State Route 57/State Route 60 Confluence at Grand Avenue Interchange Project
Water Quality Assessment Report

Prepared for:

California Department of Transportation
District 7
100 S. Main Street
Los Angeles, California 90012

May 2012

JN 10-104260

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Table of Contents

List of Exhibits

List of Tables

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Executive Summary

The State Route (SR) 57/SR 60 Confluence at Grand Avenue Interchange Project (project) is the reconfiguration of the approximately 2.5-mile confluence of SR-57 and SR-60, which would include the addition of auxiliary lanes and associated on-ramp/off-ramp reconfigurations. The project drains to Diamond Bar Creek, which is not impaired according to the 2006 Clean Water Act (CWA) Section 303(d) List of water body impairments. However, the waterbodies that Diamond Bar Creek is tributary to in the San Gabriel River Watershed are impaired and on the CWA 303(d) List. Total Maximum Daily Loads (TMDLs), or limits on the amounts of pollutants that can be discharged to Diamond Bar Creek, have been established for lead during wet weather. During the construction phase of the project, temporary erosion control measures will be implemented to retain soil and sediment. In addition, a treatment device that will address the anticipated post-construction targeted design constituents from the project will be installed to mitigate operational impacts from this project on Diamond Bar Creek and the San Gabriel River Watershed.

This report assesses the potential impacts that the project may have on the water quality of the receiving water body. It evaluates the development of the project and how it addresses water quality standards, how it complies with National Pollutant Discharge Elimination System (NPDES) permit compliance for Caltrans projects, and how it complies with the NPDES General Permit, Waste Discharge Requirements for Discharges of Stormwater Runoff Associated with Construction Activities (Construction General Permit or CGP) (Order Number 2009-0009-DWQ, NPDES Number CAS000002). The project will result in an increase in impervious area at the project site (approximately 14.1 acres), which will increase the amount of runoff from the area within the project limits. The increase in imperviousness and resulting increased runoff will be addressed in the Stormwater Data Report by selecting a device to treat the targeted design constituents from the project.

Preparation of a Stormwater Pollution Prevention Plan (SWPPP) will be required, and the SWPPP will be implemented during construction of the proposed project. The construction SWPPP identifies specific best management practices (BMPs) that will be implemented during project construction. BMPs used in the project would be implemented to meet the technology requirements as stipulated in the CGP and Caltrans NPDES Permit. Groundwater dewatering may be necessary during construction. Groundwater and other non-stormwater construction dewatering activities will need to comply with the Los Angeles Regional Water Quality Control Board's (RWQCB's) Order R4-2008-0032, NPDES Permit Number CAG994004 for waste discharge requirements for discharges of groundwater from construction and project dewatering to surface waters that pose a threat to water quality.

The project will slightly increase the impervious area at the project site, which will increase the amount of runoff from Grand Avenue within the project limits. As part of Caltrans' Stormwater Management Program and described in their Stormwater Management Plan, selected structural and non-structural source control BMPs will be incorporated into the design of the proposed project. Approved structural treatment control BMPs could include but are not limited to biofiltration systems, infiltration devices, detention devices, media filters, multi-chamber treatment trains, or wet basins. The selection of specific BMPs is also subject to identifying suitable locations. With the implementation of mitigation measures, the project's construction, design, and facility operation will result in less than significant or no adverse impacts to water quality.

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1 Introduction

This report evaluates the potential impacts of the State Route (SR) 57/SR 60 Confluence at Grand Avenue Interchange Project (project) on adjacent water resources and their beneficial uses, which are the various ways that water is used for the benefit of people and/or wildlife[1]. It will examine the existing surface and groundwater resources, assess the potential effects from the project, and support the project's environmental documentation process. This technical report describes the detailed analysis to evaluate all physical and regulatory aspects of the project, including:

- Environmental setting;
- Regulatory setting;
- Water quality assessment;
- Best management practices (BMPs); and
- Mitigation measures.

1.1 Project Description

1.1.1 Purpose

The proposed project would consist of the reconfiguration of the approximately 2.5-mile confluence of SR-57 and SR-60, which would include the addition of auxiliary lanes and associated on-ramp/off-ramp reconfigurations. SR-57 and SR-60 are major inter-regional freeways linking cities in the San Gabriel Valley and the Inland Empire with Los Angeles and Orange Counties.

1.1.2 Project Alternatives

This section describes the proposed project and the design alternatives that were developed to achieve the project purpose and need while avoiding or minimizing environmental impacts. Two build alternatives are being considered for the proposed project.

No-Build Alternative

The No-Build (or No-Action) Alternative would result in no structural or physical changes to SR-57, SR-60, or the Grand Avenue interchange. Existing deficient capacity and congestion conditions due to short weaving distances on SR-57, SR-60, and Grand Avenue would not change under this alternative.

Build Alternatives

Two build alternatives are being considered and are described below. Under both alternatives, a new bypass off-ramp is proposed for eastbound SR-60 west of the southern/western SR-57/SR-60 junction. The bypass off-ramp would be barrier separated from SR-60 and SR-57 traffic until passing the SR-57 Grand Ave off-ramp. The northbound SR-57 traffic would exit to Grand Avenue as an optional exit from the third SR-57 lane in a similar location as the existing interchange. The off-ramp lane would combine with the one lane eastbound SR-60 bypass off-

[1] Regional Water Quality Control Board, Los Angeles Region, Water Quality Control Plan Los Angeles Region, November 1994.

ramp. The off-ramp would widen to three lanes at the final approach to the intersection at Grand Avenue.

Currently the third lane on SR-57 ends at the Grand Avenue off-ramp, and begins again 4,200 feet to the east. The build alternatives would both add this 7th lane between Grand Ave off-ramp and the add lane near the SR-57 diverge at the east end.

An auxiliary lane would be added adjacent to the added seventh through lane to serve traffic entering from Grand Avenue. At the east end of the confluence, a bypass connector would be built connecting the Grand Avenue eastbound on-ramp auxiliary lane with the eastbound SR-60. This connector would require new overcrossing structures at Prospector Road and Diamond Bar Boulevard as well as realignment of the Diamond Bar Boulevard on-ramp.

In the other direction, the dropped southbound SR-57 lane would be extended 2,500 feet to the realigned westbound SR-60 off-ramp to Grand Avenue, creating a two-lane exit ramp. The exit ramp would expand to five lanes at the intersection.

Operational improvements along Grand Avenue include widening the roadway to four through lanes in each direction under all build alternatives. Grand Avenue would be widened easterly, encroaching on the westbound loop on-ramp Grand Avenue would be realigned approximately 50 feet east of the existing centerline to avoid a right-of-way take from a vacant automobile dealership on Grand Avenue north of SR-60. The centerline shift of Grand Avenue would require the westbound off-ramp to be relocated approximately 100 feet north of the existing intersection on Grand Avenue. The intersection relocation would also require realignment of the 2-lane westbound loop on-ramp and Old Brea Canyon Road (to be renamed Grand Crossing Parkway).

The existing Grand Avenue overcrossing does not have sufficient length to accommodate the added northbound SR-57 through lane or sufficient vertical clearance over SR-60 to allow for widening, and thus would be replaced. The replacement bridge would be longer, and therefore necessarily deeper, leading to a raised profile along Grand Avenue.

