3.8 HYDROLOGY/WATER QUALITY

3.8.1 Introduction

This section characterizes the local and regional hydrologic conditions for the Proposed Project. It describes existing drainage, flood hazards, water quality, and groundwater issues. Applicable plans and policies are discussed, including the objectives of the City of Lake Forest, the Orange County Water District Groundwater Management Plan (2004), City of Lake Forest Utility Report (2005), Irvine, Groundwater Bulletin 118 (2004), and Orange County Stormwater Program 2003 Drainage Area Management Plan (DAMP) (2003).

The construction and operation of the Proposed Project would potentially affect existing hydrologic conditions at the Project Area and in downstream receiving waters. Data used to prepare this section were taken from the City's General Plan, the Orange County Water District Groundwater Management Plan (2004), City of Lake Forest Utility Report (2005), Orange County Watershed and Coastal Resources Division website, Irvine Ranch Water District (IRWD) website, Groundwater Bulletin 118 (2004), Orange County Stormwater Program 2003 Drainage Area Management Plan (DAMP) (2003), and the California Regional Water Quality Control Boards: Santa Ana and San Diego Regions. Information from reports prepared by Dr. Stanley Trimble of the Department of Geography at UCLA for the County of Orange's ongoing study of the San Diego Creek watershed was also used in preparing this section. Full bibliographic entries for all reference materials are provided in Section 3.8.9 (References) of this document. No comment letters were received specific to hydrology and water quality.

3.8.2 Environmental Setting

Regional Hydrology and Water Quality

The Proposed Project is located within the coastal area of Southern California. This region is bounded on the east by the Santa Ana Mountains and on the west by the Pacific Ocean. Climate is Mediterranean, characterized by warm summers, cool winters, and highly seasonal rainfall; nearly all rain falls between late fall to early spring with nearly no precipitation during the summer months. Potential evapotranspiration exceeds precipitation and lower reaches of rivers are generally dry in the summer under natural conditions. Mean precipitation within the Proposed Project vicinity is approximately 15 inches per year with 87 percent occurring within November through March.

Surface Water

The Proposed Project is within the Coastal and Peninsula Range Provinces of California, and both the Santa Ana River Basin and the San Diego River Basin. Each basin comprises a separate regulatory region and is governed by its respective Regional Board. Designated beneficial uses and associated water quality objectives/goals are listed in the respective Regional Water Quality Control Plans (Basin Plans).

Santa Ana River Basin

The Santa Ana River Basin begins in the steep San Gabriel, San Bernardino, and San Jacinto Mountains and discharges to the Pacific Ocean at Huntington Beach. Approximately 37 percent of the watershed is within the steep mountainous areas, and the remainder is in valleys formed by broad alluvial fans along the base of these mountains and by the alluvial flood plains further downstream. The main tributary in the lower part of the watershed (i.e., below Prado Dam) is Santiago Creek, which originates in the Santa Ana Mountains.

San Diego Creek drains the southeastern portion of the Santa Ana River Basin and discharges to Newport Bay. San Diego Creek receives continuous flow from the runoff of the Borrego Canyon Wash, Agua Chinon Wash, Bee Canyon Wash, and the paved Marshburn Channel. Portions of these drainages have been channelized for flood control.

Designated beneficial uses of San Diego Creek are listed in the Basin Plan. Beneficial uses for the upper reaches and tributaries are groundwater recharge (GWR), primary and secondary contact recreation (REC1 and REC2), warm water fish support (WARM), and wildlife habitat (WILD). These designations are for intermittent use. San Diego Creek has been specifically excepted from the municipal supply designation (MUN) in accordance with the criteria specified in the Sources of Drinking Water Policy.

Reaches of San Diego Creek and Newport Bay have been listed (303(d)) as impaired by bacteria, pesticides, metals, toxics, sediment, and nutrients. Primary causes of impairment identified are urban runoff and storm sewers and unknown nonpoint sources. Total Maximum Daily Loads (TMDLs) have been developed for sediment, nitrogen, phosphorous, chlropyrifos, and diazinon. TMDLs for other toxics have been developed by the U.S. Environmental Protection Agency (US EPA); however the State Water Resources Control Board (SWRCB) has not yet adopted them. Applicable water quality goals and limits are included in the Regional Basin Plan.

San Diego River Basin

The San Diego River Basin Region is divided into a coastal plain area, central mountain-valley area, and eastern mountain valley area. The Proposed Project is located within the coastal plain area. This area is composed of a series of wave cut benches overlain by smooth, eroded, thin terrace deposits. The terrace deposits are steeply incised by streams that drain directly towards the Pacific Ocean. The San Juan Hydrologic Unit of the San Diego Region is comprised of five hydrologic areas, including the Laguna Hydrologic Area. The Aliso Creek Hydrologic Sub-Area of the Laguna Hydrologic Area conveys flow from the Cleveland National Forest to the Pacific Ocean.

Beneficial uses for Aliso Creek are identified in the Basin Plan as agriculture (AGR), secondary contact recreation (REC2), warm water fish support (WARM), and wildlife habitat (WILD) with the potential for primary contact recreation (REC1). Aliso Creek has been specifically excepted from the municipal supply designation (MUN) in accordance with the criteria specified in the Sources of Drinking Water Policy.

Aliso Creek is listed as impaired by nutrients (phosphorous), pathogens (bacteria), and unknown toxicity (303(d) list). Causes of impairment are identified as urban runoff and storm sewers, unknown point sources, and unknown nonpoint sources. No TMDLs have yet been developed for Aliso Creek.

Groundwater

This coastal area overlays the Coastal Plain of Orange County Groundwater Basin (DWR 8-1). This groundwater basin is bounded on the north by the Puente and Chino Hills, on the east by Santa Ana Mountains, and on the south by the San Joaquin Hills, on the southwest by the Pacific Ocean, and on the northwest by a low topographic divide at the border of Orange and Los Angeles County. Underlying geology of the groundwater aquifer is a thick accumulation of fresh water-bearing interbedded marine and continental sand, silt and clay deposits. The proportion of fine materials increases from the mountain areas towards the coast, resulting in areas of recharge (forebay area) where materials are coarser and more interconnected, and pressure areas where materials are finer and the aquifer becomes confined. These consolidated rocks surround and underlie thick unconsolidated alluvial deposits. The major surface water drainage overlying this groundwater basin is Santa Ana River, the headwaters of which lies outside the basin.

Historical groundwater flow was generally toward the ocean in the southwest, but pumping has greatly altered the hydraulic gradient and caused water levels to drop below sea level inland of the Newport-Inglewood fault zone. The hydraulic gradient is currently primarily from recharge areas toward withdrawal areas. Salt water intrusion has migrated inland along the coastal regions and contaminated the water supply in this area. A salt-water intrusion barrier in the Alamitos and Talbert Gaps is created through injection of imported and reclaimed water to create a mound of water seaward to protect the basin from further seawater intrusion. Groundwater storage capacity is estimated as 38,000,000 AF.

The Orange County Water District (OCWD) is charged with managing this groundwater basin by authority granted to it in the California Water Code Appendix Chapter 40. An extensive and detailed model of this system is used to assess impacts of water supply demands and recharge. The OCWD was created by legislation designed to manage overdraft in the groundwater basin. Historically, overdraft in the basin has ranged from 200,000 to 500,000 AF. Approximately 75 percent of OCWD demands are met with groundwater from this basin. Recharge occurs from percolation of Santa Ana River flow, infiltration of precipitation, spreading of reclaimed water in recharge areas, and injection into wells. Additionally, the Santa Ana River flow, itself, contains natural flow, reclaimed water, and imported water that is spread in the groundwater basin forebay area.

The groundwater basin can be divided into three aquifer systems with varying physical and chemical characteristics, usage, and recharge properties. The upper aquifer system is about 800 feet thick and consists mostly of sand, gravel, and conglomerate with some silt and clay beds from primarily Holocene alluvium, older alluvium, stream terraces, and the upper Pleistocene deposits represented by the La Habra Formation. Generally, this upper system has less water-bearing capacity in the northwest and coastal portions of the area where clays and clayey silts dominate. Recharge to the upper aquifer system occurs primarily in the northeastern portions of the basin and water from this aquifer provides most of the irrigation water for the basin. The middle aquifer system has an average thickness of about 1,600 feet

and is composed mostly of sand and gravel with only minor amounts of clay of the lower Pleistocene Coyote Hills and San Pedro Formations. About 90 to 95 percent of the groundwater for the entire basin comes from the middle aquifer. Recharge occurs primarily from the Santa Ana River channel in the northeast. The lower aquifer system and is composed of sand and conglomerate of the Upper Fernando Group of upper Pliocene age. Thickness of this aquifer is about 350 to 500 feet. The lower aquifer system could likely be used as a high yielding groundwater source.

Water within this basin is primarily of sodium-calcium bicarbonate with total dissolved solids (TDS) concentrations of about 475 mg/L (range of about 232 to 661 mg/L. The average TDS content of 240 public supply wells is 507 mg/L with a range of 196 to 1,470 mg/L. The lower aquifer contains more than one million acre-feet of water, colored primarily by the sediment of ancient redwood trees. The OCWD regards this high-quality water stored in deep aquifers, as a promising source of additional drinking water. However, the water does not meet the secondary drinking water standard for color. The groundwater basin is currently considered impaired by salt water intrusion along the coast, increasing salinity in general, high nitrates, and MTBE (methyl tertiary-butyl ether).

MTBE is a volatile, flammable, and colorless liquid that dissolved readily in water. It was added to gasoline in order to meet air quality standards mandated by the United States Environmental Protection Agency (USEPA) and California Air Resources Board (CARB). These air quality standards require gasoline to contain "oxygenates" (raise oxygen content of gasoline) to assist in complete burn of gasoline to minimize formation of carbon monoxide. MTBE is a frequent and widespread contaminant in shallow groundwater throughout California, it is more mobile than other hydrocarbon contaminants, and it resists biodegradation. MTBE is a regulated drinking water contaminant in California with a defined primary MCL (maximum contaminant level) and PHG (public health goal) of 0.13 μg/L.

Groundwater levels in the basins have periodically declined due to gradually increasing groundwater production over the last ten years, and due to drought conditions, which have reduced the amount of local water available to refill the basin. To address these low groundwater levels and continuing seawater intrusion, the OCWD has reduced the amount of groundwater available to its water retailers and increased the cost of groundwater to pay for more imported water to recharge the basin. In addition to lowering the amount of groundwater use the OCWD is shifting the pumping in the basin inward away from the coast in order to forestall continued seawater intrusion (OCWD 2003).

Watersheds

Lake Forest is located within the Aliso Creek and San Diego Creek watersheds.[8] Watershed boundaries are depicted in Figure 3.8-1. The Aliso Creek Watershed covers 30.4 square miles, or 19,663 acres, and includes portions of the cities of Aliso Viejo, Dana Point, Laguna Niguel, Laguna Woods, Laguna Beach, and Lake Forest. Its main tributary, Aliso Creek, originates in the Santa Ana Mountains inside the boundaries of Cleveland National Forest. Smaller tributaries include Wood Canyon, Sulphur Creek, the Aliso Hills Channel, and English Channel.

[8] http://www.ocwatersheds.com/brochures/ocwatersheds.pdf, Accessed January 31, 2005

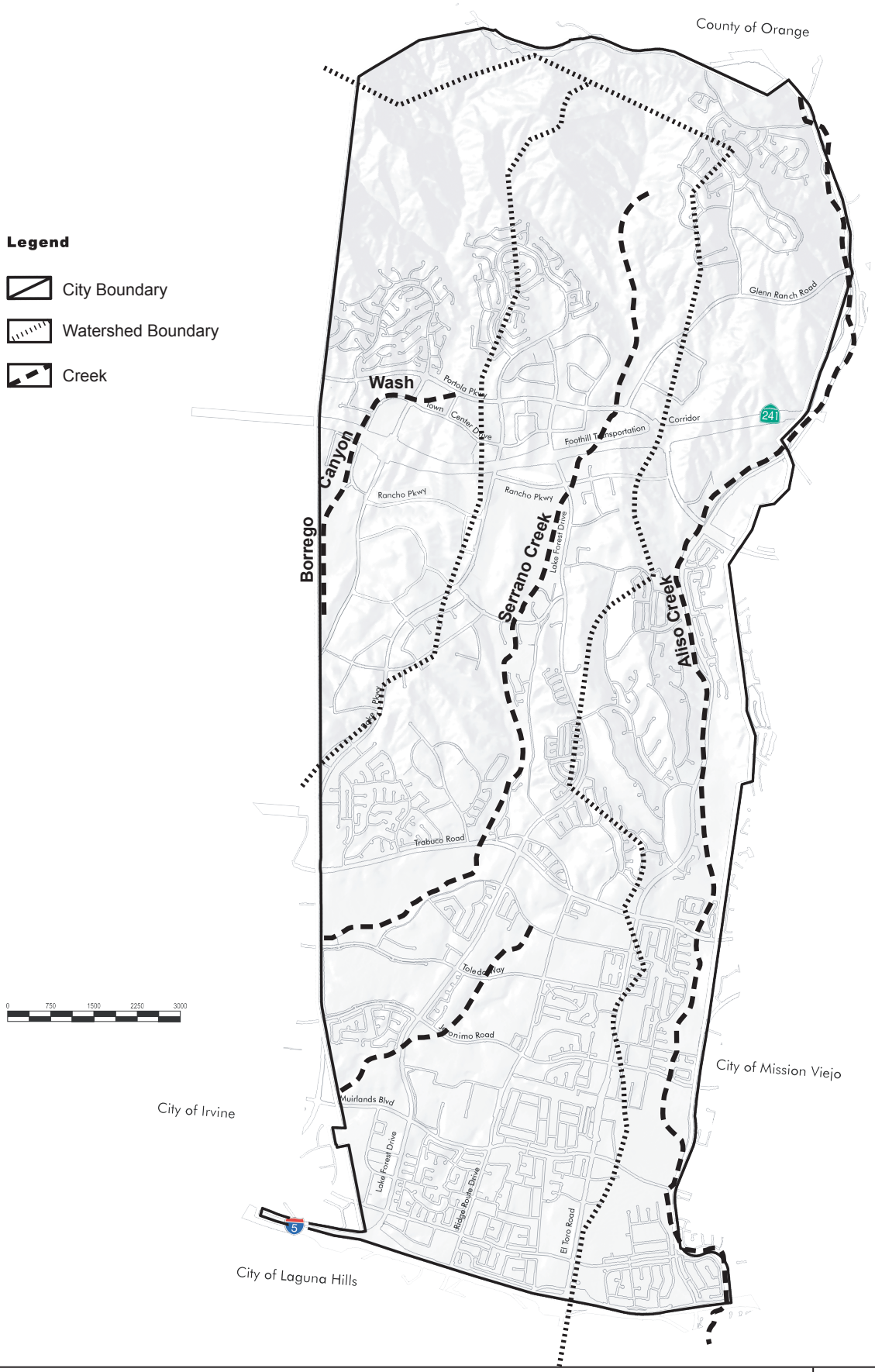

FIGURE **3.8-1**

Watershed Boundaries Map

10953-00

***Sources*:** San Diego Creek Flood Control Master Plan, April 1989; CBA; City of Lake Forest City of Lake Forest

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The San Diego Creek Watershed covers 112.2 square miles in central Orange County. It includes portions of the cities of Costa Mesa, Irvine, Laguna Woods, Lake Forest, Newport Beach, Orange, Santa Ana, and Tustin. Its main tributary, San Diego Creek, drains into Upper Newport Bay.

