## 5.7 HYDROLOGY AND WATER QUALITY

This section of the Draft Environmental Impact Report (DEIR) evaluates the potential impacts to hydrology and water quality conditions from implementation of the proposed Spring Trails Specific Plan. Although the project is within an unincorporated area of San Bernardino County, it is within the City of San Bernardino's sphere of influence (SOI). It is assumed that implementation of this project would include annexation to the City of San Bernardino. Therefore, this section discusses hydrology and water quality issues associated with the project in accordance with the City of San Bernardino's regulations and guidelines.

Hydrology deals with the distribution and circulation of water, both on land and underground. Water quality deals with the quality of surface and groundwater. Surface water includes lakes, rivers, streams, and creeks. Groundwater is below the surface of the earth.

- *Water Quality Management Plan (WQMP) for Compliance with Santa Ana Regional Water Quality Control Board Order Number R8-2002-0012 (NPDES Permit No. CAS618036) for Spring Trails, Tr. 15576,* Rick Engineering Company, May 20, 2009.

- *Hydrologic and Water Quality Report in Support of the Environmental Impact Report and Tentative Tract Map 15576 for the Spring Trails Project,* Rick Engineering Company, revised January 4, 2010.

Complete copies of these studies are included in the Technical Appendices to this Draft EIR (Volume II, Appendices I1 and I2).

### 5.7.1 Environmental Setting

**Regulatory Framework**

***Clean Water Act***

The federal Water Pollution Control Act (also known as the Clean Water Act [CWA]) is the principal statute governing water quality. The CWA establishes the basic structure for regulating discharges of pollutants into the waters of the United States and gives the EPA the authority to implement pollution control programs, such as setting wastewater standards for industry. The statute's goal is to regulate all direct and indirect discharges into the nation's waters and to restore, maintain, and preserve the integrity of those waters. The CWA sets water quality standards for all contaminants in surface waters and makes it unlawful for any person to discharge any pollutant from a point source into navigable waters, unless a permit is obtained under its provisions. The CWA mandates permits for wastewater and stormwater discharges, requires states to establish site-specific water quality standards for navigable bodies of water, and regulates other activities that affect water quality, such as the dredging and filling of wetlands. The CWA also funds the construction of sewage treatment plants and recognizes the need for planning to address nonpoint sources of pollution. The following CWA sections assist in ensuring water quality in surrounding water bodies:

- Section 208 of the CWA requires the use of best management practices (BMPs) to control discharge of pollutants in stormwater during construction.

- Section 303(d) requires creation of a list of impaired water bodies by states, territories, and authorized tribes; evaluation of lawful activities that may impact impaired water bodies;[1] and preparation of plans to improve the quality of these water bodies. Water bodies on the list do not

[1] Impaired water bodies are water bodies that do not meet, or are not expected to meet, water quality standards.

meet water quality standards, even after point sources of pollution have installed the minimum required levels of pollution-control technology. Section 303(d) also establishes the total maximum daily load (TMDL) process to guide the application of water quality standards.

- Section 401 of the CWA requires any project that needs a federal permit (such as a Section 404 permit) which allows discharge to waters of the United States also to obtain state certification that the activity would not violate water quality standards.

- Section 402(p) regulates point-source discharges to surface waters under the National Pollutant Discharge Elimination System (NPDES) permit program, administered by the United States Environmental Protection Agency (EPA). In California, the State Water Resources Control Board (SWRCB) is authorized to oversee the NPDES program through the Regional Water Quality Control Boards (RWQCB). Point-source discharges are readily identifiable, discrete inputs where waste is discharged to the receiving waters from a pipe or drain. Nonpoint discharges occur over a wide area and are associated with particular land uses (such as urban runoff from streets and stormwater from construction sites).

- Section 404 authorizes the US Army Corps of Engineers (Corps) to require permits for projects that will discharge dredge or fill materials into waters of the United States, including wetlands.

***National Pollutant Discharge Elimination System***

New development projects, industrial facilities, and construction sites are regulated by the SWRCB through general stormwater permits. Cities and counties are regulated through permits issued by the RWQCBs. Since 1990, operators of large storm drain systems such as the City of San Bernardino have been required to:

- Develop a stormwater management program designed to prevent harmful pollutants from being dumped or washed by stormwater runoff into the stormwater system, then discharged into local waterbodies.

- Obtain a NPDES permit.

The NPDES permit programs in California are administered by the SWRCB and by nine regional boards that issue NPDES permits and enforce regulations within their respective region. The City of San Bernardino lies within the jurisdiction of the Santa Ana RWQCB.

Municipal discharges of stormwater runoff are regulated under the NPDES General Permit for Municipal Small Storm Sewer Systems (MS4). In April 2002, the SWRCB issued an MS4 Permit (NPDES No. CAS618033) to the San Bernardino County Flood Control District (SBCFCD) as the principal permittee and the County of San Bernardino and 16 incorporated cities within San Bernardino County as copermittees. The MS4 Permit requires permittees to develop and implement their own programs for stormwater management. The San Bernardino County's MS4 Permit also requires implementation of design standards for BMPs. The purpose of the requirements is to minimize, to the maximum extent practicable, the discharge of pollutants from new development and renovation projects.

***Porter-Cologne Water Quality Act***

The Porter-Cologne Water Quality Act (Water Code sections 13000 et seq.) is the basic water quality control law for California. Under this Act, the SWRCB has ultimate control over state water rights and water quality

policy. In California, the EPA has delegated authority to issue NPDES permits to the SWRCB. The SWRCB, through its nine RWQCBs, carries out the regulation, protection, and administration of water quality and groundwater supplies in each region. Each regional board is required to adopt a water quality control plan or basin plan that recognizes and reflects the regional differences in existing water quality, the beneficial uses of the region's ground and surface water, and local water quality conditions and problems. The project site is in the Santa Ana River Basin, Region 8, in the Upper Santa Ana Watershed. The water quality control plan for the Santa Ana River Basin was adopted in 1995 and updated in 2008. This plan gives direction on the beneficial uses of the state waters within Region 8, describes the water quality that must be maintained to support such uses, and provides programs, projects, and other actions necessary to achieve the plan standards.

### Applicable Plans and Programs

#### *Storm Water Pollution Prevention Plans*

Pursuant to the CWA, in 2001 the SWRCB issued a statewide general NPDES Permit for stormwater discharges from construction sites (NPDES No. CAS000002). Under this Statewide General Construction Activity permit, construction sites with a disturbed area of one or more acres are required to control stormwater discharges by completing and filing a Notice of Intent (NOI) with the SWRCB and developing and implementing a Storm Water Pollution Prevention Plan (SWPPP). The SWPPP must be prepared prior to start of grading activities and must be implemented during construction. The SWPPP must list BMPs implemented on the construction site to prevent soil erosion and discharge of other construction-related pollutants that could contaminate nearby water resources. Additionally, the SWPPP must contain a visual monitoring program; a chemical monitoring program for "non-visible" pollutants to be implemented if there is a failure of BMPs; and a monitoring plan if the site discharges directly to a water body listed on the state's 303(d) list of impaired waters for sediment. The proposed project encompasses 350.6 acres and is therefore subject to the stormwater discharge requirements of the General Construction Permit. Prior to obtaining any grading permits, the project applicant must provide evidence of compliance with the General Construction Permit by providing a copy of the Waste Discharger's Identification Number to the City's Development Services Department.

#### *National Flood Insurance Program*

The National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973 mandate the Federal Emergency Management Agency (FEMA) to evaluate flood hazards. FEMA provides Flood Insurance Rate Maps (FIRMs) for local and regional planners to promote sound land use and floodplain development, identifying potential flood areas based on the current conditions. To delineate a FIRM, FEMA conducts engineering studies referred to as Flood Insurance Studies (FISs). The most recent FIS and FIRM were completed and published for San Bernardino on August 28, 2008. Using information gathered in these studies, FEMA engineers and cartographers delineate Special Flood Hazard Areas (SFHAs) on FIRMs.

The Flood Disaster Protection Act (FDPA) requires owners of all structures in identified SFHAs to purchase and maintain flood insurance as a condition of receiving federal or federally related financial assistance, such as mortgage loans from federally insured lending institutions. Community members within designated areas are able to participate in the National Flood Insurance Program (NFIP) afforded by FEMA. The NFIP is required to offer federally subsidized flood insurance to property owners in communities that adopt and enforce floodplain management ordinances that meet minimum criteria established by FEMA. The National Flood Insurance Reform Act of 1994 further strengthened the NFIP by providing a grant program for state and community flood mitigation projects. The act also established the Community Rating System for

crediting communities that implement measures to protect the natural and beneficial functions of their floodplains, as well as managing erosion hazards.

