4.8 Hydrology/Water Quality

This section analyzes potentially significant impacts related to hydrology and water quality that could result from implementation of the project. This analysis relies upon the Proposed Conditions Infrastructure Report for Water, Sewer, Storm Drainage, and Water Quality prepared by Fuscoe Engineering, Inc. (Appendix I), the updated General Plan Safety Element, and the City of Irvine Local Hazard Mitigation Plan.

4.8.1 Existing Conditions

4.8.1.1 Watersheds/Water Quality

Figure 4.8-1 presents the location of the City of Irvine (City) in relation to regional watersheds. The City is located within the Newport Bay Watershed, which is defined by the foothills of the Santa Ana Mountains to the east (Loma Ridge), and the San Joaquin Hills to the west and southwest. The Newport Bay Watershed is a part of the larger Orange County Watershed Management Areas, which is split into a South, North, and Central Watershed Management Areas (WMA). The total area of the Newport Bay Watershed is approximately 154 square miles (98,500 acres) of the Central Orange County WMA. Each watershed is comprised of a network of municipal drains and channels that ultimately deliver stormwater to Newport Bay.

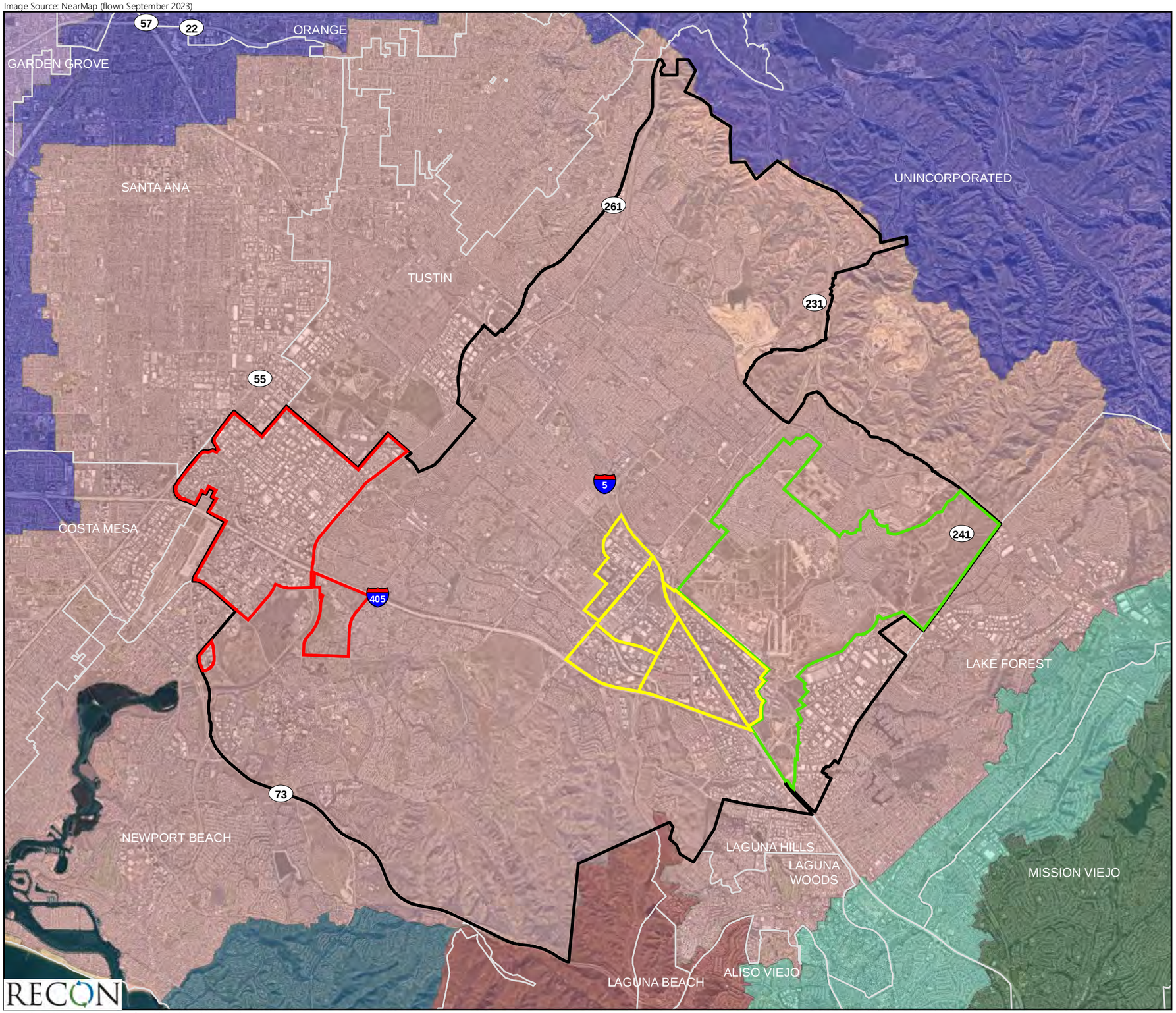
Section 303(d) of the federal Clean Water Act (CWA) requires states to identify and establish a list of water bodies for which technology-based effluent limitations required by section 301 of the CWA are not stringent enough to attain and maintain water quality standards. Table 4.8-1 lists Impaired Water Bodies in the City.

Table 4.8-1
Impaired Water Bodies in the City

Water Body/Channel	List of 303(d) Impairments	TMDL
Borrego Creek (Reach 2)	Ammonia, Indicator Bacteria	
Peters Canyon Channel	Benthic Community Effects, DDT, Indicator Bacteria, Malathion, pH, Selenium, Toxaphene, Toxicity	DDT, Toxaphene
San Diego Creek Reach 1	Benthic Community Effects, DDT, Indicator Bacteria, Malathion, Nutrients, Sedimentation/Siltation, Selenium, Toxaphene, Toxicity	Newport Bay/San Diego Creek Nutrient TMDL, Newport Bay Toxics TMDL,
San Diego Creek Reach 2	Sedimentation/Siltation, Nutrients, Indicator Bacteria, Benthic Community Effects, Toxicity	

SOURCE: State Water Resources Control Board 2018.

Image Source: NearMap (flown September 2023)



Irvine City Boundary
Focus Area 1
Focus Area 2
Focus Area 3

Watershed

Aliso
Anaheim Bay
Laguna Coast
Newport Bay
Newport Coastal
San Juan Creek
Santa Ana River

0 Miles 1.5

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FIGURE 4.8-1
Watersheds

4.8.1.2 Storm Water Drainage Systems

Construction Site Runoff

Stormwater runoff is caused by natural precipitation, and urban runoff is water generated by human use, such as irrigation systems. Stormwater runoff from construction sites contains pollutants and sediment that can potentially be carried offsite via the storm drain system and to downstream water bodies, catch basins, and ultimately, to conveyance channels and to Newport Bay. Construction site sediments and pollution can cause chemical, biological, and physical harm to local waterways.

Post-construction Site Runoff

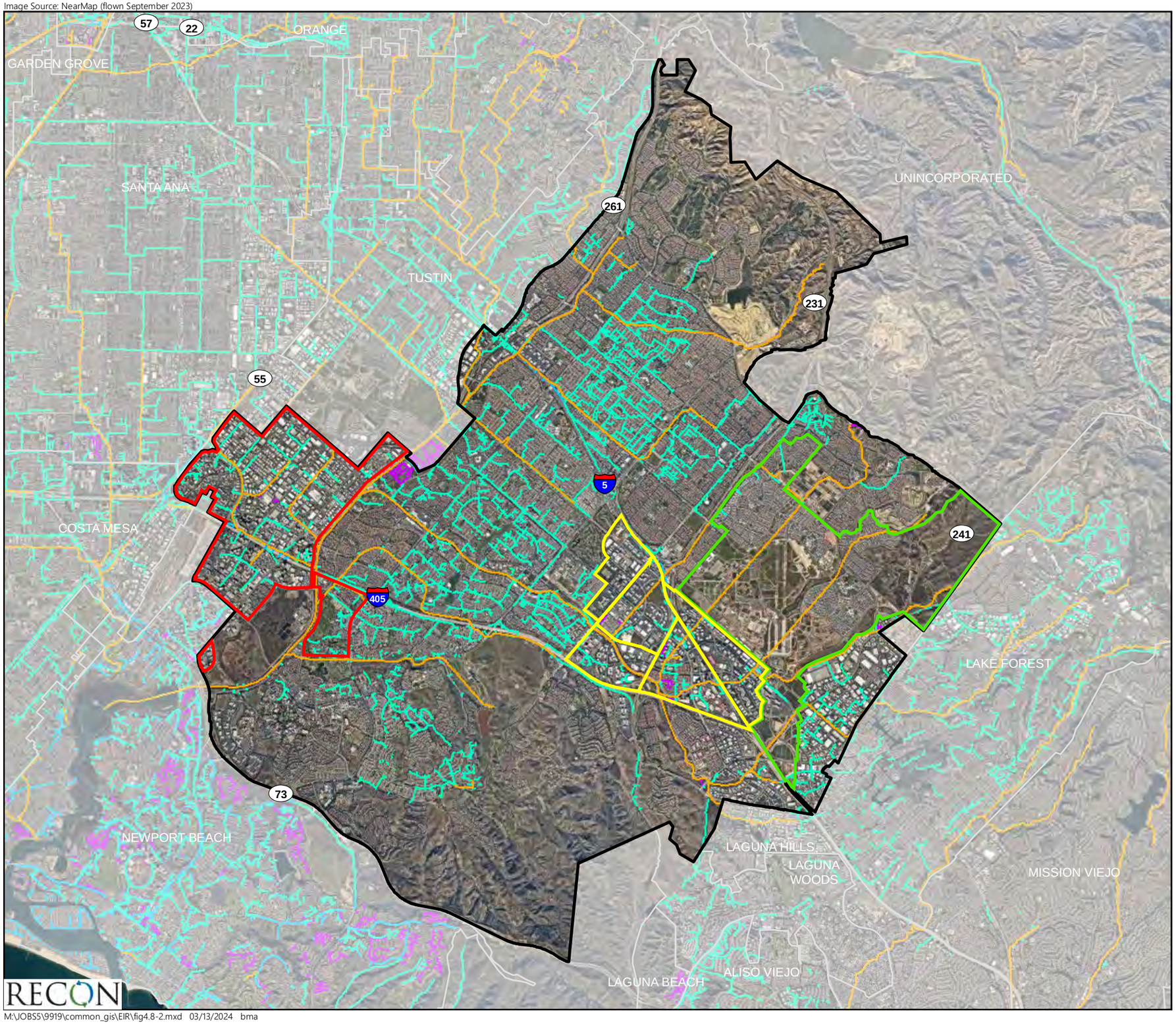
Post-construction runoff can come from landscaping irrigation (urban runoff) and natural precipitation (stormwater runoff). Under the Orange County permit (Order No. R8-2009-0030, amended by Order No. R8-2010-0062), new development and redevelopment must match the pre-project water balance (i.e., the amount of water that becomes runoff) for the two-year frequency storm event.

