Water Quality Assessment Report
I-5 MANAGED LANES PROJECT

RED HILL AVE TO ORANGE / LOS ANGELES COUNTY LINE,

Counties of Orange and Los Angeles, California

Cities Irvine, Tustin, Santa Ana, Orange, Anaheim, Fullerton, Buena Park, La Mirada, and Santa Fe Springs

12-Ora-5 – PM 28.9/44.4, 26.9, 27.9, 28.4
07-LA-5 – PM 0.1, 0.3, 0.6, 1.7
12-Ora-55 – PM 7.4, 8.0, 8.7, 8.9, 9.2, 9.7 9.9, 10.2
12-Ora-57 – PM 11.0, 11.3, 11.9, 12.5, 12.7, 12.9, 13.5
12-Ora-91 – PM 0.4, 0.7, 1.1, 1.3, 1.4, 1.6, 1.8, 2.0, 2.2, 2.6, 2.8, 3.4

EA 12-0Q950

Water Quality Assessment Report

Prepared for

March 2023

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EA 12-0Q950

March 2023

STATE OF CALIFORNIA
Department of Transportation

Approved By: _____ Date: 04/06/2023

Arvin Cuevas, Interim District 12 NPDES Coordinator
(657) 328-6149
Division of Environmental Analysis
District 12, Orange County

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EA 12-0Q950

March 2023

Prepared By: Veronica Seyde Date: 03/27/2023
Veronica Seyde, Director, Environmental Scientist
714-564-2745
1100 W. Town and Country Road, Suite 200, Orange, CA 92868
WSP USA

Approved By: Matthew C. Moore Date: 03/27/2023
Matthew C. Moore, Director, Water Resources Engineer
619-525-8375
WSP USA

Approved By: Date: 3/28/23
Jeffrey P. Fromhertz, Managing Director
714-564-2780
WSP USA

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EXECUTIVE SUMMARY

The purpose of the Water Quality Assessment Report (WQAR) is to fulfill the requirements of the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA), and to provide information for National Pollutant Discharge Elimination System (NPDES) permitting. This WQAR discusses the environmental setting, the regulatory framework, data on water resources, impact analysis as well as measures to address those impacts.

The California Department of Transportation (Caltrans), District 12, in cooperation with Caltrans District 7, and the Federal Highway Administration (FHWA), is proposing managed lanes (ML) improvements in both directions on Interstate (I) 5. The improvements would modify the existing high-occupancy vehicle (HOV) lanes within the proposed Project limits to address operational deficiencies. The proposed Project limits on I-5 extend from Red Hill Avenue (Post Mile [PM] 28.9) to the Orange/Los Angeles (OC/LA) Countyline (12-OC-5 PM 44.4) in the cities of Irvine, Tustin, Santa Ana, Orange, Anaheim, Fullerton, Buena Park, La Mirada, and Santa Fe Springs.

The proposed Managed Lanes project is evaluating four alternatives. Alternative 1 is the No Build and does not include roadway improvements, Alternative 2 would maintain the existing lane configurations for I-5 with a modification of the minimum HOV-lane occupancy requirement from two-plus (2+) to three-plus (3+) passengers within the current HOV system in each direction, between Red Hill Avenue and the Orange/Los Angeles Countyline. Alternative 3 would convert the existing HOV lane to an Express Lane (EL) in each direction between Red Hill Avenue and State Route (SR) 55; convert two existing HOV lanes to Express Lanes, in each direction between SR 55 and SR 57; and convert the existing HOV lane to an Express Lane in each direction from SR 57 to the Orange/Los Angeles Countyline. Alternative 4 would convert the existing HOV lane to an Express Lane (EL) in each direction between Red Hill Avenue and State Route (SR) 55; convert two existing HOV lanes to Express Lanes, in each direction between SR 55 and SR 57; and convert the existing HOV lane to an Express Lane in each direction from SR 57 to the Orange/Los Angeles Countyline. The Build alternatives (Alternatives 2, 3 and 4) will also include the construction of two park-and-ride facilities within Caltrans right-of-way.

The total Disturbed Soil Area (DSA) ranges from 2.07 acres for Alternative 2 to 23.66 acres for Alternative 4, which is the alternative with the largest footprint.

There are five watersheds within the Project area: the Lower San Gabriel River Watershed, Santiago Creek Watershed, Lower Santa Ana River Watershed, Bolsa Chica Channel-Frontal Huntington Harbor Watershed, and the San Diego Creek Watershed. Receiving waters for storm water within the project area include Coyote Creek, Fullerton Creek, Carbon Creek, Lower Santiago Creek (or Santiago Creek Reach 1), Santa Ana River Reaches 1 and 2, Bolsa Chica Channel, San Diego Creek Reach 1, and Peters Canyon Wash. Waterbodies within the project limits (Peters Canyon Channel, San Diego Creek, Coyote Creek, Lower Newport Bay, Upper Newport Bay) are identified on the 2020 California 303(d) List of Water Quality Limited Segments.

Construction and operation of the Project has the potential to create temporary and permanent water quality impacts to the physical/chemical characteristics, biological characteristics, and human use characteristics of the aquatic environment. During construction, soil disturbance activities include earth-moving activities such as clearing, grubbing and excavation. This activity has the potential to create temporary water quality impacts to the receiving water bodies. The estimated DSA for the build alternatives range from 2.07 acres and 23.66 acres and will require the development and implementation of a Storm Water Pollution Prevention Plan (SWPPP) as required by the State Water Resources Control Board (SWRCB) Construction General Permit (CGP) Order No. 2022-0057-DWQ, NPDES No. CAS000002). The SWPPP will identify temporary construction site BMPs to be implemented during construction.

During Project operation, long-term water quality impacts are anticipated with the increase in the net new impervious surface area. Potential operation or long-term impacts to the aquatic environment include modifying slopes, pollutants associated with the new roadway and higher concentration of pollutants due to the increase of impervious surface area created by the Project. The Project will comply with the National Pollutant Discharge Elimination System (NPDES) Permit and Waste Discharge Requirements for the State of California, Department of Transportation, Order No. 2022-0033-DWQ, NPDES No. CAS00003, Caltrans MS4 Permit (Permit) and evaluate and incorporate Caltrans approved treatment BMPs to address any long-term impacts associated with the Project. In addition to evaluating and incorporating treatment BMPs, Caltrans will incorporate Design Pollution Prevention (source control) BMPs to ensure that adequate measures are included to minimize pollutant sources such as erosion from the Project improvements.

The project limits are within a Significant Trash Generating Area (STGA) as identified in Attachment E of Permit. To comply with the Statewide Trash Provisions (SWRCB Resolution No. 2015-0019), Caltrans has committed to the SWRCB that roadways identified as STGA's will implement "Full Trash Capture" (FTC). To meet the requirements of Attachment E of the Permit, the Project will evaluate FTC devices within the STGAs in the Project limits to comply with the SWRCB Trash Provisions.

Overall, the Project will construct and incorporate Water Quality project features and implement standardized measures to address temporary and permanent water quality impacts. Specifically, this includes complying with the CGP, the Permit, and incorporation of Temporary Construction Site BMPs, Treatment BMPs, Design Pollution Prevention BMPs, Maintenance BMPs and FTC devices. The Project will manage runoff and minimize the effects to water quality from connected impervious areas to the storm water conveyance system and ultimate receiving waters.

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ACRONYMS

Acronym	Definition
Basin Plan	Water Quality Control Plan for the Santa Ana or Los Angeles Regions
BMP	Best Management Practice
BSA	Biological Study Area
Caltrans	California Department of Transportation
CDFW	California Department of Fish and Wildlife
CESA	California Endangered Species Act
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CGP	Construction General Permit
COI	Change of Information
CWA	Clean Water Act
DSA	Disturbed Soil Area
DWP	District Work Plan
FTC	Full Trash Capture
HSA	Hydrologic Subarea
HSG	Hydrologic Soil Group
JDSA	Jurisdictional Delineation Study Area
MS4	Municipal Separate Storm Sewer System
MTBE	Methyl-tert-butyl-ethylene
MVP	Maintenance Vehicle Pullout
NAL	Numeric Action Level
NEL	Numeric Effluent Limit
NIS	New Impervious Surface
NNI	Net New Impervious
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NOT	Notice of Termination
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Services
Permit	Caltrans MS4 Permit
PF	Project Feature
pH	Potential of Hydrogen
PM	Post Mile
PPDG	Project Planning and Design Guide
PRD	Permit Registration Document
Project	I-5 Managed Lanes
OCWD	Orange County Water District
QSD	Qualified Stormwater Developer
QSP	Qualified Stormwater Practitioner
R factor	Rainfall-runoff erosivity factor
RIS	Replaced Impervious Soil Area
RL	Risk Level
RUSLE	Revised Universal Soil Loss Equation
RWQCB	Regional Water Quality Control Board
SER	Standard Environmental Reference

Acronym	Definition
SHS	State Highway System
SMARTS	Stormwater Multiple Application and Report Tracking System
STGA	Significant Trash Generating Areas
SWMP	Stormwater Management Plan
SWPPP	Stormwater Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TMDL	Total Maximum Daily Load
U.S. EPA	United States Environmental Protection Agency
USACE	United States Army Corps of Engineers
WDID	Waste Discharge Identification Number
WDR	Waste Discharge Requirement
WQAR	Water Quality Assessment Report
WQO	Water Quality Objective

1 INTRODUCTION

1.1 Approach to Water Quality Assessment

The purpose of the Water Quality Assessment Report (WQAR) is to fulfill the requirements of the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA), and to provide information for National Pollutant Discharge Elimination System (NPDES) permitting. The document includes a discussion of the proposed project, the general environmental setting of the project area, and the regulatory framework with respect to water quality. It also provides data on surface water and groundwater resources within the project area and the water quality of these waters, describes water quality impairments and beneficial uses, identifies potential water quality impacts/benefits associated with the proposed project, and recommends water quality features and standardized measures to minimize the discharge of pollutants of concern to minimize potential water quality impacts associated with construction and operation of the Project.

1.2 Project Description

The California Department of Transportation (Caltrans), District 12, in cooperation with Caltrans District 7, and the Federal Highway Administration (FHWA), is proposing managed lanes (ML) improvements in both directions on Interstate (I) 5. The improvements would modify the existing high-occupancy vehicle (HOV) lanes within the proposed Project limits to address operational deficiencies. The proposed Project limits on I-5 extend from Red Hill Avenue (Post Mile [PM] 28.9) to the Orange/Los Angeles (OC/LA) Countyline (12-OC-5 PM 44.4) in the cities of Irvine, Tustin, Santa Ana, Orange, Anaheim, Fullerton, Buena Park, La Mirada, and Santa Fe Springs.

The purpose of the proposed Project is to improve overall movement of people and goods along this section of I-5. The proposed improvements along the I-5 corridor would accomplish the following objectives:

- Improving the overall regional ML network operations
- Improving mobility and trip reliability
- Maximizing person throughput by facilitating the efficient movement of bus and rideshare users
- Applying technology to help manage traffic demand

The need for the proposed Project is to address the following deficiencies being experienced by motorists along the existing I-5 HOV lanes between Red Hill Avenue and the OC/LA County line:

- HOV lane degradation (does not meet the federal performance standards)
- Demand that exceeds existing capacity
- Operational deficiencies

1.2.1 Alternatives

Three Build Alternatives and the No Build Alternative are under consideration and are described below:

Alternative 1 – No Build

Alternative 1, the No Build Alternative, does not include improvements to the existing lane configurations for I-5. Under the No Build Alternative, no additional roadway improvements would occur. This alternative includes other projects on the financially-constrained project list in the adopted SCAG 2020-2045 RTP/SCS in the proposed Project limits on I-5 and the Preferred Plan in the OCTA 2018 LRTP within the proposed Project limits.

Alternative 2 - Build Alternative: Modify Existing HOV 2+ Lanes to HOV 3+ Lanes

Alternative 2 would maintain the existing lane configurations for I-5 with a modification of the minimum HOV-lane occupancy requirement from two-plus (2+) to three-plus (3+) passengers within the current HOV system in each direction, between Red Hill Avenue and the Orange/Los Angeles Countyline. Under this alternative, no additional roadway improvements would occur. Additionally, two proposed park-and-ride facilities are being evaluated as part of Alternative 2 and would be constructed within the existing freeway right-of-way. Sign replacement and pavement delineation would also be implemented to meet the latest California Manual on Uniform Traffic Control Devices (CA MUTCD) standards.

Alternative 3 – Build Alternative: Convert Existing HOV Lanes to Express Lanes

Alternative 3 would convert the existing HOV lane to an Express Lane (EL) in each direction between Red Hill Avenue and State Route (SR) 55; convert two existing HOV lanes to Express Lanes, in each direction between SR 55 and SR 57; and convert the existing HOV lane to an Express Lane in each direction from SR 57 to the Orange/Los Angeles Countyline. The typical cross-section consists of 12-foot-wide Express Lanes, 2 to 4-foot buffer, 12-foot-wide general purpose lanes, 12-foot wide auxiliary lanes, 4- to 26-foot-wide inside shoulder, and a 10-foot-wide outside shoulder would be provided to accommodate the Express Lane. One 12-foot weave lane is proposed at locations of ingress or egress. Additionally, two proposed park-and-ride facilities are being evaluated as part of Alternative 3 and would be constructed within the existing freeway right-of-way. Sign replacement and pavement delineation would also be implemented to meet the latest CA MUTCD standards. Alternative 3 would impact one existing retaining wall to accommodate widening the mainline to avoid right-of-way acquisition. The affected retaining wall structure is located along southbound I-5, north of East 17th Street.

Alternative 4 – Converted and Expanded Express Lanes

Alternative 4 would convert the existing HOV lane to an Express Lane in each direction between Red Hill Avenue and SR 55; convert two existing HOV lanes to Express Lanes, in each direction between SR 55 and SR 57; convert the existing HOV lane to an Express Lane in each direction from SR 57 to the Orange/Los Angeles County line; and construct an additional Express Lane in each direction between SR 57 and SR 91. The typical cross-section consists of 12-foot wide Express Lanes, a 2- to 4-foot buffer, 12-foot wide general purpose lanes, 12-foot-wide auxiliary lanes, a 4- to 14-foot wide inside shoulder, and a 10-foot-wide outside shoulder would be provided to accommodate the Express Lanes. One 12-foot weave lane is proposed at locations of ingress or egress. Additionally, two proposed park-and-ride facilities are being evaluated as part of Alternative 4 and would be constructed within the existing freeway right-of-way. Sign

replacement and pavement delineation would also be implemented to meet the latest CA MUTCD standards. Alternative 4 would impact some existing ramps within the proposed Project limits. Within the proposed Project limits, ramp metering is incorporated into the existing local interchange on-ramps, except at the South Anaheim Boulevard northbound on-ramp. Where ramp improvements affect ramp metering, any ramp metering equipment would be re-established. Existing ramp meters and equipment would be reused, where possible. Alternative 4 would impact existing retaining walls and create a new retaining wall. Retaining walls would be provided, where required, to minimize and avoid right-of-way acquisition. The affected retaining wall structures are:

- Southbound I-5, south of East 17th Street
- Along northbound I-5 To northbound SR 57 direct connector
- Along southbound SR 57 to southbound I-5 direct connector

Alternative 4 would impact one existing sound wall. The affected sound wall is located along southbound I-5, north of East 17th Street.

1.2.2 Existing and Proposed Drainage

A Draft Conceptual Drainage Study Report was developed for the Project. The following discussion is based on findings documented from that report (TranSystems 2022a).

Drainage management measures would be included in the Project to address the impacts to drainage patterns associated with new construction. Proposed major drainage design features would include maintaining existing drainage flow patterns and incorporating existing drainage systems to the maximum extent practical; providing drainage facilities that will accommodate future improvements; and providing drainage facilities to prevent and/or reduce substantial erosion or siltation on- or off-site. Some of the existing systems may be abandoned or removed to accommodate Project construction. All runoff from elevated structures would be collected and carried to the next treatment device or stabilized discharge location. In addition, the Project would include measures to address impacts to existing groundwater pumping and monitoring wells located within the Project limits. Drainage improvements have been identified in the Conceptual Drainage Study Report (TranSystems 2022a). This Project is proposing to remove/replace approximately 56 inlets and add approximately 137 inlets.

Additionally, there are five Pump Stations within the Project limits. Project improvements are not anticipated to impact the Pump Stations. Pump Stations have been identified in the Conceptual Drainage Study Report (TranSystems 2022a).

Additionally, the existing I-5 freeway was constructed with the use of a pavement structural section with a permeable layer (e.g., pavement drainage layers) and edge drain systems to facilitate the existing drainage. For widened sections of the pavement for Build Alternatives 3 and 4, the existing edge drains will be replaced and reconnected to the drainage system.

1.2.3 Project Physical Footprint Description

The DSA for the proposed Project is estimated as 2.07 acres for Alternative 2, 13.55 acres for Alternative 3 and 23.66 acres for Alternative 4. The replaced impervious surface ranges from zero (0) acres for Alternative 2 to 15.77 acres for Alternative 4. The net new impervious surface area was estimated as 2.07 acres for Alternative 2, 2.37 acres for Alternative 3 and 4.09 acres for

Alternative 4. Therefore, the total post construction treatment area for the build alternatives is estimated as ranging from approximately 2.07 acres for Alternative 2 to 19.86 acres for Alternative 4.

1.2.4 Statewide Trash Provisions

Caltrans has committed to the SWRCB that roadways identified as Significant Trash Generating Areas (STGAs) as well as Park-and-Ride lots will implement FTC devices to meet the Statewide Trash Provisions (SWRCB Resolution No. 2015-0019). The following project limits have been identified as STGAs as identified in Attachment E of the Caltrans Statewide NPDES Permit (Order No. 2022-0033-DWQ, NPDES No. CAS000003) to comply with the Statewide Trash Provisions:

Table 1-1. I-5 Managed Lanes STGAs

Route	Post Miles
5	30.3-31.1
5	31.6-32.6
5	37.0-42.0
5	42.5-44.3
Park-and-Ride Site No.1	31.848
Park-and-Ride-Site No.2	36.668

To meet the requirements of Attachment E of the Caltrans NPDES Permit, the Project will evaluate and implement FTC devices within the STGAs and Park-and-Ride lots to comply with the SWRCB Trash Provisions.

2 REGULATORY SETTING

2.1 Federal Laws and Requirements

2.1.1 Clean Water Act

In 1972 Congress amended the Federal Water Pollution Control Act, making the addition of pollutants to the waters of the United States (U.S.) from any point source unlawful unless the discharge is in compliance with a NPDES permit. Known today as the Clean Water Act (CWA), Congress has amended it several times. In the 1987 amendments, Congress directed dischargers of stormwater from municipal and industrial/construction point sources to comply with the NPDES permit program. Important CWA sections are:

- Sections 303 and 304 require states to promulgate water quality standards, criteria, and guidelines.
- Section 401 requires an applicant for a federal license or permit to conduct any activity, which may result in a discharge to waters of the U.S., to obtain certification from the State that the discharge will comply with other provisions of the act. (Most frequently required in tandem with a Section 404 permit request, see below).
- Section 402 establishes the NPDES, a permitting system for the discharges (except for dredge or fill material) of any pollutant into waters of the U.S. The Federal Environmental Protection Agency delegated to the California State Water Resources Control Board (SWRCB) the implementation and administration of the NPDES program in California. The SWRCB established nine Regional Water Quality Control Boards (RWQCBs). The SWRCB enacts and enforces the Federal NPDES program and all water quality programs and regulations that cross Regional boundaries. The nine RWQCBs enact, administer and enforce all programs, including NPDES permitting, within their jurisdictional boundaries. Section 402(p) requires permits for discharges of stormwater from industrial, construction, and Municipal Separate Storm Sewer Systems (MS4s).
- Section 404 establishes a permit program for the discharge of dredge or fill material into waters of the U.S, including wetlands. This permit program is administered by the U.S. Army Corps of Engineers (USACE).