The widening of Grand Avenue would continue south to Golden Springs Drive. Golden Springs Drive would be widened to allow additional through lanes, double left-turn lanes, and one right-turn lane on three legs of the intersection of Grand Avenue and Golden Springs. One right-turn lane would be provided on Grand Avenue on the northbound approach to Golden Springs Drive. Approximately 600 feet of Grand Avenue in the northbound direction south of the intersection at Golden Springs would be restriped to three lanes.

A continuous pedestrian walkway is currently provided on the west side of Grand Avenue between Golden Springs and Old Brea Canyon Road. However, on the east side of Grand Avenue, no pedestrian walkway is provided north of the overcrossing. Under both alternatives, 8-foot-wide walkways on both sides of Grand Avenue would be constructed from Golden Springs to Old Brea Canyon Rd. Construction of build alternatives would not affect pedestrian walkways on other local roads.

The eastbound bypass off-ramp would require a sliver right-of-way take from a hotel property on Golden Springs Drive. The bypass connector from the eastbound on-ramp would require sliver right-of-way takes from several commercial properties on Diamond Bar Boulevard, a hotel and restaurant on Gentle Springs Lane, and a gas station and restaurant on Palomino Drive. No impact on residential properties is anticipated under either build alternative. As part of either

build alternative, excluding the golf course property a total of 3.4 acres would be required under temporary construction easements during the construction period.

Unique Features of Build Alternatives

Alternative 2: Combination Cloverleaf/Diamond Configuration Interchange Alternative

Alternative 2 would maintain the existing interchange configuration (compact diamond) for the eastbound on and off ramps on SR-60. The interchange configuration at Grand Avenue for Alternative 2 would remain as a combination of partial cloverleaf for the westbound SR-60 on- and off-ramps. An auxiliary lane would be added connecting the new three lane on-ramp at Grand Avenue to the new connector that bypasses the north/east SR-57/SR-60 interchange.

The existing Grand Avenue overcrossing does not have sufficient length to accommodate the added northbound SR-57 through lane or sufficient vertical clearance over SR-60 to allow for widening, and thus would be replaced. For Alternative 2, the existing Grand Avenue overcrossing would be replaced by a 10-lane, 148-foot-wide structure over SR-60. The longer span would require a deeper structure, raising the Grand Avenue profile about four feet over the freeway. The bridge would contain eight through lanes and two 450-foot-long double left-turn lanes for the southbound left turn at Grand Avenue to the eastbound on-ramp.

Alternative 3: Partial Cloverleaf Interchange Configuration Alternative

The main difference of Alternative 3 when compared to Alternative 2 is the eastbound SR-60 interchange at Grand Avenue. Under Alternative 3, the existing eastbound on and off ramps at Grand Avenue, which form a compact diamond interchange, would be reconfigured as a partial cloverleaf interchange. The new intersection of Grand Avenue and the new eastbound on and off ramps would be located approximately 500 feet south of the existing intersection, or mid-way between the freeway and Golden Springs Drive. The new eastbound on-ramp would be a loop on-ramp that would join SR-60 as a new eastbound auxiliary lane. The existing eastbound on-ramp would be realigned to accommodate the widened Grand Avenue and would merge into the eastbound auxiliary lane created by a new southbound Grand Avenue to eastbound SR-60 loop on ramp. The auxiliary lane would connect to the new connector that bypasses the north/east SR-57/SR-60 interchange.

As discussed in the common design features section above, the existing Grand Avenue overcrossing would be replaced with a new overcrossing structure over SR-60. However, unlike Alternative 2, a double left-turn lane from southbound Grand Avenue to the eastbound on-ramp would not be required, since vehicles traveling on southbound Grand Avenue would access northbound SR-57 and eastbound SR-60 by way of the new loop on-ramp on the west side of Grand Avenue. The new Grand Avenue overcrossing would be widened to accommodate the eight through lanes and a center divider/median.

Construction Activities and Staging

The construction phase of the proposed project is anticipated to begin in the fall of 2014 and end by the fall of 2017. The proposed project would involve clearing, excavation, grading, and other site preparation activities prior to structural work and paving. On-site construction staging would occur just north of the westbound SR-60/southbound SR-57 Grand Avenue on- and off-ramps. This area, which is east of Grand Avenue, is owned by the City of Industry.

Exhibit 1 is a vicinity map of the region surrounding the project location, and Exhibit 2 is a location map. A detailed location map showing the specific elements of the project is included in the appendix (Exhibit 4 and Exhibit 5).

STATE ROUTE 57 / STATE ROUTE 60
CONFLUENCE AT GRAND AVENUE PROJECT

Regional Vicinity Map

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EXHIBIT 1

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STATE ROUTE 57 / STATE ROUTE 60
CONFLUENCE AT GRAND AVENUE PROJECT

Project Location Map

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0 .5 1 Miles
APPROXIMATE

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EXHIBIT 2

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2 Environmental Setting

The project is located at the intersection of State Routes 57 and 60 with Grand Avenue in the City of Industry, Los Angeles County, California. The City of Industry is located in the San Gabriel Valley in eastern Los Angeles County, between the San Jose Hills to the northwest and the Puente Hills to the southeast. Surface water from the project generally flows southwest toward Diamond Bar Creek. Typical climate for the area is characterized by short, mild winters, and warm dry summers. The seasonal normal rainfall for the project location is approximately 19.6 inches[2].

2.1 Watershed

The project drains to Diamond Bar Creek, which confluences with San Jose Creek approximately 2.7 miles downstream. San Jose Creek is tributary to the San Gabriel River approximately 10.2 miles downstream from the Diamond Bar Creek confluence. The San Gabriel River flows through the San Gabriel Estuary into San Pedro Bay through the Los Angeles/Long Beach Harbor, and into the Pacific Ocean, draining approximately 682 square miles of eastern Los Angeles County. San Gabriel Creek's headwaters are in the San Gabriel Mountains, traversing through the San Gabriel and Morris reservoirs, and collecting runoff from a highly urbanized watershed before emptying into the Pacific Ocean. Portions of the San Gabriel River Watershed are listed on the 2006 Clean Water Act (CWA) Section 303(d) List of impaired water bodies priority list of pollutants being addressed by a Total Maximum Daily Load (TMDL), and are discussed in Section 4.2. Exhibit 3 shows the project and its location in the watershed.

[2] California State University, Sacramento, Office of Water Programs, Water Quality Planning Tool

