
5. Environmental Analysis

5.5 HYDROLOGY AND WATER QUALITY

This section evaluates the potential impacts of the Modified Project on hydrology and water quality. Where necessary, appropriate mitigation measures and/or standard conditions are also discussed. The analysis in this section is based, in part, upon the following sources:

- *Compliance Report for PA 51 and 30 Watershed Updated Marshburn Channel, Bee Canyon Channel, Agua Chinon Channel, and Borrego Canyon Channel*, RBF Consulting, March 2011.
- *2011 Project Water Quality Update To Support The Supplemental Environmental Impact Report (SEIR) for the Great Park Neighborhoods Project*, ENGEO Incorporated, March 2011.
- *Conceptual Project Water Quality Management Plan (WQMP), Updating the Integrated Master Plan of Drainage, Water Quality and Habitat Mitigation, Orange County Great Park Neighborhoods*, RBF Consulting, April 20, 2009.
- *Preliminary Water Quality Management Plan (WQMP) – Development District 1 South – PA 51, Amended Vesting Tentative Tract Map No. 17368*, Hunsaker and Associates Irvine, Inc., January 4, 2011.
- *Preliminary Water Quality Management Plan (WQMP) – Development District 1 North – PA 51, Amended Vesting Tentative Tract Map No. 17283*, Hunsaker and Associates Irvine, Inc., January 5, 2011.
- *Preliminary Water Quality Management Plan (WQMP) – Development District 4 – PA 51, Amended Vesting Tentative Tract Map No. 17366*, Hunsaker and Associates Irvine, Inc., January 5, 2011.
- *Preliminary Water Quality Management Plan (WQMP) – Development District 8 – PA 51, Amended Vesting Tentative Tract Map No. 17364*, Hunsaker and Associates Irvine, Inc., January 5, 2011.
- *Preliminary Water Quality Management Plan (WQMP) - Great Park Neighborhoods - District 7, Tentative Tract Map No. 17202*, RBF Consulting, January 10, 2011.

These studies have been included in their entirety in Appendices I and J of this DSEIR.

5.5.1 Hydrology

5.5.1.1 Environmental Setting

Regulatory Framework

As was true for the Approved Project, the Orange County Hydrology Manual, dated 1986 governs the procedure used to analyze surface water conveyance for the Modified Project.

Applicable Plans and Programs- Existing Plans, Programs, and Policies

The following measures are existing plans, programs, or policies (“PPPs”) that apply to the both the Approved Project and the Modified Project and will help to reduce and avoid potential impacts related to hydrology.

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- PPP 4-1 Prior to the issuance of precise grading permits, the applicant shall submit a hydrology and hydraulic analysis of the entire site. The analysis shall be prepared by a professional civil engineer versed in flood control analysis and shall include the following information and analysis (Standard Condition A.6):
- a. Hydrology/hydraulic analysis of 100-year surface water elevation at the project site to determine building elevation or flood proofing elevation.
 - b. Analysis of existing and postdevelopment peak 100-year storm flow rates, including mitigation measures to reduce peak flows to existing conditions.
 - c. An analysis demonstrating that the volume of water ponded on the site and stored underground in the drainage system outside of the building envelope in the proposed condition is greater than or equal to the corresponding volume in the existing condition. The water surface used to determine the ponded volume shall be based on the water surface in the major flood control facility that the site is tributary to.

Approved Project

The Approved Project includes Mitigation Measure H/WQ3 which requires that, prior to approval of the first tentative tract or parcel map for the Proposed Project Site, detailed hydrologic and hydraulic analyses be conducted in accordance with Orange County Flood Control District (“OCFCD”) methodologies and standards and the Flood Control Master Plan for San Diego Creek, as well as any additional guidelines in effect at the time of project design. To comply with that mitigation measure, the following updates to the Flood Control Master Plan for San Diego Creek (collectively, “Master Plans”) were completed. Copies of these Master Plans are available for review at the City of Irvine Public Works Department located at 1 Civic Center Plaza in Irvine.

- Update to the San Diego Creek Master Plan- Planning Area 51/30 for Bee Canyon, Agua Chinon, Borrego, Serrano and Upper San Diego Creek”- approved by the County of Orange and City of Irvine, November 2008.
- “Planning Area 51 Marshburn Watershed Update” – approved by the County of Orange and City of Irvine, November 2008.

These Master Plans were prepared in accordance with the County of Orange methodologies and standards, and the Peak Flow rates at Hydrologic Nodes along the existing downstream regional facilities and San Diego Creek were compared to the values established by the Flood Control Master Plan for San Diego Creek. The County Of Orange approved the methodology and accepted Peak Runoff rates established by the Master Plans. As part of this County approval, the City of Irvine completed a review of the Master Plans and found the Master Plans to be consistent with the Certified EIR. Copies of those reports are on file with the City of Irvine and available for inspection at the Irvine Public Works Department, located at the City of Irvine Civic Center during normal business hours.

The Master Plans merely refine the drainage control components for the Proposed Project Site. The on-site channels will continue to drain the Proposed Project Site as under existing conditions. The Master Plans incorporate into the Approved Project the additional backbone storm drain facilities needed to accommodate the changes in surface runoff caused by development of the Approved Project.

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The Master Plans identify the Tributary Runoff Area for each drainage channel system. In addition, the Master Plans identify the Average Land Use, drainage patterns and backbone storm drain system for the Approved Project. By using the Average Land Use (created by the zoning designations for the Proposed Project Site) and drainage patterns, Peak Flow Rates were identified at specific downstream locations, referred to as Hydrologic Nodes. See Table 5.5-1 for the relevant locations.

The Master Plans establish Peak Flow rates at these Hydrologic Nodes and compare those values to the flow rates that were used as the basis of the design for the existing regional drainage facilities. Peak Flow rates at these locations were acceptable to the OCFCD and the City of Irvine and were approved as part of the Master Plans. The additional backbone storm drain facilities included in the Master Plans demonstrate that development of the Approved Project will have less than significant impacts on hydrology.

*Table 5.5-1
Hydrologic Nodes*

<i>Master Plan Node</i>	<i>Tributary Watershed</i>	<i>Location</i>
95	Marshburn Channel (F16)	Trabuco Road and Marshburn Channel
96	Marshburn Channel (F16)	Marine Way and Marshburn Channel
97	Marshburn Channel (F16)	I-5 and Marshburn Channel
614	Bee Canyon Channel (F17)	OCTA/Metrolink Railway and Bee Canyon Channel
CP3B	Agua Chinon Channel (F18)	OCTA/Metrolink Railway and Agua Chinon Channel
CP4B	Borrego Canyon Channel (F20)	Upstream of Confluence with Agua Chinon Channel
421	Agua Chinon Channel (F18)	Agua Chinon/Borrego Channel Confluence

“Compliance Report for PA 51 and 30 Watershed Updated Marshburn Channel, Bee Canyon Channel, Agua Chinon Channel, and Borrego Canyon Channel – Dated March 10th, 2011” - By RBF Consulting

5.5.1.2 Thresholds of Significance

Based on Appendix G of the CEQA Guidelines, the City of Irvine has determined that a project would normally have a significant effect on the environment if the project would:

- HYD-4 Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site.
- HYD-5 Create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff.
- HYD-7 Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map.
- HYD-8 Place within a 100-year flood hazard area structures which would impede or redirect flood flows.
- HYD-9 Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam.
- HYD-10 Be subject to inundation by seiche, tsunami, or mudflow.

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Chapter 8, *Impacts Found Not to Be Significant*, of this DSEIR substantiates that impacts associated with the following potential impacts would be less than significant:

- Potential Impacts HYD-9 and HYD-10

Those impacts will not be addressed in the following analysis. For analysis of the Modified Project with respect to Potential Impacts HYD-1, HYD-3, HYD-5, and HYD-6, see Subsection 5.5.2, *Water Quality*, below. For analysis of the Modified Project under Potential Impact HYD-2, see Subsection 5.12.1, *Water Supply*, in Section 5.12, *Utilities and Service Systems*, of this DSEIR.