The City of San Bernardino, under NFIP, has created standards and policies to ensure flood protection. These policies address development and redevelopment, compatibility of uses, required predevelopment drainage studies, compliance with discharge permits, enhancement of existing waterways, cooperation with the Corps and SBCFCD for updating, and method consistency with the RWQCB and proposed BMPs.

***San Bernardino County Stormwater Program***

The Santa Ana RWQCB requires postconstruction BMPs to be implemented for new development. In addition, stormwater BMPs for construction activities are required, as per the statewide Construction General Permit. To comply with these requirements, the County of San Bernardino has issued the Model Water Quality Management Plan to guide permittees and developers in implementing programs to minimize the detrimental effects of urbanization on the beneficial uses of receiving waters. The proposed project is considered to be a Category Project (i.e., subdivision of 10 or more units and hillside development of $\geq$10,000 square feet), which requires development and implementation of a water quality management plan (WQMP) for review and approval. The WQMP must incorporate and implement all site design BMPs, all source control BMPs, and all treatment control BMPs. The combination of BMPs must address all identified pollutants and hydrologic conditions of concern. Operation and maintenance requirements for the BMPs and the funding source to implement the operation and maintenance requirements also must be included. The preliminary WQMP for this project is provided in Appendix I1. The procedures described in the San Bernardino County Hydrology Manual (1986) were used to calculate the pre- and postdevelopment peak flow rates and sediment yield analyses. The hydrologic and water quality report prepared by Rick Engineering Company is provided in Appendix I2.

The City of San Bernardino's stormwater regulations can be found in Chapter 8.80 of the San Bernardino Municipal Code. Prior to the issuance of grading permits, the project applicant must submit to the City Engineer and have approved a stormwater quality management plan (SWQMP; referred to as a WQMP by the County Stormwater Program).

**Existing Conditions**

***Regional Drainage***

The project site is in the Santa Ana River Watershed that covers 2,800 square miles of mountains, foothills, and valleys in southwestern California, including parts of Los Angeles, Riverside, San Bernardino, and Orange Counties. The Santa Ana River originates in the San Bernardino Mountains and flows in a generally southwesterly direction for over 100 miles until it discharges into the Pacific Ocean. The site is in the Upper Santa Ana River Watershed, which includes much of the San Bernardino Mountains and San Bernardino Valley (CNRA 2007; Cal/EPA 2007).

***Local Surface Waters and Drainage***

More specifically, the project site is within the Bunker Hill hydrologic subarea of the Upper Santa Ana River watershed. The project site drains into Cable Canyon and ultimately into Cable Creek; Cable Canyon passes through the site. Existing drainage from the site is by surface flow. Cable Creek begins as an unimproved watercourse at the mouth of Cable Canyon east of the interchange of Interstate 215 and Interstate 15, flowing south to the Cable Creek Spreading Grounds, then continuing southeast for about three miles before discharging into the Devil Creek Diversion Channel (see Figure 5.7-1, *Local Drainage*). Devil Creek Diversion Channel flows south roughly 1.4 miles to Lytle Creek Wash, which flows in turn about 2.9 miles southeasterly where it discharges into a flood control basin. Drainage continues into Lytle Creek Channel for about 2.8 miles southeastward to its confluence with Warm Creek, then flows southward for roughly one mile before joining with the Santa Ana River. The junction of Warm Creek with the Santa Ana River is within Reach Four of the Santa Ana River.

The project site plus the area of the Cable Creek Watershed that drains onto the site total roughly 2,638 acres. These are divided into four drainage areas, as shown in Figure 5.7-2, *Existing Site Drainage,* and described in Table 5.7-1, *Existing Drainage, Project Site, and Tributary Area*.

***Table 5.7-1***
***Existing Drainage, Project Site, and Tributary Area***

| Drainage Area | Area, Acres | | | Q100 (CFS) |
|---|---|---|---|---|
| | Onsite | Offsite | Total | |
| A | 148.8 | 1881 | 2029.8 | 5,773 |
| B | 51.6 | 12.1 | 63.7 | 107 |
| C | 128.4 | 69.8 | 198.2 | 398 |
| D | 21.8 | 324.0 | 345.8 | 708 |
| **Total** | **350.6** | **2,286.9** | **2,637.5** | **6986** |

Source: Rick Engineering 2009.
$Q_{100}$ – 100-year, one-hour peak flow rate

- Drainage area “A” on Figure 5.7-2 consists of 148.9 acres of onsite drainage and 1,881 acres of offsite drainage. The offsite drainage area is made up of the west and east forks of Cable Canyon and a unnamed blue-line stream that drains into the project from the northeast. The 100-year, one-hour peak flow rate produced from Cable Canyon and its tributary areas as it exits the project site is 5,773 cubic feet per second (cfs).

- Drainage Area “B” consists of 51.6 acres of onsite drainage area and 12.1 acres of offsite drainage. The 100-year, one-hour peak flow rate generated by drainage area “B” is 107.1 cfs.

- Drainage Area “C” consists of 128.4 acres of onsite drainage and 69.8 acres of offsite drainage area. The 100-year, one-hour peak flow rate produced by drainage area “C” is 398 cfs.

- Drainage Area “D” consists of 21.8 acres of onsite drainage area and 324 acres of offsite drainage that includes drainage area from Meyers Canyon. Drainage Area “D” produces a 100-year, one-hour peak flow rate of 708 cfs.

***Surface Water Quality***

As previously stated, the project site is within the Upper Santa Ana River Watershed. More specifically, runoff from the project site would discharge to Cable Creek and ultimately into the Santa Ana River. The present or potential beneficial uses of Cable Creek are:

- MUN Municipal and domestic supply
- GWR Groundwater recharge
- REC1 Recreation activities involving body contact with water where ingestion of water is reasonably possible
- REC2 Recreation activities close to water, but not normally involving body contact with water where ingestion of water would be reasonably possible
- WARM Warm freshwater habitat
- COLD Cold freshwater habitat
- WILD Wildlife habitat

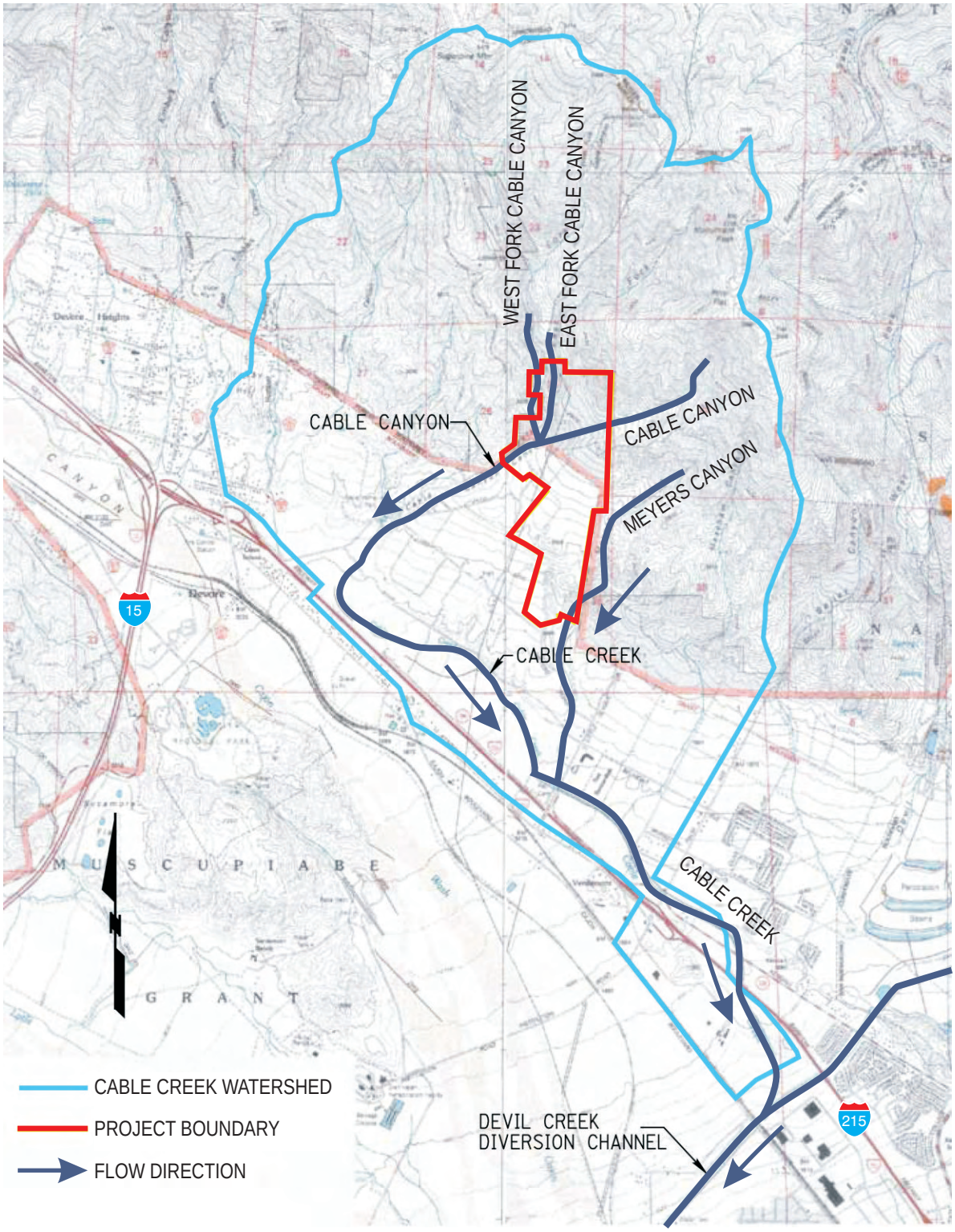
Water quality objectives have been prescribed in the Santa Ana River Basin Water Quality Control Plan (2008). The water quality objective for Cable Creek is a total dissolved solids (TDS) concentration of 325 mg/l (milligrams per liter).