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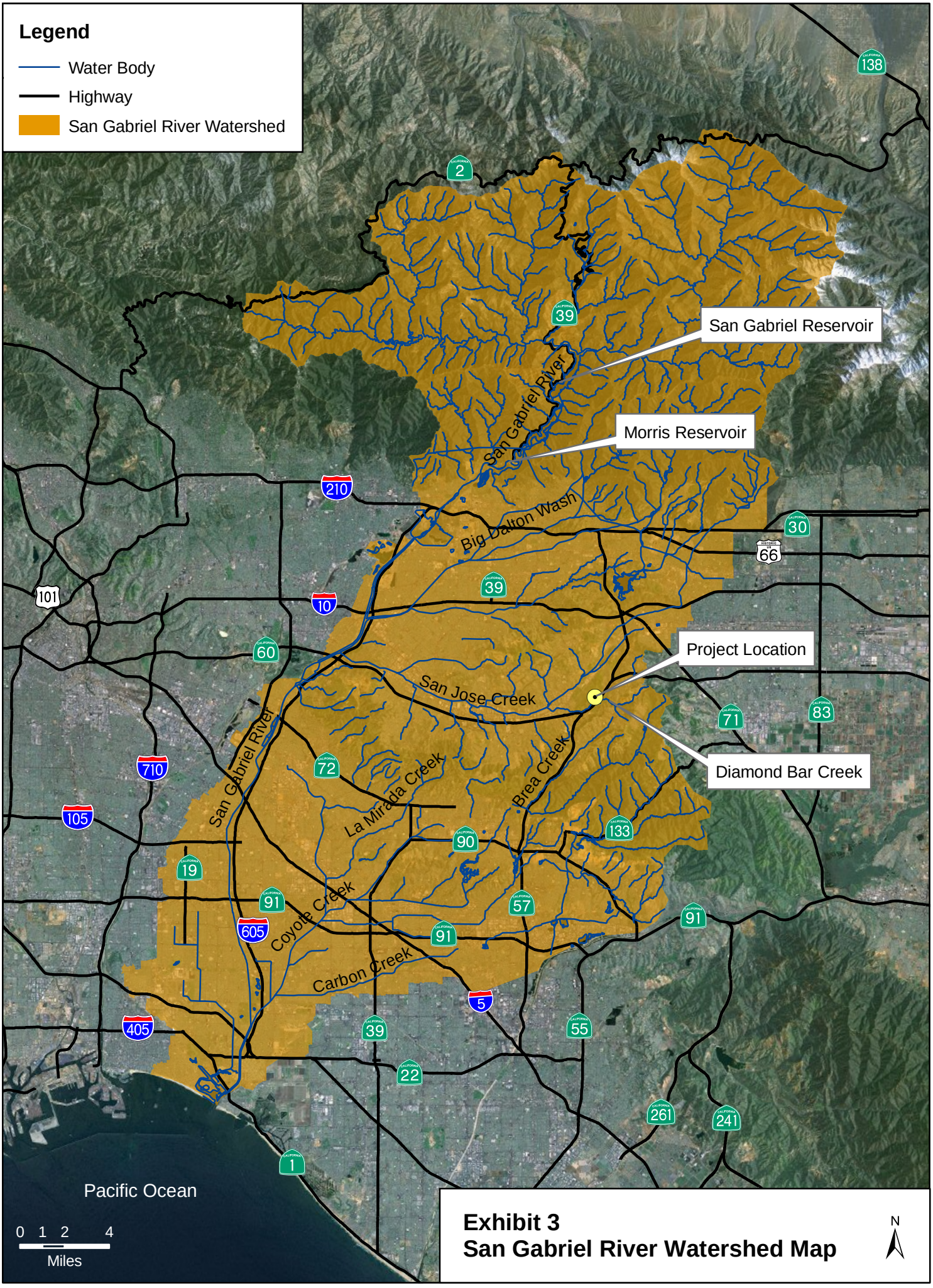
Legend
Water Body
Highway
San Gabriel River Watershed
San Gabriel Reservoir
Morris Reservoir
San Gabriel River
Big Dalton Wash
San Jose Creek
Project Location
Diamond Bar Creek
Brea Creek
La Mirada Creek
San Gabriel River
Coyote Creek
Carbon Creek
Pacific Ocean
0 1 2 4
Miles
N
Exhibit 3
San Gabriel River Watershed Map
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2.2 Flood Plains

The project is located outside the 100-year flood plain (Zone X), in which there is a 0.2 percent chance of flooding annually (Flood Insurance Rate Maps September 26, 2008 – 06037C1725F covering the project area).

2.3 Soils/Erosion Potential

The Environmental Protection Agency's (EPA) Rainfall Erosivity Factor Calculator calculated the erosivity index for this project as 150.1 based on the global positioning system coordinates for the project. However, the calculator is a planning level tool and a detailed site-specific survey is still required for design level analysis. The rainfall erosivity factor indicates that if rainfall were to occur at the site during construction, the probability of soil erosion occurring is high.

3 Regulatory Setting

The EPA and the State Water Resources Control Board (SWRCB), in accordance with the CWA and its amendments, sets regional water quality standards. The project is located within a National Pollutant Discharge Elimination System (NPDES) permitted area owned by Caltrans (Order Number 99-06-DWQ, NPDES Number CAS000003) in Los Angeles County. Drainage from the project drains to the City of Industry, which is covered by the Municipal Separate Storm Sewer System (MS4) NPDES permit (Order Number 01-182, NPDES Number CAS0041) issued to the Los Angeles County Flood Control District, the County of Los Angeles, and 84 incorporated cities (collectively called "permittees"). The Los Angeles Regional Water Quality Control Board (RWQCB) administers the regional and local implementation of the NPDES program, which regulates the discharge of contaminants into waterways and extends permitting for point- and non-point source discharges. Point source discharges are discharges generated by runoff from specific sources such as an auto repair shop, and non-point source discharges are, by contrast, from many diffuse sources such as a mixed use residential development.

The state's CGP requires measures to protect water quality during construction activities for construction sites of an acre or more. The *Water Quality Control Plan, Los Angeles Region* (Basin Plan) includes water quality standards to protect beneficial uses including maintaining aquatic ecosystems and the resources those systems provide to society. The Basin Plan also requires projects that drain to the San Gabriel River Watershed to address the requirements of TMDL standards. This project drains to Diamond Bar Creek, which is not currently 303(d) listed nor has a TMDL been developed. However, the Los Angeles RWQCB's *Amendment to the Water Quality Control Plan – Los Angeles Region to Incorporate the San Gabriel River and Impaired Tributaries Metals and Selenium TMDL* applies the lead wet weather TMDL to San Gabriel River Reach 2, its upstream reaches, and its tributaries. Therefore, Table 4-1 identifies a lead wet weather TMDL for Diamond Bar Creek. It should be noted that the U.S. Army Corps of Engineers (USACE) also has specific regulatory responsibilities associated with water quality, under the CWA, which are described in the following section.

3.1 Clean Water Act

The CWA, as amended by the Water Quality Act of 1987, is the federal legislation governing water quality, which was enacted "to restore and maintain the chemical, physical, and biological integrity of the nation's waters." Applicable sections of the CWA include:

Sections 303 and 304 – provide for water quality standards, criteria, guidelines, prioritize water bodies that are on the 303(d) List and develop plans with pollutant load limitations through TMDLs.

- Section 401 – requires an applicant for any project that proposes an activity that may result in a discharge to waters of the United States to obtain certification from the state that the discharge will comply with other provisions of the act;
- Section 402 – establishes the NPDES system, a permitting system for the discharge of any pollutant (except for dredge or fill material) into waters of the United States. This permitting program is administered by the California State Water Resources Control Board and its Regional Boards; and,
- Section 404 – establishes a permit program for the discharge of dredge or fill material into waters of the United States. This permit program is administered by the USACE.

Coordination with the respective agencies is ongoing to obtain the necessary permits for the project. The project will be required to obtain a Clean Water Act Section 401 and 404 Water Quality Certifications, and will also be required to comply with permit conditions during all phases of the project.

3.2 Porter-Cologne Water Quality Act

The Porter-Cologne Water Quality Act established a regulatory program to protect water quality and the beneficial uses of state waters. It empowers each RWQCB to formulate and adopt, for all areas within its jurisdiction, a Basin Plan that designates beneficial uses and establishes water quality objectives that in its judgment will ensure reasonable protection of beneficial uses. Each RWQCB establishes water quality objectives that will ensure the reasonable protection of beneficial uses and the prevention of nuisance. The California Water Code provides flexibility for some change in water quality, provided beneficial uses are not adversely affected. The discharge of stormwater runoff from the project is covered under Caltrans' NPDES permit (see Section 3.3.2). In addition, the project may require a waste discharge permit if groundwater is present during excavation.