The objective of the CWA is “to restore and maintain the chemical, physical, and biological integrity of the Nation’s waters.”

The USACE issues two types of 404 permits: General and Individual. There are two types of General permits: Regional and Nationwide permits. Regional permits are issued for a general category of activities when they are similar in nature and cause minimal environmental effect. Nationwide permits are issued to authorize a variety of minor project activities with no more than minimal effects.

There are also two types of Individual permits: Standard Individual permit and Letter of Permission. Ordinarily, projects that do not meet the criteria for a Nationwide Permit may be permitted under one of USACE’s Individual permits. For Standard Individual permit, the USACE decision to approve is based on compliance with U.S. Environmental Protection Agency’s (U.S. EPA) Section 404 (b)(1) Guidelines (U.S. EPA Code of Federal Regulations (CFR) 40 Part 230) and whether permit approval is in the public interest. The 404(b)(1)

Guidelines were developed by the U.S. EPA in conjunction with USACE and allow the discharge of dredged or fill material into the aquatic system (waters of the U.S.) only when there is no practicable alternative which would have less adverse effects. The Guidelines state that USACE may not issue a permit if there is a least environmentally damaging practicable alternative (LEDPA), to the proposed discharge that would have less effects on waters of the U.S., and not have any other significant adverse environmental consequences. Per Guidelines, documentation is needed that a sequence of avoidance, minimization, and compensation measures have been followed, in that order. The Guidelines also restrict permitting activities that violate water quality or toxic effluent standards, jeopardize the continued existence of listed species, violate marine sanctuary protections, or cause "significant degradation" to waters of the U.S. In addition, every permit from the USACE, even if not subject to the 404(b)(1) Guidelines, must meet general requirements. See 33 CFR 320.4.

2.2 State Laws and Requirements

2.2.1 Porter-Cologne Water Quality Control Act

California's Porter-Cologne Act, enacted in 1969, provides the legal basis for water quality regulation within California. This Act requires a "Report of Waste Discharge" for any discharge of waste (liquid, solid, or gaseous) to land or surface waters that may impair beneficial uses for surface and/or groundwater of the State. It predates the CWA and regulates discharges to waters of the State. Waters of the State include more than just waters of the U.S., like groundwater and surface waters not considered waters of the U.S. Additionally, it prohibits discharges of "waste" as defined and this definition is broader than the CWA definition of "pollutant". Discharges under the Porter-Cologne Act are permitted by Waste Discharge Requirements (WDRs) and may be required even when the discharge is already permitted or exempt under the CWA.

The State Water Resources Control Board (SWRCB) and RWQCBs are responsible for establishing the water quality standards as required by the CWA and regulating discharges to protect beneficial uses of water bodies. Details regarding water quality standards in a project area are contained in the applicable RWQCB Basin Plan. In California, Regional Boards designate beneficial uses for all water body segments in their jurisdictions, and then set standards necessary to protect these uses. Consequently, the water quality standards developed for Particular water body segments are based on the designated use and vary depending on such use. Water body segments that fail to meet standards for specific pollutants are included in a Statewide List in accordance with CWA Section 303(d). If a Regional Board determines that waters are impaired for one or more constituents and the standards cannot be met through point source or non-source point controls (NPDES permits or WDRs), the CWA requires the establishment of Total Maximum Daily Loads (TMDLs). TMDLs specify allowable pollutant loads from all sources (point, non-point, and natural) for a given watershed. The SWRCB implemented the requirements of CWA Section 303(d) through Attachment D of the Caltrans MS4 Permit (Permit) (Order No. 2022-0033-DWQ NPDES No. CAS000003), as it includes specific TMDLs for which Caltrans is named a responsible party.

2.2.2 State Water Resources Control Board and Regional Water Quality Control Boards

The SWRCB adjudicates water rights, sets water pollution control policy, and issues water board orders on matters of statewide application, and oversees water quality functions throughout the state by approving Basin Plans, TMDLs, and NPDES permits. RWCQBs are responsible for protecting beneficial uses of water resources within their regional jurisdiction using planning, permitting, and enforcement authorities to meet this responsibility.

2.2.3 National Pollutant Discharge Elimination System (NPDES) Program

Section 402(p) of the CWA requires the issuance of NPDES permits for five categories of stormwater dischargers, including MS4s. The U.S. EPA defines an MS4 as "any conveyance or system of conveyances (roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, human-made channels, and storm drains) owned or operated by a state, city, town, county, or other public body having jurisdiction over stormwater, that are designed or used for collecting or conveying stormwater." The SWRCB has identified the California Department of Transportation (Caltrans) as an owner/operator of an MS4 pursuant to federal regulations. Caltrans' MS4 permit covers all Caltrans rights-of-way, properties, facilities, and activities in the state. The SWRCB or the RWQCB issues NPDES permits for five years, and permit requirements remain active until a new permit has been adopted.

2.2.3.1 Municipal Separate Storm Sewer System (MS4)

Caltrans' MS4 Permit, NPDES No. CAS000003, SWRCB Order No. 2022-0033-DWQ (adopted on June 22, 2022, and effective on January 1, 2023) (Permit) regulates stormwater and non-stormwater discharges from Caltrans properties and facilities associated with operation and maintenance of the State highway system. It contains four basic requirements:

1. Caltrans must comply with the requirements of the CGP (see below);
2. Caltrans must implement a year-round program in all parts of the State to effectively control stormwater and non-stormwater discharges; and
3. Caltrans stormwater discharges must meet water quality standards through implementation of permanent and temporary (construction) Best Management Practices (BMPs) and other measures deemed necessary by the SWRCB and/or other agency having authority reviewing the stormwater component of the project.
4. Caltrans shall comply with the prohibition of discharge of trash to surface waters of the State or deposition of trash where it may be discharged into surface waters of the State through compliance with the requirements of Attachment E of the Permit. With a demonstration of full compliance by December 2, 2030.

Caltrans' 2022 MS4 Permit incorporated the requirements of the State Water Board Resolution 2015-0019, which amended the Water Quality Control Plan for Ocean Waters of California and the Water Quality Control Plan for Inland Surface Waters, Enclosed Bays, and Estuaries of California to include trash-related requirements, referred to in the Order as the "Trash Provisions." Implementation of the Trash Provisions includes the following:

- Caltrans shall install, operate, and maintain any combination of full capture systems, other treatment controls, and/or institutional controls for all storm drains that capture runoff from STGAs (where trash accumulates in substantial amounts as defined in section

E4). Caltrans shall develop and implement monitoring plans that demonstrate that such combinations achieve full capture system equivalency.

- Caltrans shall coordinate efforts with municipal separate storm sewer system permittees subject to NPDES permits that implement the Trash Provisions, to install, operate, and maintain full capture systems, other treatment controls, and/or institutional controls in STGAs and/or Priority Land Uses.

To comply with the permit, Caltrans developed the Statewide Stormwater Management Plan (SWMP) to address stormwater pollution controls related to highway planning, design, construction, and maintenance activities throughout California. The SWMP assigns responsibilities within Caltrans for implementing stormwater management procedures and practices as well as training, public education and participation, monitoring and research, program evaluation, and reporting activities. The SWMP describes Caltrans' stormwater management program and the minimum procedures and practices Caltrans uses to reduce pollutants in stormwater and non-stormwater discharges. It outlines procedures and responsibilities for protecting water quality, including the selection and implementation of BMPs. At the time of the preparation of this WQAR, the SWMP is being updated to meet the requirements of the adopted Permit and CGP. The Project will follow the guidelines in 2016 SWMP except where the Permit requirements differ from the 2016 SWMP.

2.2.3.2 Construction General Permit

The Construction General Permit (CGP) (NPDES No. CAS000002, SWRCB Order No. 2022-0057-DWQ, was adopted on September 8, 2022) and effective on September 1, 2023. The CGP regulates stormwater discharges from construction sites which result in a DSA of one acre or greater, and/or are smaller sites that are part of a larger common plan of development.

- For all projects subject to the CGP, the applicant is required to hire a Qualified Stormwater Pollution Prevention Plan (SWPPP) Developer (QSD) to develop and implement an effective SWPPP. A Qualified SWPP Practitioner (QSP) may be hired as well to assist in field work. All Project Registration Documents (PRDs), including the SWPPP, Risk Level (RL) Determinations, Site map and post-construction treatment documents are required to be uploaded into the SWRCB's on-line Stormwater Multiple Application and Report Tracking System (SMARTS). A Waste discharge Identification (WDID) number will be issued within 10 business days after the State Waterboard receives a complete Notice of Intent (NOI) package.
- The 2022 CGP requires post-construction treatment permit registration documents to be submitted in SMARTS with the NOI to include: (1) An attachment or web-source containing the NPDES MS4 post-construction requirements and (2) the post-construction plans and calculations (Preliminary post-construction plans and calculations may be submitted as a Permit Registration Document, as long as the approved plans and calculations are submitted within 14 days of approval by the municipal stormwater permittee, through a Change of Information (COI) in SMARTS). Additionally, a COI in SMARTS must be submitted for any revisions to post-construction plans and calculations prior to submitting the Notice of Termination (NOT).

2.2.3.2.1 Waiver From Construction General Permit

Projects that disturb over 1.0 acre but less than 5 acres of soil, may qualify for waiver of CGP coverage. This occurs whenever the Rainfall Erosivity, (R) in the Revised Universal Soil Loss Equation (RUSLE) is less than 5. When the R factor is below the numeric value of 5, projects can be waived from coverage under the CGP, and are instead covered by the Caltrans Statewide MS4 permit. Refer to the CGP, Attachment D1, Risk Determination Worksheet of the CGP, link provided in Section 6.

In accordance with the SWMP, a Water Pollution Control Plan (WPCP) is necessary for construction of a Caltrans project not covered by the CGP.

Construction activity that results in soil disturbances of less than one acre is subject to this CGP if there is potential for significant water quality impairment resulting from the activity as determined by the RWQCB. Operators of regulated construction sites are required to develop a SWPPP, to implement soil erosion and pollution prevention control measures, and to obtain coverage under the CGP.

2.2.3.2.2 Risk Level Inspection and Sampling Requirements

The CGP contains a risk-based permitting approach by establishing three levels of risk possible for a construction site. Risk levels are determined during the planning, design, and construction phases, and are based on project risk of generating sediments and receiving water risk of becoming impaired. Requirements apply according to the Risk Level (RL) determined, with additional monitoring and reporting requirements for higher risk projects with detailed requirements listed in Attachment D of the CGP. Requirements include:

- Visual inspections weekly, prior to Qualifying Precipitation Events (QPEs), during QPEs (every 24 hours) and post QPEs. A qualifying Storm Event (QPE) is defined as a forecasted 50% probability of precipitation of 0.5” or more within a 24-hour period and continues on subsequent 24-hour periods when 0.25 inches or more is forecast.
- RL 2 and 3 projects have sampling requirement for pH and Turbidity.
- Additionally, sampling for Numeric Action Levels (NALs) and Numeric Effluent Limits (NELs) is required for all risk level projects for TMDL-related non-visible pollutants listed in Attachment H of the CGP, if there is a discharge due to failure to implement a BMP, a container spill or leak, or a BMP breach or malfunction.

2.2.4 Section 401 Permitting

Under Section 401 of the CWA, any project requiring a federal license or permit that may result in a discharge to a water of the United States must obtain a 401 Certification, which certifies that the project will be in compliance with State water quality standards. The most common federal permit triggering 401 Certification is a CWA Section 404 permit, issued by USACE. The 401 permit certifications are obtained from the appropriate RWQCB, dependent on the project location, and are required before USACE issues a 404 permit.

In some cases, the RWQCB may have specific concerns with discharges associated with a project. As a result, the RWQCB may prescribe a set of requirements known as Waste Discharge Requirements (WDRs) under the State Water Code (Porter-Cologne Act). WDRs may specify the inclusion of additional project features, effluent limitations, monitoring, and plan submittals

that are to be implemented for protecting or benefiting water quality. WDRs can be issued to address both permanent and temporary discharges of a project.

2.3 Regional and Local Requirements

As required by the Porter-Cologne Act, the Santa Ana and the Los Angeles RWQCBs have established water quality objectives (WQOs) for waters within their jurisdiction to protect the beneficial uses of those waters and published them in their respective Water Quality Control Plan for the Santa Ana River Basin (Basin Plan) (Santa Ana RWQCB, 2019) and the Coastal Watershed of Los Angeles and Ventura Counties (Los Angeles RWQCB, 2014). The Basin Plan also identifies implementation programs to achieve these WQOs and requires monitoring to evaluate the effectiveness of these programs. WQOs must comply with the State anti-degradation policy (State Board Resolution No. 68-16), which is designed to maintain high quality waters while allowing some flexibility if beneficial uses are reasonably affected.
The Project lies within the boundaries of the Santa Ana RWQCB and the Los Angeles RWQCB, which make water quality decisions for their respective regions. Their responsibilities include setting standards, issuing waste discharge requirements, determining compliance with those requirements, and taking appropriate enforcement actions.

2.3.1 Regional Water Quality Control Board (RWQCB) Basin Plan

All projects within the Santa Ana and Los Angeles regions are subject to the requirements of the Santa Ana RWQCB and Los Angeles RWQCB, respectively. The Santa Ana RWQCB and the Los Angeles RWQCB have prepared a Basin Plan to help preserve and enhance water quality and to protect the beneficial uses of State waters. The Basin Plan designates beneficial uses for surface and ground waters, and it sets qualitative and quantitative objectives that must be attained or maintained to protect the designated beneficial uses and conform to the State's anti-degradation policy. The Basin Plan also describes implementation programs to protect the beneficial uses of all waters in the region, as well as surveillance and monitoring activities to evaluate the effectiveness of the Basin Plan.

2.3.2 Dewatering Activities

Care is required for the removal of nuisance water because of high turbidity and other pollutants resulting from construction activities such as dewatering. The Santa Ana RWQCB's Dewatering Permit is identified as Order No. R8-2020-0006 (NPDES No. CAG998001). This permit covers General Waste Discharge Requirements for Discharges to Surface Water which Pose an Insignificant (De Minimus) Threat to Water Quality from dewatering activities.

The Los Angeles RWQCB has established three dewatering NPDES permits. The proposed Project would be required to comply with the dewatering NPDES permit described below if there is the potential of discharging pollutants through release of construction water directly to the environment.

- RWQCB Order No. R4-2018-0125 (NPDES NO. CAG994004). This water quality order was adopted by the Los Angeles RWQCB on September 13, 2018, became effective on November 13, 2018 and will expire on November 13, 2023. This water quality order covers the General Waste Discharge Requirements for Discharges of Groundwater from Construction and Project Dewatering to Surface Waters in Coastal Watersheds of Los Angeles and Ventura Counties.

3 AFFECTED ENVIRONMENT

3.1 General Environmental Setting

For all build alternatives, the existing environmental setting is the same. The watershed, groundwater, drainages, and direct and indirect receiving waters are consistent among the No Build and Build Alternatives. All Build Alternatives have the same general setting because the Project is being developed within an existing facility. The following includes a discussion of the physical/chemical and human use characteristics of the existing environmental setting for the proposed Project with respect to water quality.

3.1.1 Population and Land Use

Table 3-1 presents the 2020 population and population density for the cities within the Project corridor. The population would be considered moderately dense given that the density within the majority of the cities that the Project crosses through is greater than 5,000 persons per square mile.

The watershed areas are highly urbanized with developed areas accounting for 84 percent of its land use (CH2M Hill 2005). The highest density residential areas occur in the central and lower reaches. Industrial and commercial areas are also more prevalent in these areas. Recreational areas are limited; and most Open Space areas are concentrated in the upper reaches of the watershed. Overall, land use within the watershed areas can be broadly classified into seven categories. These land use types include Residential, Open Space, Transportation/Utility, Commercial, Industrial, Institutional and Recreational (CH2M Hill 2005).

Table 3-1. 2020 Population

County	City	2020 Population	2020 Population Density (Persons per square mile)
Los Angeles	La Mirada	48,947	6,234
	Santa Fe Springs	18,264	2,063
Orange	Anaheim	357,059	7,169
	Buena Park	82,336	7,794
	Fullerton	142,070	6,347
	Irvine	277,988	4,261
	Orange	139,504	5,648
	Santa Ana	331,304	12,286
	Tustin	80,511	7,255

Source: Southern California Association of Governments 2021.

3.1.2 Topography

Regional topography is generally comprised of uplift (or hill) areas in the northern and northeastern part of the hydrologic area and a low-lying and relatively flat coastal plain that gently slopes from the base of the hills to the south and west. The highway has multiple high points and low points through the Project area as it crosses several waterbodies. The topography of the hydrologic area ranges from roughly sea level to approximately 1,700 feet. The primary topographic features include Coyote Hills and the Coastal Plain.

The Coyote Hills is located primarily in the City of Fullerton and are part of a chain of low hills that extend from the City of Yorba Linda on the east to Santa Fe Springs on the west. The natural topography has been altered significantly by oil field activities. These alterations generally, consist of graded roads, well pads, canyon fills, and steep cuts into natural slopes. The elevation of the Coyote Hills peaks at approximately 600 feet.

The Los Angeles/Orange County coastal plain is bounded on the north and east by the Santa Monica Mountains and the Puente Hills, on the south by the San Joaquin Hills, and on the west by the Pacific Ocean. The surface of the Coastal Plain is relatively flat and gently slopes from the base of the hills to the south and west. Several low-lying hills, however, are formed along the Newport Inglewood Uplift (CH2M Hill 2005).

3.1.3 Hydrology

3.1.3.1 Regional Hydrology

As presented in Table 3-2, the Project corridor traverses two hydrologic units (Santa Ana River and San Gabriel River) which includes the three hydrologic subareas (HSAs) (Caltrans 2017). The HSAs cover approximately 315,747 acres. Direct and indirect receiving water bodies within the proposed Project limits are identified in Table 3-3.