Under Section 303(d) of the Clean Water Act, California maintains a list of Water Quality Limited Segments, that is, water bodies that do not meet water quality standards even after point sources of pollution have installed the minimum required levels of pollution control technology. TMDLs, that is, maximum amounts of a pollutant that can be discharged into a water body, are developed for water quality limited segments. Cable Creek is not listed as impaired on the 303(d) list of water quality limited segments approved by the EPA in 2007; however, the downstream receiving water body, Lytle Creek, is listed as impaired for pathogens. In addition, Reach Four of the Santa Ana River is listed as impaired for pathogens from a nonpoint source, for which a TMDL is planned.

*Potential Historical Pollutant Sources on the Project Site*

There are no known pollutants of concern on the project site. However, the site was used for agriculture until about 1980, producing barley and grapes, and then was used for sheep grazing between about 1980 and 1989. Thus, agricultural pesticides may have been applied in the past and residual concentrations may still be present onsite. Illegal dumping is also a potential onsite pollutant source.

# Local Drainage

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Scale (Feet)

Source: Rick Engineering Company 2009

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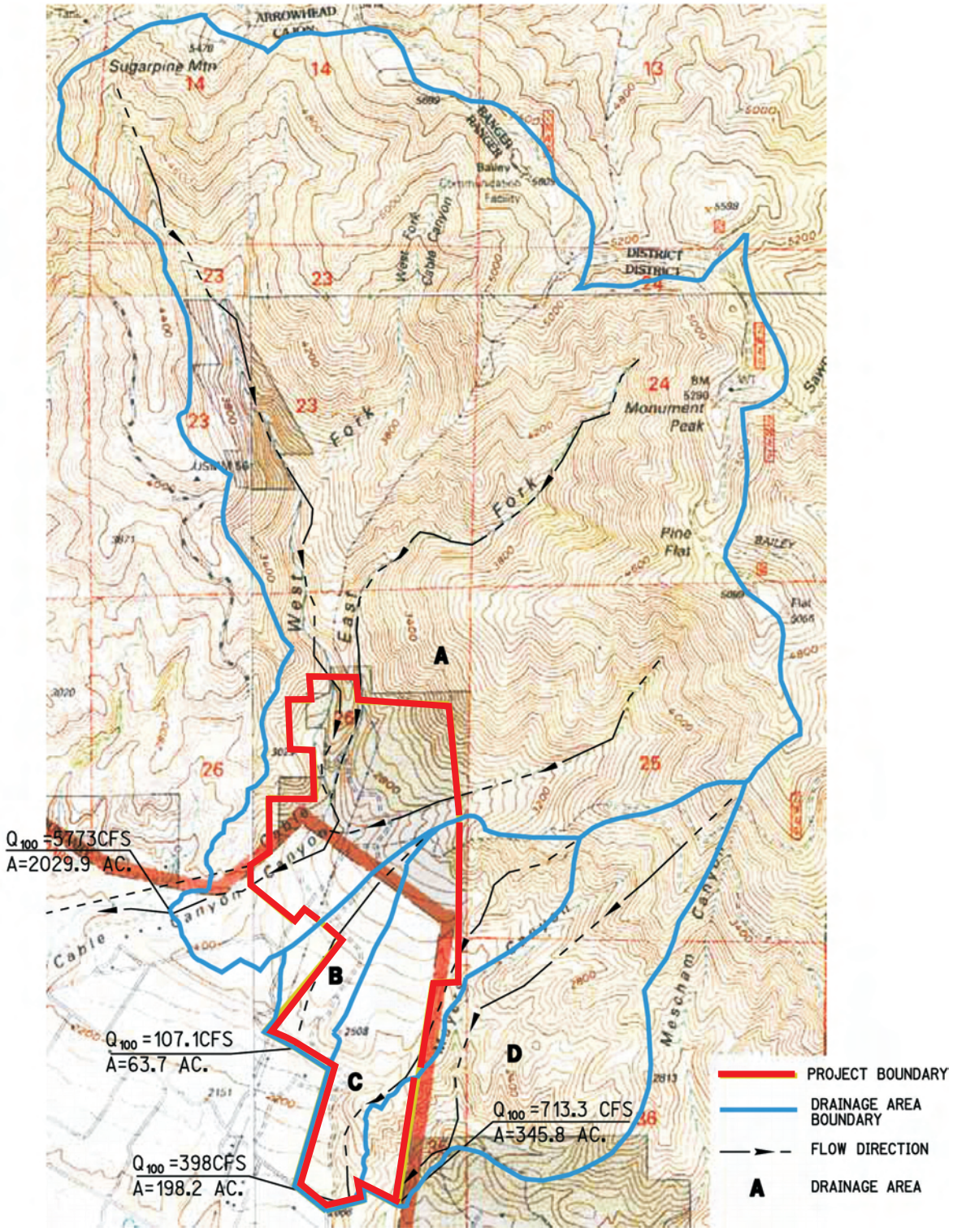
# Existing Site Drainage




Source: Rick Engineering Company 2009

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***Groundwater***

The groundwater underneath the project site lies just within the Bunker Hill Groundwater Basin (Basin), which spans part of the northwestern San Bernardino Valley, as shown in Figure 5.7-3, *Bunker Hill Groundwater Basin*. The Basin is replenished naturally by local precipitation and by stream flow from rain and snow melt in the San Bernardino Mountains. Groundwater is also artificially recharged by rerouting stream flows to recharge percolation basins. San Bernardino Municipal Water Department's water supply is extracted from the Basin. The nearest municipal groundwater well (the City of San Bernardino Cajon Well No. 1) is located approximately a mile southwest of the site. Based on geotechnical investigations conducted at the site, groundwater depth beneath the project site is greater than 50 feet. Groundwater was found at 20 feet below ground surface (bgs) in two borings in an isolated area on the eastern part of the site along the northeast side of the San Andreas Fault, which acts as a local groundwater barrier.

*Groundwater Quality*

The present and potential beneficial uses for the Bunker Hill Groundwater Management Zone, as reported in the Santa Ana River Basin Plan (RWQCB 2008) are:

- MUN Municipal and domestic supply
- AGR Agricultural supply
- IND Industrial service supply
- PROC Industrial process supply[2]

Water quality objectives for the Bunker Hill Groundwater Management Zone include a TDS concentration of 310 mg/l and nitrate as nitrogen level of 2.7 mg/l.

The intermittent beneficial uses designated for the Mountain Reaches of streams tributary to the Bunker Hill Groundwater Basin consist of MUN (municipal and domestic supply), plus the five beneficial uses listed previously (GWR, REC1, REC2, COLD, and WILD).