3.3 State Water Resources Control Board and Regional Water Quality Control Board

The SWRCB administers water rights, water pollution control, and water quality functions throughout the state, while the RWQCBs conduct planning, permitting, and enforcement activities. The project area lies within the jurisdiction of the Los Angeles RWQCB (Region 4).

3.3.1 Beneficial Uses and Water Quality Objectives

The RWQCB is responsible for the protection of beneficial uses of water resources within its jurisdiction and uses planning, permitting, and enforcement authorities to meet this responsibility. Every water body within the jurisdiction of the RWQCB is designated a set of beneficial uses that are protected by appropriate water quality objectives. For smaller tributary streams in which beneficial uses are not specifically designated, they are designated with the same beneficial uses as the streams, lakes, or reservoirs to which they are tributary. Table 3-1 lists the water bodies that this project will drain to and their beneficial use designations.

Table 3-1: Water Body Beneficial Use Designations

Water Body Name	MUN	IND	PROC	AGR	GWR	NAV	REC-1	REC-2	COMM	WARM	COLD	EST	MAR	WILD	RARE	MIGR	SPWN	SHELL
Inland Surface Water Bodies Beneficial Use Designations																		
Diamond Bar Creek	✓				✓		✓	✓		✓				✓				
San Jose Creek	✓				✓		✓	✓		✓				✓				
San Gabriel River	✓	✓	✓	✓	✓		✓	✓		✓	✓			✓	✓		✓	
San Gabriel Estuary		✓				✓	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓
Groundwater Beneficial Use Designations																		
Main San Gabriel Basin – Eastern Area	✓	✓	✓	✓														

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The Basin Plan defines the beneficial use abbreviations as the following:

- **Municipal and Domestic Supply (MUN) –** Uses of water for community, military, or individual water supply systems including, but not limited to, drinking water supply.
- **Industrial Service Supply (IND) –** Uses of water for industrial activities that do not depend primarily on water quality including, but not limited to, mining, cooling water supply, hydraulic conveyance, gravel washing, fire protection, or oil well pressurization.
- **Industrial Process Supply (PROC) –** Uses of water for industrial activities that depend primarily on water quality.
- **Agricultural Supply (AGR) –** Uses of water for farming, horticulture, or ranching including, but not limited to, irrigation, stock watering, or support of vegetation for range grazing.
- **Groundwater Recharge (GWR) –** Uses of water for natural or artificial recharge of groundwater for purposes of future extraction, maintenance of water quality, or halting of saltwater intrusion into freshwater aquifers.
- **Navigation (NAV) –** Waters used for shipping, travel or other transportation by private, military, or commercial vessels.
- **Water Contact Recreation (REC-1) –** Uses of water for recreational activities involving body contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to, swimming, wading, water-skiing, skin and scuba diving, surfing, whitewater activities, fishing, or use of natural hot springs.
- **Non-Contact Water Recreation (REC-2) –** Uses of water for recreational activities involving proximity to water, but not normally involving body contact with water where ingestion of water is reasonably possible. These uses include, but are not limited to, picnicking, sunbathing, hiking, beachcombing, camping, boating, tide pool and marine life study, hunting, sightseeing, and aesthetic enjoyment in conjunction with the above activities.
- **Commercial and Sportfishing (COMM) –** Uses of water for commercial or recreational collection of fish, shellfish, or other organisms including, but not limited to, uses involving organisms intended for human consumption or bait purposes.
- **Warm Freshwater Habitat (WARM) –** Uses of water that support warm water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.
- **Cold Freshwater Habitat (COLD) –** Uses of water that support cold water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.
- **Estuarine Habitat (EST) –** Uses of water that support estuarine ecosystems, but not limited to, preservation or enhancement of estuarine habitats, vegetation, fish, and shellfish, or wildlife (e.g., estuarine mammals, waterfowl, shorebirds).
- **Marine Habitat (MAR) –** Uses of water that support marine ecosystems including, but are not limited to, preservation or enhancement of marine habitats, vegetation such as kelp, fish, shellfish, or wildlife (e.g., marine mammals, shorebirds).

- **Wildlife Habitat (WILD) –** Uses of water that support terrestrial ecosystems including, but not limited to, preservation and enhancement of terrestrial habitats, vegetation, wildlife (e.g., mammals, birds, reptiles, amphibians, invertebrates), or wildlife water and food sources.
- **Rare, Threatened or Endangered Species (RARE) –** Uses of water that support habitats necessary, at least in part, for the survival and successful maintenance of plant or animal species established under state or federal law as rare, threatened or endangered.
- **Migration of Aquatic Organisms (MIGR) –** Uses of water that support habitats necessary for migration, acclimatization between fresh and salt water, or other temporary activities by aquatic organisms, such as anadromous fish.
- **Spawning, Reproduction and/or Early Development (SPWN) –** Uses of water that support high quality aquatic habitats suitable for reproduction and early development of fish.
- **Shellfish Harvesting (SHELL) –** Uses of water that support habitats suitable for the collection of filter-feeding shellfish (e.g., clams, oysters, and mussels) for human consumption, commercial or sport purposes.

The narrative water quality objectives for surface water bodies and groundwater bodies in the Los Angeles RWQCB are included in the Appendix of this document. Numeric water quality objectives are further discussed in Section 4.2.

3.3.2 NPDES Program

The project is located within the NPDES permitted area owned by Caltrans (NPDES Order 99-06-DWQ) in Los Angeles County. Drainage from the project drains to the City of Industry, which is covered by the urban Municipal Separate Storm Sewer System (MS4) NPDES permit issued to the Los Angeles County Flood Control District, the County of Los Angeles, and 84 incorporated cities (collectively called “permittees”). Caltrans developed a Statewide Stormwater Management Plan (SWMP) to implement its program, which describes the responsibilities, procedures, and practices Caltrans uses to protect water quality by reducing or eliminating pollutants discharged from storm drainage systems they own or operate, including the selection and implementation of BMPs. The project will be designed and developed to meet the requirements of Caltrans’ SWMP and the *Stormwater Quality Handbook, Project Planning and Design Guide* (PPDG), July 2010.

3.3.3 Caltrans’ Stormwater Data Report

This project will be required to comply with Caltrans Stormwater Program’s requirements, and as a part of project delivery, a Stormwater Data Report (SWDR) will need to be prepared and submitted to Caltrans. Caltrans has a SWDR template and their *PPDG* to assist project designers with identifying BMP design guidelines and criteria. The SWDR outlines a process to select the recommended BMPs that will be incorporated into design plans for new development and redevelopment. A SWDR will be developed for this project that meets the requirements of the SWMP and *PPDG*. It will identify the targeted design constituent(s) from the project, based on the project category, typical pollutants from the project category, and cross-referencing the typical pollutants with the downstream water body impairments the project drains to. Treatment control BMPs will be selected, with high or medium removal efficiency for the pollutants of concern, and sized to treat the 85th percentile storm per the NPDES permit requirements. Non-structural source control BMPs will be identified as well.