5.5.1.3 Environmental Impacts of the Modified Project

The following impact analysis addresses impacts that the City determined in the Initial Study could be potentially significant impacts of the Modified Project. The applicable potential impacts are identified in brackets after the impact statement.

Methodology

Two methods of hydrologic calculations were used to determine effects of the Modified Project and the design discharges at Hydrologic Nodes. The “rational method” was used to calculate the design discharge for local drainage areas for those watersheds with an area of less than 640 acres (i.e. one square mile), whereas the “unit hydrograph method” was used for those watersheds in excess of 640 acres. Flow rate values studied were derived using unit hydrographs in accordance with the current Orange County Hydrology Manual, dated October 1986. Hydrologic calculations for both methods were done using the 2004 Advanced Engineering Software (“AES”) FLOODSCx.

Modified Project Conditions

The Modified Project proposes modifications to the Approved Project's drainage patterns, land use plan, Area average pervious (“Ap”), and backbone storm drain systems. The effects of these proposed changes were analyzed in the following report, a copy of which is included in Appendix I to this DSEIR:

- “Compliance Report for PA 51 and 30 Watershed Updated Marshburn Channel, Bee Canyon Channel, Agua Chinon Channel, and Borrego Canyon Channel – Dated March 10th, 2011” - By RBF Consulting.

Peak Flow rates for the Modified Project were identified and compared to the values at the relevant Hydrologic Nodes shown in Table 5.5-1 above.

The controlling flow paths of Agua Chinon Channel and Borrego Channel Watersheds would not be changed by the Modified Project; therefore, the only changes to the hydrology created by the Modified Project would be in certain subareas within the Proposed Project Site. The results of the revised Unit Hydrograph Analysis for each Hydrologic Node conducted for the Modified Project have been summarized below in Table 5.5-2. As Table 5.5-2 demonstrates, the updated Peak Flow rates for all watersheds for the Modified Project are less than those values established in the approved Master Plans completed for the Approved Project.

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Marshburn Channel

Although the tributary area and its percent imperviousness increased at all three nodes adjacent to the Proposed Project Site along Marshburn Channel, due to the elongation of the time of concentration (“Tc”), the peak flow rates are lower for the Modified Project than for the Approved Project. Therefore, the Modified Project's proposed modifications to the site plan tributary to the Marshburn Channel Watershed comply with the approved Master Plans for the Approved Project.

*Table 5.5-2
Modified Hydrologic Node Summary*

Node	Tributary Watershed	Tributary Area (Ac)		Peak Flow Rate, Q (cfs)		Average Ap	
		Master Plan	Modified Project	Master Plan	Revised	Master Plan	Revised
95	Marshburn Channel	454	473	1,765	1,706	0.264	0.209
96	Marshburn Channel	863	899	2,524	2,364	0.278	0.232
97	Marshburn Channel	962	993	2,728	2,532	0.260	0.219
614	Bee Canyon Channel	877	843	1,802	1,780	0.580	0.503
CP 3B	Agua Chinon Channel	2,964	2,969	2,447	2,194	0.766	0.770
421	Agua/Borrego Confluence	7,044	7,049	6,493	6,477	0.729	0.732
CP 4B	Borrego Channel	4,025	4,025	4,565	4,521	0.711	0.716

Compliance Report for PA 51 and 30 Watershed Updated Marshburn Channel, Bee Canyon Channel, Agua Chinon Channel, and Borrego Canyon Channel – Dated March 10th, 2011” - By RBF Consulting

Bee Canyon Channel

The Modified Project's proposed changes to Bee Canyon Channel Watershed increase the imperviousness while decreasing the total tributary area, resulting in a lower peak flow rate at Node 614. Therefore, the Modified Project's proposed modifications to the site plan tributary to Bee Canyon Channel Watershed comply with the approved Master Plans for the Approved Project.

Agua Chinon Channel

Agua Chinon Watershed has a slight increase in the pervious area under the Modified Project. However, the discharge at all nodes is less for the Modified Project than shown in the approved Master Plans for the Approved Project. The time of concentration within Agua Chinon has increased due to the Modified Project's change in the channel configuration, which results in lower discharge. Therefore, the Modified Project's proposed modifications to the Approved Project's site plan tributary to Agua Chinon Channel Watershed comply with the approved Master Plans for the Approved Project.

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Borrego Channel

Under the Modified Project, Borrego Channel Watershed discharge is lower at the downstream node before the confluence with Agua Chinon Channel. This demonstrates that land use changes downstream of the Borrego Canyon Watershed have little or no effect on the discharge or the time of concentration. Therefore, the Modified Project's proposed modifications to the Approved Project's site plan tributary to Borrego Channel Watershed comply with the approved Master Plan for the Approved Project.

IMPACT 5.5.1-1: THE MODIFIED PROJECT WOULD NOT SUBSTANTIALLY INCREASE SURFACE WATER FLOWS INTO DRAINAGE SYSTEMS AS COMPARED TO THE APPROVED PROJECT. [IMPACTS HYD-4 AND HYD-5]

Impact Analysis: As discussed above, during operations, the Modified Project will not increase surface water flows into drainage systems as compared to the Approved Project. Therefore, like the Approved Project, the Modified Project would result in a less than significant impact.

IMPACT 5.5.1-2: THE MODIFIED PROJECT WOULD NOT LOCATE ADDITIONAL DEVELOPMENT AREAS WITHIN A 100-YEAR FLOOD HAZARD AREA. [IMPACTS HYD-7 AND HYD-8]

Impact Analysis: Current City of Irvine development standards and the Zoning Code prohibit the construction of any structure within a 100-year Flood Hazard Area. Per the Zoning Code and Mitigation Measure H/WQ-4 incorporated into both the Approved Project and the Modified Project, a Letter of Map Revision (“LOMR”) must be completed prior to building any structure within an area mapped on the Federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map. The LOMR must be filed upon the completion of the design of the flood control improvements required to contain or redirect the 100 year flood hazard. The LOMR process will be completed upon the completion of Record Drawings for the flood control facility. As a result, like the Approved Project, the Modified Project will result in a less than significant impact.

5.5.1.4 Cumulative Impacts

The geographic area for addressing cumulative hydrology impacts is the drainage area for the Proposed Project Site. Like the Approved Project, the Modified Project includes measures that assure there will be no off-site drainage impacts. The Modified Project would result in minor changes to the Approved Project's drainage patterns and peak flows with minor alterations in impervious surfaces, but in general, the drainage areas, discharge points, and peak flow discharges will be consistent with the Approved Project. As is true for the Approved Project, any drainage improvements constructed as part of the Modified Project would be subject to the design criteria and capacities required by the City of Irvine and the County of Orange.

The area surrounding the Proposed Project Site is developed or planned for development. However, all related new development and redevelopment projects in the City and surrounding cities will be subject to the City of Irvine and County of Orange hydrology-related requirements as are the Approved Project and the Modified Project. Therefore, all such projects would have to submit a hydrology report that would identify Peak Flow rates and drainage improvements that will be used to control runoff. Additionally, cumulative flows would be evaluated and addressed in terms of required Flood Control Master Plans for each cumulative project, which is specifically intended and designed to define the flood control system necessary to accommodate runoff

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from future area wide development. As such, like the Approved Project, the Modified Project's cumulative impacts related to hydrology would be less than significant.

5.5.1.5 Level of Significance Before Mitigation

Upon implementation of regulatory requirements, the standard conditions of approval, and the Approved Project mitigation measures which necessarily apply to the Modified Project (as modified as proposed below), the impacts of the Modified Project on hydrology would be less than significant.

5.5.1.6 Mitigation Measures

Applicable Mitigation Measures from Certified EIR

The Certified EIR identified two mitigation measures to reduce the effects on hydrology. Both of these mitigation measures are incorporated into both the Approved Project and the Modified Project, and as demonstrated previously, ensure that the Modified Project's impacts are less than significant. This DSEIR proposes that Mitigation Measure H/WQ4 from the Certified EIR be clarified for the Modified Project as set forth below; deletions from the original mitigation measures are identified in ~~strikeout text~~ and underlined text is used to signify new additions.