Water Quality Objectives for the Mountain Reaches of streams tributary to the Bunker Hill Groundwater Basin are the same as those previously listed for Cable Creek. Groundwater sampling over the 20-year period (1984–2003) yielded average TDS concentrations of 320 mg/l and average nitrate concentrations of 4.3 mg/l. While these levels are above the Water Quality Objectives for the respective substances, they are below the USEPA's MCLs for these two substances—1,000 mg/l and 10 mg/l, respectively (SBMWD 2008; USEPA 2003).

The proposed project site is not within a groundwater management zone. Although groundwater within the Bunker Hill Groundwater Basin is of excellent mineral quality, with TDS concentrations less than 350 mg/l, portions of the Basin are impaired with one or more of the following contaminants: trichloroethylene (TCE), perchloroethylene (PCE), 1,2-dibromo-3-chloropropane (DBCP), perchlorate, nitrates, and fluoride. Drinking water standards are met by treatment of the contaminants, blending of water to reduce contaminant levels, and pumping in noncontaminated areas (SBMWD 2005).

[2] Industrial service supply waters are used for industrial activities not dependent on water quality, including cooling water supply and hydraulic conveyance. Industrial process supply waters are used for industrial activities dependent on water quality, including manufacturing and food processing.

### Flood Hazards

*Designated Flood Zones*

The project site is in FEMA Zone X, meaning that it is outside of the 100-year and 500-year floodplains, according to Flood Insurance Rate Maps Map Nos. 06071C7910H and 06071C7930H.

*Seismically Induced Dam Inundation*

There are no dams on or upstream from the project site that could pose a hazard of seismically induced dam inundation.

*Inundation from Aboveground Water Storage Reservoirs*

There are no existing aboveground water storage tanks or reservoirs on or upstream from the project site that could pose an inundation hazard to the site.

*Seiches*

A seiche is a surface wave created when an inland body of water is shaken, usually by earthquake activity. There are no existing surface water bodies on or upstream of the site that could cause an inundation hazard to the site.

*Mudflows and Debris Flows*

Mud and debris flows are mass movements of dirt and debris that occur after intense rainfall, earthquakes, and severe wildfires. The speed of the slide depends on the amount of precipitation, steepness of the slope, vibration level, and alternate freezing and thawing of the ground. The project site is in a hilly area subject to forest fires and loss of vegetation, which makes it susceptible to debris' or mudflows. Much of the project site is on the lower slopes of the San Bernardino Mountains. The adjacent watersheds may be subject to large debris flows, especially in years after a fire. Debris volume calculations were performed and drainage culverts were sized to convey the bulked flows from a 10-year storm one year after a fire. The results are provided in the *Hydrologic and Water Quality Report* in Appendix I.

## 5.7.2 Thresholds of Significance

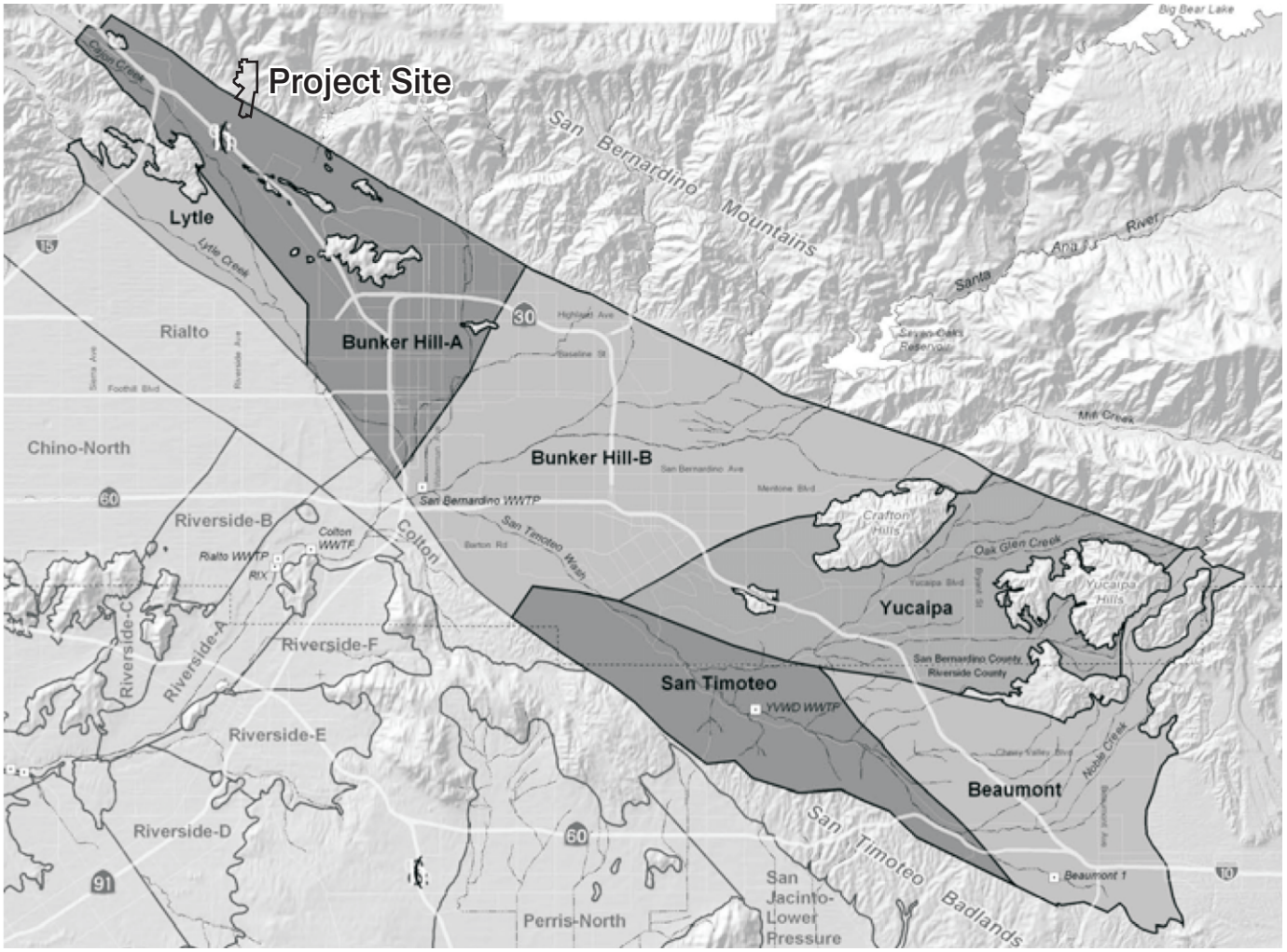
According to Appendix G of the CEQA Guidelines, a project would normally have a significant effect on the environment if the project would:

HYD-1 Violate any water quality standards or waste discharge requirements.

HYD-2 Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?

HYD-3 Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in a substantial erosion or siltation on- or offsite during construction?

# Bunker Hill Groundwater Basin

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Scale (Miles)

Source: Rick Engineering Company 2009

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HYD-4 Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite.

HYD-5 Create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff, such as from areas of material storage, vehicle or equipment fueling, vehicle or equipment maintenance (including washing), waste handling, hazardous materials handling or storage, delivery areas, loading docks, or other outdoor areas?

HYD-6 Otherwise substantially degrade water quality.

HYD-7 Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map.

HYD-8 Place within a 100-year flood hazard area structures which would impede or redirect flood flows.

HYD-9 Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam.

HYD-10 Inundation by seiche, tsunami, or mudflow.

### *5.7.3 Environmental Impacts*

The following impact analysis addresses thresholds of significance for which the Initial Study disclosed potentially significant impacts. Flood hazards due to tsunamis (part of HYD-10) were found to be less than significant in the Initial Study, included as Appendix A1 of this DEIR. The applicable thresholds are identified in brackets after the impact statement.

The proposal also includes the annexation of an adjacent 26.4-acre area consisting of six parcels owned by various property owners. A land use proposal has not been submitted for this 26.4-acre area and it is not owned or otherwise under the control of the applicant. For these reasons, no development is expected to occur on these parcels. Therefore the annexation would not contribute to impacts related to hydrology and soils.

**Alternative (Overhead Electric Lines) Development Plan**

The Spring Trails project assumes that the Southern California Edison (SCE) overhead electric lines that traverse the western portion of the site will be located underground, In the event that the overhead electric lines cannot be located underground, an alternative plan accommodating the lines above ground is proposed for the project site, as shown in Chapter 3, *Project Description*, in Figure 3-3A*, Alternative (Overhead Electric Lines) Development Plan*. The alternative plan for Spring Trails is the same as the preferred plan in every respect except for the treatment of the land beneath the above-ground electric lines and the number of residential lots. Both scenarios are analyzed in this section to assess their respective impacts to hydrology and water quality.