The local storm drain system is owned and maintained by the City and maintained by the Public Works and Transportation Department. The regional flood control system is owned and maintained by the Orange County Public Works Department (OCPW). Local storm drain facilities are designed to accommodate 25-year flow requirements, and the regional County facilities are designed to accommodate 100-year storm events. Figure 4.8-2 presents the existing storm drain system throughout the City. The City has an ongoing monitoring and maintenance procedure to ensure the storm drain system functions effectively. To prevent against significant flooding during storm events, OCPW and the City monitor and maintain its respective channels and storm drain system to ensure they are conveying storm flows as designed.

The City was designed as a master planned community. As such, the City is divided into various planning areas or "villages." As each planning area was developed, they were required to implement the necessary storm drain system for the full buildout of the planning area. This was repeated for all planning areas, resulting in a well-functioning storm drain system.

The City contains both natural areas where stormwater can be recharged into the ground and urbanized areas that are dominated by impervious (nonporous) surfaces and other hardscapes. However, most waterways in the City are channelized for flood control purposes. Because growth in the City has been master planned, stormwater infrastructure has been improved incrementally as the City has grown, keeping pace as development has occurred. Deficiencies in the system are limited. Periodically, the OCPW scours the San Diego Creek Channel to reduce sedimentation and ensure the proper functioning of channels.

Image Source: NearMap (flown September 2023)



Irvine City Boundary
Focus Area 1
Focus Area 2
Focus Area 3

Storm Drain

City
State
County
Federal
OCFCD
Private

0 Miles 1.5

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FIGURE 4.8-2
Storm Drain System

In 1997, the Irvine Ranch Water District (IRWD) implemented a treatment program, by creating wetlands that use organisms, plants, and soil to naturally remove bacteria, nitrogen, and phosphorus from water. The wetlands at the San Joaquin Marsh and Wildlife Sanctuary in the City use this natural treatment process to handle urban runoff from San Diego Creek. Plants and soils in the manmade ponds take about seven to 10 days to remove nitrates and other pollutants and deliver cleaner water back into the creek before it makes its way through Upper Newport Bay to the ocean. The success of the program led to the expansion of the natural treatment system (NTS) created throughout the San Diego Creek watershed to treat urban runoff prior to reaching the San Joaquin Marsh. There are approximately 40 smaller NTS systems currently built and operating with additional sites under consideration. Overall, the NTS program has resulted in a significant improvement in water quality for dry weather flows and smaller storm events resulting in the protection of existing receiving waters.

4.8.1.3 Flooding and Dam Inundation

Dam failure can result from several causes such as earthquakes, rapidly rising floodwaters, and structural design flaws. These hazards can occur instantaneously or gradually depending on the source of the failure. Inundation associated with these events has the potential to cause loss of life, damage property, and other ensuing hazards, as well as the displacement of persons residing in the inundation path. There are seven dams that have the potential to inundate areas of the City if failure were to occur. Of these dams, three of them are located within Irvine and four are located outside of the City limits.

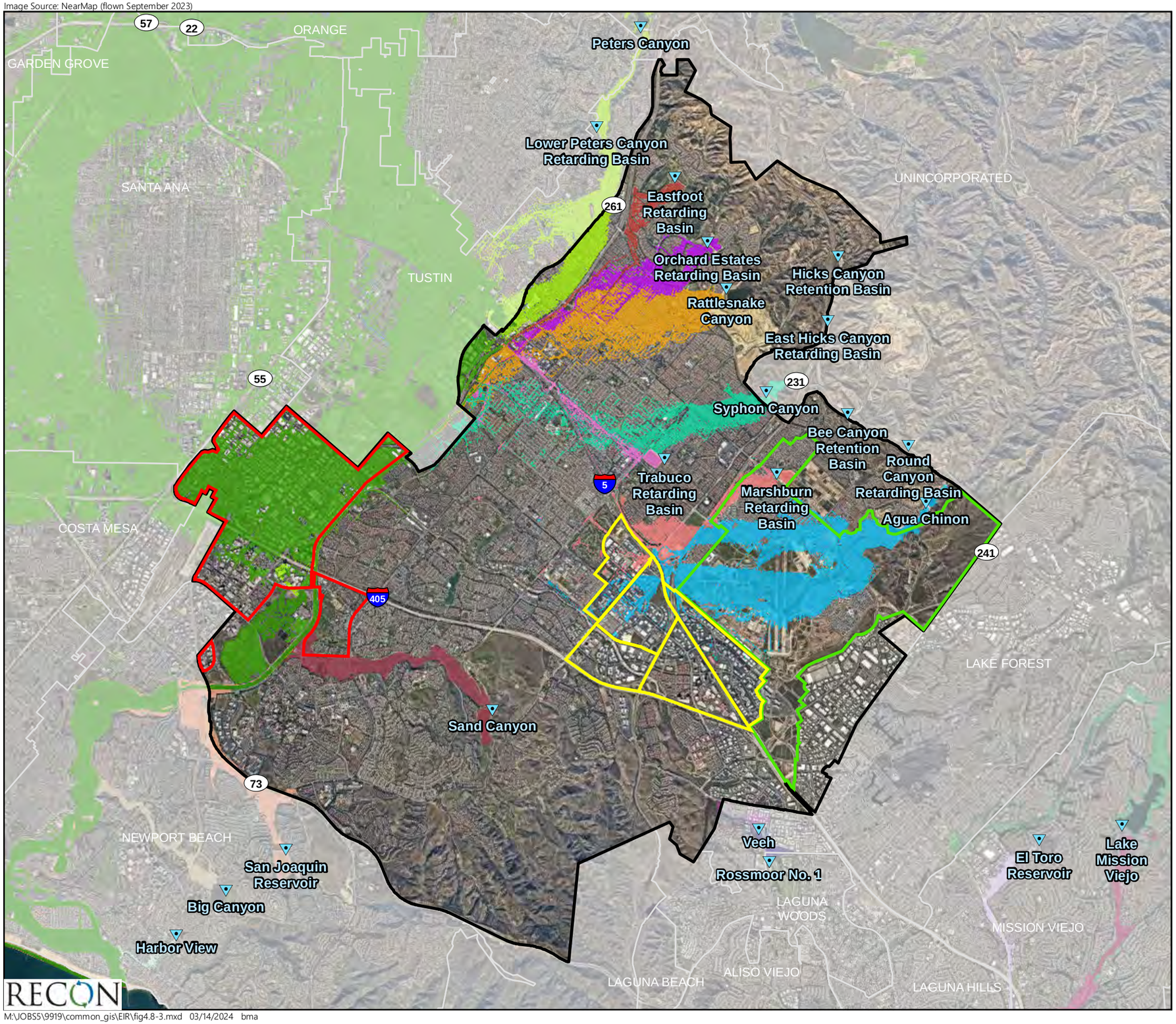
Flooding could occur from severe rainfall or from dam failure (Table 4.8-2). Dam inundation is flooding caused by the release of impounded water from structural failure or overtopping of a dam. Seiches or tsunamis can result from abrupt movements of large volumes of water due to earthquakes, landslides, volcanic eruptions, meteoric impacts, or onshore slope failure. Figure 4.8-3 presents the areas within the City that have been identified as having the potential to be subject to dam inundation. The risk of flooding due to dam failure is limited to the period during and immediately after major storms.

Table 4.8-2
Dams with Potential to Inundate Areas of Irvine

Dam Name	Owner/Operator	Year Built	Volume Water Impounded (acre-feet)
Rattlesnake Canyon Reservoir	Irvine Ranch Water District	1959	1,480
Sand Canyon Reservoir	Irvine Ranch Water District	1912	768
Syphon Canyon Reservoir	Irvine Ranch Water District	1966	535
Peters Canyon Reservoir	County of Orange	1932	626
Santiago Dam	Irvine Ranch Water District and Serrano Water District	1931	25,000
San Joaquin Reservoir	Irvine Ranch Water District	1966	>3,000
Villa Park Dam	Orange County Flood Control District	1963	>15,000

SOURCE: City of Irvine 2024a.

