble material from a substance, such as soil or rock, through the percolation of water, especially a solution containing contaminants picked up through the leaching of soil. Deliberate dumping of used oil and other automobile-related fluids directly into storm drains can also contribute to pollution. Petroleum hydrocarbons, such as polycyclic aromatic hydrocarbons (PAHs), can bioaccumulate in aquatic organisms from contaminated water, sediments, and food and are toxic to aquatic life at low concentrations. Hydrocarbons can persist in sediments for long periods of time, resulting in adverse impacts on the diversity and abundance of benthic communities. Hydrocarbons can be measured as total petroleum hydrocarbons (TPH), oil and grease, or as individual groups of hydrocarbons, such as PAHs.

Trash and Debris

Trash (such as paper, plastic, polystyrene packing foam, and aluminum materials) and biodegradable organic debris (such as leaves, grass cuttings, and food waste) are general waste products on the landscape that can be entrained in urban runoff. The presence of trash and debris may have a significant impact on the recreational value of a water body and aquatic habitat. Excess organic matter can create a high biochemical oxygen demand in a water body and thereby lower its water quality. Also, in areas where stagnant water exists, the presence of excess organic matter can promote low-oxygen (anoxic) conditions resulting in the growth of undesirable organisms and the release of odorous and hazardous compounds such as hydrogen sulfide.

Methylene Blue Activated Substances (MBAS)

MBAS are related to the presence of detergents in water. Positive results may indicate the presence of wastewater or be associated with urban runoff due to commercial and/or residential vehicle washing or other outdoor washing activities. These substances disturb the surface tension affecting insects and gill function in aquatic life.

Groundwater Pollutants of Concern

Groundwater will be a source of drinking water for the Project, and recycled water treated to unrestricted reuse standards under Title 22 of the *California Code of Regulations* will be used for outdoor irrigation and for cooling and wastewater in the commercial portions of the proposed business park as permitted by applicable laws and regulations (see Section 5.18, Water Resources). As discussed in Section 5.2, Hydrology and Flood, and in more detail below, 28 on-site retention and detention basins will provide regional hydrology, hydromodification, and water quality controls for the Project (see Exhibit 5.2-4, Proposed Infiltration Basin Locations). LID measures serving two or more parcels (e.g., facilities that could require maintenance through a “Project Water Purveyor”) or parcel-specific LID measures (e.g., facilities maintained by property owner) will also be used to meet hydrology, hydromodification, and water quality control requirements (see Exhibit 5.4-2, Low Impact Development [LID] Drainage Area with Projects). These storm water management BMPs would infiltrate a portion of the Project’s urban runoff to groundwater after receiving treatment (see PDFs 4-1 and 4-2 and MMs 4-1 and 4-2). Infiltration of recycled water could also occur. Research conducted on the effects on groundwater from storm water infiltration indicates that the potential for contamination is dependent upon a number of factors, including the local hydrogeology and the chemical characteristics of the pollutants of concern. The Water Augmentation Study conducted by the Los Angeles and San Gabriel Rivers Watershed Council, in partnership with several agencies including water districts, municipalities, and the U.S. Bureau of Reclamation, indicates that the infiltration of storm water, with appropriate pretreatment, does not adversely impact groundwater quality (Geosyntec 2016b).

Chemical characteristics that influence the potential for groundwater impacts include high mobility (low adsorption potential), high solubility fractions, and concentrations in runoff, including dry weather flows. As a class of constituents, trace metals tend to adsorb onto soil particles or be taken up by plants and are thereby effectively filtered out by the soils. This has been confirmed by extensive data collected beneath storm water infiltration/detention ponds in Fresno (conducted as part of the Nationwide Urban Runoff Program) that showed that trace metals tended to be adsorbed in the upper few feet in the bottom sediments (Geosyntec 2016b). Bacteria are also filtered out by soils. More mobile constituents such as chloride and nitrate would have a greater potential for infiltration.

Based on water quality data collected in Los Angeles County from land uses that are the same as those included in the Project, the pollutants of concern for the groundwater quality analysis are those that are anticipated or that could potentially be generated by the Project. Identification of the pollutants of concern for the Project considered the land uses and the

pollutants that have the potential to impair beneficial uses of the groundwater beneath the Project site.

The Los Angeles and Lahontan Basin Plans contain groundwater numerical objectives for bacteria, mineral quality (Los Angeles Basin only), nitrogen (Los Angeles Basin Plan only), and various toxic chemical compounds; they also contain qualitative objectives for taste and odor. Water quality objectives from the Basin Plans for pollutants of concern are included in Section 4.2 of EIR.

Nitrate and Chloride

Nitrate-N and chloride were identified as pollutants of concern for purposes of evaluating groundwater quality impacts because their chemical characteristics make them potentially mobile. High nitrate levels in drinking water can cause health problems in humans. Infants can develop methemoglobinemia (blue-baby syndrome) caused by the decreased oxygen carrying capacity in hemoglobin from consumption of water with high nitrate levels. High chloride concentrations in groundwater can impact its use for drinking water or agricultural irrigation uses. Human activities and land use practices can influence nitrogen (of which nitrate is a component) and chloride concentrations in groundwater. For example, irrigation water containing fertilizers or high chloride can increase levels of nitrogen and chloride in groundwater.

Construction-Related Pollutants of Concern

The potential impact of construction activities, construction materials, and non-storm water runoff on surface water and groundwater quality during the construction phase focuses primarily on sediment (TSS and turbidity) and on certain non-sediment-related pollutants. Construction-related activities that are primarily responsible for sediment releases are related to exposing soils to erosion by rainfall or runoff, truck traffic, and/or wind (i.e., fugitive dust). Such activities include removing vegetation, grading, and trenching for infrastructure improvements. Environmental factors that affect erosion include topography, soil, and rainfall characteristics.

Non-sediment-related pollutants that are also of concern during construction include construction materials (e.g., paint, stucco); chemicals, liquid products, and petroleum products used in building construction or the maintenance of heavy equipment; and concrete-related pollutants.

Water Quality Model Description

A water quality model was used to estimate pollutant loads and concentrations in storm water runoff from the Project for certain pollutants of concern; estimations were made for pre-development conditions and post-development conditions. Modeling runs were conducted to represent the entire Project site plus 15 acres of associated off-site roadway improvements. The water quality model used was selected because it is one of the few models that accounts for the observed variability in storm water hydrology and water quality. This is accomplished by characterizing the probability distribution of observed rainfall storm event depths, the probability distribution of event mean storm water runoff

concentrations, and the probability distribution of the number of storm events per year. These distributions are then sampled randomly using a Monte Carlo approach to develop estimates of mean annual loads and concentrations.

A detailed description of the water quality model and model assumptions is presented in Appendix B of the Water Quality Technical Report (Appendix 5.4-A to this EIR). The major features of the water quality model are listed below:

- **Rainfall Data.** The water quality model estimates the volume of runoff from storm events. The storm events were determined from 30 years (1949–1979) of hourly rainfall data measured at the nearest gage to the Project site (the National Climatic Data Center [NCDC] Sandberg rain gage). Also, this rain gage was selected because the rainfall measurements are at one-hour intervals and has been in operation for many years. Such data is essential in applying the water quality model. Although global climate change is expected to affect rainfall patterns in the future, this 40-year period of record has been used in the Water Quality Technical Report to represent the distribution of rainfall expected for the Project because the current suite of climate models is not designed to accurately predict the quantitative effects of global climate change on rainfall patterns at the local scale. Analysis of precipitation records throughout California show large year-to-year variability in the amount of annual precipitation with periods of consecutive dry or wet years and no apparent trend over the past century. Current climate projections imply an increase in the uncertainty of future precipitation conditions and that extreme events are expected to become more frequent. While precipitation projections do not show a clear trend in the future, an ensemble of 12 climate models shows a trend of decreasing runoff for Southern California between the end of the 20th and 21st centuries.
- **Land Use Runoff Water Quality.** The water quality model estimates the concentration of pollutants in runoff from storm events based on existing and all land uses on the Project site. The pollutant concentrations for various land uses, in the form of Event Mean Concentrations (EMCs), were estimated from data collected in Los Angeles County. The Los Angeles County database was chosen for use in the model because (1) it is an extensive, comprehensive database; (2) it contains monitoring data from land-use-specific drainage areas; and (3) the data is representative of the semi-arid conditions in Southern California.
- **Pollutant Load.** The pollutant load associated with each storm is estimated as the product of the storm event runoff times the EMC. For each year in the simulation, the individual storm event loads are added to estimate the annual load. The mean annual load is then the average of all the annual loads.
- **BMPs Modeled.** The modeling considers the LID, hydrology, and hydromodification BMPs planned for the Project, including 28 retention and detention basins (see Exhibit 5.2-4, Proposed Infiltration Basin Locations) and distributed or parcel-specific LID measures (see Exhibit 5.4-2, Low Impact Development [LID] Drainage Areas with Project). The modeling does not take into account source-control BMPs (e.g., street sweeping) that would also improve water quality. As a result, the modeling results are conservative and tend to overestimate pollutant loads and concentrations.

- **Treatment Effectiveness.** The water quality model estimates mean pollutant concentrations and loads in storm water following treatment. The amount of storm water runoff that is captured by the LID, hydrology, and hydromodification BMPs was calculated for each storm event, taking into consideration the intensity of rainfall, duration of the storm, and duration between storm events. The mean effluent water quality for the LID BMPs was based on the International Storm Water BMP Database. The International Storm Water BMP Database was used because it is a peer-reviewed database that contains a wide range of BMP-effectiveness studies that reflect diverse land uses.
- **Accounting for Bypass Flows.** The water quality model takes into account both the conditions when a treatment facility is full and when flows bypass the facility.
- **Volume Reduction.** The water quality model accounts for volume reductions from the BMPs due to infiltration and evaporation.
- **Use of Representative Data for Local Conditions.** The model utilizes runoff water quality data obtained from tributary areas that have a predominant land use and are measured prior to discharge into a receiving water body. Currently, such data are available from storm water programs in Los Angeles County, San Diego County, and Ventura County. Such data is often referred to as “end-of-pipe” data to distinguish it from data obtained in urban streams.
- **Infiltration.** Existing conditions infiltration parameters were based on soil hydrologic group, soil texture class, and the federal Natural Resource Conservation Service (NRCS) Soil Survey of the Project area (see Section 5.2, Hydrology and Flood, for a discussion of on-site channels and soils). As discussed in Section 5.2, and shown on Exhibit 5.2-2, Drainage Areas on the Project Site, about 90 percent of the proposed Project development will occur to the east of the West Branch of the California Aqueduct, and 10 percent of the development will occur west of the Aqueduct. These development areas will be subject to grading, including cut and fill operations, to construct infrastructure and the proposed Project’s residential, commercial, institutional and other structures. To conservatively reflect post-development conditions, soil compaction impacts were modeled for post-development open and landscaped areas assuming a 25 percent reduction in saturated hydraulic conductivity, or infiltration rate, from the pre-developed to post-developed condition. Impervious surfaces were modeled assuming no infiltration.

Modeled Pollutants

The appropriate form of data used to address water quality are flow composite storm event samples, which measure the average water quality during the event. Obtaining such data usually requires automatic samplers that collect data at a frequency that is proportionate to flow rate. The pollutants of concern for which there are sufficient flow composite sampling data in the Los Angeles County database are the following:

- TSS (sediment)
- Total Phosphorus
- Nitrate + Nitrite-Nitrogen, Ammonia, and Total Nitrogen

- Total and Dissolved Copper
- Total Lead
- Total and Dissolved Zinc
- Chloride

Qualitatively Evaluated Pollutants

Post-development storm water runoff water quality impacts associated with the following pollutants of concern were qualitatively addressed due to the unavailability of flow composite sampling data based on literature information and professional judgment:

- Turbidity
- Pesticides
- Pathogens (bacteria, viruses, and protozoa)
- Petroleum hydrocarbons (oil and grease, PAHs)
- Trash and debris
- MBAS
- Toxicity
- Emerging Contaminants

Human pathogens are usually not directly measured in storm water monitoring programs due to technical difficulty and expense and, in most cases, indicator bacteria such as fecal coliform or certain strains of *E. Coli* are measured. Because maximum allowable holding times for bacterial samples are necessarily short, most storm water programs do not collect flow-weighted composite samples that could potentially produce more reliable statistical estimates of concentrations. Fecal coliform and *E. Coli* are typically measured with grab samples, making it difficult to develop reliable event mean concentrations (EMCs). Total coliform and fecal bacteria (fecal coliform, fecal streptococcus, and fecal enterococci) were detected in storm water samples tested in Los Angeles County at highly variable densities (measured by “most probable number” of colony forming units, or MPN) ranging between several hundred to several million colony forming units per 100 milliliters (mL).

Petroleum hydrocarbons are difficult to measure because of laboratory interference effects and sample collection issues (hydrocarbons tend to coat sample bottles). Hydrocarbons are typically measured with single grab samples, making it difficult to develop reliable EMCs for the reasons explained above for pathogens.

Pesticides in urban runoff are often present at concentrations that are below detection limits for most commercial laboratories, thereby limiting the availability of statistically reliable data on pesticides in urban runoff. Pesticides were not detected in Los Angeles County monitoring data for land-use-based samples, except for diazinon and glyphosate, which were detected in less than 15 percent and 7 percent of samples, respectively.

Trash and debris, MBAS, toxicity, and emerging contaminants are not typically included in routine urban storm water monitoring programs. Several studies conducted in the Los Angeles River Basin have attempted to quantify trash generated from discrete areas, but the data represent relatively small areas, relatively short time periods, or both. MBAS was included in the land-use-based monitoring data, but not enough data is available for modeling purposes. Toxicity and emerging contaminants were not included in the Los Angeles County land use-based monitoring program.

Potential construction-phase water quality impacts caused by runoff and dewatering discharges are also qualitatively analyzed because the highly variable nature of construction conditions do not lend themselves to water quality modeling.

Best Management Practice Implementation for the Project

Effective management of wet and dry weather runoff water quality begins with limiting increases in runoff pollutants and flows at the source. Site-design and source-control BMPs minimize runoff and the introduction of pollutants into runoff. LID, hydrology, and hydromodification control BMPs are designed to control increases in post-development runoff flows, volumes, and/or durations as well as pollutant loads. PDF 4-1 and MM 4-1 incorporate LID performance standards that meet the County MS4 Permit, LID Ordinance, and LID Standards Manual requirements. The following discussion provides a description of the planned BMPs that will be implemented to meet the LID performance standards. As discussed in Section 5.2, Hydrology and Flood, these measures will also provide hydrology (flood) and hydromodification controls that meet or exceed County requirements in MM 2-1 (hydromodification) and MM 2-2 (peak and volume flows from a 50-year storm). Exhibit 5.4-2, Low Impact Development (LID) Drainage Areas with Project, shows the portions of the Project site that require treatment with regional or distributed and parcel-specific LID BMPs, and those areas that do not require treatment.

Source Control Best Management Practices

Table 5.4-4 summarizes the source-control requirements of the Los Angeles County LID Standards Manual and the corresponding BMPs that would be incorporated into the Project.

**TABLE 5.4-4
LOW IMPACT DEVELOPMENT STANDARDS MANUAL
SOURCE CONTROL REQUIREMENTS AND PROJECT
BEST MANAGEMENT PRACTICES**

Source-Control Requirement	Criteria/Description	Corresponding Centennial Project Source-Control BMPs
S-1: Storm Drain Message and Signage	<ul style="list-style-type: none"> • All storm drain inlets and catch basins in the Project area must be marked with prohibitive language and/or graphical icons to discourage illegal dumping. • Signs and prohibitive language and/or graphical icons, which prohibit illegal dumping, must be posted at public access points along channels and creeks in the Project area. • Legibility of stencils and signs must be maintained. 	<ul style="list-style-type: none"> • All storm drain inlets and water quality inlets will be stenciled or labeled. • Signs will be posted in areas where dumping could occur. • The Maintenance Entity will maintain stencils and signs.
S-2: Outdoor Material Storage Areas	<ul style="list-style-type: none"> • Where Project plans include outdoor materials storage areas that may contribute pollutants to the storm water conveyance system, measures to mitigate impacts must be included. 	<ul style="list-style-type: none"> • Pesticides, fertilizers, paints, and other high-risk materials used for maintenance of common areas, parks, commercial areas, and multi-family residential common areas will be kept in enclosed storage areas.
S-3: Outdoor Trash Storage and Waste Handling Areas	<p>All trash containers must meet the following structural or treatment-control BMP requirements:</p> <ul style="list-style-type: none"> • Trash container areas must allow for drainage from adjoining roofs and a pavement diverter around the areas. • Trash container areas must be screened or walled to prevent off-site transport of trash. 	<ul style="list-style-type: none"> • All outdoor trash storage areas will be covered and isolated from storm water runoff.
S-4: Outdoor Loading/Unloading Dock Areas	<ul style="list-style-type: none"> • Cover loading dock areas or design drainage to minimize storm water run-on and runoff • Prohibit direct connections to storm drains from depressed loading docks (truck wells) 	<ul style="list-style-type: none"> • Loading dock areas will be covered or designed to preclude run-on and runoff. • Direct connections to storm drains from depressed loading docks (truck wells) will be prohibited. • Drains or direct drainage from hydraulically isolated loading dock areas will be connected to an approved sediment/oil/water separator system. A manual emergency spill diversion valve will be provided upstream of the separator.