***IMPACT 5.7-1: DEVELOPMENT PURSUANT TO THE PROPOSED PROJECT WOULD INCREASE THE AMOUNT OF IMPERVIOUS SURFACES ON THE SITE AND WOULD THEREFORE INCREASE SURFACE WATER FLOWS INTO DRAINAGE SYSTEMS WITHIN THE WATERSHED. [THRESHOLDS HYD-4 AND HYD-5 (PART)]***

***Impact Analysis:*** Runoff from the project site in its existing condition as well as postdevelopment condition was modeled using the FloodSCX computer program and following the Unit Hydrograph methodology specified in the 1986 San Bernardino County Hydrology Manual. Since the preferred and alternative development plans would both result in similar amounts of impervious surface, the following analysis is applicable to both the preferred development plan and the alternative (overhead electric lines) development plan.

**Drainage from Offsite**

At project completion, offsite drainage would enter the project site from the north and east. Two drainage courses within Drainage Area A that flow into the site from the north are Cable Canyon West and East Forks. These two drainages, which merge onsite, would remain undisturbed and would exit the west side of the site as they do now. Four drainages would enter the site from the east. The northerly two of these drainages are tributaries to Cable Canyon and are in Drainage Area A (see Figure 3-8, *Conceptual Drainage Plan*). These two drainages would pass through a culvert under proposed Street "A", merge and continue flowing westerly, pass through a culvert under proposed Street "DD", then continue to the southwest before merging with the West and East forks of Cable Canyon. This combined drainage then flows to the west and exits the site into Cable Creek. South of the project site the Cable Creek drainage would pass through culverts under the Secondary Access Road. The third drainage course that enters the site from the east would be collected in a proposed brow ditch north of proposed Street "O" and west of proposed Street "W". This drainage would then be conveyed around the water reservoir tank and discharged to an existing flow line. The last drainage course entering the site from the east consists of Meyers Canyon and tributary areas in Drainage Area D; Meyers Canyon enters the site near its southeast corner. A culvert crossing is proposed under the Primary Access Road (Street "A"). The routing of drainage from offsite through the project site is shown on Figure 3-8, *Conceptual Drainage Plan*.

**Drainage from Onsite**

Drainage from the site at project completion would be conveyed in a series of storm drain systems that would route water into three Extended Detention Basins for treatment and detention. Drainage areas onsite at project completion are described in Table 5.7-2 and shown in Figure 3-8, *Conceptual Drainage Plan*.

**Table 5.7-2**
**Drainage Areas at Project Completion**

| Drainage Area | Area, Acres | | |
|---|---|---|---|
| | Onsite | Offsite | Total |
| **Drainage Area A** | | | |
| Cable Canyon, West Fork | 13.9 | 967.1 | 981.1 |
| Cable Canyon, East Fork | 24.2 | 551.5 | 575.7 |
| Developed area north of Cable Canyon[1] | 38.9 | 0.4 | 39.3 |
| Cable Canyon (East) | 22.1 | 295.7 | 317.8 |
| Developed area south of Cable Canyon | 40 | 0 | 40 |
| Cable Canyon downstream of West and East Forks | 17.8 | 34.9 | 52.7 |
| Downstream of Basin A | 1.3 | 30.4 | 31.7 |
| **Subtotal** | **158.2** | **1880** | **2038.3** |
| **Drainage Area B** | | | |
| Area tributary to Basin B | 23.4 | 0 | 23.4 |
| Downstream of Basin B | 4.6 | 0 | 4.6 |
| Offsite drainage crossing "I" Street | 4.9 | 12.6 | 17.5 |
| **Subtotal** | **32.9** | **12.6** | **45.5** |
| **Drainage Area C** | | | |
| Area tributary to Basin C | 89 | 0 | 89 |
| Offsite drainage parallel to Street "A" | 49.4 | 69.7 | 119.1 |
| **Subtotal** | **138.4** | **69.7** | **208.1** |
| **Drainage Area D** | | | |
| Culvert crossing (Meyers Canyon, East Branch) | 19.3 | 324 | 343.3 |
| **Total** | **350.6** | **2286.3** | **2635.2** |

[1] Developed areas 17.3 and 22 acres

Drainage Area A consists of Cable Canyon, including the west and east forks of Cable Canyon and tributary areas. In Drainage Area, A 35.6 acres of developed area onsite would drain into extended detention basin A, with the $Q_{100}$ generated by such drainage being 127.4 cfs. Drainage from the two northernmost residential areas, north of Cable Canyon, would not be routed into an extended detention basin, but routed instead into media filtration vaults where the water quality volume would be treated, after which the runoff would be discharged into Cable Canyon. Water quality volumes for each detention basin that would be built as part of the project are listed in Table 5.7-3. One of these areas is 17.3 acres, while the second is 22.0 acres. Basin "A" compensates for this discharge from the site into Cable Canyon by overdetaining runoff from other parts of Drainage Area A onsite.

**Table 5.7-3**
**Extended Detention Basins: Total Capacities and Water Quality Treatment Capacities**

| Basin | Watershed Area, Acres | $Q_{100\text{-}24}$ in (cfs)[1] | $Q_{100\text{-}24}$ out (cfs) | Water Quality Volume (acre-feet) | Total Volume (acre-feet) |
|---|---|---|---|---|---|
| A | 40 | 77.9 | 19.4 | 2.63 | 6.69 |
| B | 23.4 | 46 | 25.1 | 1.47 | 2.37 |
| C | 89 | 168.2 | 66.4 | 5.90 | 11.85 |

[1] $Q_{100\text{-}24}$ is the maximum flow rate in a 100-year, 24-hour storm in cubic feet per second.

Drainage Area B, 45.5 acres in area, is divided into two subareas. Subarea 1 would be the developed area onsite of 21.8 acres that would be routed into basin "B" plus the 1.6-acre basin and 4.6 acres of open space downstream of the basin outlet. Subarea 2 would be 17.5 acres of onsite and offsite undeveloped area that would cross under Street "I" and then discharge into an existing flow line.

Drainage Area "C" consists of 209.8 acres, roughly 89.0 acres of which would be in the developed area onsite and would drain into basin "C". The remaining 107.8 acres would be onsite and offsite undeveloped areas that would be collected north of Street "H". The $Q_{100}$ that would be produced by the 89.0 acres is 295.1 cfs that would outlet basin "C".

Drainage Area "D" consists of 339.3 acres: 319.8 acres offsite and 19.5 onsite. Drainage from Area "D" would enter the site near the southeastern site boundary, flow through a culvert under the proposed Primary Access Road (Street "A"), and then exit the site. This drainage would not be directed into a detention basin or media filtration vault.

Surface flows from the secondary access road will be conveyed into a 5-foot concrete drainage ditch located within a 13-foot graded shoulder on both sides of the road. The runoff will then be collected in storm drain inlets and conveyed through a storm drain underneath the secondary access road where it will be discharged into Cable Creek.

**Detention Basin Capacities**

Drainage volumes and rates from developed portions of the site would be increased compared to existing conditions due to the increase in impervious surfaces onsite. The three proposed detention basins would be local detention facilities maintained by the owner or homeowners association. The maximum capacity of each of the detention basins is designed to store onsite runoff from the drainage area tributary to the respective basin in order to lower the rate of outflow from the basin to the predevelopment rate in a 100-year, 24-hour storm. Each basin would also be equipped with water quality treatment features and would provide treatment for runoff. The total capacity and water quality treatment capacity of each of the three basins is listed in Table 5.7-3.

Emergency spillways are proposed for each of the three basins to convey the 1,000-year peak flow for the respective basin's tributary watershed. Emergency spillway discharges and dimensions are described in more detail in the Hydrology and Water Quality Report, included as Appendix I1.

**Debris Flows and Culvert Sizes**

The project site is in the foothills of the San Bernardino Mountains. Therefore, large debris flows may occur in watersheds in the area, especially in years after a fire. Debris flows would increase the volume of material flowing down drainages. Culverts in the project were designed to accommodate estimated debris flow volumes that would occur in a 100-year storm four years following a fire. Details of such calculations are presented in the project's Hydrology and Water Quality Report, included as Appendix I1. Recommended culvert sizes are listed in Table 5.7-4.