Table 3-2. I-5 Managed Lanes 5 Project Hydrologic Units

Hydrologic Unit	Hydrologic Area	Hydrologic Subarea Number	Hydrologic Subarea Name	Hydrologic Subarea Acres
Santa Ana River	Lower Santa Ana River	801.11	East Coast Plain	194,575
San Gabriel River	Anaheim	845.61	Undefined	40,937
San Gabriel River	Lower San Gabriel River	405.15	Central (Split)	80,235

Table 3-3. I-5 Managed Lanes Project Direct and Indirect Receiving Waters

County	Watershed	Subwatershed	Hydrologic Unit Code	Average Annual Precipitation (inches)
Orange	Lower San Gabriel River	Fullerton Creek	180701060504	13.80
	Lower San Gabriel River	Carbon Creek	180701060505	14.95
	Bolsa Chica Channel-Frontal Huntington Harbour	Bolsa Chica Channel-Frontal Huntington Harbour	180702010000	11.94
	Lower Santa Ana River	Walnut Canyon-Santa Ana River	180702031002	13.72
	Santiago Creek	Lower Santiago Creek	180702030902	17.35
	Lower Santa Ana River	Greenville Banning-Santa Ana River	180702031003	11.29
	San Diego Creek	Lower San Diego Creek	180702040103	12.65
	San Diego Creek	Peters Canyon Wash	180702040101	13.83
Los Angeles	Lower San Gabriel River	Brea Creek-Coyote Creek	180701060503	15.95

Source: Caltrans 2017.

3.1.3.2 Local Hydrology

There are five direct and three indirect receiving waters within the Project corridor. Characteristics of each of these water features are described below. Figure 3-1 displays the watersheds and surface waters within the Project corridor.

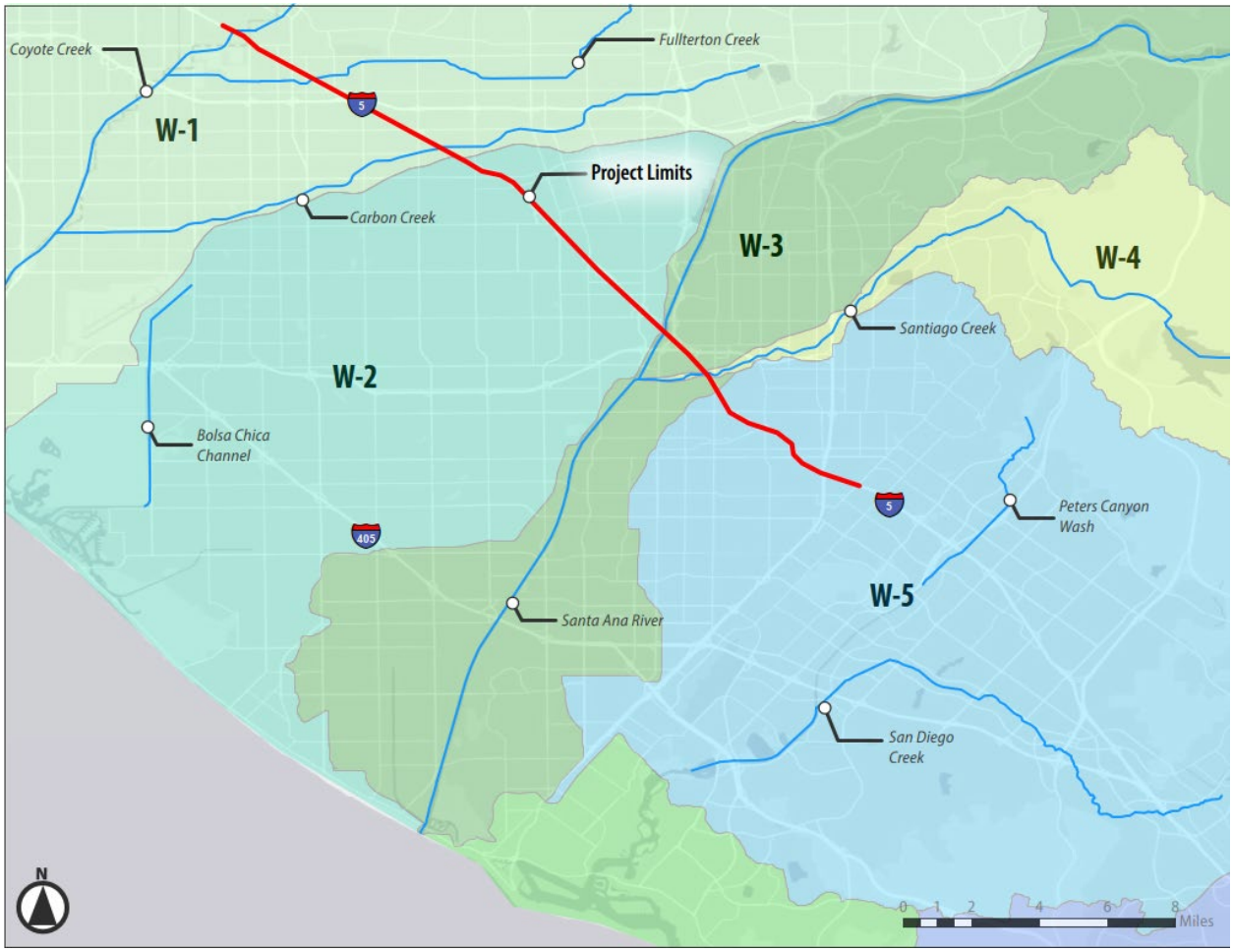

Figure 3-1. I-5 Managed Lanes Watersheds and Surface Waters

Legend:
W-1: Lower San Gabriel River Watershed
W-2: Bolsa Chica Channel-Frontal Huntington Harbour Watershed
W-3: Lower Santa Ana River Watershed
W-4: Santiago Creek Watershed
W-5: San Diego Creek Watershed

Within the Lower San Gabriel River watershed, direct receiving waters include Coyote Creek, Fullerton Creek and Carbon Creek. Fullerton Creek is a concrete lined trapezoidal channel. Carbon Creek is an engineered gravel channel and Coyote Creek is a natural creek with a concrete lined trapezoidal channel portion crossing the Project. Coyote Creek drains to San Gabriel River Reach 1, San Gabriel River Estuary and ultimately the San Pedro Bay.

Within the Santiago Creek watershed, the Project drains to Lower Santiago Creek, referenced as Santiago Creek Reach 1 by the Santa Ana RWQCB. Lower Santiago Creek is a natural river in the full extents of the study reach and ultimately drains into the Santa Ana River watershed.

Within the Lower Santa Ana River watershed, direct receiving waters include Santa Ana River Reach 1 and Santa Ana River Reach 2. Santa Ana River is a wide natural river that ultimately drains to the Pacific Ocean at Huntington Beach State Park.

Within the Bolsa Chica Channel-Frontal Huntington Harbor watershed, the Project indirectly discharges to the Bolsa Chica Channel. Bolsa Chica Channel drains to Anaheim Bay, Bolsa Bay Marsh before terminating at Bolsa Chica State Beach.

Within the San Diego Creek watershed, the Project indirectly discharges into San Diego Creek Reach 1 and Peters Canyon Wash. San Diego Creek Reach 1 and Peters Canyon Wash both flow into Newport Bay, Upper (Ecological Reserve) and Newport Bay Lower (entire lower bay, including Rhine Channel, Turning Basin and South Lido channel to east end of H-J Moorings).

3.1.3.2.1 Precipitation and Climate

The Project area has a Mediterranean-type climate, characterized by long, dry summers and mild winters. The average annual precipitation for the project corridor ranges from 11.29 inches to 17.35 inches as presented in Table 3-3. Most of the precipitation occurs from May through October. Three types of storms produce precipitation in the area: general winter storms, thunderstorms, and tropical cyclones. Flooding is most often caused by high intensity rainfall associated with general winter storms. Storm flows can rise from a dry stream bed to flood stage in a matter of hours.

3.1.3.2.2 Surface Waters

Water crossings in the Project area include Fullerton Creek, Coyote Creek, Carbon Creek, Santiago Creek and the Santa Ana River. Table 3-4 summarizes the characteristics and locations for each of these crossings.

Table 3-4. Water Crossings Within I-5 Managed Lanes Project

Waterbody	Watershed Limit (Sta)	Creek Crossing (Sta)
Santiago Creek	991 + 00 to 1013 + 00	1003 + 00
Santa Ana River	991 + 00 to 1120 + 00	1095 + 00
Fullerton Creek	1516 + 00 to 1558 + 00	1541 + 00
Carbon Creek	1374 + 00 to 1409 + 00	1398 + 00
Coyote Creek	1599 + 50 to 1681 + 00	1633 + 00

3.1.3.2.3 Total Maximum Daily Loads (TMDL)

Per Attachment D of the Permit, Table 3-5 presents the Total Maximum Daily Load (TMDL) impaired waterbodies and associated TMDL pollutant within the Project area. The TMDLs are existing regulation established by the U.S. EPA and/or a Regional Water Quality Control Board. Caltrans will comply with the TMDL-related requirements in Attachment D of the Caltrans NPDES permit.

Table 3-5. TMDLs with Baseline and Additional TMDL-Specific Implementation Requirements

Regional Water Board	TMDL Impaired Waterbody	TMDL Pollutant
Los Angeles	San Gabriel River, Estuary and Tributaries (shared TMDL)	Indicator Bacteria
Santa Ana	Rhine Channel Area of the Lower Newport Bay	Chromium and Mercury
Santa Ana	Rhine Channel	Metals (copper, lead, and zinc)
Santa Ana	San Diego Creek and Newport Bay	Dissolved copper, lead, and zinc

Per Attachment D of the Permit, Table 3-6 presents the TMDL impaired waterbodies and associated TMDL pollutant subject to Time Schedule Order 2022-0033-DWQ terms and conditions as well as specified implementation requirements.

Table 3-6. TMDLs Subject to Time Schedule Order 2022-0033-DWQ and Specified Implementation Requirements

Regional Water Board	TMDL Impaired Waterbody	TMDL Pollutant
Los Angeles	San Gabriel River Estuary and Impaired Tributaries	Metals (copper, lead, and zinc) and selenium
Santa Ana	San Diego Creek Watershed	Organochlorine compounds: dichloro-diphenyl-trichloroethane, chlordane, polychlorinated biphenyls and toxaphene
Santa Ana	Upper and Lower Newport Bay	Organochlorine compounds: dichloro-diphenyl-trichloroethane, chlordane, polychlorinated biphenyls and toxaphene

Table 3-7 presents a list of existing TMDLs that would be applicable to CGP requirements for NAL sampling when there is a discharge of a non-visible TMDL, listed on Tables H1 to H3 of Attachment H of the CGP. Sampling would be required when there is a lack of BMP installation, a BMP failure or spill.

Table 3-7. TMDL Requirements Associated with Construction Stormwater Discharges

TMDL	Pollutant
San Gabriel River Metals and Selenium TMDL	Metals and Selenium
San Diego Creek and Newport Bay Nutrients TMDL Nutrients	Nutrients
San Diego Creek and Newport Bay Organochlorine Compounds TMDL	Organochlorine Compounds
San Diego Creek and Newport Bay Sediment TMDL	Sediment
San Diego Creek and Newport Bay Toxics TMDL	Toxics

3.1.3.2.4 Floodplains

Federal Emergency Management Agency (FEMA) defines a special flood hazard area as an area inundated by the base (1-percent annual chance) flood, identified on Flood Insurance Rate Maps

(FIRMs) as Zones A, AE, AH, AO, AR, V, VE or A99. Other flood areas are designated on the FIRMs as Zone X, which consists of areas of 0.2-percent annual chance flooding; areas of 1-percent annual chance flooding with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1-percent annual chance flooding). Table 3-8 summarizes information provided from FEMA based on the Location Hydraulic Study and Summary Floodplain Encroachment Report developed for this Project (TranSystems 2022). A description of the special flood hazard areas within or adjacent to the proposed Project is provided below.

The major regional drainage crossings within the Project are referenced in Table 3-8. The proposed improvements over these water resources consist of restriping of the freeway to add the managed lanes (ML), without any bridge widenings. Therefore, the project will not result in any floodplain encroachments. Furthermore, the existing Project bridges cross the channels transversely and will not be extended beyond their existing length. Therefore, there are no longitudinal encroachments created by the Project. The Project will not increase the water surface elevation above the existing condition, therefore, the potential risk to life and property and traffic disruptions will not increase. Permanent Project improvements are not located within the floodplain and permanent changes to beneficial uses are not anticipated. Overall, the Project does not create incompatible floodplain development, therefore the combined risk level for the Project is low (TranSystems 2022).

Table 3-8. Floodplains in the Vicinity of the I-5 Managed Lanes Project

County	Floodplain Name or Floodplain Source	City	FEMA Special Flood Hazard Area	FEMA FIRM Panel No.
Los Angeles	Coyote Creek	La Mirada	Zone X	0605C0019
Orange	Fullerton Creek	Buena Park	Zone X and Zone AH	0605C0126
	Carbon Creek	Anaheim	Zone A and Zone AH	06059C0129
	Santa Ana River	Santa Ana	Zone A	06059C0142
	Santiago Creek	Santa Ana	Zone AE	06059C0163

3.1.3.2.5 Municipal Supply

The Basin Plan (Santa Ana RWQCB 1995) includes groundwater recharge as an existing beneficial use for Santa Ana River Reach 1, Santa Ana River Reach 2 and Santiago Creek Reach 1. The Caltrans District 12 Work Plan (Caltrans 2022) for the 2023 – 2024 fiscal year does not reference recharge facilities within the Project area. According to groundwater exhibits (Orange County Water District [OCWD] 2018) the I-5 Managed Lanes Project is approximately 3 miles downstream from the OCWD Burris Basin surface recharge facility.

3.1.3.3 Groundwater Hydrology

Coastal Plain of Orange County Groundwater Basin

The Coastal Plain of Orange County Groundwater Basin (Orange County Basin) underlies the northern half of Orange County, covering approximately 224,000 acres, bordered by the Coyote and Chino Hills to the north, the Santa Ana Mountains to the northeast, the Pacific Ocean to the

southwest, and terminating near the Orange County line to the northwest, where it connects to the Coastal Plain of Los Angeles - Central Basin (California Department of Water Resources 2003).

The California Department of Water Resources divides the Orange County groundwater basin into two primary hydrologic divisions, the Forebay and Pressure areas. The boundary of these two areas generally delineates the areas where surface water or shallow groundwater can or cannot move downward in substantial quantities to the first producible aquifer. This boundary represents a transition zone where low-permeability clay and silt deposits increasingly occur in near-surface sediments southwest of the boundary of these two areas.

The Santa Ana River serves as OCWD's main source for groundwater recharge. OCWD manages the underground reserves that supply 500 wells within OCWD's boundary. Approximately 270,000 acre-feet of water is pumped for use each year. Groundwater reserves are maintained by a recharge system, which replaces water pumped from wells. OCWD's facilities have a recharge capacity of about 300,000 acre-feet per year with a total capacity of 38,000,000 acre-feet. Approximately two million people depend on this source for more than seventy five percent of their water (Caltrans 2018a). Along a six-mile section of the Santa Ana River that belongs to OCWD, a system of diversion structures and recharge basins captures most of the water that would otherwise flow into the Pacific Ocean. The I-5 Project crosses the Santa Ana River approximately 3 miles downstream from the OCWD Burris Basin recharge facility (OCWD 2018).

Coastal Plain of Los Angeles Central Basin

The northern section of the Project within District 7 at I-5 from PM 0.0 to 0.5 is in the Coastal Plain of the Los Angeles Groundwater Basin, Central Basin (commonly referred to as the Central Basin). The Central Basin spans an area of 177,000 acres and occupies a large portion of the southeastern part of the Coastal Plain. Groundwater enters the Central Basin through surface and subsurface flow and by direct percolation of precipitation and streamflow. With a groundwater storage capacity of 13,800,000 acre-feet, the Central Basin replenishes the aquifers in the forebay areas where permeable sediments are exposed at ground surface (California Department of Water Resources 2003). Natural replenishment of the Central Basin's groundwater supply is primarily from surface inflow through the Whittier Narrows and some underflow from the San Gabriel Valley.

3.1.4 Geology/Soils

Hydrologic Soil Groups (HSGs) are based on the rate of water infiltration, with Group A having the highest rates and Group D having the lowest rates. A Web Soil Survey was conducted for the soil types along the Project alignment (United States Department of Agriculture Natural Resources Conservation Service (NRCS) [USDA, 2017]). Soil types within the Project area were identified as Chino silty clay loam; Urban land-Ballona-Typic Xerorthents, fine substratum complex; Urban land, frequently flooded; Chino silty clay loam, drained; Corralitos loamy sand; Hueneme fine sandy loam; Metz loamy sand; Metz loamy sand, moderately fine; Mocho sandy loam; Mocho loam; Riverwash; San Emigdio fine sandy loam; and Emigdio fine sandy loam, moderately fine substratum. According to the NRCS, San Emigdio fine sandy loam; San Emigdio fine sandy loam, moderately fine substratum; Corralitos loamy sand; and Hueneme fine sandy loam have a HSG classification of A. Urban land, frequently flooded; Metz loamy sand; Metz loamy sand, moderately fine; Mocho sandy loam; and Mocho loam have a HSG classification of B and Chino silty clay loam; Urban land-Ballona-Typic Xerorthents, fine

substratum complex; and Chino silty clay loam, drained are classified as HSG C. The remaining soil type, Riverwash is not rated. An exhibit that presents the HSG results is provided in Appendix B.

3.1.5 Biological Communities

LSA Associates, Inc. (LSA, 2023) prepared a Natural Environment Study (Minimal Impacts) (NES[MI]) to support the National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA) documentation for the Project. For the NES(MI), a Biological Study Area (BSA) was established to evaluate potential direct and indirect project-related effects on sensitive biological resources. The BSA encompassed the existing right-of-way within the project limits, as well as an approximately 300-foot buffer around the right-of-way to account for potential indirect construction-related effects. The following discussion is based on the on-site field investigations conducted within the BSA from July through October 2022.

3.1.5.1 Aquatic Habitat

Habitats are of special concern based on (1) federal, State, or local laws regulating their development; (2) limited distributions; and/or (3) the habitat requirements of special-status plants or animals occurring in a BSA. Such sensitive habitats are often designated by the CDFW as natural communities of special concern. According to the Draft NES(MI), natural communities of special concern within the BSA were limited to freshwater marsh habitat.

3.1.5.1.1 Special Status Species

Although southern California steelhead (*Oncorhynchus mykiss irideus*) was identified in the literature review as potentially occurring within areas surrounding the BSA, the field survey results were negative.

Gambel's water cress was not observed in the BSA during the August 2022 surveys. Suitable habitat for Gambel's water cress is expected to occur within the freshwater marsh habitat located within the northern portion of the BSA. There are two historical occurrences within the vicinity of the BSA with the closest occurrence overlapping with the BSA between SR 22 and SR 55 and is noted as being extirpated in southern California. The next closest occurrence is located approximately 10 miles to the southwest of the BSA along the Pacific Ocean. Therefore, the species is considered unlikely within the BSA.

Monarch butterfly was not observed in the BSA during the 2022 field surveys. Marginally suitable foraging habitat that includes limited nectar sources for monarch butterfly occurs in the freshwater marsh that occurs within the BSA. Suitable roosting and overwintering habitat occurs within the trees present within the landscaped areas dominated by ornamentals that occur throughout the BSA. There are no documented occurrences of monarch butterfly roosting sites near the BSA.

Marginal suitable habitat for the Santa Ana sucker includes Coyote Creek, La Canada Verde Creek, and Peters Canyon Wash. However, no fish were observed in the perennial waterways during the 2022 field surveys. Coyote Creek, La Canada Verde Creek, and Peters Canyon Wash are able to support Santa Ana sucker year-round; however, they are considered to be of marginal habitat quality due to their narrow width, shallow depth, and concrete-lined substrate within the BSA. No other suitable Santa Ana sucker habitat is present in the BSA.