**TABLE 5.4-4
LOW IMPACT DEVELOPMENT STANDARDS MANUAL
SOURCE CONTROL REQUIREMENTS AND PROJECT
BEST MANAGEMENT PRACTICES**

Source-Control Requirement	Criteria/Description	Corresponding Centennial Project Source-Control BMPs
S-5: Outdoor Vehicle/ Equipment Repair/ Maintenance Areas	<ul style="list-style-type: none"> • Repair/maintenance bays must be indoors or designed in such a way that do not allow storm water run-on or contact with storm water runoff. • Design a repair/maintenance bay drainage system to capture all wash water, leaks, and spills. • Connect drains to a sump for collection and disposal. • Prohibit direct connection of the repair/ maintenance bays to the storm drain system. • If required by local jurisdiction, obtain an Industrial Waste Discharge Permit. 	<ul style="list-style-type: none"> • Repair/maintenance bays will comply with design requirements.
S-6: Outdoor Vehicle/ Equipment/ Accessory Wash Areas	<ul style="list-style-type: none"> • Ensure these areas are self-contained and/or covered, equipped with a clarifier, or other pretreatment facility, and properly connected to a sanitary sewer. 	<ul style="list-style-type: none"> • Areas for washing/steam cleaning of vehicles will be self-contained or covered with a roof or overhang; will be equipped with wash racks and have prior approval of the sewerage agency; will be equipped with a clarifier or other pretreatment facility; and will be properly connected to a sanitary sewer.
S-7: Fuel and Maintenance Area	<ul style="list-style-type: none"> • The fuel dispensing area must be covered with an overhanging roof structure or canopy. The cover's minimum dimensions must be greater than the area within the grade break. The cover must not drain onto the fuel dispensing area and the downspouts must be routed to prevent drainage across the fueling area. • The fuel dispensing area must be paved with Portland cement concrete (or equivalent smooth impervious surface). The use of asphalt concrete shall be prohibited. • The fuel dispensing areas must have a 2% to 4% slope to prevent ponding and must be separated from the rest of the site by a grade 	<ul style="list-style-type: none"> • Fueling areas will comply with design requirements.

**TABLE 5.4-4
LOW IMPACT DEVELOPMENT STANDARDS MANUAL
SOURCE CONTROL REQUIREMENTS AND PROJECT
BEST MANAGEMENT PRACTICES**

Source-Control Requirement	Criteria/Description	Corresponding Centennial Project Source-Control BMPs
	<p>break that prevents run-on of urban runoff.</p> <ul style="list-style-type: none"> At a minimum, the concrete fuel dispensing area must extend 6.5 feet from the corner of each fuel dispenser or the length at which the hose and nozzle assembly may be operated plus 1 foot (0.3 meter), whichever is less. 	
S-8: Landscape Irrigation Practices	<ul style="list-style-type: none"> Do not allow irrigation runoff from the landscaped area to drain directly to storm drain system. Minimize use of fertilizer, pesticides, and herbicides on landscaped areas. Plan sites with sufficient landscaped area and dispersal capacity (e.g., ability to receive irrigation water without generating runoff). Consult a landscape professional regarding appropriate plants, fertilizer, mulching applications, and irrigation requirements (if any) to ensure healthy vegetation growth. 	<ul style="list-style-type: none"> Native and/or non-native/non-invasive, climate-appropriate vegetation will be utilized within the development. The use of the parcel-based LID BMPs and regional infiltration facilities will prevent the discharge of dry weather urban runoff from the Project. Landscape and irrigation system design will comply with the design requirements or approved alternatives.
S-9: Building Materials Selection	<ul style="list-style-type: none"> Wood that is pressure-treated with arsenate, copper, and chromium compounds may be replaced with alternative building materials. Minimize or avoid the use of copper and galvanized metals on buildings and in fencing. Reduce the use of pesticides around foundations through the use of alternative barriers where feasible. 	<ul style="list-style-type: none"> Pressure-treated wood that is treated with arsenate, copper, or chromium compounds may be replaced with alternative building materials. The use of copper and galvanized metals on buildings and in fencing will be minimized or avoided. The use of alternative barriers for termites will be considered.

TABLE 5.4-4
LOW IMPACT DEVELOPMENT STANDARDS MANUAL
SOURCE CONTROL REQUIREMENTS AND PROJECT
BEST MANAGEMENT PRACTICES

Source-Control Requirement	Criteria/Description	Corresponding Centennial Project Source-Control BMPs
S-10: Animal Care and Handling Facilities	<ul style="list-style-type: none"> • Site animal care and handling facilities away from the storm drain system and receiving waters. • Manage grazing to prevent impacts to receiving waters. • Manage horse access and horse waste to prevent pollutants from entering the storm drain system or receiving waters. 	<ul style="list-style-type: none"> • Animal care and handling facilities will be sited away from the storm drain system and receiving waters. • Grazing in selected areas will be managed under the Adaptive Management Plan and/or Ranch-Wide Management Plan. • Horse waste will be managed to prevent pollutants from entering the storm drain or receiving waters.
S-11: Outdoor Horticultural Areas	<ul style="list-style-type: none"> • Do not allow wash water from horticulture areas to drain directly to the storm drain system or receiving waters. 	<ul style="list-style-type: none"> • Wash water from horticultural areas will not drain directly to the storm drain system or to receiving waters.
BMPs: Best Management Practices. Source: LACDPW 2014		

The Project would include additional source-control BMPs to minimize pollutants in storm water runoff. These BMPs will include provision of animal waste bag stations and a carwash pad for multi-family residential areas. An education program would be implemented that includes both the education of residents and commercial businesses regarding water quality issues. Topics would include services that could affect water quality, such as carpet cleaners and others that may not properly dispose of cleaning wastes; community car washes; and residential car washing. The education program would emphasize animal waste management, such as the importance of cleaning up after pets. As described in PDF 4-2, the Project would develop and implement Integrated Pest Management measures in accordance with the integrated pest management and pesticide and fertilizer application guidelines established by the University of California Division of Agriculture and Natural Resources Statewide Integrated Pest Management Program. The IPM measures will control nutrients and reduce pesticide use.

Site-Design Best Management Practices

Site-design principles reduce storm water runoff flows and impacts associated with land development to sensitive environmental features such as riparian areas, wetlands, and steep slopes. The benefits derived from site-design BMPs include the following:

- Reduction in the size of storm water quality control measures and conveyance systems.

- Reduction in pollutant loading to storm water quality control measures and receiving waters.
- Reduction in hydraulic impact on receiving waters.

The site-design principles in the Los Angeles County LID Standards Manual include site planning; protection and restoration of natural areas; minimization of land disturbance; and minimization of impervious cover. The following site designs have been incorporated into the Project to implement with the LID Standards Manual principles:

- Impervious areas would be minimized by incorporating parks and open space areas into the Project. Approximately 6,116 acres (approximately 50 percent) of the 12,323-acre Project site are parks and open space.
- Project BMPs, including parcel-based and regional LID BMPs, would disconnect impervious areas and reduce flows to natural channels through infiltration and evapotranspiration.
- In areas not subject to mass grading, the smallest site disturbance area possible would be delineated and flagged and temporary storage of construction equipment would be restricted in these areas to minimize soil compaction on site. Site clearing and grading would be limited as necessary to allow development, to allow access, and to provide fire protection.
- Streets, sidewalks, and parking lot aisles would be designed to the minimum widths required by the Americans with Disabilities Act and safety regulations for fire and emergency vehicle access.
- Native and/or non-native/non-invasive vegetation that requires less watering and chemical application will be utilized in compliance with the County Code and Section 3.3 of the Specific Plan.
- Impervious surfaces will be minimized in common area landscape design.

Low Impact Development and Hydromodification Best Management Practices

The LID performance standards will be achieved with regional BMPs, including 28 on-site detention and retention basins, and distributed or parcel-specific BMPs. As required by MM 4-1, compliance with the LID performance standards will be further confirmed in a drainage system engineering and planning report submitted to the County in conjunction with the review and approval process for each tract map application. The following sections describe the principles used to design LID BMPs for the Project; the regional LID BMP system; and the Project's distributed and parcel-specific BMPs.

The principles used to design LID BMPs are consistent with the MS4 Permit, the LID Ordinance, and the LID Standards Manual, and include the following:

- Institutional, commercial, multi-family residential, recreation, and parkland use parcels will implement retention or biofiltration BMPs within the parcel footprint. Runoff from the remaining developed area and that is not retained within the parcel

footprints would flow through the storm drain system to regional infiltration/biofiltration facilities.

- Based on feasibility, the LID performance standards will be achieved in specific locations as follows:
 - a. If it is feasible to infiltrate all of the runoff produced from the LID design storm from the developed area (i.e., soil infiltration rates are at least 0.3 inch per hour, and no other technical infeasibility concerns exist), infiltration BMPs (Category 1) would be used. Category 1 infiltration BMPs include bioretention (without an underdrain), permeable pavement, infiltration galleries, infiltration basins or trenches, drywells, or an equivalent infiltration BMP.
 - b. If Category 1 infiltration BMPs are infeasible due solely to low soil infiltration rates (i.e., the soil infiltration rate is less than 0.3 inch per hour), bioinfiltration BMPs (Category 2) would be used. Bioinfiltration facilities are similar to bioretention facilities with an underdrain and include storage below the underdrain to maximize the volume infiltrated. Category 2 facilities would retain a portion of the runoff from the LID design storm, then biofilter 1.5 times the remaining runoff from the LID design storm included in the LID performance standards (see PDF 4-1 and MM 4-1).
 - c. If Category 1 or Category 2 BMPs are infeasible, biofiltration BMPs (Category 3) will be used. Category 3 BMPs biofilter runoff produced from the 1.5 times the LID design storm (see PDF 4-1 and MM 4-1) and include bioretention with an underdrain, flow-based biofiltration BMPs, or an equivalent biofiltration BMP.
- Runoff from roadways will be retained or biofiltered in retention or biofiltration BMPs within the right-of-way sized to capture the LID design storm volume or flow (see PDF 4-1 and MM 4-1), per the guidance in USEPA's *Managing Wet Weather with Green Infrastructure Municipal Handbook: Green Streets*, or roadways may drain to regional facilities.
- Regional facilities would be implemented to infiltrate the LID design storm volume or biofilter 1.5 times the LID design storm volume (see PDF 4-1 and MM 4-1) that has not been retained or biofiltered within parcels or road rights-of-way. These regional facilities will be designed to meet the County requirements for hydromodification-impacts in combination with the LID performance standards.

Descriptions of the LID, hydrology, and hydromodification control BMPs that would be implemented within the Project are provided below. Exhibits 4-20a through 4-20f provide representative designs of the proposed Project BMPs.

Storm Water Management Facilities

The proposed Project has been designed to meet or exceed County MS4 Permit, LID Standards Manual, and LID Ordinance hydromodification and hydrology (flood-control) requirements for new development. The Project will implement site-design, source-control, LID, and hydromodification BMP features. Most Project runoff will be subject to control and treatment in a regional system that consists of 28 detention and retention basins located throughout the Project site (see Exhibit 5.2-4, Proposed Infiltration Basin Locations). Other

developed areas will control and treat runoff by utilizing distributed, smaller, or parcel-specific LID measures (see Exhibit 5.4-2, Low Impact Development [LID] Drainage Areas with Project). LID measures that will be implemented for the Project are discussed in more detail below.

Regional Infiltration/Retention Basins

Regional detention and retention basins are storm water management facilities designed to detain or infiltrate runoff from multiple parcels or project areas. The basins are typically shallow with flat, vegetated bottoms. Regional basins are constructed by either excavating a depression or building a berm to create aboveground storage. Runoff is stored in the basin and in the pore spaces of the underlying surface soils. Storm water treatment measures (e.g., swales, filter strips, and sedimentation forebays) that intercept runoff prior to reaching the basins reduce pollutant loads and provide water quality controls. Basin outlet structures are designed to mimic pre-development discharge rates. The basins allow for infiltration below the lowest surface discharge of the facility; remove sediment and sediment-bound pollutants by filtration in the underlying soils; and retain water in the form of soil moisture to promote the adsorption of pollutants (e.g., dissolved metals and petroleum hydrocarbons) into the surface of soil matrix. Plants utilize soil moisture and promote the drying of the soil. Extended detention for flood or hydromodification control would also provide additional pollutant removal through settling. As discussed in Section 5.2, Hydrology and Flood, the regional detention and retention basin system has been sized and designed to also meet applicable flood-control and hydromodification requirements.

The regional infiltration detention system for the Project includes 28 basins that will provide both hydromodification and flow control and water quality treatment for the majority of the proposed development area. The locations of the basins are shown on Exhibit 5.2-4. Normalized sizing charts were applied to the proposed development area's tributary to each basin to identify flow retention and duration volumes required to match the pre-development flow conditions and to achieve the LID and water quality performance standards. The water quality control volumes required to meet the LID performance standards and the total volume provided for hydromodification as well as flood and hydromodification control at each basin location are listed in Table 5.4-5.

**TABLE 5.4-5
SUMMARY OF REGIONAL RETENTION AND DETENTION
FOR WATER QUALITY CONTROL**

Regional Basin Number	Receiving Channel	Tributary Area (acres)	Tributary Area Imperviousness (%)	LID Total Volume Required (acre-feet)	Total Volume Provided (acre-feet)
Basin 0	East Tributary 4	21.5	54.9	0.72	10
Basin 1	Aqueduct crossing @ ~292 nd St	1528.5	52	48.89	420
Basin 2	Oso Creek	326.9	45	9.32	120
Basin 2a	Oso Creek	64.1	30	1.35	30
Basin 2b	Oso Creek	76.5	43.8	2.14	25
Basin 3	East Tributary 4c	52.2	42	1.41	30
Basin 4	East Tributary 4a	97.9	47.7	2.92	32
Basin 5	Oso Creek	321.4	36.3	7.77	80
Basin 6	East Tributary 4a	533.4	52.6	17.21	180
Basin 7	East Tributary 4b	230.5	33.4	5.24	55
Basin 8	East Tributary 4	398.6	47.1	11.78	125
Basin 9	East Tributary 3	48.0	30	1.01	12
Basin 10	East Tributary 3	164.4	28.8	3.37	35
Basin 11	East Tributary 2	754.6	52.3	24.23	255
Basin 12	Tentrock Tributary	30.7	86	1.50	20
Basin 13	Tentrock Tributary	114.0	59.1	4.05	45
Basin 14	Tentrock Tributary	420.9	90.8	21.59	250
Basin 15	Tentrock Tributary	59.8	91	3.07	40
Basin 16	Tentrock Tributary	99.5	57.5	3.45	40
Basin 17	Tentrock Tributary	43.8	42	1.18	15
Basin 18	Tentrock Tributary	101.6	91	5.21	65
Basin 19	Tentrock Canyon	36.9	30	0.78	9
Basin 20	Tentrock Canyon	43.4	30	0.91	10
Basin 21	Aqueduct crossing @ ~292 nd St	70.8	42	1.91	23
Basin 22	Aqueduct crossing @ ~292 nd St	182.8	59.3	6.51	60
Basin 23	Aqueduct crossing @ ~292 nd St	148.5	91	7.62	50
Basin 24	Aqueduct crossing @ ~292 nd St	550.8	48.7	16.72	170
Basin 25	Aqueduct crossing @ ~286 th St	148.3	35.3	3.52	60
LID: Low Impact Development Source: Geosyntec 2016a					

Parcel-Based Best Management Practices

Distributed and parcel-based BMPs are smaller-scale facilities typically treating runoff from one or a few parcels, including underground vaults and pipes. Exhibit 5.4-2, Low Impact Development (LID) Drainage Areas with Project, shows the locations of the primary distributed LID management measures that will be implemented for portions of the Project site. As discussed in Section 5.2, Hydrology and Flood, these measures also provide flood and hydromodification controls. Distributed and parcel-based measures will meet the LID performance standards incorporated into MM 4-1 and include infiltration, bioinfiltration, and biofiltration BMPs.

Distributed and parcel-based infiltration, bioinfiltration, and biofiltration BMPs provide for pollutant removal (e.g., filtration, adsorption, nutrient uptake) by filtering storm water through vegetation and soils and by reducing runoff volumes by infiltration. To achieve the LID performance standards, distributed and parcel-based LID BMPs are designed to (1) have a minimum storage volume equivalent to the storm water quality design volume (SWQDv), as calculated in accordance with the Los Angeles County LID Calculator (LACDPW 2014); (2) infiltrate to the extent feasible based on parcel-specific infiltration feasibility; and (3) biofilter 1.5 times the runoff that cannot be feasibly infiltrated from the 1.1-inch design storm.