**Table 5.7-4**
**Recommended Culvert Sizes**

| Drainage | Proposed Street Overcrossing | Recommended Culvert Size |
|---|---|---|
| Cable Canyon, East Branch | Streets "A" and "DD" | Five 8-foot by 16-foot reinforced concrete boxes (RCB) |
| Hillside area tributary to Street "A" | Street "A" | 72-inch reinforced concrete pipe (RCP) |
| Hillside area tributary to Meyers Canyon, West Branch | | 84-inch RCP |
| Meyers Canyon, West Branch | Street "G" | Two 8-foot by 16-foot RCBs |
| Meyers Canyon, West Branch | Street "A" | Three 8-foot by 12.5-foot RCBs |
| Meyers Canyon, East Branch | Street "A" | Six 8-foot by 16-foot RCBs |
| Cable Creek | Secondary Access Road | Eight 26.5-foot by 14-foot Arch Culverts |

Project drainage features would meet requirements of the San Bernardino County Hydrology Manual and would limit runoff from the site at project completion to existing levels.

***IMPACT 5.7-2:*** ***DEVELOPMENT PURSUANT TO THE PROPOSED PROJECT WOULD INCREASE THE AMOUNT OF IMPERVIOUS SURFACES ON THE SITE. PROJECT DEVELOPMENT WOULD NOT SUBSTANTIALLY REDUCE GROUNDWATER RECHARGE COMPARED TO EXISTING CONDITIONS. [THRESHOLD HYD-2]***

***Impact Analysis:*** Project development would increase impervious surfaces on the project site. The resulting increase in drainage from most of the developed parts of the site would be conveyed to three extended detention basins. Stormwater would infiltrate into underlying sediment through the bottoms of the basins. The project would not include substantial infiltration zones except for the basins. The infiltration rate in the three basins would total roughly 2.01 cfs. At project completion, onsite groundwater recharge of stormwater from a two-year, 24-hour storm would be reduced about 1.3 percent compared to recharge from the same size storm in existing conditions (Cronquist 2009). Project development would not substantially reduce groundwater recharge from the site. Since the preferred and alternative development plans would have similar amounts of impervious surface, this analysis is applicable to both the preferred development plan and the alternative (overhead electric lines) development plan.

***IMPACT 5.7-3:*** ***THE PROJECT SITE IS NOT WITHIN A 100-YEAR FLOOD HAZARD AREA. [THRESHOLDS HYD-7 AND HYD-8]***

***Impact Analysis:*** The entire project site is in FEMA flood hazard zone X, meaning that it is outside of both 100-year and 500-year flood plains. Project development would not result in flood hazards to people or structures or redirect flood flows within a 100-year flood hazard area. This analysis is applicable to both the preferred development plan and the alternative (overhead electric lines) development plan.

***IMPACT 5.7-4:*** ***DURING THE CONSTRUCTION PHASE OF THE PROPOSED PROJECT, THERE IS THE POTENTIAL FOR SHORT-TERM UNQUANTIFIABLE INCREASES IN POLLUTANT CONCENTRATIONS FROM THE SITE. AFTER PROJECT DEVELOPMENT, THE QUALITY OF STORM RUNOFF (SEDIMENT, NUTRIENTS, METALS, PESTICIDES, PATHOGENS, AND HYDROCARBONS) MAY BE ALTERED. [THRESHOLDS HYD-1, HYD-5 (PART), AND HYD-6]***

***Impact Analysis:***

**Pollutants of Concern**

Pollutants of concern are those for which receiving waters are listed as impaired on the 303(d) Water Quality Limited Segments list. Lytle Creek is listed as impaired by pathogens from an unknown nonpoint source, and Reach Four of the Santa Ana River is listed as impaired by pathogens from a nonpoint source.

***Potential Historical Pollutant Sources***

Potential existing sources of water pollutants onsite are pesticides from past agricultural use and illegal dumping.

***Construction Phase***

Potential sources of pollutants from construction activities on the site include exposed soil, construction materials, and construction equipment. Clearing, grading, excavation, and construction activities associated with Spring Trails may impact water quality due to sheet erosion of exposed soils and subsequent deposition of particles and pollutants in drainage ways. Grading activities in particular lead to exposed areas of loose soil, as well as sediment stockpiles, that are susceptible to uncontrolled sheet flow. The use of materials such as fuels, solvents, and paints also present a risk to surface water quality due to an increased potential for these materials and related pollutants to contaminate stormwater. Additionally, storage, refueling, and maintenance of construction equipment onsite result in the potential for fuels and other substances to contaminate stormwater. Since grading activities would be similar for both the preferred and alternative development plan, this construction analysis is applicable to both scenarios.

*Storm Water Pollution Prevention Plan*

Measures for reducing potential pollution from construction activities would include obtaining coverage under the General Construction Permit for discharges of stormwater runoff from the construction site. The General Construction Permit is the coverage issued by the SWRCB that allows the discharges of stormwater to waters of the United States from the construction project. In order to get coverage under the General Construction Permit, the discharge should be in compliance with NPDES and implement a Storm Water Sampling and Analysis Strategy for monitoring of construction site runoff. In order to obtain coverage under the General Construction Permit, the project owner would be required to submit a Notice of Intent to the SWRCB to file for permit coverage, and prepare and implement a SWPPP onsite. The NOI must be filed and the SWPPP must be prepared prior to commencement of soil-disturbing activities at the project site. The SWPPP must contain a site map(s) showing the construction site perimeter, existing and proposed buildings, lots, roadways, stormwater collection and discharge points, general topography before and after construction, and drainage patterns across the project. The SWPPP must list BMPs that would be used to protect stormwater runoff and describe the placement of those BMPs. Additionally, the SWPPP must contain a visual monitoring program and a chemical monitoring program for “nonvisible” pollutants to be implemented if there is a failure of the BMPs.

Typical temporary BMPs that would be used during construction include good housekeeping practices and erosion and sediment control measures. Good housekeeping practices include street sweeping, waste disposal, vehicle and equipment maintenance, concrete washout area, materials storage, minimization of hazardous materials, and proper handling and storage of hazardous materials. Several categories of construction BMPs are described further below:

**Erosion Control BMPs** protect the soil surface by covering and/or binding it, thus preventing soil from entering stormwater runoff. These BMPs include soil stabilization measures such as erosion control mats, tackifier, or hydroseed. Similar BMPs are used to reduce wind erosion from construction sites.

**Sediment Control BMPs** are designed to intercept and filter out soil that has been detached and transported by flowing water. Typical sediment control BMPs include:

- Barriers such as silt fences, fiber rolls, gravel bags, temporary desilting basins, velocity check dams, temporary ditches or swales, and stormwater inlet protection.
- Street sweeping in areas where sediment can be tracked from the project site onto paved streets or roads.

**Tracking Control BMPs** stabilize construction entrance/exit points, as well as all construction roadways, to reduce the tracking of sediments onto paved streets and roads by construction vehicles.

**Non-stormwater Discharges** are discharges from a municipal stormwater conveyance that do not originate from precipitation events. BMPs that can be implemented in the proposed project's SWPPP to avoid or minimize nonstormwater discharges include conducting vehicle cleaning, fueling, and maintenance activities in designated areas that are sufficiently protected and contained; conducting paving and grinding operations during the dry season, where possible; and promptly reporting and cleaning up any illegal connections or illegal dumping.

**Materials and Waste Management** includes implementing procedural and structural BMPs for collecting, handling, storing, and disposing wastes generated by a construction project to prevent the release of waste materials into stormwater discharges. Materials and waste management BMPs that can be incorporated into the project's SWPPP include:

- All materials with the potential to contaminate stormwater runoff, including stockpiles of sediment, should be stored covered and in designated areas surrounded by berms or other barriers.
- Chemicals, drums, and bagged materials should be stored on pallets and not directly on the soil.
- Personnel should also be trained on the proper use of these materials.
- Spill cleanup procedures and kits should be made readily available near hazardous materials and waste.
- Solid waste should be collected on a regular basis and stored in designated areas.

**Monitoring Program** included in the SWPPP outlines storm event inspections of the site and a sampling plan in accordance with the General Construction Permit. The monitoring program would:

- Identify areas contributing to a stormwater discharge.
- Evaluate whether BMPs are effective in achieving the pollution reduction required by the General Permit.
- Evaluate whether additional control measures are needed.

- A sample of discharge shall be collected and analyzed upon the detection of any breach, malfunction, leakage, or spill that could result in the discharge of pollutants to surface waters that would not be visually detectable in stormwater.