Image Source: NearMap (flown September 2023)



- Irvine City Boundary
- Focus Area 1
- Focus Area 2
- Focus Area 3
- Dams

Dam Inundation Area

- Agua Chinon
- Big Canyon
- Eastfoot Retarding Basin
- El Toro Reservoir
- Harbor View
- Lake Mission Viejo
- Lower Peters Canyon Retarding Basin
- Marshburn Retarding Basin
- Orchard Estates Retarding Basin
- Peters Canyon
- Rattlesnake Canyon
- Rossmoor No 1
- San Joaquin Reservoir
- Sand Canyon
- Santiago Creek
- Syphon Canyon
- Trabuco Retarding Basin
- Upper Oso
- Veeh
- Villa Park

0 Miles 1.5

FIGURE 4.8-3
Dam Inundation Areas

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The National Flood Insurance Act (1968) established the National Flood Insurance Program, which is based on the minimal requirements for flood plain management and is designed to minimize flood damage within Special Flood Hazard Areas. The Federal Emergency Management Agency (FEMA) is the agency that administrates the National Flood Insurance Program. Figure 4.8-4 presents the location of areas that have been mapped by FEMA as floodways, 100-year (1 percent annual chance of flooding) and 500-year flood hazard zones (0.2 percent annual chance of flooding)

Future development within a designated flood zone would be required to follow FEMA and the City's Floodplain District requirements, including flood analysis, proper setbacks, and sufficient pad elevations. Table 4.8-3a through 4.8-3d present the acreage of land within the City and three focus areas that are targeted for future development under the project, which have been assigned a FEMA flood zone designation. Descriptions of the focus areas can be found in Chapter 3.0 of this PEIR.

Table 4.8-3a
FEMA Floodplains/Floodways within the City

Floodplain/Floodway	Acres
500-year Floodplain	1,1150.09
100-year Floodplain	1,288.76
Floodway	294.01
TOTAL	**2,732.86**
SOURCE: FEMA 2024.	

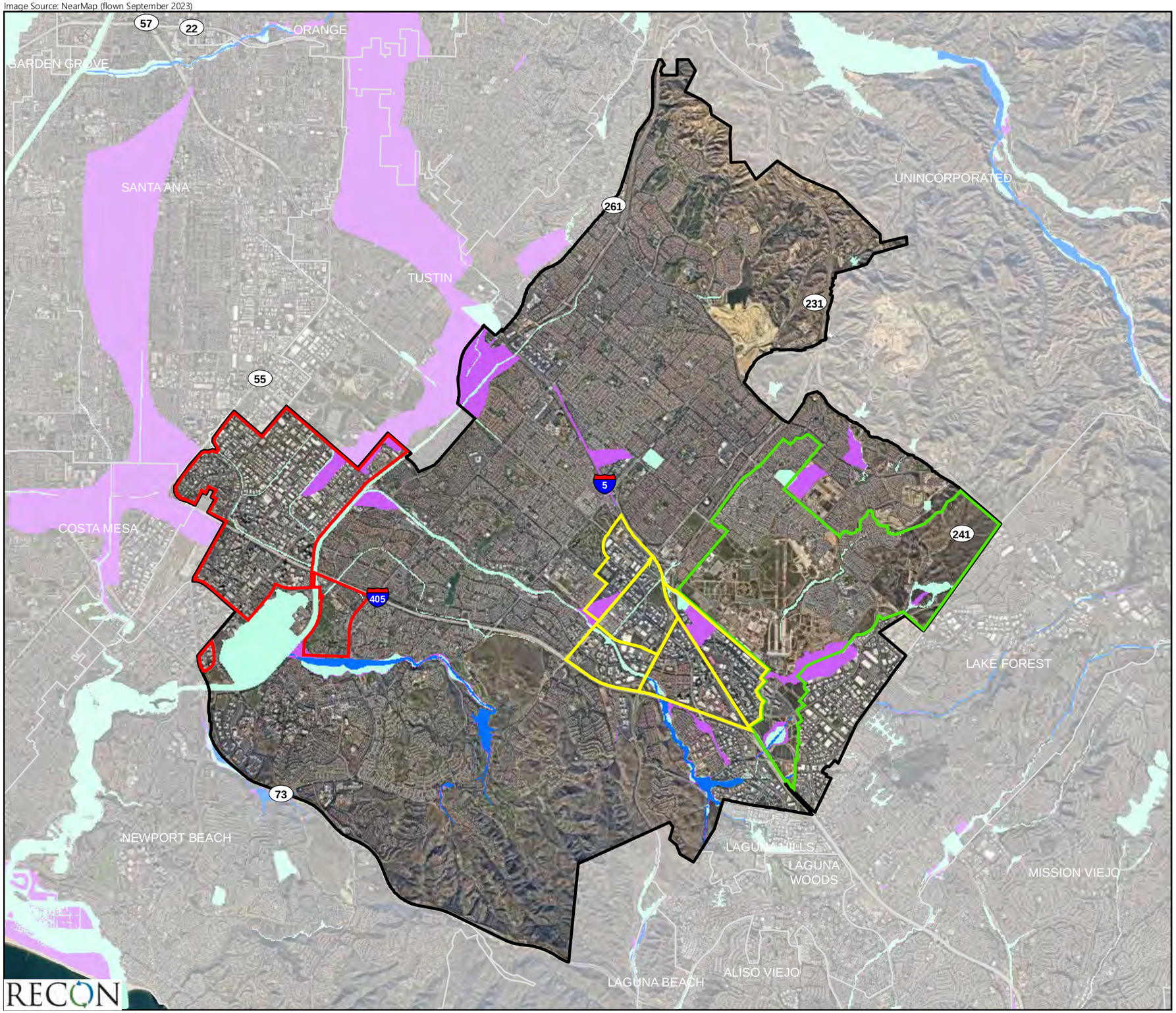
Table 4.8-3b
FEMA Floodplains/Floodways within Focus Area 1: Greater Irvine Business Complex Area

Floodplain/Floodway	Acres
500-year Floodplain	127.34
100-year Floodplain	84.44
Floodway	0
TOTAL	**211.78**
SOURCE: FEMA 2024.	

Table 4.8-3c
FEMA Floodplains/Floodways within Focus Area 2: Greater Spectrum Area

Floodplain/Floodway	Acres
500-year Floodplain	125.34
100-year Floodplain	64.65
Floodway	5.86
TOTAL	**195.85**
SOURCE: FEMA 2024.	

Image Source: NearMap (flown September 2023)



Irvine City Boundary
Focus Area 1
Focus Area 2
Focus Area 3

FEMA Flood Zones

Floodway
100-Year Flood Zone
500-Year Flood Zone

0 Miles 1.5

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FIGURE 4.8-4
FEMA Flood Zones

Table 4.8-3d FEMA Floodplains/Floodways within Focus Area 3: Great Park Neighborhood Transit Village	
Floodplain/Floodway	Acres
500-year Floodplain	138.73
100-year Floodplain	131.64
Floodway	9.28
TOTAL	**279.65**
SOURCE: FEMA 2024.	

4.8.1.4 Groundwater

The City and its sphere of influence are located within the Coastal Plain of Orange County groundwater basin also known as Basin 8-1. Under the Sustainable Groundwater Management Act (SGMA), Basin 8-1 is classified as a medium priority basin, due to heavy reliance on the Basin's groundwater as a source of water supply. IRWD's local surface water supplies are the drainage tributary areas to the Irvine Lake and Harding Canyon Reservoir. On average, about 4,000-acre feet per year is captured for IRWD's demands. Water supplies available from the Harding Canyon are often limited due to dry weather conditions. Recycled water meets about 33 percent of IRWD's (non-potable; agricultural irrigation, landscape, golf course, commercial, and industrial uses) water demands. In 2020, approximately 24,626 AF of wastewater was recycled within the service area from the Michelson Water Recycling Plant and Los Alisos Water Recycling Plant (Table 6-3). In the case there are insufficient supplies of treated wastewater for use from the Michelson Water Recycling Plant and Los Alisos Water Recycling Plant, supplemental imported water can be used.

IRWD operates the Peters Canyon Channel Water Capture and Reuse Project which captures dry weather runoff from three storm drain diversion facilities prior to flows entering Peters Canyon Channel. The dry weather runoff is then delivered to Orange County Sanitation District for treatment and subsequent discharge to Orange County Water District's Groundwater Replenishment System for eventual groundwater recharge. There are currently no commitments for purchase of desalination water by IRWD.

Portions of the groundwater table beneath the City have high salts levels because of the natural geology and the history of agricultural use. The Irvine Desalter Project includes five wells located near the segment of Interstate5 within the City. Salty water is pumped from these wells and sent to the Irvine Desalter Project treatment facility. The treatment process uses reverse osmosis, decarbonation, and disinfection to make the water suitable for drinking purposes. Purified water provides 5,100 acre-feet or 1.6 billion gallons of drinking water, enough for 50,000 people per year.