Local Hydrology and Water Quality

Surface Water

The Proposed Project area is drained by Borrego Canyon Wash, Serrano Creek, and Aliso Creek. Borrego Canyon Wash and Serrano Creek are within the San Diego Creek watershed, East Coast Plain Hydrologic Unit of the Santa Ana River Basin (number 801.11).

Aliso Creek is within the Laguna Hydrologic Area, of the San Juan Hydrologic Unit of the San Diego River Basin (number 901.13).

Surface characteristics pertaining to drainage and runoff from each site of the Proposed Project is as follows:

- Site 1 drains primarily to Borrego Canyon Wash and is characterized by a generally barren, rolling landscape with some agriculture and commercial areas. The surrounding land use on the northern, eastern, and southern boundary of this site is primarily industrial or commercial.
- Site 2 drains to both Aliso Creek and Serrano Creek, and primarily consists of open space with hilly topography. A major road bisects this site and flow from the northern portion drains to Serrano Creek. The northern portion also contains some riparian vegetation. The southern portion drains to Aliso Creek. The areas surrounding this site are primarily open space, except for along the northern boundary, which is residential.
- Site 3 drains to Serrano Creek and is formerly agricultural and primarily vacant with a rolling topography. Surrounding land uses include residential areas to the west, south, and east; industrial complexes to the north; and open space to the east and west of the site.
- Site 4 drains to Aliso Creek, and contains gravel washing and associated facilities, parking lots, and a nursery on a rolling topography.
- Site 5 may drain to Aliso Creek or Serrano Creek, but is primarily a small, internal drainage with vegetated open space. Surrounding land uses are residential and open areas.
- Site 6 drains to Serrano Creek and is adjacent to Site 3. Topography is rolling and land use is mostly open area with open areas and residential surrounding.
- Site 7 drains to Serrano Creek. This site is in agriculture (container nursery) and bounded on all sides by major roadways.

The portion of the Borrego Canyon Wash upstream of Commercentre Drive to Towne Centre Drive is a small, incised earthen channel which had been relocated to a linear alignment through historical farming operations in the area. According to studies of the San Diego Creek watershed conducted by Dr. Stanley Trimble for the County of Orange, the segment of the Borrego Canyon Wash through Site 1 was approximately 10 feet deep and 40 feet wide in 1991 but has widened to an average of 20 feet deep and 80 feet wide in the 1998 report. Much of the widening appears to be a result of erosion conditions present along the Borrego Canyon Wash. The Borrego Canyon Wash conveys surface runoff from the

developed (e.g., Foothill Ranch) and undeveloped areas upstream of the Project Area as well as runoff from the Project Area into the San Diego Creek.

The geomorphology of the portion of Borrego Canyon Wash through Site 1 has been studied and documented since approximately 1974 as part of the ongoing County studies of the San Diego Creek watershed conducted by Dr. Stanley Trimble. As documented in the Trimble reports, the Borrego Canyon Wash in Site 1 has experienced substantial invert erosion as well as lateral erosion over the term of the reports. Most recently, the Trimble reports observed that the segment of the Borrego Canyon Wash that traverses Site 1 has experienced a nearly 50 percent widening at various sections through this reach between 2002 and 2005. (The 2005 report notes erosion beyond that estimated by Dr. Trimble in 1998. At that time, the Trimble reports had documented that the Wash had experienced a 50 percent widening at various sections through this reach between 1991 and 1998.) Conditions along the Borrego Canyon Wash downstream of the SR-241 have remained fairly static (i.e., little or no development affecting the watershed) over the almost 30 year term of the Trimble reports. The Trimble reports document that the beginning of significant erosion commenced concurrent with the development upstream of SR-241.

Approximately 5 miles downstream from the Marine Corps Air Station (MCAS) El Toro, San Diego Creek runs through a recreational area consisting of hiking, biking, and equestrian trails as it makes its way to Newport Bay. Newport Bay is a major recreational area used for swimming and fishing. The reach from the Equestrian Center to Bake Parkway at Toledo Road is currently undergoing a habitat and stream channel restoration project that is near completion. There are no apparent problems with this site now, but that may change as the project features are tested during future annual flooding events. From the Bake Parkway to Interstate 5, however, the stream channel has been straightened and lined with concrete or routed through an underground culvert.

The largest drainage-course in the Proposed Project vicinity is Aliso Creek, which runs along the City's eastern boundary. Aliso Creek is considered part of the San Diego River Basin and drains directly to the ocean. It does not overlay a groundwater basin or contribute to groundwater recharge.

Flooding

Figure 3.8-2 depicts the existing FEMA 100-year and 500-year floodplains. During the 100-year storm event, some flooding is expected along Serrano Creek, Aliso Creek, and Borrego Canyon Wash. The Borrego Canyon Wash, which crosses the northern portion of Site 1, is designated as Zone A, which means that no base flood elevation has been determined; however, it is noted on the figure that the 100-year storm flow would be completely contained within the channel. Aliso Creek is also a designated floodway but does not traverse any of the project sites. Serrano Creek is designated as Zone AO, which would be subject to flooding at depths of 1 to 3 feet in a 100-year storm; portions of Serrano Creek north and south of Site 7 are also designated as a floodway area, which is the channel of a stream plus any adjacent flood plain areas that must be kept free of encroachment so that the 100-year storm flow can be carried without substantial increases in flood height. Generally, watercourses within the Proposed Project area are incised and have high enough banks or have been channelized to contain most of the 100-year flood events. The additional flow from the 500-year results in a slight increase of flooded areas.

Groundwater

At least half of the Proposed Project vicinity cannot serve as a groundwater recharge zone since it is outside of the groundwater basin boundary. Where the Proposed Project areas do overlay the basin, the layers are thin and recharge is expected to be small. Small portions of the outer edge of the groundwater basin are likely overlain by portions of Sites 1, 3, 5, 6, and 7.

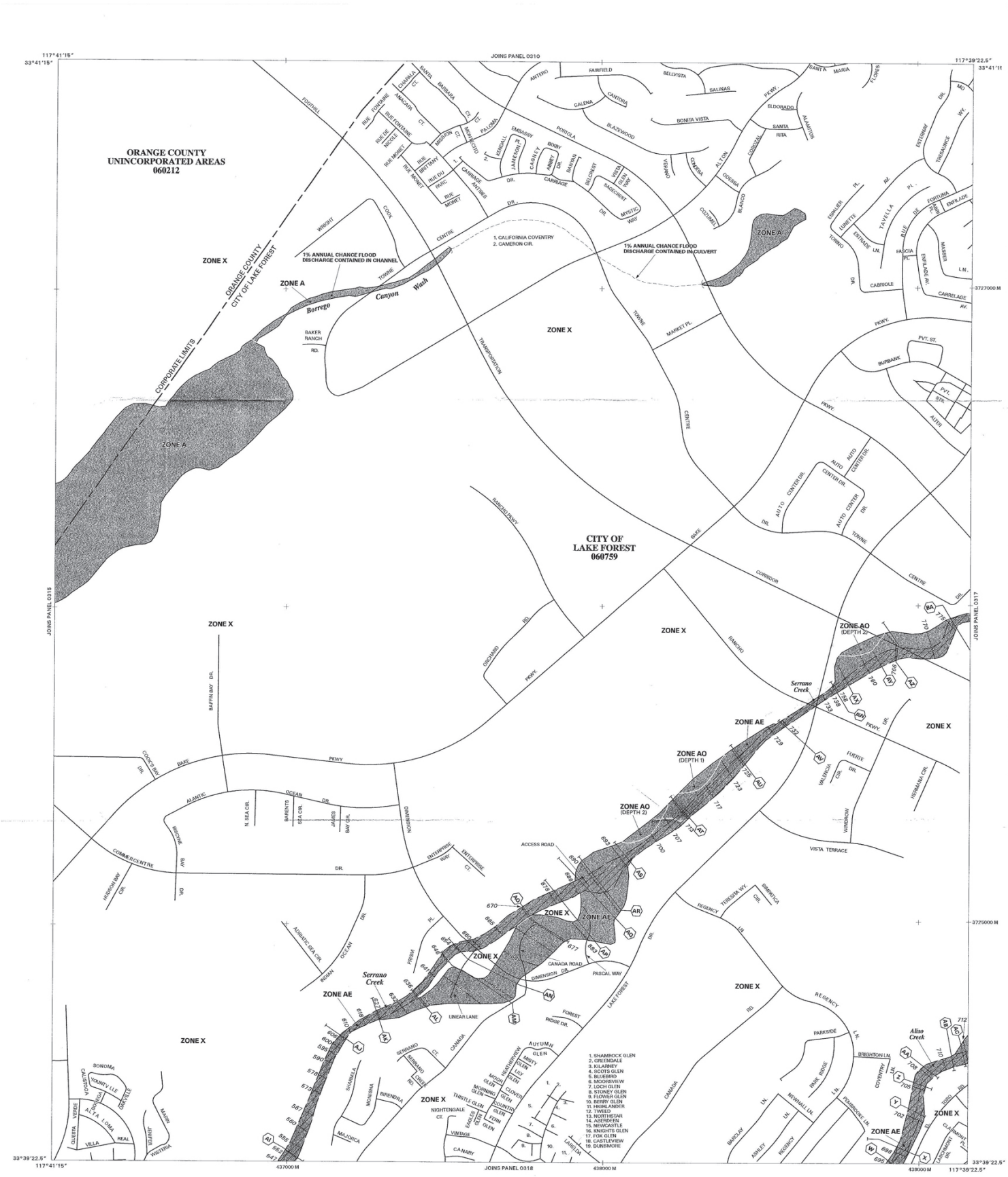
Although the IRWD regionally uses groundwater to supply about 50 percent of total water consumptive use within its district, only about five percent of Lake Forest water supplies are from groundwater resources. A well just north of the City of Lake Forest provides most of the groundwater supply for City of Lake Forest. The Lake Forest well is considered potentially vulnerable to overlaying land uses that might result in spills (e.g., drycleaners, sewer systems), although a recent study (IRWD, 2003) found no exceedance of drinking water maximum contaminant levels (MCLs) or public health goals (PHGs) in samples taken from the Lake Forest well. MCLs are regulatory water quality standards that public drinking water supplies must meet. They are based on PHGs, which denote the lowest dose of a chemical that will not result in an increase in an adverse human health effect due to long term exposure.

Additional IRWD wells are located at the Dyer Road Wellfield, several miles down gradient from the Proposed Project site. These wells are considered vulnerable to contamination by existing and historic gas stations, metal plating/finishing/manufacturing facilities, and plastics/synthetics producers. Groundwater elevation contours indicate that this wellfield has a significant effect on groundwater hydrology. Groundwater quality from these wells is good and no MCLs or Action Levels were exceeded during a 2002 study to assess groundwater resources (IRWD 2003).

Most of the municipalities supplied by IRWD water receive a blend of groundwater and surface water (including imported water). The amount of surface water or local groundwater delivered is a function of season where more surface water is used during the wet weather season, and more groundwater is used during the dry season. However, Lake Forest primarily receives surface water throughout the entire year.

Portions of the Proposed Project overlay the Irvine Sub-basin area of the Orange County Groundwater Basin. Local groundwater flow in this groundwater basin is westward, away from the Proposed Project area. Water table elevation is estimated to be 500 to 800 feet below ground surface. Contour maps indicate that local water table elevations fluctuated over the past 50 years, and have dropped by almost ten feet from 2000 through 2003 (OCWD 2000–2003), partially due to both increasing demands and recent climatic drought conditions. These maps also indicate that groundwater levels have dropped by about 10 feet from 2000 through 2003.

A 1-by-5-mile groundwater contaminant plume approximately 200 feet below ground surface is located west of the MCAS El Toro. This plume was generated by spills and disposal of used solvents (e.g., degreasers) at the MCAS El Toro that eventually seeped into the groundwater aquifer. Off-station groundwater data have been collected by the OCWD since 1985, when routine monitoring detected trichloroethylene in irrigation wells less than one-half mile from the MCAS El Toro boundary. Groundwater in the area surrounding the MCAS El Toro is primarily used for irrigation of agricultural and greenbelt areas (i.e., parkways and parks that encircle the local communities). Agricultural farm



LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD EVENT

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water surface elevation of the 1% annual chance flood.

ZONE A No base flood elevations determined.

ZONE AE Base flood elevations determined.

ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); base flood elevations determined.

ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

ZONE AR Area of special flood hazard formerly protected from the 1% annual chance flood event by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood event.

ZONE A99 Area to be protected from 1% annual chance flood event by a Federal flood protection system under construction; no base flood elevations determined.

ZONE V Coastal flood zone with velocity hazard (wave action); no base flood elevations determined.

ZONE VE Coastal flood zone with velocity hazard (wave action); base flood elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

Floodplain boundary

Floodway boundary

Zone D boundary

CBRS and OPA boundary

Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or velocities.

513 Base Flood Elevation line and value; elevation in feet*

(EL 987) Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

Cross Section Line

Transect Line

97°07'30", 32°22'30" Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)

4276000M 1000-meter Universal Transverse Mercator grid values, zone 11

600000 FT 5000-foot grid ticks

DX5510 Bench mark (see explanation in Notes to Users section of this FIRM panel).

M1.5 River Mile

MAP REPOSITORY
Refer to Repository Listing on Index Map

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
SEPTEMBER 15, 1989

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
February 5, 1992 November 3, 1993 January 3, 1997 February 18, 2004: to update corporate limits, to add special flood hazard areas, to change zone designations, to update map format, to incorporate previously issued letters of map revision, to update roads and road names.