Green Streets

The Project will utilize “green street” techniques consistent with the USEPA’s *Managing Wet Weather with Green Infrastructure Municipal Handbook: Green Streets* to meet the requirements of the LID performance standards for runoff from public rights-of-way. Two forms of green street implementation would be incorporated into the Project:

1. Where streets are tributary to regional facilities, the full requirements of the LID performance standards would be met by managing runoff in the regional LID facilities.
2. For streets that are not tributary to regional LID facilities, stand-alone green street BMPs within the street right-of-way would be used to meet the requirements of the LID performance standards, and distributed hydromodification-control BMPs would be used to meet the County LID Standards Manual Green street LID BMPs include infiltration or biofiltration BMPs, such as bioretention systems with an underdrain, vegetated swales, and filter strips. Proprietary flow-based biofiltration BMPs (e.g., Filterra® or equivalent) would also be used where appropriate and feasible.

Operation and Maintenance of Best Management Practices

As discussed in Section 5.18, Water Resources, the Project’s potable and recycled water infrastructure—including potable and recycled water treatment, delivery, metering and monitoring—will be managed by a water district or public utility district (PUD) that will serve the Project (the “Project Water Purveyor”). The Project Water Purveyor could also operate and maintain non-construction water-control BMPs within the site, and would be responsible for BMP inspections, monitoring, maintenance, and enforcement. Until the Project Water Purveyor or a similar BMP management agency is established, the Project

Applicant/Developer will be responsible for all water quality BMPs, including design, permitting, construction, operations, and maintenance.

5.2.5 THRESHOLD CRITERIA

The following significance threshold criteria are derived from the County of Los Angeles Environmental Checklist. The Project would result in a significant impact if it would:

- Threshold 4-1** Violate any (surface water) water quality standards or waste discharge requirements.
- Threshold 4-2** Generate construction or post-construction runoff that would violate applicable stormwater NPDES permits or otherwise significantly affect surface water or groundwater quality.
- Threshold 4-3** Result in point or nonpoint source pollutant discharges into State Water Resources Control Board-designated Areas of Special Biological Significance.
- Threshold 4-4** Use onsite wastewater treatment systems in areas with known geological limitations (e.g. high groundwater) or in close proximity to surface water (including, but not limited to, streams, lakes, and drainage course).
- Threshold 4-5** Otherwise substantially degrade water quality.

To evaluate whether the Project would cause a significant impact under any of the following thresholds, an integrated or “weight of evidence” approach was employed (rather than a decision based on any one criterion). The application of this approach is described in more detail below as it applies to evaluation of surface and groundwater quality.

The Water Quality Technical Report (see Appendix 5.4-A) analyzes whether polluted runoff may result from the Project based on the results of quantitative water quality modeling and qualitative assessments that account for the water quality controls and BMPs that will be implemented in accordance with PDF 4-1 and PDF 4-2 and required by MM 4-1 and MM 4-2. Any increases in pollutant concentrations or loads in runoff resulting from the development of the Project site are considered an indication of a potentially significant adverse water quality impact. If loads and concentrations resulting from development are predicted to stay the same or to be reduced when compared with existing conditions, it is concluded that the Project will not cause a significant adverse impact to the ambient water quality of the receiving waters for that pollutant.

If pollutant loads or concentrations are expected to increase, then for both the construction and post-development phases, potential impacts are assessed by evaluating the Project’s compliance with the applicable regulatory requirements of the Construction General Permit and the General Dewatering Permit during construction, and County MS4 Permit, LID Ordinance and LID Standard Manual requirements under post-construction conditions. Post-development increases in pollutant loads and concentrations are evaluated by comparing

the magnitude of the increase to relevant water quality criteria, including receiving water quality objectives and criteria from the Los Angeles or Lahontan Basin Plans and the CTR, as described below.

Groundwater quality standards are compared with post-development runoff water quality to assess potential Project impacts to groundwater quality.

Surface Water Quality Analysis Criteria

Potential Project impacts to surface receiving waters subject to a TMDL are analyzed by comparing construction and post-development water quality runoff constituent concentrations with applicable TMDL waste load or load allocations. Potential Project impacts to all surface receiving waters are analyzed by comparing post-development water quality runoff constituent concentrations with applicable numeric and narrative receiving water quality criteria in the Los Angeles and Lahontan Basin Plans and the CTR.

The narrative and numeric water quality objectives contained in the Los Angeles and Lahontan Basin Plans and the CTR apply to the Project's receiving waters. Pollutant levels in Project runoff that do not exceed receiving water quality objectives are considered to have no significant impacts to water quality.

Municipal Separate Storm Sewer System Permit, Low Impact Development Ordinance, and Low Impact Development Standards Manual Analysis Criteria

As described in PDF 4-1 and required by MM 4-1, the Project will implement the hydrology (storm water runoff), and LID standards for new development in the County MS4 Permit, the County LID Ordinance, and the County LID Standards Manual. The MS4 Permit requires that BMPs be implemented to reduce the discharge of pollutants in storm water to the maximum extent practicable (MEP). The effectiveness of storm water LID controls are primarily based on two factors: (1) the amount of runoff that is captured by the controls and (2) the selection of BMPs to address identified pollutants of concern. The MS4 Permit, LID Ordinance, and LID Standards Manual include selection and numerical sizing criteria for new development water quality controls. Project runoff subject to treatment in LID BMPs that comply with County selection and numerical sizing criteria for new development are considered to have no significant impacts to water quality related to MS4 Permit requirements.

Construction General Permit and General Dewatering Permit Analysis Criteria

As discussed in Section 5.4.2, the Project will comply with the state's Construction General Permit, the Lahontan RWQCB Limited Threat Discharge Permit, and the Los Angeles RWQCB General Dewatering Permit during construction. The Construction General Permit requires that construction period BMPs be implemented in accordance with an impact risk assessment. A Storm Water Pollution Prevention Plan (SWPPP) must be prepared and implemented that includes BMPs that meet or exceed the permit requirements applicable to the level of construction risk. The Lahontan RWQCB Limited Threat Discharge Permit covers

construction dewatering and other construction-related discharges associated with low or limited water quality risks. The limited threat discharge permit contains discharge prohibitions, receiving water limitations, and monitoring and reporting requirements. The Los Angeles RWQCB General Dewatering Permit addresses discharges from temporary dewatering operations associated with construction and permanent dewatering operations associated with development. Project construction period runoff that is subject to treatment BMPs that comply with the state's Construction General Permit and with the limited threat discharge and dewatering permits adopted by the Lahontan and Los Angeles RWQCBs during construction are considered to have no significant impacts to water quality.

Potential water quality impacts to surface water from quantitatively analyzed constituents of concern are discussed under Threshold 4-1. Potential water quality impacts to surface water from qualitatively-analyzed constituents of concern are discussed under Threshold 4-5. Potential water quality impacts to groundwater are discussed in Threshold 4-2. Thresholds 4-3 and 4-4 discuss potential impacts to Areas of Special Biological Significance and from the location of wastewater reclamation facilities near ephemeral and intermittent drainage courses.

5.2.6 ENVIRONMENTAL IMPACTS

Threshold 4-1 Would the project violate any (surface water) water quality standards or waste discharge requirements?

On-Site Impacts

Potential surface water quality impacts during construction and operation (i.e., post-construction) of the Project for qualitatively analyzed constituents are discussed under Threshold 4-1 and would be less than significant with mitigation. Potential groundwater quality impacts during construction and operation (i.e., post-construction) of the Project are discussed under Threshold 4-2 and would be less than significant with mitigation.

Potential surface water quality impacts during construction and operation (i.e., post-construction) for quantitatively analyzed constituents are discussed below. As discussed in Section 5.4.5, the pollutants of concern for which there are sufficient flow composite sampling data in the Los Angeles County database to conduct a quantitative analysis are the following:

- TSS (sediment)
- Total Phosphorus
- Nitrate + Nitrite-Nitrogen, Ammonia, and Total Nitrogen
- Total and Dissolved Copper
- Total Lead
- Total and Dissolved Zinc
- Chloride

Construction Impacts

Construction impacts from Project development would be minimized through compliance with the state Construction General Permit, the Lahontan RWQCB Limited Threat Discharge Permit, and the Los Angeles RWQCB General Dewatering Permit. The state Construction General Permit requires that construction period BMPs be implemented in accordance with an impact risk assessment. An SWPPP must be prepared and implemented that includes BMPs that meet or exceed the permit requirements applicable to the level of construction risk. Construction period BMPs may include erosion controls that prevent erosion; sediment controls that trap sediment carried in runoff in basins or other facilities; or BMPs that control other potential construction-related pollutants. The permit requires that BMPs incorporate the best available technology economically achievable and best conventional pollutant control technology (the “BAT/BCT standard”). BMP implementation must be based on the phase of construction and current weather conditions to control erosion and sediment. A Construction Site Monitoring Program that identifies monitoring and sampling requirements during construction is a required component of the SWPPP.

Project construction is anticipated to be classified as Risk Level 2 as defined in the Construction General Permit. Water Quality BMPs will be implemented in response to the risk assessment (Geosyntec 2016b). The following types of BMPs would be implemented during construction of the Project and would meet the BAT/BCT standard to comply with the Construction General Permit:

- **Erosion Control**

- Physically stabilizing the area through hydraulic mulch, soil binders, straw mulch, bonded fiber matrices, and erosion-control blankets (i.e., rolled erosion-control products).
- Containing and securely protecting stockpiled materials from wind and rain at all times, unless actively being used.
- Roughening soil in graded areas (through track walking, scarifying, sheepsfoot rolling, or imprinting) to slow runoff, to enhance infiltration, and to reduce erosion.
- Stabilizing vegetation through temporary seeding and mulching to establish interim vegetation.
- Controlling wind-erosion (dust) through the application of water or other dust palliatives (serving to lessen), as necessary, to prevent and alleviate dust nuisance.

- **Sediment Control**

- Protecting perimeters through silt fences, fiber rolls, gravel bag berms, gravel bag barriers, sand bag barriers, and compost socks to prevent discharges.
- Protecting storm drain inlets.
- Capturing sediment with sediment traps and basins.

- Reducing velocity through check dams, sediment basins, and outlet protection/velocity dissipation devices.
- Reducing off-site sediment tracking through stabilized construction entrance/exit, construction road stabilization, and entrance/exit tire wash.
- Slope interruption at permit-prescribed intervals (fiber rolls, gravel bag berms, sand bag berms, compost socks, biofilter bags).
- **Waste and Materials Management**
 - Managing the following types of materials, products, and wastes (i.e., solid, sanitary, concrete, hazardous, and equipment-related). Management measures include covered storage and secondary containment for material storage areas, secondary containment for portable toilets, covered dumpsters, dedicated and lined concrete washout/waste areas, proper application of chemicals, and proper disposal of all manner of wastes.
 - Protecting soil, landscaping, and construction material stockpiles by covering them, applying water or soil binders, and using perimeter-control measures.
 - Incorporating a spill response and prevention program as part of the SWPPP and on-site availability of spill response materials to be conspicuously located at all times.
- **Non-Storm Water Management**
 - Incorporating BMPs or good housekeeping practices to reduce or limit pollutants at their source before they are exposed to storm water, including such measures as water conservation practices, vehicle and equipment cleaning, fueling practices, and street sweeping. All such measures will be recorded and maintained as part of the Project's SWPPP.
 - Protecting receiving waters through compliance with the Los Angeles and the Lahontan RWQCB's General WDRs, which govern construction-related dewatering discharges. Typical BMPs for construction dewatering are listed below.
 - i. Infiltration of clean groundwater.
 - ii. On-site treatment using suitable treatment technologies.
 - iii. On-site or transport off site of sanitary sewer discharge with local sewer district approval.
 - iv. Use of sedimentation bags for small volumes of localized dewatering.
- **Training and Education**
 - Including Construction General Permit-defined "Qualified SWPPP Developers" (QSD) and "Qualified SWPPP Practitioners" (QSP). QSDs and QSPs shall have required certifications and shall attend State Board sponsored training.
 - Training individuals responsible for SWPPP preparation, implementation, and permit compliance, including contractors and subcontractors.

- Including signage (bilingual, if appropriate) to address SWPPP-related issues (such as site cleanup policies, BMP protection, washout locations).
- **Inspections, Maintenance, Monitoring, and Sampling:**
 - Performing routine site inspections and inspections before, during (for storm events lasting more than 24 hours), and after storm events.
 - Preparing and implementing Rain Event Action Plans (REAPs) prior to any storm event with 50 percent probability of producing 0.5 inch of rainfall, including performing required preparatory procedures and site inspections.
 - Implementing BMP maintenance and repairs, as indicated by routine, storm-event, and REAP inspections.
 - Implementing a Construction Site Monitoring Plan for non-visible pollutants, if a leak or spill is detected.
 - Sampling discharge points for turbidity and pH, at minimum, three times per qualifying storm event and recording and retention of results.

Additional information concerning the implementation of the Construction General Permit during Project construction is provided in Section 5.2, Hydrology and Flood, and in the Water Quality Technical Report, which is Appendix 5.4-A of this EIR.

Construction on the Project site may require dewatering. For example, dewatering may be needed if water has been standing on site and needs to be removed for construction, vector control, or other reasons. Further, dewatering may be necessary if groundwater is encountered during grading or to allow discharges associated with testing of water lines, sprinkler systems, and other facilities. In general, the Construction General Permit authorizes construction dewatering activities and other construction-related non-storm water discharges that (1) comply with Section III.C of the General Permit; (2) do not cause or contribute to a violation of any water quality standards; (3) do not violate any other provisions of the General Permit; (4) do not require a non-storm water permit as may be issued by certain RWQCBs in the state; and (5) are not prohibited by the applicable basin Plan provision.

The Lahontan RWQCB's Limited Threat Discharge Limited Permit authorizes construction dewatering activities in the Lahontan RWQCB region provided the following occur:

1. pollutant concentrations in the discharge do not cause, have a reasonable potential to cause, or contribute to an excursion above any applicable federal water quality criterion promulgated by USEPA pursuant to the CWA Section 303, or water quality objective adopted by the Regional Water Quality Control Board or the SWRCB, including discharge prohibitions for the receiving waters in the Lahontan Region;
2. pollutant concentrations in the discharge will not cause or contribute to degradation of water quality or impair beneficial uses of receiving waters;
3. the discharge does not cause acute or chronic toxicity in the receiving waters; and

4. discharge to land is not a practical alternative based on information provided by the discharger.

The discharger must also comply with a monitoring and reporting program that includes monitoring of the discharge and receiving waters for a mandatory suite of constituents and submit quarterly reports to the Lahontan RWQCB.

The Los Angeles RWQCB General Dewatering Permit authorizes discharges within the Los Angeles RWQCB region subject to BMPs that control potential water quality and other hydrological impacts. The Lahontan RWQCB Limited Threat Discharge Permit WDRs authorize discharges within the Lahontan RWQCB region subject to BMPs that control their potential water quality impacts. BMPs that would be implemented under the General Dewatering Permit for construction dewatering include infiltration of clean groundwater; on-site treatment using suitable treatment technologies; on-site or transport off site for sanitary sewer discharge with local sewer district approval; or use of a sedimentation bag for small volumes of localized dewatering.

The Project would reduce or prevent erosion and sediment transport and transport of other potential pollutants from the Project site during construction through implementation of BMPs meeting the BAT/BCT standard in accordance with the state Construction General Permit. These measures will ensure that discharges during Project construction do not cause or contribute to any exceedance of water quality standards in any receiving waters. All discharges from qualifying storm events must be sampled for turbidity and pH, and results will be compared to Numeric Action Levels (250 NTU and 6.5–8.5, respectively) to ensure that BMPs are functioning as intended. If discharge sample results exceed applicable action levels, a review of causative agents and the existing site BMPs must be undertaken, and maintenance and repair on existing BMPs be performed and/or additional BMPs be provided to ensure that future discharges meet the criteria. Construction BMPs would ensure effective control of sediment discharges and pollutants associated with sediments, such as nutrients, heavy metals, and certain pesticides, including legacy pesticides. Compliance with the BAT/BCT standards requires that BMPs used to control construction water quality are updated over time as new water quality control technologies are developed and become available for use. Compliance with the Construction General Permit will reduce construction period water quality impacts to less than significant levels.

The Project will also comply with the Lahontan RWQCB Limited Threat Discharge Permit and the Los Angeles RWQCB General Dewatering Permit during covered construction activities. These permits require BMPs that reduce potential construction impacts from dewatering and other low-threat construction discharges to less than significant levels.

The Project will comply with the waste discharge requirements in the state Construction General Permit, the Lahontan RWQCB Limited Threat Discharge Permit, and the Los Angeles RWQCB General Dewatering Permit during construction. The risk-based water quality and other BMPs implemented to the BAT/BCT standard (as required by the Construction General Permit) as well as additional measures required by the Lahontan RWQCB Limited Threat Discharge Permit and the Los Angeles RWQCB General Dewatering Permit will also avoid violation of any surface water quality standard during construction. Potential construction

period Project impacts from the violation of any surface water quality standards or waste discharge requirements would be less than significant and no mitigation is required.