The El Toro Groundwater Remediation program is designed to address trichloroethylene (TCE) in the groundwater basin beneath the former Marine Corps Air Station (MCAS) El Toro. TCE is a volatile organic compound that was used as a solvent for aircraft cleaning prior to the development of stricter environmental regulations. The IRWD, OCWD, and federal authorities are pumping water from a three-square-mile plume, treating the water, and returning the cleaned water to irrigate landscaping. This program provides 1.3 billion gallons of clean water annually.

Nitrate is one of the most common and widespread contaminants in groundwater supplies. Elevated levels of nitrate originate from fertilizer use, animal feedlots, wastewater disposal systems, and other sources. Plants and bacteria break down nitrate, but excess amounts can leach into groundwater. Certain portions of the City have nitrate levels exceeding maximum contaminant levels (MCLs) established in state law. IRWD Wells 21 and 22 contain nitrate at levels exceeding the primary MCL of 10 milligrams per liter and total dissolved solids concentrations above the secondary MCL. IRWD has therefore constructed a reverse osmosis treatment facility to reduce concentrations in the water to meet state water quality standards before conveying water to the potable supply distribution system.

Selenium is a naturally occurring micronutrient found in soils and groundwater in the Newport Bay Watershed. Selenium is essential for reproductive health and immune system function in humans, fish, and wildlife. However, selenium bio-accumulates in the food chain and can cause public health concerns. Prior to urban development, the Irvine Subbasin contained an area known as the Swamp of the Frogs. Runoff from local foothills over thousands of years accumulated selenium-rich deposits in the swamp. To make this region suitable for farming, drains and channels were constructed. This mobilized selenium from sediments into the shallow groundwater. Thus, the Nitrogen and Selenium Management Program was formed to develop and implement a work plan to address selenium and nitrate in the watershed to comply with the requirements of National Pollutant Discharge Elimination System (NPDES) Permits issued by the Santa Ana Regional Water Quality Control Board (RWQCB).

4.8.2 Applicable Regulatory Requirements

4.8.2.1 Federal Regulations

a. Federal Water Pollution Control Act (also known as Clean Water Act)

The CWA, enacted in 1972, is intended to restore and maintain the integrity of the nation's waters through a system of water quality standards, discharge limitations, and permits. The fundamental purpose of the CWA is to protect the designated beneficial uses of water resources. Section 303(d) of the CWA defines water quality standards as consisting of both the uses of surface waters (beneficial uses) and the water quality criteria applied to protect those uses (water quality objectives). State and regional water quality control boards have been charged with ensuring that beneficial uses and water quality objectives are established for all waters of the state. Development in the City would be subject to the NPDES to protect water resources and control pollutants in runoff.

Section 303(d) of the federal CWA requires states to identify and establish a list of water bodies for which technology-based effluent limitations required by section 301 of the CWA are not stringent enough to attain and maintain water quality standards. The list must be submitted by the State Water Resources Control Board (SWRCB) to the US Environmental Protection Agency every two years for review and approval. The water bodies on the 303(d) list are termed "impaired water bodies." For each water-quality-limited segment of water bodies identified in the 303(d) list, each respective RWQCB must develop a plan to determine the "total maximum daily load" (TMDL)—the maximum amount of a pollutant that a water body can receive per day and still attain water quality standards—or take other action to address the impairment. The implementation of and goal of a TMDL is to

reduce pollutant loads to an impaired water body so as to regain the beneficial uses of the water body.

b. Federal Emergency Management Agency

FEMA is the primary agency in charge of administering programs and coordinating with communities to establish effective floodplain management standards. FEMA is responsible for delineating areas of flood hazards. It is then the responsibility of state and local agencies to implement the means of carrying out FEMA requirements. Flood zones are geographic areas that FEMA has defined according to varying levels of flood risk. These zones are depicted on a community's Flood Insurance Rate Map (FIRM) or Flood Hazard Boundary Map. Each zone reflects the severity or type of flooding in the area.

4.8.2.2 State Regulations

a. Porter-Cologne Water Quality Control Act

This act, which is a portion of the State Water Code, established responsibilities and authorities of the State Water Resources Control Board (SWRCB) and its nine RWQCBs. Each RWQCB is directed to adopt water quality control plans for the waters of an area to include identification of beneficial uses, objectives to protect those uses, and an implementation plan to accomplish the objectives. The City is under the jurisdiction of the Santa Ana RWQCB.

b. Sustainable Groundwater Management Act

In 2014, California lawmakers passed the SGMA, which mandates that all groundwater basins within the state be managed to ensure long-term water supply reliability. Under SGMA, each high and medium priority basin, as identified by the California DWR, must have a groundwater sustainability agency that will be responsible for groundwater monitoring and the development of a groundwater sustainability plan to ensure long-term groundwater sustainability and prevent overdraft. While the Orange County Water District's (OCWD) water basin is not in overdraft, OCWD prepared a groundwater management plans to further long-term groundwater sustainability. The plan describes basin hydrogeology, water supply monitoring, management and operation of recharge facilities, groundwater replenishment system, seawater intrusion and barrier management, and water quality protection.

c. State Water Resources Control Board (SWRCB) General Construction Permit 2022

The State Water Board adopted the 2022 Construction Stormwater General Permit, Order 2022-0057-DWQ, on September 8, 2022, and it went into effect on September 1, 2023. State and regional water quality control boards have been charged with ensuring that beneficial uses and water quality objectives are established for all waters of the state. Development in the City would be subject to the NPDES to protect water resources and control pollutants in runoff. The General Construction Permit is administered at the local level by the Santa Ana RWQCB.

4.8.2.3 Regional Regulations

a. Orange County Municipal Stormwater Permit and Orange County Drainage Area Management Plan

The 2009 Orange County Municipal Stormwater Permit as amended by Order No. R8-2010-0062 is currently in effect. The Permit includes new development and significant redevelopment project requirements to demonstrate compliance with CWA regulations. Permit requirements are implemented through the Drainage Area Management Plan (DAMP), which includes the Model Water Quality Management Plan (WQMP) and Technical Guidance Document. These documents assist project proponents with addressing post-construction urban runoff and stormwater pollution from new development and significant redevelopment projects that qualify as Priority Projects. The specific water pollutant control elements of the Orange County Stormwater Program are documented in the DAMP which is the primary policy, planning and implementation document for municipal NPDES Stormwater Permit compliance. DAMP Section 7 ensures that all new development and significant redevelopment incorporate appropriate Site Design, Source Control and Treatment Control Best Management Practices (BMPs) to address specific water quality issues.

The Model WQMP has been developed to assist development project proponents with addressing post-construction urban runoff and stormwater pollution from new development and significant redevelopment projects that qualify as Priority Projects. In general, Priority Projects include new development that creates 10,000 square feet of impervious surface and significant redevelopment that adds or replaces 5,000 or more square feet of impervious area on an already developed site.

The Model WQMP describes the process that project proponents would employ for developing a Project WQMP for individual new development and significant redevelopment projects. A Project WQMP is a plan for minimizing the adverse effects of urbanization on site hydrology, runoff flow rates and pollutant loads. The Permit also encourages development of Conceptual or Preliminary WQMPs in the planning stage prior to submission of a final Project WQMP.

The Technical Guidance Document is intended to provide guidance on how to complete the Conceptual/Preliminary WQMP and/or the Project WQMP. The Municipal Stormwater Permit requires the use of Low Impact Development (LID), site design practices, hydromodification control BMPs, source control BMPs and treatment control BMPs as a stormwater management strategy. LID emphasizes retention or biotreatment and the use of site features integrated with distributed stormwater controls that are designed to more closely mimic natural hydrologic patterns of pre-development condition than traditional stormwater controls. The Technical Guidance Document includes preventative site design practices as well as mitigative LID best management practices.

Santa Ana Regional Water Quality Control Plan

Pursuant to the Santa Ana Region (North Orange County) NPDES Permit, the 2003 Orange County Drainage Area Management Plan for New Development and Significant Redevelopment lists the following potential impacts to be considered during CEQA review:

- Potential impact of project construction on stormwater runoff

- Potential impact of project's post-construction activity on stormwater runoff
- Potential for discharge of stormwater pollutants from areas of material storage, vehicle or equipment fueling, vehicle or equipment maintenance (including washing), waste handling, hazardous materials handling or storage, delivery areas, loading docks, or other outdoor work areas
- Potential for discharge of stormwater to affect the beneficial uses of the receiving waters
- Potential for significant changes in the flow velocity or volume of stormwater runoff to cause environmental harm
- Potential for significant increases in erosion of the project site or surrounding areas
- Potential decreases in quality and quantity of recharge to groundwater
- Potential impact of pollutants in stormwater runoff from the project site on any 303(d) listed "impaired" water bodies

The Industrial General Permit (IGP) is an NPDES permit that regulates discharges associated with 10 broad categories of industrial activities. The IGP requires the implementation of management measures that would achieve the performance standard of best available technology that is economically achievable and best conventional pollutant control technology. The IGP also requires the development of a SWPPP and a monitoring plan. Through the SWPPP, sources of pollutants are identified and the means to manage the sources to reduce stormwater pollution are described.

b. Regional Flood Control Master Plan

The 1999 Regional Flood Control Master Plan for San Diego Creek serves as the comprehensive engineering and flood protection document for the City's regional flood control facilities. The Orange County Flood Control District (OCFCD) and the City use the master plan to regulate peak flow discharges and ensure that runoff is managed in accordance with the design parameters in the master plan. When the City processes major land use changes within the watershed, detailed studies and addendums to the master plan are required. The master plan is used to determine where detention and flow attenuation is required to match up with the ultimate conditions within the master plan. The City also pays its fair contribution for any large-scale OCFCD flood control improvements that benefit the City.