Arroyo toad was not observed in the BSA during the 2022 field surveys. The BSA contains three perennial waterways including Coyote Creek, La Canada Verde Creek, and Peters Canyon Wash. Stream flows within these three waterways were limited during the 2022 survey but the waterways are perennial. All three perennial waterways lack suitable habitat as they are all concrete-lined and lack suitable adjacent or upland habitat required by the species within the BSA.

Tri-colored blackbird was listed as Threatened under California Endangered Species Act (CESA) in March 2019. Tri-colored blackbird is a small songbird that typically nests in colonies and forages in freshwater marshes dominated by cattails or tules (*Scirpus* spp.) and other riparian areas and forages in adjacent grasslands and farmland. Freshwater marsh is present in the BSA in one location; however, it is largely considered marginal for foraging and not suitable for nesting as it occurs immediately adjacent to I-5 where high levels of human activity occur and is small in size. In addition, the area where the freshwater marsh is located is subject to maintenance activities including vegetation removal as observed on aerial imagery as recent as May 2019. Tri-colored blackbird was not observed within the BSA during the 2022 field surveys. The species is not anticipated to nest within the vicinity of the BSA given absence of suitable nesting habitat.

Special-status bat species that have potential to roost within the BSA includes pallid bat (*Antrozous pallidus*), Mexican long-tongued bat (*Choeronycteris mexicana*), western mastiff bat (*Eumops perotis californicus*), silver-haired bat (*Lasionycteris noctivagans*), hoary bat (*Lasiurus cinereus*), western yellow bat (*Lasiurus xanthinus*), pocketed free-tailed bat (*Nyctinomops femorasaccus*), and big free-tailed bat (*Nyctinomops macrotis*), as well as non-special-status bat species.

There is a low potential of occurrence for the Southern California steelhead distinct population segment special-status animal species within the BSA based on the results of the literature review of the National Oceanic and Atmospheric Administration (NOAA) species list.

3.1.5.1.2 Stream/Riparian Habitats

Prominent or natural aquatic resources (e.g., rivers, creeks, or wetlands) within the BSA include the Peters Canyon Wash, El Modena-Irvine Channel, Santiago Creek, Bitterbrush Channel, Santa Ana River, Carbon Creek, Fullerton Creek, Coyote Creek, and La Canada Verde Creek. Undeveloped areas within the BSA are a mix of natural vegetation communities and pockets of ornamental vegetation and ruderal areas along I-5 and surrounding residential and commercial developments.

Vegetation communities or land cover types in the BSA include freshwater marsh, riverine, streambed, developed above-riverine below, developed above-streambed below, bare ground, landscaped, riprap, ruderal and developed.

Other delineated stream habitat features referenced in the NES(MI) include 52.09 acres of the CDFW stream/river and riparian. Per the NES(MI), these findings should be considered preliminary until verified by the appropriate regulatory agencies.

3.1.5.1.3 Wetlands

In total, 122 distinct drainage features were delineated within the jurisdictional delineation study area (JDSA). Of those 122 features, two features were delineated as wetland waters of the U.S. by the USACE and wetland waters of the State by RWQCB. The total area of delineated features within the JDSA includes 0.578 acre of wetland waters of the U.S.

3.1.5.1.4 Fish Passage

Caltrans is required by SB 857 to construct projects without presenting barriers to fish passage or to remediate existing barriers. There is no essential fish habitat or critical habitat for any fish species located within the BSA. Potentially suitable habitat for anadromous fish is limited to Coyote Creek, La Canada Verde Creek/La Mirada Creek, and Peters Canyon Wash within the BSA as they are the only perennial waterbodies within the BSA but lack suitable substrate as they are concrete lined. Coyote Creek, Carbon Creek, Santa Ana River, and Santiago Creek do not provide suitable habitat for anadromous fish as they are ephemeral and lack suitable substrate for spawning. However, it should be noted that CDFW considers the Santa Ana River as a historic steelhead stream subject to fish pass analysis. The build alternatives do not propose any work within the perennial waterbodies within the BSA, and no barriers to fish passage within these waterbodies would result from implementation of the build alternatives. Therefore, a fish passage analysis is not warranted.

3.2 Water Quality Objectives/Standards and Beneficial Uses

3.2.1 Surface Waters

To protect beneficial uses, the Los Angeles RWQCB and the Santa Ana RWQCB have set forth WQOs that are described in their Basin Plans. WQOs are intended to (1) protect public health and welfare; and (2) maintain or enhance water quality in relation to the designated existing and potential beneficial uses of the water. Santa Ana RWQCB and Los Angeles RWQCB (Los Angeles RWQCB 2019) surface WQOs for inland receiving waters are displayed in Table 3-9 and Table 3-10, respectively. In addition, the Basin Plan has identified a numeric WQO for Santa Ana River Reach 2. The numeric WQO for total dissolved solids, based on a five-year moving average, is 650 milligrams per liter. The Basin Plans also identify implementation programs to achieve WQOs and requires monitoring to evaluate the effectiveness of these programs. WQOs must comply with the State antidegradation policy (State Board Resolution No. 68-16), which is designed to maintain high quality waters while allowing some flexibility if beneficial uses are reasonably affected. The designated beneficial uses for direct receiving water resources within the Project are presented in Table 3-11.

Table 3-9. Santa Ana RWQCB Narrative WQOs for Inland Surface Waters

Constituent Name	Narrative Objective
Algae	Waste dischargers shall not contribute to excessive algal growth in inland surface receiving waters.
Ammonia, Un-ionized	To prevent chronic toxicity to aquatic life in the SAR, Reaches 2, 3, and 4, Chino Creek, Mill Creek (Prado Area), Temescal Creek, and San Timoteo Creek, discharges to these water bodies shall not cause the concentration of un-ionized ammonia (as nitrogen) to exceed 0.098 mg/L (NH_3-N) as a 4-day average.
Pathogen Indicator Bacteria Objectives	Recreational Use: Pathogen Indicator Objective (geometric mean of at least 5 samples in a 30-day period (running)[1] REC1-only or REC1 and REC2: <126 *E. coli* per 100 mL

[1] The Regional Board may adopt other alternative averaging periods, such as annual or seasonal averages, through the basin planning process

Constituent Name	Narrative Objective
Boron	Boron concentrations shall not exceed 0.75 mg/L in inland surface waters of the region as a result of controllable water quality factors.
Chemical Oxygen Demand (COD)	Waste discharges shall not result in increases in COD levels in inland surface waters that exceed the values shown in Table 4-1 of the Basin Plan or that adversely affect beneficial uses.
Chlorides	The chloride objectives listed in Table 4-1 of the Basin Plan shall not be exceeded as a result of controllable water quality factors.
Chlorine, Residual	To protect aquatic life, the chlorine residual in wastewater discharged to inland surface waters shall not exceed 0.1 mg/L.
Color	Waste discharges shall not result in coloration of the receiving waters that causes a nuisance or adversely affects beneficial uses. The natural color of fish, shellfish, or other inland surface water resources used for human consumption shall not be impaired.
Oxygen, Dissolved	The dissolved oxygen content of surface waters shall not be depressed below 5.0 mg/L for waters designated WARM, or 6.0 mg/L for waters designated COLD, as a result of controllable water quality factors. In addition, waste discharges shall not cause the median dissolved oxygen concentration to fall below 85% of saturation or the 95th percentile concentration or fall below 75% of saturation within a 30-day period.
Floatables	Waste discharges shall not contain floating materials, including solids, liquids, foam, or scum, which cause a nuisance or adversely affect beneficial uses.
Fluoride	Fluoride concentrations shall not exceed values specified in the Basin Plan for inland surface waters designated MUN as a result of controllable water quality factors.
Hardness	The objectives listed in Table 4-1 of the Basin Plan shall not be exceeded as a result of controllable water quality factors. If no hardness objective is listed in Table 4-1, the hardness of receiving waters used for MUN shall not be increased as a result of waste discharges to levels that adversely affect beneficial uses.
pH	The pH of inland surface waters shall not be raised above 8.5 or depressed below 6.5 as a result of controllable water quality factors.
Metals	The equations listed in the Basin Plan represent the applicable Site-Specific Water Quality Objectives.
Methylene Blue-Activated Substances (MBAS)	MBAS concentrations shall not exceed 0.05 mg/L in inland surface waters designated MUN as a result of controllable water quality factors.
Nitrate	Nitrate-nitrogen concentrations shall not exceed 45 mg/L (as NO_3) or 10 mg/L (as N) in inland surface waters designated MUN as a result of controllable water quality factors.
Nitrogen, Total Inorganic	The objectives in the Basin Plan shall not be exceeded as a result of controllable water quality factors.
Oil and Grease	Waste discharges shall not result in deposition of oil, grease, wax, or other material in concentrations that result in a visible film or in coating objects in the water, or that cause a nuisance or adversely affect beneficial uses.
Radioactivity	Radioactivity materials shall not be present in waters of the region in concentrations that are deleterious to human, plant, or animal life. Waters designated MUN shall meet the limits specified in Title 22 of the California Code of Regulations and listed in the Basin Plan.
Sodium	The sodium objectives listed in the Basin Plan shall not be exceeded as a result of controllable water quality factors.
Solids, Suspended and Settable	Inland surface waters shall not contain suspended or settable solids in amounts that cause a nuisance or adversely affect beneficial uses as a result of controllable water quality factors.

Constituent Name	Narrative Objective
Sulfate	The objectives listed in the Basin Plan shall not be exceeded as a result of controllable water quality factors.
Sulfides	The dissolved sulfide content of inland surface waters shall not be increased as a result of controllable water quality factors.
Surfactants (surface-active agents)	Waste discharges shall not contain concentrations of surfactants that result in foam in the course of flow or use of the receiving water, or which adversely affect aquatic life.
Taste and Odor	The inland surface waters of the region shall not contain, as a result of controllable water quality factors, taste- or odor-producing substances at concentrations that cause a nuisance or adversely affect beneficial uses. The natural taste and odor of fish, shellfish, or other regional inland surface water resources used for human consumption shall not be impaired.
Temperature	The natural receiving water temperature of inland surface waters shall not be altered unless it can be demonstrated to the satisfaction of the RWQCB that such alteration in temperature does not adversely affect beneficial uses. The temperature of waters designated COLD shall not be increased by more than 5°F as a result of controllable water quality factors. The temperature of waters designated WARM shall not be raised above 90°F June through October or above 78°F during the rest of the year as a result of controllable water quality factors. Lake temperatures shall not be raised more than 4°F above established normal values as a result of controllable water quality factors.
Dissolved Solids, Total (Total Filterable Residue)	The dissolved mineral content of the waters of the region, as measured by the total dissolved solids test (Standard Methods for the Examination of Water and Wastewater, 16th Ed., 1985: 209B (180 °C), p. 95) shall not exceed the specific objectives listed in Table 4-1 as a result of controllable water quality factors.
Toxic Substances	Toxic substances shall not be discharged at levels that will bioaccumulate in aquatic resources to levels that are harmful to human health. The concentration of contaminants in waters that are existing or potential sources of drinking water shall not occur at levels that are harmful to human health. The concentration of toxic pollutants in the water column, sediments, or biota shall not adversely affect beneficial uses.
Turbidity	Increases in turbidity that result from controllable water quality factors shall comply with the following: Natural Turbidity — Maximum Increase 0-50 NTU — 20% 50-100 NTU — 10 NTU Greater than 100 NTU — 10%

Table 3-10. Los Angeles RWQCB Surface WQOs for Inland Surface Waters

Constituent	Basin Plan Objectives
Ammonia	Shall not be present at levels that when oxidized to nitrate, pose a threat to groundwater. Numerical ammonia concentrations for inland surface waters are contained in Tables 3-1 through 3-4 of the Los Angeles RWQCB Basin Plan.
Bacterial, Coliform	• **REC-1 (fresh waters):** E. coli density geometric mean shall not exceed 126/100 ml. E. coli density in a single sample shall not exceed 235/100 ml. • **REC-1:** Fecal coliform concentration shall not exceed a log mean of 200/100 ml (based on a minimum of not less than four samples for any 30-day period), nor shall more than 10 percent of samples collected during any 30-day period exceed 400/100 ml. • **REC-2 (and not designated REC-1):** Fecal coliform concentration shall not exceed a log mean of 2,000/100 ml (based on a minimum of not less than four samples for any 30-day period), nor shall more than 10 percent of samples collected during any 30-day period exceed 4,000/100 ml.
Bioaccumulation	Toxic pollutants shall not be present at levels that will bioaccumulate in aquatic life to levels that are harmful to aquatic life or human health.
BOD	Waters shall be free of substances that result in increases in the BOD, which adversely affect beneficial uses.
Biostimulatory Substances	Waters shall not contain biostimulatory substances in concentrations that promote aquatic growth to the extent that such growth causes nuisance or adversely affects beneficial uses.
Chemical Constituents	Surface waters shall not contain concentrations of chemical constituents in amounts that adversely affect any designated beneficial use. Waters designated MUN shall not contain concentrations of chemical constituents in excess of the limits specified in Cal. Code Regs. Title 22 and incorporated by reference into Tables 3-8 and 3-9 of the Los Angeles RWQCB Basin Plan.
Chlorine, Total Residual	Chlorine residual shall not be present in surface water discharges at concentrations that exceed 0.1 mg/L and shall not persist in receiving waters at any concentration that causes impairment of beneficial uses.
Color	Waters shall be free of coloration that causes nuisance or adversely affects beneficial uses.
Exotic Vegetation	Exotic vegetation shall not be introduced around stream courses to the extent that such growth causes nuisance or adversely affects beneficial uses.
Floating Material	Waters shall not contain floating materials, including solids, liquids, foams, and scum, in concentrations that cause nuisance or adversely affect beneficial uses.
MBAS	Waters shall not have MBAS concentrations greater than 0.5 mg/L in waters designated MUN.
Mineral Quality	Numerical mineral quality objectives for individual inland surface waters are contained in Table 3-10 of the Los Angeles RWQCB Basin Plan.
Nitrogen (Nitrate, Nitrite)	Waters shall not exceed 10 mg/L nitrogen as nitrate-nitrogen plus nitrite-nitrogen, 45 mg/L as nitrate, 10 mg/L as nitrate-nitrogen, or 1 mg/L as nitrite-nitrogen or as otherwise designated in Table 3-10 of the Los Angeles RWQCB Basin Plan.
Oil and Grease	Waters shall not contain oils, greases, waxes, or other materials in concentrations that result in a visible film or coating on the surface of the water or on objects in the water that cause nuisance or adversely affect beneficial uses.
Oxygen, Dissolved	The mean annual dissolved oxygen concentration of all waters shall be greater than 7 mg/L, and no single determination shall be less than 5 mg/L, except when natural conditions cause lesser concentrations. The dissolved oxygen content of all surface waters designated WARM shall not be depressed below 5 mg/L.

Constituent	Basin Plan Objectives
Pesticides	No individual pesticide or combination of pesticides shall be present in concentrations that adversely affect beneficial uses. There shall be no increase in pesticide concentrations found in bottom sediments or aquatic life. Waters designated MUN shall not contain concentration of pesticides in excess of the limiting concentrations specified in Table 64444-A of Cal. Code Regs. Title 22, Section 64444, which is incorporated by reference into the Los Angeles RWQCB Basin Plan.
pH	Inland water shall not be depressed below 6.5 or raised above 8.5 as a result of waste discharges. Ambient pH levels shall not be changed more than 0.5 unit from natural conditions as a result of waste discharge.
PCBs	Pass-through or uncontrollable discharges to waters, or at locations where the waste can subsequently reach waters, are limited to 70 pg/L (30-day average) for protection of human health and 14 ng/L (daily average) to protect aquatic life in inland fresh waters.
Radioactive Substances	Radionuclides shall not be present in concentrations that are deleterious to human, plant, animal, or aquatic life or that result in the accumulation of radionuclides in the food web to an extent that presents a hazard to human, plant, animal, or aquatic life. Waters designated MUN shall not contain concentrations of radionuclides in excess of the limits specified in Table 4 of Cal. Code Regs. Title 22, Section 64443, which is incorporated by reference into Table 3-9 of the Los Angeles RWQCB Basin Plan.
Solid, Suspended, or Settleable Materials	Waters shall not contain suspended or settleable material in concentrations that cause nuisance or adversely affect beneficial uses.
Tastes and Odors	Waters shall not contain taste- or odor-producing substances in concentrations that impart undesirable tastes or odors to fish flesh or other edible aquatic resources, cause nuisance, or adversely affect beneficial uses.
Temperature	The natural receiving water temperature of all waters shall not be altered unless it can be demonstrated that such alteration in temperature does not adversely affect beneficial uses. For waters designated WARM, water temperature shall not be altered by more than 5°F above the natural temperature and shall not exceed 80°F as a result of waste discharges.
Toxicity	All waters shall be free of toxic substances in concentrations that are toxic to, or that produce detrimental physiological responses in, human, plant, animal, or aquatic life.
Turbidity	Waters shall be free of changes in turbidity that cause nuisance or adversely affect beneficial uses. Increases in natural turbidity attributable to controllable water quality factors shall not exceed the following limits: • Where natural turbidity is between 0 and 50 NTU, increases shall not exceed 20%. • Where natural turbidity is greater than 50 NTU, increases shall not exceed 10%.

BOD = Biological Oxygen Demand
Cal. Code Regs. = California Code of Regulations
°F = degrees Fahrenheit
MBAS = Methylene Blue Activated Substances
ml = milliliters
MUN = municipal and domestic supply
mg/L = milligrams per liter
ng/L = nanograms per liter
NTU = National Turbidity Units
PCBs = polychlorinated biphenyls
pg/L = picograms per liter
RWQCB = Regional Water Quality Control Board
WARM = warm freshwater habitat

Table 3-11. Beneficial Uses for Direct Receiving Waters

Inland Surface Stream	MUN	GWR	IND	PROC	AGR	REC1	REC2	WARM	RARE	WILD
Coyote Creek (Above La Canada Verde Creek)	•*		•	•				•	•	•
Carbon Creek	•	•				•	•	•	•	•
Fullerton Creek	*No designated beneficial uses per Santa ana Region Basin Plan update February 2016*									
Santa Ana River, Reach 1	+					•	•**	I		I
Santa Ana River, Reach 2	+	•			•	•	•	•	•	•
Santiago Creek, Reach 1	•	•				•	•			•

• Existing or Potential Beneficial Use
I Intermittent Beneficial Use
+ Excepted from Municipal and Domestic Supply
* Designated under SB 88-63 and RB 89-03. May be considered for exemption at a later date.
** Access prohibited in all or part per agency with jurisdiction
Beneficial Use Definitions: MUN (Municipal and Domestic Supply); AGR (Agricultural Supply); GWR (Groundwater Recharge); IND (Industrial Service Supply); PROC (Industrial Process Supply); RARE (Rare, Threatened or Endangered Species); REC1 (Water Contact Recreation); REC2 (Non-Contact Water Recreation); WARM (Warm Freshwater Habitat); WILD (Wildlife Habitat).