H/WQ3 Prior to approval of the first tentative tract or parcel map in the project area, detailed hydrologic and hydraulic analysis shall be conducted. Studies and analysis shall be prepared in accordance with OCFCD methodologies and standards and the Flood Control Master Plan for San Diego Creek, as well as any additional guidelines in effect at the time of project design. Recommendations contained in the hydrology studies and/or hydraulic analysis to address drainage/flooding issues related to proposed development shall be implemented. Compliance with this measure shall be verified by the Community Development Department.

H/WQ4 Prior to issuance of a building permit for any unit within the 100-year floodplain, developers with property located in the newly delineated 100-year floodplain shall be required to construct such improvements as necessary to remove the property from the 100-year floodplain. Additionally, the developer shall prepare a Letter of Map Revision (LOMR) request to have the FIRMs revised to remove the development areas from the 100-year floodplain upon completion of the approved flood control facilities. The LOMR request shall be filed upon completion of design of the flood control improvements to contain or redirect the 100-year flood flows away from the property.

After the improvements are constructed, Record Drawings and a maintenance agreement with, or letter from, a public agency shall be submitted to FEMA to complete the LOMR process.

Additional Mitigation

No additional mitigation measures are required, as the Modified Project would result in less than significant impacts on hydrology without additional mitigation.

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5.5.1.7 Level of Significance After Mitigation

All of the Modified Project's impacts on hydrology would be less than significant upon implementation of regulatory requirements, the standard conditions of approval, and the mitigation measures already in place under the Approved Project.

5.5.2 Water Quality

5.5.2.1 Environmental Setting

Regulatory Framework

Clean Water Act

The federal Water Pollution Control Act (also known as the Clean Water Act ["CWA"], 33 U.S.C. 1251 et seq.) is the principal federal statute that governs water quality. The CWA establishes the basic structure for the regulation of discharges of pollutants into the waters of the United States and gives the U.S. Environmental Protection Agency ("EPA") the authority to implement pollution control programs, such as setting wastewater standards for industry. The statute's goal is to end all polluted discharges entirely and to restore, maintain, and preserve the integrity of the nation's waters. The CWA regulates both the direct and indirect discharge of pollutants into the nation's waters. Under the CWA, water quality standards for contaminants in surface waters are set, and the CWA makes it unlawful for any person to discharge any pollutant from a point source into navigable waters, unless a permit is obtained under its provisions. The CWA mandates permits for wastewater and storm water discharges, requires states to establish site-specific water quality standards for navigable bodies of water, and regulates other activities that affect water quality, such as dredging and the filling of wetlands. The CWA also funded the construction of sewage treatment plants and recognized the need for planning to address non-point sources of pollution. Section 402 of the CWA requires a permit for all point source (a discernible, confined, and discrete conveyance, such as a pipe, ditch, or channel) discharges of any pollutant (except dredge or fill material) into waters of the U.S.

Section 303(d) of the CWA requires that states identify waters that do not or that are not expected to meet water quality standards (beneficial uses, water quality objectives, and the anti-degradation policy) with the implementation of technology-based controls, even after point sources of pollution have installed the minimum required levels of pollution control technology.

Once a water body has been placed on the Section 303(d) list of impaired waters, states are required to develop a Total Maximum Daily Load ("TMDL") to address each pollutant causing impairment. A TMDL defines how much of a pollutant a water body can tolerate and still meet water quality standards. Each TMDL must account for all sources of the pollutant, including: discharges from wastewater treatment facilities; runoff from homes, forested lands, agriculture, and streets or highways; contaminated soils/sediments, legacy contaminants such as DDT and PCBs on-site disposal systems (septic systems) and deposits from the air. Federal regulations require that the TMDL, at a minimum, account for contributions from point sources (permitted discharges) and contributions from nonpoint sources, including natural background. In addition to accounting for past and current activities, TMDLs may consider projected growth that could increase pollutant levels. TMDLs allocate allowable pollutant loads for each source, and identify management measures that, when implemented, will assure that water quality standards are attained.

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National Pollutant Discharge Elimination System

Runoff water quality is regulated by the federal National Pollution Discharge Elimination System (“NPDES”) program established by the Clean Water Act of 1972. The NPDES program’s objective is to control and reduce pollutants to water bodies from non-point discharges. The program is administered by Regional Water Quality Control Boards (“RWQCBs”) throughout the State. The RWQCB issues NPDES point source permits for discharges from major industries and non-point source permits for discharges for municipalities and other non-agricultural dischargers.

Under the NPDES program, facilities that discharge pollutants from any point source into waters of the U.S. are required to obtain an NPDES permit. The term “pollutant” broadly includes any type of industrial, municipal, and agricultural waste discharged into water. Point sources are generally defined as discharges from publicly owned treatment works (“POTWs”), discharges from industrial facilities, and discharges associated with urban runoff. While the NPDES program addresses certain specific types of agricultural activities, the majority of agricultural facilities are defined as non-point sources and are exempt from NPDES regulation. Pollutant contributors come from direct and indirect sources. Direct sources discharge wastewater directly to receiving waters, whereas indirect sources discharge wastewater to POTWs, which in turn discharge to receiving waters. Under the national program, NPDES permits are issued only to direct point source discharges. The National Pretreatment Program addresses industrial and commercial indirect dischargers. Municipal sources are POTWs that receive primarily domestic sewage from residential and commercial customers. Specific NPDES program areas applicable to municipal sources are the National Pretreatment Program, the Municipal Sewage Sludge Program, Combined Sewer Overflows (“CSOs”), and the Municipal Storm Water Program. Non-municipal sources include industrial and commercial facilities.

Specific NPDES program areas applicable to these industrial/commercial sources are: Process Wastewater Discharges, Non-Process Wastewater Discharges, and the Industrial Storm Water Program. NPDES issues two basic permit types: individual and general. Also, the USEPA has recently focused on integrating the NPDES program further into watershed planning and permitting.¹

The NPDES has a variety of measures designed to minimize and reduce pollutant discharges. All counties with storm drain systems that serve a population of 50,000 or more, as well construction sites one acre or more in size, must file for and obtain an NPDES permit. Another measure for minimizing and reducing pollutant discharges to a publicly owned conveyance or system of conveyances (including roadways, catch basins, curbs, gutters, ditches, man-made channels and storm drains, designed or used for collecting and conveying stormwater) is the EPA’s Storm Water Phase II Final Rule. The Phase II Final Rule requires an operator (such as a city) of a regulated small municipal separate storm sewer system (“MS4”) to develop, implement, and enforce a program (e.g., Best Management Practices [“BMPs”], ordinances, or other regulatory mechanisms) to reduce pollutants in post-construction runoff to the city’s storm drain system from new development and redevelopment projects that result in land disturbances of greater than or equal to one acre. The City of Irvine Community Development Department is the local enforcing agency of the MS4 NPDES permit relevant to the Proposed Project Site.²

¹ Source: EPA, <<http://www.epa.gov/npdes/pubs/101pape.pdf>>, September 2004.

² State of California, California Regional Water Quality Control Board, Santa Ana Region, Order No. R8-2009-0030, NPDES No. CAS618030, as Amended by Order No. R8-2010-0062, Waste Discharge Requirements for The County of Orange, Orange County Flood Control District, and The Incorporated Cities of Orange County within the Santa Ana Region Areawide Urban Storm Water Runoff Orange County.

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The provisions of the MS4 Permit require the installation of post-construction BMPs for new development as part of the federal NPDES program and have set standards for their implementation. These standards have been updated most recently in Order No. R8-2009-0030 NPDES No. CAS618030 as amended by Order No. R8-2010-0062 from the State of California, California Regional Water Quality Control Board, Santa Ana Region. The provisions of this order are scheduled to be implemented in July 2011.