Operational Impacts

As discussed above, the Project will construct and maintain distributed and parcel-specific LID and regional flood, hydromodification, and LID-control facilities that will meet or exceed applicable federal, State, and County hydrology and water quality control requirements. The locations of the primary distributed and parcel-specific LID facilities are shown in Exhibit 5.4-2, Low Impact Development (LID) Drainage Areas with Project. The locations of the 28 runoff detention and retention basins that comprise the regional control system are shown in Exhibit 5.2-4. Each basin has been sized to provide sufficient capacity to meet hydrology and flood, hydromodification, and water quality protection requirements. The following discussion summarizes the quantitative analysis of Project runoff water quality under post-development conditions, including regional, distributed and parcel-specific BMPs, relative to applicable receiving water quality standards. Potential water quality impacts for constituents subject to a qualitative analysis are discussed in Threshold 4-5.

Quantitative Analysis Results

Computer modeling was completed to forecast potential pollutant loadings that could be generated on the Project site under post-development conditions with applicable BMPs. Quantitatively analyzed constituents were evaluated with respect to the following three criteria:

1. Comparison of post-development versus pre-development (i.e., existing condition, which is primarily open space with livestock grazing and agriculture) storm water quality concentrations and loads;
2. Comparison with Los Angeles County MS4 Permit requirements; and
3. Evaluation relative to receiving water quality criteria. (The water quality criteria do not apply directly to runoff from the Project site and are used as conservative measures of potential water quality impacts.)

The comparison of post-development versus pre-development storm water quality concentrations and loads (criterion 1) are summarized in Table 5.4-6, Average Annual Runoff Volume and Pollutant Loads, and Table 5.4-7, Predicted Average Annual Pollutant Concentrations. Table 5.4-6 summarizes the predicted changes in the post-development mean annual volume of storm water runoff from existing conditions and mean annual loads for the pollutants of concern subject to a quantitative analysis. Table 5.4-7 summarizes the predicted changes in the average annual pollutant concentrations for these pollutants of concern. Pollutant loads refer to the total amount of each pollutant that would be produced on the site as an absolute volume. The pollutant concentration is a function of the measurement of the pollutant within a given amount of water. Therefore, the units for pollutant concentrations reflect the amount of the pollutant in one liter (L) of water.

The results include the Project site and approximately 15 acres located off site that would be subject to Project-related construction, including intersections with SR-138, utility connections, water wells, and Aqueduct crossings (see Section 4.0, Project Description). The modeling results are conservative because they only consider pollutant reductions attributable to the implementation of the proposed LID BMPs. Additional pollution reductions would occur due to site design and source-control, hydrology or hydromodification BMPs, and the post-development constituent loads and concentrations are likely to be lower than projected in the analysis.

**TABLE 5.4-6
PREDICTED AVERAGE ANNUAL POLLUTANT LOADS**

Parameter	Units	Existing	Developed	Change
Volume	af	240	1,014	774
TSS	tons/yr	84	131	47
Total Phosphorous	lbs/yr	355	807	452
Nitrate-N + Nitrite-N	lbs/yr	1,448	1,981	533
Ammonia-N	lbs/yr	129	1,216	1,087
Total Nitrogen	lbs/yr	2,287	8,908	6,621
Total Copper	lbs/yr	11	42	31
Dissolved Copper	lbs/yr	1.2	19.8	18.6
Total Lead	lbs/yr	3.3	18.7	15.4
Total Zinc	lbs/yr	18	236	218
Dissolved Zinc	lbs/yr	19	141	122
Chloride	tons/yr	3.7	23.9	20.2

af: acre-feet; TSS: total suspended solids (a measure of sediment); tons/yr: tons per year; nitrate-N, nitrite-N and ammonia-N are inorganic forms of nitrogen; lbs/yr: pounds per year.

Note: Modeled off-site improvements include 15 acres of roadway improvements.

Source: Geosyntec Consultants 2016b

**TABLE 5.4-7
PREDICTED AVERAGE ANNUAL POLLUTANT CONCENTRATIONS**

Parameter	Units	Existing	Developed	Change
TSS	mg/L	256	95	-161
Total Phosphorous	mg/L	0.5	0.3	-0.2
Nitrate-N + Nitrite-N	mg/L	2.2	0.7	-1.5
Ammonia-N	mg/L	0.2	0.4	0.2
Total Nitrogen	mg/L	3.5	3.2	-0.3
Total Copper	µg/L	16.3	15.2	-1.1
Dissolved Copper	µg/L	1.9	7.2	5.3
Total Lead	µg/L	5.0	6.8	1.8
Total Zinc	µg/L	27.0	85.6	58.6
Dissolved Zinc	µg/L	28.6	51.1	22.5
Chloride	mg/L	11.4	17.3	5.9

TSS: total suspended solids (a measure of sediment); mg/L: milligrams per liter; nitrate-N, nitrite-N and ammonia-N are inorganic forms of nitrogen; µg/L: micrograms per liter.

Note: Modeled off-site improvements include 15 acres of roadway improvements.

Source: Geosyntec Consultants 2016b

A discussion of the results shown in Tables 5.4-6 and 5.4-7 above, including a comparison of pre- and post-Project development conditions as well as comparison with water quality criteria for each pollutant modeled, is provided below.

Runoff Volume

Mean annual runoff volumes with are projected to increase from approximately 224 acre-feet per year (afy) under existing conditions to 774 afy under post-development conditions due to the increase in impervious surfaces on the site. For modeling purposes, the existing site was assumed to have an imperviousness of one percent in accordance with the Los Angeles County Hydrology Manual (Hydrology Manual) (LACDPW 2006). As discussed below, the increase in mean annual runoff volumes is projected to increase the annual load (in tons or pounds per year; see Table 5.4-6) of most constituents of concern.

Post-development impervious surfaces were estimated based on the proposed land uses and on the associated level of imperviousness indicated in the Hydrology Manual; these surfaces would have a composite imperviousness of approximately 54 percent. The entire Project site was estimated to have a composite imperviousness at buildout of approximately 30 percent when open space is included. Generally, runoff volume is directly proportional to percent imperviousness. As discussed above and in Section 5.2, Hydrology and Flood, the Project includes site-design, source-control, LID, water quality, and hydromodification-control BMPs that will meet or exceed County MS4 Permit, LID Ordinance, and LID Standards Manual standards for new development. Site-design BMPs, including the minimization of impervious area and the conservation of approximately 47 percent of the site (or 5,807 acres) in park and open space land uses, would reduce the post-development storm water runoff volumes. LID BMPs also reduce mean annual runoff volumes by infiltrating approximately 121 acre-

feet of storm water runoff per year on average. Potential Project impacts related to runoff volume are discussed in Section 5.2, Hydrology and Flood, and will be less than significant with mitigation.

Total Suspended Solids (TSS)

Comparison of Pre- and Post-Development Conditions: Post-development TSS loads are predicted to increase due to the increase in mean annual runoff volume discussed above. Under post-development conditions, the average TSS concentration in storm water runoff from the Project site would be reduced from 256 mg/l to 95 mg/l (see Table 5.4-7). This reduction is due to several factors, including increased hardscape and decreased grazing on the Project site, which tends to reduce the amount of suspended solids that would be carried in runoff.

Comparison with Water Quality Criteria: Table 5.4-8, Comparison of Predicted Total Suspended Solids Concentrations with Water Quality Criteria for the Project, compares the predicted average annual TSS concentration in post-development storm water runoff from the total modeled area to the narrative TSS water quality criteria in the Lahontan and Los Angeles Basin Plans.

**TABLE 5.4-8
COMPARISON OF PREDICTED TOTAL SUSPENDED SOLIDS CONCENTRATIONS WITH
WATER QUALITY CRITERIA FOR THE PROJECT**

Parameter	Predicted Average Annual Total Project Concentration (mg/L)	Los Angeles Basin Plan Surface Water Quality Objectives	Lahontan Basin Plan Surface Water Quality Objectives
TSS	95	Water shall not contain suspended or settleable material in concentrations that cause nuisance or adversely affect beneficial uses.	<p>The suspended sediment load and suspended sediment discharge rate of surface waters shall not be altered in such a manner as to cause nuisance or adversely affect the water for beneficial uses.</p> <p>Waters shall not contain suspended materials in concentrations that cause nuisance or that adversely affect the water for beneficial uses.</p> <p>For natural high quality waters, the concentration of total suspended materials shall not be altered to the extent that such alterations are discernible at the 10% significance level.</p>
mg/L: milligrams per liter			
Source: Geosyntec Consultants 2016b			

As shown in Table 5.4-7, post-development average annual TSS concentrations would be significantly lower than under current conditions. This reduction would avoid the creation of nuisance or adversely affect beneficial uses in applicable receiving waters. There are no natural high quality waters as defined in the Lahontan Basin Plan that could be affected by

Project runoff. Potential Project impacts related to TSS concentrations would be less than significant.

Nutrients

Comparison of Pre- and Post-Development Conditions: Total phosphorous loads are predicted to increase with development. Post-development phosphorus concentrations are predicted to decrease from 0.5 mg/L to 0.3 mg/L due to the reduction in agricultural and related land uses that are known to generate nutrient loads in runoff (see Table 5.4-7).

Nitrate + nitrite-nitrogen and total nitrogen average annual concentrations are also predicted to decrease while the average annual concentration of ammonia is predicted to increase in storm water runoff as a result of the Project (see Table 5.4-7). The nitrate + nitrite-nitrogen and total nitrogen decreases can be attributed to the reduction in agricultural and related land uses that are known to generate nutrient loads in discharges from LID BMPs. Ammonia concentrations will increase slightly due to greater concentrations of ammonia measured in developed area runoff in comparison to open space runoff.

As discussed above, the nutrient analysis is conservative because it only considers LID and hydromodification-control BMP constituent reductions. Other BMPs—including site-design BMPs that minimize nutrients in runoff through the preservation of natural areas, the use of native or drought tolerant plants in development area plant palettes, educational materials regarding the proper handling of fertilizers and pet waste, and the implementation of an IPM program—would further reduce nutrient loads and concentrations below the levels projected in Tables 5.4-6 and 5.4-7.

Comparison with Water Quality Criteria: The Lahontan and Los Angeles Basin Plans contain both narrative and numerical objectives for nutrients, including total phosphorus, total nitrogen, nitrate-N plus nitrite-N, and total ammonia (Table 5.4-9, Comparison of Nutrient Concentrations with Water Quality Criteria for the Project).

**TABLE 5.4-9
COMPARISON OF NUTRIENT CONCENTRATIONS WITH WATER QUALITY CRITERIA
FOR THE PROJECT**

Parameter	Predicted Average Annual Concentration (mg/L)	Los Angeles Basin Plan Surface Water Quality Objectives (mg/L)	Lahontan Basin Plan Surface Water Quality Objectives (mg/L)
Total Phosphorus	0.3	Waters shall not contain biostimulatory substances in concentrations that promote aquatic growth to the extent that such growth causes nuisance or adversely affects beneficial uses.	Waters shall not contain biostimulatory substances in concentrations that promote aquatic growth to the extent that such growths cause nuisance or adversely affect the water for beneficial uses whereby discharges are not to cause excessive algae growth in receiving waters.
Total Nitrogen	3.2		
Nitrate-N + Nitrite-N	0.7		
Total Ammonia	0.4	1.24 ^b	8.5 ^c
mg/L: milligrams per liter; ELS: early life stage ; pH: hydrogen potential; °C: degrees Celsius; °F: degrees Fahrenheit			
^a Waters shall not exceed 10 mg/L nitrogen as nitrate-nitrogen plus nitrite-nitrogen (NO ₃ -N + NO ₂ -N), 45 mg/L as nitrate (NO ₃), 10 mg/L as nitrate-nitrogen (NO ₃ -N), or 1 mg/L as nitrite-nitrogen (NO ₂ -N).			
^b 30-day average, ELS present, based on average pH (7.97) and average temperature of 25°C.			
^c Total ammonia Water Quality Objective calculated using pH = 7.5 (log mean pH) and Temperature = 30°C (86°F), which is very conservative.			
Source: Geosyntec Consultants 2016b			

The post-development total phosphorous concentration in Project storm water discharges to ephemeral receiving water drainages is lower than under existing conditions and is not likely to promote (i.e., increase) algae growth and therefore would comply with the narrative objective for biostimulatory substances in the Basin Plans. Ephemeral drainages dry out between storm events and do not support algal growth. As shown in Table 5.4-9, the average annual storm water concentration of ammonia, nitrate-N, and nitrite-N are predicted to be considerably lower than the numerical objectives in both basin plans and would also comply with applicable narrative water quality objectives. Potential Project impacts related to nutrients would be less than significant.

Metals

Comparison of Pre- and Post-Development Conditions: Projected loads and concentrations for the trace metals, copper, lead, and zinc are presented in Tables 5.4-6 and 5.4-7 above. Except for lead, CTR criteria apply to the dissolved forms of each metal. Los Angeles County land use-based monitoring data for dissolved lead is insufficient to facilitate modeling for this constituent. Copper, lead, and zinc are the most prevalent metals typically found in urban runoff. Other trace metals, such as cadmium, chromium, and mercury, are typically not detected in urban runoff or are detected at very low levels.

As shown in Tables 5.4-6 and 5.4-7, post-development dissolved copper, total lead, and total and dissolved zinc loads and concentrations are projected to increase compared with

pre-development conditions. The average annual concentration of total copper is predicted to decrease. These results are consistent with data indicating that metal loads and concentrations generally increase when a largely undeveloped site is subject to development from the introduction of automobile components, infrastructure materials, and atmospheric deposition.

As discussed above, the metals analysis is conservative because it only considers LID and hydromodification-control BMP constituent reductions. Other BMPs, such as site-design measures that direct drainage from impervious areas to vegetated infiltration areas, the selection of building materials that do not include copper or zinc, or source controls (e.g., education for property owners, street sweeping private streets, and parking lots) would further reduce metal loads and concentrations below the levels projected in Tables 5.4-6 and 5.4-7.

Comparison with Water Quality Criteria: Table 5.4-10, Comparison of Predicted Metals Concentrations with Water Quality Criteria for the Project, compares the projected post-development metal concentrations with narrative metals water quality objectives in the Lahontan and Los Angeles Basin Plans and numerical criteria in the CTR.

**TABLE 5.4-10
COMPARISON OF PREDICTED METALS CONCENTRATIONS WITH WATER QUALITY
CRITERIA FOR THE PROJECT**

Parameter	Predicted Average Annual Total Concentration (µg/L)	Los Angeles Basin Plan Surface Water Quality Objectives	Lahontan Basin Plan Surface Water Quality Objectives	CTR Criteria*
Total Copper	15.2	All waters shall be maintained free of toxic substances in concentrations that are toxic to, or that produce detrimental physiological responses in human, plant, animal, or aquatic life.	All waters shall be maintained free of toxic substances in concentrations that are toxic to, or that produce detrimental physiological responses in human, plant, animal, or aquatic life. Compliance with this objective would be determined by use of indicator organisms, analyses of species diversity, population density, growth anomalies, bioassays of appropriate duration and/or other appropriate methods as specified by the Regional Board. The survival of aquatic life in surface waters subjected to a waste discharge or other controllable water quality factors shall not be less than that for the same water body in areas unaffected by the waste discharge or, when necessary, for other control water that is consistent with the requirements for "experimental water" as defined in Standard Methods for the Examination of Water and Wastewater.	52
Dissolved Copper	7.2			50
Total Lead	6.8			480
Total Zinc	85.6			390
Dissolved Zinc	110	All waters shall be maintained free of toxic substances in concentrations that are toxic to, or that produce detrimental physiological responses in human, plant, animal, or aquatic life.		120

µg/L: micrograms per liter; CTR: California Toxics Rule; mg/L: milligrams per liter

* CTR acute aquatic life criteria are calculated for the maximum allowable hardness of 400 mg/L; an average hardness of 589 mg/L was observed in Piru Creek, which is representative of the Project's receiving waters.

Source: Geosyntec Consultants 2016b.

The narrative objectives in each Basin Plan focus on avoiding metals (i.e., “toxic substances”) in concentrations that are toxic to, or that produce detrimental physiological responses in human, plant, animal, or aquatic life. The CTR numerical criteria are based on similar water quality objectives required to protect aquatic life and provide a quantitative basis for evaluating Project compliance with the Basin Plan narrative objectives. CTR criteria are expressed for acute (one hour) and chronic (four-day average) conditions. For the Project site, only acute conditions are applicable because the duration of storm water discharges in the Antelope Valley region is consistently less than four days. The CTR criteria are calculated on the basis of the hardness of the receiving waters. Lower hardness concentrations result in lower, more stringent CTR criteria. The maximum allowable hardness of 400 mg/L was used as an estimate of the hardness in the Project’s receiving waters based on an average hardness of 589 mg/L observed in Piru Creek, the most proximate receiving water to the site for which hardness data was available.