Design standards for the BMPs are set forth by the County of San Bernardino and the California Storm Water Management handbooks. Construction BMPs for this project would be selected, constructed, and maintained so as to comply with all applicable ordinances and guidance documents.

Upon implementation BMPs as specified in the project's SWPPP, project construction would not result in substantial pollution of receiving waters.

***Operations Phase***

Pollutant sources that are expected to be generated by project operation are sediment/turbidity, nutrients, trash and debris, oxygen-demanding substances, bacteria and viruses, oil and grease, and pesticides. The builtout condition of the project site would be similar for both the alternative and preferred development plan and this analysis can be applied to both scenarios.

The residences surrounding the project site are reliant upon well water for their potable water usage. In some cases, these wells are relatively shallow, with a water table of approximately 50 feet or more. Although historical farming uses and the related fertilizers and other amendments have not had an impact on the water table, BMPs (see Tables 5.7-5 through 5.7-7) would be used to reduce contaminants in runoff from the project site, lessening any potential impacts to potable drinking water to nearby residences. Site design, source control, and treatment control BMPs as dictated by the County and City Stormwater management plans would be implemented. The project-specific WQMP would be required by the City of San Bernardino to address management of urban runoff from the project site, and specifically address site design, source control, and treatment control BMPs to minimize the impact of urban runoff from the project.

As described in Table 5.7-5, site design BMPs would be used to control and filtrate runoff from residential uses for collection in detention basins located at strategic points on the project site. On- and offsite stormwater would be collected and routed through a series of catch basins, inlets, and storm drain systems that would convey water to three extended detention basins for water quality treatment and detention. These systems would be designed and constructed in accordance with the City of San Bernardino and the San Bernardino County Flood Control District standards. Properly engineered basins reduce infiltration issues by adsorbing common residential chemicals into basin linings.

**Table 5.7-5**
**Site Design BMPs Specified in Project WQMP**

| Requirement | Included Measure |
|---|---|
| **1. Minimize Stormwater Runoff, Minimize Project's Impervious Footprint, and Conserve Natural Areas** | |
| Conserve natural areas. This can be achieved by concentrating or clustering development on the least environmentally sensitive portions of a site while leaving the remaining land in a natural, undisturbed condition. | Offsite drainage courses entering the site would remain undisturbed, and 24 percent of the site area would remain undisturbed. |
| Construct walkways, trails, patios, overflow parking lots, alleys, driveways, low-traffic streets, and other low-traffic areas with open-jointed paving materials or permeable surfaces, such as pervious concrete, porous asphalt, unit pavers, and granular materials. | Hiking trails are proposed for the site. The trails would be constructed of decomposed granite (DG). |
| Maximize canopy interception and water conservation by preserving existing native trees and shrubs, and planting additional native or drought-tolerant trees and large shrubs. | It is recommended that drought-tolerant plants be used in the landscape design. Where applicable, native trees and shrubs are to be preserved onsite. |
| Minimize the use of impervious surfaces, such as decorative concrete, in the landscape design. | Decorative concrete would not be utilized in the landscape design. Landscape would be done in accordance with the City of San Bernardino landscaping design criteria. |
| Use natural drainage systems. | Infiltration would be used on the extended detention basins. |
| Construct onsite ponding areas, rain gardens, or retention facilities to increase opportunities for infiltration, while being cognizant of the need to prevent the development of vector breeding areas. | There are three extended detention basins proposed for the Spring Trails project. The outlet structure of the basins would be sized to match preproject condition peak flow rates, volume, velocities, and flow durations. The use of rain gardens (bioretention) would be utilized in the lots north of Cable Canyon. |
| **2. Minimize Directly Connected Impervious Areas** | |
| Where landscaping is proposed, drain rooftops into adjacent landscaping prior to discharging to the storm drain. | Roof drains draining into a landscape area/planter would be incorporated into the site design BMPs. |
| [Requirements for treating street runoff] | For locations where the residential development cannot be routed into an extended detention basin, combination of rain gardens and media filtration devices to treat the street runoff are proposed for the residential lots located north of Cable Canyon. |
| [Requirements for drainage from driveways and parking areas on residential lots] | Design driveways with shared access, flared (single lane at street), or wheel strips (paving only under tires); or drain into landscaping prior to discharging to the municipal storm drain system. |

Source: Rick Engineering Company 2009.

Table 5.7-6 describes the source control BMPs included in the site-specific WQMP. Successful implementation of these controls would reduce the amount of contaminants in surface flow and groundwater by controlling the contaminants at the source. In addition, it is unlawful for household hazardous chemical wastes to be disposed of in or on to a household property. The County of San Bernardino provides recycling centers nearby where these chemicals can be properly disposed.

**Table 5.7-6**
**Source Control BMPs Specified in Project WQMP**

| BMP | Included Measure |
|---|---|
| Education of Property Owners | Education is necessary for the proper cleaning and disposal of debris, nutrients, metals, pesticides, and oil and grease that can wash into the watershed. Educational materials from San Bernardino County are included in WQMP, Attachment E. The Spring Trails owner shall distribute additional copies of handouts and posters. Property owners must familiarize themselves with the educational materials. |
| Activity Restrictions | Activities that would significantly impact receiving waters shall not be performed. Trash bin lids shall be closed at all times. Sweeping, blowing, dumping or hosing debris into the surrounding streets or storm drains is not allowed at any time. Conditions, covenants and restrictions in regards to water quality are to be developed by the HOA. Any additional activity restrictions shall require prior approval from appropriate governmental agencies regarding any activity that may affect surrounding areas or the downstream receiving waters. |
| Street Sweeping Private Street and Parking Lots | Responsibility of the HOA to sweep streets once a month. |
| Common Areas Catch Basin Inspection | Responsibility of the HOA. |
| Landscape Planning | Drought-resistant plants would be used when appropriate. |
| Hillside Landscaping | Fuel modification would be implemented into project design. |
| Roof Runoff Controls | Roof runoff would be directed to the surrounding landscape. |
| Efficient Irrigation | Water-conserving irrigation measures shall be used in the landscape to avoid washing nutrients off the site. Similar plants shall be grouped together, and irrigation should be used to minimize runoff form the project site due to overwatering. Maintenance of landscape shall be in accordance with the City of San Bernardino design guidelines or approved equivalent. Additionally, flow reducers or shutoff valves should be used in the irrigation to help in the case of a broken line or sprinkler. |
| Protect Slopes and Channels | Engineered slopes would be landscaped. |
| Storm Drain Signage | Inlets would be signed with a “No Dumping-Drains to River.” |
| Inlet Trash Racks | Inlet trash racks would be used to prevent debris/trash from flowing downstream. |
| Energy Dissipaters | Rip-rap would be used to minimize erosion. |
| Trash Storage Areas and Litter Control | Trash storage areas would be provided in common areas. |

Source: Rick Engineering Company 2009.

*Water Quality Management Plan*

A WQMP (Appendix I1) was prepared for the project and specifies site design, source control, and treatment control BMPs as required by the San Bernardino County Stormwater Program Model Water Quality Management Plan Guidance. The combination of site design BMPs, source control BMPs, and treatment control BMPs incorporated into the project plans must address the potential pollutants for the project, identified above. The WQMP includes BMPs that would be implemented during both design and operation of the project, such as:

**Site Design BMPs** reduce the volume and rate of runoff, thus reducing the amount of stormwater that must be treated, by such means as minimizing impervious areas, maximizing permeability, minimizing directly connected impervious areas, creating reduced or “zero discharge” areas, and conserving natural areas. Site design BMPs that would be included in the proposed project are specified in Table 5.7-5.

**Source Control BMPs** reduce the potential for urban runoff and pollutants from coming into contact with one another. Source control BMPs specified in the WQMP for inclusion in the project are listed in Table 5.7-6.

**Treatment Control BMP** is any engineered system designed and constructed to remove pollutants from urban runoff onsite before the pollutants can enter the receiving waters. The primary pollutants of concern for the receiving waters are pathogens. Treatment control BMPs that would be incorporated into the project are:

- **Extended Detention Basin:** An extended detention basin is a water quality basin designed to detain and slowly release the design volume in at least 48 hours. The design of extended detention basin should be such that half of the design volume drains out in not less than 24 hours and the total volume drains out in less than 72 hours to avoid vector breeding. The design of the basin should incorporate a slope toward the outlet, vegetation at the bottom, and slopes to allow for infiltration while avoiding groundwater contamination. The extended detention basin can also work as flood control measure by addition of flood detention storage. Outlet of such basins should be protected against erosion and debris flow by proper protective measures. Extended detention basins are simple to construct and operate; they also remove sediments and the toxics associated with particulates.