The intent of these regulations is to rigorously regulate the quality and quantity of post-construction stormwater runoff from any new impervious surface over 10,000 square feet so that receiving waters downstream are not adversely impacted. To comply with these requirements, new developments are required to install water quality stormwater runoff BMPs that filter or treat rainfall runoff generated from storm events up to approximately the 85th percentile rainfall event (or approximately the 1-inch storm event) before discharging into a receiving waters such as the San Diego Creek. Additional hydrograph modification BMPs are also required so that post-project runoff does not exceed pre-project rates or durations if such an increase could contribute to erosion in receiving waters downstream from the Proposed Project Site.

The Orange County Stormwater Program issued a Drainage Area Management Plan (“DAMP”)³ in July 2003, pursuant to NPDES regulations. The 2003 DAMP requires a project’s engineer to prepare a Water Quality Management Plan that specifies how the project will use BMPs to meet the aforementioned waste discharge requirements.

Although the Modified Project would not discharge directly into an impaired water body, runoff from the Proposed Project Site is tributary to Reach 2 of the San Diego Creek, which is listed on the current 2006 Section 303(d) List as impaired for metals and has established TMDL requirements for metals, nutrients, siltation and unknown toxicity (Tables 5.5-1 and 5.5-2). Reach 1 of San Diego Creek is also 303(d) listed as impaired for fecal coliform, selenium and Toxaphene, and has established TMDL requirements for metals, nutrients, pesticides and siltation (Tables 5.5-1 and 5.5-2).

Porter-Cologne Water Quality Act

The Porter-Cologne Water Quality Act (California Water Code section 13000 et seq.) is the basic water quality control law for California. Under this Act, the State Water Resources Control Board (“SWRCB”) has ultimate control over State water rights and water quality policy. In California, the USEPA has delegated authority to issue NPDES permits to the SWRCB. The State is divided into nine regions related to water quality and quantity characteristics. The SWRCB, through its nine RWQCBs, carries out the regulation, protection, and administration of water quality in each region. Each regional board is required to adopt a water quality control plan or basin plan that recognizes and reflects the regional differences in existing water quality, the beneficial uses of the region’s ground and surface water,⁴ and local water quality conditions and problems. The basin plans must include an implementation plan that describes what methods and practices will be used to meet the water quality standards established in the basin plan. TMDLs, with their associated implementation plans, are adopted into the basin plans through the basin planning process.

Santa Ana River Basin Plan

The City of Irvine is located in the Santa Ana River Basin, Region 8, in the Upper Santa Ana Watershed. The Water Quality Control Plan for the Santa Ana River Basin (“Basin Plan”)⁵ includes the San Diego Creek

³ County of Orange, The Cities of Orange County and The Orange County Flood Control District, Drainage Area Management Plan, July 1, 2003

⁴ Beneficial uses are the ways that water can be used for the benefit of people and/or wildlife.

⁵ Santa Ana River Basin (8), Water Quality Control Plan, January 24, 1995, Updated February 2008.

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watershed as well as Newport Bay, which are located downstream of the Proposed Project Site. According to the Basin Plan, beneficial uses for the San Diego Creek Drainage include water recreation, warm freshwater habitat, wildlife habitat and intermittent groundwater recharge.

Several pollutants of concern have been identified in the Basin Plan for San Diego Creek watershed and Newport Bay. Total TMDLs have been established for several of these pollutants including fecal coliform, metals, sediment, diazinon, organochlorine compounds and nutrients.

Table 5.5-3 lists the Proposed Project Site's receiving water bodies (EPA 303d and Santa Ana RWQCB) and those bodies' impairments, while Table 5.5-4 presents the status of the TMDL for the Site's receiving waters as of 2006.

*Table 5.5-3
Impaired Proposed Project Site Receiving Water Bodies
(EPA 303d and RWQCB, Santa Ana)*

<i>Watershed</i>	<i>Pollutant of Concern</i>	<i>303(d)/TMDL</i>	<i>Phase</i>
San Diego Creek, Reach 1	Fecal Coliform	2006 303(d) Listed	Expected 2019
	Selenium	2006 303(d) Listed	Expected Late 2011*
	Toxaphene	2006 303(d) Listed	Part of Orange County Watershed (OC) TMDL
San Diego Creek, Reach 2	Metals	2006 303(d) Listed	Delayed as of 2011*
Lower Newport Bay	Chlordane	2006 303(d) Listed	Part of OC TMDL
	Copper	2006 303(d) Listed	Delayed as of 2011*
	DDT	2006 303(d) Listed	Part of OC TMDL
	PCBs	2006 303(d) Listed	Part of OC TMDL
	Sediment Toxicity	2006 303(d) Listed	Expected 2019
Upper Newport Bay	Chlordane	2006 303(d) Listed	Part of OC TMDL
	Copper	2006 303(d) Listed	Delayed as of 2011*
	DDT	2006 303(d) Listed	Part of OC TMDL
	PCBs	2006 303(d) Listed	Part of OC TMDL
	Sediment Toxicity	2006 303(d) Listed	Expected 2019
Newport Bay	Metals	2006 303(d) Listed	Expected 2019
	Fecal Coliform	RB TMDL	In Effect 2000
San Diego Creek/Newport Bay	Metals	RB TMDL	Data Collection*
	Sediment	RB TMDL	In Effect 1999
	Diazinon/Chlorpyrifos	RB TMDL	In Effect 2004
	Organochlorine Compounds (OC)	RB TMDL	Pending
	Nutrient	RB TMDL	In Effect 1999

Source: http://www.waterboards.ca.gov/water_issues/programs/tmdl/303d_lists2006_epa.shtml

* - Discussion with John Peng, Orange County Stormwater Program, April 7, 2011

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*Table 5.5-4
TMDL Status of Proposed Project Site Receiving Water Bodies
(303d and RWQCB, Santa Ana)*

<i>Watershed</i>	<i>Pollutant of Concern</i>	<i>TMDL Status</i>
Newport Bay	Fecal Coliform	Santa Ana RWQCB Resolution Order 99-10 amended the Basin Plan to incorporate a TMDL for Fecal Coliform in Newport Bay. The counties and cities within the watershed are named on this TMDL as stakeholders. In response to Letter 13267 from the Santa Ana RWQCB, the Newport Watershed Permittees, IRWD and the Irvine Company are currently supporting studies and monitoring the Newport Bay.
San Diego Creek/ Newport Bay	Metals	In 2002, in response to a 1996 lawsuit, the EPA issued the Toxics TMDL for San Diego Creek/Newport Bay. This TMDL covers 14 different constituents, including several currently used and banned pesticides, copper and other metals and PCBs. The Santa Ana RWQCB is preparing the corresponding State TMDLs but has decided to issue five separate constituent and geographic specific TMDLs. When adopted, these State TMDLs will supersede the EPA TMDL. Santa Ana RWQCB is still in the data collection stage.
	Sediment	The Santa Ana RWQCB issued Resolution Order 98-101 to amend the Basin Plan to incorporate a TMDL for sediment in Newport Bay and San Diego Creek. The counties and cities within the watershed are named on this TMDL as stakeholders. The objectives of the TMDL are to reduce the annual average sediment load in the San Diego Creek watershed from a total of 250,000 tons per year to 125,000 tons per year, thereby reducing the sediment load to Newport Bay to 62,500 tons per year within 10 years (a 50% reduction) and lowering the frequency of dredging.
	Diazinon/ Chlorpyrifos	The Santa Ana RWQCB adopted TMDLs on 4/4/2003. The Waste Load Allocation (WLA) ⁶ is 72 ng/L acute Diazinon and 45 ng/L chronic Diazinon. WLA is 18 ng/L acute Chlorpyrifos and 12.6 ng/L chronic Chlorpyrifos. Named stakeholders include County of Orange; the Cities of Tustin, Irvine, Costa Mesa, Santa Ana, Orange, Lake Forest and Newport Beach; and agricultural operators in Newport Bay watershed.
	Organochlorine Compounds	A technical TMDL for Toxic Pollutants, San Diego Creek and Newport Bay, was promulgated by USEPA Region 9 in June 2002. The Constituents addressed in the TMDL included the organophosphate (“OP”) pesticides, selenium, metals and organochlorine (“OC”) compounds. The Santa Ana RWQCB approved the OC compounds TMDL on September 7, 2008.
	Nutrient	The Santa Ana RWQCB Resolution 98-9, as amended by 98-100, amended the Basin Plan to incorporate a TMDL for Nutrients for Newport Bay/San Diego Creek. The TMDL establishes targets for reducing the annual loading of nitrogen and phosphorus to Newport Bay by 50% and meeting the numeric and narrative water quality objectives by 2012. The TMDL established a number of interim targets requiring a 30% and 50% reduction in nutrients in summer flows by 2002 and 2007, respectively, and a 50% in non-storm winter flows by 2012. As of 2011, the Santa Ana RWQCB is considering revising the TMDL and establishing new water quality objectives for nitrogen in tributaries to Newport Bay*.