3.3.4 Construction Activity Permitting

The project will result in a disturbance of soil that will require compliance with the NPDES General Permit, Waste Discharge Requirements for Discharges of Stormwater Runoff Associated with Construction Activities (Construction General Permit or CGP) (Order Number 2009-0009-DWQ, NPDES Number CAS000002). This Statewide CGP regulates discharges from construction sites that disturb one or more acres of soil. By law, all stormwater discharges associated with construction activity where clearing, grading, and excavation results in a soil disturbance of at least one acre of total land area must comply with the provisions of this NPDES Permit, and develop and implement an effective Stormwater Pollution Prevention Plan (SWPPP). The permit requires:

- Electronic submittal of the Permit Registration Documents (PRDs) to the SWRCB at least 30 days before the start of construction, which includes submittal of a Notice of Intent (NOI), risk assessment, site map, SWPPP, annual fee, and a signed certification statement;
- Preparation and implementation of a SWPPP; and,
- Electronic submittal of a Notice of Termination (NOT) to the SWRCB upon completion of construction and stabilization of the site.

Based on the project's location and what water body it drains to, a risk level will be assigned to the project and indicate what level of monitoring will be required. Based on the information currently available, this project will be a risk level 2 project, which will require technology-based numeric action levels (NALs) for pH and turbidity. A risk level 2 is considered medium risk due to the project being located in an area with highly erosive soils, but no sediment impairments.

The SWPPP and Erosion Prevention and Sediment Control (EPSC) plan developed for the project will meet the requirements of the Statewide CGP and local water quality requirements in effect during the construction phase of the project. The SWPPP and erosion control plans will show a list and location of temporary BMPs to prevent the discharge of pollutants from non-stormwater and stormwater runoff.

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4 Water Quality Assessment

Part of the environmental review for the project is to assess the affect of the project on water quality. This section reports the findings of this review and identifies the following:

- Receiving surface water bodies and their impairments;
- The water quality objectives to maintain the beneficial uses the water body has been designated for by the RWQCB;
- The applicable water quality standards of the surface receiving water; and
- The anticipated pollutants generated by the project.

4.1 Receiving Surface Water Bodies

The project will drain into Diamond Bar Creek, which confluences with San Jose Creek. San Jose Creek is tributary to the San Gabriel River. The San Gabriel River flows through the San Gabriel Estuary into San Pedro Bay through the Los Angeles/Long Beach Harbor, and into the Pacific Ocean. The inland water bodies are all engineered channels. Table 4-1 identifies the constituents that these water bodies are listed for on the 303(d) List, the constituents that TMDLs have been developed for, and the constituents being addressed by actions other than a TMDL. Diamond Bar Creek is not listed as an impaired water body or listed for TMDL development on the 2006 303(d) List. However, the Los Angeles RWQCB's *Amendment to the Water Quality Control Plan – Los Angeles Region to Incorporate the San Gabriel River and Impaired Tributaries Metals and Selenium TMDL* applies the lead wet weather TMDL to San Gabriel River Reach 2, its upstream reaches, and its tributaries. Therefore, Table 4-1 identifies a lead wet weather TMDL for Diamond Bar Creek.

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Table 4-1: Summary of Impaired Water Bodies[3]

Water Body Name	303 (d) List Constituents	TMDL Constituents
Diamond Bar Creek	-	Lead (Wet Weather TMDL)
San Jose Creek Reach 1 (SG Confluence to Temple St.)	Ammonia Coliform Bacteria Selenium Toxicity	Selenium (Dry Weather TMDL) Lead (Wet Weather TMDL)
San Gabriel River Reach 3 (Whittier Narrows to Ramona)	-	Lead (Wet Weather TMDL)
San Gabriel River Reach 2 (Firestone to Whittier Narrows Dam)	Coliform Bacteria Lead	Lead (Wet Weather TMDL)
San Gabriel River Reach 1 (Estuary to Firestone)	Coliform Bacteria pH	Copper (Dry Weather TMDL)
San Gabriel Estuary	Copper	Copper (Dry Weather TMDL)
San Pedro Near/Off Shore Zones	Chlordane Chromium (sediment) Copper (sediment) DDT (tissue and sediment) PAHs (Polycyclic Aromatic Hydrocarbons) (sediment) PCBs (Polychlorinated biphenyls) Sediment toxicity Zinc (sediment)	-

[3] Sources: California Department of Transportation, Division of Environmental Analysis, Stormwater Unit, and California State University, Sacramento, Office of Water Programs, Water Quality Planning Tool, referenced via the following website: http://www.water-programs.com/wqpt.htm
Los Angeles Regional Water Quality Control Board, *Amendment to the Water Quality Control Plan – Los Angeles Region to Incorporate the San Gabriel River and Impaired Tributaries Metals and Selenium TMDL*, adopted July 13, 2006, referenced via the following website: http://63.199.216.6/larwqcb_new/bpa/docs/2006-014/2006-014_RB_BPA.pdf

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4.2 Water Quality Objectives

The Porter-Cologne Water Quality Control Act defines water quality objectives as "...the limits or levels of water quality constituents or characteristics which are established for reasonable protection of beneficial uses of water or the prevention of nuisance within a specific area."

There are two forms of water quality objectives:

- **Narrative** objectives present a general description of water quality that must be attained through pollutant control measures and watershed management. They also serve as the basis for the development of detailed numerical objectives. Narrative objectives apply to all water bodies and they are listed in the Appendix.
- **Numerical** objectives typically describe pollutant concentrations, physical and chemical conditions of the water, and toxicity of the water to aquatic organisms. Places where numerical limits are specified represent the maximum levels that will allow the beneficial use to continue unimpaired. In other cases, an objective may prohibit the discharge of specific substances, tolerate natural or "background" levels of certain substances or characteristics (but not increases over those values), or may express a limit, in terms of not impacting other beneficial uses. An adverse effect or impact on a beneficial use occurs where there is an actual or threatened loss or impairment of that beneficial use. Numerical objectives are also listed in the Appendix.

Section 303(d) of the CWA and EPA water quality planning and management regulations, lists waters that do not meet, or are not expected to meet, water quality standards, even after technology-based or other required controls are in place. These water bodies are considered impaired and are reported by states in their 303(d) List. Diamond Bar Creek and its downstream water bodies are impaired (refer to Table 4-1). The Appendix has additional information on the water quality objectives for all constituents. Water quality objectives for selected constituents in inland surface waters and regional ground waters are identified in the Basin Plan and in Table 4-2, and Table 4-3 respectively.

Table 4-2: Water Quality Objectives for Selected Constituents in Inland Surface Waters[4]

Watershed/Stream Reach	Total Dissolved Solids (mg/L)	Sulfate (mg/L)	Chloride (mg/L)	Boron (mg/L)	Nitrogen (mg/L)
San Gabriel River Watershed/ Between Morris Dam and Ramona Blvd. (Reach 3)	450	100	100	0.5	8
San Gabriel River Watershed/ Between Ramona Blvd. and Firestone Blvd. (Reach 2)	750	300	150	1.0	8

[4] Regional Water Quality Control Board, Los Angeles Region, *Water Quality Control Plan, Los Angeles Region,* June 1994.