- **Bioretention (Rain Garden):** The bioretention BMP functions as a soil- and plant-based filtration device that removes pollutants through a variety of physical, biological, and chemical treatment processes. The facilities normally consist of a grass buffer strip, sand bed, ponding area, organic layer or mulch layer, planting soil, and plants. The runoff velocity is reduced when it passes over or through the buffer strip and is subsequently distributed evenly along a ponding area. Exfiltration of the stored water from the bioretention area planting soil into the underlying soils occurs over a period of days. The vegetation provides shade and wind breaks, absorbs noise, and improves an area's landscape.

- **Water Quality Inlets:** A water quality inlet is a device that works on sedimentation of coarse materials and separation of free oil from stormwater. It removes oil and grit from stormwater runoff before the water enters the storm drain system. According to Filterra—a company that makes water quality filters—the pollutant removal for their "water quality inlets/bioretention system ranges from Medium to High, following ratings based on Caltrans Treatment Technology Report (April 2008)."

The WQMP describes long-term operation and maintenance requirements for BMPs, as listed in Table 5-7-7. The project applicant would be responsible for carrying out all BMP operations and maintenance activities.

**Table 5.7-7**
**BMP Operations and Maintenance Requirements**

| BMP | Operations and Maintenance Activities | BMP Start Date | Frequency |
|---|---|---|---|
| Storm Drain Signage | Inspect system signage for fading or vandalism and repair/replace if needed. "NO DUMPING – DRAINS TO RIVER" | At the installation of storm drains | The signage shall be monitored yearly. |
| Trash Storage Areas | Wastes (debris, vegetation, etc) shall be properly disposed of in a hazardous waste facility. After a storm event, the trash areas should be monitored for vector habitats. | At project completion | Trash areas shall be checked before and after a major storm event, as well as on a monthly basis to reduce debris. |
| Landscaping and Irrigation | Inspect landscaping and irrigation systems and repair/replace if needed. | At project completion | The landscaping and irrigation systems shall be monitored monthly. |
| Education of Property Owners | Educational materials, from San Bernardino County, are included in the WQMP, Attachment E. The HOA shall distribute additional copies of handouts. | At project completion | The educational material provided shall be reviewed yearly as well as when there is a change in ownership. |
| Activity Restrictions | Any activity that may affect surrounding areas or the downstream receiving waters (such as car washes or leaving trash bin lids open) is strictly prohibited. | At project completion | Trash areas shall be checked before and after a major storm event, as well as on a monthly basis to reduce debris. |
| Street Sweeping | A street sweeper shall clean the privately maintained streets and parking areas to reduce debris. | After site is cleared and streets are paved | A street sweeper shall clean monthly and before any known storm event. |
| Extended Detention Basin | Maintain the basin floor and inlets/outlets free of debris, silt, and trash. | At project completion | At least every 6 months and before the rainy season stars. |
| Media Filtration System | Units shall be inspected for sediment and oil buildup and these pollutants shall be removed and disposed of per the manufacturer's recommendations, with a recommended inspection once a year and actual media replacement every 3 to 4 years depending on rainfall. | At project completion | At least every 12 months and before the rainy season stars. |

Source: Rick Engineering Company 2009.

Prior to building or grading permit closeout or the issuance of a certificate of occupancy or certificate of use, the applicant shall demonstrate: that all structural BMPs have been constructed and installed in conformance with approved plans and specifications; that the applicant is prepared to implement all nonstructural BMPs described in the approved project-specific WQMP; and that an adequate number of copies of the approved project-specific WQMP are available for the future owners/occupants.

After implementation of site design, source control, and treatment control BMPs, as specified in the project's WQMP, project operation would not cause substantial pollution of receiving waters.

***IMPACT 5.7-5:*** ***THE SITE WOULD NOT BE SUBJECT TO INUNDATION BY SEICHE OR DAM FAILURE. DEVELOPMENT OF THREE RESERVOIRS ONSITE AS PART OF THE PROJECT WOULD NOT CREATE SUBSTANTIAL FLOODING HAZARDS DUE TO SEICHES. [THRESHOLDS HYD-9 AND HYD-10 (PART)]***

***Impact Analysis:*** There are no dams or enclosed bodies of water upstream from the project site that could pose a hazard of flooding to the site due to a seiche or the failure of a dam. The project would involve construction and operation of three reservoirs onsite; the locations of the reservoirs are shown in Figure 3-9, *Conceptual Drainage Plan*. The reservoirs would have capacities of 900,000 gallons, 900,000 gallons, and 2,500,000 gallons. The reservoirs would be enclosed tanks (O'Neill 2009b), the design and construction of which would comply with existing seismic safety regulations. The reservoirs that would be developed as part of the project would not pose a substantial risk of flooding due to seiches. This analysis is applicable to both the preferred development plan and the alternative (overhead electric lines) development plan.

***IMPACT 5.7-6:*** ***PROJECT DEVELOPMENT WOULD NOT PLACE HABITABLE STRUCTURES OR ROADWAYS IN THE PATHS OF DEBRIS FLOWS EXPECTED TO OCCUR IN A 100-YEAR STORM. [THRESHOLD HYD-10 (PART)]***

***Impact Analysis:*** Much of the project site is on the lower slopes of the San Bernardino Mountains. Large debris flows may occur in local watersheds, especially in years after a fire. After project development, debris flows originating upstream of the project site may flow through drainages crossing the site; debris flows are not expected to originate onsite (O'Neill 2009a). Culverts where drainages on the site would cross under roadways have been designed to accommodate the increase in volume due to sediment that would occur in a debris flow. All proposed improvements, including building pads, roads, and reservoirs, would be outside of the area that would be flooded by debris flows during a 100-year storm (Figueroa 2009). Project development is not expected to create substantial hazards to persons arising from debris flows. This analysis is applicable to both the preferred development plan and the alternative (overhead electric lines) development plan.

### *5.7.4 Cumulative Impacts*

**Runoff and Storm Drainage Capacity**

The related projects are development projects that would increase the amount of impervious surfaces and consequently cause increased runoff within the Santa Ana River Watershed. Each related project would be required to include project features that would detain onsite any increase in runoff from 100-year storm events until after the storm. After the construction and operation of required drainage features within related projects, substantial cumulative impacts to the capacity of the storm drainage system in the region are not expected to occur. Given that the proposed project would also be required to include drainage features so that the proposed project would not cause a net increase in runoff into the existing storm drainage system in the region, the proposed project is not anticipated to have a cumulatively considerable adverse impact on storm drainage capacity. This analysis of cumulative impacts to runoff and drainage is applicable to both the preferred development plan and the alternative (overhead electric lines) development plan.

**Water Pollutants**

Reach Four of the Santa Ana River, downstream from the vicinity of the project site, is included on the 303(d) list as impaired by pathogens (bacteria and viruses). Therefore, pathogens are pollutants of concern in the vicinity of the project site.

Other projects in the Santa Ana Watershed can be expected to increase the amounts of contaminants that could enter stormwater. However, other projects would be required to comply with the same NPDES regulations for minimizing water pollution as would the proposed project. Related projects would be required to prepare and implement SWPPPs and WQMPs, specifying BMPs that would be used to minimize contaminants discharged into receiving waters. After compliance with existing regulations, cumulative impacts to water quality are not expected to be substantial, and the proposed project is not anticipated to have cumulatively considerable impacts on water quality. This analysis of cumulative impacts to water quality is applicable to both the preferred development plan and the alternative (overhead electric lines) development plan.

### *5.7.5 Existing Regulations and Standard Conditions*

**Federal**

- Clean Water Act
    - National Pollutant Discharge Elimination System
- Safe Drinking Water Act
- National Flood Insurance Program

**State**

- Porter-Cologne Water Quality Act

**San Bernardino County**

- San Bernardino County Hydrology Manual
- San Bernardino County Stormwater Program Model Water Quality Management Plan Guidance

### *5.7.6 Level of Significance Before Mitigation*

Upon implementation of regulatory requirements and standard conditions of approval, the following impacts would be less than significant: 5.7-1, 5.7-2, 5.7-3, 5.7-4, 5.7-5, and 5.7-6.

### *5.7.7 Mitigation Measures*

No significant impacts have been identified, and no mitigation measures are required.

### *5.7.8 Level of Significance After Mitigation*

No significant impacts have been identified.