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at (800) 638-6620.

MAP SCALE 1" = 500'

250 0 500 1000 FEET

150 0 150 300 METERS

FIGURE **3.8-2**

FEMA Q3 Floodplain

***Source*:** Federal Emergency Management Agency, 2004

City of Lake Forest

10953-00

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workers and well operators may be exposed to contaminants in groundwater through unintentional ingestion of contaminated groundwater, skin contact with contaminated groundwater, or inhalation of aerosolized groundwater contaminants. Based on the evaluation of current groundwater data, contaminants detected in groundwater both on and off of the MCAS El Toro do not pose a health hazard to those workers (U.S. Navy 2004).

Future exposure to the contaminant plume could occur through two potable water wells that are located 10 miles downgradient of the contaminant plume. At the current rate of contaminant migration, those wells will be affected in one and a half to five years (OCWD, 2001). The OCWD has developed plans for additional groundwater treatment to prevent additional wells from becoming contaminated. Municipal wells used as a drinking water source for 45,000 people are located west of Newport Boulevard, 8 miles west of MCAS El Toro.

The MCAS El Toro was proposed for listing on EPA's National Priorities List (NPL) in 1989 because past operations and disposal practices contaminated local groundwater. In 1990, MCAS El Toro was listed on the NPL. The Agency for Toxic Substances and Disease Registry (ATSDR), a branch of U.S. Department of Health Services has categorized the MCAS El Toro as an indeterminate public health hazard due to the limited data available from on-station media that would indicate whether or not humans are being exposed to levels of contaminants expected to cause adverse health effects. The ATSDR is the agency directed by congressional mandate to perform public health assessments of waste sites, health consultations concerning specific hazardous substances, health surveillance and registries, responses to emergency releases of hazardous substances, applied research in support of public health assessments, information development and dissemination, and education and training concerning hazardous substances.

High salts and nitrates also occur in the Irvine Sub-basin are the result of natural geology and historic agricultural practices. The OCWD and IRWD began the process for implementation of a project in 1990 to clean up the high salinity groundwater for non-potable irrigation use in addition to remediation of the MCAS El Toro contaminant plume (the Desalter Project). Construction on this project is expected to begin summer of 2005 (MCAS El Toro Restoration Advisory Board, 2005). The Desalter Project is expected to provide an additional 6,000 to 8,000 acre-feet of water, some of which would be used for irrigation (25 percent) and the rest as potable water (75 percent) (OCWD, 2001).

3.8.3 Planning and Regulatory Framework

Federal

Clean Water Act

The *Clean Water Act* (CWA) was designed to restore and maintain the chemical, physical, and biological integrity of the Nation's waters. The CWA also directs states to establish water quality standards for all waters of the United States and to review and update such standards on a triennial basis. Other provisions of the CWA related to basin planning include Section 208, which authorizes the preparation

of waste treatment management plans, and Section 319, which mandates specific actions for the control of pollution from nonpoint sources. The EPA has delegated responsibility for implementation of portions of the CWA to the SWRCB and the Regional Water Quality Control Boards (RWQCBs), including water quality control planning and control programs, such as the National Pollutant Discharge Elimination System (NPDES) Program.

Section 303 of the CWA requires states to adopt water quality standards for all surface waters of the United States. Section 304(a) requires the EPA to publish water quality criteria that accurately reflects the latest scientific knowledge on the kind and extent of all effects on health and welfare that may be expected from the presence of pollutants in water. Where multiple uses exist, water quality standards must protect the most sensitive use. Water quality standards are typically numeric, although narrative criteria based upon biomonitoring methods may be employed where numerical standards cannot be established or where they are needed to supplement numerical standards. Section 303(c)(2)(b) of the CWA requires states to adopt numerical water quality standards for toxic pollutants for which EPA has published water quality criteria and which reasonably could be expected to interfere with designated uses in a water body.

Stormwater discharges to waters of the U.S. are regulated under the CWA §402, 33 USC §1342; 40 CFR Parts 122–136. In the Project Area, this requirement is regulated by two RWQCBs - the Santa Ana Region and San Diego Region - under the NPDES program. All projects resulting in discharges, whether to land or water, are subject to Section 13263 of the California Water Code and are required to obtain approval of Waste Discharge Requirements (WDRs) by the RWQCBs. Land- and groundwater-related WDRs (i.e., non-NPDES WDRs) regulate discharges of process and wash-down wastewater and privately or publicly treated domestic wastewater. WDRs for discharges to surface waters also serve as NPDES permits, which are further described below.

The Aliso Creek Watershed, San Diego Creek, and Newport Bay are listed as Section 303(d) impaired waterbodies that do not meet water quality standards.

National Flood Insurance Act

Congress acted to reduce the costs of disaster relief by passing the *National Flood Insurance Act of 1968* and the *Flood Disaster Protection Act of 1973*. The intent of these acts was to reduce the need for large, publicly funded flood control structures and disaster relief efforts by restricting development in floodplains (California Department of Water Resources 2005).

The Federal Emergency Management Agency (FEMA) administers the National Flood Insurance Program (NFIP) to provide subsidized flood insurance to communities that comply with FEMA regulations limiting development in a floodplain. The FEMA issues Federal Insurance Rate Maps (FIRMs) of communities participating in the NFIP. These maps delineate flood hazard zones in the community. The City of Lake Forest manages local storm drain facilities and the Orange County Flood Control District (OCFCD) is responsible for regional flood control planning within the County.

State

Responsibility for the protection of water quality in California rests with the SWRCB and nine RWQCBs. The SWRCB establishes statewide policies and regulations for the implementation of water quality control programs mandated by federal and state water quality statutes and regulations. The RWQCBs develop and implement Water Quality Control Plans (Basin Plans) that consider regional beneficial uses, water quality characteristics, and water quality problems. The Proposed Project area is located within the Santa Ana and San Diego Basin Plan areas, which implement a number of federal and state laws, the most important of which are the state *Porter-Cologne Water Quality Control Act* and the federal *Clean Water Act*

Porter-Cologne Water Quality Control Act

The *Porter-Cologne Water Quality Control Act* authorizes the SWRCB to adopt, review, and revise policies for all waters of the state (including both surface and groundwaters) and directs the RWQCBs to develop regional Basin Plans. Section 13170 of the California Water Code also authorizes the SWRCB to adopt water quality control plans on its own initiative.

The Santa Ana and San Diego Basin Plans specifically (1) designate beneficial uses for surface and ground waters, (2) set narrative and numerical objectives that must be attained or maintained to protect the designated beneficial uses and conform to the state's anti-degradation policy, and (3) describe implementation programs to protect all waters in the region. In cases where a Basin Plan does not contain a standard for a particular pollutant, other criteria are used to establish a standard. Other criteria may be applied from SWB documents (e.g., the Inland Surface Waters Plan and the Pollutant Policy Document) or from water quality criteria developed under Section 304(a) of the *Clean Water Act.*

The Proposed Project sites drain into either the Borrego Canyon Wash, Serrano Creek, or Aliso Creek. Beneficial uses listed for Borrego Canyon Wash, Serrano Creek, and Reach 2 of San Diego Creek include intermittent use for groundwater recharge, contact and noncontact recreation, warm water aquatic life support, and wildlife habitat. Beneficial uses listed for Reach 1 of San Diego Creek include contact and non-contact recreation (however access is prohibited for contact recreation), warm water aquatic life support, and wildlife habitat. No numeric objectives are listed for Serrano Creek or Borrego Canyon Wash, aside from the California Toxics Rule criteria and general Basin Plan objectives. Site-specific water quality objectives for Reach 1 of San Diego Creek are 1,500 mg/L total dissolved solids objective, 13 mg/L total inorganic nitrogen objective, and 90 mg/L chemical oxygen demand objective. Site specific objective for Reach 2 of San Diego Creek are 720 mg/L total dissolved solids objective and 5 mg/L total inorganic nitrogen objective.

TMDLs have been developed for portions of the San Diego Creek and Newport Bay system in order to attain designated beneficial uses. Consequently, discharges into these waterbodies can be expected to comply with the existing TMDLs load allocations. Furthermore, additional TMDLs may be developed in the future to address all causes of impairment. Existing TMDLs for the applicable waterbodies are:

Specific TMDLs:

San Diego Creek Reach 2: none

San Diego Creek Reach 1: Nutrient TMDLs—14 pounds total nitrogen total daily load by Dec 31, 2012

San Diego Creek Overall:

Sediment TMDLs—no more than 28,000 tons per year of sediment shall be discharged to San Diego Creek and its tributaries from open space areas within the watershed, no more than 19,000 tons per year shall be discharged to San Diego Creek and its tributaries from agricultural land, no more than 13,000 tons per year discharged to San Diego Creek and its tributaries from construction sites, and no more than 2,500 tons per year discharged to San Diego Creek and its tributaries from urban areas.

Pesticides/Organics TMDLs—Diazinon 80 ng/L acute, 50 ng/L chronic; chlorpyrifos 20 ng/L acute and 14 ng/L chronic concentrations. Some TMDLs have not yet approved by the RWQCBs or included in the Basin Plan; however, staff recommendations are: Chlordane (4.5 ug/kg sediment dw), Dieldrin (2.85 ug/kg sediment dw), DDT (6.98 ug/kg sediment dw), PCBs (34.1 ug/kg sediment dw), and Toxaphene (0.1 ug/kg sediment dw).

Metals TMDLs—selenium, lead, copper, cadmium, and zinc

Newport Bay:

Nutrient TDMLs—reduce total nitrogen loads by 50 percent by 2012; 15,862 pounds total nitrogen total summer load by Dec 31, 2007; 14,364 pounds total nitrogen total winter load by Dec 31, 2012; and 62,080 pounds of total phosphorous total annual load by Dec 31, 2012.

Sediment TMDLs—no more than 28,000 tons per year of sediment shall be discharged to Newport Bay from open space areas within the watershed, no more than 19,000 tons per year shall be from agricultural land, no more than 13,000 tons per year from construction sites, and no more than 2,500 tons per year discharged from urban areas.

Fecal Coliforms TMDLs—5-sample/30-days Geometric Mean less than 200 organisms per 100 mL and not more than 10 percent of samples exceed 400 organisms per 100 mL for any 30-day period by Dec 30 2013. Monthly Median less than 14 organisms per 100 mL and not more than 10 percent of samples exceed 43 organisms per 100 mL by Dec 30, 2019.

Pesticides and Organics TMDLs—Chlorpyrifos 20 ng/L acute and 9 ng/L chronic concentrations. Some TMDLs have not yet approved by the RWQCBs or included in the Basin Plan; however, staff recommendations are: Chlordane 248.01 g/year, Dieldrin 208.38 g/year, DDT 327.15 g/year, PCBs 256.7 g/year, and Toxaphene 7.27 grams per year.

Metals TMDLs—selenium, lead, copper, cadmium, and zinc

Beneficial uses for Aliso Creek are agriculture, non-contact recreation, warm water aquatic life support, and wildlife habitat. Contact recreation is listed as a potential beneficial use. Site specific water quality objectives for the Laguna Hydrologic Area, to which Aliso Creek is a part of, are 1,000 mg/L total dissolved solids, 400 mg/L chloride, 500 mg/L sulphate, 60 percent sodium, 0.3 mg/L iron, 0.05 mg/L manganese, 0.75 mg/L boron, and 20 NTU turbidity. See San Diego Region Basin Plan Table 3.2 for other substances including nitrogen and phosphorous. TMDLs have not yet been established for Aliso Creek, however, it is listed as impaired by bacteria indicators, phosphorous, and toxicity. It can be expected that future TMDLs would be developed for these parameters.

RWQCB Directive 13225

On March 2, 2001 the Executive Officer of the San Diego RWQCB issued a Directive pursuant to CWC Section 13225 for an investigation of urban runoff in the Aliso Creek watershed. This Directive was issued in response to data showing urban runoff may be a source of bacteria impairment and because implementation of the proposed countywide Drainage Area Management Plan would be inadequate to correct this impairment. This Directive required the County of Orange and the Cities within the watershed to conduct weekly monitoring at the largest storm drain outfalls that discharge to Aliso Creek. The Regional Board affirmed the issuance of the Directive in May 2001, requiring additional monitoring locations. The Directive monitoring has been conducted weekly since April 2001 at 39 storm drain outfalls, but the data produced has been inconclusive.

NPDES Permits

The National Pollution Discharge Elimination System (NPDES) permit system was established in the CWA to regulate both point source discharges (a municipal or industrial discharge at a specific location or pipe) and nonpoint source discharges (diffuse runoff of water from adjacent land uses) to surface waters of the United States. As defined in the federal regulations, nonpoint sources are generally exempt from federal NPDES permit program requirements, with two exceptions: (1) nonpoint source discharges

caused by general construction activities of over one acre; and (2) stormwater discharges in municipal stormwater systems either as part of a combined system or as a separate system in which runoff is carried through a developed conveyance system to specific discharge locations.

Point Source Discharges. For point source discharges, each NPDES permit contains limits on allowable concentrations and mass emissions of pollutants contained in the discharge through the establishment of Waste Discharge Requirements. The project sites are not considered point source discharger for regulatory purposes.

Nonpoint Source Discharges Caused by General Construction and Operational Activities. For nonpoint source discharges, the NPDES program establishes a comprehensive stormwater quality program to manage urban stormwater and minimize pollution of the environment to the maximum extent practicable. The NPDES program consists of (1) characterizing receiving water quality, (2) identifying harmful constituents, (3) targeting potential sources of pollutants, and (4) implementing a Comprehensive Stormwater Management Program.

The reduction of pollutants in urban stormwater discharge to the maximum extent practicable through the use of structural and nonstructural Best Management Practices (BMPs) is one of the primary objectives of the water quality regulations. The EPA implemented the NPDES stormwater program in two phases.

NPDES Phase I (Large MS4 Municipal Stormwater Permits and the General Construction Activity Stormwater Permit)

Phase I addressed large dischargers and construction activities that affect 5 acres or greater, while Phase II, which was implemented in 1999, addressed smaller dischargers and construction activities that affect one or more acres. The Proposed Project is regulated under the NPDES Phase I Municipal Stormwater Permits issued by the Santa Ana and San Diego RWQCBs to Orange County (Order No. R8-2002-0010 and R9-2002-0001, and NPDES Permit Nos. CAS618030 and CAS0108740, respectively) and the SWRCB Order No. 99-08-DWQ (1999) for stormwater discharges and urban runoff.