Table 4-3: Water Quality Objectives for Selected Constituents in Ground Waters

DWR Basin Number	Basin	Total Dissolved Solids (mg/L)	Sulfate (mg/L)	Chloride (mg/L)	Boron (mg/L)
4-13	San Gabriel Valley, Main San Gabriel Basin, Eastern area	600	100	100	0.5

4.3 Expected Pollutants

When the project is ultimately developed, the roadway and storm drain improvements will be built adjacent to the existing roadway. Targeted design constituents are defined in Caltrans' *PPDG* as pollutants that have been "identified during Departmental runoff characterization studies to be discharging with a load or concentration that commonly exceeds allowable standards and which is considered treatable by currently available Department-approved Treatment BMPs". The potential and anticipated pollutants from a roadway project such as this project may include the following:

- Particulate and dissolved metals
- Total suspended solids
- Litter
- Biochemical oxygen demand

Since the project drains to Diamond Bar Creek, which is impaired, the following targeted design constituents were identified for the project:

- Nitrogen
- Copper
- Lead
- Zinc
- General metals

4.3.1 Expected Pollutants during Construction

During construction, the total disturbed area from the proposed project is estimated to be 42.1 acres (38.9 acres within Caltrans right-of-way, and 3.2 acres outside of Caltrans right-of-way), and will include the following elements:

- Roadway configuration,
- Retaining walls,
- Drainage structures; and
- Permanent water quality treatment control BMPs.

The pollutants of concern during construction typically include:

- Sediment,
- Litter,

- Petroleum products,
- Concrete waste (dry and wet),
- Sanitary waste; and
- Chemicals.

Each of these pollutants on its own or in combination with other pollutants can have a detrimental effect on water quality. Under the CGP, the project is required to prepare a SWPPP and implement erosion and sediment control BMPs detailed in the SWPPP to be implemented during construction. If construction BMPs are properly designed, implemented, and maintained, as presented in the Mitigation Measures in Section 6, then no adverse water quality impacts would occur during construction of the proposed project.

During construction, groundwater may be encountered during excavation associated with the project. Groundwater and any other non-stormwater dewatering activities are subject to the requirements of the Dewatering Permit (Order Number R4-2008-0032). Compliance with this permit would avoid adverse impacts to water quality via dewatering.

4.3.2 Expected Pollutants after Construction

Because the project consists of new roadway and on-ramp areas, it would result in a permanent increase of impervious surfaces of 14.1 acres (12.9 acres within Caltrans right-of-way, and 1.2 acres outside of Caltrans right-of-way) and a permanent increase in runoff and pollutant loading. Operation of the project is subject to the requirements of Caltrans' Permit. As part of these requirements, the design of the project must:

- Consider approved structural treatment control and non-structural source control BMPs for the project site; and
- Construct structural treatment control BMPs where feasible.

Currently, stormwater runoff from within the project limits is untreated. As part of the proposed project, structural treatment control BMPs must be implemented to target the anticipated constituents (particulate and dissolved metals, total suspended solids, litter, and biochemical oxygen demanding substances) in stormwater, as well as non-stormwater sources, in runoff from the project area. Where feasible, structural treatment control and non-structural source control BMPs will be incorporated into the project. In addition, the structural treatment control and non-structural source control BMPs will be used to maximize pollutant treatment where feasible. With the implementation of these mitigation measures, operation of the project's facility will result in less than significant to no adverse impacts to water quality.

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5 Best Management Practices

5.1 Temporary BMPs during Construction

Caltrans' SWMP and NPDES permit require that all projects incorporate BMPs into their design to address pollutants of concern. This project will modify the SR-57/SR-60 interchange to promote the movement of traffic. During the construction of the project, the following BMPs will be considered for implementation:

- Temporary Sediment Control
  - Silt Fence
  - Sandbag Barrier
  - Straw Bale Barrier
  - Fiber Rolls
  - Gravel Bag Berm
  - Check Dam
  - Desilting Basin
  - Sediment Trap
  - Sediment/Desilting Basin
- Temporary Soil Stabilization
  - Hydraulic Mulch
  - Hydroseeding
  - Soil Binders
  - Straw Mulch
  - Geotextiles, Mats/Plastic Covers and Erosion Control Blankets
  - Wood Mulching
- Scheduling
- Preservation of Existing Vegetation
- Temporary Concentrated Flow Conveyance Controls
  - Earth Dikes/Drainage Swales & Lined Ditches
  - Outlet Protection/Velocity Dissipation Devices
  - Slope Drains
  - Streambank Stabilization
- Temporary Stream Crossing
- Clear Water Diversion
- Wind Erosion Control
- Paving Operations
- Sediment Tracking Control
  - Street Sweeping and Vacuuming
  - Stabilized Construction Roadway
  - Entrance/Outlet Tire Wash
- Waste Management
  - Spill Prevention and Control
  - Solid Waste Management
  - Hazardous Waste Management
  - Contaminated Soil Management
  - Concrete Waste Management
  - Sanitary/Septic Waste Management
  - Liquid Waste Management
- Materials Handling
  - Material Delivery, and Storage
  - Material Use
- Vehicle and Equipment Operations
  - Vehicle and Equipment Cleaning
  - Vehicle and Equipment Fueling
  - Vehicle and Equipment Maintenance
- Stockpile Management
- Water Conservation Practices
- Potable Water/Irrigation
- Dewatering Operations
- Illicit Connection/Illegal Discharge Detection and Reporting
- Storm Drain Inlet Protection
- Stabilized Construction Entrance/Exit

5.2 Post- Construction Permanent Treatment Control BMPs

In addition to temporary construction BMPs, the project will include permanent structural treatment control BMPs and non-structural source control BMPs to treat anticipated constituents. Table 5-1 summarizes the treatment control BMPs that will treat the anticipated constituents. The selection, design, and implementation of BMPs will be based on guidance in Caltrans' *PPDG*.

Design BMPs

- Consideration of Downstream Effects Related to Potentially Increased Flow
  - Peak Flow Attenuation Basins
- Preservation of Existing Vegetation
- Concentrated Flow Conveyance Systems
  - Ditches, Berms, Dikes and Swales
  - Overside Drains
  - Flared Culvert End Sections
  - Outlet Protection/Velocity Dissipation Devices
- Slope/Surface Protection Systems
  - Vegetated Surfaces
  - Hard Surfaces

Treatment Control BMPs

- Biofiltration Systems
- Infiltration Devices
- Detention Devices
- Dry Weather Flow Diversions
- Traction Sand Traps
- Gross Solids Removal Devices (GSRDS)
- Media Filters
- Multi-Chamber Treatment Train
- Wet Basins

The approved treatment control BMPs available to treat pollutants of concern that will be considered for this project are summarized in Table 5-1.

Table 5-1: Treatment Control BMP Selection Matrix

Pollutant	Treatment Control BMP Categories								
	Biofiltration Systems	**Infiltration Devices**	**Detention Devices**	**Dry Weather Flow Diversions[A]**	**Gross Solids Removal Devices**	**Multi-Chamber Treatment Train**	**Media Filters**	**Wet Basins**	**Traction Sand Traps**
Total Suspended Solids	✓	✓	✓	✓		✓	✓	✓	✓
Total Dissolved Solids				✓					
Nutrients	✓[D]	✓	✓[D]	✓			✓[B]	✓[C]	
Pesticides		✓		✓					
Particulate Metals	✓	✓	✓	✓		✓	✓	✓	
Dissolved Metals	✓	✓		✓		✓	✓		
Pathogens		✓		✓				✓	
Litter		✓	✓	✓	✓	✓	✓	✓	
Biochemical Oxygen Demand		✓		✓				✓	
Turbidity	✓	✓	✓	✓		✓	✓	✓	✓

(A) Dry Weather Flow Diversions address non-stormwater flows only.
(B) Phosphorous and Nitrogen for the Austin Sand Filter; Phosphorus only for the Delaware Sand Filter.
(C) Reductions observed for dry weather flow only.
(D) Soil needs to have adequate infiltration capacity.