4.8.2.4 Local Regulations

a. Water Resources Master Plan

IRWD developed a comprehensive planning document titled Water Resources Master Plan (WRMP) that identifies existing and future planned water supply sources and demands to effectively manage such a large water system. The most recent updated occurred in 2019. The data within the WRMP is used for hydraulic modeling, the groundwater work plan, assessments of available water supply for specific development projects as required by CWC Section 10910, sub-area master plans and basin pumping projections. As part of the WRMP, the IRWD Capital Program identifies short-term and long-term projects needed to maintain future demands while accounting for replacement and

maintenance for existing facilities. In addition to the Capital Program, the Financial Plan includes infrastructure repair and replacement funds and identifies how to pay and manage the long-term funding requirements.

b. Urban Water Management Plans

Through Urban Water Management Plan (UWMP) reporting, IRWD uses population growth, climate scenarios, water supplies, water conservation, large development projects and approved specific plans and other factors to estimate future water demand and evaluate the ability to meet this demand through various water supply sources over a 20-year projection. This document is required by the California Water Code and based on the Water Resources Master Plan, with certain elements required by the water code. It is updated every five years, and the latest revision was prepared in 2020.

c. Local Hazard Mitigation Plan

The Local Hazard Mitigation Plan (LHMP) is designed to identify the City's hazards, estimate the probability of future occurrences, and set goals to mitigate potential risks to reduce or eliminate long-term natural or made-made hazard risks to life and property. The LHMP identifies specific hazards related to flooding and erosion that could result in damage to life and/or property. The LHMP also establishes hazard priority and identifies mitigation strategies for reducing losses associated with these hazards.

d. Municipal Code

The following regulations from the Municipal Code address hydrology and water quality.

Title 5 (Planning), Division 10 (Grading Code and Encroachment Regulations), Chapter 1 (Grading Code)

The City's Grading Code establishes rules and regulations to control excavation, grading, and earthwork, construction (including fills and embankments), and establishes administrative requirements for issuance of grading permits, approval of plans, and inspection of grading construction in accordance with the requirements for grading and excavation contained in the California Building Code as adopted and modified by City ordinance. The Grading Code also contains erosion control requirements and guidelines for the preparation of erosion control plans.

Title 6 (Public Works), Division 8 (Pollution), Chapter 3 (Stormwater/Urban Runoff)

This section of the Municipal Code also outlines the provisions for the control of stormwater/urban runoff in the City and provides legal authority to enforce the requirements within the City's NPDES Permit as it pertains to new development and significant redevelopment, such as the requirement for submittal of a Water Quality Management Plan.

e. Grading Manual

The City Grading Manual is a compilation of rules, procedures, and interpretations necessary to carry out the provisions of the City Grading Code. The purpose of the Grading Manual is to assist users of the Grading Code by supplementing it with detailed information regarding rules, interpretations, standard specifications, procedures, requirements, forms and other information applicable to control excavation, grading and earthwork construction in the City. The Grading Manual also contains erosion control requirements. For example, Section 9.4 (Disposal) of the Grading Manual states that all drainage generated within development, which includes surface water and all drainage facilities, shall drain independently within a system of disposal approved by the City. Drainage shall be designed to carry water to the nearest practical street, storm drain, or natural watercourse. Erosion of ground in the area of discharge, including a return of flow to a natural sheet flow condition, shall be prevented by installation of nonerosive down-drains, riprap, energy dissipators or other approved devices.

f. Planning Commission Resolution No. 09-2968

Standard Conditions are adopted by Planning Commission Resolution No. 09-2968. These conditions assist staff in applying standardized wording for frequently used conditions of approval to discretionary and subdivision applications. Standard conditions are applied on a case-by-case basis depending upon the specifics of the application. Companion conditions are cross-referenced and are required to be used together. The following standard conditions related to hydrology and water quality apply:

Standard Condition 2.7 (Groundwater Survey)

Prior to the issuance of precise grading permits, the applicant shall submit to the Chief Building Official a groundwater survey of the entire site. The analysis shall be prepared by a licensed geotechnical engineer versed in groundwater analysis and shall include the following information and analysis:

- Potential for perched groundwater intrusion into the shallow groundwater zone upon buildout.
- Analysis for relief of groundwater buildup and properties of soil materials on-site.
- Impact of groundwater potential on building and structural foundations.
- Proposed mitigation to avoid potential for groundwater intrusion within five feet of the bottom of the footings.

Standard Condition 2.11 (Special Flood Hazard Area)

Prior to the issuance of a precise grading permit for any lot or parcel wholly or partially located within the Special Flood Hazard Area (SFHA, FP 2 District), the applicant shall submit one of the following:

- The final approved Letter of Map Revision (LOMR) to the Flood Plain Administrator, as designated by the City Engineer; or

- Preliminary Elevation Certificates (North American Vertical Datum [NAVD] 1988) for each proposed structure based on construction documents to the Chief Building Official; or
- For nonresidential construction only, a preliminary Floodproofing Certificate based on construction documents to the Chief Building Official.

Standard Condition 2.12 (Water Quality – Notice of Intent)

Prior to the issuance of preliminary or precise grading permits for a project that would result in soil disturbance of one or more acres of land, the applicant shall provide the Chief Building Official with evidence that a Notice of Intent (NOI) has been filed with the State Water Resources Control Board. Such evidence shall consist of a copy of the NOI stamped by the State Water Resources Control Board or the Regional Water Quality Control Board, or a letter from either agency stating that the NOI has been filed.

Standard Condition 2.13 (Water Quality Management Plan)

Prior to the issuance of preliminary or precise grading permits, the applicant shall submit to the Chief Building Official for review and approval, a WQMP that would identify the BMPs and the full capture system that would be used on the site to control predictable pollutant runoff, and to meet Statewide Trash Provisions requirements.

Standard Condition 3.3 (Disclosure Statements)

Prior to the issuance of building permits, the applicant shall submit to the Director of Community Development for review and approval a completed occupancy disclosure form for the project. The approved disclosure form, along with its attachments, shall be included as part of the rental/lease agreements and as part of the sales literature for the project. The disclosure statement shall include information, current as of the date of submittal, with respect to each item marked with an "x" on the list below. The items marked "n/a" need not be included.

- Information on Noise resulting from aircraft and/or helicopter operations from John Wayne Airport.
- Reference to Emergency Preparedness information available on the City of Irvine website at www.cityofirvine.org/office-emergency-management.
- Map of Special Flood Hazard Area information for areas subject to inundation.
- Notice that initial occupancy and any subsequent change in use or occupancy of any nonresidential condominium space, requires the buyer or the new or existing occupant to apply to the Community Development Department and obtain approval by way of a of written zoning confirmation letter or obtain a building permit and obtain inspection approval for any necessary work to establish the use and/or occupancy consistent with that intended.
- Notice that the property owner shall be responsible for continuous maintenance of the emergency access equipment thus ensuring these systems will be operational at all times, as required by the Chief of Police.

- Notice that the property is located near and/or adjacent to private and/or public park(s) that may include recreational, field/court lighting, and other related improvements.
- Notice that the property is located near and/or adjacent to public open space land that may include trails, trailheads, parking facilities, and other related improvements and operations.
- Notice that the property is located near and/or adjacent to public trails and/or related improvements and operations.
- Notice that residential buildings such as single-family homes, condominiums and apartments are prohibited from being used as short-term rentals (aka vacation rentals). A rental arrangement for a term of less than 31 days is considered "short-term". For more detailed information contact the Community Development Department.

Standard Condition 3.4 (Special Flood Hazard Area)

Prior to the issuance of a building permit for any structure wholly or partially located within the floodplain (FP 2 District) of the Special Flood Hazard Area (SFHA), the applicant shall submit one of the following:

- The final approved Letter of Map Revision (LOMR) to the Flood Plain Administrator, as designated by the City Engineer; or
- Preliminary Elevation Certificates (based on North American Vertical Datum [NAVD] 1988) for each proposed structure based on construction documents to the Chief Building Official; or
- For nonresidential construction only, a preliminary Floodproofing Certificate for each building or structure based on construction documents showing floodproofing measures complying with adopted codes and standards and approved by the Chief Building Official.

Standard Condition 4.5 (Special Flood Hazard Area)

Prior to authorization to use, occupy, and/or operate, for any structure wholly or partially located within the Special Flood Hazard Area (SFHA, FP 2 District), the applicant shall submit one of the following:

- The final approved Letter of Map Revision (LOMR) to the Flood Plain Administrator, as designated by the City Engineer; or
- Final Elevation Certificates (based on North American Vertical Datum [NAVD] 1988) for each structure based on finished floor construction to the Chief Building Official; or
- For nonresidential construction only, a final Floodproofing Certificate for each building or structure based on completed construction.

g. Local Implementation Plan

Section A-7 of the Local Implementation Plan (LIP) has incorporated DAMP Section 7, which addresses new development and significant redevelopment. This approval processing framework ensures that both development and redevelopment occur in an organized and orderly manner that reflects the vision and needs of the community, assesses the environmental issues associated with

the proposed changes and provides a regulatory framework to ensure that standards set by the City are implemented and water quality requirements in the City's NPDES Permit are incorporated in the City's regulatory framework. The Model Water Quality Management Plan and the Technical Guidance Document provide the basis for project planning and design.