Under Phase I of the NPDES program for large discharges, each permittee must implement a Stormwater Management Program that addresses six minimum control measures associated with construction and operational activities, including (1) public education and outreach; (2) public participation/involvement; (3) illicit discharge detection and elimination; (4) construction site stormwater runoff control for sites greater than one acre; (5) post-construction stormwater management in new development and redevelopment; and (6) pollution prevention/good housekeeping for municipal operations. These control measures will typically be addressed by developing BMPs.

Typical operation BMPs include, but are not necessarily limited to, controlling roadway and parking lot contaminants by installing oil and grease separators at storm drain inlets, cleaning parking lots on a regular basis, incorporating peak-flow reduction and infiltration features (such as grass swales, infiltration trenches, and grass filter strips) into landscaping, and implementing educational programs.

BMPs are intended to reduce impacts to the Maximum Extent Practicable (MEP), which is standard created by Congress to allow regulators the flexibility necessary to tailor programs to the site-specific nature of municipal stormwater discharges. Regulations do not define a single MEP standard, but reducing impacts to the MEP generally relies on BMPs that emphasize pollution prevention and source control, with additional structural controls, as needed.

Construction activity subject to the NPDES General Permit includes clearing, grading, and disturbances to the ground, such as stockpiling or excavation that results in soil disturbances of at least one or more acres (Phase 1) of total land area. Construction activity that results in soil disturbances of less than one acre is subject to this General Construction Permit if the construction activity is part of a larger common plan of development that encompasses one or more acres of soil disturbance, or if there is significant water quality impairment resulting from the activity. The SWRCB permits all regulated construction activities under Order No. 99-08-DWQ (1999). This Order requires that prior to beginning any construction activities, the permit applicant must obtain coverage under the General Construction Permit by preparing and submitting a Notice of Intent (NOI) and appropriate fee to the SWRCB. Additionally, coverage will not occur until an adequate Stormwater Pollution Prevention Plan (SWPPP) has been prepared. A separate NOI shall be submitted to the SWRCB for each construction site. Dischargers are also required to inspect construction sites before and after storms to identify stormwater discharge from construction activity, and to identify and implement controls where necessary.

Typical construction BMPs include, but are not necessarily limited to, scheduling or limiting activities to certain times of year; prohibiting certain construction practices; implementing equipment maintenance schedules and procedures; implementing a monitoring program; other management practices to prevent or reduce pollution, such as using temporary mulching, seeding, or other suitable stabilization measures to protect uncovered soils; storing materials and equipment to ensure that spills or leaks do not enter the storm drain system or surface waters; developing and implementing a spill prevention and cleanup plan; installing traps, filters, or other devices at drop inlets to prevent contaminants from entering storm drains; and using barriers, such as straw bales or plastic, to minimize the amount of uncontrolled runoff that could enter drains or surface water.

Because construction of the Proposed Project would cumulatively disturb more than one acre, all improvements, development, and redevelopment activities would be subject to these permit requirements. The City does not have any additional regulations or requirements for implementing the NPDES Program.

Required elements of a SWPPP include (1) site description addressing the elements and characteristics specific to the site; (2) descriptions of BMPs for erosion and sediment controls; (3) BMPs for construction waste handling and disposal; (4) implementation of approved local plans; (5) proposed post-construction controls, including a description of local post-construction erosion and sediment control requirements; and (6) nonstormwater management.

Small, linear project construction activities are regulated under Order No. 2003-0007-DWQ, Small Linear Underground Projects (LUP) General Permit, and NPDES General Permit No. CAS000005 Waste Discharge Requirements (WDRs) for Discharges of Stormwater Runoff Associated with Small Linear

Underground/Overhead Construction Projects. Projects associated with private and municipal development to provide service to new development or redevelopment projects that are owned or operated by private parties or municipal or other public agencies are subject to coverage under this Small LUP General Permit. These types of projects include the following:

a. Linear Underground/Overhead Projects associated with pre-development activities. These are construction activities associated with small LUPs conducted by a discharger or its authorized representative to remove and/or relocate lines and facilities prior to the start of construction for new development and redevelopment projects that are owned or operated by third parties or municipal agencies.

b. Linear Underground/Overhead Projects associated with new development. These involve construction activities associated with small LUPs by dischargers or their authorized representatives to provide service to new development projects that are owned or operated by third parties or municipal agencies. Construction activities covered under this permit include on-site construction activities, off-site construction required to bring service up to the site boundary, and the relocation of lines or conversion of facilities from overhead to underground for a redevelopment project.

For Small LUPs associated with pre-development and pre-redevelopment construction activities, the discharger or its representative must seek coverage under this Small LUP General Permit for its pre-development, pre-redevelopment construction, new development, and redevelopment construction projects where the total disturbed land area of these construction activities is greater than one acre but is less than five acres. Coverage under the Small LUP General Permit is not required where the Small LUP construction activities are covered by another NPDES permit (e.g., where the NOI and SWPPP of the owner or operator of a new or redevelopment site includes the small LUP activities). Dischargers or their representatives who seek coverage under this General Permit for Small LUPs are required to:

1. Develop and implement an SWPPP that specifies BMPs to control and reduce discharges of pollutants associated with construction in stormwater runoff into storm drains and receiving waters.
2. Eliminate or reduce nonstormwater discharges to storm sewer systems and waters of the United States.
3. Monitor the construction site to ensure all BMPs are implemented, maintained, and effective.

Portions of the Proposed Project may include activities associated with linear underground utility realignment, replacement, or construction that may occur on or off site, such as telephone lines, sewer lines, water lines, gas lines, or electrical lines. If not included in the NOI for the overall project, these activities would be regulated under the Small LUP General Permit.

Permit requirements; such as NOI submittal requirements, minimum SWPPP elements, and the amount and degree of monitoring vary depending on the complexity of the Small LUP.

NPDES Phase II

New NPDES Phase II stormwater regulations were finalized and issued by the EPA in January 2000 in an effort to continue to preserve, protect, and improve the nation's water resources from polluted

stormwater runoff. These new regulations are designed to implement programs to control urban stormwater runoff from additional MS4s in urbanized areas and the operations of small construction sites (one acre or more of disturbance) that were not already covered by Phase I NPDES permits. The main objectives of the Phase II regulations are to reduce the amount of pollutants being discharged to the maximum extent practicable and protect the quality of the receiving waters. Stormwater discharge activities for the Proposed Project are regulated under NPDES Phase I, and since construction will disturb more than five acres, NPDES Phase II regulations are not pertinent.

Construction Dewatering

Clean or relatively pollutant-free non-stormwater construction-generated wastewater that poses little or no threat to water quality may be discharged directly to surface water under certain conditions pursuant to the SARWQCB's General Waste Discharge Requirements for Short-Term Groundwater-Related Discharges and De Minimus Wastewater Discharges to Surface Waters within the San Diego Creek/Newport Bay Watershed. Order No. R8-2004-0021 (NPDES No. CAG998002) for drainage within the Santa Ana Region. Permit conditions for the discharge of these types of wastewaters to surface water are specified in this Order. Discharges may be covered by the permit provided either (1) they are one year or less in duration, or (2) the discharge does not pose a threat to water quality, generally because it is de minimus in nature. Construction dewatering, well development water, pump/well testing, and miscellaneous dewatering/Low-threat discharges are among the types of discharges that may be covered by the permit. The general permit also specifies standards for testing, monitoring and reporting, receiving water limitations, and discharge prohibitions. Construction dewatering in the San Diego Region would be covered under the General Waste Discharge Requirements Groundwater Extraction Waste Discharges from Construction, Remediation, and Permanent Groundwater Extraction Projects to Surface Waters within the San Diego Region Except for San Diego Bay (Order No. 2001-96, NPDES AG919002).

General Waste Discharge Requirements

The General Waste Discharge Requirements for Dredged or Fill Discharges to Waters Deemed by the U.S. Army Corps of Engineers to be outside of federal jurisdiction was adopted by the SWRCB on May 4, 2004. In this order, the SWRCB adopted General Waste Discharge Requirements (General WDRs) for some discharges of dredged or fill materials to waters outside federal CWA regulations. To be eligible for the General WDRs, the discharge must be to a water body deemed by the U.S. Army Corps of Engineers to be outside of its jurisdiction for the issuance of federal *Clean Water Act* Section 404 permits. The General WDRs require dischargers to prepare and implement mitigation plans. The mitigation plans must demonstrate how the dischargers will sequentially avoid, minimize, and compensate for adverse impacts on water bodies, including wetlands, that receive the dredged or fill materials.

Safe Drinking Water Act

The SDWA and subsequent amendments authorize the Environmental Protection Agency (EPA) to set health-based standards (maximum contaminant levels or MCLs) for drinking water to protect public health against both naturally-occurring and man-made contaminants. EPA administers the SDWA at the federal level and establishes MCLs for bacteriological, inorganic, organic, and radiological constituents

(United States Code Title 42, and Code of Federal Regulations Title 40). California administers and enforces the drinking water program and has adopted its own SDWA, which incorporates the federal SDWA requirements including some requirements specific only to California (California Health and Safety Code Section 116350 and related sections).

The California Office of Environmental Health Hazard Assessment (OEHHA) is initiating evaluation for several chemicals for which new MCLs have been promulgated by U.S. EPA, which triggers a requirement that OEHHA prepare a Public Health Goal (PHG) designed to define the level of pollutant at which no adverse health effect is expected to occur. PHGs are concentrations of chemicals in drinking water that are not anticipated to produce adverse health effects following long-term exposures. These goals are advisory but must be used as the health basis to update the state's primary drinking water standards (MCLs) by the California Department of Health Services (DHS) (Health and Safety Code Section 116365(b)(1).`In addition, re-review, as required by Health and Safety Code Section 116365(e)(1), is being initiated for chemicals for which initial PHGs were published in 1997 and 1999. Risk assessments are being initiated for the chemicals listed below that are newly regulated:

- Bromate
- Chlorite
- Haloacetic acids
- Nitrosodimethylamine (NDMA)

A list of all public health goals can be found at: http://www.oehha.ca.gov/water/phg/allphgs.html

Regional

Orange County Stormwater Program 2003 Drainage Area Management Plan (DAMP)

The DAMP satisfies NPDES permit conditions for creating and implementing an Urban Runoff Management Program (URMP) to reduce pollutant discharges to the maximum extent practicable (MEP) for protection of receiving water body water quality and support of designated beneficial uses. This DAMP contains guidance on both structural and nonstructural best management practices (BMPs) for meeting these goals.

Priority projects as defined in the DAMP generally include residential development of 10 units or more, commercial and industrial development greater than 100,000 sf, including parking area, automotive repair shops, restaurants of greater than 5,000 sf land area, hillside development greater than 5,000 sf for the San Diego Region, hillside developments on 10,000 sf or more located on areas with known erosive soil conditions or where natural slope is 25 percent or more for the Santa Ana Region, impervious surface of 2,500 sf or more located within, directly adjacent to (within 200 feet), or discharging directly to receiving waters within Environmentally Sensitive Areas (ESAs), parking lots 5,000 sf or more, or with 15 parking spaces or more, and potentially exposed to urban stormwater runoff, streets, roads, highways, and freeways, which would create a new paved surface that is 5,000 sf or greater (San Diego Region), and all significant redevelopment projects where significant redevelopment is defined as the addition of 5,000 or more sf of impervious surface on an already developed site (Santa Ana Region).

The Land-Use Planning for New Development and Redevelopment Component of the DAMP requires that each co-permittee shall minimize the short and long-term impacts on receiving water quality from new development and redevelopment. Each co-permittee's General Plan or equivalent plan (e.g., Comprehensive, Master, or Community Plan) shall include water quality and watershed protection principles and policies to direct land use decisions and require implementation of consistent water quality protection measures for development projects. It should be noted that the Lake Forest Local Implementation Plan takes precedence over DAMP requirements.

Environmentally Sensitive Areas (ESA)

Aliso Creek is a 303d-listed ESA. Part of San Diego Creek is also an ESA with impaired 303d status; however, the ESA designation for San Diego Creek stops at the Lake Forest boundary. If a new development or redevelopment project in Orange County involves the addition of 2,500 square feet or more of impervious surface and is located within, directly adjacent to (within 200 feet), or discharging directly to receiving waters within environmentally sensitive areas, then it qualifies as a priority project and is subject to additional requirements. For the area of Orange County within the Santa Ana Regional Water Quality Control Board jurisdiction of Orange County (area north of El Toro Rd.), the Model WQMP (DAMP Exhibit 7.II) explains the requirements placed upon all new development and significant redevelopment projects. The Model WQMP underwent a lengthy public review process and was approved for implementation by the Executive Officer of the Santa Ana Regional Water Quality Control Board on September 30, 2003. For the area of Orange County within the San Diego Regional Water Quality Control Board jurisdiction of Orange County (area south of El Toro Rd.), each municipality was required by the permit to develop a Local WQMP, based on the Model WQMP, to oversee new development and significant redevelopment within their local jurisdiction. These Local WQMPs were finalized for implementation on August 13, 2003. The Local WQMP may vary slightly from city to city.

Orange County Water District Groundwater Management Plan (OCWD Plan)

In 1974, the District proposed a Basin-wide groundwater quality monitoring program, on behalf of Basin Producers, to satisfy the drinking water testing requirements specified in the federal *Safe Drinking Water Act* (SDWA). The OCWD Plan also addresses the requirements of Senate Bill 1938, passed in 2002, which includes a list of issues to be addressed to ensure compliance of groundwater management plans with the California Water Code. Any specific projects that may be developed as a result of recommendations in the Plan would be reviewed and approved by the District's Board of Directors and processed for environmental review prior to project implementation. The OCWD Plan does not commit the District to a particular program or level of Basin production, but describes the factors to consider and key issues as the Board makes Basin management decisions on a regular basis each year. Potential projects that are conceptually described in the OCWD Plan are described in greater detail in the Long-Term Facilities Plan.

Two major objectives drive the OCWD Plan: protecting and enhancing groundwater quality and cost-effectively protecting and increasing the Basin's sustainable yield. The management program has enabled the Basin to avoid an adjudication process of determining groundwater rights, which is beneficial since adjudications of other groundwater basins have been lengthy, costly, and divisive. A key component of

the management program is to reach consensus with the Producers regarding Basin management issues. The consensus-based approach, coupled with management of Basin production through the BPP and increasing the recharge of water into the Basin, has enabled increased Basin production to meet growing water needs.