3.2.2 List of Impaired Waters

The drainage course of water from the Project to offsite areas was used to determine what water bodies could potentially be impacted by the Project. The Project crosses over five waterbodies which convey flow to downstream tributaries before draining to the Pacific Ocean. The 2020-2022 Integrated Report (State Water Resources Control Board, 2022b) includes a combined list of CWA Section 303(d) water bodies that are listed as not meeting water quality standards and Section 305(b) water bodies that identifies water bodies still requiring the development of a TMDL, those that have a completed TMDL approved by the U.S. EPA, and those that are being addressed by actions other than a TMDL. Table 3-12 presents the impaired waterbodies and the TMDL status. Existing water quality conditions for the Project receiving waters are described below. A discussion regarding TMDLs within the Project limits where Caltrans is identified as a responsible party is presented in Section 3.1.3.2.3.

Peters Canyon Channel is listed on the 303(d) List of Water Quality Limited Segments as impaired for toxaphene, pH, indicator bacteria toxicity, benthic community effects, malathion, selenium, and dichlorodiphenyltrichloroethane (DDT). San Diego Creek Reach 1 is listed as impaired for nutrients, sedimentation/siltation, selenium, toxaphene, toxicity, indicator bacteria, benthic community effects, DDT, and malathion. Coyote Creek is listed as impaired for indicator bacteria, dissolved copper, iron, malathion, pH, and toxicity. Lower Newport Bay is listed as impaired for chlordane, copper, DDT, indicator bacteria, nutrients, polychlorinated biphenyls (PCBs), and toxicity. Upper Newport Bay is listed as impaired for chlordane, copper, DDT, indicator bacteria, malathion, nutrients, PCBs, sedimentation/siltation, and toxicity.

Table 3-12. Direct and Indirect Receiving Waterbody Listing Status

Waterbody Name	303(d) Impairment	TMDL Status	
		TMDL still required	Being addressed by US EPA approved TMDL
Peters Canyon Channel	Toxaphene, pH, Indicator Bacteria, Toxicity, Benthic Community Effects, Malathion, Selenium , DDT (Dichlorodiphenyltrichloroethane)	pH, Indicator Bacteria, Toxicity, Benthic Community Effects, Malathion, Selenium	Toxaphene, DDT
San Diego Creek Reach 1	Nutrients, Sedimentation/Siltation, Selenium, Toxaphene, Toxicity , Indicator Bacteria, Benthic Community Effects, DDT, Malathion	Selenium, Toxicity , Indicator Bacteria, Benthic Community Effects, Malathion	Nutrients, Sedimentation/Siltation, Toxaphene, DDT
Coyote Creek	Indicator Bacteria, Dissolved Copper, Iron, Malathion, pH, Toxicity	Iron, Malathion, pH, Toxicity	Dissolved Copper, Indicator Bacteria
Newport Bay, Lower	Chlordane, Copper, DDT, Indicator Bacteria, Nutrients, PCBs (Polychlorinated biphenyls), Toxicity	Copper, Toxicity	Chlordane, DDT, Indicator Bacteria, Nutrients, PCBs, Toxicity
Newport Bay, Upper	Chlordane, Copper, DDT, Indicator Bacteria, Malathion, Nutrients, PCBs, Sedimentation/Siltation, Toxicity	Copper, Malathion, Toxicity	Chlordane, DDT, Indicator Bacteria, Nutrients, PCBs, Sedimentation/Siltation

Source: 2020-2022 Integrated Report

3.2.3 Groundwater

3.2.3.1 Coastal Plain of Orange County Groundwater Basin

Existing Groundwater Quality

Groundwater within the basin is primarily sodium-calcium bicarbonate in character. Total dissolved solids (TDS) range from 232 - 661 milligrams per liter (mg/L) and average 475 mg/L. The average TDS content of 240 public supply wells was measured at 507 mg/l with a range of 196 – 1,470 mg/l. Groundwater quality impairments include sea water intrusion near the coast; colored water, from natural organic materials in the lower aquifer system; and increasing salinity, high nitrates and methyl-tert-butyl ethylene (MTBE) (California Department of Water Resources 2003).

Existing Groundwater Levels

Groundwater levels are generally lower than the level in 1969, when the basin was considered to have been full. The level in the forebay has generally stabilized, whereas the southern coastal area has declined steadily through time. Since 1990, the magnitude of yearly groundwater level fluctuation has approximately doubled near the coast because of seasonal water demand and short-term storage programs but has stayed the same in the forebay. Average groundwater levels for the Orange County Basin have risen about 15 feet since 1990, with average levels in the forebay area rising about 30 feet and average levels in the coastal area dropping a few feet (Department of Water Resources 2004).

Groundwater Quality Objectives/Standards and Beneficial Uses

The groundwater quality objectives shown in Table 3-13 apply to all groundwater in the Project area under the jurisdiction of the Santa Ana RWQCB (Santa Ana RWQCB 1995). Beneficial uses for groundwater in the Orange Groundwater Management Zone are Municipal and Domestic Supply, Agriculture Supply, Industrial Service Supply, and Industrial Process Supply. Table 3-14 identifies WQOs for selected constituents in the Orange Groundwater Management Zone.

Table 3-13. Santa Ana RWQCB Water Quality Objectives for Groundwater

Constituent	Water Quality Objectives for Groundwater
Arsenic	Arsenic concentrations shall not exceed 0.05 mg/L in groundwater designated MUN as a result of controllable water quality factors.
Bacteria	Total coliform numbers shall not exceed 2.2 organisms/100 mL median over any 7-day period in groundwaters designated MUN as a result of controllable water quality factors.
Barium	Barium concentrations shall not exceed 1.0 mg/L in groundwaters designated MUN as a result of controllable water quality factors.
Boron	Boron concentrations shall not exceed 0.75 mg/L in groundwaters of the region as a result of controllable water quality factors.
Chloride	Chloride concentrations shall not exceed 500 mg/L in groundwaters of the region designated as MUN as a result of controllable water quality factors.
Color	Waste discharges shall not result in coloration of the receiving waters which causes a nuisance or adversely affects beneficial uses.
Cyanide	Cyanide concentrations shall not exceed 0.2 mg/L in groundwaters designated MUN as a result of controllable water quality factors.
Dissolved Solids, Total (Total Filterable Residue)	The dissolved mineral content of the waters of the region, as measured by the total dissolved solids test (Standard Methods for the Examination of Water and Wastewater, 20th Ed., 1998: 2540C (180 °C), p. 2-56), shall not exceed the specific objectives listed in the Basin Plan as a result of controllable water quality factors.
Fluoride	Fluoride concentrations shall not exceed 1.0 mg/L in groundwaters designated MUN as a result of controllable water quality factors.
Hardness	The hardness of receiving waters used for MUN shall not be increased as a result of waste discharges to levels that adversely affect beneficial uses.
Metals	Metal concentrations shall not exceed the values listed in the Basin Plan in groundwaters designated MUN as a result of controllable water quality factors.
Methylene Blue Active Substances (MBAS)	MBAS concentrations shall not exceed 0.05 mg/L in groundwaters designated MUN as a result of controllable water quality factors.
Nitrate	Nitrate-nitrogen concentrations listed in the Basin Plan shall not be exceeded as a result of controllable water quality factors.
Oil and Grease	Waste discharges shall not result in deposition of oil, grease, wax, or other materials in concentrations that cause a nuisance or adversely affect beneficial uses.
pH	The pH of groundwater shall not be raised above 9 or depressed below 6 as a result of controllable water quality factors.

Constituent	Water Quality Objectives for Groundwater
Radioactivity	Radioactivity materials shall not be present in the waters of the region in concentrations that are deleterious to human, plant, or animal life. Groundwaters designated MUN shall meet the limits specified in Title 22, California Code of Regulations and as listed in the Basin Plan.
Sodium	Sodium concentrations shall not exceed 180 ml/L in groundwaters designated as MUN as a result of controllable water quality factors. Groundwaters designated AGR shall not exceed the sodium absorption ratio of 9 as a result of controllable water quality factors.
Sulfate	Sulfate concentrations shall not exceed 500 mg/L in groundwaters of the region designated MUN as a result of controllable water quality factors.
Tastes and Odors	The groundwaters of the region shall not contain, as a result of controllable water quality factors, taste- or odor-producing substances at concentrations that cause a nuisance or adversely affect beneficial uses.
Toxic Substances	All waters of the region shall be maintained free of substances in concentrations that are toxic, or that produce detrimental physiological responses in human, plant, animal, or aquatic life.

Table 3-14. Santa Ana RWQCB Groundwater Management Zone Water Quality Objectives

Groundwater Management Zone	Total Dissolved Solids	Nitrate as Nitrogen
Orange	580	3.4

3.2.3.2 Coastal Plain of Los Angeles Central Basin

Existing Groundwater Quality

Groundwater in this area is primarily calcium sulfate and calcium bicarbonate in character. The TDS in the Central Basin ranges from 200 to 2,500 mg/L based on data from 293 public supply wells. The average TDS concentration for these 293 wells is 453 mg/L (California Department of Water Resources 2003).

Existing Groundwater Levels

According to the Groundwater Bulletin (California Department of Water Resources 2003), groundwater levels varied over a range of approximately 25 feet between 1961 and 1977. Since 1996, groundwater levels have varied by a range of 5 to 10 feet. Well water levels documented in 1999 indicated that most water levels are in the upper portion of their recent historical range.

Beneficial uses for groundwater within the jurisdiction of the Los Angeles RWQCB are Municipal and Domestic Supply, Agriculture Supply, Industrial Service Supply, and Industrial Process Supply. The groundwater quality objectives shown in Table 3-15 apply to all groundwater in the Project corridor (Los Angeles RWQCB 2019).

Table 3-15. Los Angeles RWQCB Groundwater Quality Objectives

Constituent	WQOs for Groundwater
Bacteria, Coliform	In ground waters used for domestic or municipal supply (MUN) the concentration of coliform organisms over any seven-day period shall be less than 1.1/100 ml.
Chemical Constituents and Radioactivity	Ground waters designated for use as domestic or municipal supply (MUN) shall not contain concentrations of chemical constituents and radionuclides in excess of the limits specified in the following provisions of Title 22 of the California Code of Regulations which are incorporated by reference into the Basin Plan: Table 64431-A of Section 64431 (Inorganic chemicals), Table 64444-A of Section 64444 (Organic Chemicals), Table 64442 of Section 64442 (Gross Alpha Particle Activity, Radium-226, Radium-228, and Uranium), and Table 64443 of Section 64443 (Beta Particle and Photon Radioactivity). This incorporation by reference is prospective including future changes to the incorporated provisions as the changes take effect. (See Basin Plan, Tables 3-8, 3-9, 3-12a, and 3-12b.) Ground waters shall not contain concentrations of chemical constituents in amounts that adversely affect any designated beneficial use.
Mineral Quality	Numerical mineral quality objectives for individual groundwater basins are contained in the Basin Plan. In coastal aquifers where elevated concentrations of minerals are caused by natural sources due to an aquifer's proximity to the ocean, the Los Angeles RWQCB may grant a variance from implementing the mineral quality objectives specified in the Basin Plan when issuing waste discharge requirements (WDRs) or enforcement orders. Any variance granted pursuant to this variance provision shall be for no more than five years and may be extended not more than once for an additional period of up to five years. Any further relief should be in the form of a Basin Plan amendment. A decision to issue or to extend a variance will be based upon the Los Angeles RWQCB's evaluation of the evidence submitted concerning the granting of the variance.
Nitrogen (Nitrate, Nitrite)	Ground waters shall not exceed 10 mg/L nitrogen as nitrate-nitrogen plus nitrite-nitrogen (NO3-N + NO2N), 45 mg/L as nitrate (NO3), 10 mg/L as nitrate-nitrogen (NO3-N), or 1 mg/L as nitrite-nitrogen (NO2-N).
Tastes and Odors	Ground waters shall not contain taste or odor-producing substances in concentrations that cause nuisance or adversely affect beneficial uses.

4 ENVIRONMENTAL CONSEQUENCES

4.1 Introduction

Construction and operation of the Project has the potential to affect water quality. BMPs would be evaluated and implemented to address potential impacts during the construction and operational phases. The following discussion pertains to potential environmental effects related to water quality with implementation of the Project as well as project features that would be applied to minimize those effects.

4.2 Potential Impacts to Water Quality

4.2.1 Anticipated changes to the Physical/Chemical Characteristics of the Aquatic Environment

Construction of the Project results in an increase in new impervious surface (NIS) areas which includes net new impervious (NNI) areas and replaced impervious surface (RIS) areas. The NNI is associated with new sound walls, freeway widening, maintenance vehicle pullouts (MVPs) and two Park and Ride facilities. The RIS includes areas where existing asphalt roadway is being replaced by concrete. Overall, the NIS has the potential to increase the pollutant load from this transportation corridor and alter the beneficial uses of direct and indirect receiving water bodies without the implementation of BMPs. For example, construction of the Project and the increase in runoff would potentially cause or contribute to an alteration in water quality and have the potential to affect the beneficial uses of water bodies within and downstream of the Project.

Project construction and operation activities were reviewed for each build alternative. The following discussion summarizes the results of each alternative's potential to introduce pollutants into the environment, with respect to storm water and non-storm water runoff.

4.2.1.1 Substrate

Substrate relates to the nonliving material or base on which an organism lives or grows. From a water quality perspective, this would pertain to habitats, refuges, and nesting sites of aquatic life. During the construction phase, potential impacts to substrate would be associated with erosion and sedimentation. Soil disturbance activities include earth-moving activities such as excavation and trenching, soil compaction and moving, cut and fill activities, and grading. Disturbed soils are susceptible to high rates of erosion from wind and rain, resulting in sediment transport via storm water runoff from the Project area. Anticipated changes associated with sediment transport to receiving water bodies would be a decrease in water clarity, which would cause a decrease in aquatic plant production, and obscure sources of food, habitat, refuges, and nesting sites of fish. The deposition of sediment or silt in a water body can fill gravel spaces in stream bottoms, smothering fish eggs and juvenile fish.

Operation of the Project would result in an increase in impervious surface areas, which could potentially increase storm water runoff. Potential pollutants associated with the operation of transportation facilities include: sediment from natural erosion; nutrients, such as phosphorus and nitrogen, associated with replace-in-kind landscaping and establishment of vegetative cover as a permanent erosion control measure to protect new slopes 2:1 or flatter; mineralized organic matter in soils; nitrite discharges from automobile exhausts and atmospheric fallout; litter; and

metals from the combustion of fossil fuels, the wearing of brake pads, and corrosion of galvanized structures (Caltrans 2017a). Pollutants associated with the operational phase also have the potential to impact areas on which organisms live and grow.

4.2.1.2 Currents, Circulation or Drainage Patterns

Construction of highway widening projects generally impact existing drainage areas and streams in a watershed by altering the natural flow patterns through the addition of impervious surface area and variations in contributing drainage area. The impacts modify the natural timing of drainage in the watershed through changes in the time required for runoff to reach local streams and changes in peak runoff rates and runoff volumes.

The goal of the Project drainage design would be to maintain existing drainage patterns; however, during construction, temporary drainage facilities may be required to redirect runoff from work areas. The Project will cross five streams: Coyote Creek, Carbon Creek, Fullerton Creek, Santa Ana River and Santiago Creek. Within the Coyote Creek watershed, the NNI will increase by 0.01 acres (TranSystems 2023). For the remaining streams, freeway widening will not require the addition of NNI. Furthermore, no lateral or vertical stability issues are anticipated at these crossings. Therefore, temporary changes to drainage patterns are anticipated to be low.

The additional NNI created by the Project may result in changes to the existing hydrograph, including increases in low flow and peak flow velocity and volume to the receiving waterbodies which are Coyote Creek, Carbon Creek, Fullerton Creek, Santiago Creek and Santa Ana River Reach 2. All build alternatives would preserve existing surface drainage at each offsite discharge location. Modifications to existing drainage features and new drainage improvements would be required to collect and convey the additional runoff generated by the proposed widening for the operational phase. Therefore, change associated with currents, circulation or drainage patterns are anticipated to be low.

4.2.1.3 Suspended Particulates (Turbidity)

During construction, sediment-laden flow can result from runoff over DSAs that enter storm drainage facilities or directly discharge into receiving water bodies, increasing the turbidity and decreasing the clarity and beneficial uses of the receiving water body. Additional sources of sediment that could result in increases in turbidity include uncovered or improperly covered active and non-active stockpiles, construction staging areas, and a lack of implementing wind erosion control measures.

The result of the Project's wider cross section will result in additional runoff being transferred to the storm water conveyance facility which will likely have some incremental effect on turbidity at the discharge location and in the downstream receiving waters during the operational phase.

4.2.1.4 Oil Grease and Chemical Pollutants

Construction materials, waste handling, and the use of construction equipment could result in storm water contamination and affect water quality. Spills or leaks from heavy equipment and machinery can result in oil and grease contamination. Operation of vehicles during construction could result in tracking of dust and debris. Staging areas can also be sources of pollutants because of the use of paints, solvents, cleaning agents, and metals during construction. Pesticide use, including herbicides, fungicides, and rodenticides, associated with site preparation is another potential source

of storm water contamination. Larger pollutants, such as trash, debris, and organic matter, are also associated with construction activities, STGAs within the project limits, as well as from other existing sources such as unsheltered populations living within the corridor. As such, the discharge of storm water may cause or threaten to cause violations of WQOs. These pollutants would occur in both the storm water discharges and non-storm water discharges and could potentially cause chemical degradation and aquatic toxicity in the receiving waters.

Operation of the Project would result in an increase in impervious surface areas, which could potentially increase storm water runoff. Potential chemical pollutants associated with the operation of transportation facilities include nutrients, such as phosphorus and nitrogen, associated with replace-in-kind landscaping and establishment of permanent erosion control on new slopes 2:1 or flatter; nitrite discharges from automobile exhausts; nitrogen from atmospheric fallout; and metals from the combustion of fossil fuels, the wearing of brake pads (e.g., total and dissolved copper) and corrosion of galvanized structures (e.g., zinc) (Caltrans 2016).

4.2.1.5 Temperature, Oxygen Depletion and Other Parameters

Construction of any of the build alternatives has the potential to cause temporary changes to normal ambient temperature and dissolved oxygen levels of receiving water bodies by contributing pollutants to receiving water bodies. Pollutants include sediment and silt, associated with soil disturbance and chemical pollutants associated with the construction materials that are used on the Project site with the potential to discharge offsite into the aquatic environment.

Completion of the Project would result in an increase in impervious surface areas; causing the velocity and volume of downstream flow to increase. Once the new facility is operational, potential pollutant sources conveyed by storm water and non-storm water discharges would be associated with motor vehicle operations (i.e., brake dust; oil and grease; and nitrites), highway maintenance activities (i.e., sediment and tree/shrub clippings), illegal dumping (i.e., trash), accidental spills (i.e., hazardous and nonhazardous chemicals), and landscaping care (i.e., fertilizers, pesticides, and herbicides). Nutrients associated with chemicals used in replace-in-kind landscaping and establishment of permanent erosion control on new slopes 2:1 or flatter may cause oxygen depletion and increased temperatures in the aquatic environment. Changes to aquatic temperatures associated with shading from the roadway widening are not anticipated given that the preliminary design indicates that there is no new impervious area proposed over the five major waterbodies that the Project crosses.