The City has also incorporated the model construction program described in DAMP Section 8 as the basis for Section A-8 of the LIP. This construction program presents requirements and guidelines for pollution prevention methods that must be used by construction site owners, developers, contractors, and other responsible parties, in order to prevent illicit discharges into the municipal storm drain system, implement and maintain structural and non-structural BMPs to reduce pollutants in storm water runoff discharged to the municipal storm drain system from construction sites, reduce construction site discharges of storm water pollutants from the municipal storm drain system to the maximum extent practicable, and prevent construction site discharges from the municipal storm drain system from causing or contributing to a violation of water quality standards in the receiving waters.

h. Sustainability in Landscaping Guideline Manual

The goal of the Sustainability in Landscaping Program is to ensure that environmental impacts and benefits of landscaping are considered throughout the planning and design process and will result in sustainable landscapes. The ordinance defines a sustainable landscape as one that provides positive levels of carbon storage and oxygen productivity after all demands for energy, water, soil improvement and maintenance activities to support have been accounted for. Concept plans and village-wide zone change applications require a proposed landscape design and management objectives which are consistent with the landscape manual. The manual includes design guidelines pertaining to: landscape productivity, plant associations, energy conservation, water conservation, microclimate improvement, and soil management.

i. Existing Plans, Programs, and Policies

Compliance measures are regulations imposed uniformly by the approving agency based on the proposed action taken and are required of the project to reduce its potential environmental effects. Because these features are standard requirements, they do not constitute mitigation measures. The following measures are existing plans, programs, or policies (PPP) that apply to the project and will help to reduce and avoid potential impacts related to hydrology and water quality:

- PPP HYD-1 Compliance with General Construction Permit
- PPP-HYD-2 Compliance with Section 303(d) of the federal Clean Water Act
- PPP-HYD-3 Compliance with the Santa Ana RWQCB Regional Water Quality Control Plan
- PPP-HYD-4 Compliance with the OCWD groundwater management plan
- PPP-HYD-5 Compliance with Orange County Municipal Water Stormwater Permit and Orange County Drainage Area Management Plan (DAMP)
- PPP-HYD-6 Compliance with the OCFCD San Diego Creek 19999 Regional Flood Control Master Plan
- PPP-HYD-7 Compliance with the IRWD Water Resources Master Plan
- PPP-HYD-8 Compliance with the IRWD Urban Water Management Plan (UWMP)

- PPP-HYD-9 Compliance with the City of Irvine Local Hazard Mitigation Plan
- PPP-HYD-10 Compliance with Municipal Code Title 5 (Planning), Division 10 (Grading Code and Encroachment Regulations), Chapter 1 (Grading Code)
- PPP-HYD-11 Compliance with Municipal Code Title 6 (Public Works), Division 8 (Pollution), Chapter 3 (Stormwater/Urban Runoff)
- PPP-HYD-12 Compliance with the City Grading Manual
- PPP-HYD-13 Compliance with City Standard Condition 2.7 Groundwater Survey
- PPP-HYD-14 Compliance with City Standard Condition 2.11 Special Flood Hazard Area
- -PPP-HYD-15 Compliance with City Standard Condition 2.12 Water Quality – Notice of Intent
- PPP-HYD-16 City Standard Condition 2.13 Water Quality Management Plan
- PPP-HYD-17 City Standard Condition 3.3 Disclosure Statements
- PPP-HYD-18 City Standard Condition 3.4 Special Flood Hazard Area
- PPP-HYD-19 City Standard Condition 4.5 Special Flood Hazard Area
- PPP-HYD-20 Compliance with Local Implementation Plan (LIP)
- PPP-HYD-21 Compliance with sustainability in Landscaping Guideline Manual

Proposed General Plan Strategies and Policies

In addition to the above-listed PPPs, the following proposed goals, objectives, policies, and implementation actions are applicable to the analysis of hydrology and water quality and would replace existing goals, strategies, and policies outlined in the City's existing General Plan following project approval:

Safety Element

Goal 2: Improve the community's resilience to seismic and geologic hazards by ensuring the integrity of the built environment.

Objective S-2: Seismic and Geologic Hazards. Anticipate the risks and mitigate the effects that seismic and egologic hazards pose to the community. The following policies support Goal 2:

- Policy S-2(b): Coordinate groundwater management with Orange county Water District to avoid subsidence impacts in Irvine.

Goal 3: Anticipate the risks and mitigate the effects that flood hazards pose to the community.

Objective S-3: Flood Hazards. The following policies support Goal 3:

- Policy (a): Work with Orange County Flood Control District to ensure flood control facilities are adequately provided and maintained.
- Policy (b): Collaborate with partner agencies and municipalities to align green infrastructure projects (i.e., projects that allow for filtration of stormwater where it falls) and develop regulations for watersheds across jurisdictions to reduce impervious hard surfaces.
- Policy (c): Support efforts of other organizations and academic institutions to conduct studies of the impact combined riverine and coastal flooding, groundwater intrusion, and increased precipitation has on flood risk and vulnerability.

- **Policy (d)**: Support efforts of other organizations and academic institutions to inventory and map vegetation on hillsides with a specific focus on improving hillside stability in the case of extreme rainfall and seasonal erosion.
- **Policy (e)**: Develop or update a long-term plan to address current and future flood risk to critical facilities.
- **Policy (f)**: Continue to partner with Orange County Public Works to proactively disseminate information from the "H2OC Stormwater Program" to educate home and small business owners on regulations and highlight the role that engaged residents can play to assist with community-based stormwater management.
- **Policy (g)**: Ensure resilience and long-term functionality of stormwater and sewer systems.
- **Policy (h)**: Encourage the use of climate-smart landscaped surfaces (e.g., permeable pavement, stormwater parks, green streets) in new and existing development to reduce runoff, minimize flood hazards, and maintain existing drainageways.
- **Policy (i)**: Continue to encourage the implementation of low-impact development (e.g., rain gardens and rainwater harvesting) to reduce flood risk, filter pollutants, and replenish groundwater over time.)
- **Policy (j)**: Continue to promote the application of nature-based solutions (e.g., greenways, tree trenches) to improve resilience and preserve biodiversity.
- **Policy (k)**: Coordinate with other agencies to increase the public awareness of flooding, stormwater management, and drought management issues and techniques for residents to mitigate those challenges on their property.

Goal 5: Protect the community from the threat of drought and extreme heat.

Objective S-5: Drought and Extreme Heat. The following policies support Goal 5:

- **Policy (a)**: Collaborate with federal, State, and local agencies and organizations to explore alternative water sources (e.g., desalinization) and improve capacity in consideration of increased demand and drought.
- **Policy (b)**: Continue to support Irvine Ranch Water District's recycled water program and explore opportunities to enhance water recycling.
- **Policy (c)**: Continue to support and participate in the development of a regional and local drought contingency plan.
- **Policy (d)**: Encourage drought-tolerant native landscaping, low-flow water fixtures beyond the state minimum code, and daytime watering restrictions on properties throughout the City to reduce water consumption.
- **Policy (e)**: Explore the feasibility of recycled water distribution for residential uses on all lot sizes.
- **Policy (f)**: Protect groundwater supply against contamination, degradation, or loss due to flooding.
- **Policy (g)**: Promote a system for rapidly detecting, reporting, and repairing water leaks in public facilities and the water conveyance system.
- **Policy (h)**: Promote nature-based methods and best management practices (BMPs) (e.g., bioswales, rain gardens, natural ground cover) through the City's stormwater program to promote groundwater infiltration and reduce the impacts of drought.

- Policy (i): Support regional partners in education and outreach efforts focused on water conservation measures (e.g., water reuse, water use, and irrigation efficiency) for City residents.

4.8.4 Significance Determination Thresholds

The City has adopted Appendix G of the State CEQA Guidelines as the significance thresholds for hydrology and water quality impacts. A project would normally have a significant effect on the environment if the project would:

1) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality;
2) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin;
3) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:
    i) result in a substantial erosion or siltation on- or off-site;
    ii) substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite;
    iii) create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or
    iv) impede or redirect flood flows;
4) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation; or
5) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan.

4.8.5 Methodology

The potential for significant impacts associated with the project has been determined based upon review of existing information and data relative to the hydrology and water quality resources available for the City. Additionally, an existing conditions infrastructure report was prepared for the project that included a review of existing City, local, and federal datasets.

4.8.6 Topic 1: Violate Water Quality Standards/Degrade Water Quality

Would the project violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?

4.8.6.1 Impact Analysis

Buildout of the project would involve the construction of up to 57,565 residential units, nonresidential uses within the Great Park area, the extension of Ada, and the continuation of nonresidential uses at the same intensities currently permitted under the City's existing General Plan.

Construction activities associated with future development would likely involve grading, paving, utility installation, building construction, and landscaping installation, which could result in the generation of potential water quality pollutants such as silt, debris, chemicals, paints, and other pollutants with the potential to affect water quality. In addition, refueling and parking of construction vehicles and other construction equipment may result in oil, grease, or other related pollutant leaks and/or spills that may discharge into the storm drain system.