Groundwater Production Management

In addition to administering a comprehensive groundwater monitoring program, the District conducts routine monitoring of the SAR and major creeks and surface water bodies in the upper watershed that are tributary to the river. Since the quality of the river may affect groundwater quality and the SAR is the primary source of recharge water, a routine monitoring program is maintained to continually assess ambient river water quality.

Recharge Water Supply Management

Refilling or replenishing the Basin to balance the removal of pumped groundwater is a core activity for OCWD. The District maintains several programs to enhance recharge including 17 major spreading (percolation) facilities. In addition to the percolation system, the District also operates the Talbert Barrier in Fountain Valley and Huntington Beach and participates in financing operation of the Alamitos Barrier in Seal Beach and Long Beach to prevent salt water intrusion. These barriers are formed by injection of water into aquifers near the coast to create a hydraulic barrier against seawater that would otherwise migrate into the aquifers where groundwater is withdrawn inland. The barriers help prevent seawater intrusion and also help refill the Basin. Sources of recharge water include Santa Ana River base flow and storm flow, Santiago Creek flows, imported supplies purchased from the Metropolitan Water District of Southern California (Metropolitan), and purified water from the Groundwater Replenishment (GWR) System (starting in 2007). The SAR is the largest single source of recharge water.

Groundwater Quality Management

The District's multi-faceted water quality management program areas include the following:

- Nitrate management
- Total dissolved solids (TDS) management
- Groundwater contaminant cleanup
- Leaking underground fuel tanks, including the gasoline additive methyl tertiary-butyl ether (MTBE)
- Emerging contaminants, such as endocrine disrupting compounds (EDCs), and pharmaceuticals and personal care products (PPCPs)
- Colored groundwater management
- Close coordination with regulatory agencies
- Drinking water source protection activities
- Land use and development
- Well construction and abandonment programs
- Other related water quality activities

Groundwater Quality Improvement Projects

When authorizing a BEA exemption, the District must provide the replenishment water for the additional production. Cooperative projects include desalters, nitrate removal, removal of volatile organic compounds (VOCs), colored water treatment, iron and manganese removal, and removal of n-nitrosodimethylamine (NDMA).

Historical and Future Water Demands

Review of the District's current water demands and provides an estimate of future water demands – both within OCWD's existing boundary and within possible annexation areas.

Integrated Demand and Supply Management

The District's mechanisms for managing groundwater production include the BPP and the BEA, which are set each year. When setting the BPP, the District evaluates several factors, including the amount of recharge water estimated to be available for the upcoming year and the accumulated overdraft level. Several basin management factors are related to the overdraft level. These factors are considered on an annual basis as the BPP for the upcoming year is determined.

Local

County of Orange Development Codes and Ordinances

Division 1 Stormwater Management and Urban Runoff–County Regulations*

*Cross references: Water quality—Orange County Flood Control District, Title 8.

Water Quality Ordinance (Ord. No. 3987, § 1, 7-22-97)

The purpose of the Water Quality Ordinance is to prescribe regulations as mandated by the *Clean Water Act* [33 USC Sec. 1251 et seq., as amended] to effectively prohibit non-stormwater discharges into the storm sewers and to reduce the discharge of pollutants. (Ord. No. 3987, § 1, 7-22-97)

Article 3. Controls for Water Quality Management—Sec. 4-13-50

New development and significant redevelopment. within the unincorporated area of the county shall be undertaken in accordance with the DAMP, including but not limited to the development project guidance. Prior to the issuance by the county of a grading permit, building permit or nonresidential plumbing permit for any new development or significant redevelopment, the public facilities and resources department and/or planning and development services department shall review the project plans and impose terms, conditions and requirements on the project in accordance with Section 4-13-50(a).

Article 5. Enforcement—Sec. 4-13-71. Nuisance

Any condition in violation of the prohibitions of this ordinance, including but not limited to the maintenance or use of any illicit connection or the occurrence of any prohibited discharge, shall constitute a threat to the public health, safety and welfare, and is declared and deemed a nuisance pursuant to Government Code Section 38771.

City of Lake Forest

City of Lake Forest Ordinances include protection of water resources. Pertinent ordinances are summarized below.

Title 13 Parks and Recreational Facilities

Chapter 13.04 Parks and Recreation Facility Regulations, Section 13.04.032

No person shall swim, fish, bathe, wade, release pet animals in, or pollute the water of any fountain, pond, lake, stream, or reservoir. (Ord. 25 § 2 (part), 1992: Ord. 91-10 § 4 (part), 1991)

Title 14 Streets and Sidewalks

Chapter 14.24 Obstructions, Section 14.24.030

Orange County Code Section 6-1-58 is adopted as follows:

- Sec. 6-1-58. It shall be and is hereby declared unlawful for any person, firm or corporation to run, or to allow to run, upon any highway or right-of-way thereof, any irrigation, waste or other water, provided that such water may be allowed to run upon or in any drain ditch along the side of such highway or right-of-way thereof if the same does not fill or overflow such ditch or run upon or percolate under the base of the paved or traveled portion of such highway. (Code 1961, § 61.023) (Ord. 58 § 2 (part), 1995)

Title 15 Water and Sewers

Chapter 15.14 Stormwater Quality Management

- Section 15.14.040—prohibits discharges of pollutants in stormwater that have not been reduced to the maximum extent practicable.
- Section 15.14.050—for all development, requires development of a stormwater pollution prevention plan in accordance with the state General NPDES Permit; submit a stormwater pollution control plan, prepared in accordance with City Requirements, prior to obtaining a grading or building permit; incorporation of watershed/drainage area specific requirements.
- Section 15.14.060—best management practices and requirements.
- Section 15.14.070—compliance with general NPDES permits.
- Section 15.14.090—Watercourse protection: Every person owning property through which a watercourse passes, or the occupant of such property, shall keep and maintain the property reasonably free of trash, debris, vegetation, and other obstacles that would pollute, contaminate, or significantly retard the flow of water through the watercourse. In addition, all existing structures within or adjacent to the watercourse shall be maintained so that such structures will not become a

hazard to the use, function, or physical integrity of the watercourse. The said owner or occupant shall not remove healthy bank vegetation beyond that actually necessary for said maintenance, nor remove said vegetation in such a manner as to increase the vulnerability of the watercourse to erosion. (Ord. 76 § 2 (part), 1997)

- Section 15.14.100—prohibited acts or requiring a permit including; pollutant discharge into any drainage (e.g., pipe, channel, watercourse), modifying natural flow of water, fill and work within a stream.

Chapter 15.12 Sewage and Solid Waste Disposal

- Section 15.12.010 Construction site sanitation facilities.
- Section 15.12.020 Industrial waste disposal.
- Section 15.12.030 Hazardous materials disclosure.

Title 8 Buildings and Construction

Chapter 8.30 Lake Forest Grading and Excavation Code

- Section 8.30.012—preparation and adoption of a grading manual to assure the water quality requirements relevant to activities subject to this chapter apply to all such activities.
- Section 8.30.032—grading permit required for paving more than 3,000 square feet
- No person shall construct pavement surfacing in excess of three thousand (3,000) square feet, on
- Section 8.30.034 Grading permit--Watercourse alteration.
- No person shall alter an existing watercourse, channel, or revetment by excavating, or placing fill, rock protection, or structural improvements without a valid grading permit unless waived by the Building Official or performed as interim protection under emergency flood-fighting conditions. (Ord. 107 § 1 (part), 1999)
- Section 8.30.050 Permits required.
- Except as exempted in Section 8.30.030, Grading Permits, of this Grading Code, no person shall conduct any grading or clearing, brushing, or grubbing on natural grade or existing grade that is preparatory to grading, without first obtaining a grading permit from the Building Official. A separate permit shall be required for each site and may cover both excavations and fills. (Ord. 107 §1 (part), 1999)
- Section 8.30.054—required reports and information for grading plan
- Section 8.30.058 - soil engineering and engineering geology reports required unless otherwise waived.
- Section 8.30.100—cut restrictions
- Section 8.30.120—setback restrictions
- Section 8.30.130—drainage and terracing restrictions
- Section 8.30.150—erosion control system; stabilize slopes, incorporate use of temporary or permanent devices as necessary during the rainy season, grading amount restrictions during rainy season, debris maintenance, facilities installation and maintenance by qualified personnel, desilting facilities at drainage outlets with minimum capacities and design criteria, revegetation of slopes, and others.
- Section 8.30.152—erosion control plan specifications

Chapter 8.70 Flood Damage Prevention and Floodplain Management

- Section 8.70.025—Methods of reducing flood losses including building and use restrictions

- Section 8.70.210—development permit required before construction or development begins in special flood hazard zones.
- Section 8.70.310—standards of construction for development in special flood hazard areas
- Section 8.70.330—floodways development prohibited unless certification by a registered professional engineer or architect is provided demonstrating that encroachments shall not result in any increase in flood levels during the occurrence of the base flood

Nitrogen and Selenium Management Program

The City is a member of the Working Group for the "Nitrogen and Selenium Management Program" to help address water quality impairments within the watersheds. Participation in this Working Group and development and implementation of the work plan satisfies the SARWQCB requirements for selenium and nitrogen in construction dewatering discharges for the Santa Ana Watershed (Order No. R8-2004-0021).

3.8.4 Methodology

Impacts to surface and groundwater quality were analyzed by reviewing existing groundwater and surface water quality literature that pertains to the plan area, identifying existing on-site ground and surface waters, including the depth to groundwater, and evaluating existing and potential sources of water quality pollutants based on the types of land uses and operational activities that occur or could occur on the plan area. Additionally, the applicability of federal and state regulations, ordinances, and/or standards to surface and groundwater quality of the Project Area and subsequent receiving waters was assessed. Potential impacts from implementation of the Proposed Project were determined by evaluating whether development of the proposed residential and commercial uses as well as the parks and public facilities associated with the Proposed Project would exceed the thresholds of significance outlined below.

Impacts related to surface water runoff, groundwater, and water quality were assessed qualitatively. Potential surface runoff impacts were calculated as a function of the approximate runoff coefficient. Runoff coefficients were assigned to each site according to the methodology prescribed in the Caltrans Hydrology Manual. The County of Orange uses the Rational Method or the Unit Hydrograph method to calculate runoff, based on the size of the watershed. The Hydrology Manual calculations are determined by defining a runoff coefficients based on percent of impervious area and calculating peak runoff rates or volumes based on time of concentration or unit hydrographs for the area. Without a description of infrastructure and drainage paths (e.g., final grades, storm drain slopes and sizes, and others) it is not feasible to calculate peak runoff rates or volumes and their effect on the 100-year flood flows. Furthermore, without quantification of impervious surfaces, the County-specific calculations using the Rational Method determination of runoff are not feasible. Therefore, approximations were made based on the Caltrans Hydrology Manual that allows for assignment of runoff coefficients based on land use categories. Runoff coefficients for various land use categories are based on generalized amounts of impervious surfaces associated with the land use categories. The run-off coefficient basically represents the percent of water that will run off the ground surface during a storm. Values of the coefficient, "C", may be determined for undeveloped and developed areas. Coefficients for undeveloped areas are based on type of terrain, soil infiltration, vegetative cover, and surface storage. For developed areas, coefficients

are based on the type of development that exists for the drainage area, commercial or residential, parks, lawns, and streets.

Runoff coefficients are slightly different between sites for existing conditions due to slightly variable land use, land cover, topography, and soils. It should be noted that some sites drain towards the San Diego Creek Watershed, while others drain towards watercourses in the Aliso Creek Watershed. Consequently, water resources are assessed based on the particular receiving water body, either Aliso Creek or San Diego Creek, as well as the overall impact.

The following table lists the runoff coefficients and areas associated with each site.

Table 3.8-1 Assigned Runoff Coefficients for the Proposed Project

Site	Area (acres)	Runoff Coefficients		
		Existing	General Plan	Proposed Project
1	387	0.38	0.60	0.41
2	243	0.48	0.56	0.32
3	82	0.48	0.66	0.38
4	50	0.48	0.70	0.60
5	13	0.44	0.50	0.30
6	18	0.44	0.25	0.30
7	45	0.46	0.60	0.50
Overall		0.43	0.59	0.40

SOURCE: EIP Associates 2005

Revised Table 3.8-1
Assigned Runoff Coefficients for the Proposed Project

Site	Runoff Coefficient			Watershed*	
	Existing	General Plan	Proposed Project		
1	0.24	0.60	0.23	Borrego Serrano	82% 18%
2	0.48	0.56	0.32	Aliso Serrano	80% 20%
3	0.48	0.66	0.38	Serrano	100%
4	0.48	0.70	0.60	Aliso Serrano	80% 20%
5	0.44	0.50	0.30	Aliso Serrano	50% 50%
6	0.44	0.25	0.30	Serrano	100%
7	0.46	0.60	0.50	Serrano	100%
Watercourse Composite					
Borrego	0.24	0.60	0.23		
Serrano	0.41	0.59	0.33		
Watershed Composite					
San Diego Creek	0.31	0.59	0.28		
Aliso Creek	0.48	0.58	0.37		
Total **	***0.36***	***0.59***	***0.30***		

SOURCE: EIP Associates 2006 and Lake Forest Department of Public Works

* Where the site may drain to more than one watercourse, the estimated percent of area draining to each watercourse is identified.

** The total is a blended coefficient.

Relatively lower post-development runoff coefficients are due, in part, to grading, landscaping, and potential effects of vegetative cover, as well as providing direct conveyances into storm sewer systems. Specific design will also affect drainage, runoff amount, pollutants types and quantities in runoff, peak flow rates, and other parameters. However, the change in runoff coefficient associated with different land use practices can provide an indication of the relative magnitude of change in associated runoff. Runoff is directly proportional to the runoff coefficient.

Consequently, effects of each scenario on annual groundwater recharge can be approximated by the amount of infiltration where:

Infiltration = Annual Precipitation – Annual Runoff – Annual Evapotranspiration

Evapotranspiration is a term used for the amount of water lost to the atmosphere from two different processes. The first process is called evaporation, which occurs when water is lost from surface water bodies or from wet soil. The second process is called transpiration, which occurs when water is lost through the leaves of plants.

If we assume that evapotranspiration is negligible during potential recharge conditions (wet season), then potential recharge would be simply:

Infiltration = Annual Precipitation – Annual Runoff

Annual precipitation in the Project Area is 15 inches. It is reasonable to assume a negligible evapotranspiration factor, since many existing areas have minimal vegetation, developed condition vegetative evapotranspiration would likely be offset by irrigation, and evapotranspiration is generally lower during the wet season when recharge events would be most likely. Elimination of evapotranspiration also provides a 'worst-case' estimate of Proposed Project potential reductions in groundwater recharge.