Source:
California Department of Transportation, *Stormwater Quality Handbook, Project Planning and Design Guide* (CTSW-RT-10-254.03), Table 2-2, Pollutants of Concern from Typical Highway Runoff and Applicable Treatment BMPs, July 2010.

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Treatment control BMPs will be designed per the guidance in the Caltrans *PPDG*. The technologies to address the anticipated constituents for the project (particulate and dissolved metals, total suspended solids, litter, and biochemical oxygen demanding substances) will be considered in the following order:

- Infiltration devices;
- Biofiltration Strips;
- Wet Basin;
- Biofiltration Swale;
- Austin Sand Filter;
- Detention Device;
- Delaware Filter; and
- Multi-Chamber Treatment Trains.

As the project progresses through the design phase, the above list of treatment control BMPs will be evaluated per the *PPDG* process. Treatment control BMPs will be proposed based on their technical feasibility, the site conditions, and geotechnical conditions.

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6 Mitigation Measures

This assessment of the State Route 57/State Route 60 Confluence at Grand Avenue Interchange Project analyzed the impact of the project on adjacent water resources and their beneficial uses. To avoid contributing to existing impairments and protecting beneficial uses, potential impacts and mitigation measures were identified. Table 6-1 summarizes the potential impacts from the project and the appropriate mitigation measure to address each impact. Compliance with the requirements of the CWA, the Los Angeles RWQCB, the Caltrans SWMP, and appropriate non-structural and structural treatment control BMPs to address potential short- (during construction) and long-term (post construction/maintenance) impacts as listed in Table 6-1 is required.

Table 6-1: Summary of Potential Impacts and Mitigation Measures

Potential Impact	Mitigation Measure
Exceed water quality standards or waste discharge requirements, including those specified in Order Number 99-06-DWQ	Conduct all work related to the project per the requirements of the CWA and NPDES permit requirements
Potential for discharge of stormwater to affect the beneficial uses of the receiving waters	Analyze project's anticipated pollutants and identify BMPs to prevent pollutants from impacting downstream waterbodies; include analysis results in the project's SWDR
Potentially impact stormwater runoff from construction activities and violation of waste discharge requirements specified in Order Number 2009-0009-DWQ	Develop and implement a SWPPP and Erosion Control Plans. Implement temporary erosion and sediment control BMPs during the construction of the project. Implement requirements of the Statewide Construction General Permit (including anticipated new requirements). Temporary BMPs such as desilting basins, erosion control blankets, and other minimum construction BMPs will be implemented consistent with the SWPPP and the Erosion Control Plans.
Potential impact to Diamond Bar Creek during construction of the extension to the existing storm drain system and a new outfall	Apply for, obtain, and comply with the Clean Water Act Section 401 Water Quality Certification. During the application process for the 401 Certification, the mitigation measures for the impacts to Diamond Bar Creek will be defined by the applicant and approved by the Los Angeles RWQCB.

Potential Impact	Mitigation Measure
Potentially impact stormwater runoff from post-construction activities	Develop and implement the measures noted in the SWDR. Implement treatment control BMP devices such as detention devices, vegetated treatment, and other Caltrans-approved devices per the SWDR. Treatment control BMPs will capture and treat stormwater runoff from the project and treat the targeted design constituents (pollutants) anticipated to the maximum extent practicable.

7 References

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California Regional Water Quality Control Board, Los Angeles Region, *Waste Discharge Requirements for Discharges of Groundwater from Construction and Project Dewatering to Surface Waters in Coastal Watersheds of Los Angeles and Ventura Counties*, Order Number R4-2003-0111, General NPDES Permit Number CAG994004, August 7, 2003

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State Water Resources Control Board, *National Pollutant Discharge Elimination System (NPDES) Permit, Statewide Storm Water Permit and Waste Discharge Requirements (WDRs) for the State of California, Department of Transportation (Caltrans)*, Order Number 99-06-DWQ, NPDES Number CAS000003, July 15, 1999

State Water Resources Control Board, *National Pollutant Discharge Elimination System (NPDES) General Permit, Waste Discharge Requirements for Discharges of Stormwater Runoff Associated with Construction Activities*, Order Number 2009-0009-DWQ, NPDES Number CAS000002, September 2, 2009

Regional Water Quality Control Board, Los Angeles Region, *Amendment to the Water Quality Control Plan – Los Angeles Region to incorporate the San Gabriel and Impaired Tributaries Metals and Selenium TMDL*, adopted on July 13, 2006, cited at http://63.199.216.6/larwqcb_new/bpa/docs/2006-014/2006-014_RB_BPA.pdf

United States Environmental Protection Agency, Rainfall Erosivity Factor Calculator, cited at http://cfpub.epa.gov/npdes/stormwater/LEW/lewCalculator.cfm , on August 3, 2011.

Appendix: Detailed Location Maps and Water Quality Objectives

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Exhibit 4: Alternative 2 Detailed Location Map

Exhibit 4: Alternative 2 Detailed Location Map

Exhibit 5: Detailed Location Map – Alternative 3

Exhibit 5: Detailed Location Map – Alternative 3

Water Quality Objectives[5]

Inland Surface Water Quality Objectives

Ammonia – The neutral, un-ionized ammonia (NH_3, or UIA) is highly toxic to fish and other aquatic life. In order to protect aquatic life, ammonia concentrations in receiving waters shall not exceed the values listed in Tables 3-1 to 3-4 (of the Basin Plan).

Bacteria, Coliform – Fecal bacteria are used to indicate the likelihood of pathogenic bacteria in surface waters. Water quality objectives for total and fecal coliform vary with the beneficial uses of the waterbody and are described below:

In waters designated for water contact recreation (REC-1), the 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 total samples during any 30-day period exceed 400/100 mL.

In waters designated for non-water contact recreation (REC-2) and not designated for water contact recreation (REC-1), the fecal coliform concentration shall not exceed a log mean of 2000/100 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 4000/100 mL.

In all waters where shellfish can be harvested for human consumption (SHELL), the median total coliform concentration throughout the water column for any 30-day period shall not exceed 70/100 mL, nor shall more than ten percent of the samples collected during any 30-day period exceed 230/100 mL for a five-tube decimal dilution test or 330/100 mL when a three-tube decimal dilution test is used.

Biochemical Oxygen Demand (BOD_5) – The five-day BOD test indirectly measures the amount of readily degradable organic material in water by measuring the residual dissolved oxygen after a period of incubation (usually 5 days at 20 degrees C), and is primarily used as an indicator of the efficiency of wastewater treatment processes.

Waters shall be free of substances that result in increases in the BOD which adversely affects beneficial uses.

Color – Color in water can result from natural conditions (e.g., from plant material or minerals) or can be introduced from commercial or industrial sources. Color is primarily an aesthetic consideration, although extremely dark colored water can limit light penetration and cause additional water quality problems. Furthermore, color can impact domestic and industrial uses by discoloring clothing or foods. The secondary drinking water standard is 15 color units.