To minimize potential water quality impacts during construction, future development would be required to comply with the statewide Construction General Permit (PPP HYD-1; SWRCB 2022), which itself requires preparation and implementation of a Storm Water Pollution Prevention Plan (SWPPP) for projects that disturb one or more acre of land and include any construction or demolition activity, including, but not limited to, clearing, grading, grubbing, or excavation, or any other activity that results in a land disturbance of equal to or greater than one acre (SWRCB 2022). A SWPPP requires the identification and implementation of BMPs to control sediment, erosion, tracking, non-stormwater, and waste management during construction and prevent such contaminants and materials from entering receiving water bodies. Future projects would also be required to comply with the City Grading Code (PPP HYD-10;Title 5, Division 10, Chapter 1), and the City Grading Manual (PPP HYD-HYD-12), which establish erosion control requirements pertaining to construction related water quality impacts including but not limited to erosion control plans and BMPs. The Grading Manual establishes slope angle, stability, fill material, compaction, setback, and other requirements to ensure erosion and pollutant control during construction of future development. Adherence to these requirements during construction would ensure that all potential pollutants of concern are prevented, minimized, and/or otherwise appropriately treated prior to being discharged. Therefore, construction impacts associated with future developments are anticipated to be less than significant.

Post-construction activities associated with operation of proposed land uses resulting from adoption of the project may have long-term impacts on stormwater quality, subsequently impacting downstream water quality. For example, future developments could create new sources of runoff contamination from changing land uses and/or from changes in pervious to impervious surfaces. As a result, development proposed throughout the City, and within the three focus areas, may increase post-construction pollutant loadings of constituent pollutants associated with future developments.

To minimize potential post-construction water quality impacts , future priority development projects would be required to prepare WQMPs in accordance with the Model WQMP and incorporate LID principles (PPP HYD-16). As described in Section 4.8.2.3.a of this Draft PEIR, "in general, Priority Projects include new development that creates 10,000 square feet of new impervious surface and significant redevelopment that adds or replaces 5,000 or more square feet of impervious area on an already developed site." A WQMP is required in the following instances: for priority development projects as defined by Section 6-8-301 of the Municipal Code; projects requiring a discretionary action involving approval of a precise plan, including projects that need coordinated and/or early water quality planning; and projects involving a nonresidential plumbing permit having the potential to impact water quality. A WQMP is prepared in accordance with the City's LIP, Model WMP, and any mitigation measures, conditions and/or requirements established under the discretionary approval process. Additionally, General Plan Policies S-3(h), S-3(i), and S-3(j) encourage implementation of erosion control measures, climate-smart landscaped surfaces, implementation of LID, and nature-based solutions to further support the City's goal of preventing and reducing operational stormwater impacts.

Furthermore, drainage patterns would largely be maintained and would utilize existing drainage facilities within the right-of-way. Because the City is primarily developed and because the three focus areas are largely urban in nature, new development would likely be development under buildout conditions. Therefore, overall operational impacts relating to stormwater quality would be less than significant.

4.8.6.2 Significance of Impacts

Adherence to the applicable laws, standards, and requirements listed above would prevent the project from violating any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality. Accordingly, impacts would be less than significant.

4.8.6.3 Mitigation

Impacts would be less than significant. No mitigation is required.

4.8.7 Topic 2: Deplete Groundwater Supplies

Would the project substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?

4.8.7.1 Impact Analysis

As described in section 4.8.1.4 above, the City and its sphere of influence are located within Basin 8-1, which is classified as a medium priority basin, due to heavy reliance on the Basin's groundwater as a source of water supply. There are minimal stormwater recovery systems. IRWD captures dry weather runoff via Peters Canyon Channel Water Capture and Reuse project (three intersections in

the channel are used to capture and send dry weather runoff to Orange County Sanitation District for treatment and eventual recharge into groundwater sources).

There are existing impacts to groundwater not associated with the project, including high levels of salt in portions of the groundwater table, TCE beneath the former MCAS El Toro, elevated nitrates resulting from agricultural uses and wastewater disposal, and selenium accumulation due to farming. Further discussion and treatment of these groundwater issues is described in section 4.8.1.4 above.

Buildout of the project would involve the construction of up to 57,565 residential units, nonresidential uses within the Great Park area, the extension of Ada, and nonresidential uses at the same intensities as permitted under the City's existing General Plan. Future development would increase impervious surfaces within the City, which would reduce the amount of rainwater that would infiltrate the soil and incrementally reduce groundwater recharge rates over time. However, the project has been designed to minimize the increase in impervious surfaces by primarily focusing future development and redevelopment within the proposed focus areas (which are existing urbanized areas), thereby reducing the amount conversion of permeable land to impermeable surfaces which would otherwise occur with more development concentrated outside of the focus areas. Additionally, future development both inside and outside of the focus areas under the project would be required to comply with federal, state, regional and local plans, programs, and policies pertaining to groundwater described in detail in section 4.8.2 above.

All future site-specific projects would be required to comply with the OCWD groundwater management plan (PPP HYD-4) . Pursuant to the Santa Ana Region (North Orange County) NPDES Permit, future development under the project would also be required to comply with WQMP new development and significant redevelopment requirements and would also be required to prepare a groundwater survey per City Standard Condition 2.7 (PPP HYD-13) prior to the issuance of precise grading permits, which would identify potential for groundwater intrusion, groundwater buildup, groundwater impact to building and structural foundations, and proposed site-specific mitigation to avoid potential for groundwater intrusion within five feet of the bottom of footings. Additionally, General Plan policies S-2(b), S-3(i), S-5(b), S-5(c), S-5(d), S-5(f), S-5(g), S-5(h), and S-5(i) within the Safety Element all support the integrity and conservation of existing groundwater supplies. Implementation of post-construction BMPs and LIDs established via a WQMP, described in more detail in Section 4.8.6.1 above, in accordance with PPP-HYD-16 would increase groundwater infiltration and replenishment, thus reducing groundwater related impacts. Therefore, construction and operation of future development projects facilitated by project approval would not interfere substantially with groundwater recharge.

4.8.7.2 Significance of Impacts

Adherence to the applicable laws, standards, and requirements listed above (including PPP HYD-4 and HYD-13) would prevent the project from substantially depleting groundwater supplies and interfering substantially with groundwater recharge, and impacts would be less than significant.

4.8.7.3 Mitigation

Impacts would be less than significant. No mitigation is required.

4.8.8 Topic 3: Drainage Patterns

Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would: (i) result in a substantial erosion or siltation on- or off-site; (ii) substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite; (iii) create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or iv) impede or redirect flood flows?

4.8.8.1 Impact Analysis

As previously described, the City is largely developed and there are no major areas of undeveloped land. Future residential and residential mixed-use development associated with the project would largely be concentrated within three primary focus areas, which are characterized by urban and developed environments. Specifically, buildout of the project would involve the construction of up to 57,565 residential units, nonresidential uses within the Great Park area, the extension of Ada, and the continuation of nonresidential uses at the same intensities as permitted under the City's existing General Plan

a. Erosion, Siltation, and Increased Surface Runoff

Future development under the project would have the potential to result in increased erosion or siltation both on- and off-site during construction and operation of future development. The alteration of drainage patterns and increase in runoff associated with the addition of impervious surfaces and structures can increase the frequency and amount of flooding which in turn could potentially result in an accelerated rate of erosion and siltation through the watershed.

The statewide General Construction Permit (PPP HYD-1; SWRCB 2022) requires preparation and implementation of a SWPPP for projects that would disturb one or more acres and include construction or demolition activity, including, but not limited to, clearing, grading, grubbing, or excavation, or any other activity that results in a land disturbance of equal to or greater than one acre (SWRCB 2022). The SWPPP would provide construction related BMPs to reduce erosion, siltation, and runoff-related impacts resulting from construction associated with future development.

Operation of future development under the project, both within the focus areas and throughout the City, would have the potential to increase surface runoff and change stream-flow velocities or quantities. Although future site-specific development would be located primarily in the three focus areas, which are urbanized areas, the potential exists to affect downstream properties if drainage patterns are changed.

For smaller infill projects that would not substantially increase impervious surface area, compliance with City stormwater requirements would reduce operational impacts. Larger site-specific projects involving substantial changes in drainage patterns, impervious surfaces, and resulting surface runoff, require preparation of a hydrology or drainage study to determine the pre- and post-construction peak runoff flow rates and velocities exiting the project site, as well as the potential for siltation and

erosion for sites discharging to naturally lined waterbodies. Post-construction erosion and siltation resulting from increased runoff would generally be avoided or reduced through site design and hydromodification control BMPs as required per PPP-HYD-3, PPP-HYD-5, PPP-HYD-10, PPP-HYD-12, and PPP-HYD-16. Projects would also be required to adhere to the City's Municipal Code (PPP-HYD-10, PPP-HYD-11), Standard Conditions (PPP-HYD-14, PPP-HYD-15), Grading Manual (PPP-HYD-12), to reduce erosion, siltation and other runoff-related impacts. Additionally, General Plan Safety Element Policies S-3(b), S-3(e), S-3(f), S-3(h), S-3(i), S-3(j), S-3(k), S-5(d), S-5(f), S-5(h), and S-5(j) would further the City's goals of reducing erosion and siltation impacts resulting from operation of future development associated with the project by increasing groundwater infiltration.

Future site-specific development projects would also be required to prepare a WQMP and identify hydromodification control BMPs to address any hydrologic conditions of concern identified that impact downstream channels and aquatic habitats. As described in more detail in Section 4.8.6.1 above, a WQMP is required for priority projects which typically include new development that creates 10,000 square feet of new impervious surface and significant redevelopment that adds or replaces 5,000 or more square feet of impervious area on an already developed site.