Source: <http://www.ocwatersheds.com/TMDL.aspx>

* Discussion with John Peng, Orange County Stormwater Program, April 7, 2011

⁶ Waste Load Allocation (WLA) is defined as the portion of a receiving water's loading capacity that is allocated to one of its existing or future point sources of pollution (e.g., permitted waste treatment facilities)

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Storm Water Pollution Prevention Plans

Pursuant to the CWA, on September 2, 2009 the SWRCB issued a statewide general NPDES Permit (Order No. 2009-0009 DWQ)⁷ for storm water discharges from construction sites (NPDES No. CAS000002) that became fully effective on July 1, 2010 (“Construction General Permit”). Under that Construction General Permit, discharges of storm water from construction sites with a disturbed area of one or more acres, or if part of a larger development, are required to either obtain individual NPDES permits for construction storm water discharges or be covered by the Construction General Permit. Coverage by the Construction General Permit is accomplished by completing and filing a Notice of Intent (“NOI”) with the SWRCB and developing and implementing a Storm Water Pollution Prevention Plan (“SWPPP”).

Each applicant under the Construction General Permit must ensure that a SWPPP is prepared and a Waste Discharge Identification (“WDID”) Number is issued prior to grading, and that the SWPPP is implemented during construction. Under Order No. 2009-0009 DWQ, the SWPPP must be developed by a Qualified SWPPP Developer (“QSD”) and implemented by a Qualified SWPPP Practitioner (“QSP”) for each site covered by the Construction General Permit.

A SWPPP must include a risk level determination based upon the project’s sediment risk and receiving water risk. Based on the combined risks, a Risk Level is assigned to each project, Risk Level 1, 2, or 3. Risk Level 1 is the least stringent, while Risk Level 3 is the most stringent. Based on the project’s Risk Level, BMPs are designed to reduce potential impacts to surface water quality through the construction and life of the project. Order No. 2009-0009 DWQ includes the following additional elements:

- Annual Reports are to be submitted each year the permit is active and all standards and BMPs outlined in the project SWPPP shall be followed and enhanced as necessary to maintain the project in compliance with the then current Construction General Permit.
- Minimum BMPs include good site management for construction materials, waste management, vehicle storage and maintenance, landscape materials, and potential pollutant sources; non-stormwater management; erosion controls; sediment controls; and run-on and runoff controls. Site-specific project risk-level determination for sediment and receiving water (such as if stormwater discharges directly or indirectly into a Section 303d listed impaired water body) yields additional BMP measures.
- Primary sediment control BMPs (interceptors/barriers) include perimeter protection, natural channel barriers, and storm drain inlet protection to prevent temporary construction-related erosion from entering into permanent drainage systems. Primary erosion control BMPs include preserving existing vegetation, tracking, and soil stabilization within 14 days after completion. In addition, dust control measures and stockpile protection are required year-round.
- A Sampling and Analysis Plan instituted for sediment related and non-visible pollutants in stormwater discharges attributed to a breach or malfunction of a BMP or if contaminants stored or used on the construction site are not properly contained and result in a spill. In addition, each site SWPPP receives a site-specific Risk Level determination based on sediment and receiving water risks (such as if stormwater discharges directly or indirectly into a Section 303d listed impaired water body) that yield specific Stormwater discharges sampling and testing requirements for pH and turbidity.

⁷ http://www.swrcb.ca.gov/water_issues/programs/stormwater/construction.shtml.

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- Year-round Construction Site Monitoring and SWPPP inspection, maintenance and repair based upon site-specific risk level determination requirements. As a minimum, construction site monitoring shall be performed once every 7 days, prior to and after storm events, and at least once each 24-hour period during extended storm events (normal work days, daylight hours). Quarterly non-stormwater monitoring is also required.

The primary objective of the SWPPP is to identify, construct, implement and maintain proper BMPs to reduce or eliminate pollutants in stormwater discharges and authorized non-stormwater discharges from the construction site during construction. The SWPPP also outlines the monitoring and sampling program required to verify compliance with the requirements of effluent discharge. Depending upon the project Risk Level, Numeric Action Levels (“NALs”) and Numeric Effluent Limitations (“NELs”) are set by the Construction General Permit for stormwater discharges from construction sites. Compliance with the Construction General Permit is used as one method of evaluating a project’s construction-related impacts on surface water quality.

Approved Project

The Approved Project converts former agricultural and military uses on the former MCAS El Toro to primarily residential and commercial uses. With the proposed removal of many features of the former Air Station, the Approved Project was calculated to achieve a total net reduction in Proposed Project Site watershed imperviousness of roughly 15 percent, resulting in a regional watershed percent imperviousness of roughly 41 percent. The Approved Project also achieves a site imperviousness of roughly 70 percent as described in the April 20, 2009 Conceptual Project Water Quality Management Plan (“WQMP”)⁸ approved by the City of Irvine.

The Approved Project incorporates Mitigation Measure H/WQ1, which requires that a SWPPP be prepared prior to the approval of grading permits for any portion of the Proposed Project Site in order to reduce sedimentation and erosion. The SWPPP must include the adoption of erosion and sediment control practices such as desilting basins and construction site chemical control management measures.

The Approved Project also incorporates Mitigation Measure H/WQ2, which requires demonstration that all stormwater runoff and dewatering discharges from the Proposed Project Site be managed to the maximum extent practicable (“MEP”) or treated as appropriate to comply with water quality requirements identified in the Basin Plan, including the TMDL Implementation Plan adopted for the San Diego Creek/Upper Newport Bay Watershed. The Approved Project includes the following Conceptual Project Water Quality Management Plan (“WQMP”) prepared in conformance with the Orange County DAMP standards, and approved by the City of Irvine in April 2009 (a copy of the WQMP is included in Appendix J to this DSEIR).

- RBF Consulting, April 20, 2009, Conceptual Project Water Quality Management Plan (WQMP), Updating the Integrated Master Plan of Drainage, Water Quality and Habitat Mitigation, Orange County Great Park Neighborhoods. *Approved by City of Irvine April 23, 2009.*

The WQMP implements standards from the DAMP based on the Proposed Project Site’s imperviousness, land use type, and downstream receiving water characteristics by incorporating project design features (“PDFs”)

⁸ RBF Consulting, April 20, 2009, Conceptual Project Water Quality Management Plan (WQMP), Updating the Integrated Master Plan of Drainage, Water Quality and Habitat Mitigation, Orange County Great Park Neighborhoods (Appendix 1 of ENGEIO Incorporated, March 15, 2011, Project Water Quality Technical Report)

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and BMPs which reduce discharges of pollutants of concern from the Approved Project to the maximum extent practicable.