Impacts on water quality are assessed as function of potential pollutant types, concentrations, and load (effect of flow quantity changes). These are evaluated qualitatively because specific design characteristics and land uses will greatly affect the amount, type, and susceptibility to runoff of potential pollutants.

3.8.5 Thresholds of Significance

The City of Lake Forest has developed thresholds of significance related to water resources. Based on the City's thresholds, the Proposed Project would result in significant impacts related to water resources if they would:

Surface Water and Flooding

- Increase the rate of runoff from a site above the pre-development condition.
- Adversely alter the existing drainage pattern of the site or area, including alteration of the course of a stream or river.
- Raise the 100-year flood water surface level by 1 foot or more.

Groundwater

- Degrade or deplete groundwater resources.
- Adversely change the rate, direction, or flow of groundwater.
- Result in a demonstrable and sustained reduction of groundwater recharge capacity.
- Have an impact on groundwater that is inconsistent with a groundwater management plan prepared by the water agencies with the responsibility for groundwater management.

Water Quality

- Violate water quality standards or waste discharge requirements for the receiving drainages as specified by the RWQCB for the applicable drainage area.
- Result in an increase in any pollutant for which a water body is impaired as identified on the *Clean Water Act* Section 303(d) list.
- Cause a rate of flow that exceeds any downstream facility's capacity.
- Result in runoff that exceeds the pre-developed condition.

3.8.6 Impacts

CEQA requires that the Proposed Project's potential environmental impacts be compared to on-the-ground conditions in the Project Area at the time the Notice of Preparation is issued or at the time the analysis of such impacts is commenced. Such on-the-ground conditions are considered, and often referred to as, the environmental or CEQA "baseline." Thus, the following section analyzes the Proposed Project's potential environmental impacts on baseline conditions. However, it should be noted that the land under consideration for the Proposed Project, while currently undeveloped, would not necessarily remain undeveloped. Most sites within the Project Area are subject to existing development agreements or entitlements and, in the absence of the Proposed Project, would in the future likely be developed with approximately 9.8 million square feet of industrial and commercial space under the existing General Plan. Given this, the analysis of alternatives to the Proposed Project in Chapter 4 of this EIR, under the "No Project/Reasonably Foreseeable Development" alternative, analyzes the potential environmental impacts associated with buildout of the existing General Plan. That analysis includes a comparison of the impacts of buildout of the existing General Plan with the potential environmental impacts of the Proposed Project.

Impact 3.8-1 **The Proposed Project could increase the amount of runoff from some sites compared to existing conditions. The increased runoff could affect downstream facility capacity and may alter the 100-year floodwater surface elevation.**

Significance Level: **Less than significant with mitigation**

Table 3.8-2 shows the percent Proposed Project change, from both existing conditions and the current General Plan, in runoff coefficient for each site. These values provide a relative indication of Proposed Project impact on runoff processes. Higher coefficients will likely mean greater runoff.

The existing landscape consists of fairly steep, poorly-vegetated slopes with low infiltration soils. Consequently, estimations of existing runoff coefficients are fairly high; the potentially affected lands already likely experience a high amount of runoff. Although development of a bare property will often increase the amount of imperviousness (and therefore, increase the potential for runoff), it also requires grade leveling, landscaping, and stormwater quality BMPs. Implementation of these features tends to reduce the amount of stormwater runoff, and in some cases, increase the amount of infiltration, which offset the potential increase in runoff because of more impervious surfaces. Therefore, post-project runoff coefficients are often lower than pre-project runoff coefficients.

The overall volume of runoff from sites 1, 4, and 7 are expected to be greater for the Proposed Project compared to existing conditions, but peak flow runoff is expected to remain the same through implementation of detention basins and other BMPs to avoid substantial increases in peak flow runoff. Overall runoff to the San Diego Creek and Aliso Creek watersheds will likely decrease from current conditions and the current General Plan. On an entire project basis, runoff will decrease when compared to existing conditions.

Higher runoff amounts for individual sites could exceed local conveyance capacities or contribute to localized flooding if not properly addressed by each proposed project. For example, the northern area of Site 1 is within the 100-year flood zone for Borrego Wash; however, runoff from Site 1 is proposed to be

directed to stormwater conveyance facilities that will detain runoff to avoid increases in peak flow runoff and will deposit the water into the Borrego Wash at the southern end of Site 1, thus having no effect on the 100-year flood zone area or flood elevations. Runoff to both the Aliso Creek and San Diego Creek Watersheds would be reduced when compared to existing conditions.

~~Table 3.8-2 Magnitude of Runoff Coefficient Change for the Proposed Project~~

~~Site~~	~~Change in Proposed Plan Runoff Coefficient~~	
	~~Existing Conditions (%)~~	~~General Plan Conditions (%)~~
~~1~~	~~8.9~~	~~-31.0~~
~~2~~	~~-33.5~~	~~-42.7~~
~~3~~	~~-20.8~~	~~-42.4~~
~~4~~	~~25.0~~	~~-14.3~~
~~5~~	~~-31.8~~	~~-40.0~~
~~6~~	~~-31.8~~	~~20.0~~
~~7~~	~~8.7~~	~~-16.7~~
~~To Aliso Creek~~	~~-17.5~~	~~-33.4~~
~~To San Diego Creek~~	~~-5.6~~	~~-33.1~~
~~Overall~~	~~-8.4~~	~~-33.1~~

~~SOURCE: EIP Associates 2005~~

Revised Table 3.8-2
Magnitude of Runoff Coefficient Change for the Proposed Project

Site	Change in Proposed Plan Runoff Coefficient	
	Existing Conditions (%)	General Plan Conditions (%)
1	-4.2	-61.7
2	-33.3	-42.9
3	-20.8	-42.4
4	25.0	-14.3
5	-31.8	-40.0
6	-31.8	20.0
7	8.7	-16.7
Watercourse Composite		
Borrego	-4.2	-61.7
Serrano	-18.2	-43.3
Watershed Composite		
San Diego Creek	-12.2	-53.7
Aliso Creek	-23.6	-37.1
Total	-15.6	-48.7

SOURCE: EIP Associates 2006 and Lake Forest Department of Public Works

If the drainage system is not adequately designed (e.g., concentrated flow paths) implementation of the Proposed Project could result in localized higher peak flow rates even though runoff coefficients (and therefore amounts of runoff) are lower for the Proposed Project compared to existing conditions (Table 3.8-2). Localized increases in flow would only be significant if such increases exceeded system capacity or contributed to bank erosion. However, the Borrego Canyon Wash, San Diego Creek, and Aliso Creek are all designed to completely contain 100-year floodwaters, and the runoff from the Proposed Project would not be expected to increase the surface elevation such that overflow and flooding would occur. Compliance with existing City and County construction and stormwater management codes and the DAMP would reduce any potential impacts. In addition, prior to the issuance of grading permits, each

site developer would be required to submit a site-specific hydrology study to the City for approval. Consequently, local changes in runoff are expected to have a less-than-significant impact on flooding.

The City manages local storm drain facilities and the Orange County Flood Control District (OCFCD) is responsible for regional flood control planning within the County. Provision of stormwater detention facilities as needed would reduce runoff rates and peak flows. With implementation of mitigation measure MM 3.8-1, Proposed Project impacts to downstream flooding would be less than significant.

Impact 3.8-2 **The Proposed Project would not adversely alter an existing drainage pattern or watercourse.**

Significance Level: **Less than significant with mitigation and compliance with statutory requirements**

Grading activities are likely to alter existing drainage patterns and may alter watercourses. Two sites (5 and 6) may have internal drainages that could potentially be filled or otherwise altered. Most of the sites have a rolling to hilly topography, bisected by ephemeral and potentially intermittent watercourses. Additionally, Sites 1, 2, 3, and 7 are adjacent to or contain riparian corridor areas. Development in these areas would likely involve grading and alteration of drainage patterns to minimize stormwater impacts to planned structures and facilities. Existing City ordinances, however, require a grading permit prior to

initiation of construction. Disturbance of watercourse beds or banks and changes in drainage patterns would require prior approval and project requirements that would be identified during the permitting process. MM 3.8-1 will reduce these potential impacts to below significance, as it requires project developers to provide a water quality management plan prior to grading.

Compliance with the existing regulations for the San Diego Creek and Aliso Creek Watersheds would ensure that Proposed Project impacts to drainage patterns are less than significant.

Impact 3.8-3 **The Proposed Project would not have an impact on groundwater that is inconsistent with a groundwater management plan. With compliance with existing regulations, the Proposed Project would not cause or contribute to depletion or degradation of groundwater resources.**

Significance Level: Less than significant with compliance with statutory requirements

Development of the Proposed Project would likely increase demand on water supplies. However, the Irvine Ranch Water District (IRWD, Proposed Project water supplier) has performed a Water Supply Assessment (see Chapter 3.15, Utilities, for details) that shows adequate water resources are available to meet Proposed Project needs without contributing to degradation of the groundwater basin. Approximately 50 percent of the water supplied by the IRWD within the entire district is groundwater; colored groundwater and recycled water is used as a non-potable supply. However, IRWD groundwater supplies to the City of Lake Forest comprise only 5 percent of total water use. The IRWD, Orange County Water District and member agencies aggressively manage groundwater resources to minimize impacts. These agencies may use recycled water, imported water for groundwater storage, spreading grounds for groundwater recharge, injection wells, and conduct monitoring and research programs to further manage groundwater resources. Additionally, existing NPDES stormwater regulations (e.g., construction activities, post construction BMPs, and others) would prevent direct contamination and degradation of groundwater resources. City and County development codes are consistent with the groundwater management plan. No new wells are proposed and no significant impact on groundwater recharge or recharge potential would occur due to the Proposed Project. Additionally, potential groundwater quality degradation will be less than significant, since only a portion of the Proposed Project overlays the groundwater basin and compliance with NPDES General Construction Activity and Industrial Permits, the DAMP, the Groundwater Management Plan, City of Lake Forest Codes, and County of Orange codes will prevent discharges of pollutants to groundwater or landscapes where they may infiltrate to groundwater. Compliance with existing regulations would reduce potential impacts to a less-than-significant level.

Impact 3.8-4 **The Proposed Project would affect water quality of receiving waterbodies and thus would degrade water quality.**

Significance Level: Significant and unavoidable

Water Quality Issues

San Diego Creek is 303(d) listed as impaired by nutrients (nitrogen and phosphorous), sediment, and toxics (pesticides and metals in water and sediment). TMDLs have been developed and approved for nitrogen, phosphorous, sediment, chlorpyriphos, and diazinon. TMDLs for metals and other pesticides have been developed by the US EPA; however, they have not yet been approved by the SWB. Although the Proposed Project would not result in direct discharges to San Diego Creek, it will discharge to Serrano Creek and Borrego Wash, tributaries to San Diego Creek. In order to comply with TMDLs and assure that discharge waters do not contribute to water quality degradation, the following general TMDLs will have to be met areawide:

- Sediment reduction by 50 percent over 10 years
- Reduced nitrogen and phosphorous in summer flow by 2007 of 50 percent, and in non-storm winter flow by 2012.
- Concentrations of chlorpyrifos not exceeding an acute concentration of 18 ng/L or chronic concentration of 12.6 ng/L
- Concentrations of diazinon not exceeding an acute concentration of 72 ng/L or chronic concentration of 45 ng/L

The Aliso Creek Watershed is 303(d) listed as impaired by pathogens, phosphorous, and unknown toxicity. No TMDLs have yet been developed for Aliso Creek.

US EPA promulgated TMDLs for the San Diego Creek Watershed include flow-tiered limits for cadmium, lead, zinc, copper, selenium, other pesticides, and sediment associated toxics.

Pollutant transport in runoff is largely a function of stormwater runoff washing off sediment that has accumulated on land surfaces. More directly connected impervious area will generally result in more surface area for pollutants to accumulate and be available for transport, as well as contribute to greater quantities of runoff. During rainfall, a film of water builds up on impermeable surfaces. Once this film is of sufficient depth (about 0.1 inch), the water collecting on the impermeable surface begins to flow. The initial flow of each storm often contains the highest concentrations of pollutants, but this is not always the case because the phenomenon is dependent on the duration of the preceding dry weather period, rainfall patterns, rainfall intensity, the chemistry of individual pollutants, and other site-specific conditions. Urban contaminants in runoff from the Project Area could lower the quality of stormwater runoff and infiltrating groundwater both during and after construction.

Erosion and sedimentation are major visible water quality impacts attributable to construction activities. Sediment impact on water quality includes interference with photosynthesis, oxygen exchange, and respiration, growth, and reproduction of aquatic species. Other pollutants, such as nutrients, trace metals, and hydrocarbons, can attach to sediment and be transported by it. Implementation of the Proposed Project would include construction activities, such as excavation and trenching for foundations and

utilities, grubbing and clearing, soil compaction and moving, cut and fill activities, and grading that would disturb soil and could decrease permeability. Unprotected disturbed soil is susceptible to high rates of erosion from wind and rain, resulting in sediment transport from the site. Increased runoff from the site resulting from decreased permeability both during and after construction would further exacerbate the amount of sediment transport. Sediment-laden runoff resulting from construction and post-construction operations at the site could enter receiving waters such as Borrego Wash, Serrano Creek, Aliso Creek, and San Diego Creek.

Delivery, handling, and storage of construction materials and wastes, as well as use of construction equipment on site during the construction phase of the project, also introduce a risk for stormwater contamination that could impact water quality. Spills or leaks from heavy equipment and machinery can result in oil and grease contamination of stormwater. Some hydrocarbon compound pollution associated with oil and grease can be toxic to aquatic organisms at low concentrations. Staging areas or building sites can be the source of pollution due to paints, solvents, cleaning agents, and metals contained in the surface of equipment and materials. The impacts associated with metal pollution of stormwater include toxicity to aquatic organisms, bioaccumulation of metals in aquatic animals, and potential contamination of drinking supplies. Gross pollutants such as trash, debris, and organic matter are additional potential pollutants associated with the construction phase of the project. Impacts include health hazards and aquatic ecosystem damage associated with bacteria, viruses, and vectors that can be harbored by gross pollutants.