As shown on Table 5.4-10, each of the projected post-development metal concentrations are below the CTR numerical criteria. As a result, the projected post-development metals concentrations would also comply with the toxicity avoidance narrative criteria in the Lahontan and Los Angeles Basin Plans. Potential Project impacts related to metals would be less than significant.

Chloride

Comparison of Pre- and Post-Development Conditions: As shown in Tables 5.4-6 and 5.4-7, average annual chloride concentrations and loads are predicted to increase compared with existing conditions. This result is due to the fact that chloride sources in urban areas (e.g., bulk precipitation deposition, leaching from materials such as plywood and plastics, fumigants, and paint removers) are typically more prevalent in developed areas than in undeveloped locations in Los Angeles County.

Comparison with Water Quality Criteria: Table 5.4-11, Comparison of Predicted Chloride Concentrations with Water Quality Criteria for the Project, compares the predicted chloride concentration in post-development Project runoff with the Los Angeles Basin Plan water quality objective. The Lahontan Basin Plan does not contain water quality objectives for chloride.

**TABLE 5.4-11
COMPARISON OF PREDICTED CHLORIDE CONCENTRATIONS WITH WATER QUALITY
CRITERIA FOR THE PROJECT**

Parameter	Predicted Average Annual Total Concentration (mg/L)	Los Angeles Basin Plan Surface Water Quality Objectives (mg/L)	Lahontan Basin Plan Surface Water Quality Objectives*
Chloride	17.3	100	N/A
mg/L: milligrams per liter; N/A: not applicable			
* There is no Lahontan Basin Plan surface water quality objective for chloride in the Project site’s receiving waters.			
Source: Geosyntec Consultants 2016b.			

As shown in Table 5.4-11, the post-development conditions for chloride concentrations would be less than significant.

In summary, the development average annual chloride concentration in storm water runoff from the Project site is significantly below the Los Angeles Basin Plan water quality objective for chloride. Potential Project impacts related to chloride concentrations would potential Project impacts for all quantitatively analyzed constituents of concern, including TSS, nutrients, trace metals, and chloride, would be consistent with or significantly below applicable narrative and numerical water quality objectives in the Lahontan and Los Angeles Basin Plans and in the CTR. As discussed in Threshold 4-5, potential Project impacts related to constituents of concern that are qualitatively analyzed, including turbidity, pesticides, pathogens (bacteria, viruses, and protozoa), petroleum hydrocarbons (oil and grease, PAHs), trash and debris, MBAS, toxicity, and emerging contaminants, would be less than significant. As a result, with the implementation of MM 4-1 and MM 4-2, the Project would not result in a violation any surface water quality standards or waste discharge requirements and impacts would be less than significant.

Off-Site Impacts

Construction and Operational Impacts

Approximately 15 acres located off site would be subject to Project-related construction, including intersections with SR-138, utility connections, water wells, and Aqueduct crossings (see Section 4.0, Project Description). The construction period and operational quantitative and qualitative water quality analysis includes these off-site locations. Consistent with the on-site analysis, with the implementation of MM 4-1 and MM 4-2 the Project would not result in a violation any off-site (surface water) water quality standards or waste discharge requirements and impacts would be less than significant.

Impact Summary: The Project will implement a comprehensive system of site design, source control, low impact development, and hydromodification Best Management Practices that meets or exceeds the water quality and hydrology (storm water runoff) standards for new development in the County LID Ordinance, LID Standards Manual, and MS4 Permit. All water quality controls, including regional, distributed and parcel-specific measures, are designed to meet or exceed the LID performance standards consistent with the requirements of the MS4 Permit, the LID Ordinance, and the LID Standards Manual. The project will also implement integrated pest management and landscaping BMPs consistent with the integrated pest management and pesticide and fertilizer application guidelines established by the University of California Division of Agriculture and Natural Resources Statewide Integrated Pest Management Program. Compliance with the LID performance standards and integrated pest management and landscaping BMP requirements will be reconfirmed in drainage and landscape plans to be submitted to the County in conjunction with each Project tract map review and approval process. These requirements

are incorporated in MM 4-1 and MM 4-2. During construction, the Project will comply with the state Construction General Permit, the Lahontan RWQCB Limited Threat Discharge Permit, and the Los Angeles RWQCB General Dewatering Permit and implement BMPs that will comply with all applicable waste discharge requirements and applicable water quality standards. The quantitative analysis results show that post-development concentrations of TSS, nutrients, trace metals, and chloride would be consistent with or significantly below applicable narrative and numerical water quality objectives in the Lahontan and Los Angeles Basin Plans and in the CTR. The qualitative analysis in Threshold 4-5 shows potential Project impacts related to turbidity, pesticides, pathogens (bacteria, viruses, and protozoa), petroleum hydrocarbons (oil and grease, PAHs), trash and debris, MBAS, toxicity, and emerging contaminants would be less than significant. With the implementation of MM 4-1 and MM 4-2, and compliance with applicable laws and regulations, including the state Construction General Permit and the Lahontan RWQCB Limited Threat Discharge Permit, potential Project impacts related to a violation of any surface water quality standards or waste discharge requirements would be less than significant.

Threshold 4-2 **Would the project generate construction or post-construction runoff that would violate applicable stormwater NPDES permits or otherwise significantly affect surface water or groundwater quality?**

On-Site Impacts

Surface water quality impacts during construction and operation (i.e., post-construction) of the Project are discussed under Threshold 4-1 above for qualitatively analyzed constituents and under Threshold 4-5 for qualitatively analyzed constituents. With mitigation, and compliance with applicable laws and regulations, the Project would not result in a violation of any surface water quality standards, waste discharge requirements, or applicable stormwater National Pollutant Discharge Elimination System (NPDES) permits, nor would it otherwise significantly affect or degrade surface water quality.

Potential groundwater quality impacts are addressed below.

Construction Impacts

The primary groundwater quality concern during Project construction is that construction activities could substantially increase the rate or amount of surface runoff in a manner that would result in the infiltration of pollutants into the Antelope Valley Groundwater Basin. As discussed above, approximately 96 percent of the Project site is located within the Antelope Valley Groundwater Basin Watershed. No runoff from developed areas on the Project site will occur in the Quail Lake Watershed. Approximately 4 percent of the site is in the Gorman Creek Watershed, which drains to the Hungry Valley and Peace Valley Groundwater Basins.

Potential construction impacts to groundwater from Project development would be minimized through compliance with the state Construction General Permit, the Lahontan RWQCB Limited Threat Discharge Permit, and the Los Angeles RWQCB General Dewatering Permit, all of which have been issued as NPDES and state permits. The state Construction General Permit requires that construction period BMPs be implemented in accordance with an impact risk assessment. An SWPPP must be prepared and implemented that includes BMPs that meet or exceed the permit requirements applicable to the level of construction risk. Construction period BMPs may include erosion controls that prevent erosion; sediment controls that trap sediment carried in runoff in basins or other facilities; or BMPs that control other potential construction-related pollutants. The permit requires that BMPs incorporate the best available technology economically achievable and best conventional pollutant control technology. BMP implementation must be based on the phase of construction and current weather conditions to control erosion and sediment. A Construction Site Monitoring Program that identifies monitoring and sampling requirements during construction is a required component of the SWPPP.

Project construction is anticipated to be classified as Risk Level 2, as defined in the Construction General Permit. Water quality BMPs will be implemented in response to the risk assessment (Geosyntec 2016b). Additional information concerning the implementation of the Construction General Permit during Project construction is provided in Threshold 4-1 and Section 5.2, Hydrology and Flood, of this EIR. As discussed in Threshold 4-1, the Project will also comply with the Lahontan RWQCB Limited Threat Discharge Permit, and the Los Angeles RWQCB General Dewatering Permit during covered construction activities.

Compliance with the state Construction General Permit, the Lahontan RWQCB Limited Threat Discharge Permit, and the Los Angeles RWQCB General Dewatering Permit during construction will not result in violation of applicable storm water NPDES permits or otherwise significantly affect surface water or groundwater quality. Potential impacts would be less than significant and no mitigation is required.

Operational Impacts

Groundwater quality impacts could result from the infiltration of developed area runoff into the Antelope Valley Groundwater Basin. As discussed above, approximately 93 percent of the Project site is located within the Antelope Valley Groundwater Basin Watershed. No runoff from Project developed areas will occur in the Quail Lake Watershed. Approximately four percent of the site is in the Gorman Creek Watershed, which drains to the Hungry Valley and Peace Valley Groundwater Basins. Developed area runoff could infiltrate into groundwater by (1) the infiltration of water applied to outdoor areas for landscaping, slopes, parks, schools, and common area irrigation; (2) infiltration in regional detention and retention basins and in distributed or parcel-specific LID BMPs; and (3) infiltration of post-treatment runoff that flows from regional detention and retention basins and distributed or from parcel-specific LID BMPs that eventually flows to Antelope Valley Groundwater Basin recharge locations.

As discussed in Section 5.4.5, Groundwater Pollutants of Concern, research conducted on the effects on groundwater from storm water infiltration indicates that, with appropriate pretreatment, storm water infiltration does not adversely impact groundwater quality

(Geosyntec 2016b). Exhibit 5.4-2, Low Impact Development (LID) Drainage Areas with Project, shows the portions of the site that are subject to regional water quality treatment in 28 retention and detention basins and the locations that are subject to water quality treatment in distributed or parcel-specific LID BMPs; as shown, all on-site runoff will be subject to appropriate pretreatment prior to infiltration in regional and distributed or parcel-specific LID BMPs.

Groundwater constituents of concern are characterized by high mobility, low adsorption potential, high solubility fractions, and high concentrations in runoff. Most of the constituents of concern, including metals and bacteria, lack these characteristics and are filtered from runoff by soils. As discussed in Threshold 4-1 for qualitatively analyzed constituents, and in Threshold 4-5 for quantitatively analyzed constituents, most constituents of concern would also not occur in high concentrations or in concentration levels that exceed applicable water quality objections. With the implementation of MM 4-1 and MM 4-2, potential groundwater impacts from these constituents would be less than significant.

As discussed in Section 5.4.5, chloride and nitrate have a greater potential for infiltration because these constituents are more mobile and could reach groundwater by infiltration. Table 5.4-12 compares the predicted average annual nitrate-N and chloride concentrations in Project post-development runoff with applicable groundwater quality objectives from the Los Angeles and Lahontan Basin Plans. As shown in Table 5.4-12, under developed conditions and including the proposed regional and distributed or parcel-specific LID BMPs, predicted average annual nitrate-N and chloride concentrations in Project runoff would be significantly below the nitrate-N groundwater quality objective in the Los Angeles Basin Plan (no nitrate-N groundwater objective is included in the Lahontan Basin Plan) and the chloride groundwater objectives in both Basin Plans.

**TABLE 5.4-12
COMPARISON OF NITRATE-N AND CHLORIDE CONCENTRATIONS
WITH GROUNDWATER QUALITY OBJECTIVES FOR THE PROJECT SITE**

Predicted Average Annual Concentration in Storm Water (mg/L)		Los Angeles Basin Plan Water Groundwater Quality Objectives (mg/L)		Lahontan Basin Plan Groundwater Quality Objectives (mg/L)	
Nitrate-N	Chloride	Nitrate-N	Chloride	Nitrate-N*	Chloride
0.7	17.3	10	50	N/A	250
mg/L: milligrams per liter; N/A: not applicable					
* There is no Lahontan Basin Plan groundwater quality objective for nitrate-N in the Project area groundwater basin.					
Source: Geosyntec Consultants 2016b.					

The Los Angeles Basin Plan groundwater quality objective for nitrate-nitrogen is 10 mg/L. The predicted nitrate-nitrogen concentration in runoff after treatment with LID BMPs is 0.7 mg/L, significantly below the Los Angeles Basin Plan groundwater quality objective.

The Lahontan Basin Plan groundwater quality objective for chloride is 250 mg/L and the Los Angeles Basin Plan's groundwater quality objective for the Hungry Valley and Peace Valley Groundwater Basins is 50 mg/L. The average annual chloride concentration in Project site runoff is predicted to be 17.3 mg/L, which is significantly lower than the groundwater objectives. Therefore, the potential for adversely affecting groundwater quality for chloride due to infiltration of Project site runoff would be less than significant.

As discussed in Section 5.18, Water Resources, at buildout, the Project will use approximately 4,659 afy of recycled water treated to unrestricted reuse standards in accordance with Title 22 of the of the *California Code of Regulations*, primarily for outdoor irrigation. Recycled water can be a contributing source of nitrate-N and chloride in runoff.

As discussed in Section 5.19, Wastewater, the Project will include two wastewater reclamation facilities (WRFs), including one to the west of and a larger facility to the east of the West Branch of the California Aqueduct. Title 22 of the *California Code of Regulations* establishes criteria for recycled water, treatment, conveyance, and water quality testing; these criteria are administered by the SWRCB Division of Drinking Water. State surface and ground water quality, including discharge from the WRFs, is further regulated by the Lahontan RWQCB under the Porter Cologne Act. Each of the proposed WRFs will be required to obtain WDRs from the Lahontan RWQCB that include enforceable operational, treatment, conveyance, discharge, water quality, and monitoring requirements before wastewater treatment and recycled water operations may commence. The WDRs issued by the board will be consistent with the RWQCB's wastewater treatment requirements. The proposed WRFs will not be located in or discharge to portions of the site within the boundaries of the Los Angeles RWQCB.

On February 3, 2009, in Resolution No. 2009-0011, the SWRCB adopted a Recycled Water Policy (SWRCB 2009b)(Policy) that provides direction to each RWQCB regarding appropriate criteria to be used in issuing permits for recycled water projects and is intended to streamline recycled water project permitting. The Policy notes that (1) some groundwater basins contain salts and nutrients that exceed or threaten to exceed water quality objectives established in Basin Plans; (2) all salts and nutrients should be managed on a basin-wide or watershed-wide basis through development of regional or sub-regional management plans; and (3) every groundwater basin/sub-basin in California is to have a consistent, locally driven salt/nutrient management plan developed by water and wastewater entities, together with contributing stakeholders in collaborative processes, including compliance with CEQA and participation by RWQCB staff. The Policy describes the components of these salt and nutrient management plans. Finally, the Policy addresses the control of incidental runoff from landscape irrigation projects, recycled water, groundwater recharge projects, anti-degradation factors, control of emerging constituents, and chemicals of emerging concern.

The WRF permits issued by the Lahontan RWQCB will contain waste discharge requirements that ensure compliance with the Lahontan Basin Plan surface water quality objectives for nitrate-N (10 mg/L) and chloride (100 mg/L) as well as the Basin Plan groundwater chloride objective of 250 mg/L. The permits will also be consistent with the SWRCB Recycled Water Policy, including salt and nutrient policy provisions. MM 19-5 in Section 5.19, Wastewater,

requires that, prior to the issuance of grading permits for areas served by each WRF, the County must be provided with documentation demonstrating that the applicable WRF is in conformance with all Lahontan RWQCB and Title 22 requirements.

With the implementation of MM 4-1, MM 4-2 and MM 19-5, and compliance with all WRF permit terms and conditions, the Project would not significantly affect groundwater quality and potential impacts will be less than significant.

Off-Site Impacts

Approximately 15 acres located off site would be subject to Project-related construction, including intersections with SR-138, utility connections, water wells, and Aqueduct crossings (see Section 4.0, Project Description). The construction period and operational quantitative and qualitative water quality analysis includes these off-site locations. Consistent with the on-site analysis, with the implementation of MM 4-1, MM 4-2, and MM 19-5 and with compliance with all WRF permit terms and conditions, the Project would not significantly affect off-site groundwater quality, and potential impacts will be less than significant.

Impact Summary: The Project will implement a comprehensive system of site design, source control, low impact development, and hydromodification Best Management Practices that meet or exceed the water quality and hydrology (storm water runoff standards for new development in the County LID Ordinance, the LID Standards Manual, and the MS4 Permit. All water quality controls, including regional, distributed and parcel-specific measures, are designed to meet or exceed the LID performance standards consistent with the requirements of the MS4 Permit, the LID Ordinance and the LID Standards Manual. The project will also implement integrated pest management and landscaping BMPs consistent with the integrated pest management and pesticide and fertilizer application guidelines established by the University of California Division of Agriculture and Natural Resources Statewide Integrated Pest Management Program. Compliance with the LID performance standards and integrated pest management and landscaping BMP requirements will be reconfirmed in drainage and landscape plans to be submitted to the County in conjunction with each Project tract map review and approval process. These requirements are incorporated in MM 4-1 and MM 4-2. Two WRFs will be operated in conformance with all Lahontan RWQCB and Title 22 requirements, which will be reconfirmed in documentation and to be submitted to the County prior to the issue of building permits. These requirements are incorporated into MM 19-5. During construction, the Project will comply with the state Construction General Permit, the Lahontan RWQCB Limited Threat Discharge Permit, and the Los Angeles RWQCB General Dewatering Permit. Potential surface water quality impacts are discussed in Threshold 4-1 and 4-5 and will be less than significant after mitigation. With implementation of MM 4-1, MM 4-2, and MM 19-5

as well as compliance with applicable laws, regulations, and WRF permits, potential Project impacts from construction or post-construction runoff that would violate applicable storm water NPDES permits or that would otherwise significantly affect groundwater quality would be less than significant.