4.2.1.6 Flood Control Functions

The Project would add new impervious surface areas which would create an increase in stormwater runoff from the Project. The Project is also adding new drainage facilities to carry the increased stormwater runoff. These systems would be designed to convey the stormwater runoff without affecting the hydraulic capacity of the existing systems and downstream channels by increasing the time of concentration. No substantial changes to hydraulic conveyance capacity are anticipated because culverts and other drainage facilities would be designed and constructed to maintain or provide greater hydraulic capacity. Therefore, implementation of the Build Alternative would not create any increase in flooding, erosion, sedimentation or surpass the hydraulic capacity of the on-site and off-site drainage facilities (TranSystems 2023).

4.2.1.7 Erosion and Accretion Patterns

Under Build Alternative conditions, sediment yield from the road is negligible, because it is paved, and final design and construction criteria stipulates those disturbed areas will be stabilized during and after construction so that they will not provide additional sources of sediment.

The Permit mandates that a Rapid Stability Assessment (RSA) be conducted during planning and design for all projects that will include one (1) acre or more of net new impervious (NNI) surface and for which any new impervious portion of the project drains to a stream crossing located within the project limits. The proposed project crosses five major waterbodies. These waterbodies are Fullerton Creek, Coyote Creek, Carbon Creek, Santa Ana River and Santiago Creek. Of the five major waterbodies, only Coyote Creek will require the addition of 0.01 acres of NNI (TranSystems 2023a). Given the marginal increase in NNI at Coyote Creek and no increase in NNI at locations where the Project crosses the remaining waterbodies, changes to erosion and accretion patterns during the operational phase are anticipated to be low.

Furthermore, drainage facilities such as slotted corrugated steel pipe, storm drain pipelines and inlets would be constructed so that during the operational phase, throughout the Project corridor, runoff would be intercepted and conveyed while minimizing erosion potential. Therefore, anticipated changes to erosion and accretion patterns are considered low.

4.2.1.8 Aquifer Recharge/Groundwater

Although approximately 44 percent of the soils within the Project limits are classified as HSG A and exhibit high infiltration rates, the Project is being constructed in a built environment. The urbanized areas where Project corridor improvements are proposed have a very low potential for groundwater recharge. Therefore, operations of the Project would not cause any substantial short term or long- term changes to groundwater quality or volume.

4.2.1.9 Baseflow

Although baseflow data was not available for Coyote Creek, the Los Angeles County Department of Public Works (2022) provided short interval flow data for a gaging station at Coyote Creek just below Spring Street. During the 2021-2022 rainy season, for Coyote Creek, short interval flow data ranged from a minimum of 3.86 cubic feet per second (cfs) to a maximum of just over 1,000 cfs. This maximum flow was recorded at 1600 hours on October 25, 2021 and within eight hours the short interval flow was measured as 134 cfs. During the dry season, the short interval flow ranged from a minimum of 0.51 cfs to a maximum of 447 cfs with an average flow of 10.1 cfs. Like Coyote Creek, flow within Fullerton Creek, below the Fullerton Dam near Brea, California, is relatively permanent (i.e., flowing for more than 3 months) (US Geological Survey 2022). During the summer, however, flow within Fullerton Creek, Santiago Creek, Santa Ana River and Carbon Creek is less than 20 cfs. Therefore, given the low flow during the dry season and between storm events, along with no increase in water surface elevations above the existing condition as referenced in the Location Hydraulic Study Report (TranSystems 2022), anticipated changes to baseflow are considered low. Exhibits displaying discharge flow for four of the five major waterbodies within the Project's proposed disturbance footprint are provided in Appendix C.

4.2.2 Anticipated Changes to the Biological Characteristics of the Aquatic Environment

4.2.2.1 Special Aquatic Sites

Freshwater marsh is present in one portion of the BSA east of the I-5 northbound Artesia Boulevard offramp. The freshwater marsh is located within a larger manmade catchment basin constructed to contain stormwater flows from I-5 and surrounding areas. The catchment basin is regularly maintained including vegetation removal as evidenced on aerial imagery as recent as May 2019. According to the NES(MI), the Project would result in 0.22 acres of temporary impacts to freshwater marsh[2].

4.2.2.2 Habitat for Fish and Other Aquatic Organisms

A total of 0.04 acres of temporary direct impacts to marginally suitable freshwater marsh habitat for Gambel's water cress within the BSA would occur during Project activities associated with Alternative 4. No permanent impacts will occur to suitable habitat for the species. Alternative 4 will not impact critical habitat for the species as none exists within the BSA. Alternative 4 is not anticipated to impact the species as suitable habitat present is isolated within an otherwise developed area. With the implementation of avoidance and minimization measures referenced in the NES(MI), potential impacts to Gambel's water cress will be avoided to the greatest extent possible.

Although there are no direct anticipated impacts to monarch butterfly there could be indirect temporary effects to suitable monarch butterfly habitat through implementation of Alternative 4. These indirect temporary effects may include increased noise, vibration, dust, and lighting during construction activities. In addition, because those activities will be performed on highly traveled portions of I-5, indirect impacts are expected to be minimal.

4.2.2.2.1 Fish Passage (Beneficial Uses)

Activities associated with Alternative 4 within Coyote Creek, La Canada Verde Creek or Peters Canyon Wash are not planned as part of Alternative 4. No modifications to suitable habitat are proposed, and no barriers to fish passage would be created by Alternative 4. Temporary indirect impacts during construction activities may include an increase or change in off-site runoff due to construction activities. In addition, because those activities will be performed on highly traveled portions of I-5, indirect impacts are expected to be minimal. Alternative 4 has been designed, to the extent feasible, to avoid impacts to fish, including Santa Ana sucker. Alternative 4 will not impact critical habitat for the species as it is absent from the BSA and areas adjacent to the BSA. No modifications to suitable habitat for the arroyo toad are proposed as none is present within the BSA. Consequently, there are no anticipated effects to arroyo toad habitat.

Tri-colored blackbird is not anticipated to occur within the freshwater marsh habitat that would be removed by Alternative 4. No permanent impact and up to 0.04 acre of temporary impacts to marginally suitable foraging habitat, in the form of freshwater marsh habitat are anticipated to

[2] Impacts that are quantified in the NES(MI) are for Alternative 4 only. Other effects that are qualitative, such as wildlife movement or invasive species, pertain to all build alternatives since it will generally apply to all build alternatives.

occur because of Alternative 4. No impacts would occur to suitable nesting habitat for the species as none occurs within the BSA. Indirect temporary effects to suitable tri-colored blackbird foraging habitat associated with Alternative 4 may include increased noise, vibration, dust, lighting, and predation during project activities. In addition, because those activities will be performed on highly traveled portions of I-5, indirect impacts are expected to be minimal. Alternative 4 is planned to avoid impacts to nesting birds, including tri-colored blackbird.

Bat-roosting habitat is not subject to direct impacts from implementation of Alternative 4 as construction activities will occur under or on top of several bridges that provide potentially suitable day-roosting and/or night-roosting habitat within the BSA. Impacts to the underside of these bridges where bats are likely to roost will not occur as part of Alternative 4. In addition, impacts will occur on highly traveled portions of I-5, SR-55, SR-57, SR-91 and other highly traveled roads.

Because those activities will be performed on highly traveled portions of I-5, SR-91, SR-57 and SR-55 and other highly traveled roadways within the BSA and impacts to suitable roosting habitat would be avoided, direct impacts to bat-roosting habitat is not anticipated.

Indirect construction-related impacts could temporarily deter access to roost sites in the crevices of bridges, culverts, and overhead structures. Because those activities will be performed on highly traveled roadways, indirect impacts (i.e., noise and lighting) are expected to be minimal. Alternative 4 includes measures to avoid adverse effects to roosting bats to the fullest practicable extent, as detailed in the NES(MI).

4.2.2.3 Wildlife Habitat

The BSA encounters primarily urban, disturbed unproductive wildlife habitat. The following discussion is directed at species in the NES(MI) that occur in a few fragments of habitat that may support them.

Adverse modifications in the form of temporary impacts to marginally suitable foraging habitat for great blue heron are proposed as part of Alternative 4. No direct impacts are anticipated during activities associated with Alternative 4 for suitable large trees adjacent to Peters Canyon Wash.

Adverse modifications to suitable foraging and nesting habitat for Cooper's hawk are proposed as part of Alternative 4 in the form of landscaped vegetation and ruderal areas. Vegetation removal activities associated with Alternative 4 also have the potential to directly impact nesting birds during the typical avian nesting season (February–September).

Indirect temporary effects to suitable habitats may occur with the implementation of Alternative 4 and include increased noise, vibration, dust, lighting, and predation during activities associated with Alternative 4. Direct and indirect impacts would be minimized through implementation of avoidance and minimization features, which include nesting bird avoidance, pre-construction clearance surveys, seasonal work windows, biological resources monitoring, and BMPs to avoid indirect disturbance to nearby habitats. Alternative 4 is not anticipated to have any adverse effects on non-listed special-status animal species.

4.2.2.4 Wildlife Passage (Beneficial Uses)

Wildlife movement of both small species such as reptiles and small mammals and larger species such as coyotes is limited to the following nine drainage features within the BSA: La Canada Verde Creek, Coyote Creek, Fullerton Creek, Carbon Creek, Crescent Retarding Basin, Santa Ana River, Bitterbrush Channel Santiago Creek, El Modena-Irvine Channel, and Peters Canyon Wash. These drainage features provide low function and value to wildlife movement and are not anticipated to be impacted as a result of the build alternatives.

Implementation of the build alternatives is not expected to permanently affect wildlife movement or decrease the functionality of any wildlife crossings. Active construction activities may temporarily deter wildlife movement due to increased noise and human activity, but wildlife is expected to continue to use drainages during construction or when construction work is not occurring, particularly at dawn and dusk. No permanent barriers would be placed within any known wildlife movement corridors. As such, implementation of the build alternatives would not permanently affect wildlife movement or decrease the functionality of any wildlife crossings; therefore, there would be no project-specific mitigation required.

4.2.2.5 Endangered or Threatened Species

Unofficial and official species lists were received from the United States Fish and Wildlife Service and the NOAA on October 18, 2022. A *No Effect* determination was made for each species on the federal lists or additional literature review sources. If listed species are found during pre-construction surveys and work cannot be postponed until the species is not present in the area, or the scope of work changes such that newly designated critical habitat or listed species may be adversely affected, Section 7 consultation would be required prior to such activities.

With implementation of the avoidance and minimization measures described in this NES(MI), Alternative 4 will avoid impacts and direct take of CESA-listed species. If CESA-listed species are found during pre-construction surveys or unavoidable impact to CESA-listed species occurs during construction, consultation with CDFW will be initiated and additional measures will be developed.

4.2.2.6 Invasive Species

In total, 17 invasive plant species with a moderate or high (Cal-IPC) rating were identified in the BSA. The build alternatives have a minimal potential to spread invasive species to native habitat in the BSA as native habitat is limited to less than 0.05 acre throughout the BSA. However, the build alternatives do have potential to spread invasive species to native habitats outside the BSA through the entering and exiting of contaminated construction equipment.

4.2.3 Anticipated Changes to the Human Use Characteristics of the Aquatic Environment

4.2.3.1 Existing and Potential Water Supplies; Water Conservation

The Project is not sited in a location used by a local water district for existing or potential water supplies, or water conservation; therefore, no changes to existing water supplies, potential water supplies, or water conservation are anticipated.

4.2.3.2 Recreational or Commercial Fisheries

No known commercial fishing is permitted in the receiving water bodies within the Project boundary; therefore, no changes to commercial fishing are anticipated.

4.2.3.3 Other Water Related Recreation

Other water-related recreation (i.e., passive recreation such as birding, biking, and walking) has been identified and includes the Coyote Creek bikeway, the Santa Ana River bikeway and the Santiago Creek bike trail. During construction, other water related recreation such as birding, biking and walking may be affected. No changes to the public's use of these water bodies for birding, walking, and biking, however, are anticipated during operation of the Project.

4.2.3.4 Aesthetics of the Aquatic Ecosystem

Although the Project crosses five major waterbodies, most of these waterbodies are large, concrete lined channels surrounded by industrial buildings. For example, within the Project corridor, Fullerton Creek is an urban, concrete channel as it runs throughout north Orange County. Fullerton Creek ends at Coyote Creek which is also a large concrete channel surrounded by industrial buildings. These concrete channels are not vegetated. The Project would not have direct permanent changes during construction to the aesthetics of the aquatic ecosystem because the Project would not create a disturbance or require the removal of riparian vegetation within the channels.

4.2.3.5 Traffic/Transportation Patterns

Service vehicles are permitted along the maintenance access road that parallel the concrete lined channels within the Project corridor. During construction, service vehicle access may be affected. During operation, it is not anticipated that traffic and transportation patterns would be impacted.

4.2.3.6 Navigation

Santa Ana River Reach 2, within the Project's disturbance footprint is a relocated tributary or excavated flood control facility within a tributary that drains to Pacific Ocean (a Traditional Navigable Water). Likewise, from Coyote Creek, the river discharges to San Gabriel River Reach 1 and San Gabriel River Estuary where it ultimately empties into the Pacific Ocean between the cities of Long Beach and Seal Beach (CH2M Hill 2005). No changes to navigation in the Pacific Ocean are anticipated because of construction or long-term operation of the Project.

4.2.3.7 Safety

Construction of the Project may cause changes to human safety within the aquatic environment. After Project construction, it is not anticipated that changes to safety would occur based on current information.

4.2.4 Temporary Impacts to Water Quality

The following sections summarize the short-term impacts of the no build and build alternatives to the physical/chemical characteristics, biological characteristics, and human use characteristics of the aquatic environment.

4.2.4.1 No Build Alternative

No temporary impacts to hydrology or water resources are anticipated under the No Build Alternative because there will be no work constructed within the Caltrans transportation corridor. Any planned residential, commercial, or industrial development adjacent to the transportation corridor are responsible for their own temporary drainage conveyance facilities and are excluded from conveying offsite runoff into the Caltrans drainage facility. Therefore, no changes to hydrology or water resources are anticipated with construction activities associated with offsite planned development under the No Build Alternative.

4.2.4.2 Build Alternatives

Physical/Chemical Characteristics of the Aquatic Environment

Construction of the Project has the potential to contribute pollutants to receiving water bodies. These pollutants include sediment and silt, associated with soil disturbance and chemical pollutants associated with the construction materials that are brought onto the Project site.

Soil disturbance activities include earth-moving activities such as excavation and trenching; soil compaction and moving; cut and fill activities; and grading. Disturbed soils are susceptible to high rates of erosion from wind and rain, resulting in sediment transport via storm water runoff from the Project area. The potential demolition of roadway, bridges, walls, culverts and headwalls to allow for roadway widening, and the removal of waste material during construction could result in the tracking of dust and debris and release of contaminants from existing structures.

Chemical contaminants, such as oils, fuels, paints, solvents, nutrients, trace metals, and hydrocarbons, can attach to sediment and be transported to downstream drainages and ultimately into collecting waterways, contributing to the chemical degradation of water quality. Operation of vehicles during construction could also result in tracking of dust and debris.

Some pollutants can create turbidity in water bodies, which blocks light transmission and penetration, reduces oxygen levels, affects the food chain, and creates changes in water temperature. Construction materials, liquid and solid waste handling, and the use of construction equipment could also result in storm water contamination and affect water quality. Spills or leaks from heavy equipment and machinery can result in oil and grease contamination and spills or leaks from portable toilets can result in microbial contamination.

Staging areas can also be sources of pollutants because of the use of paints, solvents, cleaning agents, and metals during construction. Pesticide use, including herbicides, fungicides, and rodenticides, associated with site preparation is another potential source of storm water contamination. Larger pollutants, such as trash, debris, and organic matter, could also be associated with construction activities. As such, sediments, trash and chemical contaminants may be transported throughout site runoff to downstream drainages and ultimately into the collecting waterways, and potentially into the Pacific Ocean, thereby affecting surface water and offshore water quality.

Non-storm water discharges from dewatering activities also have the potential to effect water quality. Care is required for the removal of nuisance water resulting from construction activities such as dewatering because of the high turbidity and other pollutants associated with this activity. If temporary excavations require dewatering, there is the potential of discharging

pollutants (primarily from entraining silt and clay, but also from encountering chemicals and other contaminants) through the release of construction water directly to the environment. If dewatering of temporary or new potable water lines requires pressure testing, microbiological testing and flushing, there is the potential of discharging chlorine into the water environment which may cause or threaten to cause violations of WQOs. This discharge would be considered an unauthorized non-storm water discharge and could potentially cause chemical degradation and aquatic toxicity in the receiving waters.

Biological Characteristics of the Aquatic Environment

Although construction of the Project will not occur in a creek or channel, it is likely that sediment and other contaminants associated with stormwater and non-storm water may be transported throughout site runoff to downstream drainages and ultimately into the collecting waterways, and potentially into the Pacific Ocean, thereby affecting the biological characteristics of the aquatic environment. The build alternatives do have potential to spread invasive species to native habitats outside the BSA through the entering and exiting of contaminated construction equipment.

Again, some pollutants can create turbidity in water bodies, which blocks light transmission and penetration, reduces oxygen levels, affects the food chain, and creates changes in water temperature. These pollutants thereby have a direct effect to the biological characteristics of the aquatic environment.

Temporary disturbances such as excavation and grading could increase erosion and sedimentation rates. Erosion and sedimentation could affect the biological characteristics of the aquatic environment through interference with photosynthesis; oxygen exchange; and the respiration, growth, and reproduction of aquatic species. Sediment transport to receiving water bodies could decrease water clarity, which causes a decrease in aquatic plant production and obscures sources of food, habitats, refuges, and nesting sites of fish. The deposition of sediment or silt in a water body can fill gravel spaces in stream bottoms, smothering fish eggs and juvenile fish. Sediment can also carry nutrients, such as nitrogen and phosphorus, which may cause algal blooms. Pesticides that attach to soil particles and enter waterways have the potential to bioaccumulate within the food chain, which ultimately could affect the aquatic ecosystems. The transport of other toxic pollutants into receiving water bodies may introduce subtle, sublethal changes in plant and wildlife gene structure, nervous system function, immune response, and reproductive rates, which ultimately affects species survival, population, and ecosystem structure (California Department of Water Resources 2005).

The freshwater marsh east of the I-5 northbound Artesia Boulevard offramp is located within a larger manmade catchment basin constructed to contain stormwater flows from I-5 and surrounding areas. The catchment basin is regularly maintained including vegetation removal. Temporary and direct impacts of Alternative 4 are anticipated to affect 0.04 acre of freshwater marsh. Vegetation removal, grubbing, or grading may occur with implementation of Alternative 4. Temporary indirect impacts during activities associated with Alternative 4 may include an increase or change in off-site runoff, erosion, and spread of invasive species during construction. These impacts would not be new to the work site but would temporarily increase the level of indirect disturbance near the freshwater marsh during activities associated with Alternative 4.

Human Use Characteristics of the Aquatic Environment

Short term effects to human use characteristics of the aquatic environment include service vehicle access, human safety, and changes to other water related recreation such as birding, biking, and walking.