Nitrogen (Nitrate, Nitrite) – High nitrate levels in drinking water can cause health problems in humans. Infants are particularly sensitive and can develop methemoglobinemia (blue-baby syndrome). Excess nitrogen in surface waters also leads to excess aquatic growth and can

[5] Regional Water Quality Control Board, Los Angeles Region, *Water Quality Control Plan, Los Angeles Region,* June 1994.

contribute to elevated levels of NO_3 in ground water as well. The primary drinking water standard for nitrate (as NO_3) is 45 mg/L.

Waters shall not exceed 10 mg/L nitrogen as nitrate-nitrogen plus nitrite-nitrogen (NO_3-N+NO_2-N), 45 mg/L as nitrate (NO_3), 10 mg/L as nitrate-nitrogen (NO_3-N), or 1 mg/L as nitrite-nitrogen (NO_2-N) or as otherwise designated in Table 3-8 (of the Basin Plan).

Oil and Grease – Oil and grease are not readily soluble in water and form a film on the water surface. Oily films can coat birds and aquatic organisms, impacting respiration and thermal regulation, and causing death. Oil and grease can also cause nuisance conditions (odors and taste), are aesthetically unpleasant, and can restrict a wide variety of beneficial uses.

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 that otherwise adversely affect beneficial uses.

Oxygen, Dissolved (DO) – Adequate dissolved oxygen levels are required to support aquatic life. Depression of dissolved oxygen can lead to anaerobic conditions resulting in odors or, in extreme cases, in fish kills. Dissolved oxygen requirements are dependent on the beneficial uses of the waterbody.

At a minimum, the mean annual dissolved oxygen concentration of all waters shall be greater than 7 mg/L, and no single determination shall be less than 5.0 mg/L, except when natural conditions cause lesser concentrations.

The dissolved oxygen content of all surface waters designated as WARM shall not be depressed below 5 mg/L as a result of waste discharges.

The dissolved oxygen content of all surface waters designated as COLD shall not be depressed below 6 mg/L as a result of waste discharges.

The dissolved oxygen content of all surface waters designated as both COLD and SPWN shall not be depressed below 7 mg/L as a result of waste discharges.

For that area known as the Outer Harbor area of Los Angeles-Long Beach Harbors, the mean annual dissolved oxygen concentrations shall be 6.0 mg/L or greater, provided that no single determination shall be less than 5.0 mg/L.

pH – The hydrogen ion activity of water (pH) is measured on a logarithmic scale, ranging from 0 to 14. While the pH of “pure” water at 25 degrees Celsius is 7.0, the pH of natural waters is usually slightly basic due to the solubility of carbon dioxide from the atmosphere. Minor changes from natural conditions can harm aquatic life.

The pH of inland surface waters 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 units from natural conditions as a result of waste discharge.

The pH of bays or estuaries 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 0.2 units from natural conditions as a result of waste discharge.

Polychlorinated Biphenyls (PCBs) – Polychlorinated biphenyls (PCBs) are a highly toxic and persistent group of organic chemicals that have been historically released into the environment. Many historic discharges still exist as sources in the environment.

Solid, Suspended, or Settleable Materials – Surface waters carry various amounts of suspended and settleable materials from both natural and human sources. Suspended sediments limit the passage of sunlight into waters, which in turn inhibits the growth of aquatic plants. Excessive deposition of sediments can destroy spawning habitat, blanket benthic (bottom dwelling) organisms, and abrade the gills of larval fish.

Waters shall not contain suspended or settleable material in concentrations that cause nuisance or adversely affect beneficial uses.

Temperature – Discharges of wastewaters can cause unnatural and/or rapid changes in the temperature of receiving waters which can adversely affect aquatic life.

The natural receiving water temperature of all regional waters shall not be altered unless it can be demonstrated to the satisfaction of the Regional Board that such alteration in temperature does not adversely affect beneficial uses. Alterations that are allowed must meet the requirements below.

For waters designated WARM, water temperature shall not be altered by more than five degrees Fahrenheit above the natural temperature. At no time shall these WARM-designated waters be raised above 80 degrees Fahrenheit as a result of waste discharges.

For waters designated COLD, water temperature shall not be altered by more than five degrees Fahrenheit above the natural temperature.

Toxicity – Toxicity is the adverse response of organisms to chemical or physical agents. When the adverse response is mortality, the result is termed acute toxicity. When the adverse response is not mortality but instead reduced growth in larval organisms or reduced reproduction in adult organisms (or other appropriate measurements), a critical life stage effect (chronic toxicity) has occurred. The use of aquatic bioassays (toxicity tests) is widely accepted as a valid approach to evaluating toxicity of waste and receiving waters.

All waters shall be maintained free of toxic substances in concentrations that are toxic to, or that produce detrimental physiological responses in human, plan, animal, or aquatic life. Compliance with this objective will be determined by use of indicator organisms, analyses of species diversity, population density, growth anomalies, bioassays of appropriate duration or other appropriate methods as specified by the state or regional board.

The survival of aquatic life in surface waters, subjected to a waste discharge or other controllable water quality factors, shall not be less than that for the same waterbody in areas unaffected by the waste discharge or, when necessary, other control water.

There shall be no acute toxicity in ambient waters, including mixing zones. The acute toxicity objective for discharges dictates that the average survival in undiluted effluent for any three consecutive 96-hour static or continuous flow bioassay tests shall be at least 90%, with no single test having less than 70% survival when using an established USEPA, state board, or other protocol authorized by the regional board.

There shall be no chronic toxicity in ambient waters outside mixing zones. To determine compliance with this objective, critical life stage tests for at least three species with approved testing protocols shall be used to screen for the most sensitive species. The test species used for screening shall then be used for routine monitoring. Typical endpoints for chronic toxicity tests include hatchability, gross morphological abnormalities, survival, growth, and reproduction.

Effluent limits for specific toxicants can be established by the regional board to control toxicity identified under Toxicity Identification Evaluations (TIEs).

Turbidity – Turbidity is an expression of the optical property that causes light to be scattered in water due to particulate matter such as clay, silt, organic matter, and microscopic organisms. Turbidity can result in a variety of water quality impairments. The secondary drinking water standard for turbidity is 5 NTU (nephelometric turbidity units).

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%.

Allowable zones of dilution within which higher concentrations may be tolerated may be defined for each discharge in specific Waste Discharge Requirements.

Groundwater Quality Objectives

The following objectives apply to all ground waters of the region:

Bacteria – Total and fecal coliform bacteria are used to indicate the likelihood of pathogenic bacteria in waters.

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.

Nitrogen (Nitrate, Nitrite) – High nitrate levels in drinking water can cause health problems in humans. Infants are particularly sensitive and can develop methemoglobinemia (blue baby syndrome). The primary drinking water standard for nitrate (as NO_3) is 45 mg/L or 10 mg/L.

Human activities and land use practices can also influence nitrogen concentration in ground waters. For example, effluents from wastewater treatment plants, septic tanks, and confined animal facilities can add high levels of nitrogen compounds to the ground water that they recharge. Irrigation water containing fertilizers can add high levels of nitrogen to ground water.

Ground waters shall not exceed 10 mg/L nitrogen as nitrate-nitrogen plus nitrite-nitrogen (NO_3-N + NO_2-N), 45 mg/L as nitrate (NO_3), 10 mg/L as nitrate-nitrogen (NO_3-N), or 1 mg/L as nitrite-nitrogen (NO_2-N).