Threshold 4-3 Would the project result in point or nonpoint source pollutant discharges into State Water Resources Control Board-designated Areas of Special Biological Significance?

On-Site and Off-Site Impacts

SWRCB-designated Areas of Special Biological Significance (ASBS) are 34 ocean areas, covering much of the length of California's coastal waters, that are monitored and maintained for water quality by the SWRCB. The only coastal ASBS in Los Angeles County is the Laguna Point to Latigo Point ASBS, which encompasses 11,842 acres of marine habitat and approximately 24 miles of coastline roughly between Pt. Mugu and Malibu (SWRCB 2014).

As discussed above, approximately 93 percent of the Project site is located within the Antelope Valley Groundwater Basin Watershed. No runoff from Project developed areas will occur in the Quail Lake Watershed. Approximately four percent of the site is in the Gorman Creek Watershed, which drains to Gorman Creek. Gorman Creek flows to Cañada de los Alamos in the Lower Hungry Valley before discharging to Pyramid Lake about six miles downstream from the Project boundary. Downstream of Pyramid Lake, Piru Creek flows south approximately 20 miles to Piru Lake, which is formed by the Santa Felicia Dam and then for approximately 6 miles south to Reach 4 of the Santa Clara River. The point of confluence with the Santa Clara River is located approximately 40 miles south of the Project site (Geosyntec 2016b). As a result, the Project site is approximately 72 miles upstream of the Pacific Ocean. The Santa Clara River discharges at McGrath State Beach in the City of Oxnard, which is approximately six miles from the northern terminus of the Laguna Point to Latigo Point ASBS. The Project will not result in point or non-point source pollutant discharges into any ASBS. There would be no impact and no mitigation is required.

Impact Summary: The Project will not result in point or non-point source pollutant discharges into any ASBS. There would be no impact and no mitigation is required.

Threshold 4-4 Would the project use onsite wastewater treatment systems in areas with known geological limitations (e.g. high groundwater) or in close proximity to surface water (including, but not limited to, streams, lakes, and drainage course)?

On-Site Impacts (Construction and Operations)

As discussed in Section 5.19, Wastewater, the Project will include two WRFs, including one to the west of the West Branch of the California Aqueduct (WRF West) and a larger facility to the east of the Aqueduct (WRF East). Title 22 of the *California Code of Regulations* establishes criteria for recycled water, treatment, conveyance, and water quality testing, and it is administered by the SWRCB Division of Drinking Water. State surface and groundwater quality, including discharge from the WRFs, is further regulated by the Lahontan RWQCB under the Porter-Cologne Act. Each of the proposed WRFs will be required to obtain WDRs from the Lahontan RWQCB that include enforceable operational, treatment, conveyance, discharge, water quality, and monitoring requirements before wastewater treatment and recycled water operations may commence. The WDRs issued by the board will be consistent with the RWQCB's wastewater treatment requirements and the SWRCB's Recycled Water Policy (SWRCB Resolution No. 2009-0011). The proposed WRFs will not be located in or discharge to portions of the site within the boundaries of the Los Angeles RWQCB.

Both WRFs are proposed in locations that would allow for wastewater to generally flow by gravity for treatment and are sited in areas that are not adjacent to sensitive land uses. The wastewater collection system also includes locations where small sewer lift stations and force mains will be required. The proposed sewer lift stations will typically consist of a duplex, a submersible pump system equipped with aboveground electrical facilities, and generators to provide stand-by power.

The treatment facilities will consist of primary treatment using grinder pumps and by screening in channels, which can be constructed in phases, followed by secondary and tertiary treatment. The wastewater will be treated to state Title 22 unrestricted reuse standards, which requires biological oxidation clarification and filtration of treated wastewater. Membrane bioreactor (MBR) wastewater treatment technology will be utilized to meet the recycled water quality objectives. The MBR process combines a biological treatment system followed by membrane filtration. This MBR technology will provide recycled water supplies that exceed secondary and tertiary Title 22 requirements. Solids handling will be provided by anaerobic digesters to thicken the sludge followed by centrifuges or belt filter presses to further reduce the liquid content prior to being hauled to a suitable landfill or to convert it into fertilizer products. Exhibit 4-15, Treatment Methods at Project Wastewater Reclamation Facilities (WRF), in Section 4.0 Project Description, provides an overview of treatment processes and methods that would be used at each WRF.

Exhibit 5.19-2 in Section 5.19, Wastewater, shows the Project's proposed recycled water, storage, and distribution system. The WRFs and related facilities are not located in areas with high groundwater or that are in close proximity to perennial streams or lakes. As discussed in Section 5.2, Hydrology and Flood, and in Section 5.7 Biological Resources, Threshold 7-3, intermittent and ephemeral drainage courses occur within and adjacent to the Project site, including areas that are proximate to the proposed WRFs and related facilities.

Potential surface water quality impacts to drainage courses during construction and operation (i.e., post-construction) of the Project are discussed under Threshold 4-1 for

qualitatively analyzed constituents and under Threshold 4-5 for qualitatively analyzed constituents. Potential ground water quality impacts, including from the use of recycled water produced by the WRFs that could be conveyed and infiltrated by drainage courses, are discussed in Threshold 4-2. The WRFs will be required to obtain WDRs from the Lahontan RWQCB that include enforceable operational, treatment, conveyance, discharge, water quality, and monitoring requirements before wastewater treatment and recycled water operations may commence. The WDRs issued by the board will be consistent with the RWQCB's wastewater treatment requirements and will ensure compliance with the Lahontan Basin Plan's surface and ground water quality objectives and with the SWRCB's Recycled Water Policy. The proposed WRFs' wastewater treatment and recycled water systems will not be located or discharge to portions of the site within the boundaries of the Los Angeles RWQCB. MM 19-5 in Section 5.19, Wastewater, requires that, prior to the issuance of grading permits for areas served by each WRF, the County be provided with documentation demonstrating that the applicable WRF is in conformance with all Lahontan RWQCB and Title 22 requirements. During construction, including the construction of the WRFs and related facilities, the Project will comply with the state Construction General Permit, the Lahontan RWQCB Limited Threat Discharge Permit, and the Los Angeles RWQCB General Dewatering Permit.

With the implementation of MM 4-1, MM 4-2 and MM 19-5, compliance with all WRF permit terms and conditions, and compliance with all applicable laws and regulations, including the state Construction General Permit, the Lahontan RWQCB Limited Threat Discharge Permit, the Los Angeles RWQCB General Dewatering Permit and the SWRCB Recycled Water Policy, potential Project impacts from the use of on-site wastewater treatment systems in areas with known geological limitations or in close proximity to surface water will be less than significant.

Off-Site Impacts

Approximately 15 acres located off site would be subject to Project-related construction, including intersections with SR-138, utility connections, water wells, and Aqueduct crossings (see Section 4.0, Project Description). No wastewater treatment systems will be located off site; no impacts from the use of wastewater treatment systems in areas with known geological limitations or in close proximity to surface water will occur off site; and no mitigation is required.

Impact Summary: Potential Project impacts from the use of on-site wastewater treatment systems in areas with known geological limitations or in close proximity to surface water will be less than significant with the implementation of MM 4-1, MM 4-2 and MM 19-5; with compliance with all WRF permit terms and conditions; and with compliance with all applicable laws and regulations, including the state Construction General Permit, the Lahontan RWQCB Limited Threat Discharge Permit, the Los Angeles RWQCB General Dewatering Permit and the SWRCB Recycled Water Policy.

Threshold 4-5 Would the project otherwise substantially degrade water quality?

On-Site Impacts (Construction and Operations)

Potential surface water quality impacts during construction and operation (i.e., post-construction) of the Project for quantitatively analyzed constituents are discussed under Threshold 4-1 and would be less than significant with mitigation. Potential surface water quality impacts during construction and operation (i.e., post-construction) for qualitatively analyzed constituents are discussed below.

Qualitatively evaluated pollutants and other surface water quality factors during construction and operation of the Project are discussed in this section. As discussed in Section 5.4.2, post-development storm water runoff water quality impacts associated with the following pollutants of concern are qualitatively addressed due to the unavailability of flow composite sampling data based on literature information and professional judgment:

- Turbidity
- Pesticides
- Pathogens (bacteria, viruses, and protozoa)
- Petroleum hydrocarbons (oil and grease, polynuclear aromatic hydrocarbons (PAHs))
- Trash and debris
- Methylene-blue active substances (MBAS)
- Toxicity
- Emerging Contaminants

Potential construction impacts to surface and groundwater from Project development would be minimized through compliance with the state Construction General Permit, the Lahontan RWQCB Limited Threat Discharge Permit, and the Los Angeles RWQCB General Dewatering Permit. The state Construction General Permit requires that construction period BMPs be implemented in accordance with an impact risk assessment. An SWPPP must be prepared and implemented that includes BMPs that meet or exceed the permit requirements applicable to the level of construction risk. Construction period BMPs may include erosion controls that prevent erosion, sediment controls that trap sediment carried in runoff in basins or other facilities, or BMPs that control other potential construction-related pollutants. The permit requires that BMPs incorporate the best available technology economically achievable and best conventional pollutant control technology. BMP implementation must be based on the phase of construction and current weather conditions to control erosion and sediment. A Construction Site Monitoring Program that identifies monitoring and sampling requirements during construction is a required component of an SWPPP.

Project construction is anticipated to be classified as Risk Level 2, as defined in the Construction General Permit. Water Quality BMPs will be implemented in response to the risk assessment (Geosyntec 2016b). Additional information concerning the implementation of the Construction General Permit during Project construction is provided in Threshold 4-1 and Section 5.2, Hydrology and Flood, of this EIR. As discussed in Threshold 4-1, the Project

will also comply with the Lahontan RWQCB Limited Threat Discharge Permit and the Los Angeles RWQCB General Dewatering Permit during covered construction activities. Compliance with the state Construction General Permit, the Lahontan RWQCB Limited Threat Discharge Permit, and the Los Angeles RWQCB General Dewatering Permit during construction will not result in violation of applicable storm water NPDES permits, nor would it otherwise significantly affect surface water or groundwater quality.

The following sections discuss potential construction and operational period impacts to qualitatively analyzed constituents of concern in more detail.

Turbidity

Turbidity is a measure of suspended matter that interferes with the passage of light through the water or in which visual depth is restricted. Turbidity may be caused by a wide variety of suspended materials that range in size from colloidal to coarse dispersions, depending upon the degree of turbulence. A colloid is a system where finely divided particles are dispersed within a continuous medium in a manner that prevents them from being filtered easily or settled rapidly. In lakes or other waters that have relatively quiescent (still) conditions, most of the turbidity would be due to colloidal and extremely fine dispersions. In rivers under flood conditions, most of the turbidity would be due to relatively coarse dispersions. Erosion of clay and silty soils may contribute to in-stream turbidity. Organic materials that reach rivers serve as food for bacteria, and the resulting bacterial growth and other microorganisms that feed upon the bacteria produce additional turbidity. Nutrients in runoff may stimulate the growth of algae, which also contributes to turbidity.

Discharges of turbid runoff are primarily of concern during the construction phase of development. Construction-related impacts are summarized above. The Project will comply with the state Construction General Permit, including implementation of an SWPPP, sediment- and erosion-control BMPs, non-visible pollutant monitoring, and trash-control BMPs that meet BAT/BCT standards. These measures would reduce potential turbidity impacts to less than significant levels.

Post-development conditions will include new impervious surfaces that will stabilize soils and reduce the amount of turbidity in the runoff from the Project site. Proposed source controls such as common area landscape management and common area litter control, and the regional and distributed LID BMPs, would prevent or reduce the release of organic materials and nutrients which might contribute to algal blooms and increase turbidity in receiving waters. As discussed above under Threshold 4-1, post-development nutrient concentrations in Project runoff would be below applicable water quality objectives and result in less than significant water quality impacts. Based on compliance with the Construction General Permit, the Lahontan RWQCB Limited Threat Discharge Permit, and the Los Angeles RWQCB General Dewatering Permit during construction and with the implementation of water quality BMPS in accordance with MM 4-1 and MM 4-2, runoff from the Project would not cause increases in turbidity that result in adverse effects to beneficial uses in the receiving waters. Potential turbidity impacts would be less than significant.

Pesticides

In urban settings, pesticides are commonly applied in and around buildings (structural pest control) to control against ants and other pests and in vegetated areas to control insects, molds, and other vectors. The forms of pesticides used have evolved in response to regulatory actions. Organochlorine pesticides including Chlordane, Dieldrin, DDT and Toxaphene were some of the earliest pesticides, applied generally in the 1940s to 1960s. These pesticides were found to be persistent in the environment, bioaccumulated in the food chain of various animals, and posed a health risk to humans consuming food contaminated by these pesticides. These persistent organochlorine pesticides can be of concern where past farming practices involved their application. Historical pesticides should no longer be discharged in the watershed except in association with erosion of sediments to which these pollutants may have adhered in the past. Site development involves remedial grading, which would stabilize soils and prevent their transport from the Project site, actually reducing the potential for discharge of sediments to which historical pesticides may have adsorbed (to accumulate on the surface) in pre-development conditions. Transport of legacy pesticides adsorbed to existing site sediments may be a concern during the construction phase of development. The SWPPP must contain sediment- and erosion-control BMPs pursuant to the Construction General Permit implemented to meet the BAT/BCT standard. These sediment and erosion controls would avoid construction-related impacts associated with the transport of legacy pesticides adsorbed to existing site sediments, and impacts would be less than significant.

Under post-development conditions, pesticides would be applied to common landscaped areas and residential lawns and gardens. Organochlorine pesticides have been replaced in response to State and federal regulations by organophosphate pesticides, a class of pesticides that includes diazinon and chlorpyrifos, which have been commonly found in urban streams. Depending on the sample locations within the County, only between 0 to 13 percent of the samples in the Los Angeles County water quality database had detectable levels of diazinon (depending on the land use). Levels of chlorpyrifos were below detection limits for all land uses in all samples taken between 1994 and 2000. Other pesticides included in the County database were seldom measured above detection limits. In general, County water quality database records reflect flows that are not subject to the same level of LID and treatment controls that would be included in the Project. As a result, post-development pesticide concentrations in Project runoff would likely be lower than the sample results in the County database.

Diazinon and chlorpyrifos are pesticides of concern due to their potential toxicity in receiving waters. The USEPA banned all indoor uses of diazinon in 2002 and stopped all sales for all outdoor non-agricultural use in 2003. Changes to the use of chlorpyrifos include reductions in the residue tolerances for agricultural use; phase out of nearly all indoor and outdoor residential uses; and disallowal of non-residential uses where children may be exposed. Retail sales of chlorpyrifos ceased by December 31, 2001, and structural (e.g., construction) uses were phased out by December 31, 2005. Some uses are still allowed such as for public health purposes for fire ant eradication and mosquito control. Permissible uses of diazinon are also restricted. All indoor uses were prohibited as of December 2001

and retailers were required to end sales for indoor use on December 2002. All outdoor non-agricultural uses were phased out by December 31, 2004.

Due to legal sale and use restrictions, it is likely that diazinon and chlorpyrifos use in the Project area will be limited under post-development conditions. These pesticides can be detected as legacy constituents in water and sediment samples, although the incidence of detection is declining over time. Statewide sampling from 2008 to 2010 conducted as part of the California Surface Water Ambient Monitoring Program (SWAMP) Stream Pollution Trends sampling indicates that organophosphate pesticides detected in sediment decreased between 2008 and 2010 from 12 percent of 92 sediment sampling sites in 2008 to 0 percent in 95 sites sampled in 2010 (Geosyntec 2016b).

Organophosphate pesticides have been largely replaced with pyrethroid pesticides, which are a synthetic form of naturally occurring pyrethrins. State-wide sampling conducted as part of the SWAMP indicated 55 percent of 92 sediment sampling sites monitored in 2008 contained pyrethroid pesticides. This percentage increased to 81 percent of 95 samples taken in 2010. A recent survey of data from approximately 80 studies that focused on pyrethroid pesticides in receiving waters subject to urban runoff conducted by the California Stormwater Quality Association (CASQA) included 9,200 samples for pyrethroids. Pyrethroids were detected in 34 percent of the sediment samples and 25 percent of the water samples in the CASQA study and at concentrations exceeding levels known to cause toxicity to sensitive aquatic organisms in water. In 2012, the California Department of Pesticide Regulation (CDPR) issued new regulations limiting the outdoor non-agricultural use of 17 pyrethroids (Geosyntec 2016b).