The pollutants of concern that were identified for the Approved Project by the above-referenced WQMP are listed in Table 5.5-5:

*Table 5.5-5
Approved Project Pollutants of Concern*

<i>Land Use</i>	<i>Pollutant Concerns:</i>
Agriculture	Pesticides, Nutrients, Bacteria
Educational/Exposition Center/Research and Development	Bacteria, Nutrients, Pesticides, Sediments, Trash, Oxygen Demanding Substances, Oil and Grease, Metals
Residential	Bacteria, Nutrients, Pesticides, Sediments, Trash, Oxygen Demanding Substances, Oil and Grease, Metals
Roadway	Metals, Organic Compounds, Sediment, Trash, Oil and Grease, Bacteria, Nutrients, Pesticides, Oxygen Demanding Substances

Source: RBF Consulting, 2009

Through the WQMP, the Approved Project incorporates source control, site design and treatment control measures as generally described below:

Site Design BMPs

Site design BMPs decrease the amount of potential runoff where practical to mimic pre-development hydrology to the maximum extent practicable. The Approved Project incorporates the following site design BMPs as part of its WQMP:

1. Conservation of Natural Areas to reduce imperviousness.
2. Disconnection of directly connected impervious areas allowing greater natural infiltration and time of concentration to downstream watercourses.

Source Control BMPs

Source controls are BMPs that are intended to reduce the amount of pollutants mobilized during rain storm or other events. They include both non-structural and structural BMPs. The following Table 5.5-6 lists the source control BMPs incorporated into the Approved Project:

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Table 5.5-6
Approved Project Source Control BMPs

BMPs	Residential	Commercial	Industrial	Recreational
Structural Source Control BMPs				
Storm Drain Stenciling	X	X	X	X
Outdoor Material Storage		X	X	X
Trash/Waste Storage	X	X	X	X
Irrigation Systems and Landscape Design	X	X	X	X
Slope and Channel Protection/Energy Dissipation	X	X	X	X
Maintenance Bay and Docks		X	X	
Vehicle Wash Areas		X	X	
Outdoor Processing Areas		X	X	
Equipment Wash Areas		X	X	
Fueling Areas		X	X	
Hillside Landscaping	X	X	X	X
Wash Water Control		X	X	
Car Wash Racks	X	X	X	
Non-Structural Source Control BMPs				
Educational Materials	X	X	X	X
Activity Restriction		X	X	
Common Area Landscape Management	X	X	X	X
BMP Maintenance	X	X	X	X
Title 22 CCR Compliance		X	X	
Local Industrial Permit Compliance		X	X	
Spill Contingency Plan		X	X	
Underground Storage Tank Compliance		X	X	
Hazardous Materials Disclosure		X	X	
Uniform Fire Code Implementation	X	X	X	X
Common Area Litter Control	X	X	X	X
Employee Training		X	X	X
Loading Dock Housekeeping		X	X	
Common Area Catch Basin Inspection	X	X	X	X
Street Sweeping	X	X	X	X
Commercial Vehicle Washing		X		
Retail Gasoline Outlets		X		

Treatment Control BMPs

Treatment control BMPs capture stormwater before it leaves the site and cleanse the water through various processes prior to discharge, or infiltrate the water where practical to mimic pre-development hydrology to the maximum extent practicable.

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The Approved Project incorporates several treatment control BMPs through its approved WQMP including the following main treatment control BMPs:

1. Small proprietary filter devices in select areas to capture roadway runoff and filter through a media system which would cleanse the water prior to discharge.
2. Extended detention basins (“EDBs”) in subregions which cleanse water through settlement of particles and direct infiltration in areas where the underlying strata is permeable.
3. Natural Treatment Systems (“NTS”) incorporated into EDBs which are engineered wetlands that cleanse stormwater through a series of processes including uptake of nutrients, adsorption, microbial activity, decomposition and volatilization.

A more complete list of Treatment Control BMPs incorporated into the Approved Project by the WQMP are listed in the following Table 5.5-7:

*Table 5.5-7
Approved Project Treatment Control BMPs*

<i>BMPs</i>	<i>Residential</i>	<i>Commercial</i>	<i>Industrial</i>	<i>Recreational</i>
Bioretention	X	X	X	X
Extended Detention Basins (EDBs)	X	X	X	X
Infiltration Basins	X	X		X
Infiltration Trench	X	X		X
Media Filters	X	X	X	X
Retention/Irrigation	X	X	X	X
Tree Box Filters	X	X	X	
Underground Infiltration Basins	X	X		
Vegetated Strips	X	X	X	X
Vegetated Swales	X	X	X	X
Wet Ponds	X	X	X	X
Green Roof		X	X	
Cisterns		X	X	

Source: RBF Consulting, 2009

The WQMP for the Approved Project incorporates sites within PAs 30 and 51 for new water quality basins and/or NTS facilities (constructed wetlands integrated into stormwater EDBs) in addition to existing NTS Site 18 (Marshburn Retarding Basin).

These NTS facilities are designed to capture 80 percent of the average annual runoff from developed areas of the Proposed Project Site to cleanse water through settlement of particles and direct infiltration in areas where the underlying strata is permeable, and capture and either evapotranspire or treat summer dry-weather nuisance flows in order to reduce discharges to downstream receiving waters to the maximum extent practicable (MEP). The design meets 2009 standard for MEP treatment of post-construction stormwater flows as defined by the Orange County Stormwater Program MS4 permit because the NTS facilities promote on-site detention and infiltration, when feasible, of stormwater during

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rainfall events in a manner intended to mimic pre-development hydrologic conditions throughout the site, as well as at points of discharge. These combined elements reduce geomorphic impacts associated with changes in flow, duration or volume, of existing downstream watercourse hydrographs known as watershed “hydromodification” (hydrograph modification). Because overall net site imperviousness is either generally similar or slightly reduced by the Approved Project, effects of hydrograph modification to downstream receiving waters due to implementation of the Approved Project are considered to be negligible.

Funding for post-construction project design features and BMPs associated with the Approved Project will come from fees generated by the Approved Project through a property assessment fee. Ownership and maintenance of post-construction project design features will remain under control of the project applicants until such a time as an entity acceptable to the applicants and the City agrees to undertake maintenance responsibilities.

Applicable Plans and Programs – Existing Plans, Programs, and Policies

The following measures are existing plans, programs, or policies (“PPPs”) that apply to both the Approved Project and the Modified Project, and that will help to reduce and avoid potential impacts related to hydrology and water quality:

- PPP 4-1 Prior to the issuance of precise grading permits, the applicant shall submit a hydrology and hydraulic analysis of the entire site. The analysis shall be prepared by a professional civil engineer versed in flood control analysis and shall include the following information and analysis (Standard Condition A.6):
- a. Hydrology/hydraulic analysis of 100-year surface water elevation at the project site to determine building elevation or flood proofing elevation.
 - b. Analysis of existing and post-development peak 100-year storm flow rates, including mitigation measures to reduce peak flows to existing conditions.
 - c. An analysis demonstrating that the volume of water ponded on the site and stored underground in the drainage system outside of the building envelope in the proposed condition is greater than or equal to the corresponding volume in the existing condition. The water surface used to determine the ponded volume shall be based on the water surface in the major flood control facility that the site is tributary to.
- PPP 4-2 Prior to the issuance of precise grading permits, the applicant shall submit a groundwater survey of the entire site. The analysis shall be prepared by a geotechnical engineer versed in groundwater analysis and shall include the following information and analysis (Standard Condition A.7):
- a. Potential for perched groundwater intrusion into the shallow groundwater zone upon buildout.
 - b. Analysis for relief of groundwater buildup and properties of soil materials on-site.
 - c. Impact of groundwater potential on building and structural foundations.