Therefore, compliance with existing regulations addressing stormwater runoff-related impacts would reduce potential project-related construction and operational impacts to existing drainage patterns in the area to a level less than significant.

b. Exceed Capacity of Stormwater System

Operation of future development associated with the project could result in increased impervious surfaces resulting in increased volumes of storm water runoff affecting the existing storm water drainage system. Most rainfall becomes runoff because there are minimal opportunities for infiltration in developed areas, resulting in high peak flow rates for short durations. Although future development under the project would largely occur within the three focus areas, future development may result in an increase in impervious surfaces with the potential to change runoff characteristics, including the volume of runoff, rate of runoff, and drainage patterns, which could result in flooding.

Future development would be required to comply with PPP-HYD-11, PPP-HYD-16, and PPP-HYD-14 which outline provisions for the control of stormwater/urban runoff from new development and significant redevelopment. To minimize potential post-construction stormwater capacity impacts, future priority development projects would also be required to prepare WQMPs in accordance with the Model WQMP and incorporate LID principles. As described in Section 4.8.2.3.a of this PEIR "In general, Priority Projects include new development that creates 10,000 square feet of new impervious surface and significant redevelopment that adds or replaces 5,000 or more square feet of impervious area on an already developed site." A WQMP is required in the following instances: for priority development projects as defined by Section 6-8-301 of the Municipal Code; projects requiring a discretionary action involving approval of a precise plan, including projects that need coordinated and/or early water quality planning; and projects involving a nonresidential plumbing permit having the potential to impact water quality. Additionally, General Plan Safety Element Policies S-3(h), S-3(i), and S-3(j) encourage implementation of erosion control measures, climate-smart landscaped surfaces, implementation of low-impact development (LID), and nature-based solutions to allow for increased groundwater infiltration and reduced stormwater impacts. Compliance with existing

regional and local requirements addressing stormwater would reduce and avoid potential stormwater related impacts to a less than significant level.

c. Flood Flows

Operation of future development associated with the project could increase volumes of stormwater runoff, as described in Section 4.8.8.1.a and Section 4.8.8.1.b above, resulting in the impediment or redirection of flood flows. As described above, future development would be required to adhere to the NPDES requirements to control direct stormwater discharges, and to Title 6, Division 8, Chapter 3 of the City's Municipal Code, which outlines the provisions for the control of stormwater/urban runoff from new development and significant redevelopment. All future development would include BMPs to manage polluted runoff and minimize flow volume and velocity. Compliance with the described PPPs, including those requiring implementation of BMPs and LIDs which increase groundwater infiltration thereby reducing flood flows, would reduce potential flooding impacts to a less than significant level.

4.8.8.2 Significance of Impacts

Construction and operation of future projects facilitated by project approval would be required to comply with applicable state, regional, and local regulations (PPPs HYD-1 through HYD-16). Compliance with these regulations would ensure that the project would not substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces. Therefore, impacts would be less than significant.

4.8.8.3 Mitigation

Impacts would be less than significant. No mitigation is required.

4.8.9 Topic 4: Flood hazard, Tsunami, or Seiche

In flood hazard, tsunami, or seiche zones, would the project risk release of pollutants due to project inundation?

4.8.9.1 Impact Analysis

The project is not located within a tsunami or seiche zone. Therefore, there are no potential impacts related to tsunamis. Hazardous conditions related to a seiche within North Lake or South Lake in the Woodbridge community are unlikely given the small size of the lakes and the height of the banks surrounding the lakes. No other enclosed waterbodies where a seiche could occur exist within the city (City of Irvine 2024a).

As shown in Figure 4.8-4 above, portions of the City are in areas mapped as FEMA flood zones, including 211.78 acres of Focus Area 1, 195.85 acres of Focus Area 2, and 279.65 acres of Focus Area 3.

Future development within areas mapped as flood zones would be required to comply with compliance measures as specified by City Planning Commission Resolution No. 09-2968 with respect to Special Flood Hazard Areas (PPP-HYD-14). These include obtaining an approved LOMR, a Preliminary Elevation Certificate (NAVD 1988) for each proposed structure based on construction documents to the Chief Building Official, or for nonresidential construction, a preliminary Floodproofing Certificate based on construction documents to the Chief Building Official. These forms of documentation require a project applicant to demonstrate that a future site-specific project would not place future structures at flood risk, would not generate downstream flood risks that could affect other structures, and would not be subject to risks associated with dam failure. Furthermore, the Safety Element Update includes objectives and policies related to flooding. For example, Objective S-3 aims to anticipate flood risks and minimizes the effects that flood hazards pose to the community. Supporting policies include, but are not limited to, actions aiming to improve flood control facilities, developing long-term plans to address flood risks, and partnering with other agencies to collaboratively plan for and mitigate flood risks. Compliance with relevant PPPs (PPP-HYD-5, PPP-HYD-6, PPP-HYD-9, PPP-HYD-14, PPP-HYD-HYD-18, PPP-HYD-19 PPP-HYD-21) would require stormwater management practices and design features that would reduce and avoid potential impacts related to flooding. Therefore, impacts related to the release of pollutants due to project inundation in flood hazard, tsunami, and seiche zones would be less than significant.

4.8.9.2 Significance of Impacts

The project would be required to comply with PPP HYD-5, PPP-HYD-6, PPP-HYD-9, PPP-HYD-14, PPP-HYD-HYD-18, PPP-HYD-19 PPP-HYD-21, which address flooding. Compliance with these regulations would ensure that the project would result in less than significant impacts related to a flood hazard, tsunami, or seiche zones that would risk release of pollutants due to project inundation.

4.8.9.3 Mitigation

Impacts would be less than significant. No mitigation is required.

4.8.10 Topic 5: Water Quality Plans

Would the project conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?

4.8.10.1 Impact Analysis

As described in Section 4.8.1.4 above, the City and its sphere of influence are located within Basin 8-1, which is classified as a medium priority basin, due to heavy reliance on the Basin's groundwater as a source of water supply.

As described in Section 4.8.6 and 4.8.7 above, future development associated with the project has been designed to minimize the increase in impervious surfaces by primarily focusing future development and redevelopment within the proposed focus areas which are existing urbanized areas, thereby reducing the amount conversion of permeable land to impermeable surfaces. For example, all future site-specific projects would be required to comply with the OCWD groundwater

management plan (PPP-HYD-4). Pursuant to the Santa Ana Region (North Orange County) NPDES Permit (PPP-HYD-1), future development under the project would also be required to comply with WQMP requirements for new development and significant redevelopment and would also be required to prepare a groundwater survey per City Standard Condition 2.7 (PPP-HYD-13) prior to the issuance of precise grading permits, which would identify potential for groundwater intrusion, groundwater buildup, groundwater impact to building and structural foundations, and proposed site-specific mitigation to avoid potential for groundwater intrusion within five feet of the bottom of footings.

Additionally, future development under the project would be required to comply with federal, state, regional and local plans, programs, and policies pertaining to groundwater described in detail in Section 4.8.2 above. Specifically, the following PPPs would require implementation and compliance with existing water quality control plans and sustainable groundwater management plans as conditions of approval for future development associated with the project: PPP-HYD-1, PPP-HYD-2, PPP-HYD-3, PPP-HYD-4, PPP-HYD-5, PPP-HYD-7, PPP-HYD-8, PPP-HYD-9, PPP-HYD-11, PPP-HYD-12, PPP-HYD-13, PPP-HYD-15, PPP-HYD-16, PPP-HYD-17, and PPP-HYD-20. Compliance with the existing PPPs would necessitate compliance and implementation of the existing water quality control plan and sustainable groundwater management plan, therefore impacts would be less than significant.

4.8.10.2 Significance of Impacts

Construction and operation of the project would comply with PPPs HYD-1 through HYD-5, PPP HYD-7 through HYD-9, PPP HYD-11 through HYD-17, and PPP-HYD-20, which require compliance and implementation of existing water quality control plans and sustainable groundwater management plans. Therefore, the project would not conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan, and impacts would be less than significant.

4.8.10.3 Mitigation

Impacts would be less than significant. No mitigation is required.

4.8.11 Cumulative Analysis

As defined in Section 15130 of the State CEQA Guidelines, cumulative impacts are the incremental effects of an individual project when viewed in connection with the effects of past, current, and probable future projects within the cumulative impact area for hydrology and water quality. The study area for the assessment of cumulative impacts related to hydrology and water quality is the City. While future development under the project could increase the total amount of pollutants entering downstream rivers and water bodies and could increase rates and volumes of storm water runoff due to new impermeable surfaces, site-specific projects would be subject to the regulatory requirements described above. Specifically, future development would adhere to the requirements of the City's Municipal Permit, Municipal Code, Standard Conditions and Grading Manual, and would be required to prepare WQMPs to identify BMPs directed at pollution reduction and the maintenance of on-site drainage patterns. Additionally, adherence to the requirements of the joint NPDES Permit

from the Santa Ana RWQCB would avoid cumulative impacts due to the regional nature of these water quality planning documents. Future development within a Special Flood Hazard Area would need to obtain documentation demonstrating that future site-specific project would not place future structures at flood risk, would not generate downstream flood risks that could affect other structures, and would not be subject to risks associated with dam failure per PPP-HYD-17, PPP-HYD-18, and PPP-HYD-19. Moreover, the project would not result in flood hazards related to tsunami or seiche. Therefore, the project would not contribute to cumulative impact related to hydrology and water quality.