4.2.5 Long-term Impacts During Operation and Maintenance

4.2.5.1 No Build Alternative

No long-term impacts to hydrology or water resources are anticipated under the No Build Alternative because there will be no work constructed within the Caltrans transportation corridor. Any planned residential, commercial, or industrial development adjacent to the transportation corridor are responsible for their own drainage conveyance facilities and are excluded from conveying offsite runoff into the Caltrans drainage facility. Therefore, no long-term impacts to hydrology or water resources are anticipated under the No Build Alternative.

4.2.5.2 Build Alternatives

Operation of the proposed project would result in an increase in impervious surface areas, which would result in an increase in storm water runoff. Potential pollutants associated with the operation of transportation facilities include nutrients, such as phosphorus and nitrogen, associated with replace-in-kind landscaping and establishment of permanent erosion control (i.e., vegetative cover) on new slopes 2:1 or flatter; mineralized organic matter in soils; nitrite discharges from automobile exhausts and nitrogen from atmospheric fallout; trash from unsheltered populations living within the corridor and roadway users; and metals from the combustion of fossil fuels, the wearing of brake pads, and corrosion of galvanized structures (Caltrans 2017a). The following sections summarize the long-term impacts of the Build Alternatives to the physical/chemical characteristics, biological characteristics, and human use characteristics of the aquatic environment.

Physical/Chemical Characteristics of the Aquatic Environment

Where roadway widening is required to accommodate weave lanes between the express lane and the general-purpose lanes due to the conversion of the HOV to an EL highway, the Project would widen the freeway in the southbound direction under Alternative 3 and Alternative 4.

Where improvements such as an increase in storage capacity are required, the Project would construct new impervious surface areas. Pollutants of concern from the new sources of runoff surfaces include sediment, hydrocarbons, oil and grease, which could adversely affect water quality through discharges downstream.

As part of Attachment E of the Permit and the Caltrans Statewide Trash Implementation Plan (Caltrans 2019), Caltrans identified and designated 24 percent of Caltrans' urban area right-of-way as a STGA. Of the 24 percent, 4 percent or 2,656 acres were designated as STGA within District 12 and are considered existing sources of trash. Figure 4-1 displays STGAs within the Project limits. During the operational phase, to reduce or prevent trash discharges from the Caltrans' right-of-way to storm drain systems and receiving waters, the Project would evaluate and install FTC measures at the STGA locations within the Project corridor.

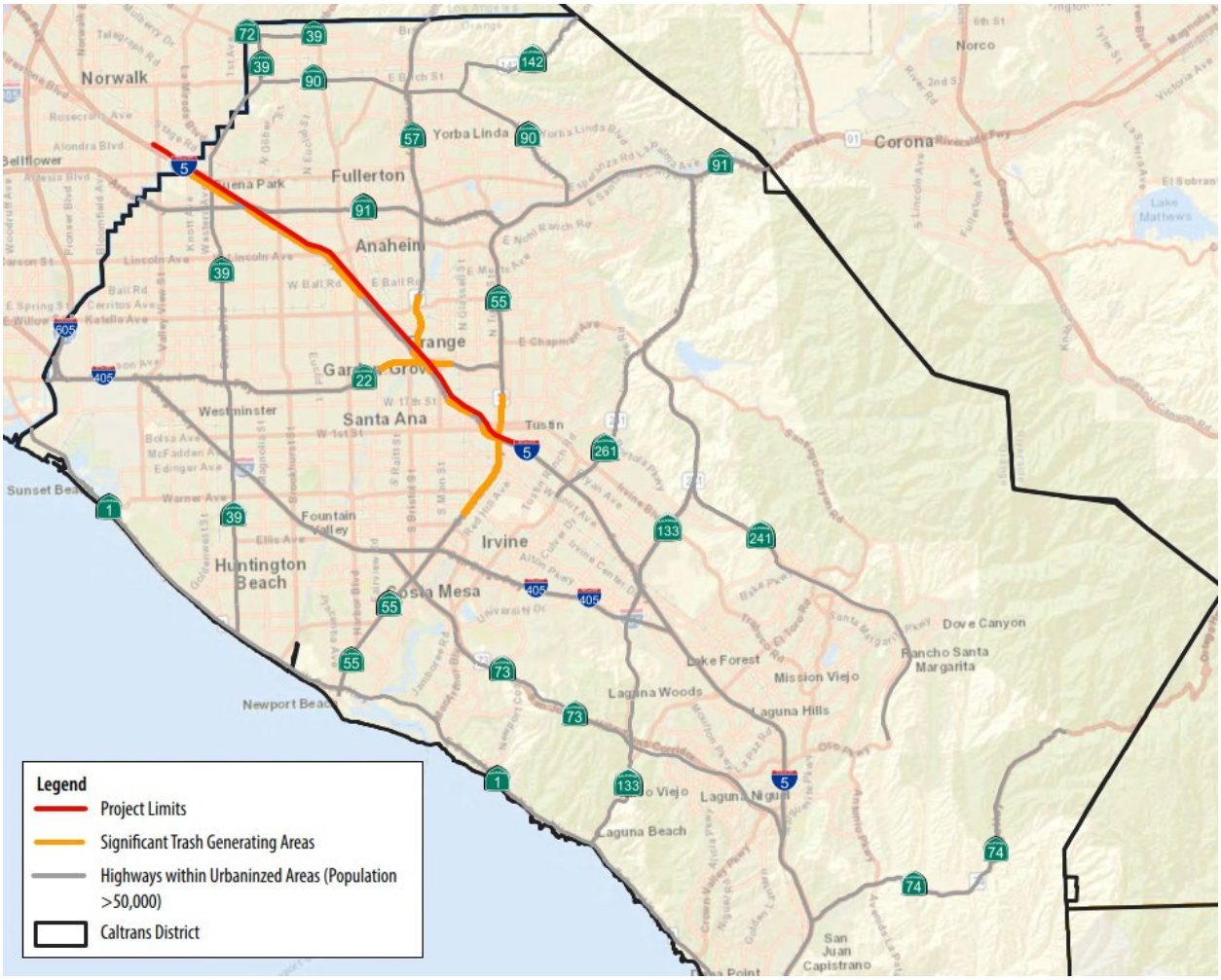

Figure 4-1. I-5 Managed Lanes Significant Trash Generating Areas

Overall, during Project operation, to address water quality impacts, storm water runoff would be directed to Water Quality Features. Water Quality Features include design pollution prevention BMPs, treatment BMPs and trash control measures. The Water Quality PFs would be consistent with design criteria identified in the Project Planning and Design Guide (PPDG) (Caltrans 2017a). Water quality PFs are described in Section 4.4.

Although soils within the Project limits are classified as HSG A and HSG B and exhibit high infiltration rates, the Project is being constructed in a built environment. The urbanized areas where Project improvements are proposed have a very low potential for groundwater recharge. Therefore, operation of the Project would not cause a substantial long-term change to groundwater quality or volume.

Biological Characteristics of the Aquatic Environment

The addition of new impervious surface areas would marginally increase flow volumes and velocities. If this marginal increase in storm water runoff from the Project exceeds the capacity of the offsite drainage system, this could cause or exacerbate flooding, erosion, and/or sedimentation in downstream water bodies. An increase in sedimentation in downstream waterbodies could result in the deterioration of aquatic life in naturally occurring ecosystems

downstream. These potential effects to receiving water bodies could be anticipated with the implementation of the build alternatives without effective runoff management. No substantial changes to hydraulic conveyance capacity are anticipated, however, and thus no appreciable impact to the biological characteristics of the aquatic environment is anticipated because culverts and other drainage facilities would be designed and constructed to accommodate the anticipated marginal increase in flow volumes and velocity.

Human Use Characteristics of the Aquatic Environment

No long-term impacts to the human use characteristics of the aquatic environment are anticipated.

4.3 Impact Assessment Methodology

The NNI area for the build alternatives ranges from 2.07 acres for Alternative 2 to 4.09 acres for Alternative 4. The NNI area includes the installation of new sound walls, freeway widenings, MVPs and two Park and Ride facilities. The RIS ranges from 0 acres for Alternative 2 to 15.77 acres for Alternative 4. The RIS includes areas within Alternative 3 and Alternative 4 where the existing asphalt roadway will be replaced by concrete. Although the severity of the impacts to downstream, naturally occurring water resources may vary based on the NIS (see Table 4-5), other than the biological effects under Alternative 4, overall, no unique impacts were identified among the build alternatives. Table 4-1 and Table 4-2 summarize the potential impacts related to construction (short-term) and operation and maintenance (long term) activities, respectively, if water quality PFs and applicable regulatory requirements were not implemented.

Table 4-1. Summary of Potential Construction (Short-Term) Impacts to the Aquatic Environment

Summary of Impacts
Physical/Chemical Characteristics
Excavation and trenching; soil compaction and moving; cut and fill activities; and grading could contribute sediment to downstream receiving water bodies.
Construction materials, waste handling, and the use of construction equipment could result in storm water contamination and affect water quality.
Demolition of roadway, culverts, and headwalls to allow for roadway widening, and the removal of waste material during construction could result in the tracking of dust and debris and release of contaminants from existing structures.
Chemical contaminants, such as oils, fuels, paints, solvents, concrete curing compounds, nutrients, trace metals, and hydrocarbons, can attach to sediment and be transported to downstream drainages and ultimately into collecting waterways contributing to the chemical degradation of water quality.
Dewatering activities could convey sediment, nuisance water and or chlorinated water to downstream receiving water bodies and contribute to chemical degradation of water quality.
Biological Characteristics
Pollutants creating turbidity in water bodies, which blocks light transmission and penetration, reduces oxygen levels, affects the food chain, and creates changes in water temperature can create a direct effect to the biological characteristics of the aquatic environment.
Sediment deposition in water bodies can fill gravel spaces in stream bottoms, smothering fish eggs and juvenile fish.
Under Alternative 4, 0.04 acre of temporary impacts are anticipated on freshwater marsh

Summary of Impacts
Pollutant conveyance to naturally occurring downstream receiving waters via site runoff of stormwater and non-storm water may introduce subtle, sublethal changes in plant and wildlife gene structure, nervous system function, immune response, and reproductive rates, which ultimately affects species survival, population, and ecosystem structure.
Human Use Characteristics
Service vehicles may encounter limited access during construction which could interfere with maintenance of landscaping, irrigation systems and debris removal within the five regional drainage crossings. A lack of regular maintenance can create impacts to the designated beneficial uses of a receiving water.
Changes to other water related recreation such as birding, biking, and walking can create impacts to the designated beneficial uses of a receiving water.
Construction may create changes to human safety within the aquatic environment.

Table 4-2. Summary of Potential Operation/Maintenance (Long-Term) Impacts to the Aquatic Environment

Summary of Impacts
Physical/Chemical Characteristics
Modified slopes may be a source of sedimentation in downstream substrates.
Pollutants associated with the new roadway may create turbidity in receiving water bodies.
Pollutants, such as sediment, trash, hydrocarbons, oil and grease may affect water quality through discharges downstream
Nutrients associated with chemicals used to replace-in-kind landscaping and establishment of permanent erosion control (i.e., vegetative cover) on new slopes 2:1 or flatter may cause oxygen depletion and increased temperatures in the aquatic environment.
Biological Characteristics
Higher concentrations of pollutants of concern because of the increase in impervious surface area
Human Use Characteristics
No long-term impacts to the human use characteristics of the aquatic environment are anticipated

4.3.1 Alternative-Specific Impact Analysis

The build alternatives were assessed for their potential to impact the physical/chemical, biological, and human use characteristics of the aquatic environment during construction (short-term) and operation and maintenance (long-term). Potential short-term impacts were analyzed based on the amount of DSA. Potential long-term impacts were analyzed by determining the NNI area associated with the build alternatives and the RIS area associated with Alternative 3 and Alternative 4, and then comparing the NIS area with the East Coastal Plain, the Central (Split) and the Undefined hydrologic sub-areas. Again, although the intensity of a potential short-term and long-term impact may vary among the build alternatives, the potential impacts to water quality are similar. As no improvements are proposed to I-5 with the No Build Alternative,

no short-term or long-term impacts to the characteristics of the aquatic environment are expected.

4.3.2 Short Term Impacts to Water Quality

Table 4-3 displays the estimated temporary DSA for each of the Build Alternatives. Soil disturbance activities include earth-moving activities such as soil compaction, transferring soil, grading and excavation necessary for the Park and Ride facilities for all of the build alternatives. Remaining soil disturbance activities under Alternative 3 and Alternative 4 include the freeway widening, MVPs, extending retaining walls and soundwalls, and a new retaining wall under Alternative 4. Disturbed soils are susceptible to high rates of erosion from wind and rain, resulting in sediment transport via storm water runoff from the Project area. Section 4.3.4.2 discusses anticipated changes associated with sediment transport to receiving water bodies.

Table 4-3. Temporary Disturbed Soil Area

Alternative	Acres
2	2.07
3	13.55
4	23.66

Construction activities common to Alternative 3 and Alternative 4 that also have the potential to impact water quality would be the areas where the existing asphalt roadway is being replaced with concrete, concrete curing, slope protection and water diversion within proximity or upgradient from water resources within the Project corridor. Activities common to all the Build Alternatives that have the potential to impact water quality include areas where demolition and pavement delineation would be required. These activities have the potential to result in polluted storm water runoff that could be transported throughout the work area to downstream drainages and ultimately into the collecting waterways, and potentially into the Pacific Ocean, affecting water quality. Soils from stockpiles and other chemical pollutants would be of concern, as they could result in direct impacts on aquatic resources.

Where removal of groundwater from excavation may be required, under Alternative 3 and Alternative 4, it is possible that dewatering activities could result in the release of unsuitable and untreated water if discharged directly to the environment. Dewatering activities would also have the potential to impact water quality, especially during flushing of potable water from temporary or new potable water pipelines.

Excavations could affect groundwater quality during dewatering activities if groundwater is encountered. If an excavation needs to be dewatered, groundwater would be disposed of according to NPDES dewatering permit requirements. The amount of dewatering, under all the Build Alternatives, however, is likely to be relatively small. Therefore, no substantial changes to regional groundwater levels are anticipated under any of the Build Alternatives.

Construction activities could result in accidental releases of construction-related hazardous materials that might affect groundwater. Excavations could provide a direct path for construction-related contaminants to reach groundwater. Excavations could disturb known and

undocumented soil or groundwater contaminants resulting in the migration of contaminated groundwater further into the groundwater table. Per NPDES requirements, a dewatering plan would be prepared to guide the response to undocumented soil or groundwater contamination. Therefore, no substantial changes to groundwater quality are anticipated.

The Project Risk Level (RL), as prescribed in CGP, is determined by two distinct factors. These factors are the Sediment Risk Factor and the Receiving Water Risk Factor. The Sediment Risk Factor is determined by three factors, the rainfall-runoff erosivity factor (R factor), Soil Type (K Factor), and Length Slope Factor (LS Factor). The R Factor was determined using the United States Environmental Protection Agency (U.S. EPA) website Erosivity Calculator (U.S. EPA 2010). The R factor was determined to be 194. The K factor was determined using the SWRCB Google Earth K factor Keyhole Markup Language (kml) file. The K factor was estimated as 0.32. The LS Factor was estimated using the Google Earth LS factor kml file provided by the SWRCB. Given that the Project corridor crosses more than one LS region, a conservative estimate of 0.65 was used because this LS value represented the highest LS value for the two LS regions. With these combined factors the Sediment Risk Factor equated to 40 tons/acre or Medium. The Receiving Water Risk Factor was determined as High because the Project is within the San Diego Creek watershed. The San Diego Creek watershed is designated as a high-risk receiving watershed because it is impaired for sediment/siltation. Given a Sediment Risk Factor of Medium and a Receiving Water Risk Factor of High, the combined RL was determined as Level 2. As a RL 2 project, the discharger must comply with the requirements included in Attachment D of the CGP. The sediment and receiving water risk factor input values are provided as an exhibit in Appendix A.

During construction, all regulatory requirements would be implemented prior to soil disturbance. Additionally, a SWPPP would be prepared and implemented and would address storm water management, spill prevention and response, and non-storm water discharges. Construction site BMPs would be deployed to the maximum extent practicable. Given that construction is already occurring in a built environment, construction impacts caused by the Build Alternatives includes only a minimal increase in sediment loads due to removal of paved areas and disturbance of soil below the pavement. The temporary residual increase in sediment loads from the construction area is unlikely to alter the hydrologic response (i.e., erosion and deposition) downstream in the hydrologic subarea watersheds presented in Table 4-6 and, subsequently, the sediment processes in these watersheds because of the negligible potential for sediment. Use of temporary construction site BMPs is expected to minimize any sedimentation, erosion and chemical water quality impacts during construction. Temporary construction site BMPs are considered Water Quality Features and are further discussed in Section 4.4.

4.3.2.1 Long Term Impacts to Water Quality

The operation of the Project will result in an increase in impervious surface which will result in an increase in storm water runoff. Pollutants typically conveyed in storm water runoff during the operation of a transportation facility include sediment, turbidity, nutrients, trash and debris, bacteria and viruses, oxygen demanding substances, organic compounds, oil and grease, pesticides, and metals. The Post Construction Treatment Areas (PCTA) for the Build Alternatives ranges from 2.07 acres for Alternative 2 to 19.86 acres for Alternative 4 as presented in Table 4-4.

Table 4-4. Impervious Surface

Alternative	Replaced Impervious Surface (RIS)	Net New Impervious Surface (NNI)	New Impervious Surface (NIS)	Post Construction Treatment Area (PCTA)
2	0	2.07	2.07	2.07
3	8.32	2.37	10.69	10.69
4	15.77	4.09	19.86	19.86

In addition to addressing the increase of impervious surfaces, the Project must comply with the SWRCB adopted Statewide Trash Provisions (SWRCB Resolution No. 2015-0019) and Attachment E of the Permit to address the adverse impacts from trash on the beneficial uses of surface waters in California. Caltrans has committed to the SWRCB that roadways identified as STGAs as well as Park-and-Ride lots will implement FTC devices. The Project limits are within a STGA located on I-5 in addition to the construction of the new Park-and-Ride lots. To meet the Permit requirements, the Project will incorporate FTC devices within the STGA in the Project limits as well as the new Park-and-Ride facilities to comply with the SWRCB Trash Provisions.

To address the Build Alternative long-term impacts, the Project will incorporate Caltrans approved treatment BMPs and/or evaluate Low Impact Development (LID) strategies consistent with the Permit. In addition to evaluating and incorporating treatment BMPs, Caltrans will incorporate Design Pollution Prevention (source control) BMPs to ensure that adequate measures are included to minimize pollutant sources such as erosion from the Project improvements.

Operation of the Project would result in an increase in impervious surface areas. Each of the Build Alternatives would add NIS within the corridor, which, in turn, could potentially increase storm water runoff. A discussion regarding the potential impacts associated with an increase in storm water runoff is presented in Section 4.2.5. Use of design pollution prevention BMPs, Treatment BMPs, FTC systems for trash, and Maintenance BMPs are expected to minimize any long-term water quality impacts during operation. These BMPs are considered water quality PFs and are further discussed in Section 4.4

4.4 Project Features/Standardized Measures

The following project features implemented by the Project to address permit requirements will minimize temporary and permanent water quality impacts created by the Project. These measures were taken into consideration prior to determining project impacts:

PF-WQ-1 The Project will comply with the provisions of the National Pollutant Discharge Elimination System (NPDES) Permit and Waste Discharge Requirements for the State of California, Department of Transportation, Order No. 2022-0033-DWQ, NPDES No. CAS000003 and any subsequent permits in effect at the time of construction.