In the post-construction phase, major sources of pollution in runoff and infiltrating groundwater will be contaminants that have accumulated on the land surface over which stormwater passes. In developed areas, driveways, parking lots, sidewalks, streets, and gutters are often connected directly to storm drains that collect and guide stormwater runoff. Between rainstorms, materials are deposited on these surfaces from debris dropped or scattered by individuals, street sweepings, debris, and other particulate matter washed into roadways from adjacent areas, wastes and dirt from construction and renovation or demolition, fecal droppings from animals, remnants of household refuse dropped during collection or scattered by animals or wind, oil and various residues contributed by automobiles, and fallout of airborne particles.

Pollutants associated with the post-construction phase would include nutrients, oil and grease, metals, organics, pesticides, and gross pollutants. Nutrients that may be contributed to stormwater in the post-construction phase are primarily nitrogen and phosphorous from fertilizers applied to landscaping and organic debris degradation. Excess nutrients can impact water quality by promoting excessive and/or rapid growth of aquatic vegetation; reducing water clarity, and resulting in oxygen depletion. Pesticides also may enter into stormwater after application on landscaping areas of the project. Pesticides impact on water quality because they are toxic to aquatic organisms and some can bioaccumulate in larger species such as birds and fish. Oil and grease may be contributed to stormwater in the post-construction from automobile leaks, car washing, restaurants, and waste oil disposal. Metals may enter stormwater in the post-construction phase as surfaces corrode, decay, or leach. Potential gross pollutants associated with the post-construction phase include clippings from with landscape maintenance, street litter, and animal excrement.

If uncontrolled, the accumulation of urban pollutants could have a detrimental cumulative effect during both the construction and post-construction phases of the project because overland flow from paved surfaces and landscaped areas transport many of the above-mentioned constituents, thereby contributing to the deterioration of the quality of stormwater runoff and infiltrating groundwater. The cumulative result could be the deterioration of water quality in San Diego Creek, Aliso Creek, and Newport Bay.

Construction Phase

Construction of the Proposed Project would include activities with the potential to contribute to water quality degradation. However, prior to obtaining a grading permit, the project proponent would be required to obtain coverage under the existing NPDES General Construction Permit and SARWQCB Orders 93-49 and 96-17, as amended, or SDRWQCB Order No. 2001-96 if construction dewatering is necessary.

The portion of the project that would discharge to the San Diego Creek/Newport Bay Watershed would also be subject to SARWQCB Order R8-2004-0021, which requires compliance with selenium limits (8 μg/L daily max or 4 μg/L monthly average) for construction dewatering activities. Alternatively, membership in a watershed working group or proving in the NOI that the discharge to the surface waters cannot be reasonably avoided, reduced, or eliminated would result in compliance with the selenium provision. The project developer would further be required to develop a plan and schedule for an offset program to ensure no net increase in loading of selenium and to comply with remaining permit requirements. If discharges are in compliance, construction dewatering discharges would be expected to be *de minimus*. For the Proposed Project, the six site developers would be required by MM 3.8-3 to participate in the Nitrogen and Selenium Working Group to be eligible for the *de minimus* permit for construction dewatering discharges.

Prior to the issuance of a grading permit, the project applicants would need to file a Notice of Intent (NOI) with California and comply with the requirements of the NPDES General Construction Permit and *de minimus* permit. This would include the preparation of a SWPPP incorporating BMPs for construction-related control of the Proposed Project site runoff. Requirements include construction sediment and erosion control plans in connection with Proposed Project grading activities. The Erosion Control Plan and permit application information will be reviewed and approved by the City of Lake Forest. The SWPPP should include the following applicable measures:

- Diversion of off-site runoff away from the construction area
- Prompt revegetation of proposed landscaped areas
- Perimeter straw wattles or silt fences and/or temporary basins to trap sediment before it leaves the site
- Regular sprinkling of exposed soils to control dust during construction during the dry season
- Installation of a minor retention basin(s) to alleviate discharge of increased flows
- Specifications for construction waste handling and disposal
- Erosion control measures maintained throughout the construction period
- Preparation of stabilized construction entrances to avoid trucks from imprinting debris on City roadways
- Contained wash out and vehicle maintenance areas
- Training of subcontractors on general construction area house keeping

- Construction scheduling to minimize soil disturbance during the wet weather season
- Regular maintenance and storm event monitoring

It should be noted that the SWPPP is a "live" document and should be kept current by the person responsible for its implementation. Preparation of, and compliance with, a required SWPPP and ECP would effectively prevent Proposed Project construction activity degradation of water quality.

Compliance with City of Lake Forest Grading and Excavation Code and Stormwater Management Code, Stormwater Pollution Prevention Plan (SWPPP), and DAMP would reduce potential construction activity impacts on water quality in San Diego Creek and Aliso Creek to less-than-significant levels and therefore, beneficial uses of Aliso Creek and San Diego Creek, as well as its tributaries, would not be significantly impacted.

Post-Construction Phase

Post-construction water quality impacts are often as much a function of changes in runoff quantity as of quality. As mentioned in Impacts 3.8-1 and 3.8-2 for the Proposed Project, changes in land use and land cover associated with the Proposed Project will not greatly affect stormwater runoff quantities and drainage, and no impact to water quality will occur due to changes in runoff volume or rate. Therefore, potential post-construction changes in water quality will be primarily a function of land use and type of land cover. Compliance with the DAMP and incorporation of water quality BMPs, to the maximum extent practicable (MEP), will result in compliance with general waste discharge requirements and the NPDES permit. However, water quality degradation potential is still possible; practicable BMPs may not be available to sufficiently reduce pollutant concentrations in stormwater.

Generally, changing land use from undeveloped land to residential, mixed uses, and parks (urbanization) would alter the type an amount of likely constituents in runoff water and water infiltrating to the groundwater aquifer. Pesticides and fertilizers associated with agricultural uses are expected to decrease as the area becomes more urbanized with the Proposed Project. Heavy metals and oil and grease concentrations will likely increase, while nutrient concentrations decrease. Furthermore, fecal coliforms and other pathogen indicator concentrations are higher in urban runoff compared to undeveloped runoff.

Meeting NPDES and DAMP requirements include implementation of BMPs (structural and non-structural) best suited to maximized reduction of the pollutants of concern. BMPs listed in the DAMP; California Stormwater Best Management Practices Handbooks; Caltrans Stormwater Quality Handbook: Planning and Design Staff Guide; Manual for Stormwater Management in Washington State; The Maryland Stormwater Design Manual; Florida Development Manual: A Guide to Sound Land and Water Management; Denver Urban Storm Drainage Criteria Manual, Volume 3 – Best Management Practices and Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters, USEPA Report No. EPA-840-B-92-002, are considered "likely to have significant impact" beneficial to water quality for targeted pollutants that are of concern at the site in question. Other BMPs can be used if shown to be better suited to mitigating potential pollutant impacts.

Examples of BMPs that can be used for minimizing the introduction of pollutants of concern generated from site runoff include the following:

- Reduced width sidewalks and landscaped buffer areas between sidewalks and streets

- Minimum required pavement widths for residential streets needed to comply with all zoning and applicable ordinances
- Minimize the number of residential street cul-de-sacs and incorporate landscaped areas to reduce their impervious cover
- Use permeable materials for private sidewalks, driveways, parking lots, or interior roadway surfaces
- Use open space development that incorporates smaller lot sizes
- Reduce building density
- Reduce overall lot imperviousness by promoting alternative driveway surfaces and shared driveways that connect two or more homes together
- Reduce the overall imperviousness associated with parking lots by providing compact car spaces, minimizing stall dimensions, incorporating efficient parking lanes, and using pervious materials in spillover parking areas
- Direct rooftop runoff to pervious areas and avoid routing rooftop runoff to the roadway or the stormwater conveyance system
- Biofilters, including vegetated swales and strips
- Extended/dry detention basins
- Infiltration basin
- Infiltration trenches or vaults
- Wet detention basins/wet ponds
- Constructed wetlands
- Catch basin inserts
- Continuous flow deflection/separation systems
- Storm drain inserts
- Media filtration
- Bioretention facility
- Foundation planting
- Catch basin screens
- Normal flow storage/separation systems
- Clarifiers
- Filtration systems
- Primary waste water treatment systems
- Dry Wells
- Cisterns

Sediment

Control of erosion and sediment transport during the construction phase will effectively mitigate potential sediment impairment of receiving waters by the Proposed Project. Additionally, the existing TMDL requires only a reduction in total existing load (by 50 percent). Incorporation of stormwater detention, minimization of directly-connected impervious area, implementation of a construction SWPPP and post-construction BMPs, all activities required for compliance with existing regulations, would create conditions that would likely reduce potential sediment load to San Diego Creek to the less-than-50-percent level. Compliance with these regulations, as mandated by state and federal water quality laws, would result in less-than-significant sediment-related water quality impacts.

In order to accommodate long-term aggradation/degradation behavior of the Borrego Canyon Wash, the ACOE HEC-6 computer model was used to determine sediment routing within the Project Area. This

model evaluated the unsteady conditions of the channel invert and estimated the response of the channel invert during the passage of the storm hydrograph. The outcome of this analysis determined the need for grade control structures and other channel stabilizing measures that would lead to a long-term equilibrium slope for the channel. The proposed grade control structure would be constructed at the same general location as the existing grade control structure (approximately 400 feet upstream of Irvine Boulevard). The existing grade control structure is proposed to be relocated as a result of grading in the channel to increase the channel capacity at approximately Street Station 154+00 to 156+00. This area in the channel represents a "pinch point" that would be created due to the need for the proposed roadway alignment at Irvine Boulevard. The proposed channel grading would remove an abrupt S-curve in the existing channel alignment. The removal of the curve would increase the channel hydraulic performance and reduce potential bank erosion by reducing the impingement of flows on the channel banks.

In order to complement the project's goal of minimizing the impact on the existing Borrego Canyon Wash, as part of the Proposed Project, an erosion resistant armor[9] would be constructed along the portion of the Borrego Canyon Wash bordering the Shea-Baker Ranch development. The purpose of the armoring is to protect against possible future migration of the wash and to reduce further bank erosion from upstream runoff that enters the Wash north of SR-241. The possibility of further erosion on the Shea/Baker Ranch side of the Borrego Canyon Wash and the amount of erosion that could occur is largely a function of the future migration of the Borrego Canyon Wash. As demonstrated in the Trimble reports, migration of the Wash has occurred and will occur with or without the project due to existing runoff conditions. The Project itself will not contribute significant runoff into the Wash in the Shea/Baker Ranch area of the Wash that has been subject to significant erosion in the past as all Project runoff, including runoff from Alton Parkway through Shea/Baker Ranch will be conveyed to a detention basin that will release runoff into the Wash at the southerly end of the Shea/Baker Ranch property near Commercentre Drive below the area where erosion has occurred in the past.

The erosion resistant armor is proposed to consist of a series of sheet piles that will be placed along the Borrego Canyon Wash outside of federal jurisdictional waters on the Shea-Baker Ranch property. The placement of the sheet piles may, depending upon the exact location, require a Streambed Alteration Agreement under the California Fish and Game Code. A Section 1602 Streambed Alteration Agreement, if required, must be obtained prior to any impacts to State jurisdictional waters.[10] The proposed lining is expected to function properly to stabilize the bank of the Borrego Canyon Wash on the Shea-Baker Ranch side should it be exposed at some point in the future. If exposed in the future, the water flowing down the Borrego Canyon Wash will encounter the armored area and could potentially result in flows being channeled away from the armored side and towards the center of the Wash or the unarmored side, which is fairly protected due to the debris and vegetation that has lodged along that side of the bank. It is not anticipated, however, that sediment production would exceed existing conditions, and as the Trimble reports have demonstrated, erosion in certain segments of the Borrego Canyon Wash would be expected to occur in the future as a result of existing runoff conditions. This would occur with or without the project, and implementation of the project is not anticipated to alter the existing conditions, and in fact may improve conditions by diverting uncontrolled surface runoff to a discharge point where the banks of

[9] During project design, OCFCD will be asked to approve appropriate material(s) for slope and bottom stabilization.
[10] Changes to the 100-year floodplain are expected to occur entirely within the Shea-Baker property.

the Wash are more stable. Therefore, increased flooding and erosion would not be expected. The lining, as well as the slope adjacent to the wash, will be owned and maintained by either a public agency or private association (business or homeowners).

Metals

Potentially higher metals concentrations in developed-area stormwater are likely because of the accumulation of metals on roof tops and roads by atmospheric deposition, leaching from materials exposed to rain (e.g., roofs, metal storage, fences), automotive wear, and industrial/commercial activities. The BMPs listed above would help minimize the runoff of metals in stormwater by providing flow reduction and treatment. In addition, regular street sweeping, as currently exists under the City of Lake Forest maintenance program, could, with appropriate equipment, significantly reduce sediment and associated pollutant build-up and subsequent transport to receiving water bodies. Therefore, urbanization of the Proposed Project area will not contribute a significant amount of metals to either San Diego Creek or Aliso Creek. However, because San Diego Creek is listed as impaired by metals concentrations, and draft TMDLs have been developed for certain pollutants, any increase in quantities above existing conditions could result in a significant impact. Several conventional and proprietary BMPs have been shown to effectively remove metals concentrations from stormwater. Implementation of the DAMP and associated BMPs, such as redirecting rooftop runoff and using biofilters, would reduce potential impacts on metals contamination of water resources to less-than-significant levels.

Chlorpyrifos and Diazinon

Measured concentrations of chlorpyrifos and diazinon in San Diego Creek (at the Campus Station) are approximately 120 ng/L and 848 ng/L, respectively. Therefore, to meet TMDL requirements, existing conditions runoff concentrations will need to be reduced by 90 to 97 percent. Implementation of the Proposed Project will include residential and mixed-use land uses and would remove the current agricultural uses on Sites 1 and 7. This could result in an overall net decrease in the amount of chlorpyrifos and diazinon in runoff water compared to current conditions because these chemicals have been banned for all non-agricultural uses. However, measured concentrations of chlorpyrifos from residential areas in Orange County have ranged from 11.3 to 803 ng/L during dry weather flow and 0 to 270 ng/L during wet weather. Diazinon concentrations ranged from 1159 to 3265 ng/L during dry weather flow and 182.7 to 4327ng/L during wet weather flow (Schiff and Tiefenthaler 2003). These data suggest that even if pesticide concentrations in Proposed Project stormwater are less than existing conditions, TMDL requirements may still be exceeded.