The CASQA report also summarized 3,200 fipronil sample results. Fipronil is a non-pyrethroid pesticide that has been used as a replacement for pyrethroid pesticides in urban areas. The pesticide and related degradates (fipronil desulfinyl, fipronil sulfone, and fipronil sulfide) are increasingly detected in water and sediment in urban watercourses. Fipronil was detected in 40 percent of the water samples and 36 percent of the sediment samples, and fipronil degradates were detected in 27 percent of the water samples and 61 percent of the sediment samples in the CASQA report.

The water quality risks posed by a pesticide relate to the quantity of the pesticide used, its breakdown or degradation rate, its runoff characteristics, and its relative toxicity in water and sediment. Many pesticides exhibit toxicity at very low concentrations, the most effective control strategy is source control and compliance with CDPR regulations limiting outdoor applications (see Section 5.4.2 above). Source-control measures such as education programs for owners, occupants, and employees in the proper application, storage, and disposal of pesticides also provide post-development pesticide controls. Most pesticides, including historical pesticides that may be present at the site, are relatively insoluble in water and tend to adsorb to the surfaces of sediment, which would be stabilized with development or, if eroded, would be settled or filtered out of the water column by the Project's regional and distributed LID BMPs. These measures are required by MM 4-1 and would remove pesticides from storm water in conjunction with TSS reductions for storm water infiltration and/or biofiltration.

As discussed in PDF 4-2 and as required by MM 4-2, the Project will implement an Integrated Pest Management (IPM) program consistent with the integrated pest management and pesticide and fertilizer application guidelines established by the University of California Division of Agriculture and the Natural Resources Statewide Integrated Pest Management Program. The IPM program will prevent or suppress pest problems (i.e., insects and diseases) through a combination of techniques including using pest-resistant plants; biological controls; cultural practices; habitat modification; and judicious use of pesticides. Pesticide management BMPs will be implemented to promote safety (e.g., Material Safety Data Sheets, precautionary statements, protective equipment); compliance with regulatory requirements; spill mitigation; groundwater and surface water protection measures associated with pesticide use; and pesticide applicator certifications, licenses, and training (i.e., all pesticide applicators must be certified by the CDPR). Pesticides are subject to degradation and vary in their ability to eradicate pests. Some pesticides break down almost immediately into nontoxic byproducts, while others can be active for longer periods of time. Pesticides that degrade rapidly are less likely to adversely affect non-targeted organisms. In some instances, longer-lasting pesticides are preferable if fewer applications or smaller amounts of pesticide use are required to control pests. The proper amount and frequency of pesticide use will be addressed in the IPM program.

Pesticide loads and concentrations in Project runoff will be reduced by the regional and distributed LID BMPs required by MM 4-1. An IPM program that will reduce pesticide requirements by controlling pests with nontoxic measures will be implemented in accordance with MM 4-2 and will ensure that unavoidable pesticide use will be managed to minimize impacts to surface and groundwater. Compliance with MM 4-1 and MM 4-2 will be reconfirmed in drainage and landscape plans to be submitted to the County with each Project tract map application. All Project pesticide use will comply with applicable laws and regulations, including USEPA and CDPR pesticide use limitations. As a result, the Project would result in less than significant impacts related to pesticides.

Pathogens

Pathogens are viruses, bacteria, and protozoa that can cause gastrointestinal or other illnesses in humans. Fecal indicator bacteria (FIB), such as total and fecal coliform, enterococci, and *E. coli*, are used by regulatory agencies as indirect measures of the presence of pathogens the risk of human illness.

The USEPA updated recreational water quality criteria in 2012 and recommended that two indicators, *E. Coli* for fresh waters and enterococci for marine or fresh waters, be used. The Los Angeles RWQCB subsequently revised the Los Angeles Basin Plan to incorporate the updated USEPA criteria. In fresh waters designated for water contact recreation (REC-1), the Los Angeles Basin Plan use *E. Coli* criteria of 126/100 milliliters (mL) for a geometric mean criterion and 235/100 mL for a single sample limit. The implementation provisions in the Los Angeles Basin Plan state that the geometric mean values should be calculated based on a statistically sufficient number of samples, generally not less than 5 samples equally spaced over a 30-day period.

The Lahontan Basin Plan contains a 20 fecal coliform units (cfu) per 100 mL water quality objective for all water bodies in the region. The Lahontan Water Board staff is engaged in a

multi-year project to assess bacteria concentrations in the region's surface waters; to evaluate the data relative to the existing bacteria water quality objective of 20 cfu/100 mL; and to modernize the objective to an E. Coli standard.

The Los Angeles Basin Plan provides that the single sample limit must be strictly applied, except in the context of a TMDL, where a "reference system/antidegradation approach" or "natural sources exclusion approach" may be used. A reference system is defined as an area and associated monitoring point that is not impacted by human activities that may potentially affect bacteria densities in the receiving water body. Under the reference system approach, a certain frequency of exceedance of the single sample objective is permitted on the basis of the observed exceedance frequency in the selected reference system or the targeted water body, whichever is less. Under the natural source exclusion approach, after all anthropogenic sources of bacteria have been controlled and are determined to not cause or contribute to an exceedance of the single sample objective and the natural sources have been identified and quantified, a certain frequency of exceedance of the single sample objective is permitted based on the residual exceedance frequency in the specific water body. These approaches recognize that there are natural sources of bacteria that may cause or contribute to exceedances of the single sample objective and acknowledge that it is not the intent of the Los Angeles RWQCB to require treatment of natural sources of bacteria from undeveloped areas.

Santa Clara River Bacteria Total Maximum Daily Load

The Los Angeles RWQCB approved a Basin Plan amendment on July 8, 2010, to incorporate a TMDL for Indicator Bacteria for Reaches 3, 5, 6 and 7 of the Santa Clara River and for the Santa Clara River Estuary (Resolution #R10-006). The TMDL, in effect as of March 21, 2012, provides allowable exceedance day-based waste load allocations (WLAs) for MS4 dischargers for E. Coli in Reaches 3, 5, 6 and 7, and for fecal coliform, enterococcus, and total coliform in the Santa Clara River Estuary. These WLAs have been incorporated into the County MS4 Permit. The Indicator Bacteria TMDL MS4 WLAs are applied in the form of allowable exceedance days. The TMDL implementation schedule includes deadlines in 2016 and 2029. The TMDL is subject to reconsideration if one of the following occurs: (1) monitoring or any voluntary local reference system studies justify a TMDL revision; (2) the USEPA publishes revised recommended bacteria criteria that affect the TMDL; or (3) the Los Angeles RWQCB adopts a separate Basin Plan amendment, suspending recreational uses in the Santa Clara River during high flows.

Factors That Affect Fecal Indicator Bacteria Concentrations

There are various factors that affect the reliability of FIB as pathogen indicators. One factor is that there are numerous natural or non-anthropogenic (or "zoonotic") sources of FIB in developed watersheds and in receiving water bodies, including birds and other wildlife, soils, and plant matter. Anthropogenic sources may include domesticated animals and pets, poorly functioning septic systems, sewer system overflows or spills, cross-connections between sewer and storm drains, and the utilization of outdoor areas or storm drains for human waste disposal by people without access to indoor sanitary facilities. All of these sources can contribute to the concentrations of FIB. The extent to which human health risks vary by FIB source type remains uncertain (Geosyntec 2016b).

A second factor is that FIB can multiply in the field if the substrate, temperature, moisture, and nutrient conditions are suitable. Bacteria presence and growth has been observed in various substrates such as beach sands, wrack line (accumulation of kelp and other vegetative debris in the inter-tidal area of beaches), inter/sub-tidal sediments, and material deposited in storm drains. FIB monitoring in the Santa Ana River indicate that the ubiquity of sources and potential regrowth exceed the human sources of fecal bacteria generated by the entire population in the watershed. Regrowth of bacteria downstream of a package treatment plant utilizing ultraviolet (UV) radiation to disinfect dry weather flows in Aliso Creek was considered a prime factor in the rapid rebound of FIB concentrations downstream of the plant. Recent research also implicates storm drain biofilms as another source of FIB to receiving waters (Geosyntec 2016b).

A third factor is that the persistence of FIB may differ from other pathogenic viruses, bacteria, and protozoa. Viruses, for instance, are small, low in number, and difficult to inactivate, while protozoa may form protective cysts that are resistant to destruction and render them dormant but capable of reactivating in the future. While some indicator bacteria may die off in the water column due to ultraviolet disinfection or other unfavorable environmental conditions (including predation and antagonism), pathogens occasionally may persist longer.

Epidemiological Studies

In Southern California, the Southern California Coastal Water Research Project (SCCWRP) conducted three epidemiology studies between 2007 and 2009 at Doheny Beach in Dana Point, Avalon Beach on Santa Catalina Island, and at Surfrider Beach in Malibu in an effort to document the relationship between illness rates and FIB levels, including enterococcus, fecal coliform, and total coliforms. The results from the Doheny Beach study indicate significant differences in diarrhea and other illness for swimmers compared to non-swimmers and for swimmers who experienced body immersion, head immersion, or swallowed water. When the source of FIB consistently exceeded water quality standards, enterococcus levels measured by using traditional and rapid methods were both strongly related to higher levels of illness. Fewer significant associations were measured during periods when a beach berm prevented urban runoff from flowing into the ocean. The results of the SCCWRP study indicate that the accuracy of predicting human health associations at urban runoff impacted beaches using currently available indicators remains uncertain (Geosyntec 2016b).

Effects of Land Use and Runoff on Fecal Indicator Bacteria Concentrations

Dry weather, non-storm stream flows from undeveloped watersheds tend to have lower concentrations of FIB than dry weather urban flows. A recent study by SCCWRP that monitored 15 unimpaired natural Southern California streams weekly during dry weather for a year showed that about 18 percent of the samples exceeded daily and monthly bacterial indicator thresholds, although concentrations from these unimpaired streams were one to two orders of magnitude lower than levels found in developed watersheds. The study reported an average of the geometric means for E. Coli in dry weather flows in each stream of 41 MPN/100 mL. The Santa Clara River bacteria TMDL WLAs are based on the unimpaired stream and reference beach data reported in the SCCWRP studies (Geosyntec 2016b).

During wet weather, storm water runoff can mobilize indicator bacteria from a number of watershed and instream sources, and indicator bacteria concentrations tend to increase. Median storm water runoff monitoring results for open space land uses include E. Coli concentrations of about 5,400 MPN/100 mL as reported in the 2001–2005 Los Angeles River Watershed Wet Weather Study. Open land use data from the National Storm Water Quality Database indicate a median wet weather concentration of 7,200 MPN/100 mL (Geosyntec 2016b).

Land use type and condition also affect runoff concentrations. Most studies show higher FIB concentrations in urban runoff than in open space runoff. Runoff from residential land uses from the Los Angeles River Watershed Wet Weather Study had a median E. Coli concentration of about 6,300 MPN/100 mL and about 8,300 in the National Storm Water Quality Database. The median value of four flow-weighted average results from the 2001–2005 Los Angeles River Watershed Wet Weather Study was about 6,100 MPN/100mL for E. Coli for the low density residential land use site. These data represent urban areas that generally have not implemented source and treatment controls comparable with the proposed Project regional and distributed LID BMPs (Geosyntec 2016b).

Project Best Management Practices that Address Pathogen Indicators

The primary sources of pathogen indicators from the Project development would likely be sediment, pet wastes, wildlife, and pathogen regrowth in storm drains or other favorable locations for propagation. Other sources of pathogens and pathogen indicators (e.g., such as cross connections or leakage from sanitary and storm water facilities) are unlikely given modern sanitary sewer installation methods and inspection and maintenance practices.

The levels of bacteria in runoff from the Project site would be reduced by the proposed regional and distributed source-control and LID BMPs required by MMs 4-1 and 4-2. The Project source controls will include educating pet owners and providing products and disposal containers that encourage and facilitate cleaning up after pets to control pet waste. Education regarding feeding waterfowl also assists in managing wildlife sources and reducing related wastes and FIBs.

The proposed Project infiltration and bioretention LID BMPs and filtration through soils will provide effective pathogen controls. Studies by the City of Austin, Texas showed that sand filters removed from 37 percent to 83 percent of fecal coliforms and 25 percent to 81 percent of fecal streptococci in runoff (Geosyntec 2016b). Studies by the Southwest Florida Water Management District documented that significant reductions in total and fecal coliform bacteria and other indicators were observed between inflow and outflow samples subject to sand filtration ranging from nearly 70 percent for total coliforms and between 65 percent and 100 percent for fecal coliform bacteria. Analysis of enterococcus influent and effluent data for bioretention facilities have also documented significant reductions, including median influent concentrations of 605 MPN/100 mL and median effluent concentrations of 234 MPN/100 mL (Geosyntec 2016b).

Storm water discharges from the Project site without the proposed LID BMPs could potentially exceed the Lahontan and Los Angeles Basin Plan standards for FIB. Implementation of MM 4-1 will result in regional and distributed LID BMPs consistent with

controls that have been documented to reduce FIB concentrations in developed area runoff. Source-control BMPs would be implemented in accordance with the IPM and landscaping measures required by MM 4-2, including educating pet owners; educating residents regarding feeding (and therefore attracting) of waterfowl near water bodies; and providing products and disposal containers that encourage and facilitate cleaning up after pets. The Project would not include septic systems, and the sewer system would be designed to current standards which minimizes the potential for leaks. With mitigation, the Project would not result in appreciable changes in pathogen levels in the receiving waters compared with existing conditions, and impacts would be less than significant.

Petroleum Hydrocarbons

During construction, hydrocarbons in site runoff could result from construction equipment or vehicle fueling or spills. Construction-related impacts are analyzed above and in more detail in Threshold 4-1. Compliance with the state Construction General Permit, the Lahontan RWQCB Limited Threat Discharge Permit, and the Los Angeles RWQCB General Dewatering Permit would reduce construction water quality impacts, including from hydrocarbons, to less than significant levels.

Hydrocarbons are a broad class of compounds including oil and grease, most of which are non-toxic. Hydrocarbons are hydrophobic (low solubility in water) and have the potential to volatilize; most forms are biodegradable. Polynuclear aromatic hydrocarbons (PAHs) are a class of hydrocarbons that can be toxic depending on concentration levels, exposure history, and the sensitivity of the receptor organisms.

Hydrocarbon sources in developed settings derive principally from transportation sources, including emissions and leaks from vehicles and spill from fueling operations. These sources are located on impervious surfaces (including roads and parking lots) that generate runoff and can mobilize oil, grease, PAHs, and other hydrocarbon compounds. Hydrocarbon concentrations in developed area storm water have been reported in several studies. Runoff was sampled at 8 stations located in the Los Angeles metropolitan area near the mouths of major channels (i.e., mass emissions stations) and at 15 land use stations from 2001 through 2004. The mean flow-weighted total PAH concentration for the mass emission stations was 2,300 nanograms per liter (ng/L), compared with approximately 140 ng/L for one storm from an open space-dominated drainage. These data indicate that development increases PAH runoff concentrations. The most prevalent PAHs in developed area runoff (e.g., pyrene, fluoranthene, and chrysene) have higher molecular weights and are pyrogenic (related to combustion) (Geosyntec 2016b).

The majority of PAHs in storm water adsorb to the organic carbon fraction of particulates in runoff, including soot carbon generated from vehicle exhaust. Sediments could become contaminated with PAHs at levels considered toxic to benthic organisms. In a monitoring survey conducted as part of the SWAMP Stream Pollution Trends Project, average PAHs in stream sediments increased from 2008 to 2009 and then decreased in 2010. These data suggest that PAHs in stream sediments subject to urban runoff may decrease over time. An examination of the correlation between amphipod survival and PAH levels in 2008, 2009 and 2010 indicated that PAHs are not statistically correlated with amphipod survival.

Consequently, PAHs do not appear to be a cause of observed toxicity in SWAMP Stream Pollution Trends Project 2008–2010 data set (Geosyntec 2016b).

PAHs in urban runoff are primarily associated with transportation activities and are expected to increase with development. Source-control BMPs that reduce petroleum hydrocarbon loads include educational materials on oil disposal and recycling programs, spill control at fueling facilities, carpooling, and public transportation alternatives to driving. The proposed regional and distributed LID BMPs would further reduce PAH concentrations in runoff. As discussed above, PAHs tend to be adsorbed to particulates and are reduced by settlement, filtration, and/or adsorption LID BMPs. These forms of BMPs are required by MM 4-1. With mitigation, potential water quality impacts from petroleum hydrocarbons in Project runoff would be less than significant.

Trash and Debris

Urban development tends to generate significant amounts of trash and debris. Trash refers to any human-derived material including paper, plastics, metals, glass, and cloth. Debris is defined as any organic material transported by storm water, including leaves, twigs, and grass clippings. Trash and debris are often characterized as material retained on a five-millimeter (mm) mesh screen. These constituents contribute to the degradation of receiving waters by utilizing available oxygen as they decompose; by attracting pests; by disturbing physical habitats; by clogging storm drains and conveyance culverts; and by mobilizing nutrients, pathogens, metals, and other pollutants. Trash that is carried in runoff in developed areas can be both accidental and intentionally deposited. During wet weather events, gross debris deposited on paved surfaces can be transported to storm drains and is eventually discharged to receiving waters. Trash and debris can also be mobilized by wind or transported directly (and often illegally) into waterways.