PF-WQ-2 The Project will comply with the provisions of the NPDES Construction General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities (Construction General Permit) Order No. 2022-0057-DWQ, NPDES No. CAS000002 and any subsequent permits in effect at the time of construction.

PF-WQ-3 The Project will comply with the Construction General Permit by preparing and implementing a Stormwater Pollution Prevention Plan (SWPPP) to address all construction-related activities, equipment, and materials that have the potential to impact water quality for the appropriate Risk Level. The SWPPP will identify the sources of pollutants that may affect the quality of stormwater and include BMPs to control the pollutants, such as sediment control, catch basin inlet protection, construction materials management and non-stormwater BMPs. All work would conform to the Construction Site BMP requirements specified in the latest edition of the Stormwater Quality Handbooks: Construction Site Best Management Practices Manual to control and minimize the impacts of construction and construction related activities, material, and pollutants on the watershed. These include, but are not limited to temporary sediment control, temporary soil stabilization, scheduling, waste management, materials handling, and other non-stormwater BMPs.

PF-WQ-4 Design Pollution Prevention Best Management Practices (BMPs) will be implemented such as preservation of existing vegetation, slope/surface protection systems (permanent soil stabilization), concentrated flow conveyance systems such as ditches, berms, dikes, and swales, over side drains, flared end sections, and outlet protection/velocity dissipation devices.

PF-WQ-5 Caltrans approved treatment Best Management Practices (BMPs) will be implemented consistent with the requirements of National Pollutant Discharge Elimination System (NPDES) Permit and Waste Discharge Requirements for the State of California, Department of Transportation, Order No. 2022-0033-DWQ, NPDES No. CAS00003 and any subsequent permits in effect at the time of construction. Treatment BMPs may include biofiltration strips, biofiltration swales, infiltration basins, detention devices, Design Pollution Prevention Infiltration Areas (DPPIA), dry weather flow diversion, Gross Solids Removal Devices (GSRDs), media filters, bioretention, Open Graded Friction Course, wet basins and other BMPs.

PF-WQ-6 If dewatering is expected for the preferred alternative, the Project shall fully conform to the requirements specified in Order No. R8-2022-0006, General Waste Discharge Requirements for Discharges to Surface Waters that Pose an Insignificant (De Minimus) Threat to Water Quality or Order No. R4-2018-0125 General Waste Discharge Requirements for Discharges of Groundwater from Construction and Dewatering to Surface Waters in Coastal Watersheds of Los Angeles and Ventura Counties. These NPDES permits address temporary dewatering operations during construction. Dewatering BMPs must be used to control sediment and pollutants, and the discharges must comply with the WDRs issued by the Santa Ana and Los Angeles RWQCB.

PF-WQ-7 Caltrans FTC Devices, other treatment controls, and/or institutional controls will be implemented within STGAs consistent with the requirements of Attachment E of National Pollutant Discharge Elimination System (NPDES) Permit and Waste Discharge Requirements for the State of California, Department of Transportation, Order No. 2022-0033-DWQ, NPDES No. CAS000003.

4.4.1 Caltrans Guidance and Best Management Practices (BMPs)

Caltrans has developed policy and guidance to comply with the Caltrans Statewide NPDES permit in the form of the *Storm Water Management Plan (SWMP)* and the *Storm Water Quality Handbooks (PPDG, Construction Site BMP Manual, Maintenance Staff Guide)* to provide a framework for the management of storm water discharges and water quality controls at all phases of project development. These guidance documents include details regarding standard measures and/or project features such as Best Management Practices (temporary construction, design pollution prevention, and treatment BMPs) that will be incorporated during the planning, design, and construction phase for the project. BMPs will meet the maximum extent practicable and the Best Available Technology Economically Available/Best Conventional Pollutant Control Technology (BAT/BCT) requirements and address compliance with water quality standards. Potential short-term water quality impacts associated with the construction phase would be minimized with the implementation of Construction Site BMPs. Potential long-term water quality impacts associated with operation and maintenance of the transportation facility would be minimized with the implementation of Maintenance, Design Pollution Prevention, and Treatment BMPs.

The following Best Management Practices (BMPs) outlined from Caltrans Stormwater Guidance have been approved for statewide application and are considered and implemented during planning, design, and construction phases of the Project. The BMPs fall into the following categories:

4.4.1.1 Construction Site BMPs

Construction Site BMPs would be applied during construction activities to minimize pollutants in storm water and non-storm water discharges throughout construction. Construction Site BMPs would provide temporary erosion and sediment control, as well as control for potential pollutants other than sediment. Detailed information regarding the specific Construction Site BMPs can be found in the Construction Site BMP Manual (Caltrans 2003) and are summarized in Table 4-5.

Table 4-5. Construction Site BMP Categories

Category
Temporary Soil Stabilization
Temporary Sediment Control
Wind Erosion Control
Tracking Control
Non-Storm Water Management
Waste Management and Materials Pollution Control

Source: Caltrans 2003

Construction Site BMPs would be evaluated and identified through the preparation of a SWPPP. The SWPPP would address all construction-related activities, equipment, and materials that have the potential to affect water quality. The SWPPP would identify BMPs to minimize pollutants, sediment from erosion, storm water runoff, and other construction-related impacts. In addition,

the SWPPP would include a Construction Site Monitoring Program, which requires inspection, sampling, and analysis procedures to ensure that the implemented Construction Site BMPs are effective in minimizing the exceedance of any water quality standard. The Construction Site BMPs identified in the SWPPP would be consistent; therefore, they would comply with the control practices required under the CGP (State Water Resources Control Board 2022).

4.4.1.2 Design Pollution Prevention BMPs

Design Pollution Prevention BMPs are permanent measures to minimize pollution discharges by retaining source materials and stabilizing soils. The three objectives associated with Design Pollution Prevention BMPs include maximizing vegetated surfaces; preventing downstream erosion; and stabilizing soil areas. These design objectives would be applied to the entire Project. Without incorporation of Design Pollution Prevention BMPs, the Project could affect downstream channel erosion processes, leading to increased channel scouring and sediment deposition through changes in peak discharges and runoff volumes. Design Pollution Prevention BMPs proposed include conveyance systems such as engineered channels, rock slope protection, vegetative or hard-surface slope protection strategies, preservation of existing vegetation, overside drains, and down drains to reduce downstream impacts.

4.4.1.3 Treatment BMPs

Treatment BMPs are permanent measures to improve water quality by removing pollutants in storm water runoff after construction is completed. The following treatment BMPs have been approved by Caltrans for statewide use to remove pollutants to the Maximum Extent Practicable (MEP):

- Biofiltration Systems (Swales/ Strips)
- Design Pollution Prevention Infiltration Areas (DPPIA)
- Infiltration Devices
- Detention Devices
- Traction Sand Traps
- Dry Weather Flow Diversion
- Gross Solids Removal Devices (GSRDs)
- Media Filters
- Multi-Chambered Treatment Trains
- Wet Basin
- Bioretention
- Open Graded Friction Course

FTC Devices

The Caltrans Stormwater Quality Handbook's PPDG (Caltrans 2017a) provides a list of effective trash removal BMPs that were evaluated. Trash effectiveness may require the addition of a mesh screen to convert a typical stormwater treatment BMP to a FTC device. A list of the approved BMPs effective for trash removal are summarized below:

- Infiltration Basin
- Detention Devices

- Dry Weather Flow Diversion
- Gross Solids Removal Devices (GSRDs)
- Media Filters (Austin Sand Filter or Delaware San Filter)
- Multi-Chambered Treatment Trains
- Wet Basin
- Bioretention
- Trash Netting Device
- Trash Capture Housing

The Treatment BMP strategy for the Project would first evaluate the possibility of infiltrating the NNI area by using Design Pollution Prevention Infiltration Areas (DPPIA) located within existing state right-of-way. DPP IAs are used to maximize infiltration of storm water runoff without the need of constructing a traditional Treatment BMP (Infiltration Basin, Biofiltration Swale, Detention Basin, etc.). The Caltrans Infiltration Tool would also be utilized to determine the approximate amount of the water quality volume that could be infiltrated with the use of soil amendments.

For the remaining area, the Targeted Design Constituent (TDC) method, outlined in the PPDG would be used to determine the prioritization for potential Treatment BMPs. The applicability of all twelve Caltrans approved Treatment BMPs would be analyzed for the entirety of the Project from a water quality perspective in relation to the receiving water bodies and the STGAs within the Project limits. Preliminary engineering has indicated that the Project presents opportunities for implementation of Treatment BMPs.

Treatment BMPs will be implemented for the Project to comply with the Permit.

4.4.1.4 Maintenance BMPs

Treatment BMPs would be inspected and maintained, and maintenance activities would also be conducted along the freeway and on- and off-ramps. Most of these activities would be handled by small crews with a minimal amount of soil disturbance.

The purpose of applying Maintenance BMPs[3] is to implement water quality controls that will minimize pollutant discharges during maintenance activities. Maintenance activities, along with the application of Maintenance BMPs, would be ongoing throughout the lifespan of the facility. All Maintenance BMPs implemented would be consistent with the specifications and guidelines presented in the Maintenance Staff Guide (Caltrans 2018). The Maintenance Staff Guide provides detailed instructions regarding the application of approved Maintenance BMPs for maintenance highway, bridge and roadway activities. Table 4-6 displays typical transportation facility related maintenance activities, along with some of the Maintenance BMPs that would be implemented.

[3] Maintenance BMPs include a variety of measures including litter pickup within treatment BMPs such as Biofiltration Swales.

Table 4-6. Maintenance BMPs

Maintenance Activity	Maintenance BMP
Drainage Ditch and Channel Maintenance	Sediment Control; Material Use; Compaction
Drain and Culvert Maintenance	Scheduling and Planning; Stockpile Management; Sediment Removal
Sweeping Operations	Liquid Waste Management; Safer Alternative Products
Litter and Debris Removal	Anti-Litter Signs; Litter and Debris; Solid Waste Management
Graffiti Removal	Material Use; Safer Alternative Products; Storm Drain Inlet Protection

Water quality PFs for the selected alternative would include Construction Site, Maintenance, Design Pollution Prevention, and Treatment BMPs. These BMPs would be implemented to improve storm water quality during construction and operation of the Project to minimize potential storm water and non-storm water impacts to water quality.

4.5 Cumulative Impacts

Cumulative impacts are those that result from past, present, and reasonably foreseeable future actions, combined with the potential impacts of this Project. A cumulative effect assessment looks at the collective impacts posed by general plans and individual projects. Cumulative impacts can result from individually minor, but collectively substantial, impacts taking place over a period of time.

Cumulative impacts to resources in the Project area may result from residential, commercial, industrial, and highway development, as well as from agricultural development and the conversion to more intensive types of agricultural cultivation. This analysis considers known projects identified within the Project area. Each of these projects would have its own environmental document. Appendix D provides a list of projects that have the potential to influence cumulative impacts and were considered for this analysis.

Water Quality

The geographic context for the analysis of cumulative impacts associated with water quality is the area covered by the three hydrologic subareas within the Project corridor. Development of the Project, in combination with all other development that would occur in the HSA, would involve construction activities, increases in storm water runoff from new impervious surface area, and possibly reduction in groundwater recharge areas. Construction of new development throughout the HSA could result in the erosion of soil, thereby cumulatively degrading water quality. In addition, the increase in impervious surface area resulting from future development may also adversely affect water quality by increasing the amount of storm water runoff, transportation-related pollutants, and associated TDCs entering the storm drain system. New development, however, would have to comply with existing regulations regarding construction practices that minimize risks of erosion and runoff. Among the various regulations are the applicable provisions of the Permit; County and municipal codes related to control of storm water quality for new development and significant redevelopment, roads and highways, and public works projects; municipal grading permits; and other NPDES permits. This would minimize degradation of water

quality at individual project construction sites. Consequently, cumulative water quality impacts would be minimized during the construction and operational phases. Compliance with applicable SWRCB, Los Angeles RWQCB and Santa Ana RWQCB regulations would ensure that water quality is maintained to the maximum extent practicable for potential development projects within the HSA; therefore, there would be no water quality impacts associated with implementation of the I-5 Managed Lanes Project, and the Project would not have a cumulatively considerable contribution to the cumulative effects related to water quality.

Groundwater

The geographic context for the analysis of cumulative impacts associated with groundwater is the area underlain by the Coastal Plain of the Orange County Groundwater Basin and the Coastal Plain of the Los Angeles Central Basin. The Project is not located within an identified recharge area. Pile driving, dewatering, and other construction activities that would encounter groundwater could potentially occur. While the insertion of support and foundation structures in the groundwater may reduce the storage capacity of groundwater, the displaced volume would not be substantial relative to the volume of either basin. Likewise, the volume of water used during construction for dust control and other uses would be nominal; therefore, construction activities would not substantially deplete groundwater supplies nor interfere substantially with groundwater recharge. Thus, there would be no potential impacts to groundwater recharge. Although implementation of the Project would not have a cumulatively considerable contribution to the adverse effects on groundwater recharge in the Orange County or Los Angeles County groundwater basins, the overall development associated with transportation infrastructure projects that may be planned within the region could directly and/or indirectly result in the loss of groundwater volume and recharge areas. This loss would be mitigated by groundwater recharge programs that have already been designed and implemented within Orange County and Los Angeles County to ensure that groundwater will continue to be a viable water supply in the future. In addition, all the projects would be required to implement Treatment BMPs to the maximum extent practicable. Treatment BMPs, such as infiltration devices, augment groundwater by retaining storm water runoff, which subsequently infiltrates into the groundwater regime.

Caltrans's Maintenance Division conducts highway activities (i.e., Sweeping Operations; Litter and Debris Removal; and Emergency Response and Cleanup Practices) on a regular basis to correct situations that could cause water pollution; therefore, implementation of these maintenance activities would reduce the discharge of potential pollutants to the storm water drainage system and watercourses and not create any groundwater quality impacts.

Therefore, there would be no groundwater impacts associated with the Project, and the Project would not have a cumulatively considerable contribution to the cumulative effects related to groundwater.

Conclusions

The Project consists of improving the I-5 freeway corridor for approximately 16 miles. Overall, Project improvements include converting HOV lanes to ELs, except for Alternative 4 which includes construction of one new EL from SR-57 to SR-91. The Project is being developed in an already built environment. Although the area has been substantially altered by human activity, the Project corridor has been functioning as a highway transportation corridor for more than 70 years with a constructed drainage system that conveys storm water runoff to nearby drainage systems and surface waters.

The total DSA is estimated to range from approximately 2.07 acres to 23.66 acres. For areas where improvements are required, impervious surfaces are already common because of past land development, so in most cases the Project would have a small absolute increase in NIS (see Table 4-4). Storm water runoff from the Project has the potential to contribute pollutants of concern to the storm water conveyance system during construction and operation. With implementation of water quality PFs and adherence to water quality regulations, the effects during construction and operation on drainage and storm water runoff patterns, as well as groundwater quality, would be minimized. Specifically, incorporation of Treatment BMPs, Design Pollution Prevention BMPs, Construction BMPs, FTC devices, Maintenance BMPs and complying with NPDES permits, the runoff will be managed to minimize the effects to water quality from connected impervious areas to the storm water conveyance system and ultimate receiving waters.

5 AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES

The project will incorporate Water Quality PF as listed in Section 4.4. With implementation of the water quality PFs there are no adverse impacts to water quality and no Avoidance, Minimization and/or Mitigation Measures are required.

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6.2 Preparer(s) Qualifications

Veronica Seyde, Masters of Science, Environmental Studies, over 30 years of experience in water quality and environmental analysis.

Appendix A Construction Risk Level Exhibits

Appendix B Soils Report

Appendix C Baseflow Exhibits

Appendix D Cumulative Projects within the I-5 Managed Lanes Project Area

List of Cumulative Projects within I-5 Managed Lanes Project Area

Project	Location	Description	Timeline
OCTA			
I-5 Irvine Tustin Project	I-405 to SR 55	Additional general purpose lanes in each direction, additional auxiliary lanes, modification of ramp configurations for nine select interchanges, braiding the NB Sand Canyon Ave on-ramp and SB SR 133 to NB I-5 connector with the NB Jeffrey Road off-ramp, and converting existing buffer-separated HOV lanes to continuous access HOV lanes	PS&E
SR 57 NB Improvement Project	Orangewood to Katella	Extension of the fifth general-purpose lane, additional exit lanes to Katella Ave off-ramp, and shoulder widening	Approved
SR55 Improvement Project	I-5 to SR 91	Additional general-purpose lane in each direction between I-5 an SR-22, Katella Ave SB on- and off-ramps modifications, Lincoln Ave SB off-ramp modification, and 4th St NB and SB off-ramps modifications	Approved
SR 55 Improvement Project	I-405 to I-5	Improvements to four bridges, retaining walls, ramp configurations, lane reconstruction, utilities relocation, and local street modifications and realignment	Construction
Transit Security and Operations Center	Lincoln Ave to I-5 Interchange	New TSOC facility to house OCTA operations and security functions	Construction
Caltrans			
EA 07-2159U4	07-LA-5 / PM 0.0-1.5	Widen and realign freeway to add one HOV lane to the Orange / Los Angeles Countyline on southbound I-5	Construction
EA 12-0J34U4*	12-Ora-55 / PM 6.4-10.3	Add one regular lane and one carpool lane in each direction between I-405 and I-5	Construction
EA 12-0K6721	12-Ora-5 / PM 21.3-30.3	Add one general-purpose lane in each direction, add auxiliary lanes, convert existing buffer-separated HOV lanes to continuous access HOV lanes, and modify ramp configurations on select interchanges, between Yale Ave and SR 55 (segment 1)	PS&E
EA 12-0R750	12-Ora-5 / PM 33.7/35.4	Modify traffic control devices and elongate lane-reduction to meet current standards of posted speed limit	Construction
EA 12-0S052	12-Ora-5 / PM 25.8-30.3	Rehab pavement, storm drain, roadside safety and install Census Station	Construction

Project	Location	Description	Timeline
EA 12-0S310	12-Ora-5 / PM 26.3R-42.2	Install signs, raised islands, safety lighting and pavement markings	Construction
EA 12-0S390	12-Ora-5 / PM 41.8-41.8	HFST overlay, pavement delineation, traffic control devices, reconstruct curb ramps at Magnolia St NB Off-Ramp	Construction
EA 12-0S500	12-Ora-5 / PM 30.3-44.4	Restore pavement, increase safety, restore drainage system, improve overhead sign panel reflectivity, and reduce traffic delay and ease queue backup on the NB Artesia off-ramp	PA&ED
EA 12-0S690	12-Ora-5 / PM 35.7-44.1	Refresh and augment pavement delineation and install additional signs	PA&ED
EA 12-0S840	12-Ora-5 / PM 36.7-36.7	Upgrade traffic signal and lighting system, reconstruct curb ramps, and refresh pavement delineation at Anaheim Blvd	Construction

Note: *May affect implementation of associated signage and tolling infrastructure required by the Build Alternatives