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- d. Proposed mitigation to avoid potential for groundwater intrusion within five feet of the bottom of the footings.
- PPP 4-3 This project will result in soil disturbance of one or more acres of land that has not been addressed by an underlying subdivision map. Prior to the issuance of preliminary or precise grading permits, the applicant shall provide the City Engineer with evidence that a Notice of Intent (NOI) and relevant Permit Registration Documents have been filed with the State Water Resources Control Board and that a Waste Discharge Identification (“WDID”) Number is issued. Such evidence shall consist of a copy of the NOI Receipt letter with WDID retrieved from the State Water Resources Control Board Stormwater Multi-Application and Report Tracking System (SMARTS) website or the Regional Water Quality Control Board, or a letter from either agency stating that the NOI has been filed (Standard Condition A.10).
- PPP 4-4 Prior to the issuance of precise grading permits, the applicant shall submit, and the Director of Community Development shall have approved, a project water quality management plan (WQMP). The WQMP shall identify the best management practices that will be used on the site to control predictable pollutant runoff (Standard Condition A.13).

5.5.2.2 Thresholds of Significance

Based on Appendix G of the CEQA Guidelines, the City of Irvine has determined that a project would normally have a significant effect on the environment if the project would:

- HYD-1 Violate any water quality standards or waste discharge requirements.
- HYD-3 Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in a substantial erosion or siltation on- or off-site.
- HYD-5 Create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff.
- HYD-6 Otherwise substantially degrade water quality.

Note that Potential Impacts HYD-4, HYD-5, HYD 7, HYD-8, HYD-9, and HYD-10 are addressed above in Subsection 5.5.1, *Hydrology*. For analysis of the Modified Project under Potential Impact HYD-2, see Subsection 5.12.1, *Water Supply*, in Section 5.12, *Utilities and Service Systems*, of this DSEIR.

5.5.2.3 Environmental Impacts of the Modified Project

As detailed below, because the Modified Project does not substantially change the land use types and site imperviousness as compared to the Approved Project, the water quality impacts associated with the Modified Project would not increase as compared to the Approved Project.

Methodology

The following technical study (see Appendix J to this DSEIR) has been prepared to summarize potential water quality impacts of the Modified Project based on the Modified Project’s land use:

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- Project Water Quality Technical Report, ENGEO Incorporated, March 15, 2011.

The report concludes that the Modified Project would result in approximately the same overall net impervious area as the Approved Project, as well as the same general land uses and pollutants of concern. Given that the Modified Project makes only minor refinements to the Approved Project as outlined in the Project Water Quality Technical report, the impacts of the Modified Project are expected to be the same as those of the Approved Project.

IMPACT 5.5.2-1: THE MODIFIED PROJECT WOULD NOT SUBSTANTIALLY ALTER THE DRAINAGE PATTERN OF THE PROPOSED PROJECT SITE OR AREA, INCLUDING THROUGH THE ALTERATION OF THE COURSE OF A STREAM OR RIVER, IN A MANNER WHICH WOULD RESULT IN SUBSTANTIAL EROSION OR SILTATION ON- OR OFF-SITE. [IMPACT HYD-3]

Modified Project Conditions

The Modified Project proposes changes to the Approved Project. These changes include: (1) relocating 1,100 residential units, previously located on a programmatic basis within Districts 5 and 7, on the proposed Vesting Tentative Tract Maps, VTTMs 17283A, 17368, 17366, 17202, and 17364 (Proposed VTTMs), and changing their designation from Low Density (0-5 dwelling units/acre) to Multi-Use (0-40 dwelling units/acre); (2) relocating 1,500 residential units, previously located on a programmatic basis within the portion of the TOD located within Planning Area 51, as designated on the Proposed VTTMs; (3) locating the 1,269 density bonus units, which have not yet been located even on a programmatic basis, as designated on the Proposed VTTMs; (4) transfer of development intensities between zones; and (5) realigning Ridge Valley and O Street at Irvine Boulevard. The Modified Project also includes proposed amendments to VTTM 17008, and VPM 2006-271 in furtherance of the Proposed VTTMs. In addition, the Modified Project implements the Approved Project by locating the remaining 1,025 residential units of the Approved Project as designated on the Proposed VTTMs. Otherwise, the Modified Project is generally the same as the Approved Project for land use and overall net site imperviousness and disturbance, and incorporates Mitigation Measures H/WQ 1 and H/WQ 2 from the Certified EIR.

In accordance with Mitigation Measure H/WQ-1, WQMPs for each District within the Proposed Vesting Tentative Tract Maps 17283A, 17368, 17366, 17202, and 17364 (“District WQMPs”) have been prepared for the Modified Project⁹. These documents provide greater detail for the post-construction stormwater management project design features that would be implemented as part of the Modified Project.

The District WQMPs are listed below and presented in Appendix 2 of the Project Water Quality Technical Report (ENGEO, March 2011) (see Appendix J of this DSEIR):

- Hunsaker and Associates Irvine, Inc., January 4, 2011, Preliminary Water Quality Management Plan (WQMP) – Development District 1 South – PA 51, Amended Vesting Tentative Tract Map No. 17368.
- Hunsaker and Associates Irvine, Inc., January 5, 2011, Preliminary Water Quality Management Plan (WQMP) – Development District 1 North – PA 51, Amended Vesting Tentative Tract Map No. 17283.
- Hunsaker and Associates Irvine, Inc., January 5, 2011, Preliminary Water Quality Management Plan (WQMP) – Development District 4 – PA 51, Amended Vesting Tentative Tract Map No. 17366.

⁹ Appendix 2 of ENGEO Incorporated, March 15, 2011, Project Water Quality Technical Report

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- Hunsaker and Associates Irvine, Inc., January 5, 2011, Preliminary Water Quality Management Plan (WQMP) – Development District 8 – PA 51, Amended Vesting Tentative Tract Map No. 17364.
- RBF Consulting, January 10, 2011, Preliminary Water Quality Management Plan (WQMP) - Great Park Neighborhoods - District 7, Tentative Tract Map No. 17202.

Site Design BMPs, Structural and Non-Structural Source Control BMPs and Treatment Control BMPs as described in the WQMP for the Approved Project remain substantially the same in the District WQMPs for the Modified Project. Some modifications to the location of, and minor modification to the size of, the water quality basins have occurred based on alterations to land use layout and refinement as reflected by the proposed five VTTMs.

Funding for post-construction project design features and BMPs will come from fees generated by the Modified Project through a property assessment fee. Ownership and maintenance of post-construction project design features will remain under control of the project applicants until such a time as an entity acceptable to the applicants and the City agrees to undertake maintenance activities.

Table 5.5-8 presents the water quality basin layout described in the District WQMPs for the Modified Project, which may be further refined in location and footprint as the VTTM grading plans are finalized.

*Table 5.5-8
Preliminary District Water Quality Basins for the Modified Project*

<i>Basin</i>	<i>Development District and Location</i>	<i>Approx. Tributary Area (acres)</i>	<i>Receiving Water</i>
1	8 – Existing Marshburn Retarding Basin	121	Marshburn Channel
2	8 – SW Corner	46	Marshburn Channel
1	1S – SE Corner	339	Marshburn Channel
2	1S – SW Quadrant	43	Bee Canyon Channel
3	1N – SW Corner	73	Marshburn Channel
4	1N – Central West Edge	93	Marshburn Channel
5	1N – NW Corner	180	Marshburn Channel
1	7 – Central West Edge	61	Agua Chinon
2	7 – SW Corner	95	Agua Chinon
3	7 – SE Corner	112	Agua Chinon

Source: RBF and Hunsaker, January 2011, District WQMPs

As stated in the Water Quality Technical Report (see Appendix J to this DSEIR), when compared to the Approved Project, the Modified Project would not increase overall net site imperviousness or create additional pollutants of concerns as a result of locating the 1,269 density bonus units, or altering the location of previously-approved residential units and non-residential uses.

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During construction, water quality effects would be controlled at a less than significant level through the development and implementation of a Storm Water Pollution Prevention Plan(s) in accordance with SWRCB Order No. 2009-0009 DWQ, which is required prior to receiving site demolition and grading permits. As a result, incorporation of the same project design features as for the Approved Project and adherence to SWRCB/RWQCB standards will ensure that the Modified Project would result in less than significant impacts related to downstream water quality during construction.