During construction, there is potential for an increase in trash and debris loads due to lack of proper contractor good housekeeping practices at the construction site. Construction-related impacts are analyzed above and in more detail in Threshold 4-1. Compliance with the state Construction General Permit, the Lahontan RWQCB Limited Threat Discharge Permit, and the Los Angeles RWQCB General Dewatering Permit would reduce construction water quality impacts, including from trash and debris, to less than significant levels.

The proposed source-control and LID BMPs for the Project would minimize the adverse impacts of trash and debris during long-term operations. Source controls such as street sweeping, public education, fines for littering, and storm drain stenciling are effective in reducing the amount of trash and debris that is available for mobilization during wet and dry weather events. LID BMPs trap and remove trash and debris from runoff. The implementation of source controls and LID BMPs are required by MM 4-1. With mitigation, potential water quality impacts from trash and debris in Project runoff would be less than significant. The Project would result in a less than significant impact related to trash and debris.

Methylene Blue Activated Substances (MBAS)

MBAS, which are related to the presence of detergents in runoff, may be incidentally associated with urban development due to commercial and/or residential vehicle washing or other outdoor cleaning activities. MBAS are a measure of surfactants in water; surfactants lower the surface tension of a liquid and lower the interfacial tension between two liquids. In storm water, surfactants disturb the naturally high surface tension of water, which affects insects and can affect gills in aquatic life.

The presence of MBAS and soap in runoff from the Project would be controlled through source-control BMPs, including a public education program on residential and charity car washing, and the provision of a car wash pad connected to the sanitary sewer in the multi-family residential areas. Other sources of MBAS, such as cross connections and leakage from sanitary to storm water facilities, are unlikely given modern sanitary sewer installation methods and inspection and maintenance practices. Source-control BMPs are required by MM 4-1 and, with mitigation, Project water quality impacts from MBAS in runoff will be less than significant.

Other Surface Water Quality Factors

Toxicity

The Lahontan Basin Plan and Los Angeles Basin Plan each contain a narrative objective for toxicity which states that waters shall be maintained free of toxic substances in concentrations that are toxic to or that produce detrimental physiological responses in human, plant, animal, or aquatic life. Pesticides, metals, PAHs, and other organic compounds (e.g., PCBs) can enter the aquatic food chain and cause acute or chronic toxicity in the form of lethal or sublethal effects to affected organisms, including adverse effects to survival, reproduction, and prey avoidance. The extent which specific concentrations of constituents of concern cause these effects is commonly measured by exposing sensitive organisms to water samples with known constituent concentrations over a period of time and assessing organism responses.

Pesticides are a primary cause of most of the observed toxicity in receiving waters when organisms are exposed to urban runoff water samples or are exposed to sediments contaminated by urban runoff. Data from the SWAMP Stream Pollution Trends Second Year Report show that the primary class of pesticides causing toxicity are pyrethroids and that the concept of “toxicity units” is an effective measure of cumulative toxicity associated with a mix of individual pyrethroids in runoff (Geosyntec 2016b). Data from streams and other receiving water bodies subject to urban runoff determined that pyrethroids were commonly found at concentrations exceeding levels that cause toxicity to sensitive aquatic organisms in water. The average reported concentrations of bifenthrin, cyfluthrin, cyhalothrin, cypermethrin, and permethrin in water samples ranged from approximately one to more than three orders of magnitude above chronic criteria values. Similar toxicity impacts were associated with pyrethroid concentrations in sediment (Geosyntec 2016b). Potential water quality impacts from pesticides in Project runoff are discussed above (see the subsection “Pesticides” under this Threshold 4-5). Other pollutants that can affect toxicity (metals and PAHs) are also addressed above. With incorporation of source-control and LID BMPs as

required by MM 4-1, potential impacts associated with acute and chronic aquatic toxicity would be less than significant.

Constituents of Emerging Concern

Constituents of emerging concern (CEC) refer to chemicals that are potentially present in the aquatic environment subject to ongoing impact assessment methodological development. State efforts to characterize CECs include a 2012 report entitled *Monitoring Strategies for Chemicals of Emerging Concern (CECs) in California's Aquatic Ecosystems*, which included recommendations for phased monitoring and evaluation of CECs in storm water and wastewater treatment plant discharges. The report-identified CECs were based on risk-based screening criteria and recommended the following approaches (Geosyntec 2016b):

- Non-targeted analyses using advanced bioanalytical and chemical methods.
- Confirmatory biological investigations linking chemical and bioassay screening data with higher order effects (i.e., at the organism and population level).
- Environmental fate models and screening-level mass-based models that can assist in estimating the predicted environmental concentrations in effluents coupled with structure-based toxicity assessments to determine the source, occurrence, fate, and effects of CECs.
- Baseline monitoring for antibiotic resistance in wastewater treatment plant effluent.

The extent to which CECs that could occur in Project runoff could impact water quality has not yet been characterized. Most CECs would be effectively controlled by the source and LID controls required by MM 4-1, including unit processes to filter, absorb, and biologically transform CECs in storm water runoff. Other control measures may be required for CECs that are determined by the State or by other programs to pose potential water quality impacts and would be implemented to the maximum extent feasible by the Project. Subject to the analysis uncertainties discussed above, with mitigation, potential Project water quality impacts that could be associated with CECs would be less than significant.

Pollutant Bioaccumulation

The Los Angeles Basin Plan contains a narrative objective for bioaccumulation, which states that toxic pollutants shall not be present at levels that will bioaccumulate in aquatic life to levels that are harmful to aquatic life or human health. Bioaccumulation is the net uptake and retention of a chemical in an organism from all routes of exposure (diet, dermal, respiratory) and any source (water, sediment, food). The Lahontan Basin Plan does not include an objective for pollutant bioaccumulation. Certain toxic pollutants can bioaccumulate in fish and other organisms at levels that are harmful for both the organism itself and the organisms that prey upon these species (including humans). An important pathway into the food chain is via sediments, as many bioaccumulative pollutants of concern are adsorbed to sediments. Pollutants that are known to bioaccumulate include certain pesticides, metals (i.e., lead and mercury), PAHs, and synthetic organic compounds like PCBs and dioxins. Bioaccumulative pollutants that are present in storm water runoff from the Project site may have the potential to accumulate in LID BMP vegetation and soils, potentially

increasing the risk of exposure to wildlife and the food chain. Factors that could affect the extent of potential bioaccumulation include (Geosyntec 2016b):

- The bioavailability of the pollutant.
- Conditions in the soils (e.g., pH, acid-volatile sulfide concentration, organic content) that affect the form and bioavailability of the pollutant and other environmental conditions.
- The efficiency by which pollutants in the soils are taken up and migrate up the trophic levels including plankton, zooplankton, and prey and predator species.
- The type of habitats, organisms attracted to these habitats, and their feeding habits.
- System design and maintenance.

Tests on the survival of amphipods in sediments from receiving waters in urbanized watersheds indicate that the sum of pyrethroid pesticides, PCBs, and DDT most closely correlate with adverse impacts (Geosyntec 2016b). PAHs and metals did not show a significant correlation. The Project site is unlikely to contain legacy PCBs or DDT concentrations in amounts that would be carried in runoff and cause water quality impacts. As discussed above, pyrethroid pesticides could occur in Project runoff and may cause bioaccumulation impacts.

Mercury and selenium are also known to cause bioaccumulation impacts. Selenium is not naturally present at levels of concern in the Project's watershed. Mercury sources include fossil fuel power plant emissions and exposed tailings at former mercury mines, which are also not present on or adjacent to the Project site (Geosyntec 2016b). Project bioaccumulation impacts from mercury and selenium are unlikely to occur.

Potential bioaccumulation impacts from the proposed distributed and regional LID BMPs would be minimal for several reasons. The vegetation and soil media in the LID BMPs would trap sediments and pollutants in soils which contain bacteria that metabolize and transform pollutants. This process will reduce the potential for bioaccumulative pollutants to enter the food chain. The Project will not significantly contribute to bioaccumulation of pollutants in major downstream waters, including the Santa Clara River, because these waters are located several miles from the site, and constituent concentrations in Project runoff that may discharge from on-site facilities will be significantly below all applicable Lahontan and Los Angeles Basin Plan and CTR water quality objectives. With mitigation, potential Project bioaccumulation impacts to aquatic life or human health will be less than significant.

Dry Weather Runoff (Nuisance Flows)

Pollutants in dry weather flows can adversely impact receiving waters and, unlike storm event runoff, are more persistent over time. The primary sources of dry weather flows in urban areas include irrigation, vehicle washing, construction dewatering, fire hydrant purging, and drainage from swimming pools and decorative fountains. Other sources may include leaks from sanitary sewers and septic tanks; wash water from laundry and vehicle wash facilities; and many types of industrial wastewaters that discharge directly (via illicit

connections) to the storm drain system. The Project will not include septic tanks, and illicit industrial discharges are unlikely to occur due to the proposed site design and land uses.

Dry weather flows are typically low in sediment because the flows are relatively low and because coarse suspended sediment tends to settle out or be filtered out by vegetation. As a consequence, dry weather flows typically include low concentrations of pollutants associated with suspended solids such as phosphorous, some bacteria, some trace metals, and some pesticides. Constituents of concern in dry weather flows tend to be dissolved or subject to mobilization in runoff, such as nitrate and trace metals, pathogens, and oil and grease.

As discussed in Section 5.2, Hydrology and Flood, and Section 5.18, Water Resources, landscaping in public and common areas would utilize drought-tolerant vegetation that requires little watering or chemical application, consistent with Section 3.3 of the *Centennial Specific Plan*. Landscape watering in common areas, commercial areas, multi-family residential areas, and in parks would use efficient irrigation technology such as evapotranspiration sensors to minimize excess watering (see Section 5.18). Source-control BMPs (e.g., educational programs and materials) would describe appropriate car washing locations (at commercial car washing facilities or the car wash pad in the multi-family residential areas) and techniques (minimizing usage of soap and water); would encourage low impact landscaping and appropriate watering techniques, appropriate swimming pool dechlorination and discharge procedures; and would discourage driveway and sidewalk washing. Illegal dumping would be discouraged by stenciling storm drain inlets and posting signs that illustrate the connection between the storm drain system and the receiving waters and natural systems downstream. The source controls are required by MM 4-1 and MM 4-2.

The proposed regional and distributed LID BMPs would infiltrate and provide treatment for dry weather flows and small storm events. Water cleansing is a natural function of vegetated areas. The LID BMPs are required by MM 4-1. Sedimentation of particulates is a primary removal mechanism in LID facilities and treatment performance is enhanced as plant and soil materials allow pollutants to come in contact with bacteria that metabolize and transform pollutants, especially nutrients and trace metals. Plants also take up nutrients in their root system. Pathogens in dry weather flows would be removed through infiltration. Oil and grease in dry weather flows would be adsorbed by the vegetation and soil within the LID BMPs. Dry weather flows and small storm flows would infiltrate into the bottom of the basin after receiving treatment in the vegetation.

With mitigation and the implementation of the source-control BMPs (which reduce the amount of dry weather runoff and constituent loads that could be carried in the runoff) and regional and distributed LID BMPs (which capture and treat dry weather runoff), the Project would result in less than significant water quality impacts related to dry weather flows.

Off-Site Impacts

Approximately 15 acres located off site would be subject to Project-related construction, including intersections with SR-138, utility connections, water wells, and Aqueduct crossings (see Section 4.0, Project Description). The construction period and operational on-site qualitative water quality analysis includes these off-site locations. Consistent with the on-site analysis, with the implementation of MM 4-1 and MM 4-2, the Project would not otherwise degrade off-site groundwater quality; potential impacts will be less than significant with mitigation.

Impact Summary: The Project will implement a comprehensive system of site design, source control, low impact development, and hydromodification Best Management Practices that meet or exceed the water quality and hydrology (storm water runoff) standards for new development in the County LID Ordinance, the LID Standards Manual, and the MS4 Permit. All water quality controls, including regional, distributed and parcel-specific measures, are designed to meet or exceed the LID performance standards consistent with the requirements of the MS4 Permit, the LID Ordinance, and the LID Standards Manual. The Project will also implement integrated pest management and landscaping BMPs consistent with the integrated pest management and pesticide and fertilizer application guidelines established by the University of California Division of Agriculture and Natural Resources Statewide Integrated Pest Management Program. Compliance with the LID performance standards and integrated pest management and landscaping BMP requirements will be reconfirmed in drainage and landscape plans to be submitted to the County in conjunction with each Project tract map review and approval process. These requirements are incorporated in MM 4-1 and MM 4-2. During construction, the Project will comply with the state Construction General Permit, the Lahontan RWQCB Limited Threat Discharge Permit, and the Los Angeles RWQCB General Dewatering Permit, and it will implement BMPs that comply with all applicable waste discharge requirements and applicable water quality standards. The quantitative analysis results in Threshold 4-1 show that post-development concentrations of TSS, nutrients, trace metals, and chloride would be consistent with or significantly below applicable narrative and numerical water quality objectives in the Lahontan and Los Angeles Basin Plans and in the CTR. The qualitative analysis shows that potential Project impacts related to turbidity, pesticides, pathogens (bacteria, viruses, and protozoa), petroleum hydrocarbons (oil and grease, PAHs), trash and debris, MBAS, toxicity, and emerging contaminants would be less than significant. With implementation of MM 4-1 and MM 4-2 and with compliance with applicable laws and regulations (including the state Construction General Permit and the Lahontan RWQCB Limited Threat Discharge Permit), the Project will not otherwise degrade water quality; impacts will be less than significant with mitigation.

5.2.7 MITIGATION MEASURES

MM 4-1 The Project shall implement Low Impact Development (LID) and water quality control Best Management Practices (BMPs) that will achieve the following LID performance standard:

LID BMPs shall be selected and sized to retain the volume of storm water runoff produced from the higher of the 85th percentile or ¾ inch, 24-hour storm depth as determined from the Los Angeles County 85th Percentile 24-hr Rainfall Isohyetal Map (February 2004) (LID design volume). When it has been demonstrated that 100 percent of the LID design volume cannot be feasibly infiltrated within the Project, then the volume shall be harvested and reused. If that volume cannot be harvested and reused within 96 hours, then biofiltration shall be provided for 1.5 times the portion of the LID design volume that is not retained. Runoff from roadways shall be retained or biofiltered in retention or biofiltration BMPs sized to capture the design storm volume or flow, per the guidance in the U.S. Environmental Protection Agency's (USEPA's) *Managing Wet Weather with Green Infrastructure: Green Streets*. LID BMPs may be parcel-based or regional facilities.

Compliance with the LID performance standards shall be confirmed by the County based on a Drainage System Engineering and Planning Report to be submitted with each Tentative Map application. The Report shall describe applicable water quality control and LID BMPs and shall utilize approved Los Angeles County methodologies to demonstrate compliance with the LID performance standards. To the extent feasible, incorporate permeable pavement, groundcovers, and/or other measures to increase infiltration.

MM 4-2 The Project shall implement integrated pest management (IPM) and landscaping best management practices (BMPs) consistent with the integrated pest management and pesticide and fertilizer application guidelines established by the University of California Division of Agriculture and Natural Resources Statewide Integrated Pest Management Program. The IPM and landscaping BMPs shall be confirmed in a Landscaping Plan submitted to the County during the review and approval process for each tract map application. The BMPs shall include a Planting Plan that is consistent with the plant water use requirements of Section 3.3 of the *Centennial Specific Plan*; with procedures for removing non-native vegetation and planting native vegetation; with fertilizer guidelines; and with the IPM approach for preventing or suppressing pest problems (i.e., insects and diseases). This shall be done through a combination of techniques including using pest-resistant plants; using biological controls; incorporating cultural practices; including habitat modification; and judiciously using pesticides. The IPM and landscaping BMPs shall address the following:

- Pest identification.
- Practices to prevent pest incidence and to reduce pest buildup.

- Monitoring to examine vegetation and surrounding areas for pests to evaluate trends and to identify when controls are needed.
- Establishment of action thresholds that trigger control actions.
- Pest-control methods (cultural, mechanical, environmental, biological, and appropriate pesticides).
- Pesticide management, which includes safety requirements (e.g., Material Safety Data Sheets, precautionary statements, protective equipment); regulatory requirements; spill mitigation measures; groundwater and surface water protection measures associated with pesticide use; and pesticide applicator certifications, licenses, and training (i.e., all pesticide applicators must be certified by the California Department of Pesticide Regulation).

5.2.8 LEVEL OF SIGNIFICANCE AFTER MITIGATION

With implementation of MM 4-1 and MM 4-2, potentially significant impacts to water quality would be reduced to levels considered less than significant.

5.2.9 REFERENCES

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