Chlorpyrifos has been banned or phased out from nearly all indoor and outdoor residential uses, and as of 2004, is banned from use in new construction. However, chlorpyrifos may still be used in some professional applications such as the maintenance of road medians. Diazinon was banned for all household retail sales and manufacturing production has been reduced by 50 percent (2003). These reductions in use and manufacturing will contribute towards meeting TMDLs; however, additional BMPs are necessary as indicated by existing measured concentrations in urban runoff. Implementation of the existing DAMP will include structural and non-structural post-construction BMPs, such as through the use of natural landscaping that does not require extensive pesticide use. Unfortunately, the effectiveness

of BMPs regarding pesticide concentration reduction is not well documented. Additionally, selection of BMPs by individual developers or maintenance personnel may not appropriately target reduction in pesticides. Consequently, the potential for continued high levels of these pesticides in runoff water will remain. Implementation of BMPs targeted to reducing pesticides and continued monitoring of program success will be necessary. Implementation of education and training programs to assure appropriate application by professionals, voluntary collection and disposal of individual stores of pesticides, and structural controls may help reduce concentrations of these pollutants in stormwater; however, regardless, implementation of BMPs to the maximum extent practicable may still result in exceedance of these pesticide TMDLs.

To minimize the need for fertilizers and pesticides, minimum-maintenance plant species will be required for all new development landscape elements. This will reduce the potential for nutrient and pesticide transport in stormwater runoff. Species should be identified that are minimum maintenance, but will also protect bare surfaces from erosion and provide a suitable matrix for infiltration of stormwater. Amount, timing of application, and form of many landscape chemicals can affect subsequent transport in stormwater. Application of chemicals prior to a storm event or over-application of chemicals increases their susceptibility to mobilization in runoff water. Surface applications compared to soil incorporated applications will also increase potential for transport in runoff; and, dissolved forms of chemicals are more likely to be mobilized compared to solid forms that may be released over a longer time frame. A nutrient and pesticide management program that includes guidelines, application regulations, applicator training, and encourages minimization of chemical use would minimize the risk of pollutants associated with landscape maintenance practices in runoff waters.

With implementation of mitigation measures MM 3.8-1 through MM 3.8-4, the Proposed Project impacts on water quality would be reduced; however, levels may still remain significant and unavoidable.

Nutrients

Implementation of the Proposed Project could increase nutrient concentrations in stormwater runoff due to landscaping practices and degradation of organic debris on impervious surfaces. Since the majority of the existing condition landscape is primarily undeveloped, raw/bare land, nutrient contributions from existing conditions are likely to be low (with the exception of the nursery site and some agricultural areas). Landscaping and vegetation is encouraged for aesthetic purposes, erosion protection, and reduced stormwater runoff. However, over application or incorrect timing of nutrient and pesticide applications could result in higher amounts of these pollutants in stormwater entering receiving water bodies or the underlying groundwater. Implementation of appropriate BMPs, such as biofilters or a nutrient management program, as well as design guidelines and ordinances encouraging use of native plant species and other minimal maintenance plants in landscaping would reduce potential nutrient impacts from the Proposed Project on San Diego Creek and Aliso Creek can be reduced to less-than-significant levels with incorporation of mitigation measures MM 3.8-1, MM 3.8-2, and MM 3.8-4.

Water quality impacts to both San Diego Creek and Aliso Creek, associated with sediment, metals, and nutrients would be less than significant with the incorporation of mitigation measures. However, water quality impacts related to pesticide use would be significant and unavoidable as discussed above and

attainment of designated beneficial uses for Aliso Creek and San Diego Creek, as well as its tributaries, would not be significantly altered compared to existing conditions.

3.8.7 Mitigation Measures

The following mitigation measures are designed to eliminate or reduce to a level of less than significant those significant impacts to hydrology/water quality resources that are caused by the Proposed Project and that are capable of being feasibly eliminated or reduced to a level of less than significant.

MM 3.8-1 *Prior to approval of a Parcel Map or a Tentative Tract Map (whichever comes first), the applicant shall submit a Water Quality Management Plan (WQMP), including a hydrology study, if appropriate, for review and approval of the City Engineer. The Plan shall include Best Management Practices (BMPs) in accordance with the latest City of Lake Forest Water Quality Management Plan Template User Guide and include stormwater detention/retention features, if necessary, to mitigate impacts of changes in stormwater rates or volumes as identified in the site-specific hydrology study.*

MM 3.8-2 *All City landscape contractors and project developers shall be required, as part of their contract, to submit to the City a landscape design plan including the following elements:*

- *Maximized use of native plant species with minimum water and fertilizer requirements*
- *Watering shall be kept to the minimum necessary to maintain new landscaping*
- *Drip irrigation shall be used only until the native landscaping is established*
- *Minimal use of fertilizers and pesticides*

MM 3.8-3 *Prior to the issuance of a grading permit, the applicant shall be required to join the Nitrogen and Selenium Working Group in order to establish eligibility for the de minimus permit implemented by the Santa Ana Region of the RWQCB.*

MM 3.8-4 *Prior to the issuance of a grading permit, the applicant shall develop and implement appropriate Best Management Practices, such as a nutrient management program, to reduce the amount of nutrients entering the watershed (see San Luis Rey Watershed Urban Runoff Management Program http://www.projectcleanwater.org/html/wurmp_san_luis_rey.html) for an example of a management program that addresses nutrients). In addition, a pesticide management program shall be developed to reduce the amounts of pesticides entering the watershed through minimizing the use of pesticides and emphasizing s non-chemical controls (see the City of San Francisco's Integrated Pest Management Program (http://www.sfgov.org/site/frame.asp?u=http://www.sfwater.org/) for an example). These plans shall be approved by the City prior to issuance of a grading permit.*

MM 3.8-5 *Prior to issuance of a grading permit, the applicant shall conduct a hydrology and hydraulics study to determine potential stormwater runoff rates and peak flows for the City of Lake Forest and County of Orange design storms, as well as the 100-year storm for both existing and Proposed Project conditions. Sufficient detail shall be provided to develop the existing conditions and Proposed Project conditions potential hydrograph and timing of peak flows. Studies shall be completed by a qualified professional and be consistent with standard engineering practices for the region, including the use of the criteria of the Orange County Hydrology Manual. The studies shall demonstrate that the effect of stormwater discharge to any City-, County-, or Other Agency–owned drainage or flood control facility as mitigated shall be designed and implemented to prevent post-construction stormflows from exceeding pre-construction volumes and rates.*

3.8.8 Summary of Impacts

Table 3.8-3 summarizes the potential long-term adverse impacts of the Proposed Project related to hydrology and water quality, and identifies the significance of those impacts after mitigation, if required.

Table 3.8-3 Summary of Impacts

Impact	Threshold	Significance
Surface Water and Flooding		
3.8-1	The Proposed Project could increase the amount of runoff from some sites compared to existing conditions. The increased runoff could affect downstream facility capacity and may alter the 100-year floodwater surface elevation.	Less than Significant with mitigation
3.8-2	The Proposed Project would not adversely alter an existing drainage pattern or watercourse.	Less than significant with mitigation and compliance with statutory requirements
Groundwater		
3.8-3	The Proposed Project would not have an impact on groundwater that is inconsistent with a groundwater management plan. With compliance with existing regulations, the Proposed Project would not cause or contribute to depletion or degradation of groundwater resources.	No impact with compliance with statutory requirements
Water Quality		
3.8-4	The Proposed Project would affect water quality of receiving waterbodies and thus would degrade water quality. This impact is related to pesticide use only. Water quality impacts related to sediment,metals and nutrients were less than significant.	Significant and unavoidable for pesticides

3.8.9 References

Barry J. Hibbs. 2000. *Sources of Nutrients and Selenium in the San Diego Creek Watershed, Orange County, California.* Department of Geological Sciences, California State University Los Angeles. Prepared for Defend the Bay www.greenstart.org/cuerec/DEFENDBA.PDF. Accessed 4/22/2004

California Department of Water Resources. 2005. The National Flood Insurance Program. Webpage: http://www.nd.water.ca.gov/PPAs/FloodplainMgmt/NFIP/ Accessed 5/3/2005.

Irvine Ranch Water District (IRWD). 2005. *2004 Annual Water Quality Report.* www.irwd.com/FreeServices/WQReport2004.pdf. 2004. accessed 4/12/2005

Kirst, John. *Regulators Call on Nature to Fight Pollution. In* Environment NEPAL. www.environmentnepal.com.np/news_d.asp?id+244. Environmental New Network, October 18, 2002. accessed 4/12/2005

Lake Forest, City of. 2000. *El Toro Redevelopment Project Area Design Guidelines Adopted by Ordinance No. 114 on August 15, 2000.*

———. 2001. *City of Lake Forest CEQA Significance Thresholds Guide.* www.city-lakeforest.com/pdf/lake_forest_thresholds_guide.pdf, November.

Office of Environmental Health Hazard Assessment. 2005. *Public Health Goals (PHGs).* http://www.oehha.ca.gov/water/phg. Accessed 3/20/2005

Municipal Water District of Orange County. 2000. 2000 Regional Urban Water Management Plan Updated, Dec. 20, 2000. p 3-5.

Orange, County of. 2005. *Precipitation 2001-2002 El Toro – Sta. 176/207.* www.ocgov.com/pfrd/enres/Rainfall/HydroReports/AcrobateFiles/Precipitation.pdf. Public Facilities and Resources Department 2003. accessed 4/12/2005

Orange County Water District (OCWD). n.d. *Groundwater Contour Maps, Southeast Quadrant of the OCWD, 2000 through 2003.* www.ocwd.com/_html/servarea.htm#Anchor-GROUNDWATER-47857

———. 2005. *Orange County Water District. Water Districts and Navy Move Ahead with El Toro Groundwater Cleanup and Water SUPP Project.* June 2001. OCWD Online – Press Release: El Toro Groundwater Cleanup Moves Ahead. www.ocwd.com/_html/_pr/_pr01/pr_010607_desalter.htm accessed 4/12/2005

Orange County Watershed and Coastal Resources Division (OCWCRD). 2005. *Alert System – Orange County Point Precipitation Return Frequency Data.* http://www.ocgov.com/pfrd/envres/Rainfall/alert_PPD.asp

———. *San Diego Creek/Newport Bay Nutrient TMDL.* www.ocwatersheds.com/watersheds/tmdls_nutrient_intro.asp. Accessed 4/12/2005

———. 2005. *San Diego Creek Watershed – Reports and Studies – Reconnaissance Report.* www.ocwatersheds.com/watersheds/sandiego_reports_studies_reconnaissance.asp. Accessed 4/12/2005

———. 2005. *San Diego Creek/Newport Bay Sediment TMDL.* www.ocwatersheds.com/watersheds/tmdls_sediment_intro.asp. Accessed 4/12/2005

———. 2005. *San Diego Creek/Newport Bay Toxics TMDL..* www.ocwatersheds.com/watersheds/tmdls_toxics_intro.asp. Accessed 4/12/2005

San Diego Regional Water Quality Control Board. 2004. *Executive Officer Summary Report Item: 6, Subject: NPDES Permit Revision: South Orange County Wastewater Authority, Irvine Ranch Desalter Project, Orange County (Tentative Addendum No. 3 to Order No. 2001-08, NPDES Permit No. CA0107611).* www.waterboards.ca.gov/sandiego/rb9board/Dec-04/item%206/EOSR%20Dec%208%20Item%206.pdf, December 8.

Santa Ana Regional Water Board. 2005. *Appendix D: Diazinon and Chlorpyrifos TMDL Basin Plan Amendment, April 4, 2003.* www.swrcb.ca.gov/rwqcb8/pdf/tmdl/appendixd.pdf. Accessed 4/12/2005

Schiff, K.C. and L.L. Tiefenthaler. *Contributions of Organophosphorous Pesticides From Residential Land Use During Dry and Wet Weather*. Southern California Coastal Water Research Group. Technical Report 406, June 2003. Prepared for Orange County.

SWRCB. *Appendix D: Attachment to Resolution No. R8-2003-039 Amendment to the Santa Ana Region Basin Plan.* Swrcba.gov/rwqcb8/pdf/tmdl/appendix.pdf. Accessed 4/15/2005.

Trimble, Staley W. *Recent Erosion in the Baker Ranch Gully, Borrego Canyon Wash, Orange Co., CA.* August 17, 2005.

Trimble, Stanley W. *Channel Modifications, Urbanization, and Channel Instability in the Borrego Canyon Wash, Orange County, CA.* November 2004.

Trimble, Stanley W. *Field Research Report for San Diego Creek Channel Study.* Spring 2001.

Trimble, Stanley W. *Field Research Report for San Diego Creek Channel Study.* Fall 1998.

Trimble, Stanley W. *Field Research Report for San Diego Creek Channel Study.* Fall 1997.

Trimble, Stanley W. *Field Research Report, Spring 1993: Rates of Channel Erosion in San Diego Creek Basin 1983-1993.*

Trimble, Stanley W. *Field Research Report for San Diego Creek Channel Study.* Spring 1992.

Trimble, Stanley W. *Field Research Report for San Diego Creek Channel Study.* Fall 1991.

Trimble, Stanley W. *Field Research Report for San Diego Creek Channel Study.* Fall 1989.

U.S. Army Corps of Engineers (USACE). 2004. Los Angeles District Watershed Planning Section. *Serrano Creek Corridor Ecosystem Restoration Project Planning Reconnaissance Section 905(b) Report US Army Corps of Engineers*, January.

_____. 2004. San Diego Creek SAMP. http://www.spl.usace.army.mil/samp/sandiegocreeksamp.htm Accessed 5/2/2005

U.S. Environmental Protection Agency (USEPA). 2005. *U.S. EPA 305(b) Lists/Assessment Unit Information for Year 2002: Aliso Creek.* April, 2005 www.oaspub.epa.gov/pls/tmdl/enviro_v2.wcontrol. Accessed 4/12/2005

———. Region 9. 2005. *Total Maximum Daily Loads for Toxic pollutants, San Diego Creek and Newport Bay, California Established June 14, 2002.* http://www.epa.gov/region09/water/tmdl/final.html

U.S. Navy. 2004. *Environmental Baseline Study for Former Marine Corps Air Station El Toro.*

Western Regional Climate Data Center. *Tustin Irvine Ranch, California (049087) Monthly Total Precipitation.* March 2005. www.wrcc.dri.edu/cgi-bin/cliMONtpre.pl?catust. Accessed 4/12/2005

Wilt, G. *Sleuthing MTBE with Statistical Data. Lawrence Livermore National Laboratory.* June 1999. http://www.netl.doe.gov/scngo/Petroleum/publications/newsletters/eoe/Jun99/page5.html, Accessed May 4, 2005.