In terms of post-construction stormwater management, the Modified Project would have the same less-than-significant impacts as the Approved Project because the overall net imperviousness of the site, pollutants of concern, and proposed land uses of the Modified Project have not significantly changed compared to the Approved Project (Hunsaker and RBF, 2011, District WQMPs¹⁰).

BMPs needed to address the Modified Project's pollutants and conditions of concern have been incorporated into the District WQMPs, and would be approved by the City of Irvine in conjunction with the most recent RWQCB and NPDES watershed objectives as specified in the Orange County DAMP. The adherence to these standards would ensure that operation of the Modified Project, like the Approved Project, would result in less than significant impacts related to downstream water quality after construction is completed.

Pollutants and Conditions of Concern

Because the land use types included in the Approved Project would not be changed by the Modified Project, the pollutants and conditions of concern for the Modified Project would be the same as identified for the Approved Project. These same pollutants and conditions of concern are addressed in the District WQMPs listed above. Impacts to downstream receiving waters or other downstream conditions of concern for the Modified Project would be substantially the same as for the Approved Project since land use types and pollutants of concerns would be substantially the same. Therefore, like the Approved Project, the Modified Project would result in less than significant impacts on water quality.

IMPACT 5.5.2-2: THE MODIFIED PROJECT WOULD NOT SIGNIFICANTLY INCREASE WATER POLLUTANT CONCENTRATIONS IN RUNOFF FROM THE PROPOSED PROJECT SITE DURING LONG-TERM OPERATION OR ALTER THE QUALITY OF STORMWATER RUNOFF, OR OTHERWISE SUBSTANTIALLY DEGRADE WATER QUALITY, AS COMPARED TO THE APPROVED PROJECT. [IMPACTS HYD-1, HYD-5 AND HYD-6]

Because the Mitigation Measures for the Approved Project are incorporated into the Modified Project, the Modified Project's modifications to the Approved Project would not substantially change the pollutants and conditions of concern, land uses or net site imperviousness as compared to the Approved Project. During construction, compliance with the Construction General Permit, preparation of a SWPPP(s) prior to receiving site demolition and grading permits, incorporation of the Approved Project's project design features into the Modified Project and adherence to SWRCB/RWQCB standards will ensure that the Modified Project would result in less than significant impacts related to downstream water quality. With respect to operations, the Modified Project will incorporate water quality features in conformance with DAMP/RWQCB standards to ensure that it will have a less than significant impact on post-construction water quality and downstream hydromodification effects (ENGEO, March 15, 2011). Consequently, the environmental impacts of the Modified Project on water quality during operation would be less than significant.

¹⁰ Appendix 2 of ENGEO Incorporated, March 15, 2011, Project Water Quality Technical Report (Appendix J of this DSEIR)

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The Modified Project impacts to storm drainage systems are addressed above in Section 5.5.1 and are not analyzed further here.

5.5.2.4 Cumulative Impacts

The area surrounding the Proposed Project Site in the San Diego Creek Watershed is either already developed or planned for development. As is true for the Approved Project, by adherence to the Orange County DAMP¹¹ standards and the Orange County MS4, which is required of all new development and redevelopment projects, the cumulative water quality impact of the Modified Project together with additional development in the area would be regulated in conformance with Basin Plan standards adopted by the RWQCB, which are intended to take a watershed scale approach to water quality issues and are periodically updated based on regional water quality studies. These studies include additional specific constituents of concern (TMDLs) and broader objectives (Beneficial Uses). Also, the Maximum Extent Practicable standard associated with water quality mitigation is reevaluated periodically based on advances in technology associated with project design features and regulated through RWQCB and DAMP standards. Therefore, through the regulatory approval process, impacts due to development on the Proposed Project Site would be mitigated to a level of less than significant.

While related projects could result in substantial erosion and sedimentation impacts, such projects would also comply with Construction General Permit requirements regarding preparation and implementation of SWPPPs, and implementation of BMPs for minimizing construction water quality impacts. Cumulative impacts on water quality from construction activities would be less than significant.

As such, the cumulative impacts related to water quality would be less than significant.

5.5.2.5 Level of Significance Before Mitigation

With implementation of the same regulatory requirements, mitigation measures and standard conditions of approval that are already included in the Approved Project, the Modified Project's impacts on water quality, including Impacts 5.5.2-1 and 5.5.2-2 would be less than significant.

5.5.2.6 Mitigation Measures

Applicable Mitigation Measures from the Certified EIR

Like the Approved Project, the Modified Project will incorporate two mitigation measures to reduce its effects on water quality. Implementation of already imposed Mitigation Measures H/WQ1 and H/WQ2 (listed below) ensure that the Modified Project's impacts on water quality will be less than significant.

H/WQ1 Prior to issuance of a grading permit, the applicant shall provide evidence that the development of the project area shall comply with City of Irvine adopted Grading and Water Quality Ordinances to ensure that the potential for soil erosion is minimized on a project-by-project basis. Specifically, the NPDES discharge permitting requirements to which the City is obligated will ensure that construction activities reduce, to the maximum extent feasible, the water quality impacts of construction activities. The NPDES permit guidance states that "industrial/commercial construction operations that result in a disturbance of one acre or more of total land area...and residential

¹¹ County of Orange, The Cities of Orange County and The Orange County Flood Control District, Drainage Area Management Plan, July 1, 2003

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construction sites that result in the disturbance of five acres or more...shall be required to develop and implement BMPs...to control erosion and siltation and contaminated runoff from the construction sites.” Note: In March 2003 this provision will apply to residential construction sites that result in the disturbance of one acre or more.

The City’s standard conditions of approval indicate that a Storm Water Pollution Prevention Plan (SWPPP) shall be prepared prior to the approval of grading permits for any project site in order to reduce sedimentation and erosion. The SWPPP shall include the adoption of erosion and sediment control practices such as desilting basins and construction site chemical control management measures.

Additionally, prior to the issuance of a grading permit, project applicants must submit, and the Director of Community Development or designee must have approved, a Water Quality Management Plan (WQMP). The WQMP must identify the Best Management Practices (BMPs) that will be used on the site to control predictable pollutant runoff after the site is occupied. Ongoing operations after construction would be subject to the Countywide Municipal NPDES Stormwater Permit, for which the City is a Co-Permittee. This WQMP shall identify, at a minimum, the routine, structural, and non-structural measures specified in the Countywide NPDES DAMP Appendix which they are applicable to a project, the assignment of long-term maintenance responsibilities (specifying the developer, parcel owner, maintenance association, lessee, etc.), and shall reference the location(s) of structural BMPs.

Also in accordance with standard City project permitting and approval procedures, Notices of Intent (NOI) for coverage of projects under the General Construction Activity Storm Water Runoff Permit will be submitted to the State Water Resources Control Board prior to issuance of grading permits in the project area. This requirement will be met to the satisfaction of the Director of Community Development of any disturbance of one acre or more of soil in the project area. Also in force during the period of construction would be the General Dewatering NPDES permit of the Santa Ana RWQCB, as well as the provisions of the Countywide Permit.

The Mitigation Measures will be implemented in accordance with local and State regulatory requirements. As future projects are planned and designed in the project area, specific BMPs and other water quality control methods will be utilized to reduce water quality degradation in the Newport Bay watershed. Future projects in the proposed project area will acknowledge and implement those additional requirements that may be imposed by RWQCB in the future. Compliance with these measures shall be verified by the Community Development Department.

H/WQ2 Prior to issuance of a grading permit, evidence (e.g., in the form of a construction management plan) shall be provided that demonstrates that all stormwater runoff and dewatering discharges from the project area shall be managed to the maximum extent practicable or treated as appropriate to comply with water quality requirements identified in the Santa Ana Regional Water quality Control Board Basin Plan, including Total Maximum Daily Load (TMDL) Implementation Plan adopted for this watershed.

Additional Mitigation

No additional mitigation measures are required because the Modified Project's impacts on water quality would be less than significant prior to any additional mitigation.

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5.5.2.7 Level of Significance After Mitigation

All of the Modified Project's impacts on water quality would be less than significant.

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